Betriebsanleitung
Operating instructions
Notice d'instructions

Hei-VAP Expert/Expert Control
Hei-VAP Ultimate/Ultimate Control

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About this document

These operating instructions describe all the functions and operation of the Hei-VAP Expert, Hei-VAP Expert Control, Hei-VAP Ultimate and Hei-VAP Ultimate Control type rotary evaporators. The operating instructions are an integral part of the described device!

Typographic conventions

This document uses the following symbols, signal words, and highlights:

Symbol	Signal word/explanation
	Warning symbols in combination with a signal word indicate dangers: **DANGER** Indicates an immediate dangerous situation. Failure to respect the indications will result in death or serious injury. **WARNING** Indicates a potential danger. Failure to respect the indications will result in serious injuries. **CAUTION** Indicates a potential hazard. If not avoided, damage to property and minor to moderate injuries can occur.
	Mandatory signs are used to indicate important and useful information on handling a product. This information is used to ensure operational safety and to maintain the value of the product.
→	The arrow indicates specific instructions to be followed to ensure operational safety when handling the product.

Copyright protection

Safety instructions in the official languages of the European Union

A summary of all safety instructions in the official languages of the European Union can be found in our Safety Guide for the product group Hei-VAP (shakers and mixers, Ref. 01-005-006-67). This document is available for download on our homepage in the most up-to-date version.

Directives applied, product certification

CE	**CE marking** The device meets all requirements of the following directives: • European Machinery Directive 2006/42/EC • EMC Directive 2014/30/EU
TÜV SÜD C US	**NRTL Certification** The device has been tested in accordance with the following standards: • UL 61010-1 :2012/R:2016-04 • CAN/CSA-C22.2 No. 61010-1:2012/U2:2016-04 • UL 61010-2-010:2015 • CAN/CSA-C22.2 NO. 61010-2-010:2015

California Residents

Important information for California residents regarding Prop 65:
Please visit www.P65Warnings.ca.gov for more information.

Customs declaration

Rotary evaporators, as combustion and cleaning equipment, may be subject to notification to a competent customs authority in the country of destination.

The evaluation of a customer obligation to notify and, if applicable, the notification to a competent customs authority in the country of destination is solely the responsibility of the user!

Residual risk

The device has been designed and manufactured in accordance with the state-of-the-art standards at the time of development and the recognized safety regulations. During mounting and use, as well as during maintenance, repair and cleaning work, there are nevertheless certain residual risks associated with the described device.

These are identified and described at the appropriate points in this document.

Intended use

The described device was designed by the manufacturer for the separation of substances, powder drying, concentration, crystallization of substances, and recycling of solvents under vacuum.

Due to its design, the device in its delivery condition may only be used in analytical processes or in laboratory-like conditions in the food, cosmetics, and pharmaceutical industries as well as other comparable industries that manufacture products intended for consumption by humans or animals, or for use on humans or animals.

Any other use of this device is not considered as intended!

Compliant use

The user is generally responsible for evaluating the conformity of his application and, if necessary, for taking additional measures.

Reasonably foreseeable misuse

Additional measures may be necessary for use under conditions or for purposes deviating from the intended use, and/or specific guidelines and safety regulations must be observed. Corresponding requirements must be evaluated and implemented by the operator in each individual case.

Compliance with and implementation of all relevant directives and safety measures for the respective field of application is the sole responsibility of the operator.

All risks resulting from improper use are borne solely by the operator.

The device may only be operated by authorized and instructed personnel. Training and qualification of the operating personnel as well as ensuring that the device is handled responsibly are the sole responsibility of the operator!

Transportation

During transportation, avoid severe shocks and mechanical stresses that can cause damage to the device.

Keep the original packaging in a dry and protected place for later use.

Storage

Always store the device in its original packaging. To protect against damage and excessive material aging, store the device in an environment that is as dry, temperature-stable and dust-free as possible.

Acclimatization

After each transportation and after storage under critical climatic conditions (e.g., high temperature difference between inside and outside), allow the device to acclimatize at room temperature for at least two hours to prevent possible damage due to condensation before commissioning it in the place of use. If necessary, extend the acclimatization phase if the temperature differences are very high.

Make all supply connections (power supply, tubing) only after the device has been acclimatized!

Permissible ambient conditions

The device is designed for indoor use only. The device is **NOT** suitable for outdoor use! The device is **NOT** suitable for use in potentially explosive areas!

When used in corrosive atmospheres, the service life of the device may be reduced depending on the concentration, duration and frequency of exposure.

Energy saving potential and cost efficiency

Even in standby mode, small amounts of energy are used to supply individual device functions. However, especially over longer periods of nonuse, this resource consumption adds up and causes avoidable costs.

Therefore, always switch off the device when not in use, especially for long periods of time (devices with main switch: Main switch in position [O]; devices without main switch: Unplug) to effectively avoid unnecessary energy consumption and the resulting costs.

General safety instructions

Before commissioning and using the device, familiarize yourself with all the safety regulations and occupational safety guidelines applicable at the place of use and observe them at all times.

Only operate the device if it is in faultless technical condition. In particular, ensure that there is no visible damage on the device itself and, where applicable, on connected devices or the supply connections.

If there is missing or misleading information on the device or regarding occupational safety, contact the responsible safety specialist or our technical service.

Only use the device in accordance with the regulations for intended use.

Electrical safety

Before connecting the device to the power supply, ensure that the voltage indicated on the rating plate matches the specifications of the local power utility company.

Ensure that the power supply circuit provided is protected by means of a residual-current device (RCD).

Always use the power supply cord provided with the device.

Prior to use, check that the device and the power supply cord are free of visible damage.

Make sure that the power plug can be reached directly at any time, in order to disconnect the device from the power supply at any time without delay.

Have repairs and/or maintenance work on the device carried out exclusively by an authorized electrician or by the technical service department of Heidolph Scientific Products GmbH.

Always disconnect the device from the power supply system before carrying out any maintenance, cleaning or repair work.

Data security

The user is responsible for ensuring data security when transferring data between the described device and other devices.

Only use secure networks for the data transfer and avoid use of critical infrastructure.

Only use high-quality shielded data cables for the data transfer.

For data transfer via USB, an industrial standard USB hub should be preferably used to ensure the most stable connection possible.

Operational safety

Operate the device under a closed ventilated fume hood when working with potentially hazardous substances (see EN 14175 and DIN 12924).

Do not make any unauthorized changes or modifications to the device!

Only use genuine spare parts and accessories, or those expressly approved by the manufacturer!

Rectify malfunctions or faults on the device immediately. Switch off and disconnect the device from the power supply, preventing reconnection, if it is not possible to eliminate the malfunction or rectify the fault immediately.

Observe all relevant general and safety instructions for the connected peripheral devices (observe the supplied documentation!).

Observe all other applicable regulations such as laboratory and workplace guidelines, recognized safety technology rules and special local regulations.

Occupational safety

Always use the prescribed personal protective equipment (PPE) such as protective clothing, safety goggles, protective gloves, safety shoes, etc.

Do not operate any other devices in the immediate vicinity of the device …

- which can generate electromagnetic fields in the frequency range between 9×10^3 Hz to 3×10^{11} Hz,
- which generate emission or radiation sources in the frequency range 3×10^{11} Hz to 3×10^{15} Hz (in the optical spectral range wavelengths from 1,000 µm to 0.1 µm),
- which generate ultrasonic or ionizing waves.

Do not operate the unit when adiabatic compression or shock waves may occur (pressure wave ignition).

Do not use substances that could release energy in an uncontrolled way and cause a pressure increase (exothermic reaction, spontaneous ignition of dusts).

Do not process hard, brittle materials such as stones, soil samples, etc., that could destroy the evaporation flask.

Only use heating bath media that guarantee sufficient heat transfer.

Do not operate the device with overpressure.

Do not expose the glass components to a pressure difference of more than 2 bar.

Ensure that the coolant overpressure does not exceed a level of 2 bar.

Ensure that the flow velocity does not exceed 1 m/s when aspirating liquids with flammable components (electrostatic charge, danger of ignition!).

Avoid the formation of explosion group IIC gases and potentially explosive distillation residues.

Personal protective equipment (PPE)

The operating company must determine and provide the necessary PPE, depending on the respective application and the media and chemicals used.

The required instruction of the personnel is solely within the operating company's responsibility.

Environmental protection

When processing environmentally hazardous substances, take appropriate measures to avoid hazards to the environment.

The evaluation of appropriate measures such as the marking of a hazardous area, their implementation, and the training of the relevant personnel is the sole responsibility of the operator!

Biohazard

When processing biohazardous substances, take appropriate measures to prevent hazards to persons and the environment, including:

- Instruction of the personnel regarding the necessary safety measures.
- Provision of personal protective equipment (PPE) and instruction of the personnel in its use.
- Marking of the device with the biohazard warning symbol.

The evaluation of appropriate measures such as the marking of a hazardous area, their implementation, and the training of the relevant personnel is the sole responsibility of the operator!

Other regulations

In addition to the notes and instructions in this document, observe all other applicable regulations such as laboratory and workplace guidelines, hazardous substances ordinances, recognized rules of safety engineering and occupational medicine as well as particular local regulations!

Noncompliance will invalidate any warranty claims against Heidolph Scientific Products GmbH.

The operating company is solely liable for all damage resulting from unauthorized changes or modifications to the device, from the use of unapproved or non-genuine spare parts and accessories, or from disregarding the safety instructions and hazard warnings or the manufacturer's instructions!

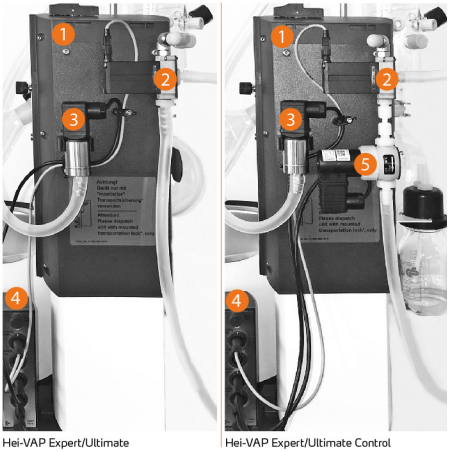
Mechanical design

Front view

The Hei-VAP Expert and Hei-VAP Ultimate variants have an identical design, but are equipped with different control panels.

The figure shows an example of the Hei-VAP Ultimate variant with glassware G3:

1 Condenser (e.g., G3) with receiving flask
2 Tilt angle adjustment for evaporation flask
3 Evaporation flask drive
4 EasyClip evaporation flask
5 Control panel
6 Evaporation flask
7 On/off switch (on the side of the device)
8 Heating bath



Hei-VAP Expert/Ultimate | Hei-VAP Expert/Ultimate Control

Device connections

Left: Hei-VAP Expert/Ultimate Control for use with speed-controlled vacuum pumps.

Right: Hei-VAP Expert/Ultimate Control with vacuum valve for use with diaphragm vacuum pumps.

Hei-VAP Expert/Ultimate variants without control functionality do not have the Control Box (4).

1 Vacuum terminal with components for vacuum regulation
2 Venting valve
3 Vacuum sensor
4 Control box (device [Control] variants only)
5 Vacuum valve

Hei-VAP Expert variant control panel & interfaces

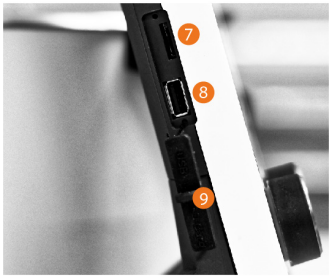
The control elements of the central display are touch-sensitive (touch panel) and can be operated by finger or with a suitable stylus.

CAUTION

Pointed or sharp objects can damage the surface of the display!

To operate the device functions, touch the display only with your fingertips or a special stylus with a soft-touch tip.

