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HBR 4 digital/control_052018

IKA®

IKA® HBR 4 digital

IKA® HBR 4 control



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EU Declaration of conformity

We declare under our sole responsibility that this product corresponds to the directives 2014/35/EU, 2014/30/EU and 2011/65/EU and conforms with the following standards or normative documents: EN 61010-1, EN 61010-2-010, EN 61010-2-051, EN 61326-1, EN 60529 (A1+A2) and EN ISO 12100.

A copy of the complete EU Declaration of Conformity can be requested at sales@ika.com.

Explication of warning symbols

 DANGER	Indicates an imminently hazardous situation, which, if not avoided, will result in death, serious injury.
 WARNING	Indicates a potentially hazardous situation, which, if not avoided, can result in death, serious injury.
 CAUTION	Indicates a potentially hazardous situation, which, if not avoided, can result in injury.
 ATTENTION	ATTENTION - risk of damage due to magnetism.
 DANGER	DANGER - note on hazards arising from a hot surface.

Safety instructions

For your protection

- **Read the operating instructions in full before starting up and follow the safety instructions.**
- Keep the operating instructions in a place where they can be accessed by everyone.
- Ensure that only trained staff work with the appliance.
- Follow the safety instructions, guidelines, occupational health and safety and accident prevention regulations.
- Wear your personal protective equipment in accordance with the hazard category of the medium to be processed. Otherwise there is a risk of splashing liquids.
- When emptying the device use only the handles to carry and hold it.
- Set up the device in a spacious area on an even, stable, clean, non-slip, dry and fireproof surface.
- Prior to each use, always check the device and accessories for damage. Do not use damaged components.
- **Caution!** Only process and heat up media that has a flash point higher than the adjusted safe temperature limit of the heating bath that has been set.
The safe temperature limit of the heating bath must always be set to at least 25 °C lower than the fire point of the media used.



Risk of burns! During operation, the heating bath housing can get hot.

- When working with temperature sensitive mediums please consider: upon continuous operation with high speed and a room temperature of 20 °C a warming up of the housing up to 40 °C is possible.
- Prior to filling or emptying the heating bath, the device must be switched off and disconnected from the power supply at the plug.
 - Only fill or empty the heating bath when it is cold.
 - Empty the heating bath prior to transporting it.
 - Never operate the heating bath without tempering medium.



Caution! The preferred tempering medium in the heating bath is water (up to approx. 80 °C). Low viscosity silicone oils (50 mPas) with a

flash point > 260 °C are also permitted.

There is a risk of burning when using tempering media with lower flashpoints!

- Before use, calculate the optimum fill level of the tempering medium! Pay special attention to the change in volume caused by heating and the displacement that occurs when immersing an object, for example, an evaporating flask.
- When using the heating bath in conjunction with a rotary evaporator, the heating bath temperature must not be allowed to rise to a value higher than the boiling point of the solvent at normal pressure, since if the evaporating flask glass were to break there would be a hazard due to liquid spraying out (for instance breakage of the evaporating flask glass during distillation of water using a silicone oil bath).
- When working with the **IKA®** rotary evaporator, be aware of a hazard arising from breakage of the evaporating flask glass.
- Be aware of a hazard due to lack of grip on a wet evaporating flask, in particular when operating the **IKA® HBR 4 digital/control** heating bath with silicone oil!

- When using as a water bath, the use of demineralised water is recommended.
- Always observe the minimum fill level of one litre when using oil as the tempering medium.
- Ensure that the interfaces are not soiled.
- Beware of hazards due to flammable materials.
- Only process media that will not react dangerously to the extra energy produced through processing. This also applies to any extra energy produced in other ways, e.g. through light irradiation.
- Do **not** operate the appliance in explosive atmospheres, with hazardous substances or under water.
- Refer to the operating instructions for the accessories.
- Safe operation is only guaranteed with the accessories described in the "**Accessories**" chapter.
- Always disconnect the plug before fitting accessories.
- After an interruption to the power supply, the device can be started up again in operating mode B and C.
- The device is only disconnected from the power supply network if the device power switch is off or the plug is pulled out.
- The socket for the mains cord must be easily accessible.



