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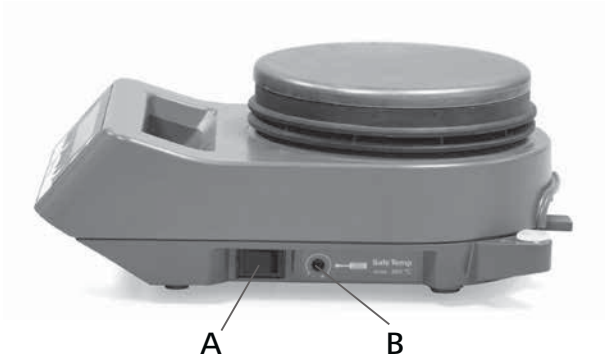
RH bd_072017

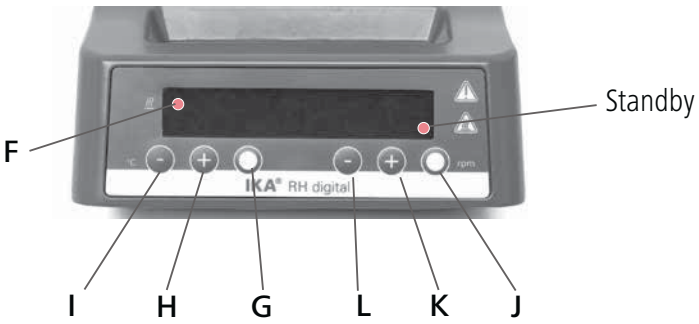
IKA® RH basic
IKA® RH digital

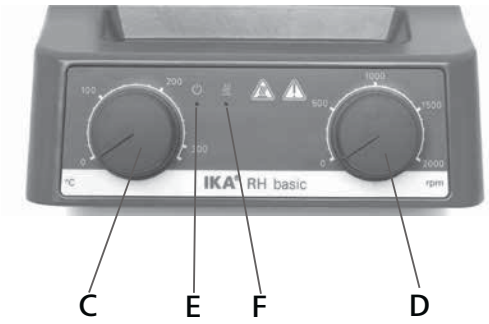
Contents

EN

Control elements







IKA® RH digital

A Main switch
B Adjustable safety circuit
F LED heating plate
G Button heater On/Off
H Button temperature "+"
I Button temperature "-"
J Button motor On/Off
K Button motor "+"
L Button motor "-"
M Contact thermometer jack
N Contact plug
O Power socket
P Threaded hole for stand
R Threaded plug

IKA® RH basic

A Main switch
B Adjustable safety circuit
C Rotary knob, heater
D Rotary knob, motor
E LED power
F LED heating plate
M Contact thermometer jack
N Contact plug
O Power socket
P Threaded hole for stand
R Threaded plug

Declaration of Conformity

We declare under our sole responsibility that this product is in compliance with the regulations 2014/35/EU, 2014/30/EU and 2011/65/EU and conforms to the standards or standardized documents: EN 61010-1, EN 61010-2-010, EN 61010-2-051, EN 61326-1, EN 60529 and EN ISO 12100.

Warranty

In accordance with **IKA**® warranty conditions, the warranty period is 24 months. For claims under the warranty please contact your local dealer. You may also send the machine directly to our factory, enclosing the delivery invoice and giving reasons for the claim. You will be liable for freight costs.

The warranty does not cover worn out parts, nor does it apply to faults resulting from improper use, insufficient care or maintenance not carried out in accordance with the instructions in this operating manual.

Explication of warning symbols

General hazard.

This symbol identifies information **that is of vital importance for protecting your health and safety**. Disregarding this information may lead to health impairment and injuries.

This symbol identifies information **that is of importance for the technically correct functioning of the system**.
Disregarding this information may result in damage to the instrument or to system components.

This symbol indicates information **which is important for proper use and ensuring that the operations of the instrument are performed efficiently.**
Failure to observe this information may result in inaccurate results.

Attention - Note the hazards of magnetism!

Danger - Reference to exposure to a hot surface!

Accessories

- Stirring bars See catalog
- Bath attachments See catalog
- Synthesis Attachments See catalog

- **RS 1** Set of stirring bars
- **RSE** PTFE-stirring bar remover
- **H 102.1** Protection handle
- **H 16 V** Support rod
- **H 16.1** Extension
- **H 38** Holding rod
- **H 44** Boss head clamp
- **ETS-D** Contact thermometer
- **H 102** Protective cover (RH basic)
- **H 103** Protective cover (RH digital)

See more accessories on **www.ika.com**

Safety instructions

- **Read the operation instructions completely before starting up and follow the safety instructions.**
- Keep the operation instructions in a place where they can be accessed by everyone.

