Vacuum Controller
Hei-VAC Control

Instructions for use

Original instructions
Original instructions
Keep for future use!

This manual is only to be used and distributed in its complete and original form. It is strictly the users’ responsibility to check carefully the validity of this manual with respect to his product.

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Thank you for purchasing this product. You have chosen a modern and technically high quality product.
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Detailed descriptions about programming, function menu with address assignment, differential pressure measurement, and interface commands are included in the Online Instructions for use. You get the Online Instructions for use from the technical service of Heidolph Instruments.
First steps (delivery status)

First steps on delivery status
Select language and units
1 Introduction

This manual is part of your product. It provides important instructions for safe use of the product. Read this manual completely in order to understand proper use of your product.

1.1 User information

Safety

- Read this manual thoroughly and completely before using the product.
- Keep this manual in an easily accessible location.
- Proper use of the product is essential for safe operation. Comply with all safety instructions provided!
- In addition to this manual, adhere to any relevant local accident prevention regulations and comply with industrial safety regulations.

General

- To make the text more readable in this manual, mostly the term Controller is used instead of Hei-VAC Control.
- When giving the product to a third party also hand out these instructions for use.
- The illustrations in this manual are provided as examples. They are intended to aid in your understanding of the proper use of the product.
- We reserve the right to modify or change the product design and/or technical specifications at any time without advanced notice.

Copyright

The content of these instructions for use is protected by copyright. Only copies for internal use are allowed, e. g., for professional training.

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Contact

- Contact us regarding any questions about this product, if you need further information, or to provide us with feedback.
- When contacting our Customer Service Department, please be sure to have the correct type and serial number of your product → see Rating plate

1.2 About this document

1.2.1 Display conventions

Warning levels

[DANGER]
Indicates an imminent hazardous situation.
Disregarding the situation will result in serious and even fatal injury or death.
⇒ Take appropriate action to avoid dangerous situation!

[WARNING]
Indicates a potentially hazardous situation.
Disregarding the situation could result in serious, even fatal injury or massive damage to property.
⇒ Observe instruction to avoid dangerous situation!

[CAUTION]
Indicates a potentially hazardous situation.
Disregarding the situation could result in slight or minor injury or damage to property.
⇒ Observe instruction to avoid dangerous situation!
**NOTICE**

Notice for a potentially harmful situation. Disregarding the notice could lead to material damage.

### Additional notes

**IMPORTANT!**

- Information or specific use recommendation, which must be observed.
- Important information for the proper operation.

- Helpful tips and tricks
- Additional information

### 1.2.2 Symbols and icons

This manual includes symbols and icons. Safety symbols indicate special danger in handling the product. Icons shall help to identify the danger directly and easier.

#### Safety symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Acute toxicity - hazards to human health" /></td>
<td>Acute toxicity – hazards to human health</td>
</tr>
<tr>
<td><img src="image" alt="General warning symbol" /></td>
<td>General warning symbol</td>
</tr>
<tr>
<td><img src="image" alt="Danger: electricity" /></td>
<td>Danger: electricity</td>
</tr>
<tr>
<td><img src="image" alt="Hot surface" /></td>
<td>Hot surface</td>
</tr>
<tr>
<td><img src="image" alt="Explosive material" /></td>
<td>Explosive material</td>
</tr>
<tr>
<td><img src="image" alt="General prohibition symbol" /></td>
<td>General prohibition symbol</td>
</tr>
<tr>
<td><img src="image" alt="General mandatory sign" /></td>
<td>Disconnect mains plug from outlet</td>
</tr>
</tbody>
</table>
# Additional icons

<table>
<thead>
<tr>
<th>References</th>
<th>Handling or action</th>
<th>Signals</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>Positive example – Do! result – o. k.</td>
<td>Flashing cycle – flashing icon indicating malfunction</td>
</tr>
<tr>
<td>✗</td>
<td>Negative example – Do not!</td>
<td>Sound – signal or warning sound</td>
</tr>
<tr>
<td><img src="image" alt="Reference to content of this manual." /></td>
<td><img src="image" alt="Refers to content of this manual." /></td>
<td><img src="image" alt="Refers to content of other documents." /></td>
</tr>
<tr>
<td><img src="image" alt="Press selection knob or key." /></td>
<td><img src="image" alt="Turn selection knob" /></td>
<td><img src="image" alt="Push and turn selection knob" /></td>
</tr>
<tr>
<td><img src="image" alt="Push and hold key" /></td>
<td><img src="image" alt="Press selection knob or key." /></td>
<td><img src="image" alt="Push and turn selection knob" /></td>
</tr>
</tbody>
</table>

For further detailed information about icons and signals in the display see chapter 5.2.2 Display icons on page 32.

## 1.2.3 Handling instructions (action steps)

**Action step** (single step)

⇒ Do the described step.

✓ Result of action.

**Handling instructions** (multiple steps)

1. first step
2. next step

✓ Result of action.

Follow steps in the described order.
1.2.4 Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>abs.</td>
<td>absolute</td>
</tr>
<tr>
<td>ATM</td>
<td>Standard Atmospheric Pressure</td>
</tr>
<tr>
<td>Hei-VAC</td>
<td>Vacuum controller, Controller</td>
</tr>
<tr>
<td>Control</td>
<td></td>
</tr>
<tr>
<td>d_i</td>
<td>Interior diameter</td>
</tr>
<tr>
<td>DN</td>
<td>Nominal diameter</td>
</tr>
<tr>
<td>EK</td>
<td>Emission condenser</td>
</tr>
<tr>
<td>EX*</td>
<td>Outlet</td>
</tr>
<tr>
<td>FKM</td>
<td>Fluorelastomer</td>
</tr>
<tr>
<td>Gr.</td>
<td>Size</td>
</tr>
<tr>
<td>hh:mm:ss</td>
<td>Time settings in hour/minute/second</td>
</tr>
<tr>
<td>hPa</td>
<td>Pressure unit, hectopascal (1 hPa = 1 mbar = 0.75 Torr)</td>
</tr>
<tr>
<td>IN*</td>
<td>Inlet</td>
</tr>
<tr>
<td>KF</td>
<td>Small flange</td>
</tr>
<tr>
<td>Max</td>
<td>Maximum value</td>
</tr>
<tr>
<td>mbar</td>
<td>Pressure unit, millibar (1 mbar = 1 hPa = 0.75 Torr)</td>
</tr>
<tr>
<td>Min</td>
<td>Minimum value</td>
</tr>
<tr>
<td>min</td>
<td>Minute</td>
</tr>
<tr>
<td>PA</td>
<td>Polyamide</td>
</tr>
<tr>
<td>PBT</td>
<td>Polybutylene terephthalate</td>
</tr>
<tr>
<td>PE</td>
<td>Polyethylene</td>
</tr>
<tr>
<td>respon.</td>
<td>responsible, supervising Specialist</td>
</tr>
<tr>
<td>RAN-N°</td>
<td>Return Merchandise Authorization number</td>
</tr>
<tr>
<td>SW</td>
<td>Wrench size (tool)</td>
</tr>
<tr>
<td>Torr</td>
<td>Pressure unit (1 Torr = 1.33 mbar = 1.33 hPa)</td>
</tr>
<tr>
<td>VAC</td>
<td>Vacuum</td>
</tr>
<tr>
<td>VMS</td>
<td>Vakuum Management System</td>
</tr>
</tbody>
</table>

* labeling on top of the vacuum pump
2 Safety instructions

All safety instructions must be observed by all individuals working with the product described here. The safety instructions are valid for the complete life cycle of the product.

2.1 Working conditions

Use the product only when it is in proper working condition.

2.1.1 Intended use

The **Hei-VAC Control** is a laboratory instrument, used to measure and/or control vacuum in therefore intended plants.

The controller may only be used in non-explosive areas and indoors.

Any other use is considered to be improper use. In that case, the safety and the protection of the system may be compromised.

**Intended use also includes the following:**

- observing safety information of document "**Safety Information for Vacuum Equipment**".
- observing this manual.
- observing the manual of connected elements and to know their functioning.

2.1.2 Improper use

Using the product in contrary to its intended use could result in injury or damage to property.

**Improper use includes:**

- Using the product contrary to its intended use.
- Operation with obvious malfunctions.
Safety instructions

Improper use

- Controlling explosive atmosphere. The device is not protected against explosion. There is no explosion or ATEX protection available.
- Operation in impermissible operating and environmental conditions.
- Unauthorized modifications and the use of accessories and spare parts that are not recommended by the manufacturer.
- Use in mining.

2.1.3 Foreseeable misuse

Additionally to improper use there are types of use and dealing with the product, which are generally prohibited:

- Unauthorized modifications.
- The control of media which is liquid, hot, instable, or explosive.
- Installation and operation in explosive environments.
- To switch on/-off by foot or with unsuitable tool.
- To operate the controller with sharp stylus or objects.
- To put the controller completely into vacuum.
- To immerse the controller into liquid or to blast it with steam.
2.2  Target groups

**IMPORTANT!** Ensure that the controller is only operated by authorized and skilled personnel.

Users need to have the corresponding skills and qualifications for doing the job listed in the table *User permissions*.

2.2.1 User permissions

This manual must be read, understood and complied with by the person performing one of the following tasks:

<table>
<thead>
<tr>
<th>Task (Job)</th>
<th>User</th>
<th>Specialist</th>
<th>Supervising Specialist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation and assembly</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Commissioning</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Readjust vacuum sensor</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Error report</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Troubleshooting</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Update</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Cleaning, simple</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Clean vacuum sensor</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Decontamination</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Repair order</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

* or order the decontamination by a qualified service provider.