Caution - magnetism!

Beware of possible effects from the magnetic field (pacemakers, data media).

For protection of the equipment

- The voltage stated on the type plate must correspond to the mains voltage.
- Socket must be earthed (protective ground contact).
- Protect the appliance and accessories from bumps and impacts.
- The appliance may only be opened by experts.

In conjunction with IKA® rotary evaporator, IKA® glassware and solvents

- Solvents can be hazardous to health. Therefore comply with the relevant warnings and refer to the relevant safety data sheet (Internet).

IKA® Glassware

- The glassware is designed to be used at vacuums down to 1 mbar.

Coated glassware

- Coated glass components offer protection against the glass splintering if it breaks under vacuum. Please note that when coated glassware is used it is only to the condenser and receiving flask to which coating is applied.
- For operational reasons, the coating is not applied to the entire area of the glass. In particular on the condenser there are areas to which no coating is applied, especially at places where joints and connections are made.
- Evaporating flasks with special heat-resistant coatings are available as accessories.
- The coating does not offer any protection against damage to the glass or breakage of the glass.
- Do not use the glass component if its coating is damaged.
- The use of coated glassware does not release you from the obligation when the device is in use to enclose it on all sides with an extractor hood or to employ an appropriate safety device.

Oil-tempered heating bath

- If silicone oil is used as a tempering medium, in the event that the evaporating flask fractures there is a risk that on mixing with the aqueous solvents (contents of the evaporating flask) the hot oil will foam up and spurt out in conjunction with a rapid increase in volume (formation of bubbles by the solvent).

Note: Using high-viscosity oils or solid grease can lead to overheating in localized areas, causing excessive pressure to build up in the bottom of the vessel.

Unpacking

• Unpacking

- Please unpack the device carefully;
- In the case of any damage a fact report must be set immediately (post, rail or forwarder).

• Delivery scope

Heating bath IKA® HBR 4 digital/control

- Heating bath
- Mains cable
- Operating instructions
- Temperature sensor PT 1000.60/61 (only for **HBR 4 control**)

Correct use

• Use

The IKA® tempering baths **HBR 4 digital/control** are laboratory devices and are suitable for directly tempering substances filled into the bath container.

They are also suitable for indirect tempering of substances filled in glass containers when the glass containers are immersed in the actual tempering medium. A rotary glass container is particularly advantageous, for example, when used in conjunction with an IKA® rotary evaporator.

Do not use the device to prepare food!

• Area of use (only indoors)

- Laboratories - Schools
- Pharmacies - Universities

The device is suitable for use in all areas apart from:

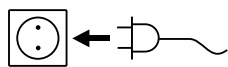
- domestic areas
- areas directly connected to a low-voltage supply which also serves domestic areas.

The safety of the user cannot be guaranteed:

- if the device is used in conjunction with accessories which are not supplied or recommended by the manufacturer;
- if the device is used contrary to the intended purpose against the manufacturer's instructions;
- if the device itself or PCB has been subjected to modifications by the third parties.

Commissioning

Observe the ambient conditions (temperature, humidity, etc.) listed under Technical Data.



The unit is ready for service when the mains plug has been plugged in.

Please follow above directions to ensure safe operation and prevent device from suffering damage.

The device is switched on with the 2-pole ON/OFF mains switch (A). When switched on the lamp in the rocker switch lights up green.

Setting the safety circuit

When activating the **HBR 4 control** devices an automatic self-test is carried out, all LEDs flash and all segments (**Fig. 1**) are visible on the LCD display. After this, the LCD displays in **Fig. 2** to **Fig. 6** are visible (standard factory setting).

When setting the safety circuit an upper temperature limit between 50 °C and 210 °C is set. The safety circuit can only be set in operating mode **A**.