General information

- Ensure that only trained staff work with the appliance.
- Follow the safety instructions, guidelines, occupational health and safety and accident prevention regulations.
- Socket must be earthed (protective ground contact).

ATTENTION

Attention - Magnetism!
Effects of the magnetic field have to be taken into account (e.g. data storage media, cardiac pacemakers ...)

DANGER

Risk of burns!
Exercise caution when touching the housing parts and the heating plate. The heating plate can reach temperatures in excess of 320 °C. Pay attention to the residual heat after switching off.

The device may only be transported in cold condition!

Device design:

DANGER

Do not operate the appliance in explosive atmospheres, with hazardous substances or under water.

- Set up the appliance in a spacious area on an even, stable, clean, non-slip, dry and fireproof surface.
- The feet of the appliance must be clean and undamaged.
- Ensure that the mains power supply cable does not touch the heating plate.
- Check the appliance and accessories for damage before each use. Do not use damaged components.

Permissible medium / contaminants / side reactions

WARNING

Attention!
Only process and heat media that has a flash point higher than the adjusted safe temperature limit that has been set (100 to 360 °C).
The safe temperature limit must always be set to at least 25 °C lower than the fire point of the media used.

WARNING

Beware of hazards due to:

- flammable materials
- combustible media with a low boiling temperature
- glass breakage
- incorrect container size
- overfilling of media
- unsafe condition of container.

- Process pathogenic materials only in closed vessels under a suitable fume hood. Please contact **IKA**® if you have any questions.

DANGER

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.

- The heating plate can heat up due to the action of the drive magnets at high motor speeds, even if the heater is not operational.
- Please consider any possible contaminations and unwanted chemical reactions.
- It may be possible for wear debris from rotating accessory parts to reach the material being processed.
- When using PTFE-coated magnetic bars, the following has to be noted: *Chemical reactions of PTFE occur in contact with molten or solute alkali metals and alkaline earth metals, as well as with fine powders of metals in groups 2 and 3 of the periodic system at temperatures above 300 °C - 400 °C. Only elementary fluorine, chlorotrifluoride and alkali metals attack it; halogenated hydrocarbons have a reversible swelling effect.*
  (Source: Römpps Chemie-Lexikon and "Ulmann", Volume 19)

Experimental procedures

WARNING

Wear your personal protective equipment in accordance with the hazard category of the media to be processed. There may be a risk from:

- splashing and evaporation of liquids,
- ejection of parts,
- release of toxic or combustable gases.

- Reduce the speed if:
  - the medium splashes out of the vessel,
  - the appliance is not running smoothly,
  - the container moves on the heating plate.

Accessories

- Safe operation is only guaranteed with the accessories described in the "Accessories" chapter.
- Always disconnect the plug before attaching accessories.
- Observe the operating instructions of the accessories.
- Ensure that the external temperature sensor (ETS-D...) is inserted in the media to a depth of at least 20 mm.
- The ETS-D external temperature sensor must always be inserted in the media when connected.
- Accessories must be securely attached to the device and cannot come off by themselves. The centre of gravity of the assembly must lie within the surface on which it is set up.

Power supply / Switching off

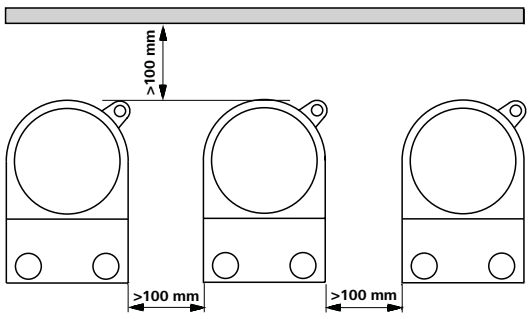
- The voltage stated on the type plate must correspond to the mains voltage.
- The socket for the mains cord must be easily accessible.
- The appliance can only be disconnected from the mains supply by pulling out the mains plug or the connector plug.

WARNING

The device will automatically restart in mode B following any interruption to the power supply. (RH digital)

For protection of the equipment

- The appliance may only be opened by experts.
- Do not cover the device, even partially e.g. with metallic plates or film. This may result in overheating.
- Protect the appliance and accessories from bumps and impacts.
- Keep base plate clean.
- Observe minimum distances between devices. Between device and wall should be 100 mm (min), above the assembly should be 800 mm (min).