1 Display
2 Lift button UP (variant with motor-driven lift)
3 Lift button DOWN (variant with motor-driven lift)
4 Speed controller
5 Heating bath temperature control unit/vacuum pressure regulator
6 Standby button



The device interfaces are located on the side (7 + 8) and on the rear (10) of the control panel:

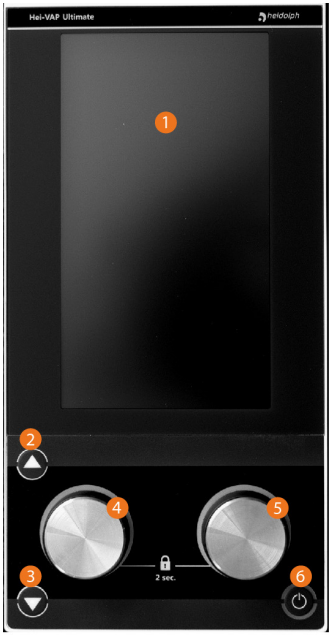
CAUTION

Penetrating liquid can cause malfunctions/short-circuits.

Only open the cap for the side interfaces if necessary and ensure that it is always plugged in during normal operation.

7 1× Micro SD (interface for service purposes)
8 1 × USB 2.0, max. 500 mA (interface for USB flash drives: Software and firmware updates, data backup)
9 Cap
10 Connection socket for rotary evaporator/control panel (4-pin) COM connection

Hei-VAP Ultimate variant control panel & interfaces



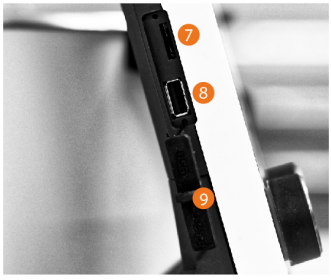
The control elements of the central display are touch-sensitive (touch panel) and can be operated by finger or with a suitable stylus.

CAUTION

Pointed or sharp objects can damage the surface of the display!

To operate the device functions, touch the display only with your fingertips or a special stylus with a soft-touch tip.

1 Display
2 Lift button UP (variant with motor-driven lift)
3 Lift button DOWN (variant with motor-driven lift)
4 Speed controller
5 Heating bath temperature control unit/vacuum pressure regulator
6 Standby button



The device interfaces are located on the side (7 + 8) and on the back (10 - 13) of the control panel.

CAUTION

Penetrating liquid can cause malfunctions/short-circuits.

Only open the cap for the side interfaces if necessary and ensure that it is always plugged in during normal operation.

7 1× Micro SD (interface for service purposes)
8 1 × USB 2.0, max. 500 mA (interface for USB flash drives: Software and firmware updates, data backup)
9 Cap
10 Connection socket for rotary evaporator/control panel (4-pin) COM connection
11 Mini USB port type AB, has no function in the current SW version!
12 RS-232 interface for connecting a Distimatic Pro automatic module
13 Ethernet interface for controlling the device via external control software

Control Box

The Control Box is an integral part of the delivery of the Hei-VAP Expert Control and Hei-VAP Ultimate Control variants and is used to control the peripheral devices.

1 Free slots for expansion cards (e.g., intermediate valve (option))
2 RS232 interface for connection of a recirculation chiller
3 Venting valve connection
4 Switchbox connection
5 Vacuum sensor connection
6 Vacuum valve connection

Structure of the user interface

All device functions are controlled via the integrated control panel and the graphical user interface. For clarity, all detailed descriptions in the following sections only use the example of the Hei-VAP Ultimate variant.

After switching on the device and initializing the device control, the start window of the last active operating mode appears on the display (in the example, DAA automatic mode):

1 [Main Menu] button
2 [Operating Mode] button, DAA mode in the example
3 [System Time] function button
4 [Process Visualization] display area
5 Boil or AUTOaccurate temperature (automatic mode only)
6 Coolant temperature indicator: Setpoint/actual value
7 [Vacuum] process parameters, setpoint/actual value
8 [Rotation] process parameters, setpoint/actual value
9 [Heating bath temperature] process parameters, setpoint/actual value
10 [Enable/Disable remote control] button
11 [Start/Stop process] button
12 [Start/Stop warm-up] button

Control and display elements

Control element	Function
[Main Menu] button	Touch this button to open the main menu with the following options: • Applications → Operating mode • Settings → System parameters • Languages → Menu language • Formats → System configuration and display formats • Data logging → Data recording • System check → complete system test • Error list → Open error list • Info → Open system info
[Operating mode] button	Touch this button to select the required operating mode: • Automatic mode • Ramp profile mode • Favorites mode
[System Time] function button	Touch this function button to toggle between the following functions: • System time display • Timer • Stopwatch See the following section “System time/timer/stopwatch display selection” on page 86 for detailed information.
[Remote Control] function button	Touch this function button to make the required setting: • Disable remote control: ´confirm the confirmation prompt. When remote control is disabled, the icon is crossed out. • Enable remote control: tap the crossed-out icon to re-enable the remote control without prompting.
[Start process] button	Touch this button to start the selected process.
[Warm-up] button	Touch this button to warm up the heating bath.
[Stop process] button	Touch this button to stop the ongoing process.
Process parameters set value/ actual value indicator	The following process parameters are displayed: • Boil/AUTOaccurate temperature • Coolant temperature • Vacuum pressure • Rotation speed • Heating bath temperature
Process visualization main display	The current process step is visualized in the main display.

Buttons and symbols

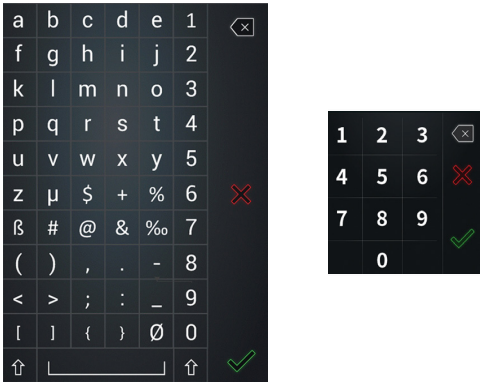
The following table provides an overview of the most important HMI buttons and icons on the control panel and in the menu navigation:

Symbol	Function
	Menu button
	Home button
	Automatic mode DAA button
	Ramp profile mode button
	Favourites mode button
	Start / start all button
	Stop / stop all button
	Confirm/OK button
	Cancel/Discard/NOK button
	Delete button
	Screen lock icon

On-screen keyboard

The numeric on-screen keyboard appears automatically when you touch a numeric entry field within a mask.

The alphanumeric on-screen keyboard appears automatically when you touch an input field for alphanumeric values within a mask.



- → Use the keyboard to enter the desired designation or value within the permitted range of values.
- → Touch the [Cancel] button to return to the parent dialog without making any changes.
- → Touch the Delete button to cancel the last entry.
- → Confirm your entry with [OK] to accept the new value or name. The on-screen keyboard closes.

Device-specific safety features

Electronic overtemperature protection

The device's electronic overtemperature protection is factory-set to 10 °C: In the case of thermally unstable substances, work must be carried out sufficiently far below the decomposition point to ensure process reliability when using the device and thus sample quality to a sufficient extent. Compliance with this requirement and the corresponding measures are the responsibility of the user.

The set value for the electronic overtemperature protection of the device cannot be adjusted by the user! If necessary, please contact our technical service, see “Contact details” on page 120 section for contact details.

Heating bath overheat protection

The device is equipped with an autonomous overheat protection function that prevents the heating bath from overheating. When reaching the maximum heating bath temperature, the heating function is switched off by a mechanical switch To reset the safety function while the device is in operation, follow these steps:

- Remove the heating bath from the base unit.
- Empty and let cool down the heating bath.
- Press the reset button [1] on the underside of the heating bath with a suitable tool (blunt tip, insulated or non-conductive material).
- Put the heating bath back on the base unit.

Residual heat indicator

After switching off the heating function, as long as the heating bath temperature is above 50° C, the LED ring of the temperature/vacuum control knob flashes after the end of the process. If the temperature/vacuum control knob is assigned the vacuum control function, a temperature warning message will appear on the display instead.

The residual heat indicator goes out when the device is switched off!

Positioning the device

Ensuring proper system and/or device mounting, including all accessory parts, is the sole responsibility of the operating company.

If required, Heidolph offers a professional system and/or device mounting service, including all supplied components and including commissioning. The associated mounting instructions (Ref. 01-001-009-12) describe all steps for proper system and/or device mounting in detail!

CAUTION

Due to improper mounting and/or installation of the system/device, as well as unauthorized changes to the mounting, there is a risk of direct and indirect damage to property!

If necessary (system mounting and installation carried out by the operating company or third parties, necessary changes to the existing mounting), contact the manufacturer's technical service.

Place the device on a clean, stable, level and horizontal surface.

The operating company is solely liable for all damage resulting from unauthorized changes or modifications to the device, from the use of unapproved or non-genuine spare parts and accessories, or from disregarding the safety instructions and hazard warnings or the manufacturer's instructions! At the same time, in such a case, all warranty claims against Heidolph Scientific Products GmbH are invalidated.

Connecting the control panel

Use the associated 4-pin connection cable to connect the removable control panel to the device base (rear, see also sections “Hei-VAP Expert variant control panel & interfaces” on page 73and “Hei-VAP Ultimate variant control panel & interfaces” on page 74).

Power supply

DANGER

Observe the notes and instructions given in section “Electrical safety” on page 69.

Connect the power supply cord to the device inlet on the back of the base unit. Make sure that the device is switched off: Main switch [off]. Connect the power supply cord to a properly secured mains socket-outlet.

Switching the device on/off

CAUTION

Before each operation of the device, check the caps and connecting elements of all glass components for correct and tight fit!

At loose/leaky connections, ambient air is sucked in during the vacuum build-up and the required vacuum pressure cannot be reached in a stable manner!

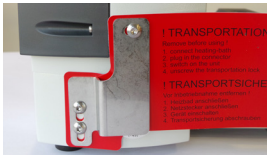
In the event of excess pressure, there is a risk that liquid will escape from the system! The device and surrounding areas can be severely contaminated by leaking media!

To switch on and off, use the main switch (on the side of the housing).

Transportation lock

All variants with motor driven lift are provided with a mechanical transportation lock to prevent damage during the transport of the device. This transportation lock must be removed as part of the commissioning the device! Keep the transportation lock with the original packaging for future use.

The transportation lock consists of a profiled plate, which is fixed onto the housing with three screws M5×8. The profiled plate is clearly marked with a red flag.



Procedure

- → Make sure that the control panel is connected correctly and switch on the device.
- → Using the supplied hex wrench, loosen the three fixing screws and remove the profiled plate.
- → Move the flask lift to the upper end position (see section “Flask lift” on page 82).
- → Switch off the device: Switching off the device with the flask lift in the upper end position, the additional electronic safety function will be disabled.
- → Switch on the device again: The device is ready for use.

Evaporation flask

CAUTION

In the event of improper handling, the evaporation flask can fall to the floor.

- Glass breakage!
- Risk of injury/contamination due to leaking media!

Observe the instructions in section “Mount/remove evaporation flasks” on page 81.

Use only the evaporation flasks approved by the manufacturer.

WARNING

The smallest damage to the evaporation flask can lead to glass breakage when pressurized.

- Glass breakage!
- Risk of injury/contamination due to leaking media!

Before each operation of the device, check the evaporation flask for visible damage.

Mount/remove evaporation flasks

CAUTION

The heating bath is designed for a maximum operating temperature of 210°C (using silicone oil). From a liquid temperature of 50 °C, there is a risk of injury in the event of contact.

Allow heated liquid to cool below 50 °C before removing the flask.

Use appropriate personal protective equipment (heat-resistant gloves, eye protection, safety clothing) to remove the flask.

The evaporation flask is fixed to the vapor tube of the rotary evaporator using a special retort clamp (EASY CLIP):

EASY CLIP open, flask unsecured

EASY CLIP closed, flask saved

Procedure

→ Stop all ongoing processes and the rotational movement of the flask and move the flask lift to the upper end position (see section “Flask lift” on page 82).

→ Loosen the fitting of the EASY CLIP on the vapor tube and push the clamping lever outward (see figure above).