2.2.2 Personal responsibility

**Safe work** Personal safety has top priority. Processes which create a potentially hazardous situation are not allowed.

Always be conscious of safety, and work in a safe manner. Observe the owners’ directives at work, the national accident prevention regulations and occupational safety provisions.

⇒ Use the controller only if you have understood its function and this manual.
2.3 Safety precautions

Our products are subject to high quality tests with goals for safety and operation. Prior to delivery each product has been tested thoroughly.

2.3.1 Protective clothing

No special protective clothing is required when working with the controller. Observe the owners regulation for workplaces. Only for cleaning the controller we recommend to wear protective gloves, protective clothing and safety goggles.

IMPORTANT!

⇒ Be sure to observe the local requirements for decontamination.
⇒ Wear your personal protective equipment when handling chemical materials.

2.3.2 Eliminate sources of danger

DANGER
Explosion hazard for critical processes. Depending on the process explosive mixtures can develop.
⇒ Never operate critical processes unattended!

Explosion danger for critical processes

Depending on the running process, explosive mixtures can form in plants or other hazardous situations could result!

IMPORTANT!

Malfunctions which may affect safety must be eliminated immediately.
⇒ Do not work with damaged components.
⇒ Replace defective parts immediately, e. g., broken cable or faulty plug-connection.
## Sources of error during connection

<table>
<thead>
<tr>
<th>NOTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measuring error due to an obstructed vacuum line.</strong></td>
</tr>
<tr>
<td>✍️ Prevent overpressure $&gt; 1060 \text{ mbar} \ (&gt; 795 \text{ Torr})$ in the piping system.</td>
</tr>
</tbody>
</table>

### Condensate

Condensate can falsify the measurement. Position the vacuum hose in such a way that condensate cannot flow towards the controller and its vacuum sensor. No liquid should accumulate inside the vacuum hose.

- ✍️ Install vacuum hoses in such a way that condensate cannot flow into the controller.

### Particles, liquids, dust

Particles, liquids or dust may not enter the controller.

- ✍️ Install a separator or filter at the intake of the system. Appropriate filters are for example chemically resistant, and resistant to clogging.

### Risks due to residual energy

After switching off the controller and disconnecting it from mains, risk of residual energy could still prevail at the power supply adapter.

- ✍️ Repairs may only be performed by qualified personnel, e. g., service technician.
**Installation and explosive environment**

Installation and operation in areas where explosive atmospheres can occur is not allowed.

Avoid ignition sources

The use of gas ballast or the operation of venting valves is only permitted if thereby explosive atmospheres normally do not occur in the interior of the equipment or, if they do occur, are likely to do so only infrequently and for a short period.

⇒ If necessary vent with inert gas.
2.4 Safety and service

Safety regulations that apply to your work environment also apply to persons who perform service works, especially in the handling of hazardous materials.

2.4.1 Meaning Health and Safety Clearance

Products which are potentially hazardous may only be returned when all dangerous contaminations are removed.

- Observe the requirements for services.
- Observe the *Notes on return to the factory* listed on the form Health and Safety Clearance.
- Protect the service personnel from hazardous substances.
- Confirm harmlessness with your signature.

You get the form *Health and Safety Clearance* from Heidolph Instruments.

2.4.2 Requirements for services

Fulfill the following conditions

1. Clean your product thoroughly and if necessary decontaminate it professionally.

- For all service works hazardous substances need to be excluded.

2. Fill in the form *Health and Safety Clearance* thoroughly and completely.

3. Contact your local supplier or our service department.

4. Request a RAN-N° for your service order.
5. Before returning the product, please send the signed *Health and Safety Clearance* form to your local supplier or our service department.

**IMPORTANT!**

For all service works the safety clearance needs to be proofed and confirmed.

⇒ Did your product get in touch with hazardous substances?
   Please wait for the release of reshipment.

6. Send in your product including:
   - RAN-N°,
   - Service order (e. g., repair),
   - Form *Health and Safety Clearance*,
   - Short description (e. g., malfunction, working environment, media).

### 2.5 Environmental protection

**NOTICE**

Risk of environmental damage due to incorrect disposal of the controller.

⇒ Do not dispose your product in household waste!
   Electronic components are subject to hazardous waste treatment and must only be disposed of by certified specialists.

⇒ Observe the national regulations for safe disposal and environmental protection.

⇒ Receive detailed information about respective regulations from your competent administrative authority.
3 Product description

Goods arrival

Check the shipment for transport damage and completeness.
⇒ Report any transit damage immediately to the supplier.

NOTICE

Condensate can damage the controller.
A large temperature difference between storage location and installation location can cause condensation.
⇒ Let the product acclimatize for 3–4 hours.

Included materials

<table>
<thead>
<tr>
<th>Component</th>
<th>Quantity</th>
<th>Order number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller Hei-VAC Control</td>
<td>1</td>
<td>11-001-591-28</td>
</tr>
<tr>
<td>Power supply unit 30W 24V; including interchangeable mains plugs</td>
<td>1</td>
<td>11-300-008-12</td>
</tr>
<tr>
<td>Vacuum valve preassembled</td>
<td>1</td>
<td>569-00080-00</td>
</tr>
<tr>
<td>Plastic foot CVC 3000</td>
<td>1</td>
<td>11-300-008-11</td>
</tr>
<tr>
<td>Operating manual german</td>
<td>1</td>
<td>01-005-005-87</td>
</tr>
<tr>
<td>Operating manual english</td>
<td>1</td>
<td>01-005-005-95</td>
</tr>
<tr>
<td>Warranty registration / confirmation of condition</td>
<td>1</td>
<td>01-006-002-78</td>
</tr>
<tr>
<td>EU Declaration of conformity</td>
<td>1</td>
<td>01-001-025-18</td>
</tr>
</tbody>
</table>

3.1 Vacuum controller Hei-VAC Control

The controller is designed for applications requiring controlled vacuum.

The controller has a two-point control mode to switch an in-line isolation valve.

The controller is freely programmable. Up to 10 programs can be stored in the controller memory. Each program also offers up to 10 program steps (time/pressure) plus control functions, such as: venting, pump down and ramp function.

The controller enables the measurement of relative pressure with regard to a reference sensor (VSK 3000).
### Front side

**Front panel**

1. Chemically resistant plastic housing
2. LC display
3. Control panel
4. Selection knob

### Rear side

**Rear side**

5. Ports for Heidolph vacuum valve
6. Mains connection
   - Power supply unit
7. Serial port RS 232 C (Sub-D)
8. Hose nozzle, vacuum connection
9. Venting tube, connection for external venting, e.g., inert gas
10. Rating plate
11. Spring clip as fixation for built-in version
    or
    Plastic foot for table top version
3.2 Functionality

The controller manages vacuum processes by controlling vacuum pumps, in-line isolation- and/or air admittance valves. It controls process vacuum, cooling water and venting to demand.

Valves and/or vacuum pumps are necessary to operate the controller. **Without those components the controller can only be used as vacuum measurement device.**

3.3 Operation modes

Up to 5 different operation modes are selectable at the controller. Specific modifications can be realized by individual mode menus.

Selectable operation modes

- Pump down
- Vac control
- Program

For more information about individual operation modes → see chapter 6.3.2 Mode menu on page 41

---

1 -> excluded for package fine vacuum control with VSP 3000.
4 Installation and connection

The controller is designed for installation directly at the workplace.

⇒ Observe all specifications for installation, connection and operation according to technical data, → see chapter 10.1.1 Technical data.

⇒ Also observe rating plate data.

Installation conditions

- The controller has acclimatized.
- Ambient conditions are observed and are within the limitation of use.

<table>
<thead>
<tr>
<th>Limitation of use</th>
<th>(US)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>10–40 °C</td>
</tr>
<tr>
<td>Altitude, max.</td>
<td>3000 m above sea level</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>30–85 %, non condensing</td>
</tr>
<tr>
<td>Degree of protection (controller front)</td>
<td>IP 20 (IP 42)</td>
</tr>
</tbody>
</table>

Avoid condensation or contamination by dust, liquids or corrosive gases.

4.1 Installation

4.1.1 Table top version

The table top or bench-top type controller can be installed and connected directly on top of the work bench or on laboratory table. The table top version is supplied with a hose nozzle. The hose nozzle should be positioned in a way that the connected vacuum hose cannot kink.
4.1.2 Attachment to Hei-VAP Rotary Evaporator

The Hei-VAC Control can be attached to Hei-VAP Rotary Evaporator directly.

1. Screw the preassembled metal plate that carries the vacuum valve to the back of the evaporator with two screws.

2. Attach the support rod to the evaporator and attach the controller to the top end of the support rod, so that the support rod locks into the gap on the back of the controller.

3. Connect the power supply to the controller. → see chapter 4.2.1.

4. Connect the cable of the vacuum valve to the controller.

5. Attach the hoses:
   - From the upper connector of the vacuum valve to the top of the condensate cooler (5a).
   - From the lower connector of the vacuum valve to the vacuum source (5b).
   - From the connector for measuring and venting of the controller to the second connector at the top of the condensate cooler (5c).
4.2  Connection

4.2.1 Electrical connection

Wall power supply kit*

* short-circuit-proof multi-voltage power supply with integrated overload protection and changeable mains plugs.

Prepare wall power supply plug

Prepare connection

6. Take the wall power supply kit out of the packaging.

7. Select the mains plug that fits to your mains socket.

8. Connect the mains plug to the metal contacts of the wall power supply plug.

9. Slide the mains plug until it locks.

Remove mains plug

Remove mains plug

1. Press the locking knob on top of the wall power supply plug.

2. Remove the mains plug.

✓ Another mains plug can be fixed.
Installation and connection

Connect power supply to the controller

⇒ Plug female connection of the power supply cable into mains connection of the controller.

