

Safe
Heating and Mixing



Betriebsanleitung Operating instructions

Hei-PLATE Mix 20 l
Hei-PLATE Mix'n'Heat Core

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research made easy

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About this document

This operating instructions manual describes the features and operation of Hei-PLATE Mix 20 I and Hei-PLATE Mix'n'Heat Core magnetic stirrers. The operating instructions manual is an integral part of the delivery!

Typographic conventions

Standardized symbols, highlighting elements, and signal words are used in this document to identify warnings, cautions, important information, and special text contents.

Symbol	Signal word / explanatory note
	<p>Warning symbols in combination with a signal word indicate dangers:</p> <p>DANGER Indicates a hazardous situation which, if not avoided, will result in death or serious injury.</p> <p>WARNING Indicates a possible hazardous situation which, if not avoided, may result in death or serious injury.</p> <p>CAUTION Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury or material/environmental damage.</p>
	<p>Prohibition signs indicate actions or situations that are to be omitted or avoided.</p> <p>Failure to comply may result in personal injury and / or damage to property.</p>
	<p>Mandatory signs are used to indicate important information regarding the product handling.</p> <p>This information is used to ensure operational safety and to maintain the value of the product.</p>
[GUI]	<p>Parameter designations, display texts, and device labels are highlighted in text and tables in a typographic manner to facilitate the assignment on the device.</p>
→	<p>The arrow symbol indicates instructions to be followed in order to ensure the operational safety when handling the product.</p>

Copyright protection

This publication is protected by copyright and intended for internal use by the purchaser of the product only.

No part of this publication may be transmitted or reproduced in any form, by any means, without the prior written consent of the copyright owner Heidolph Instruments GmbH & Co. KG. Any violation is subject to compensation for damages.

Basic product information

Guidelines applied, product certification



CE Marking

The device complies with the following standards:

- European Machinery Directive, 2006/42/EC
- EMC Directive 2014/30/EU

California Residents

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

Residual risk

The device was designed and manufactured in accordance with the latest technical standards at the time of development and the recognized safety regulations. During installation and use, as well as during maintenance work, repairs and cleaning, there are nevertheless certain residual risks associated with the device described.

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

Intended use

The devices described in this manual are specifically designed for the following tasks:

- Heating (Hei-PLATE Mix'n'Heat Core only)
- Mixing
- Stirring
- Titration

The devices described in this manual are suitable for use in chemistry, pharmacy, biology, environmental analytics, basic research and research laboratories.

Any other use of the devices described in this manual is not considered as intended!

Due to the design, the devices in their 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.

Reasonably foreseeable misuse

For use under conditions or for purposes deviating from the intended use, additional measures may become necessary, and/or specific guidelines and safety regulations will have to be observed (see section „Special hygiene measures for the use of laboratory equipment in food, cosmetics and pharmaceutical production“, page 33). Corresponding requirements must be evaluated and observed by the operator in each individual case.

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

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

The device may exclusively be operated by authorized and instructed personnel.

Training and qualification of the operating personnel as well as ensuring that the device is operated with responsibility are the sole responsibility of the operator!

Transportation

During transport, 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 unreasonable material aging, store the device in a dry environment that should be as temperature-stable and dust-free as possible.

Recommended ambient conditions for storage:

- 5 °C – 31 °C up to 80 % rel. humidity
- 32 °C – 40 °C up to 50 % rel. humidity (decreasing linearly)

Acclimatization

After each transport 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 a minimum of two hours to prevent possible damage from condensation before putting it into operation at 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. Permissible ambient conditions for operation:

- 5 °C – 31 °C up to 80 % rel. humidity
- 32 °C – 40 °C up to 50 % rel. humidity (decreasing linearly)
- Maximum height above sea level: 2,000 m

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



The device **IS NOT** suitable for outdoor use!
The device **IS NOT** suitable for use in hazardous areas!

Processing liquids at extreme cold temperatures

The device is suitable for the processing of liquids at extreme cold temperatures within the stated permissible ambient conditions and observing the regulations for proper use.

Always use a suitable insulating vessel (e.g., a Deware flask) to process liquids above a temperature of < -15 °C to avoid damage to the device due to condensation and frost.

General safety information

- Before commissioning and using the device, familiarize yourself with all the safety regulations and guidelines for occupational safety applicable at the place of use and observe them at all times.
- Only operate the device if it is in perfect technical condition. In particular, ensure that there is no visible damage on the device itself and, where necessary, on connected devices or the supply connections.
- If there is missing or misleading information on the device or on occupational safety, contact the responsible safety specialist or our technical service.
- Only use the device in accordance with the regulations for intended use („Intended use“, page 29).