- Switch on the device.

- Within 5 seconds of the display **Fig. 7** appearing, keep the button "Mode" (**D**) pressed down and set the safety temperature desired by simultaneously turning the control knob (**B**).
- Release the button "Mode" (**D**). For two seconds the safety temperature is set and safe OK **Fig. 8** is displayed; the safety temperature set is saved.

The safety circuit is automatically checked each time the device is restarted.

Setting the operating modes

The device can be operated in three different operating modes (display see **Fig. 9** to **Fig. 11**). To toggle from one operating mode to the other keep the button "Mode" (**D**) depressed when switching on the device (min. 5 secs). Sequence A-B-C-A-B-C-A- etc.

Operating mode A

This operating mode is the factory setting of the device. When switching on the device the heating and stirring functions are deactivated. The set values last set are saved and are used when the heating or stirring functions are switched on. The set values can be changed.

Operating mode B

When switching on the device the state of the heating and stirring functions are taken over before the device was switched off last as well as the last values set. The set values can be changed.

Operating mode C

When switching on the device the state of the heating and stirring functions are taken over before the device was switched off last as well as the last values set. The set values cannot be changed.

Heating function

With the button "Mode" (**D**) the correcting variable desired (set temperature) can be preselected. The heating bath temperature of the device is kept constant by the control circuit and is additionally monitored by the safety circuit. In the event of a disturbance in the control circuit, the heating bath is switched off permanently by the safety circuit. In the event of a fault in the control circuit or in the safety circuit, the LED "Temp." flashes yellow and green alternately. The LED next to the reset button lights up red.

The error is also displayed on the LCD (see chapter "Error messages").

The heating function cannot be started.

Control of medium temperature

The desired medium temperature can be set between 0 and 200 °C with the control knob (B), but not higher than the set safety temperature. The value set can be read off on the digital display (C) (Fig. 12). The heating function is switched on and off by pressing the button "Temp. On/Off" (F). If this function is activated the green LED next to the lettering "Temp" lights up. The heating bath is heated up to the set temperature. On the LCD display the set temperature, actual temperature and the PV symbol are displayed. The set temperature and actual temperature relate to the medium. During the heating phase the colour of the LED changes between green and yellow. If the yellow LED lights up this means that the heating system is being supplied with energy. If the heating function is switched off using the sensor key and the medium has reached a temperature of above 50 °C the yellow LED flashes (20% on 80% off).

On the LCD display °C and HOT are displayed alternately (Fig. 13 and 14). The temperature of the heating element is limited by the safety temperature set. The medium temperature is controlled by a fuzzy logic controller. The medium temperature is measured by a PT 500 temperature sensor and is heated up as quickly as possible without overshooting to the set temperature. The fuzzy logic controller automatically adapts to the various heat capacities of the different heat transfer fluids. This guarantees an optimal temperature management without temperature drift and waviness.

Operation with external temperature sensor PT 1000.60/61 (only for HBR 4 control)

The supplied external temperature sensor PT 1000.60/61 can be used as a setpoint transmitter for controlling the temperature of media, by using a vessel (e.g. glass flask) which is immersed in the water or oil bath.

The sensor tube must be of sufficient length to be immersed in the medium to be tempered (at least 20 mm) and fixed in position on the vessel.

If the temperature sensor PT 1000.60/61 is connected to the interface, the temperature regulation is automatically controlled by the external sensor!

The temperature sensor PT 1000.60/61 is not intended to act as a temperature sensor for the heating bath.

If the sensor is immersed directly in the heating bath (which is considered misuse) and is at the bottom of the bath, control deviations of up to +/-4 K can occur.

An error message (Er 5) will appear if the sensor value of the external sensor does not change within a certain period of time (adjustable Error 5 response time 1 ... 30 min), e.g., because the sensor is not immersed in the medium.