Consider new connection design:

For easy connection, the controller of the newest series have a guide groove on the rear side for each port.

For connection insert the nose of the round plug into the guide groove.

IMPORTANT!

⇒ Please install the power supply line in such a way, that no damage be caused to the cable due to sharp edges, chemicals or hot surfaces.

Connect to mains

⇒ Plug the wall power supply into the mains socket.

✔ Green LED at wall power supply plug glows.
4.2.2 Vacuum connection

**NOTICE**

Flexible vacuum hoses can contract because of evacuation.
- Fix vacuum hose at the connections.
- Fix connected components.
- Measure and trim the vacuum hose to a length that cares for the maximum shrinkage.

Possible damages to parts which are in contact with process media.
Residuals of aggressive or condensing media can cause damages to the controller or its inner parts.
- Prevent that damaging process media can get into the controller.

Filters will compromise measurement and control.

**Connect vacuum line**
- Connect the vacuum line gas-tight to the vacuum port of the controller;
  → see also *Connection examples on page 28*.

**IMPORTANT!**
- Only use a vacuum hose that is sufficient for the purpose and which provides enough stability.
- Use hose tubes as short as possible.
- Maximum admissible pressure at vacuum sensor: 1,5 bar/750 Torr (absolute).
- Observe the maximum measuring limit of the controller, approximately 1060 mbar (795 Torr).
Connection examples

Depending on design and installation the controller provides several options for connection to the vacuum system.

Table top version

- Flexible caoutchouc hose (1) or (2), directly plugged on the hose nozzle (3).

Attachment at the Hei-VAP Verdampfer

- Flexible caoutchouc hose (4), directly plugged on the hose nozzle (5).

Built-in version (front mounting)

- Vacuum hose made of PTFE (6) – plugged on hose nipple, fixed with union nut (7).

**IMPORTANT!**

With built-in controller the vacuum port is not visible. The vacuum hose may not be kinked.

⇒ Make sure there is sufficient space inside the housing, or
⇒ use a stable, curved hose nozzle for connection.
5 Operating and display elements

5.1 Operating elements

The operating elements are located on the controller front.

controller figure

→ see chapter 3.1 Vacuum controller Hei-VAC Control on page 20

5.1.1 Selection knob

The selection knob of the controller is a combination of rotary knob and push-button.

<table>
<thead>
<tr>
<th>Selection knob</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| Press – Selection knob =
  ▸ Call up menu or function.
  ▸ Exit menu or function.
  ▸ Confirm and store setting or selection.
  ▸ Step to next menu, function or content.
  ▸ Call up Configuration menu while booting. |

| Turn – Selection knob =
  ▸ Select menu, navigation function.
  ▸ Value setting – increase/decrease.
  ▸ Adapt set vacuum (in mode Vac control). |

5.1.2 Control panel

<table>
<thead>
<tr>
<th>Key</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| On/Off
  ▸ Switch on/off controller. |
| Start/Stop
  ▸ Start/stop vacuum control.
  ▸ Confirm completed program when clock icon blinks.
  ▸ Confirm error and status indications. |
| VENT – system venting;
  ▸ Keystroke < 2 sec = momentarily venting, control continues.
  ▸ Keystroke > 2 sec = venting to atmospheric pressure (max. 1050 mbar/787 Torr), control stops.
  ▸ Keystroke while venting = venting stops. |
### Operating and Display Elements

**Control panel keys**

<table>
<thead>
<tr>
<th><strong>Mode</strong> – Select operation mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>With stopped operation: Mode menu for selecting the operation mode.</td>
</tr>
</tbody>
</table>

**Mode** – Change function/mode

- During running operation: To switch from Pump down to Vac control and further to Auto mode.
- During running operation: To switch between Auto mode and Vac control.

### 5.1.3 Key combinations

Menus and functions that are not intended for everyday use, can only be accessed through key combinations.

**NOTICE**

Wrong key combinations can lead to faulty settings.

⇒ First push and hold the key which must be hold and pressed, only then push the combination key shortly.

<table>
<thead>
<tr>
<th>Combination</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ Press and hold Selection knob + Press On/Off =</td>
<td>Only when the controller is switched off</td>
</tr>
<tr>
<td>+ ‣ Call up menu Language selection</td>
<td></td>
</tr>
<tr>
<td>‣ Call up menu Pressure unit</td>
<td></td>
</tr>
<tr>
<td>VENT + Press and hold VENT + Press On/Off =</td>
<td>Call up menu Function</td>
</tr>
<tr>
<td>MODE + Press and hold Mode + press Selection knob =</td>
<td>Only in Function menu</td>
</tr>
<tr>
<td>‣ Enable Vauubus address assignment (frame marking).</td>
<td></td>
</tr>
<tr>
<td>‣ Confirm parameter transfer of selection Vario init.</td>
<td></td>
</tr>
<tr>
<td>Press and hold Selection knob + turn it =</td>
<td>Only in combination with VARIO®</td>
</tr>
<tr>
<td>‣ Quick adaption set vacuum. (in mode Vac control)</td>
<td></td>
</tr>
<tr>
<td>‣ Quick adaption motor speed high/low (in mode Pump down)</td>
<td></td>
</tr>
</tbody>
</table>
5.2 Display and user interface

After booting the pressure display appears, including *Bar graphic* and preset operation mode.

5.2.1 Pressure display

<table>
<thead>
<tr>
<th>Meaning</th>
<th>1 Title bar (or status bar)</th>
<th>Operation mode - <em>Mode</em></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pump down</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vac control</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Program</td>
<td></td>
</tr>
<tr>
<td>Process time</td>
<td>hh:mm:ss</td>
<td>(only displayed with running process)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Meaning</th>
<th>2 Bar graphic</th>
<th>3 Numerical value</th>
<th>4 VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Graphical display of actual pressure</td>
<td>Actual pressure = digital pressure display</td>
<td>Vacuum</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pressure unit according to pre-setting (mbar, Torr, hPa)</td>
</tr>
</tbody>
</table>
5.2.2 Display icons

When vacuum control has started additional icons appear on the display.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Vacuum control icon" /></td>
<td>Vacuum control is running (animation)</td>
</tr>
<tr>
<td><strong>00:00:00</strong></td>
<td>Process time; runtime vacuum control (hh:mm:ss)</td>
</tr>
</tbody>
</table>

### Active component

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Pump icon" /></td>
<td>Pump is running; in combination with percentage sign = motor speed (only for VARIO systems)</td>
</tr>
<tr>
<td><img src="image" alt="Venting valve icon" /></td>
<td>Venting* valve is active, i.e. open (VENT); Flashing cycle: continuous venting switched on.</td>
</tr>
<tr>
<td><img src="image" alt="Coolant valve icon" /></td>
<td>Coolant valve switched on, open</td>
</tr>
<tr>
<td><img src="image" alt="In-line valve icon" /></td>
<td>In-line valve switched on, open</td>
</tr>
<tr>
<td><img src="image" alt="Emission condenser icon" /></td>
<td>Emission condenser (Peltronic) connected</td>
</tr>
<tr>
<td><img src="image" alt="Level sensor icon" /></td>
<td>Level sensor activated (only when level sensor is connected)</td>
</tr>
</tbody>
</table>

* *also named air admittance valve*

The icon of a connected component is displayed as long as the component is running.
## Status display while operation is running

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Down Arrow]</td>
<td>Pump down – continuous pumping</td>
</tr>
</tbody>
</table>
| ![Double Down Arrow] | Pump down: lower pressure limit reached  
VACUU·LAN: pump down to set pressure  
Vac control: for 2-point control – pump down to set pressure |
| ![Up Arrow] | VACUU·LAN: pressure increase to switch on pressure  
Vac control: preset maximum exceeded |
| ![Down Arrow] | VARIO control: pump down to set point.  
Auto mode: pump down and boiling point detection within the preset time interval regarding changing process conditions. |
| ![Angle Left] | VARIO control: reaches and tracks boiling point. The next program step starts when the programmed pressure has been reached or the preset time has elapsed. |
| ![Down Arrow] | 2-point control: pressure in hysteresis, pump switched on |
| ![Up Arrow] | 2-point control: pressure in hysteresis, pump switched off |
| ![Turbo Mode] | Turbo mode switched on (for VARIO® pump in combination with turbomolecular pump) |

## Additional information

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| ![Clock] | Clock  
- Program completed*  
- Mode VACUU·LAN: delay time elapses |
| ![Lock] | Lock – operation locked |
| ![Hi] | HI mode for Pump down = optimum speed for the respective pressure. |
| ![Percentage] | Percentage value for Pump down motor speed. |
| ![Set Value] | Set value for Vac control. |

*The clock icon keeps flashing until the Start/Stop button has been pressed to acknowledge the end of program.*
## Fault indication (warning symbol)

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>⚠️</td>
<td>Flashing: warning!</td>
</tr>
</tbody>
</table>

### 5.2.3 Signal sounds (warning beep)

Setting *Sound On* in menu *Configuration/Display* is required to hear the audio signals.

### Meaning signal sound

<table>
<thead>
<tr>
<th>Audio signal</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="beep_icon.png" alt="Beep Icon" /></td>
<td>Short beep for each keystroke.</td>
</tr>
<tr>
<td><img src="beep_icon.png" alt="Beep Icon" /> ⚠️</td>
<td>Audio warning for error indication. In short intervals a number of warning beeps are to be heard. This Audio warning is active until error clearance or reset.</td>
</tr>
</tbody>
</table>

Error messages are indicated by differing numbers of beeps (audio warning). For the list of possible warning beeps → see chapter 8.1 *Error display on page 60*.  