Electrical safety

- Ensure that the voltage indicated on the rating plate matches the supply voltage of the country in which the device is being used.
- Ensure that the power supply circuit provided is protected by means of a residual-current device (RCD).
- Always use the supplied power supply cord provided with the device.
- Prior to use, check that the device and the power supply cord are free of visible damage.
- Have repairs and/or maintenance work on the device carried out exclusively by an authorized and skilled electrician or by the technical service department of Heidolph Instruments.
- Always switch off and disconnect the device from the power supply, preventing reconnection, before carrying out maintenance work, cleaning, or repairs.

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

Work 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).
- Only use stirring tools approved and authorized by Heidolph Instruments.
- Route all cables free of kinks and outside the operating and hazardous area.
- Avoid excessive pressure on the device display.
- Avoid fluid accumulation on the device.
- Keep the base unit dry during operation.
- Ensure adequate safety distance: Do not store objects in the working and hazardous area of the device during operation.

Personal protective equipment (PPE)

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

The corresponding instruction of the personnel is solely within the operator's responsibility.

Environmental protection

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

The evaluation of corresponding measures such as the marking of a hazardous area, their implementation, and the training of the responsible 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 a biohazard warning symbol.

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

Special hygiene measures for the use of laboratory equipment in food, cosmetics and pharmaceutical production

When laboratory equipment is used in the production processes of the food, cosmetics or pharmaceutical industry, special hygiene measures must be taken by the user to avoid sample contamination and to minimize any risk to humans and the environment as far as possible.

Please observe the following recommendations:

General Measures

- Ensure a clean working and storage environment when handling substances and materials.
- Train all employees in the field of occupational hygiene, document all training measures and check the implementation of all required hygiene measures during operation regularly.
- Use a hygiene control concept such as HACCP (Hazard Analysis and critical Control points). The HACCP comprises the following criteria:
 - Hazard analysis
 - Identification of critical control points
 - Definition of critical limit values
 - Establishment of a system for monitoring and controlling critical hazard control points (CCP)
 - Corrective actions for uncontrollable CCP
 - Establishment of a system to verify the implementation of all HACCP measures
 - Establishment of a system for documenting all associated procedures and protocols

The evaluation of the applicability of the mentioned rules and regulations is within the sole responsibility of the operator!

Device-specific measures

- Regularly clean components that come into contact with the product, such as flasks, seals, tubes, etc. in the autoclave (if available or possible) or chemically (e.g. with ethanol) to sterilize all surfaces.
- Make sure that even products that are intended for single use only are of sufficient purity.
- Do not use open containers.
- Avoid contamination by handling contaminated vessels, apparatus or aids with care.



Contact information

For further information, please contact our after sales service at any time.

Phone: +49-9122-9920-0

Mail: sales@heidolph.de

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 against Heidolph Instruments.

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

Mechanical design

Hei-PLATE Mix 20 I



Hei-PLATE Mix'n'Heat Core



Setting up the device



CAUTION

Risk Of Slipping!

The vibration during operation can cause the device to move over the mounting surface and/or fall to the ground.

- Observe the instructions for the correct positioning of the device!

- Place the device on a solid level and horizontal surface for use.
- Before switching on, make sure that the device is sufficiently stable.
- Keep all contact surfaces clean and dry.
- Keep a minimum distance of 10 cm between magnetic stirrers and other devices and structures (devices with heating function only).

Power Supply



Always use the supplied power supply cord provided with the device! Observe the instructions in section „Electrical safety“, page 31.

The device must only be supplied with power from a properly grounded mains socket-outlet.

The appliance inlet is located under the protective cover on the back of the device (figure: Hei-PLATE Core. Hei-PLATE Mix 20 I without port for external temperature sensor!)



- Lift the protective cover for connecting the power supply cable by hand. No tools are required to open the protective cover.

As soon as the device is supplied via the power supply cable, the on/off button lights up white.

External temperature controller (Hei-PLATE Core only)

- The port used to connect the external temperature controller EKT-HEI CON is located under the protective cover on the rear of the device (see figure above).
- Lift the protective cover for connecting temperature controller cable by hand. No tools are required to open the protective cover.

Switching the device on/off

- To turn on the device, press the on/off button. When the device is switched on, the on/off button lights up green.
- To turn off the device, press the on/off button again. When the device is turned off, the on/off button lights up white.