This detection is activated only at differences > 5 K between the sensor temperature and the target temperature, when the sensor temperature remains constant (+/- 0.5 K).

Setting the response time of error 5:

When "Er 5" appears on the display, press and hold the button "Mode" (D) and at the same time set the desired response time (1...30 min) by turning the control knob (B).

Note:

0 min (zero) means the monitoring is switched off (OFF)!

Stirring function

With the button "Mode" (D) the correcting variable desired (set speed) can be preselected. With the control knob (B) the desired speed of the stirrer drive can be set between 0 and 800 rpm in steps of 50 rpm. The value set can be read off on the digital display (C) (Fig. 15).

The stirring function is switched on and off by pressing the button "Motor On/Off" (E). If this function is activated the green LED lights up next to the lettering "Mot." The motor runs gently up to the speed set. On the LCD display the set speed, actual speed and the PV symbol are displayed (Fig. 16).

If both functions (heating and stirring) are switched off, the LCD display always indicates the set temperature set. When the heating function is switched on it is given priority on the LCD display.

If the stirring function is started with the sensor key or called up using the button "Mode" (D), the system switches over to speed display for five seconds. With the button "Mode" (D) the LCD display can be changed from temperature to speed and vice versa at any time. After five seconds the system switches back to the predominant mode.

Error messages

The following error messages can be displayed (**Fig. 20**) and have the following causes described:

Error code	Cause	Correction
Er 2	In remote operation (PC) mode with activated watchdog function in mode 1: no communication between PC and HBR 4 control . PC does not transmit any data within the set watchdog time, or connection to PC is interrupted.	Change watchdog time. Transmit data from PC within set watchdog time (OUT_WDx@m). Check cable and plug.
Er 3	Internal device temperature above 76 °C	Allow the device to cool down Mains switch OFF/ON
Er 4	Motor speed deviates ± 300 rpm from the speed Set speed greater than 350 rpm	Reduce load Mains switch OFF/ON
Er 4	Stirring function turned on, Actual speed = 0 rpm Indication after approx 30 sec	Mains switch OFF/ON Increase the speed or turn on the stirring function
Er 5	No temperature increase in PT 1000.60/61 at continuous temperature difference (corresponding to the set error 5 response time)	Place the temperature sensor in the medium. Adjust the error 5 response time according to the response characteristic of the system.
Er 11	Temperature sensor PT 1000 unplugged during operation	Plug in and unplug temperature sensor only when HBR 4 control is switched off.
Er 12	Temperature sensor PT 1000 plugged in during operation	Plug in and unplug temperature sensor only when HBR 4 control is switched off.
Er 20	Safety relay does not close	Safety circuit is set too low, check mains voltage (mains voltage must be larger than the nominal voltage - 10%). Mains switch OFF/ON
Er 21	Safety relay does not open	RESETbutton / service
Er 22	Disturbance before the last time the device was switched OFF or safety temperature is lower then the temperature of the medium	RESET button
Er 23	Adjustable safety circuit faulty	Mains switch OFF/ON / service
Er 24	Safety temperature set exceeded	Set safety temperature higher Mains switch OFF/ON
Er 26	System dry, no medium in the bath container	Allow the device to cool down, then refill with medium. Mains switch OFF/ON
Er 27	Calibration error	Mains switch OFF/ON. When switching on, a calibration is automatically carried out.
Er 28	Sensor rupture	Mains switch OFF/ON
Er 29	Short circuit in the safety sensor or controller and safety sensor mixed up	Service
Er 30	Short circuit in the controller sensor	Service

If the actions described fail to resolve the fault or another error code is displayed then take one of the following steps:

- contact the **IKA®** service department,
- send the device for repair, including a short description of the fault.

Interfaces and outputs

The device can be operated in "Remote" mode via an RS 232 using the laboratory software *Labworldsoft*[®].

Note: Please comply with the system requirements together with the operating instructions and help section included with the software.

Configuration

The RS 232 serial interface can be used to operate the device using a computer and a suitable user program (*Labworldsoft*[®]).