---
5.2.4 Menu display in general

The controller includes several menus and submenus, e. g., Configuration, Function, Display....

Submenu

<table>
<thead>
<tr>
<th>Konfiguration</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Abgleich 1000 mbar</td>
<td></td>
</tr>
<tr>
<td>RS-232...</td>
<td></td>
</tr>
<tr>
<td>Sensoren...</td>
<td></td>
</tr>
<tr>
<td>Anzeige...</td>
<td></td>
</tr>
<tr>
<td>Autostart Ein</td>
<td></td>
</tr>
<tr>
<td>Werkseinst. Abbruch</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>zurück ---</td>
<td></td>
</tr>
</tbody>
</table>

Meaning

1 Titel bar

- Menu name

2 Menu interface

- Selectable functions or submenus
- (on the right side of the display)
- Adaptable value or
- Selectable content

3 Back (return)

- Call-up previous menu or
- Previous display

For detailed descriptions about individual menus, → see chapter 7.1 Operation menus.
5.3 Handling

The handling of the controller is menu-driven. Menus are accessed via push buttons on the control panel or via key combinations. Use the selection knob to select function or menu.

Operating steps and actions are displayed by an illustration, which is complemented by action symbols.

→ see chapter 1.2.2 Symbols and icons.

Navigation

Turn selection knob to select a menu by shifting the bar marking.

→ bar marking up/down.

Submenus

Submenus are highlighted with points.

Selection

Press selection knob to confirm selection.
Input (data entry)

Changeable values are positioned on the right side in the display.

Text on the right side accords to content selection like in a drop down list.

Exception: menu Program, in this menu data and value are editable.

Example: enable entry and edit

1. Select the required line and press selection knob.
   - Marking jumps to the input field.
   - Input/Content selection enabled.

2. Turn the selection knob.
   - Value/Content changes.

3. Adapt the numeric value within the specified min/max range or select the required function out of the available content.

4. Confirm input/selection by pressing the selection knob.
   - Value is stored or
   - selected function starts.

Back (return)

Place the bar marking on line back and press the selection knob to return to previous menu, display or to pressure display.

In submenu Sensors the display returns to previous menu only after the selection of a sensor.
6 Operation

6.1 Switch-on/-off controller

Switch-on

1. Initial screen: company logo and firmware version, for approximately 2 seconds.
2. Pressure graphic is displayed.

Switch-off

Press key On/Off

Controller switched off (display off).
6.2 Select language and pressure unit

Select language and pressure unit

1. Initial screen.

2. Select language and pressure unit.

3. Select the desired language.

4. Choose the pressure unit.

5. Confirm the selection.

6. Initial screen.
6.3 Mode – Operation mode

The controller is supplied with several operating modes. Only when the controlling process is stopped it is possible to select an operation mode.

6.3.1 Select operation mode

Title bar shows the selected operation mode (Mode).

Select any other operation mode in the same way as described above for Vac control. After 20 seconds without action, the display will return automatically to pressure display.
6.3.2 Mode menu

Mode menu display

Example Menu description

1 Title bar menu name
2 Selectable operation modes

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump down</td>
<td>- Continuous pump down or pump down with pressure and time presetting.</td>
</tr>
<tr>
<td></td>
<td>- VARIO®: pump down with adjustable motor speed (pumping speed) and continuous speed control.</td>
</tr>
<tr>
<td>Vac control</td>
<td>- Control to a preset vacuum value.</td>
</tr>
<tr>
<td>Program</td>
<td>- Load, edit and/or store program.</td>
</tr>
<tr>
<td></td>
<td>- Max. 10 programs with pressure and time presetting.</td>
</tr>
</tbody>
</table>

Select the mode suitable for vacuum apparatus and planned process.
### 6.4 Start controlling

Start vacuum controlling after selecting the required operation mode. The controller works in delivery status with the default settings of the factory setting.

- Controller starts.
- Icons are displayed.

### 6.5 Control during operation

#### 6.5.1 Venting (VENT)

**DANGER**

Danger of explosion when venting with air by forming of explosive mixtures. Depending on the process venting can cause formation explosive mixtures.

- Never vent processes with air which can form explosive mixtures.
- If necessary vent with inert gas (max. 1.2 bar absolute).

**IMPORTANT!**

Certain processes may cause overpressure.
Venting
The **VENT** button is used to vent the system. A short click on this button will momentarily vent the system as the process continues. Holding the **VENT** key for longer than 2 seconds will cause the system to be vented to atmospheric pressure and the pump will stop running; max. 1060 mbar (795 Torr). Continuous venting stops when pressing **VENT** key again.

**Momentarily venting**

1. Venting impulse, venting valve respectively air admittance valve opens momentarily \(\rightarrow\) short-term pressure increase.

**Continuous venting**

1. Icon for venting valve is flashing,
2. Venting valve opens \(\rightarrow\) continuous pressure increase until atmospheric pressure \(\rightarrow\) venting valve closes.
3. Controller stops.
6.5.2 Change operation mode

During running operation the operation mode can be switched between *Pump down* and *Vac control* by pressing *Mode* key.

Switch mode during running operation

1. Switch mode to *Vac control*.
2. Switch back from *Vac control* to *Pump down*.

- Operation mode switched to *Vac control*.

Switch back to primary mode

5. Switch back to *Pump down*.

- Title bar displays *Pump down*.
Typical applications

*Pump down → Vac control:*
*Semiautomatic distillation.* Recommended for applications for which the process vacuum is still to be determined. Firstly the vacuum pump is pumping down rapidly in mode *Pump down.* As soon as the required process vacuum has been reached, e. g., boiling vacuum, this vacuum can be maintained by switching to *Vac control.* The actual pressure is adopted as the required set vacuum.

*Auto mode ⇔ Vac control:*
With a connected *VARIO* pump a controller working in *Auto mode* will detect and track the boiling point automatically. The vacuum will be adapted continuously to the process. If a particular process vacuum is required, the mode can be switched back again to *Vac control.*

*Switching the mode during operation* via *Mode* key works only temporarily. After stopping the controller switches back to its primary mode.
6.5.3 Display graphic (curve)

In addition to the bar graphic of the pressure display the display can be switched to a diagram named Graphic which shows a pressure vs. time curve.

That Graphic curve will only be displayed while operation is running. With each start the recording restarts.

Call up graphic

Example
Call up pressure history display

1. [Image showing the display with Vakuumregler 30:35:41 and pressure 8.3 hPa.]
2. [Image showing the hand selecting the Graphic menu.]
3. [Image showing the display with Vakuumregler and pressure history.]
4. [Image showing the check mark indicating the correct selection.]

Graphic menu is displayed with the pressure curve of the actual process.

To call up Graphic with pressure history for other operation modes, do as described above.
Graphic menu

1 Header
- Active operation mode.
- Vacuum set point; for Vac control or Auto mode.
- Actual vacuum value (actual pressure).
- Elapsed process time.

2 Axis – pressure
- Unit according to pre-settings (mbar, Torr, hPa)

3 Pressure graph
- Pressure/time progress

4 Axis – time
- Continuous, automatically scaling time (minute, hour)

6.5.4 Quit display graphic

Return to basic display

Example Switch back to basic display

1

2

☑ View basic display.
6.6 Quick adaption during operation

6.6.1 Set vacuum

In mode *Vac control* the set vacuum can be adapted directly during running operation.

**Adapt set vacuum → fine tuning**

1 detent = 1 pressure value (mbar, Torr, hPa)

![Example of fine tuning](image1)

- Controller controls to new set vacuum.

**Adapt set vacuum → quick tuning**

- Press selection knob and turn it clockwise: increase set vacuum (venting).
- Press selection knob and turn it anticlockwise: decrease set vacuum (vacuum pump on).

- Controller controls to the new set vacuum which is displayed while releasing the selection knob.
6.7 Stop control

Stop control

- Controller and vacuum control stops.
- Display icons switched off.
7 Advanced menus and operation

7.1 Operation menus

A selected operation mode can be adapted and optimized for the process through the corresponding operation menu. The settings in an operation menu include mainly: motor speed, set vacuum or time presettings. Settings in operation menus are retained also after switching on/off.

Menu *Program* is for storing up to 10 individual programs, e. g., to store control settings for frequently repeated processes.

---

### Call up submenu of an individual operation mode

1. Call up operation menu
2. Corresponding menu of the preset operation mode is displayed.

To call up an operation menu, press the selection knob. Adaptions are possible during a running process as well as when control is stopped.

---

*Use operation menu to optimize vacuum control for application requirements.*
7.1.1 Pump down

Meaning

Continous pump down with pressure and time presettings.

Menu – *Pump down*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum*</td>
<td>Vacuum set point; once reached, the controller switches off the vacuum pump or closes the in-line valve. Adjustment range: Off; 1–1060</td>
</tr>
<tr>
<td>Duration** (min)</td>
<td>Presetting process runtime from Start on. Adjustment range: Off; 1–1440</td>
</tr>
</tbody>
</table>

* If Minimum and Duration are set to Off, pump down has to be stopped by pressing START/STOP key.

Application example – cabinet dryer

Set Minimum to a vacuum value below boiling pressure and the controller will switch the vacuum pump off, once the liquid has completely evaporated.
7.1.2 Vac control

Control to a set vacuum value.