→ Place the flask in the EASY CLIP so that the ground joints of the flask and the vapor tube are fully aligned next to each other in a straight line and press the clamping lever of the EASY CLIP over the flask collar until the clamping lever audibly clicks into place (clean the glass joints before inserting!).

→ Screw the EASY CLIP back onto the vapor tube and move the flask lift to the lower end position. Take into consideration the flask size and the filling quantity of the heating bath (see section “Fill the heating bath” on page 83)!

Adjusting the flask tilt

→ Stop all ongoing processes and the rotational movement of the flask and move the flask lift to the upper end position (see section “Flask lift” on page 82).
→ Loosen the locking[1] on the lift base and hold it tight against the spring force.
→ Swing the condenser until the evaporation flask is at the desired angle. Make sure that the flask can turn freely!
→ Release the locking [1] and if necessary, slightly swing the condenser-evaporation flask axis until the drive unit clicks into place.

Adjusting the immersion depth

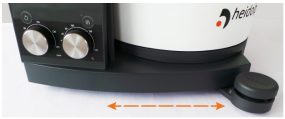
→ Stop all ongoing processes and the rotation movement of the flask and move the flask lift to the desired height with the evaporation flask mounted (see section “Flask lift” on page 82).
→ Loosen the fixing screw [1] on the lift base [2] of the device and push the stop adjustment bar [3] downward up to the lift stop [4].
→ Retighten the fixing screw [1].
→ If necessary, position the base plate with the heating bath according to the flask size.

The lift can only be moved downwards up to the set immersion depth. Before the evaporation flask is immersed, check that the fixing screw is firmly seated!

Flask lift

Devices with manual lift

Devices with a manual lift are equipped with a lever for moving the lift up and down:



→ Push and move the lever to the left to move the lift up.
→ Push and move the lever to the right to move the lift down.

Devices with motor-driven lift

For devices with motor-driven lift, the lift is moved using the two lift buttons on the control panel:

→ Press the [UP] arrow button to move the lift upward.

→ Press the [DOWN] arrow button to mode the lift downward.

The movement stops as soon as you release the button!

Receiving flask

→ Stop all ongoing processes and the rotation of the flask.

→ Move the flask lift to the upper end position (see section “Flask lift” on page 82).

→ Place the receiving flask on the condenser so that the ground joints have full contact and are in a straight line (clean the ground joints before inserting the flask).

→ Guide the ground clamp above the ground joint and tighten the ground clamp finger tight.

Heating bath

The heating bath is placed on the flexible base plate of the base unit and connected to the device by means of a 7-pin connecting cable.

The recess provided on the bottom side ensures that the heating bath can only be placed in the right position on the base plate.

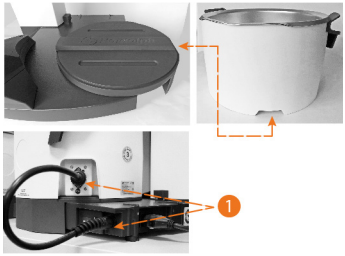
→ Stop all ongoing processes and the rotation of the flask.

→ Move the flask lift to the upper end position (see “Flask lift” on page 82).

→ Place the heating bath on the base plate of the base unit: The base plate is equipped with a guide rail suitable for the recess in the bottom of the heating bath.

→ Make sure that the heating bath is securely fixed to the base plate and in position.

→ Use the 7-pin connection cable [1] supplied to connect the socket of the heating bath to the base unit.



→ Before removing the heating bath, disconnect the 7-pin connecting cable between the heating bath socket and the base unit!

Fill the heating bath

CAUTION

If the level in the bath is too high, there is a risk that the heating bath liquid will overflow when the flask is immersed.

- Property damages
- Loss of production

The device and surrounding areas can be severely contaminated by escaping heating bath liquid!

Use the MIN/MAX markings imprinted on the inside of the heating bath as a reference.

→ Ensure that the evaporation flask is correctly mounted (“Mount/remove evaporation flasks” on page 81).

→ Move the flask lift to the upper end position (see “Flask lift” on page 82).

→ With the flask in the lower end position, fill the heating bath until the fluid reaches a level between the MIN/MAX marks on the inside.
  • The maximum filling volume is 6 liters. Recommended filling quantity: Depending on the flask size and the immersion angle: 2.2 L to 4.5 L.

Emptying the heating bath

CAUTION

The heating bath is designed for a maximum operating temperature of 210°C (using silicone oil). From a liquid temperature of 50 °C, there is a risk of injury in the event of contact.

Always grip and hold the heating bath by the ergonomic safety handles on the side!

Before emptying the heating bath, allow heated liquid to cool down to below 50 °C.

Use suitable personal protective equipment (heat-resistant gloves, eye protection, safety clothing) to empty the heating bath.

→ Move the flask lift to the upper end position (see “Flask lift” on page 82).
→ Disconnect the 7-pin connecting cable between the heating bath and the base unit.
→ Remove the heating bath from the base plate of the base unit.

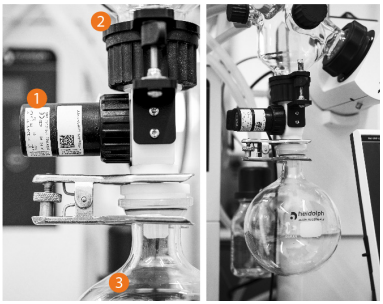
When changing the bath liquid, the heating bath must be thoroughly cleaned and dried.

In particular, when changing from water to oil, make sure that the heating bath temperature is only slowly and gradually augmented during restart (recommendation: 10 °C), so that remaining water in the system can evaporate until the process temperature is reached.

Intermediate valve (option)

The [Intermediate valve] system extension was specially developed for applications for drying substances. It helps the user to separate fractions (liquid/liquid or liquid/solid) without the distillate boiling back, in order to be able to end processes in a controlled manner.

The optional intermediate valve [1] is mounted between the condenser [2] and the receiving flask [3] of the device, detailed installation instructions and further information on the display of the intermediate valve on the user interface are provided on the enclosed information sheet 01-005-006-86.



Cooling water and vacuum connection

The cooling water and vacuum are supplied via the condenser used. Please observe the specific installation instructions for the individual glassware.

Vapor tube

The vapor tube between the condenser and the evaporation flask is supplied pre-assembled and can be dismantled for conversion, maintenance and cleaning purposes.

A flask clamp type EASY CLIP NS29 is pre-fitted to the vapor tube in the as-delivered condition. A flask clamp type EASY CLIP NS24 is required for smaller flasks; this is included in the scope of delivery.

Vapor tube assembly parts:

1 Clamping sleeve
2 Fitting
3 EASY CLIP flask clamp
4 Vapor tube

Condenser

→ If necessary, install the vapor tube [3] on the drive [2], see previous “vapor tube” section.
→ Place the PTFE seal [1] stop supplied on the vapor tube.
  • Pay attention to the position of the [Motor side] embossing.
→ Insert the supplied tension spring [4] into the union nut [5] of the condenser [6.]
→ Place the flange of the condenser in the middle and flat against the PTFE seal and screw the union nut onto the thread of the drive [2].
  • Press in the [lock] pin to block the drive.

PTFE seal

The PTFE seal of the device must be cleaned after a 100-hour running-in period. To do this, follow the steps in this section.

CAUTION

Improper cleaning can damage the surfaces of the PTFE seal.

Clean the seal surfaces with a soft, lint-free and only slightly moistened cloth. Never use any aggressive or abrasive cleaning agents or aids.

Dismantling and cleaning the PTFE seal

- → Disassemble the condenser as described above.
- → Remove the PTFE seal from the vapor tube.
- → Clean the PTFE seal with a soft cloth, paying particular attention to any residue under the sealing lips.
- → Install the PTFE seal and condenser as described above.

Distimatic Pro

To connect an optional Hei-VOLUME Distimatic Pro automatic module, use the RS-232 interface on the rear of the control panel (Hei-VAP Ultimate variant only, see section “Hei-VAP Ultimate variant control panel & interfaces” on page 74).

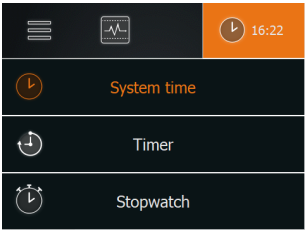
Operation with a Hei-VOLUME Distimatic Pro automatic module requires various settings to be made, which are described in more detail in sections “Connectivity” on page 96 and”Remote mode” on page 109. For more information, see Hei-VOLUME Distimatic Pro manual, Ref. 01-005-006-51.

Device configuration

The basic settings for operation are made in the main menu. After switching on the device and initializing the software, the start page of the last active operating mode appears (in the example: Advanced operating mode, DAA mode [2]).

System time/timer/stopwatch display selection

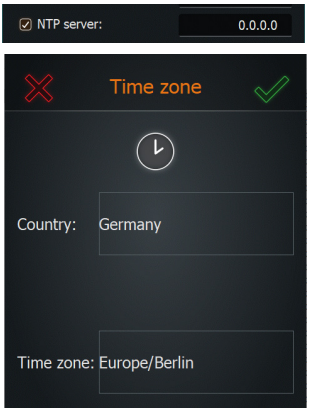
- → Tap the [System time/3] function button to open the Time/Timer/Stopwatch selection window.
- → Tap the required option to switch to display mode:
  - System time: Time in 12-/24-h format.
  - Timer: Display of the time remaining until the scheduled end of the process
  - Stopwatch: Display of the actual elapsed time from start of the process.



System time

The system time can be set manually by the operator or synchronized with a time server. The corresponding preselection is made via the main menu, [Hei-CONTROL Pro] menu item.

Synchronizing system time with NTP server



- → Select the [NTP Server] option in the [Hei-CONTROL Pro] menu for automatic synchronization.
- → Confirm with [OK] to close the menu.
- → In the start window, switch to the [System Time] display mode, if necessary, see "System time/timer/stopwatch display selection" on page 86.
- → Touch the [System time] function button for about two seconds to open the dialog box to select your time zone:
  - First touch the [Country] field and select the user country from the following selection list.
  - Then touch the [Time zone] field to set a specific time zone within the user country, if necessary.
- → Confirm the new setting with [OK]: The system time is updated automatically via the displayed NTP server.

Setting the system time manually

- → In the [Hei-CONTROL Pro] menu, deselect [NTP server] option to set the time manually.
- → Confirm with [OK] to close the [Hei-CONTROL Pro] menu and open the start window with the home button.
- → If necessary, switch to the [System time] display mode, see "System time/timer/stopwatch display selection" on page 86.
- → Touch and hold the [System time] function button for about two seconds to open the system time manual setting dialog box.
- → Touch the [Date/1] function button and use the keyboard to enter the current date.
- → Touch the [Time zone/2] function button and select your time zone.
  - First, tap [Country] and select the user country from the following selection list.
  - Then tap [Time zone] to set a specific time zone within the user country, if necessary.
  - Confirm the new setting with [OK].
- → Touch the [Time/3] function button and use the keyboard to enter the current time.
- → Confirm the new setting with [OK].

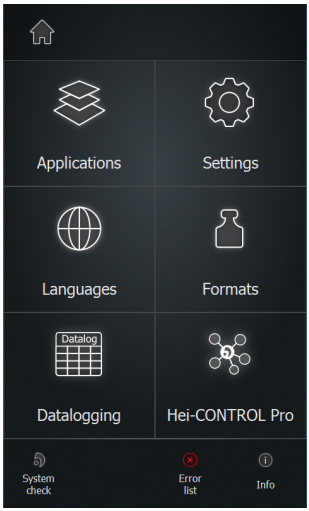
Programming the timer

→ Switch to [Timer] display mode, see “System time/timer/stopwatch display selection” on page 86.

→ Touch and hold the [System time] function button for approx. two seconds to open the on-screen keyboard and to program the timer.