In order to increase safety when operating the **HBR 4 control** using a PC, a watchdog function can be activated which monitors the continuous data flow (see section entitled: "Watchdog function").

- The functions of the interface circuit between the laboratory device and the automation system are a selection from the signals specified in the EIA standard RS 232 C as per DIN 66020 Part 1. The assignment of the different signals can be seen in the image.
- Standard RS 232 C, corresponding to DIN 66259 Part 1 is valid for the electronic characteristics of the interface circuits and assignment of signal states.
- Transmission process: asynchronous character transmission in start-stop operation.
- Transmission type: full duplex
- Character format: character composition according to data format in DIN 66022 for start-stop operation. 1 start bit, 7 character bits, 1 parity bit (even), 1 stop bit.
- Transmission speed: 9600 bit/s
- Data flow control: hardware handshake
- Access method: data transmission from the device to the computer only occurs after a request from the computer.

Command syntax

The following points should be noted for the instruction set:

- Commands are generally sent from the computer (master) to the lab device (slave).
- The device sends only at the computer's request. Even fault indications cannot be sent spontaneously from the device to the computer (automation system).
- Commands and parameters, as well as consecutive parameters, must be separated by at least one space (code: hex0x20).
- Each individual command (incl. parameters and data) and each response are terminated with Blank CR LF (Code: hex 0x0D and 0x0A) and have a maximum length of 80 characters.
- The decimal separator in a number is a dot (Code: hex 0x2E).

The above details correspond as far as possible to the recommendations of the NAMUR working party (NAMUR recommendations for the design of electrical plug connections for analogue and digital signal transmission on individual items of laboratory control equipment, rev. 1.1).

Summary of available NAMUR commands

Abbreviations used:

X,y	=		numbering parameter (integer)
m	=		variable value, integer
n	=		variable value, floating-point number
X	=	1	Temperature of external sensor
X	=	2	Bath temperature
X	=	3	Bath safety temperature
X	=	4	Speed
X	=	52	External PT 1000 temperature sensor offset in K (-3.0 <= n <=+3.0)
X	=	54	Error 5 response time in minutes (1 <= n <= 30)

NAMUR commands		Function	Display (additional)
IN_NAME		Title request	
IN_PV_X	X=1;2;3;4;;	Current value reading	
IN_SOFTWARE		Software ID number, date, version request	
IN_SP_X	X=1;2;3;4;12;42 52;54;	Set target value reading	
IN_TYPE		Lab device identification request	
OUT_NAME name		Output of identification name. (Max. 6 characters; default: IKAHBR)	
OUT_SP_12@n		Setting WD safety limit temperature with set value echo	
OUT_SP_42@n		Setting WD safety limit speed with set value echo	
OUT_SP_X n	X=1;2;4;52; 54;	Setting of target value to n	
OUT_WD1@m		Watchdog mode 1: if event WD1 should occur, the heating and stirring functions are switched off and ER 2 is displayed. Set watchdog time to m (20 - 1,500) seconds, with watchdog time echo. This command launches the watchdog function and must be transmitted within the set watchdog time.	
OUT_WD2@m		Watchdog mode 2: if event WD2 should occur, the speed target value is changed to the WD safety speed limit and the temperature target value is changed to the WD safety temperature limit value. The warning WD is displayed. The WD2 event can be reset with OUT_WD2@0 - this also stops the watchdog function. Set watchdog time to m (20 - 1,500) seconds, with watchdog time echo. This command launches the watchdog function and must be transmitted within the set watchdog time.	
RESET		Switches off the device function.	
RMP_CONT_X	X=1;4	Continuation of ramp function (After prior RMP_PAUSE_X).	
RMP_IN_X	X=1;4	Reading the real segment number of ramp. With ramp not started: 0	
RMP_IN_X_y	X=1;4	Reading the accumulated value and the ramp segment duration of ramp segment y.	
RMP_LOOP_SET_X	X=1;4	Ending of ramp loop.	
RMP_LOOP_RESET_X	X=1;4	To work off the ramps in one loop.	
RMP_OUT_X_y n hh:mm:ss	X=1;4	Setting the accumulated value (n) and the ramp segment duration (hh:mm:ss) for ramp segment y.	
RMP_PAUSE_X	X=1;4	Stopping the ramp function. Freezing of real rated value and real ramp segment time.	
RMP_RESET_X		Switching off ramp functions and deleting of all set ramp segments	
RMP_START_X	X=1;4	Starting the ramp function, beginning with ramp function No.1 (Only possible after prior START_X. After RMP_STOP_X START_X is not necessary.)	
RMP_STOP_X	X=1;4	Switching off ramp function. Rated value = 0. (Ramp is maintained, that means, ramp can be restarted with RMP_STARTX_X).	
START_X	X=1;2;4;5;7	Starting the instrument's (remote) function.	Remote