### Menu – Vac control

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set vacuum (mbar)</td>
<td>Setting for lower vacuum level for 2-point control or precisely for VARIO® pump. Adjustment range: Turbo*; 1–1060</td>
</tr>
<tr>
<td>Hysteresis (mbar, Torr, hPa)</td>
<td>Only for VMS or in-line valve with vacuum pump: control range for 2-point control. Adjustment range: Auto; 1–300</td>
</tr>
<tr>
<td>Maximum (mbar, Torr, hPa)</td>
<td>Setting for upper vacuum level. Once reached, control switches off. Adjustment range: Off; 1–1060</td>
</tr>
<tr>
<td>Duration (min)</td>
<td>Presetting process runtime from Start on. Adjustment range: Off; 1–1440</td>
</tr>
</tbody>
</table>

* Turbo mode: auto-adapting vacuum control for best ultimate vacuum. Best backing pressure for operation with a turbomolecular pump.

### Application example – filtration

Set the set vacuum higher than the boiling pressure of the liquid and set Maximum value even a little bit higher. If the filter runs dry or if the filter is fractured, the pressure will increase and the control will be stopped automatically.

### Hysteresis values Auto

<table>
<thead>
<tr>
<th>Set vacuum (mbar)</th>
<th>5</th>
<th>10</th>
<th>50</th>
<th>80</th>
<th>100</th>
<th>200</th>
<th>500</th>
<th>700</th>
<th>900</th>
<th>1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hysteresis (mbar)</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>8</td>
<td>9</td>
<td>17</td>
<td>40</td>
<td>55</td>
<td>71</td>
<td>78</td>
</tr>
</tbody>
</table>
7.1.3 Program

Up to 10 individual programs including vacuum and time presettings can be loaded, edited, and stored.

Menu – Program

Parameter Program

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edit</td>
<td>Edit program with presettings for a process cycle or edit an existing program.</td>
</tr>
<tr>
<td>Open</td>
<td>Load the selected program.</td>
</tr>
<tr>
<td>Store</td>
<td>Store the program under the selected number. (memory capacity for up to 10 programs)</td>
</tr>
<tr>
<td>Hysteresis (mbar, Torr, hPa)</td>
<td>Only for VMS or in-line valve with vacuum pump: control range for 2-point control. Adjustment range: Auto; 1–300</td>
</tr>
</tbody>
</table>

Hysteresis values Auto

<table>
<thead>
<tr>
<th>Set vacuum (mbar)</th>
<th>5</th>
<th>10</th>
<th>50</th>
<th>80</th>
<th>100</th>
<th>200</th>
<th>500</th>
<th>700</th>
<th>900</th>
<th>1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hysteresis (mbar)</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>8</td>
<td>9</td>
<td>17</td>
<td>40</td>
<td>55</td>
<td>71</td>
<td>78</td>
</tr>
</tbody>
</table>

For further descriptions of program functions → see Online Instructions for use.
7.2  Program functions (see Online Instructions for use)

You get the Online Instructions for use from the technical service of Heidolph Instruments.

7.3  Configuration menu

Meaning

In menu Configuration the controller parameters are set. This menu is also for adjusting the vacuum sensor and for loading Defaults settings.

Call up Configuration menu

- Example
  Call up Configuration menu

1. Configuration menu displayed.

After 20 seconds without action, the display will return automatically to pressure display.
7.3.1 Content selection

The following menu items of Configuration can be selected, activated and used.

### Defaults

<table>
<thead>
<tr>
<th>Selection</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancel</td>
<td>Leave menu item without default setting.</td>
</tr>
<tr>
<td>Load</td>
<td>Load default settings.</td>
</tr>
</tbody>
</table>

**IMPORTANT!** If Defaults Load is activated all controller parameter will be reset to delivery status. Stored programs will be deleted.

### Autostart

<table>
<thead>
<tr>
<th>Selection</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>After switching on power supply or after power failure the controller remains in Stop. Press Start/Stop key to start the controller.</td>
</tr>
<tr>
<td>On</td>
<td>Once power is applied, the controller starts automatically with the settings before power failure. The controller starts control directly without pressing Start/Stop key, if it previously was in running operation. Recommended, if power supply is switched on from a central point or if power is switched on by an external switch.</td>
</tr>
</tbody>
</table>

**IMPORTANT!** Ensure, if Autostart is activated, that no hazardous situations may occur due to the automatic start of the process.

⇒ Check whether the Autostart feature can be used safely with the intended application.
### Adjustment

<table>
<thead>
<tr>
<th>Selection</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1060–700</td>
<td>Adjustment range of a vacuum sensor, internal or external at atmospheric pressure (1060–700) or under vacuum (20–~0).</td>
</tr>
<tr>
<td>20–0</td>
<td></td>
</tr>
</tbody>
</table>

For further descriptions about sensor adjustment → see chapter 9.2 Sensor readjustment on page 70

### 7.3.2 Submenus

#### Submenu – Display

<table>
<thead>
<tr>
<th>Anzeige</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Helligkeit</td>
<td>100 %</td>
</tr>
<tr>
<td>Kontrast</td>
<td>40 %</td>
</tr>
<tr>
<td>Warnton</td>
<td>Ein</td>
</tr>
<tr>
<td>Einheit</td>
<td>mbar</td>
</tr>
<tr>
<td>Sprache</td>
<td>Deutsch</td>
</tr>
</tbody>
</table>

--- zurück ---

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Selection</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brightness</td>
<td>0–100 %</td>
<td>Adjust backlight brightness of the display.</td>
</tr>
<tr>
<td>Contrast</td>
<td>0–100 %</td>
<td>Adjust display contrast.</td>
</tr>
<tr>
<td>Sound</td>
<td>Off</td>
<td>Switch off keystroke sound and warning sound.</td>
</tr>
<tr>
<td></td>
<td>On</td>
<td>Switch on keystroke sound and warning sound.</td>
</tr>
<tr>
<td>Units</td>
<td>mbar</td>
<td>Preset pressure unit for user interface.</td>
</tr>
<tr>
<td></td>
<td>Torr</td>
<td></td>
</tr>
<tr>
<td></td>
<td>hPa</td>
<td></td>
</tr>
<tr>
<td>Language</td>
<td>14 languages available</td>
<td>Preset pressure unit for user interface.</td>
</tr>
</tbody>
</table>
Advanced menus and operation

Submenu – Sensors

In submenu **Sensors** all connected sensors are listed. The internal sensor is generally displayed as **Sensor**. External sensors are listed with sensor type name and address.

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor</td>
<td>990.8 mbar</td>
</tr>
<tr>
<td>VSP 1</td>
<td>4.1E+2 mbar</td>
</tr>
</tbody>
</table>

The display switches automatically to the previous menu when selecting a sensor with the selection knob.

For descriptions about sensor address assignment → see **Online Instructions for use**.

**Display** | **Meaning**                          
---          | -----------------------------------  
Inverse      | **Sensor** = currently selected for pressure display.  
Sensor type  | Selection for displaying pressure on basic display (max. 8 sensors are listed).  

Advanced menus and operation

Submenu – RS-232

Submenu RS-232 is applied for interface configuration, parameter adjustments and commands.

→ see also Online Instructions for use.

### Adjustable RS232 parameter

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Selection</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baud</td>
<td>19200</td>
<td>Default setting for transmission speed.</td>
</tr>
<tr>
<td></td>
<td>9600</td>
<td>The baud rate of data transfer of transmitter and receiver must correspond.</td>
</tr>
<tr>
<td></td>
<td>4800</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2400</td>
<td></td>
</tr>
<tr>
<td>Parity</td>
<td>8-N-1</td>
<td>Default setting for parity check, a method for error detection</td>
</tr>
<tr>
<td></td>
<td>7-O-1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7-E-1</td>
<td></td>
</tr>
<tr>
<td>Handshake</td>
<td>RTS-CTS</td>
<td>Preset for continuous data transmission without loss – flow control.</td>
</tr>
<tr>
<td></td>
<td>Xon-Xoff</td>
<td></td>
</tr>
<tr>
<td></td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Remote</td>
<td>Off</td>
<td>Control commands not enabled, only queries possible</td>
</tr>
<tr>
<td></td>
<td>On</td>
<td>Connection for communication via RS 232 interface enabled.</td>
</tr>
</tbody>
</table>

**IMPORTANT!**

When selecting Remote On the controller itself is only operable via an external device. All keys of the control panel except key On/Off are locked.

VACUU·CONTROL® detects automatically, if Remote is activated or deactivated and retains that setting.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>![PC_icon]</td>
<td>PC icon? Controller in remote operation!</td>
</tr>
</tbody>
</table>
7.4 Function menu (see Online Instructions for use)

You get the Online Instructions for use from the technical service of Heidolph Instruments.

7.5 Program functions (see Online Instructions for use)

Detailed descriptions about function menu with address assignment or about differential pressure measurement are included in the Online Instructions for use. You get the Online Instructions for use from the technical service of Heidolph Instruments.
8 Resolving problems

Technical support

⇒ To identify errors and potential remedies, please refer to the troubleshooting table: Fault – Cause – Remedy on page 62

In case you need additional assistance, please contact our service department.

8.1 Error display

The major symbol for fault indication is the warning triangle. Additionally displayed icons and sounds refer to the cause of fault.