- Adjustment range: 00:00:01 to 99:9:9 in [hh:mm:ss], corresponding to one second to four days, three hours, nine minutes and nine seconds

Menu structure



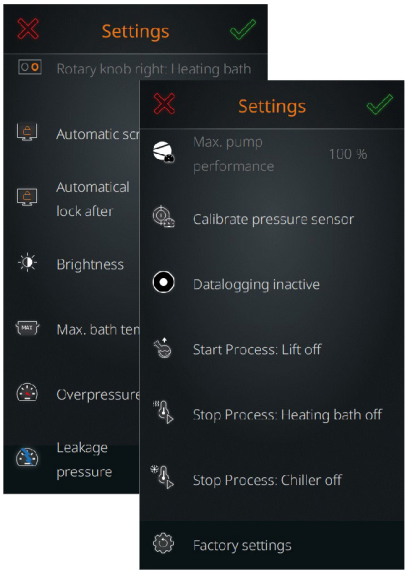
The following buttons and function buttons are available in the main menu:

Button	Function/Meaning
	[Home] button. Touch this function button to return to the previously opened view (start window).
Applications	Touch this function button to open the [Applications] menu and select an operating mode.
Settings	Touch this function button to open the [Settings] menu. In this menu, various basic settings can be adjusted and the device can be reset to the factory settings.
Languages	Touch this function button to open the [Languages] menu and load a required user language.
Formats	Touch this function button to open the Formats menu. Here you can select the desired format for the display of numerical values, time, date and temperature. At the same time, the connected rotary evaporator/glassware is assigned and operation with or without residue drainage is selected.

Button	Function/Meaning
Data logging	Touch this function button to start the data logging function.
Hei-CONTROL Pro	Touch this function button to open the screen form for definition of the network parameters.
System check	Touch this function button to perform a full system check.
Error list	Touch this function button to open the list of all error messages.
Info	Touch this function button to open the information window of the system, including firmware and hardware data .

Settings

The device settings can be adjusted in the [Settings] menu. The menu includes several screens! Touch the display and swipe up or down to scroll through the menu.



Confirm each entry with [OK] to accept changes and return to the higher-level menu or start window of the operating mode; return to the higher-level menu/start window with [Cancel] if necessary without any changes. The various options are described in detail in the following sections:

Right knob: ...

Use this menu item to define the function of the temperature/vacuum control knob on the control panel.

→ Touch the function button to switch between the two options:

- [Vacuum] selection: Knob is used to regulate the vacuum pressure.
- [Heating bath] selection: Knob is used to regulate the heating bath temperature.

Automatic screen lock ...

This menu item allows you to activate/deactivate the automatic screen function. Touch the function button to switch between the two options:

- [Automatic screen lock active] selection: Screen is locked after a specified time. The desired wait time is set under the following [Automatically lock after] parameter.
- [Automatic screen lock inactive] selection: Screen is not locked. In this mode, the following [Automatically lock after] parameter is grayed out and cannot be changed.

Automatically lock after

You can use this menu item to specify the time after which the display is automatically locked from the last operation. Condition: the previous parameter [Automatic screen lock ...] must be set to [... active]:

→ Touch the function button to open the on-screen numeric keyboard.

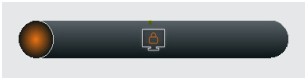
→ Use the keyboard to enter the desired wait time in a range of at least one (1) to a maximum of sixty (60) minutes. Entries outside this value range are not accepted!

From a continuous on-time of approx. 60 minutes, there is a risk of the display becoming burnt in and static display elements remaining visible as a visible pattern temporarily, even after switching off. It is therefore advisable to set a maximum time of 60 minutes before the screen lock is activated.

When the screen is locked, the lock icon appears on the display.

→ Touch anywhere on the screen to display the screen unlock slider:

→ To unlock the screen, drag the slider to the right.



Brightness

You can use this menu item to adjust the brightness of the display.

→ Touch the function button to open the on-screen numeric keyboard.

→ Define the required brightness in percent.

→ Confirm your entry with [OK] to accept the change.

Max. bath temperature

You can use this menu item to define a maximum heating bath temperature (e.g., for the processing of thermosensitive media).

→ Touch the function button to open the on-screen numeric keyboard.

→ Set the maximum heating bath temperature in the range between 20° C and 90° C. Entries outside this value range are not accepted!

When loading favorites and ramp profiles, the system automatically checks whether the set maximum bath temperature could affect the process. In such a case, a warning message appears on the display.

→ Confirm your entry with [OK] to accept the change.

Overpressure

This menu item allows you to set the value for the safety shutdown of the system when an impermissible high vacuum pressure is reached. As soon as the vacuum pressure reaches this limit, all functions are switched off (vacuum, flask rotation, heating bath) and the flask lift is moved to the upper end position (only variants with motor lift!). In addition, a warning message appears on the display.

→ Touch the function button to open the on-screen numeric keyboard.

→ Define a limit value in the range between 900 mbar and 1,400 mbar (factory setting: 1,400 mbar). Entries outside this value range are not accepted!

When loading favorites and ramp profiles, it is automatically checked whether the set limit value could affect the process. In such a case, a warning message appears on the display.

→ Confirm your entry with [OK] to accept the change.

Leakage pressure

This menu item allows you to set the limit value for the safety shutdown of the system in case of failure to reach the leakage pressure. This safety function is activated when the leak pressure falls below the specified minimum during the evacuation process. If the leak pressure is not reached during evacuation (e.g. due to glass breakage or leaks), all functions are switched off (vacuum, flask rotation, heating bath) and the flask lift is moved to the upper end position (only variants with motor lift!). In addition, a warning message appears on the display.

→ Touch the function button to open the on-screen numeric keyboard.

→ Define a limit value in the range between 1 mbar and 1,399 mbar (factory setting: 1,399 mbar). Entries outside this value range are not accepted!

→ Confirm your entry with [OK] to accept the change.

Max. pump performance

This menu item allows you to define the maximum pump performance in percent of one hundred. By reducing the intake capacity of the pump, a higher solvent recovery rate can be achieved. When using a speed-controlled vacuum pump, the maximum pump performance can be reduced to a maximum of 20% in 10% increments to avoid foaming or boiling delay. When using a diaphragm vacuum pump, this menu item is grayed out!

→ Touch the function button to open the on-screen numeric keyboard.

→ Set the maximum pump performance in the range between 20 % and 90 %. Entries outside this value range are not accepted!

→ Confirm your entry with [OK] to accept the change.

Calibrating the pressure sensor

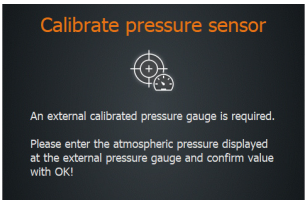
The vacuum sensor is properly calibrated by the manufacturer before delivery. Normally, recalibration is not required.

During a user recalibration, the evaporation flask should rotate to ensure that system does not have any leaks. All other processes must be stopped!

→ Make sure that the pressure sensor is properly connected to the device.

→ Ventilate the system.

- → Touch the function button to open the Calibrate p-sensor mask and follow the instructions on the display:
- → Use the on-screen keyboard to enter the actual atmospheric pressure.
- → Close all openings on the evaporator system.
- → Confirm the entry. The vacuum control starts automatically.



- → Once the system is evacuated to a low level, the second calibration value can be entered: Wait until the vacuum pump does not reduce the pressure further, i.e. until the minimum possible vacuum pressure is reached.
- → Enter this value and confirm the values.
- → The calibration is then corrected based on the input values.

When the calibration process is canceled and the device is reset to the factory settings, the default values are loaded!

Data logging

This menu item allows you to activate/deactivate the data recording function.

- → Data logging off display: Touch the function button to activate the function.
- → Data logging active: Touch the function button to deactivate the function.
- → Confirm your entry with [OK] to accept the change.

See “Data logging” on page 94 for detailed information.

Start process: Lift ...

Only variants with motor-driven lift: In this menu, define the behavior of the flask lift at the start of the process.

- → Touch the function button to switch between the two options:
  - [Start process: Lift on]: With this selection, the flask lift automatically moves to the lower end position when starting the process and the evaporation flask is thus automatically immersed in the heating bath.
  - [Start process: Lift off]: With this selection, the flask lift remains in the upper end position on starting the process; the evaporation flask must be immersed in the heating bath manually.
- → Confirm your entry with [OK] to accept the selection.

Deactivate this function when using a foam brake and on devices using a large evaporation flask to prevent damage to the flask!

Stop process: Heating bath ...

Use this menu item to define the behavior of the heating bath heater at the end of the process.

→ Touch the function button to switch between the two options:
  - [Stop process: Heating bath on]: With this selection, the heating bath heater remains switched on after the end of the process.
  - [Stop process: Heating bath off]: With this selection, the heating bath heater is switched off automatically at the end of the process.

→ Confirm your entry with [OK] to accept the selection.

Stop process: Chiller ...

In this menu, define the behavior of the chiller at the end of the process.

→ Touch the function button to switch between the two options:
  - [Stop process: Chiller on]: With this selection, the chiller remains switched on at the end of the process.
  - [Stop process: Chiller off]: With this selection, the chiller is automatically switched off at the end of the process.

→ Confirm your entry with [OK] to accept the selection.

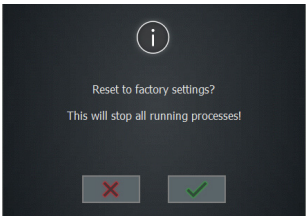
Factory settings

With this menu item you can reset the device to the factory settings. All user data (parameter adjustments, favorites, ramp profiles) will be deleted!

→ Touch the [Factory settings] function button. The following prompt appears on the display:

→ Confirm the confirmation prompt with [OK] to reset the device to the factory settings. The device must be restarted!

→ To cancel the reset and return to the previous menu without making any changes, touch the Cancel button.



Applications

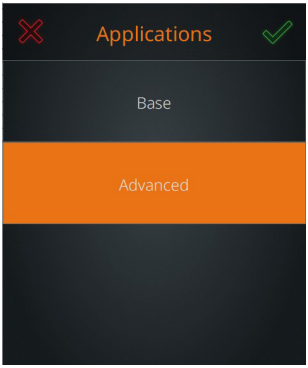
In the Applications menu, you can switch between manual mode [Basic] and automatic mode [Advanced] (see section “Operating modes” on page 98 for a detailed description of the operating modes).

→ Complete all ongoing processes before changing the operating mode.

→ Touch the entry of the desired operating mode. The background color of the selected entry changes to yellow, as shown.

→ Confirm the selection with [OK] to activate the selected mode; press [Discard] to return to the previous view without making any changes.

→ The start window of the activated mode appears on the display.



User language

The user language can be changed at any time in the [Languages] menu. Available languages are English, German, Mandarin, French, Spanish, Portuguese, Italian, Russian and Polish.

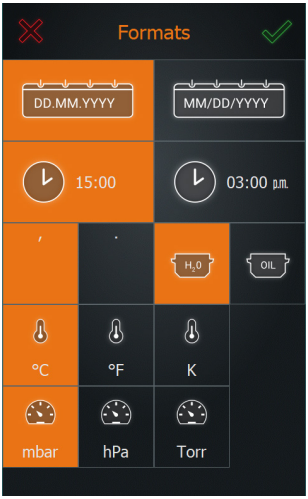
→ Touch the [Languages] function button.
  • The list of all available menu languages opens.
→ Touch the entry for the desired language.
  • The background color of the selected entry changes to yellow.
→ Press [OK] to confirm the selection and to return to the start window of the active mode.

Formats

The following system settings can be made in the [Formats] menu:

- Set date format (US or EU)
- Set time format (12/24-hour)
- Select heating bath liquid (water, oil)
- Set number separator (US or EU)
- Set temperature unit (degrees Celsius, Fahrenheit, Kelvin)
- Set unit for pressure display (mbar, hPa, torr)

→ The active selection is highlighted in yellow. Touch the desired function button to switch between options. Several changes can be made at the same time!
→ Confirm the new settings with [OK]. All changes are immediately accepted without a confirmation prompt!
→ To discard changes and to return to the previous menu, touch the [Cancel] button.



Data logging

Use the [Data logging] function to record the individual steps of a process. The function records each individual step with start and end time and stores this information in the Data logging memory.