General notes

Observe the instructions in this section when operating the device!

CAUTION

Risk of injury, risk of damage to property due to tilting/falling of the device

High shaking frequencies in combination with a large load and/or a tall attachment assembly on the shaking platform may cause the device to swing up and fall!

- Only gradually increase the shaking frequency to the required level under the above conditions, paying attention to the stability of the structure.
- Lower the shaking frequency or reduce the total load on the shaking platform when the device starts to move during operation.



An uneven distribution of the load on the shaking platform may cause the device to swing up and fall!

- Always ensure that the vessels are evenly distributed on the shaking platform.
- Pay particular attention to an even distribution of the weight load when vessels of different sizes and/or differently filled vessels are placed on the shaking platform at the same time!

Risk of injury, risk of damage to property from falling vessels

At high shaking frequencies, there is a risk that improperly fastened vessels will fall off the shaking platform.

- Before switching on the device, make sure that all vessels are properly fixed on the shaking platform.
- Contaminated surfaces should be cleaned immediately.



Always place individual vessels in the center of the heating plate. Use suitable attachments for processing multiple samples/vessels simultaneously.

Do not switch on the appliance until all the vessels are securely positioned on the heating plate.

Always use the necessary and appropriate personal protective equipment!

Setting the rotation speed

WARNING

Risk of injury, risk of damage to property caused by splashing fluids



When using open vessels, there is a risk that fluid will spray out.

- Whenever possible, use closed vessels for processing corrosive, toxic or biohazardous substances and seal them safely.
- Especially using open vessels, increase the rotation speed only gradually and observe the fluid movements.
- **Hei-PLATE Core:** Always use the necessary personal protective equipment (heat-resistant gloves, eye protection, safety clothing) to process samples from a temperature of 50 °C.

-
- Turn on the device as described in section „Switching the device on/off“, page 37.
 - Turn the [**rotation**] control clockwise or counter-clockwise to set the desired speed (setting range: 100 – 1,400 rpm).
 - The rotation speed can be adjusted at any time.

Heating function (Hei-PLATE Core only)

The following sections are only relevant for Hei-PLATE Core devices. Devices of the type Hei-PLATE Mix 20 l do not offer heating function!

Setting the heating temperature

WARNING

Risk of burn

The heating plate is designed for a maximum operating temperature of 300°C. Contact with surfaces above 50 °C can lead to serious injury.



- Avoid direct skin contact with the heating plate during operation and also observe the residual heat indicator after switching off!
 - Do not place heat-sensitive objects on the heating plate.
 - Always use the necessary personal protective equipment (heat-resistant gloves, eye protection, safety clothing) to process samples from a temperature of 50 °C.
-

- Turn on the device as described in section „Switching the device on/off“, page 37.
- Turn the **[temperature]** control clockwise or counter-clockwise to set the heating temperature (setting range: 20 – 300 °C).

Switching the heating function on/off

- Make sure the device is switched on and the heating temperature is set.
- Press the **[heating on/off]** button to activate the heating function.
 - When the heating function is activated, the LED ring of the **[heating on/off]** button and the corresponding **[heating]** indicator LED will light orange.
- The heating temperature can be adjusted at any time during operation by turning the **[temperature]** control.
- Press the **[heating on/off]** again to turn off the heating function.

Operation with external temperature controller



Devices of the type Hei-PLATE Core can be operated with an external temperature controller EKT Hei-CON (optional accessory). For detailed instructions on setting up, connecting and operating with a temperature controller, refer to the operating instructions for the EKT Hei-CON (article number 01-005-004-61-61). The port for the external temperature controller is located under the protective cover on the back of the device. No tools are required to open the protective cover.



WARNING

Risk of burn

As long as the temperature controller is not immersed in the sample, the temperature of the ambient air is displayed. The heating plate can heat up to 300 °C unnoticed!

- Before switching on the device and for calibration, immerse the temperature controller in the sample!
- Do not place heat-sensitive objects on the heating plate.
- Always use the necessary personal protective equipment (heat-resistant gloves, eye protection, safety clothing) to process samples from a temperature of 50 °C.

- Make sure that the device is switched on and the heating temperature is set.
- Immerse the temperature controller at least 20 mm deep in the sample to obtain a stable reading.
- When making measurements, follow the instructions in the EKT Hei-CON manual!

Troubleshooting

The following table includes possible failures and corresponding corrective measures.