Safety alert symbol

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Warning triangle]</td>
<td>Flashing: Warning!</td>
</tr>
<tr>
<td>![Warning icon]</td>
<td>Where applicable with:</td>
</tr>
<tr>
<td></td>
<td>- flashing component icon,</td>
</tr>
<tr>
<td></td>
<td>- warning sound (only when switched on) or</td>
</tr>
<tr>
<td></td>
<td>- flashing backlight.</td>
</tr>
<tr>
<td>![Warning icon]</td>
<td>in combination with number = Vacuubus address of the component which is defective.</td>
</tr>
</tbody>
</table>

Example display in case of error

Error In-line valve 1

1 Possible positions for flashing component/display icon; here: warning In-line valve

2 Flashing: Warning triangle
### Combinations of flashing display icons

<table>
<thead>
<tr>
<th>Icon flash rate</th>
<th>Fault and Meaning</th>
<th>beep when Sound</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="1x beep" /></td>
<td>Limit pressure reached</td>
<td>1x</td>
</tr>
<tr>
<td><img src="image" alt="1x beep" /></td>
<td>Overpressure</td>
<td>1x</td>
</tr>
<tr>
<td><img src="image" alt="1x beep" /></td>
<td>Process time elapsed</td>
<td>1x</td>
</tr>
<tr>
<td><img src="image" alt="2x beep" /></td>
<td>Venting valve</td>
<td>2x</td>
</tr>
<tr>
<td><img src="image" alt="3x beep" /></td>
<td>In-line suction valve</td>
<td>3x</td>
</tr>
<tr>
<td><img src="image" alt="4x beep" /></td>
<td>Coolant valve</td>
<td>4x</td>
</tr>
<tr>
<td><img src="image" alt="5x beep" /></td>
<td>External sensor removed or defective</td>
<td>5x</td>
</tr>
<tr>
<td><img src="image" alt="7x beep" /></td>
<td>internal sensor defective</td>
<td>7x</td>
</tr>
<tr>
<td><img src="image" alt="6x beep" /></td>
<td>Vario pump</td>
<td>6x</td>
</tr>
<tr>
<td><img src="image" alt="8x beep" /></td>
<td>VACUULAN process pressure not reached within 99 hours.</td>
<td>8x</td>
</tr>
<tr>
<td><img src="image" alt="9x beep" /></td>
<td>Digital I/O module: Fault indicator triggered or fault special configurations</td>
<td>9x</td>
</tr>
<tr>
<td><img src="image" alt="10x beep" /></td>
<td>Level sensor triggered; flask full</td>
<td>10x</td>
</tr>
<tr>
<td><img src="image" alt="11x beep" /></td>
<td>Emission condenser Peltronic (too hot)</td>
<td>11x</td>
</tr>
<tr>
<td><img src="image" alt="12x beep" /></td>
<td>Analog I/O module</td>
<td>12x</td>
</tr>
</tbody>
</table>

A defective I/O module, which is configured as a remote module, does not trigger a warning alert. The control is stopped. Alert display by the flashing warning triangle.
# 8.2 Fault – Cause – Remedy

<table>
<thead>
<tr>
<th>Fault</th>
<th>Possible cause</th>
<th>Remedy</th>
<th>Personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitive process not controllable</td>
<td>Motor speed too high.</td>
<td>✓ Reduce motor speed.</td>
<td>User, Specialist</td>
</tr>
<tr>
<td></td>
<td>Pumping speed too high.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequent error messages of connected components</td>
<td>Several controllers are connected.</td>
<td>✓ Use only one controller for one VACUU-BUS system.</td>
<td>respon. Specialist</td>
</tr>
<tr>
<td></td>
<td>Several VACUU-BUS components of the same type are using the same address.</td>
<td>✓ Only in <em>Function</em> menu Assign a new address number to VACUU-BUS® component</td>
<td></td>
</tr>
<tr>
<td>VENT key does not work</td>
<td><em>Venting</em> function deactivated.</td>
<td>✓ Check why <em>Venting</em> is deactivated.</td>
<td>Specialist, respon. Specialist</td>
</tr>
<tr>
<td>Internal air admittance valve cannot be triggered</td>
<td>Setting of <em>int.Air V</em> in menu <em>Function</em> is switched <em>Off</em> or <em>Auto</em>.</td>
<td>✓ Check if <em>Venting</em> by internal air admittance valve can be used without risk.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>External air admittance valve is connected, and/or</td>
<td>✓ <em>Venting</em> safe? Enable the function in menu <em>Function/ int.Air V</em>; adjustment: <em>Auto</em> or <em>On</em>.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>External vacuum sensor is connected.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal air admittance valve does not switch</td>
<td>Air admittance valve soiled.</td>
<td>✓ Clean venting valve (air admittance valve), see chapter 9.1 Cleaning on page 69</td>
<td>Specialist</td>
</tr>
<tr>
<td>Function or menu item cannot be used</td>
<td>Fuction or menu item possibly only usable with short-cut (key combination).</td>
<td>✓ Press the correct key combination; for descriptions of keys and short-cuts see chapter: 5.1 Operating elements on page 29</td>
<td>Specialist, respon. Specialist</td>
</tr>
<tr>
<td>Vario pump icon flashes</td>
<td>VARIO pump and VMS are both connected at the same time.</td>
<td>✓ Remove VMS from VARIO-pump and restart controller.</td>
<td>Specialist</td>
</tr>
<tr>
<td></td>
<td>VARIO pump defective.</td>
<td>✓ Check VARIO pump for defective parts.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>VMS defective or cable is not connected.</td>
<td>✓ Check VMS for defective parts.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cable break.</td>
<td>✓ Check cable connections.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓ Replace defective parts.</td>
<td></td>
</tr>
<tr>
<td>Air admittance valve icon flashes</td>
<td>External air admittance valve removed.</td>
<td>✓ Check the connection.</td>
<td>Specialist</td>
</tr>
<tr>
<td></td>
<td>Plug disconnected.</td>
<td>✓ Check plug connection.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>External air admittance valve defective.</td>
<td>✓ Replace defective parts.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓ Use internal air admittance valve.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓ Reconfiguration without air admittance valve.</td>
<td></td>
</tr>
<tr>
<td>Fault</td>
<td>Possible cause</td>
<td>Remedy</td>
<td>Personnel</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>In-line suction valve icon flashes</td>
<td>‣ In-line suction valve removed. ‣ Plug disconnected. ‣ In-line suction valve defective.</td>
<td>✓ Check the connection. ✓ Check plug connection. ✓ Replace defective parts. ✓ Reconfiguration without In-line suction valve. ✓ Switch-off the controller; <em>On/Off</em> key. ✓ Remove In-line suction valve and switch on controller again.</td>
<td>Specialist</td>
</tr>
<tr>
<td>Coolant valve icon flashes</td>
<td>‣ Coolant valve removed. ‣ Coolant valve defective.</td>
<td>✓ Check the connection. ✓ Replace defective parts. ✓ Reconfiguration without coolant valve.</td>
<td>Specialist</td>
</tr>
<tr>
<td>Level sensor icon flashes</td>
<td>‣ Level sensor triggered (flask full). ‣ Level sensor removed. ‣ Level sensor triggered with empty flask. ‣ Cable break. ‣ Level sensor defective.</td>
<td>✓ Empty flask/catch pot. ✓ Check position of level sensor. ✓ Adjust level sensor or delete the sensor from controller (by loading default). ✓ Check plug connection. ✓ Replace defective parts.</td>
<td>Specialist</td>
</tr>
<tr>
<td>Peltronic icon flashes</td>
<td>‣ Peltronic emission condenser too hot. ‣ Plug disconnected.</td>
<td>✓ Let the Peltronic emission condenser cool down. ✓ Check plug connection.</td>
<td>User, Specialist</td>
</tr>
<tr>
<td>Title bar without text</td>
<td>‣ No controllable device connected (In-line suction valve, VMS, VARIO pump).</td>
<td>✓ Check device connections and cable. ✓ Replace defective parts. ✓ Connect a controllable device to the controller. ✓ Use the controller as measuring gauge.</td>
<td>Specialist</td>
</tr>
<tr>
<td>No key reaction – only On/Off, PC icon displayed</td>
<td>‣ Remote switched <em>On</em>. ‣ Controller only controllable via connected external end device (via RS232).</td>
<td>✓ <em>Switch-off</em> Remote (switch off and on controller, press selection knob shortly while booting, select <em>Configuration</em>/<em>RS232</em>/<em>Remote</em> and adjust <em>Off</em>). ✓ Control controller via end device.</td>
<td>Specialist</td>
</tr>
<tr>
<td>No reaction to key actuation</td>
<td>‣ Controller defective</td>
<td>✓ Contact us and return device for repair.</td>
<td>Specialist</td>
</tr>
<tr>
<td>Fault</td>
<td>Possible cause</td>
<td>Remedy</td>
<td>Personnel</td>
</tr>
<tr>
<td>----------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>No display</td>
<td>Controller switched off.</td>
<td>✓ Switch on the controller; <strong>On/Off</strong> key.</td>
<td>Specialist</td>
</tr>
<tr>
<td></td>
<td>Power supply disconnected.</td>
<td>✓ Check plug connection and wall power supply for correct connection.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Power supply not correctly connected.</td>
<td>✓ Replace defective parts.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mains voltage failure.</td>
<td>✓ Contact service and return device for repair.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Controller defective</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cable break.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blank display</td>
<td>Too many devices connected, e. g., valves.</td>
<td>✓ Power input of all connected devices may not exceed the maximum power consumption of the controller: - controller with wall power supply max. 30 W, - Controller + VARIO max. 25 W.</td>
<td>Respond. Specialist</td>
</tr>
<tr>
<td></td>
<td>Short circuit of a connected device.</td>
<td>✓ Replace defective parts.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Controller defective</td>
<td>✓ Contact <strong>Service</strong> and return device for repair.</td>
<td></td>
</tr>
<tr>
<td>Incorrect pressure display</td>
<td>Humidity inside the vacuum sensor.</td>
<td>✓ Identify and remove source of humidity.</td>
<td>User, Specialist</td>
</tr>
<tr>
<td></td>
<td>Vacuum sensor soiled.</td>
<td>✓ Dry the vacuum sensor, e. g., by pumping down.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vacuum sensor not adjusted.</td>
<td>✓ Clean the vacuum sensor, see chapter <strong>9.1 Cleaning on page 69.</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vacuum sensor not correctly adjusted.</td>
<td>✓ Readjust vacuum sensor.</td>
<td></td>
</tr>
<tr>
<td>Digital pressure gauge</td>
<td>Pressure display flashing with 0.0: - vacuum adjustment not correctly carried out.</td>
<td>✓ Readjust internal or external vacuum sensor, see chapter <strong>9.2 Sensor readjustment on page 70.</strong></td>
<td>Specialist</td>
</tr>
<tr>
<td>flashes</td>
<td>Pressure display flashing: - Overpressure! Pressure &gt; 1060 mbar.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No digital pressure</td>
<td>External vacuum sensor defective.</td>
<td>✓ Replace defective parts.</td>
<td>Respond. Specialist</td>
</tr>
<tr>
<td>reading</td>
<td>External vacuum sensor removed.</td>
<td>✓ Reconnect external vacuum sensor.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Internal vacuum sensor defective.</td>
<td>✓ Contact <strong>Service</strong> and return device for repair.</td>
<td></td>
</tr>
</tbody>
</table>
### Resolving problems