The internal database offers a total of 30 slots with a capacity of 550,000 entries per measurement series for this.

The data is recorded at fixed intervals (ten seconds) with a fixed recording rate of 1 entry/10 seconds, i.e. the maximum recording time is approx. 152 hours.

If the remaining capacity is 10%, a first warning message appears on the display.

If the remaining capacity is 0%, a second warning message appears on the display and data recording is stopped. In this case, export and/or delete existing data from the system memory to record additional data.

No running processes will be affected by the stop of the data recording!

Activating/deactivating data logging

The data logging function is manually activated/deactivated.

→ To enable data recording, open the [Settings] menu and activate the [Data logging] function there.

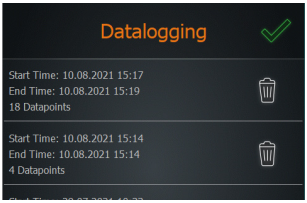
- When the function is activated, the [Start process] and [Stop process] buttons are marked with an additional icon in the footer of the start window:

Use the data logging option to export the recorded values to a USB flash drive and read them out on a PC or delete them from the system.

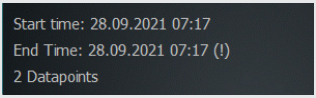
→ Open the main menu and touch the [Data logging] function button.

→ The data logging list opens.

→ The recorded values show when a process was started and stopped again.



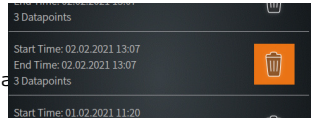
In the event of a power interruption or when the device is switched off during the current data recording, the recording process is aborted and the corresponding entry marked with "(!)". The displayed data set contains the recorded process data that was recorded up to the power interruption:



In the Datalog export file, the corresponding file names are also given the addition "(!)" before the file extension: "(!).csv", or "(!).json".

Deleting entries

→ To delete an entry from the list, touch the associated delete button. During the deletion, the assigned delete button has a yellow background.

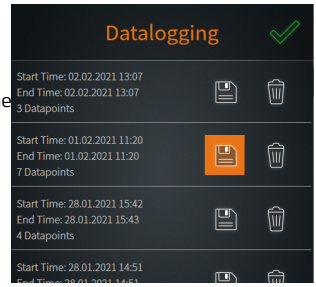


Saving entries on a USB flash drive

Recorded entries can be saved on a USB flash drive. To do this, connect a VFAT-formatted USB flash drive to the USB port of the display and open the data list as described.

As soon as a USB flash drive is connected, a **Save**button (disk icon) is assigned to each list entry.

→ To save an entry from the list, touch the associated **Save** button. During the saving, the assigned **Save** button has a yellow background:



PRACTICAL TIP

Large amounts of data are generated during the long-term recording of process data (several days).

It is therefore recommended that you save the current data recording memory on a USB flash drive and remove the existing entries from the internal memory before starting the process.

Connectivity

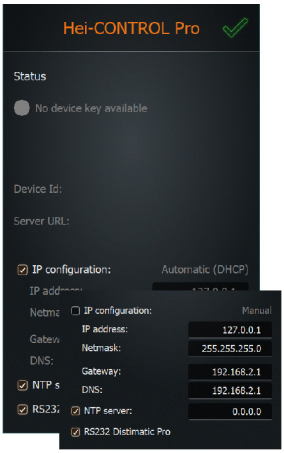
All necessary network parameters and settings for time synchronization can be defined in the [Hei-CONTROL Pro] menu:

All associated parameters can be defined manually in [Static IP configuration] mode (checkbox deselected). Select the checkbox to obtain the IP address of the device automatically.

Select the [NTP server] checkbox to synchronize the system time of the device with a time server. This function requires a valid IP configuration! Place the cursor in the corresponding input field and use the on-screen keyboard to enter the required server address.

Select the [RS232 Distimatic Pro] checkbox if the device is to be connected directly to an automatic Hei-VOLUME Distimatic Pro module and will be controlled by it.

Deselect the [RS232 Distimatic Pro] check box if the device is to be addressed via the RS-232 interface of the control panel via a compatible external controller (for further information, see sections “Remote mode” on page 109 and “RS-232 interface commands” on page 114).



If the time is synchronized via a time server, the [System time] function button in the display header can only be used to select a time zone.

If an ethernet connection exists, the system time is updated automatically via the defined time server. To define the system time manually, the [NTP server] option must be deselected!

The full functionality of the Hei-CONTROL Pro application also requires the Hei-CONTROL Pro server. For more information, refer to the Hei-CONTROL Pro User Manual. The connection status of the Hei-CONTROL Pro application is displayed in the [Status] field.

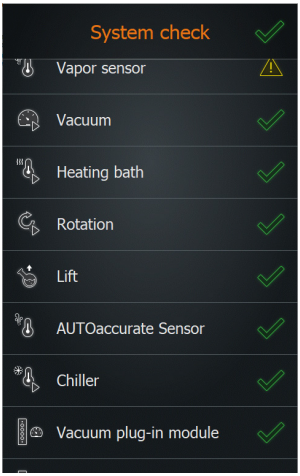
System check

All connected sensors and actuators or peripheral devices are displayed in the [System check] menu. Various tests can be carried out via the corresponding [System test] sub-menu to ensure the functional and operational safety of the system:

→ Open the [Main menu] and touch the [System check] function button in the footer. The [System check] menu appears:
  - Fault-free components are marked with the [OK] status indicator.
  - Faulty components are marked with [NOK]. Please note the corresponding error messages.

→ Swipe up or down on the touch panel to scroll through the list.

→ Touch the [TEST] function button in the header of the [System check] menu to open the [System test] sub-menu.



CAUTION

Faulty connections or signaling can lead to malfunctions or uncontrolled switching operations!

Leaks reduce the performance of the entire system.

Correct any indicated faults and/or detected malfunctions immediately.

In the event of a continued fault indication/malfunction, contact your local sales representative or our technical service department.

Operating modes

WARNING

Due to incorrect/insufficient process settings, there is a risk that impermissible operating values are reached and, as a result, device components will be damaged and heating bath liquid and/or distillation material will escape.

Only qualified personnel may adjust the process settings of the device.

When determining the pressure values, observe the chemical-physical properties of the respective material to be distilled.

Pay particular attention to the specific safety instructions for the processing of toxic substances!

When operating the device, there is a risk of contact with rotating parts. Loose clothing, jewelry and open hair can be pulled in!

If possible, operate the device with a guard hood (accessory) or under a closed laboratory fume hood.

Never touch rotating parts with your hands. Do not bend over rotating parts.

Wear tight-fitting work clothes, remove jewelry before starting work, tie long hair under a hair net or under a suitable head covering.

Use appropriate personal protective equipment (PPE).

At high rotation speeds, the heating bath liquid can spray away from the evaporation flask by forming film and/or slop out of the heating bath. There is a risk of scalding and/or contamination.

If possible, operate the device with the guard hood closed.

Adjust the rotation speed of the evaporation flask according to the recommendations in this section.

Use appropriate personal protective equipment (PPE).

Clean dirty surfaces immediately!

After switching on the device and initializing the software, the start page of the last active operating mode appears.

Before starting the process, check and correct the main device parameters such as [behavior of the motor-driven lift at the start of the process], [behavior of the heating bath heater on stopping the process], [behavior of the chiller on stopping the process] etc., see section “Device configuration” on page 86

Open the [Main menu], touch the [Applications] function button and activate the desired operating mode: [Basic] or [Advanced]. For a detailed description of the operating modes, see the following sections.

Base mode

After switching on the device and initializing the software, the start page of the last active operating mode appears. Open the [Main menu] (1), touch the [Applications] function button and activate [Basic] mode.

In [Basic] mode, the vacuum pressure, rotation speed and heating bath temperature operating parameters are entered manually by the operator:

→ Touch a parameter's field to open the on-screen keyboard and set a desired value. The input values are accepted without a security prompt:
  - Coolant temperature (2), -10 – 20 °C)
  - Vacuum pressure (3), 1 – 1,400 mbar
  - Rotation speed (4), 10 – 280 rpm
  - Heating bath temperature (5), 20 – 80 °C)

→ Touch the icons of the [Coolant temperature] (2), [Vacuum pressure] (3), [Rotation] (4) and [Heating bath temperature] (5) parameter displays to start (icon changes from white to yellow) or to deactivate (icon changes from yellow to white) the assigned process independently of the other processes.

→ Touch the [Start process] button to start all processes with the displayed setpoints at the same time.
  - Function button changes to [Stop process].

→ Touch the [Stop process] button to stop all ongoing processes at the same time.
  - Function button changes to [Start process]

Advanced mode

After switching on the device and initializing the software, the start page of the last active operating mode appears. Open the [Main menu] (1), touch the [Applications] function button and activate the [Advanced] operating mode.

In [Advanced] mode, the following modes can be selected via the [Operating mode] function button (7) (in the example, Dynamic AUTOaccurate): Favorites (8), Ramp profiles (9), and Dynamic AUTOaccurate (10).

By default, the last active profile or the last active favorite is always loaded!

Dynamic AUTOaccurate (DAA) mode

In Dynamic AUTOaccurate (DAA) mode, the vacuum pressure is controlled depending on the temperature.

System requirements

For operation in Dynamic AUTOaccurate (DAA) mode, the device has to be equipped with an optional AUTOaccurate sensor.

The AUTOaccurate sensor can only be used in combination with glassware G3 or G6!

The temperature-dependent vacuum control in DAA mode is based on two values:

- [Chiller temperature]: Temperature reading on the AUTOaccurate sensor in the condenser
- [Intensity]: Relative temperature rise to the closing of the vacuum valve, based on the measured condenser temperature T(AA)

At the start of the process, the condenser temperature T(AA) is measured using the AUTOaccurate sensor. When reaching a stable level, the actual evaporation process starts. This "pre-process" can be manually canceled at any time. In this case, the evaporation process is started immediately with the currently measured condenser temperature value.

During the evaporation process, the temperature at the AUTOaccurate sensor increases relative to the initial condenser temperature T(AA). If this temperature rise reaches the defined intensity ([Intensity] parameter), the evaporation process is stopped.

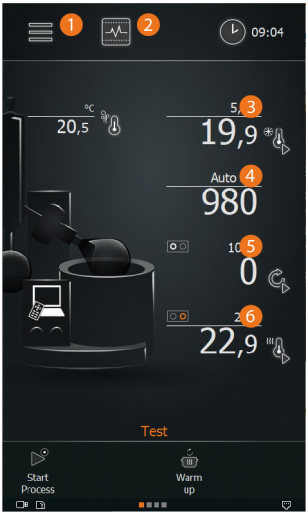
As soon as the temperature at the AUTOaccurate sensor has dropped by a defined value, the system is evacuated and the evaporation process starts again. If the temperature rise at the AUTOaccurate sensor reaches the defined intensity again (at relatively higher vacuum pressure), the vacuum pump is switched off again, etc.

In this way, a consistent performance is achieved in the processing of solvents or mixtures throughout the distillation process.

During multiple solvent distillation, the described process steps are repeated until a defined maximum vacuum pressure is reached ([End pressure] input value). The distillation process is then switched off.

Activating DAA mode

Touch the [Operating mode] function button (2) and the [Dynamic AUTOaccurate] icon in the following selection.



Adjusting parameters

Touch a parameter's number field to open the on-screen keyboard. Options:

- Coolant temperature (3), -10 – 20 °C)
- Rotation speed (4), 10 – 280 rpm
- Heating bath temperature (5), 20 – 80 °C)

Existing profiles with identical input values are detected and loaded automatically!

Tap the arrow buttons next to the actual value display of a function to start/stop the respective process individually (recirculation chiller, rotation, heating bath).