Malfunction	Possible cause/ remedy
On/off button illumination remains off	<ul style="list-style-type: none"> → Mains voltage not present: Check the power supply cable for damage, check the connection plug for correct seating, check the fuse of the house installation. → LED defective, contact technical service.
No mixing function	<ul style="list-style-type: none"> → No magnetic stirring bar in the vessel, insert stirring bars. → Rotation speed set to zero, increase rotation speed.
No heating function	<ul style="list-style-type: none"> → Heating temperature setpoint below current temperature, adjust setpoint. → Heating plate defective, contact technical service!
Temperature display not plausible with temperature sensor connected	<ul style="list-style-type: none"> → Check temperature sensor connection. → The immersion depth is too low, note the minimum immersion depth of 20 mm.
Deviation setpoint/ current value of sample	<ul style="list-style-type: none"> → Setpoint too low, take into account heat losses. → Heating plate defective, contact technical service!

If a fault cannot be rectified with the described remedies, please contact an authorized sales representative or our technical service (see section „Contact information Heidolph international“, page 46).

Technical data

General device data	
Model	Magnetic stirrer Hei-PLATE Mix'n'Heat Core, Hei-PLATE Mix 20 I
Dimensions (W × H × D)	168 × 101 × 299 mm
Usable surface heating plate	Ø 145 mm
Weight	approx. 3 kg
Maximum permissible load	25 kg
Drive	EC motor, left-turning
Speed range	100 – 1.400 U/min
Protection class (EN 60529)	IP42
Acoustic pressure	< 50 db(A)
Heating	
	Hei-PLATE Mix'n'Heat Core only
Heating power	800 W at 230 V (EU) 600 W at 115 V (US)
Heating temperature range	20 – 300 °C
Heating control	PID
Electrical data	
Rated voltage	230 V, 50/60 Hz (EU) 115 V, 50/60 Hz (US)
Connection	L+N+PE
Protection class	I
Overvoltage category	II
Degree of pollution	2
Power input	Normal operation 230 V: 825 W (EU) Normal operation 115 V: 625 W (US) Standby mode: 1.7 W
EMC class	B, Group 1
Permissible ambient conditions	
Operating temperature	5 °C – 31 °C up to 80 % rel. humidity 32 °C – 40 °C up to 50 % rel. humidity (decreasing linearly)
Maximum height above sea level	2,000 m

Scope of delivery

Item	Quantity	Product no.
Hei-PLATE Mix'n'Heat Core	1	506-11100-00
OR		
Hei-PLATE Mix 20 l	1	505-00000-00
Operating instructions	1	01-005-006-54
Guarantee registration / Declaration of no objection	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-instruments.com.

In case of need, contact an authorized dealer or our technical service, see „Contact information Heidolph international“, page 59.

Device service

When carrying out service work on the device (cleaning, maintenance, repair), observe the general instructions and safety information described in this section.



WARNING: Danger of electric shock

Live components are installed inside the device.

When opening the device, there is a risk of touching live components.

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

Penetrating liquid poses the danger of an electric shock.

→ When cleaning, avoid the penetration of liquids.

General cleaning instructions

Wipe all surfaces and the control panel with a damp cloth if necessary. Persistent contamination can be removed with mild soapy water.



CAUTION: Damage to the device

Improper cleaning can damage the surfaces of the device.

Penetrating liquid can damage the electronic components inside the device.

→ 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.

Repairs

Repairs to the device may only be carried out by authorized skilled experts!

Unauthorized repairs during the warranty period will result in the loss of the warranty claim.

The owner is solely liable for damage caused by unauthorized repairs.

In case of repair contact an authorized dealer or our technical service, see „Contact information Heidolph international“, page 46.

Include the completed declaration of no objection with every device return, see „Declaration of no objection“, page 47.

Maintenance

The device contains no user-serviceable components. If necessary, in the event of abnormal operating behavior such as excessive noise or heat generation, for example, contact our technical service, see „Contact information Heidolph international“, page 46.

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 transposition into 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 disposing.
- Properly remove and dispose residues of substances that are hazardous to health, the environment and biohazardous!

Contact information Heidolph international



Heidolph Instruments North America

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 E-mail: service@heidolph.com
www.heidolphNA.com

Heidolph Instruments United Kingdom

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 E-mail: service@radleys.co.uk
www.heidolph-instruments.co.uk

Local distributors

To find your local distributor please visit www.heidolph.com

Warranty Statement



Heidolph Instruments assumes a three-year warranty against material and manufacturing defects.

Excluded from the warranty are glass and wear parts, transport damage, and damage resulting from improper handling or non-intended use of the product.

For registered products, the warranty period 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.