<table>
<thead>
<tr>
<th>Fault</th>
<th>Possible cause</th>
<th>Remedy</th>
<th>Personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensors submenu is permanently displayed</td>
<td>Submenu Sensors... does not automatically switch back to previous display.</td>
<td>Select the required sensor by turning and pressing selection knob.</td>
<td>User, Specialist</td>
</tr>
<tr>
<td>After loading defaults Language selection appears</td>
<td>Special factory settings have been loaded.</td>
<td>Set language and pressure unit. <strong>IMPORTANT!</strong> Check if the loaded default settings are suitable for your vacuum apparatus.</td>
<td>User, Specialist</td>
</tr>
</tbody>
</table>
| Error I/O module | Plug disconnected.  
An error occurred in the system, the I/O module passed the error alert to the controller. | Check plug connection.  
Remedy external fault. | Specialist, respon. Specialist |
| VSP sensor displays wrong values | VSP sensor configured as VSK. | Use menu Function/Vacuubus to reconfigure the sensor as VSP. | Specialist, respon. Specialist |
| Controller in operation, pressure display flashes | VSK sensors are measuring negative difference pressure. | Select another vacuum sensor in menu Sensors. | Specialist, respon. Specialist |

<table>
<thead>
<tr>
<th>Action required</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
</table>
| Elapsed process time | All program steps are completed.  
Program end reached. | Acknowledge indication by pressing Start/Stop key. |
| Flashing clock icon | Elapsed process time | Acknowledge indication by pressing Start/Stop key. |
| Pump down stops, flashing arrow down icon | Pressure below preset minimum value. | Acknowledge indication by pressing Start/Stop key.  
If possible readjust presetting (Min.). |
| Vac control stops, flashing arrow up icon | Preset maximum value exceeded. | Acknowledge indication by pressing Start/Stop key.  
If possible readjust presetting (Max.). |
| Program - | Program not yet stored. | Store program under a free program number. |
8.3 Controller Reset

Auto reset

The following error indications will be reset automatically with remedy:

- Overpressure
- Process time elapsed
- Limit pressure reached
- Error air admittance valve
- Error Peltronic

Active reset

Several error indications need to be reset manually. Depending on the fault severity different actions are required.

Press **Start/Stop** key to reset the following error indications:

- In-line suction valve error
- Coolant valve error
- External vacuum sensor removed
- I/O module activated *Error indication*
- External error indicator has triggered via Digital I/O module; assigned as *Error*.
- Level sensor triggered

Load **Defaults** (standard factory setting) to reset the following error indications:

- Missing set value presetting or VACUU·BUS plug disconnected via Digital I/O module; assigned as *Remote*.
- Level sensor removed and/or VACUU·BUS plug disconnected.

→ see also chapter: 7.3 *Configuration menu on page 54* for loading **Defaults**.
**IMPORTANT!**

⇒ Note the settings of stored programs, before loading 
*Default.*

---

**Load default settings**

1. Load factory settings

2. **Function**
   - Pump down
   - Vac control
   - Program
   - Configuration

3. **Configuration**
   - Adjustment
   - RS-232
   - Sensors
   - Display
   - Autostart
   - Defaults

4. **Configuration**
   - Adjustment
   - RS-232
   - Sensors
   - Display
   - Autostart
   - Defaults

5. **Configuration**
   - Adjustment
   - RS-232
   - Sensors
   - Display
   - Autostart
   - Defaults

6. **Configuration**
   - Adjustment
   - RS-232
   - Sensors
   - Display
   - Autostart
   - Defaults
8.4 Error of external components

Error messages for defective external components such as In-line suction valve, vacuum sensor, etc. cannot be reset.

⇒ Replace defective accessories or
⇒ send defective accessories for repair to your local supplier or to our service.
9 Cleaning and maintenance

9.1 Cleaning

IMPORTANT!
This chapter does not contain descriptions for the decontamination of the controller. This chapter describes only simple cleaning and care measures.

9.1.1 Controller

Clean surface

⇒ Clean soiled surface with a clean, slightly wetted cloth. To moisten the cloth we recommend water or mild soap.

9.1.2 Venting valve

Clean venting\(^1\) valve

1. Apply slight overpressure of dry air or inert gas to the vacuum port \(1\).
2. Press the \(VENT\) key several times until gas escapes through the venting port \(2\).
3. Repeat this procedure until you hear the clicking of the valve and a gas stream is noticeable at the venting port \(2\).

9.1.3 Internal sensor

Clean internal sensor

1. Fill a small amount of solvent via the vacuum port \(1\) in the controller, e. g., cleaning solvent.
2. Let the solvent react for a few minutes.
3. Drain the solvent.
   ✓ Dissolved substances or discolorations in the solvent are possible.
4. Repeat this procedure until no more pollutants are in the solvent.
5. Let the controller dry.
6. Readjust the internal (vacuum) sensor.

---

\(^1\) air admittance valve
9.2 Sensor readjustment

**NOTICE**

For readjustment the reference pressures need to be known with certainty.

In the pressure range 20 – 700 mbar (15 – 525 Torr) no adjustment is possible.

- Check the accuracy of the pressure sensor in case of irregularities in the pressure display.
- Readjust the sensor in two steps: at atmospheric pressure and under vacuum.

Do not adjust at atmospheric pressure, if the pressure at the location of the device is not exactly known (pay attention to height above sea level).

Any kind of pollution of the vacuum system, e.g., oil, substances, or humidity could falsify the adjustment.

- Clean polluted sensors before readjustment.

**Adjustment at atmospheric pressure**

An adjustment at atmospheric pressure is only possible if the pressure is higher than > 700 mbar (> 525 Torr).

1. Vent the measurement connection of the controller or in case the connected external vacuum sensor VSK 3000.
2. Make sure that the vacuum sensor (internal or external) is really at atmospheric pressure.
3. Determine the exact atmospheric pressure of your location, e.g., by barometer, inquiry at the meteorological office or the airport.
4. Call up menu **Configuration**.
5. Turn the **selection knob** and place the bar marking on **Adjustment**.
6. Press the **selection knob**.
   - ✔ Marking jumps to numeric value.
7. Adjust the exactly determined local atmospheric pressure by turning the **selection knob**.
8. Press the **selection knob**.
   - ✔ Sensor adjusted to atmospheric pressure.
Adjustment under vacuum

An adjustment under vacuum is only possible if the pressure is lower than < 20 mbar (< 15 Torr) absolute.

1. Evacuate the measurement connection of the controller or in case the connected external vacuum sensor VSK 3000 to a pressure < 0.1 mbar.

2. Call up menu Configuration.
3. Turn the selection knob and place the bar marking on Adjustment.
4. Press the selection knob.
   - Marking jumps to numeric value.
5. Adjust the pressure value to 0 by turning the selection knob.
6. Press the selection knob.
   - Sensor adjusted under vacuum.

IMPORTANT!

Adjustment under vacuum with an actual pressure higher than 0.1 mbar (0.1 Torr) reduces the accuracy of the measurement. If the pressure is significantly higher than > 0.1 mbar (> 0.1 Torr) the adjustment to a reference pressure is recommended.

NOTICE

The readjustment of a VSP 3000 can only be carried out in warmed-up state.
Adjustment is not possible during the warm-up time.
- Use a high vacuum pump for the adjustment of a VSP sensor.
- After connection to power supply and after the pressure has reached < 10⁻³ mbar, wait 20 minutes before adjusting the VSP sensor.
- Carry out the adjustment in the same order as described above for VSK.
Adjustment at a reference pressure

Instead of adjustment under vacuum to a pressure < 0,1 mbar (< 0.1 Torr), adjustment to a precisely known reference pressure within the range of 0 – 20 mbar (0 – 15 Torr) is possible.

1. Evacuate the measurement connection of the controller or in case the connected external vacuum sensor VSK 3000 to a pressure in the range of 0 – 20 mbar (0 – 15 Torr).

2. Call up menu *Configuration*.

3. Turn the *selection knob* and place the bar marking on *Adjustment*.

4. Press the *selection knob*.

   ✓ Marking jumps to numeric value.

5. Adjust the pressure value to the actual reference pressure by turning the *selection knob*.

6. Press the *selection knob*.

   ✓ Sensor adjusted to reference pressure.

**IMPORTANT!**

The measurement uncertainty of the reference pressure will directly affect the measurement uncertainty of the controller.

If the nominal ultimate vacuum of a diaphragm pump is used as reference vacuum, the accuracy of the controller might be doubtful. The diaphragm pump may not achieve the specified vacuum (due to condensate, poor condition, failure of valves or diaphragm, leaks).