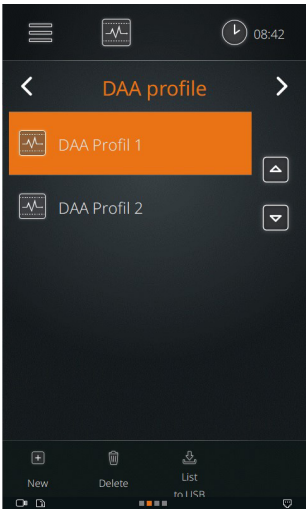
Touch the [Start process] button in the footer to start all processes simultaneously: Button changes to [Stop process]. To stop all processes, touch the button again: Button changes to [Start process].

Touch the [Warm-up] function button in the footer to activate the warm-up function for the heating bath heater independently of the process.

DAA profiles

The list of existing DAA profiles can be found on screen page 2 of DAA operating mode (swipe left once to open the display).

If necessary, use the arrow buttons on the right to scroll through the list.



Loading the DAA profile and starting the process

Select the desired list entry and confirm with [Load] to load the profile. The view returns to the start page with the profile's operating parameters.

Use [Delete] to delete profiles if necessary.

All profile settings can be adjusted during the ongoing process. In order to permanently apply these changes to the system, the profile must be overwritten with the new values after the end of the process or saved as a new profile in the system. Follow the instructions on the display.

If the intensity is adjusted during the ongoing process, the change must be at least 0.5 °C. Changes < ±0.5 °C are not taken into account.

Creating a DAA profile

A new DAA profile can be defined during the ongoing process based on the current operating parameters or in advance using set parameters.

Switch to operating mode screen page 2. Tap the [New] button to create a new profile.

The view changes to screen page 3. Set the following parameters here (tap value to switch between the options or to open the on-screen keyboard):

- [Multiple solvent distillation]: Selection of mixed/single distillation
- [Intensity]: relative temperature rise (1 - 10 °C)
- [End pressure]: only for [multiple solvent distillation] selection, desired end pressure (1 – 1,000 mbar)
- [Hysteresis Δp]: Hysteresis for the opening pressure of the vacuum valve, see section "Vacuum valve opening pressure hysteresis" on page 102
- [Rotation]: Rotation speed (10 – 280 rpm)
- [Heating bath]: Heating bath temperature (20 – 210 °C)
- [Recirculation chiller]: Recirculation chiller temperature (-10 – 20 °C)

After entering all values, press [Save] to open the on-screen keyboard and assign an individual name to the profile.

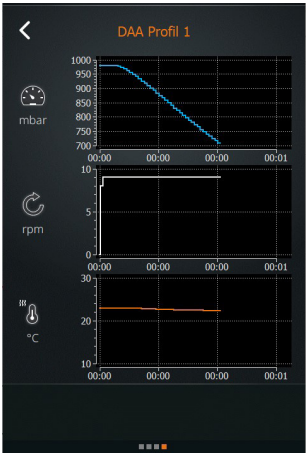
Use [Load] to load the new profile directly. The view returns to the start page with the profile's operating parameters.

Profile charts

On-screen page 4 of the operating mode, the process-specific profile charts for vacuum pressure, rotation speed and chiller temperature are displayed in real time.

The boiling points are marked on the temperature curve.

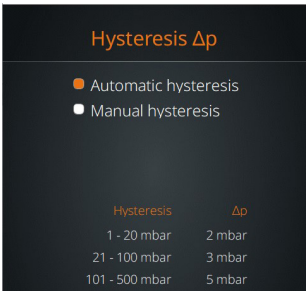
All charts are touch-sensitive: Touch a chart to zoom in and out.



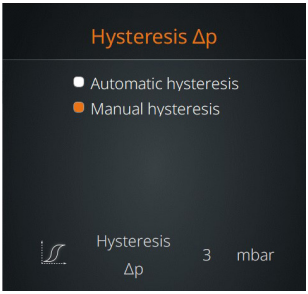
Vacuum valve opening pressure hysteresis

Use the [Hysteresis Δp] function button in the parameter view to open the manual/automatic hysteresis selection:

- The [Automatic hysteresis] selection is used to apply predefined hysteresis values for different pressure ranges, see figure on the right.
- These values cannot be changed.



- Select [Manual hysteresis] to define a uniform hysteresis value for the whole vacuum pressure range. Tap the displayed value to open the on-screen keyboard.
- Specify a hysteresis value within the range 1 – 50 mbar and confirm your entry with [OK] to accept the value. The set value replaces the [Auto] value on the overview page.

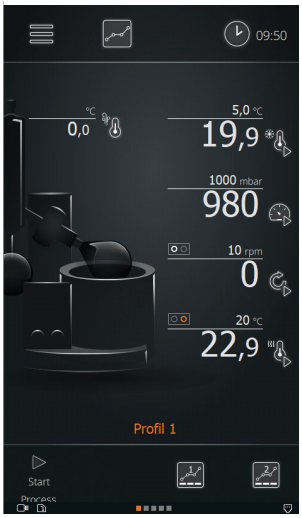


Ramp profiles mode

In Ramp profiles mode, user-specific process sequences can be stored as a ramp profile.

Activating ramp profiles mode

Touch the [Operating mode] function button (2) and in the following selection touch the [Ramp profiles] icon.



Adjusting parameters

Touch a parameter's number field to open the on-screen keyboard. Options:

- Coolant temperature (3), -10 – 20 °C)
- Vacuum pressure (4), 1 – 1,400 mbar
- Rotation speed (5), 10 – 280 rpm
- Heating bath temperature (6), 20 – 80 °C)

Existing profiles with identical input values are detected and loaded automatically!

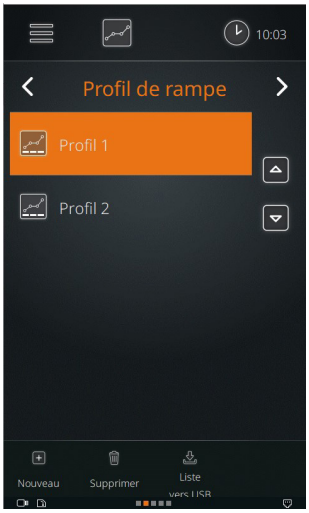
Tap the arrow buttons next to the actual value display of a function to start/stop the respective process individually (circulation chiller, vacuum, rotation, heating bath).

Touch the [Start process] button in the footer to start all processes simultaneously: Button changes to [Stop process]. To stop all processes, touch the button again: Button changes to [Start process].

Ramp profiles

The list of existing ramp profiles is on screen page 2 of the operating mode (swipe left once to open the display).

If necessary, use the arrow buttons on the right to scroll through the list.



Loading ramp profiles and starting the process

Select the desired list entry and confirm with [Load] to load the profile. The view returns to the start page with the profile's operating parameters.

- Use [Delete] to delete profiles if necessary.
- With [List on USB] – available as soon as a USB flash drive is plugged into the control panel – ramp profiles can be stored on a USB flash drive.

All profile settings can be adjusted during the ongoing process. In order to permanently apply these changes to the system, the profile must be overwritten with the new values after the end of the process or saved as a new profile in the system. Follow the instructions on the display.

Creating a ramp profile

A new ramp profile can be defined during the ongoing process based on the current operating parameters or in advance using set parameters.

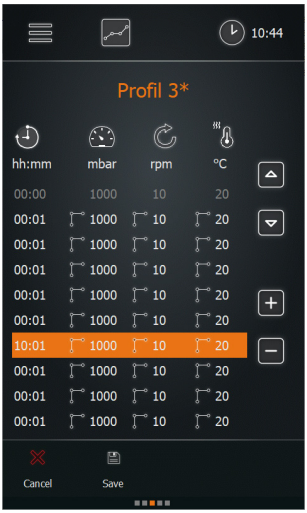
On screen page 2 of the operating mode, touch the [New] button to create a new ramp profile:

- Use the [+] key to add a new row.
- Touch the [hh:mm] value in the new row and use the on-screen keyboard to specify the duration of the process step (setting range 00:01 to 99:9).
- Touch the [mbar] value and set the vacuum pressure (1 – 1,400 mbar).
- Touch the [rpm] value and set the rotation speed (10 – 280 rpm).
- Touch the [°C] value and set the heating bath temperature (20 – 210 °C).
- Use the [+] key to add additional rows if necessary and set the parameters for each process step as described.
- To delete a row, select it and touch the [-] button.
- It is possible set whether the setpoint should be reached abruptly or linearly over time for each individual value (vacuum pressure, rotation speed and heating bath temperature). Touch the assigned symbol to toggle between the two options:
  - Abruptly option:  /linearly over time option: 
- After entering all required rows and values, open the on-screen keyboard with [Save] and assign an individual name to the ramp profile and confirm with [OK].

It is not possible to assign designations for ramp profiles twice in the system. If a desired designation already exists, a warning message appears on the display.

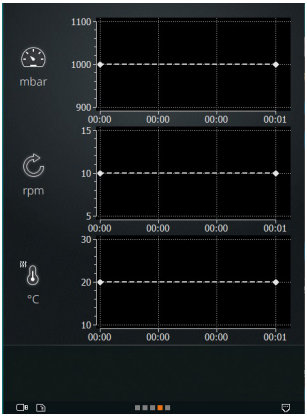
In this case, change the designation or overwrite the existing ramp profile. This operation cannot be undone!

Adjusting ramp profiles



- Switch to screen page 3 of the operating mode and open the desired profile.
- From the list of all process steps of the ramp profile, select all the affected rows one after the other (highlighted in yellow) and adjust the values as described above.
  - Multiple process steps can be changed at the same time.
  - Modified ramp profiles are marked with an asterisk (*).
- Then confirm all changes with [Save]. The on-screen keyboard opens.
- Confirm the user name to save the ramp profile with the changed values in the system or assign a new name to save a new profile.
- Touch the [Cancel] button to cancel the operation at any time and on any level. All changes made to the ramp profile before are discarded.
- Confirm the additional confirmation prompt with [OK] to finally accept all changes.

Profile charts



On-screen page 4 of the operating mode, the process-specific profile charts for vacuum pressure, rotation speed and chiller temperature are displayed in real time.

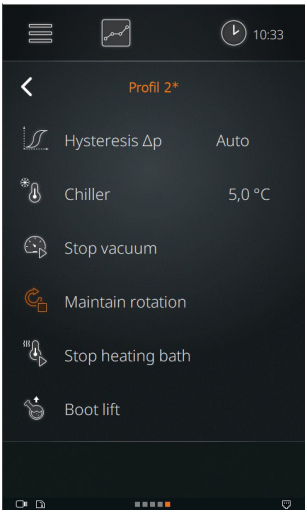
Color coding: the planned ramp is shown in gray, real-time data is shown in white.

All charts are touch-sensitive: tap a chart to zoom in and out.

Process parameters

Switch to operating mode screen page 5. Set the following parameters here (tap value to switch between the options or to open the on-screen keyboard):

- [Hysteresis Δp]: Hysteresis for the opening pressure of the vacuum valve, see section “Vacuum valve opening pressure hysteresis” on page 102
- [Recirculation chiller]: Recirculation chiller temperature (-10 – 20 °C)
- [Stop/Hold vacuum]: Hold or ventilate the vacuum pressure after the process has ended.
- [Stop/Hold rotation]: Hold the speed after the end of the process or stop rotation.
- [Stop/Hold heating bath]: Hold the heating bath temperature after the end of the process or switch off the heating bath heater.
- [Move up/hold lift]: Hold the lift in position after the end of the process or move it up.
- [Stop chiller]: Switch off the chiller after the end of the process.

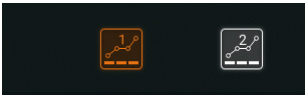


The settings made here are prioritized and suppress the general parameter settings in the [Settings] menu!

Assigning quick access buttons

Load a desired profile (see “Loading ramp profiles and starting the process” on page 103).

In the footer of the start page, touch one of the two quick access icons for about two seconds:



As soon as the icon color changes from white to yellow, the previously loaded ramp is assigned to the quick access button (in the example, quick access button 1).

The assignment can be made during operation without affecting the process.

Import ramp profiles

As soon as a USB stick with stored ramp profiles is inserted into the control panel, a dialog box appears prompting you to import the existing data.