STATUS_X	X=1;4;5 X=16 (old function)	Display of status 1*: Operation mode A 2*: Operation mode B 3*: Operation mode C *0: manual operation without fault *1: Automatic operation Start (without fault) *2: Automatic operation Start (without fault) <0: Error code: (-1) - 1: Error 1 - ... (see table) - 31:Error 31 -83: wrong parity -84: unknown instruction -85: wrong instruction sequence -86: invalid rated value -87: not sufficient storage space	
STOP_X	X=1;2;4;5;7	Switching off of device - (remote) function The variables set with OUT_SP_X remain saved. Includes command RMP_STOP.	Remote

“Watchdog” functions; monitoring of the serial data flow

If, once this function has been activated (see NAMUR commands), there is no retransmission of the command from the computer within the set time (“watchdog time”), the heating and stirring functions are switched off in accordance with the set “watchdog” function or are changed to the set target values.

The data transmission may be interrupted by, for example, a crash in the operating system, a power failure in the PC or an issue with the connection cable between the computer and the device.

“Watchdog” - mode 1

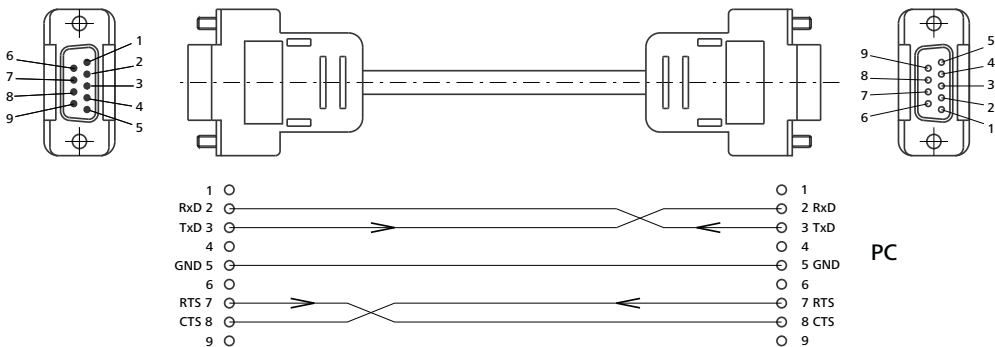
If there is an interruption in data communications (longer than the set watchdog time), the heating and stirring functions are switched off and ER 2 is displayed.

“Watchdog” - mode 2

If there is an interruption in data communications (longer than the set watchdog time), the speed target value is changed to the WD safety speed limit and the temperature target value is changed to the WD safety temperature limit value. The warning WD is displayed.

PC 2.1 cable

The PC 2.1 cable is used to connect the 9-pin plug to a computer.