For further descriptions about *Adjustment* → see chapter: 7.3 *Configuration menu* on page 54
## 10 Appendix

### 10.1 Technical information

<table>
<thead>
<tr>
<th>Product</th>
<th>Vacuum Controller Hei-VAC Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal vacuum sensor</td>
<td>Ceramic diaphragm (alumina), capacitive, gas independent, absolute pressure</td>
</tr>
</tbody>
</table>

### 10.1.1 Technical data

<table>
<thead>
<tr>
<th>Ambient conditions (US)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Working temperature</td>
<td>10–40 °C 50–104°F</td>
</tr>
<tr>
<td>Transport- and storage</td>
<td>-10–60 °C 14–140°F</td>
</tr>
<tr>
<td>temperature</td>
<td></td>
</tr>
<tr>
<td>Altitude, max.</td>
<td>3000 m 9840 ft</td>
</tr>
<tr>
<td>above sea level</td>
<td></td>
</tr>
<tr>
<td>Relative humidity</td>
<td>30–85 %, non condensing</td>
</tr>
<tr>
<td></td>
<td>Avoid condensation or contamination by dust, liquids, or corrosive gases.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power supply unit (US)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Input voltage</td>
<td>90–264 VAC 90–264 VAC</td>
</tr>
<tr>
<td>Frequency</td>
<td>47–63 Hz 47–63 Hz</td>
</tr>
<tr>
<td>Input current, max.</td>
<td>0.8 A 0.8 A</td>
</tr>
<tr>
<td>Output voltage,</td>
<td>24 VDC 24 VDC</td>
</tr>
<tr>
<td>short-circuit-proof</td>
<td></td>
</tr>
<tr>
<td>Output current, max.</td>
<td>1.25 A 1.25 A</td>
</tr>
<tr>
<td>Cable length, approx.</td>
<td>2 m 79 in.</td>
</tr>
<tr>
<td>Dimension</td>
<td>108 mm x 58 mm x 34 mm</td>
</tr>
<tr>
<td></td>
<td>4.3 in. x 2.3 in. x 1.4 in.</td>
</tr>
<tr>
<td>Weight</td>
<td>300 g 0.66 lb</td>
</tr>
<tr>
<td>Mains plug</td>
<td>AC, changeable: EU/UK/US/AUS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical data (US)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage, max.</td>
<td>24 VDC (±10 %) 24 VDC (±10 %)</td>
</tr>
<tr>
<td>Power, max.</td>
<td>3.4 W 3.4 W</td>
</tr>
<tr>
<td>Max. admissible current total for connected valves</td>
<td>4 A 4 A</td>
</tr>
<tr>
<td>Degree of protection (controller front)</td>
<td>IP 20 (IP 42)</td>
</tr>
<tr>
<td>Port (interface)</td>
<td>RS 232 SUB-D 9 poles</td>
</tr>
</tbody>
</table>
### Vacuum data

**Hei-VAC Control, internal vacuum sensor** (US)
- **Measuring range, absolute**: 1080–0,1 mbar 810–0.1 Torr
- **Max. control range**: 1060–0,1 mbar 795–0.1 Torr
- **Resolution**: 0,1 mbar 0.1 Torr

**Max. admissible media temperature (gas):**
- Temporarily: 80 °C 176°F
- Continuous operation: 40 °C 104°F
- **Measurement uncertainty**: < ±1 mbar < ±0.75 Torr
- **Temperature coefficient**: < ±0.07 mbar/K < ±0.05 Torr/K

**External vacuum sensor VSK 3000**
- **Max. admissible pressure, absolute**: 1,5 bar 1125 Torr

**Venting**
- **Max. admissible pressure, absolute**: 1,2 bar 900 Torr

**Gas connections**
- **Hei-VAC Control table top version**: Fitting for PTFE tube 10/8 mm or hose nozzle for flexible tube DN 6/10
- **Venting**: Hose nozzle for flexible tube \( d_1 = 4–5 \text{ mm} \)

### Display

- **Type**: LC display (LCD)
- **Brightness control**: yes
- **Pressure display**: switchable: mbar, Torr, hPa

### Weight and dimensions*

<table>
<thead>
<tr>
<th></th>
<th>(US)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weight (built-in)</strong></td>
<td>440 g 0.97 lb</td>
</tr>
<tr>
<td><strong>Weight with foot (table top)</strong></td>
<td>570 g 1.3 lb</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>123 mm x 124 mm x 83 mm 5 in. x 5 in. x 3.5 in.</td>
</tr>
<tr>
<td><strong>Dimensions with foot</strong></td>
<td>144 mm x 124 mm x 115 mm 6 in. x 5 in. x 4.5 in.</td>
</tr>
</tbody>
</table>

*without wall power supply*
10.1.2 Rating plate

- In case of malfunction, please note type and serial number on the rating plate.
- When contacting our service department, name us product type and serial number. With this information we can offer selective support and advice for your product.

Rating plate

<table>
<thead>
<tr>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Made in Germany</td>
</tr>
<tr>
<td>Rotary Evaporators</td>
</tr>
<tr>
<td>Hei-VAC Control</td>
</tr>
<tr>
<td>P/N: 591-00360-00-0</td>
</tr>
<tr>
<td>24 V DC 3.4 W</td>
</tr>
<tr>
<td>S/N: 200150525 0618</td>
</tr>
<tr>
<td>Heidolph Instruments GmbH &amp; Co. KG</td>
</tr>
<tr>
<td>Walpersdorfer Str. 12 - 91126 Scheibbach/Germany</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product class &amp; Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product number</td>
</tr>
<tr>
<td>Power supply &amp; Electrical power</td>
</tr>
<tr>
<td>Serial number</td>
</tr>
<tr>
<td>Address</td>
</tr>
</tbody>
</table>

10.1.3 Wetted parts

<table>
<thead>
<tr>
<th>Component</th>
<th>Wetted materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vacuum connection, hose nozzle</td>
<td>PP</td>
</tr>
<tr>
<td>Sensor</td>
<td>Aluminium oxide ceramic</td>
</tr>
<tr>
<td>Sensor housing</td>
<td>PPS/Glasfaser</td>
</tr>
<tr>
<td>Sensor seal</td>
<td>chemically resistand fluoroelastomer</td>
</tr>
<tr>
<td>Venting valve seal</td>
<td>FFKM</td>
</tr>
</tbody>
</table>
10.2 Interface commands (see Online Instructions for use)

You get the Online Instructions for use from the technical service of Heidolph Instruments.

10.2.1 Pin assignment (RS232)

Sub-D panel connector

<table>
<thead>
<tr>
<th>PIN</th>
<th>Name</th>
<th>Operation</th>
<th>PIN</th>
<th>Name</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DCD</td>
<td>---</td>
<td>6</td>
<td>DSR</td>
<td>---</td>
</tr>
<tr>
<td>2</td>
<td>RxD</td>
<td>Received data</td>
<td>7</td>
<td>RTS</td>
<td>Transmission request</td>
</tr>
<tr>
<td>3</td>
<td>TxD</td>
<td>Transmission data</td>
<td>8</td>
<td>CTS</td>
<td>Ready to send</td>
</tr>
<tr>
<td>4</td>
<td>DTR</td>
<td>+10 V</td>
<td>9</td>
<td>RI</td>
<td>+5 V (Bluetooth, remote control)</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>Mass</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
10.3 Certifications

10.3.1 EC Declaration of Conformity

Wir, die Heidolph Instruments GmbH & Co. KG,
We, Heidolph Instruments GmbH & Co. KG,
Heidolph Instruments GmbH & Co. KG
Walpersdorfer Straße 12
91126 Schwabach / Deutschland


hereby declare, that the product (from serial number on 200150525) 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 Control 591-00360-00

Niederspannungsrichtlinie / low voltage Directive 2014/35/EU
EMV-Richtlinie / Electromagnetic Compatibility Directive 2014/30/EU
RoHS-Richtlinie / RoHS directive 2011/65/EU
Angewandte (harmonisierte) Normen / (Harmonized) Standards applied:

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

Schwabach, 23.09.2019

Wolfgang Jaenicke
Geschäftsführer
Managing Director

Marcell Sarré
Qualitätsmanager
Quality Manager

01-001-025-18-2
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.

<table>
<thead>
<tr>
<th>MATERIAL CONTENT DECLARATION FOR Heidolph Instruments GmbH &amp; Co. KG PRODUCTS</th>
<th>Hazardous substances</th>
<th>铅 Pb</th>
<th>汞 Hg</th>
<th>铬 Cd</th>
<th>六价铬 Cr(VI)</th>
<th>多溴联苯 PBB</th>
<th>多溴二苯醚 PBDE</th>
<th>环保期限标志 EFUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>部件名称 Part name</td>
<td>包装 Packaging</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>塑料外壳/组件 Plastic housing / parts</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>电池 Battery</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>玻璃 Glass</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>电子电气组件 Electrical and electronic parts</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>控制器/测量设备 Controller / measuring device</td>
<td>X</td>
<td>O</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>金属外壳/组件 Metal housing /parts</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>电机 Motor</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>配件 Accessories</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This table is created according to SJ/T 11364-2014.
Note: Table applies to all products. Some of the components or parts listed above may not be part of the enclosed product.

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: 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.

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.

Place, date Schwabach, 19.09.2019

Wolfgang Jaenicke
Chief Executive Officer CEO

Marcell Sarré
Vice President Quality Management & Technical Service
Manufacturer:

Heidolph Instruments GmbH & Co. KG
Walpersdorfer Str. 12
D-91126 Schwabach

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E-Mail: sales@heidolph.com
Web: www.heidolph-instruments.com