To import the existing data, confirm with [OK] or close the dialog box without importing by touching the [Cancel] button.

Only ramp profiles can be imported in the [Ramp profiles] mode. Unrecognized formats (e.g., favorites) are not displayed.

Files with file names that already exist in system memory cannot be imported. In such a case, you can rename the file stored in the system before the import or overwrite this file with the import file.

Favorites mode

In [Favorites] mode, user-specific parameter settings for the distillation of certain substances can be stored as favorites.

In [Favorites] mode, processes must be stopped manually or by timer. There is no automatic switch-off!

Activating favorites mode

Touch the [Operating mode] function button (2) and in the following selection touch the [Favorites] icon.

Adjusting parameters

Touch a parameter's number field to open the on-screen keyboard. Options:

- Coolant temperature (3), -10 – 20 °C)
- Vacuum pressure (4), 1 – 1,400 mbar
- Rotation speed (5), 10 – 280 rpm
- Heating bath temperature (6), 20 – 80 °C)

Existing profiles with identical input values are detected and loaded automatically!

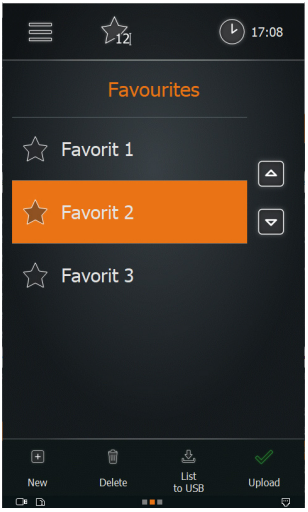
Tap the arrow buttons next to the actual value display of a function to start/stop the respective process individually (circulation chiller, vacuum, rotation, heating bath).

Touch the [Start process] button in the footer to start all processes simultaneously: Button changes to [Stop process]. To stop all processes, touch the button again: Button changes to [Start process].

Favorites

The list of existing favorites is on screen page 2 of the operating mode (swipe left once to open the display).

If necessary, use the arrow buttons on the right to scroll through the list.



Loading favorites and starting the process

Select the desired list entry and confirm with [Load] to load the favorite. The view returns to the start page with the operating parameters of the favorite.

- Use [Delete]to delete favorites if necessary.
- With [List on USB] – available as soon as a USB flash drive is inserted into the control panel – favorites can be saved to a USB flash drive.

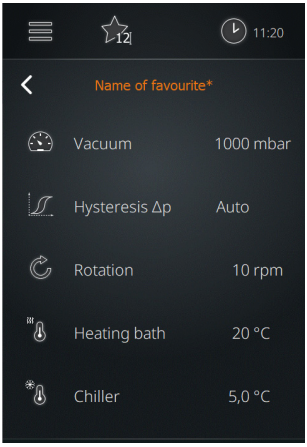
Process parameters

Switch to operating mode screen page 3. Set the following parameters here (tap value):

- [Vacuum]: Vacuum pressure (1 – 1,400 mbar)
- [Hysteresis Δp]: Hysteresis for the opening pressure of the vacuum valve, see section “Vacuum valve opening pressure hysteresis“ on page 102
- [Rotation]: Speed (10 – 280 rpm).
- [Heating bath]: Heating bath temperature (20 – 80 °C)
- [Recirculation chiller]: Recirculation chiller temperature (-10 – 20 °C)

All settings can be adjusted during the current process. In order to permanently apply these changes to the system, the favorite must be overwritten with the new values after the end of the process or saved as a new favorite in the system.

After entering all values, press [Save] to open the on-screen keyboard and assign an individual name to the favorite.



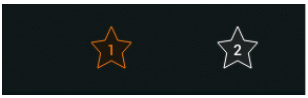
It is not possible to assign names for favorites twice in the system. If a desired designation already exists, a warning message appears on the display.

In this case, change the designation or overwrite the existing favourite. This operation cannot be undone!

Assigning quick access buttons

Load a desired favorite (see section “Loading favorites and starting the process” on page 107).

In the footer of the start page, touch one of the two quick access icons for about two seconds:



As soon as the icon color changes from white to yellow, the previously loaded favorite is assigned to the quick access button (in the example, quick access button 1).

The assignment can be made during operation without affecting the process.

Importing favorites

As soon as a USB flash drive with stored favorites is inserted into the control panel, a dialog box appears prompting you to import the existing data.

To import the existing data, confirm with [OK] or close the dialog box without importing by touching the [Cancel] button.

Only favorites can be imported in [Favorites] mode. Unrecognized formats (e.g., ramp profiles) are not displayed.

Files with file names that already exist in system memory cannot be imported. In such a case, you can rename the file stored in the system before the import or overwrite this file with the import file.

Remote mode

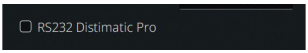
The RS-232 interface on the device's control panel enables the device to be controlled and process data to be recorded remotely via an external controller. This requires suitable software, which supports the set of commands stored in the device (see “RS-232 interface commands” on page 114).

WARNING

Secure the device in remote mode with a clearly visible warning sign and, if necessary, take further ambient-specific protective measures that protect against damage to property and injuries in the event of unexpected/unmonitored starting of the device.

Requirements

To use an external control to access the device via the RS-232 interface of the control panel, the [RS232 Distimatic Pro] option must be deselected in the [Hei-CONTROL Pro] menu.



In addition, the [Remote control] function may need to be activated (function deactivated: icon crossed out). To do this, tap the [Remote control] function button in the process view, see also section “Control and display elements” on page 76.

Confirm the confirmation prompt with [OK].

- Function ready: The icon is white, not crossed out
- External control is active: icon changes color (orange)

Operation with intermediate valve (option)

The system extension with intermediate valve (option) was specially developed for applications for drying substances. It helps the user to separate fractions (liquid/liquid or liquid/solid) without boiling back the distillate in order to be able to end processes in a controlled manner (for position/assembly see section “Mechanical design” on page 72).

Display of the intermediate valve on the user interface

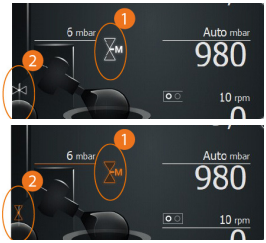
As soon as the intermediate valve is detected in the system after being switched on, the following symbols appear in the process view:

- Symbol [1]: Operating mode of the intermediate valve.
  - M = manual
  - A = Automatic.
- This symbol is stored with a function button (Button [Intermediate valve]). Use this button to switch the valve by tapping it.
- Symbol [2]: Operating state of the intermediate valve (open/closed, closed in the example).

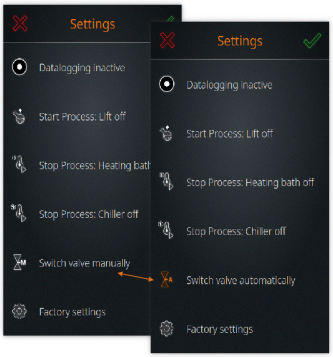
Switching statuses

When switching on the device, the intermediate valve is closed by default. When the intermediate valve is switched, the display changes as follows:

- In the closed state, the symbols [1] and [2] are shown in white.
- If the intermediate valve is open, symbols [1] and [2] are shown in yellow.



Operating modes



The intermediate valve can be operated in the manual and the automatic mode. The operating mode is selected in the [Settings] menu:

- Touch the button [Switch valve automatically] in the list of the parameters to switch from the manual mode to the automatic mode.
- In automatic mode, touch the [Switch valve manually] button in the list of parameters to switch to manual mode.

The list entry is only available if the intermediate valve has been correctly detected!

Manual mode

In manual mode, the intermediate valve can be opened and closed as required during the ongoing process. If the pressure rises again at the end of the process, the closed intermediate valve is reopened automatically when the previously manually set switching point is reached!

Automatic mode

In automatic mode, the operator can set a switching point (= vacuum pressure) at which the valve is closed by tapping the [intermediate valve] button on the control panel during the ongoing process. As a result, the valve closes when the vacuum pressure falls below the set value and no further distillate enters the receiving flask.

If the valve is open, the switching point can be reset as often as desired. As soon as the valve is closed, no new switching point can be set!

When the evaporator is vented, the intermediate valve opens automatically as soon as the switch value is exceeded, regardless of the active operating mode. The distillate flask can therefore be removed without any pressure difference.

Initial switching point

→ Switch on the device and make sure that the intermediate valve is detected and displayed as described above.

→ In the [Settings] menu, set the [Switch valve automatically] option.

→ Switch to [Advanced] operating mode from the start page.

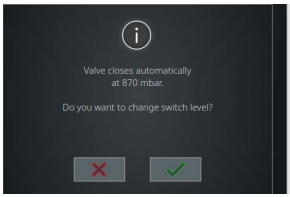
→ Activate the desired operating mode.

→ Specify an initial switching point in the respective [Parameters] sub-menu: Tap the value, set a new value in the following input window and confirm (in the example, [Favorites] mode).

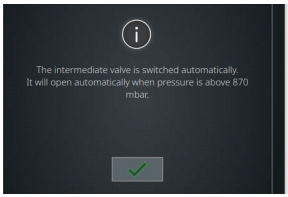
In principle, the switching value of the intermediate valve selected must be lower than the process pressure at which the solvent is evaporated.

→ Start the process: the intermediate valve is switched (closed) when the vacuum pressure defined in [intermediate valve] is reached.

→ In the further process, set any switching point: When the desired level is reached, tap the [intermediate valve] button to set the current vacuum pressure as the switching point. The following prompt appears on the display (example value!):



→ Confirm with [OK] to accept the value. The following message appears:



Troubleshooting

Failure	Possible cause – remedy
Device does not turn on Display remains dark after switching on	No power supply, check power supply cord.
	Fuse defective, replace.
	On/off switch to OFF, switch on.
	On/off switch defective, contact technical service.
Device does not heat up	Connection cable heating bath is not connected, connect.
	Heating bath defective, contact technical service.
	Overheat protection has tripped: Let the heating bath cool down and empty, reset the overheating protection.
Drive does not turn	No rotation movement, press speed controller.
	Drive defective, contact technical service.
Engine lift not running	Lift in end position, move in opposite direction.
	Lift at height stop, adjust height stop.
	Mechanical defect/motor defective, contact technical service.
No vacuum	Vacuum pump on/off switch OFF, switch on
	Vacuum valve defective, replace
Vacuum insufficient	System leaking, check seals and connections, check joints, grease if necessary.
	Vacuum pump defective, observe manufacturer's instructions for vacuum pump.
Device shuts down unexpectedly	Fuses defective, replace.
	Emergency stop when detecting pressure (see settings, overpressure and leakage pressure), check system and switch on the device again, calibrate the vacuum sensor.
Boiling temperature is not displayed	Boiling temperature sensor not connected, connect or check connection, switch device off and on again if necessary.
	Boiling temperature sensor defective, visual inspection for defect, contact technical service, replace sensor if necessary.
	Temperature outside the measuring range, heat the sensor or let it cool down.

Automatic mode (DAA) cannot be selected	AUTOaccurate sensor not connected, connect or check the connection, switch off and on the device if necessary.
	AUTOaccurate sensor defective, visual inspection for defect, contact technical service, replace sensor if necessary.
	Temperature outside the measuring range, heat the sensor or let it cool down.
Control box not connected or defective	Check connection between control box and evaporator, contact technical service.
Ventilation valve defective	Short circuit in the ventilation valve, contact technical service.
Vacuum valve not connected or defective	Vacuum valve not connected or connection between control box and vacuum valve interrupted, connect vacuum valve, check connection between control box and vacuum valve, contact technical service.
	Short circuit in the vacuum valve, contact technical service.
Vacuum pump not connected or defective	Vacuum pump not connected or connection between Control Box and vacuum pump interrupted, connect vacuum pump, check connection between Control Box and vacuum pump.
Process canceled by chiller monitoring (error message)	Chiller failure or repeated disruption within 30 seconds, check connecting lines to the chiller.

All system messages (error messages, warnings, information) are shown in plain text on the display.

Follow the instructions on the display.