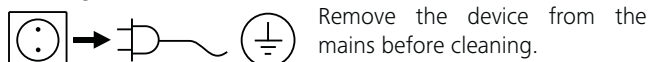


Maintenance and cleaning

The safety circuit must be checked over at least once a year by the user. To do this, fill the temperature control bath with 1 l of water and in operating mode A set the safety temperature to 100 °C. Then set the target temperature to 80 °C and start the heating function by pressing the Temp ON/OFF key. After the target temperature has been reached, switch the moderating bath off and back on again with the power switch and set the safety temperature to 70 °C. The temperature of the medium will then be 10 °C above the safety temperature, and the safety circuit will be activated. Error message Er 22 or Er 24 must be displayed.

The device is maintenance-free. It is subject only to the natural wear and tear of components and their statistical failure rate.

Cleaning:



Only use cleaning materials recommended by IKA®:

Dirt	Cleaning agent
Dyes	Isopropyl alcohol
Building materials	Water containing detergent/isopropyl alcohol
Cosmetics	Water containing detergent/isopropyl alcohol
Food	Water containing detergent
Fuels	Water containing detergent
Other materials	Please consult IKA®

Wear the proper protective gloves during cleaning of the devices. Electrical devices may not be placed in the cleansing agent for the purpose of cleaning.

Do not allow moisture to get into the equipment when cleaning.

Before using another than the recommended method for cleaning or decontamination, the user must ascertain with the manufacturer that this method does not destroy the instrument.

Ordering spare parts:

When ordering spare parts, please make sure to indicate the following:

- device type
- device serial number, see rating plate
- position number and description of spare part, see www.ika.com
- software version.

Repairs:

Please only send devices in for repair that have been cleaned and are free of materials which might present health hazards.

For this, use the "Decontamination Certificate" form which you can obtain from IKA® or can download a version for printing from the IKA® website at www.ika.com.

If your appliance requires repair, return it in its original packaging. Storage packaging is not sufficient when sending the device - also use appropriate transport packaging.

Accessories

H 210 Ring set
H 159 Intermediate bottom
H 162 Set of test tubes

H 160 Cover
IKAFLON stirring bar, ø7x60 mm
PC 2.1 Connecting cable
Software IKA® Labworldsoft®

Warranty

According to **IKA**'s Terms and Conditions of sale and delivery, this product is covered by a warranty for a period of 24 months. In case of making a warranty claim, please contact your local dealer or, if you wish, you can send the device directly to our factory. Please include the sales invoice and state the reasons for your guarantee claim. In this case, you are responsible for shipping and handling costs.

The warranty does not cover wearing parts, nor to defects that are the result of improper use, insufficient care and maintenance or failure to follow the instructions in this operating manual.

Technical data

		HBR 4 control	HBR 4 digital
Nominal voltage or	VAC VAC	230 ± 10% 115 ± 10%	
Frequency	Hz	50/60	
Heating function			
Heating output	W	1000	
Temperature range (medium)	°C	Room temperature...200	
Temperature range (medium)		Set and actual temperature LCD	
Setting accuracy	K	1	1
Controller deviation (3 l water/90 °C)	K	± 0.4	± 0.4
Absolute deviation / mean (3 l water/90 °C)	K	± 1	± 1
Controller deviation (3 l Marlotherm oil/150 °C)	K	± 0.8	± 0.8
Absolute deviation / mean (3 l Marlotherm oil/150 °C)	K	± 2	± 2
Stirring function			
Motor		Ballbearing brush-free, EC motor	
Motor output	W	5	5
Speed range	rpm	150...800 adjustable in steps of 50 rpm	
Minimum filling height	cm	3	3
Overvoltage class		II	
Permissible operating time	%	100	
Protection class according to DIN EN 60529		IP 20	
Permissible ambient temperature	°C	+5...40	
Permissible relative humidity	%	80	
Class designation acc. DIN 12876		II	
Total volume - bath container	l	5	5
Material - bath container		1.4301	
Dimensions (Ø x H)	mm	340 x 250	340 x 250
Weight	kg	4.4	4.4
Interfaces		PT 1000.60/61 RS 232	-

Subject to technical changes!

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