In case of recurring faults, please contact the responsible sales department or our technical service.

RS-232 interface commands

Command	Response	Description
r\r\n	RPM:xxxx\r\n	Display the actual rotation speed value (rpm).
Rxxx\r\n	RPM_SET:xxx\r\n	Set rotation speed setpoint (rpm): xxxx=10-280. If the command does not contain a numerical value, the actual value is returned.
RMx\r\n	R_MODE:x\r\n	Rotation off (x=0) or on (x=1). If the command does not contain a numerical value, the actual value is returned.
h\r\n	HEAT:xxx.x\r\n.	Display the actual heating temperature value (resolution 0.1 C°)
Hxxx\r\n	HEAT_SET:xxx\r\n	Set the heating temperature setpoint: XXXX=20-210 (degrees Celsius or Fahrenheit). If the command does not contain a numerical value, the actual value is returned.
HMx\r\n	H_MODE:x\r\n	Heating off (x=0) or on (x=1). If the command does not contain a numerical value, the actual value is returned.
v\r\n	V:xxxx\r\n	Display the actual vacuum pressure value (mbar)
Vxxx\r\n	V_SET:xxx\r\n	Set the vacuum pressure setpoint: xxxx=1-1400. If the command does not contain a numerical value, the actual value is returned.
VMx\r\n	V_MODE:x\r\n	Vacuum off (x=0) or on (x=1). If the command does not contain a numerical value, the actual value is returned.
c\r\n	C:xxxx\r\n	Display the actual chiller temperature value (resolution 0.1 C°).
C-xx.x\r\n	C_SET:-xx.x\r\n.	Set chiller temperature setpoint: xxxx=-10.0-+20.0. If the command does not contain a numerical value, the actual value is returned.
CMx\r\n	C_MODE:x\r\n	Chiller off (x=0) or on (x=1). If the command does not contain a numerical value, the actual value is returned.
ix\r\n	I:x\r\n	Set intermediate valve status: x=0/closed, x=1/open. If the command does not contain a numeric value, the actual status is returned. **Only permissible if the intermediate valve is switched manually, see [Imx] command.**
Ixxx\r\n	I_SET:xxxx\r\n	Set vacuum valve setpoint switch value (mbar): If the pressure drops below the setpoint in automatic mode, the intermediate valve closes automatically. If the command does not contain a numerical value, the actual value is returned.
IMx\r\n	I_MODE:x\r\n	Close the intermediate valve manually (x=0) or automatically (x=1). If the command does not contain a numerical value, the actual value is returned.

s\r\n	R(120;1;119), H(55;1;34.9), V(899;0;1015), C(-1.0;1;0.9), I(700;1;0), T(AA;20.5)\r\n	Display the status of all actuators: Setpoint;Operating mode;Actual value. For example: R(120;1;119) corresponds to rotation speed setpoint 120 rpm, rotation ON, rotation speed actual value 119 rpm. Sensors (type;status): E.g., AA=AutoAccurate, V=Steam. Valves (switching status;operating mode;current switching status): For example: Mode 0=manual, Mode 1=auto and Status 0=closed, Status 1=open. Unavailable values remain empty when feedback is received (e.g., <V(;;)>)
e\r\n	E_CODES:x\r\n	Query error status: <0> = no error, <1> = at least one error queued.
Sx\r\n	S_MODE:x\r\n	Start everything: <x=0> = off, <x=1> = on. If there are missing or incorrect entries, <NAK> ("Negative Acknowledgment" or "Not Acknowledged") is returned.
CCx\r\n	CC_MODE:x\r\n	SET commands must be activated with a CCx command. Activation can be indefinite or time-limited (e.g., <CC10>): inhe latter case, commands (GET or SET) must be received within this defined period (here: 10 s). If no further command is received within the defined validity period, the device switches to an operationally safe condition. To reactivate the remote SET commands, a new CCxcommand must be sent. (x = 0: inactive; x ≥ 1: Validity period in seconds; response <-1> = timeout)
IDENT\r\n	Hei-VAP, SW(<internal SW ID>), HW(<product variant>;<hardware>;<microcontroller serial N°>)\r\n.	Display device ID: Product, software ID, hardware ID.

- Do not send commands as a packet, minimum pause time between commands: 0.1 seconds
- <xxxx> = one to four digit numeric value
- <-xx.x> = positive or negative numeric value with decimal place, e.g., <-8.7> or <+11.8>

RS-232 interface parameters

- 115200 Baud
- No parity
- Data: 8 Bit
- Stop: 1 Bit

Command termination

All ASCII strings have to be finished with \r\n (0x0D 0x0A):

→ ...`\r\n`

For further information on interface handling, please contact our technical service, see “Contact details” on page 120.

Technical specifications

General device data		
Model	Rotary evaporator Hei-VAP Expert/Ultimate	
Dimensions (W × H × D)	Variant with motor driven lift & glassware G3: 739 × 887 × 477 mm	
	Variant with manual lift & glassware G3: 739 × 887 × 532 mm	
Weight	approx. 15 kg, without glassware	
Acoustic pressure	< 85 (dB(A)) (in accordance with IEC 61010)	
Flask drive	EC motor	
Speed range	10 – 280 rpm	
Stroke flask lift	155 mm	
Lifting speed flask lift	55 mm/s	
Evaporation rates (L/h) ΔT* 40 °C (during continuous operation)	Toluene 8.5 Acetone 5.8 Ethanol 3.5 Water 1.2	
Maximum cooling surface	1.4 m^2	
Protection class	Device	IP20
	Control panel	IP42
	Control Box	IP42
	Connection cable heating bath	IP67
Electrical data		
Rated voltage	230 V (50/60 Hz) or 115 V (50/60 Hz)	
Connection	L+N+PE	
Protection class	I ⏚ (IEC 61140)	
Overvoltage category	II	
Degree of pollution	2	
Power input	1,400 W max.	

Heating bath, cooling	
Heating bath	Inner Ø: 253 mm, outer Ø: 291 mm Material: V4A steel (1.4404) X2CrNiMo 17-12-2 Volume: 6 L
Heating power	1,300 W
Temperature range heating bath	20 – 100 C° H_2O / 20 – 210 C° oil
Overtemperature protection	Cut-off at 5 °C deviation from the set temperature
Overheat protection	Threshold value 250 °C
Control	electronic
Control accuracy	±1 °C
Permissible ambient conditions	
Storage conditions (recommendation)	5 °C – 31 °C at up to 80 % rel. humidity 32 °C – 40 °C at up to 50 % rel. humidity (linearly decreasing)
Operating temperature	5 °C – 31 °C at up to 80 % rel. humidity 32 °C – 40 °C at up to 50 % rel. humidity (linearly decreasing)
Installation altitude	up to 2,000 m asl

Scope of delivery

Item	Quantity	Product no.
Hei-VAP Expert rotary evaporator, complete Hei-VAP Ultimate rotary evaporator, complete	1	see package list
Warranty registration	1	01-006-002-78

Accessories

Detailed information on the available accessories for your device variant can be found on our website at www.heidolph.com.

Device service

DANGER

Switch the device's main switch off and disconnect it from the power supply before carrying out maintenance work, cleaning, or repairs.

When cleaning, avoid the penetration of liquids.

Before replacing the fuses, switch off the device and disconnect the power supply cord.

Always replace the two device fuses in pairs with original manufacturer fuses. Further information on available accessories can be found on our website at www.heidolph.com!

After fuse replacement, check the device for a safe condition according to IEC 61010-1.

General cleaning instructions

CAUTION

Clean the device's surfaces with a soft, lint-free and only slightly moistened cloth.

Never use any aggressive or abrasive cleaning agents or aids.

Cleaning and care instructions for heating baths

If water is used as a heating medium, it is generally recommended to change the bath liquid regularly.

In case of high salt load, use a mixture of 50 % tap water and 50 % deionized water to prevent calcification of the heating bath.

When using deionized or distilled water: Add 0.2 % borax ($Na_2B_2O_7$ *10 H_4O) to deionized or distilled water.

If the heating bath container shows calcification, add a teaspoon of citric acid to the bath liquid before changing and heat the bath slightly until all the lime residue is dissolved or can be easily removed with a non-abrasive sponge. Then change the bath liquid.

Corroded areas can be carefully cleaned with a little stainless steel polish.

Repairs - Return of equipment

Repairs to the device may only be carried out by authorized experts! Unauthorized repairs during the warranty period will result in the loss of the warranty claim. Regardless of the warranty claim, the owner is solely liable for damage caused by unauthorized repairs.

→ In case of repair and before returning your device, contact our technical service at the following e-mail address:

- service@heidolph.de.

→ In your message, please provide us with the following information in addition to an error description:

- Item number
- Serial no.

The required data can be found on the rating plate of the device.

A service representative will contact you as soon as possible to agree on the next steps.

Include the completed certificate of decontamination with every device return, see “Certificate of decontamination” on page 121.

Maintenance

There are no user-serviceable components in the unit housing. If necessary (in the event of abnormal operating behavior such as excessive noise or heat generation, for example), contact our technical service, see section “Contact details” on page 120.

- ➙ Check the caps and fasteners of all glass components for correct and tight fit at regular intervals and especially before each start-up of the device.
- ➙ Check the level sensor in the heating bath regularly for proper function, dirt and limescale deposits to prevent malfunctions.
- ➙ Check the PTFE seal of the EASY LOCK flask clamping system at regular intervals for heavy contamination and visible damage.
- ➙ Clean the PTFE seal of the EASY LOCK flask clamping system at regular intervals to prevent excessive deposits or encrustations.

CAUTION

At loose/leaky connections, ambient air is sucked in during the vacuum build-up and the required vacuum pressure cannot be reached in a stable manner!

In the event of excess pressure, there is a risk that liquid will escape from the system! The device and surrounding areas can be severely contaminated by leaking media!

Tighten loose caps/fasteners by hand or correct the seating of the retaining clips.

PTFE seal

The PTFE seal of the device must be cleaned after a 100-hour running-in period. To do this, follow the steps in section “PTFE seal” on page 85.

Disposal

- When disposing of the device, observe the provisions of the WEEE Directive 2012/19/EU and its transposition into national law in the country of use.
- When disposing of portable batteries, observe the provisions of the European Battery Directive 2013/56/EU and their implementation in national law in the country of use.
- Check the device and all components for residues of substances that are hazardous to health, the environment and biohazardous before disposal.
- Properly remove and dispose of residues of substances that are hazardous to health, the environment and biohazardous!

Registration in accordance with the Electrical and Electronic Equipment Act (ElektroG)

Heidolph Scientific Products GmbH, headquartered in 91126 Schwabach/Germany, address Walpersdorfer Str. 12, is registered under the number DE 50705753 in the electronic waste equipment register of the foundation ear (www.ear-system.de).

Warranty statement

Heidolph Scientific Products GmbH provides a three-year warranty against material and manufacturing defects.

Glass and wear parts, transportation damage, and damage resulting from improper handling or non-intended use of the product are excluded from the warranty.

The warranty period for registered products begins on the date of purchase. Register the product with the enclosed warranty card or on our homepage www.heidolph.com.

For non-registered products, the warranty period begins with the date of the serial production (to be determined by the serial number).

In the event of material or manufacturing defects, the product will either be repaired or replaced free of charge within the warranty period.

Contact details

Heidolph Scientific Products GmbH
Technical service
Walpersdorfer Str. 12
D-91126 Schwabach/Germany
Email: service@heidolph.de
Representations
To find your local Heidolph distributor please visit www.heidolph.com

Certificate of decontamination

Enclose the certificate of decontamination, duly completed, with your device return. Submissions without a certificate of decontamination cannot be processed!

CERTIFICATE OF DECONTAMINATION

IN CASE OF RETURNS

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Please fill in the required fields.
Note: The sender must package the goods properly and appropriately for transport.

Heidolph Scientific Products GmbH
Walpersdorfer Straße 12
91126 Schwabach
Phone: +49 (0) 9122 9920-380
Fax: +49 (0) 9122 9920-19
E-Mail: 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 _____