Unpacking

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

- **Contents of package**
  - Magnetic stirrer with heating RH basic or RH digital
  - Mains cable
  - Operating Instructions
  - Screwdriver
  - H 102.1 Protection handle
  - H102 protective cover (RHb)
  - H103 protective cover (RHd)
  - Stirring bar 20, 30 and 40 mm

Correct use

- **Use**
  - For mixing and/or heating liquids.

- **Range of use (only indoors)**
  - Laboratories
  - Schools
  - Pharmacies
  - Universities

This device is suitable for use in all areas except:
- Residential areas
- Areas that are connected directly to a low-voltage supply network that also supplies residential areas.

The safety of the user cannot be guaranteed if: the appliance is operated with accessories that are not supplied or recommended by the manufacturer, the appliance is operated improperly according to the manufacturer's specifications or the appliance or printed circuit board are modified by third parties.

Commissioning

Assembly of **H 102.1** protection handle

Protection handle should be assembled in place for safety!

Please note that slight residual odor could be smelt during first-heating of the heater.

We suggest to operate the unit under a fume hood during the first use.

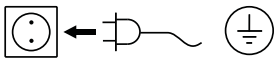
RH basic

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

Make sure the contact plug **(N)** is plugged in.

Before switching the device on, turn the two rotary knobs on the device to the off position.

Once these conditions are satisfied, and the mains plug has been plugged in, the device is ready to operate.



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

The device is switched on and off using the main switch **(A)** on the right hand side.

After the device has been switched on using the main switch **(A)** the "power" LED **(E)** lights up; this indicates standby status.

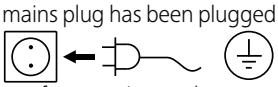
The device is now ready to operate. If the heating function is switched on, the LED **(F)** lights up, indicating that the heating process is active.

RH digital

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

Make sure the contact plug **(N)** is plugged in.

Once this condition is satisfied, and the mains plug has been plugged in, the device is ready to operate.



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

The device is switched on and off using the main switch **(A)** on the right hand side.

A few seconds after the device has been switched on, the display will show all display segments, the software version, operating mode, target temperature and speed.

The device is now ready for operation.

Setting the operation mode

RH digital

Operating the device in mode A or B

Mode A

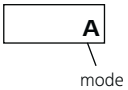
All settings will be stored if the device is switched off or disconnected from the power supply. The agitation and heating functions will be set to OFF when the device is powered on.

Mode B

All settings will be stored if the device is switched off or disconnected from the power supply. The agitation and heating functions will be set to ON or OFF when the device is powered on, depending on the previous status of the device.

Factory setting: mode A

The mode selected will be shown on the display when the device is started up.



Change the mode

	☞ Move device switch (A) to the OFF position
	☞ Press and hold button (G and J)
	☞ Move device switch (A) to the ON position
	☞ Release button (G and J) until mode changed
ⓘ	➪ The set value is indicated on the display **b**

Stirring function

The stirring bar, whose max. length should not exceed 80 mm, is driven via permanent magnet. The permanent magnet is directly attached to the output shaft of the motor.

The actual speed depends on the load and the voltage. Please note that fluctuations within the permissible tolerance of the mains voltage, and process-based changes to the viscosity of the medium being stirred, can also cause minor fluctuations in the speed.

RH basic

The motor speed is set using the rotary knob for the motor **(D)**. The speed setting corresponds approximately to the value in rpm on the speed scale. Turning the rotary knob **(D)** clockwise to the stop sets the motor to run at maximum speed.

RH digital

The stirring function is started by pressing the button **(J)**. The speed can be set within the range 0 to 2000 rpm in increments of 50 rpm by pressing the buttons **(L)** or **(K)**. The current speed setting is shown on the display; this is the speed at which the device operates.

Setting the safety temperature limit

The max. attainable heating plate temperature is restricted to 360 °C by an adjustable safety temperature limit. Once this limit has been attained, the device stops heating.

⚠ WARNING **The safe temperature limit must always be set at least 25 °C lower than the fire point of the media to be processed!**

The temperature set for the heating plate will be at least 25 °C lower than the safe temperature limit.
Factory setting: about 360 °C.

Setting the safety temperature limit

After switching on the device, the safety temperature limit **(B)** can be adjusted using a screwdriver.

Do not turn the setting screw beyond the clockwise or anticlockwise stop. This will cause irreparable damage to the potentiometer.

- Using the screwdriver supplied, turn the "Safe Temp" setting screw **(B)** to the clockwise stop.
- Use the temperature rotary knob **(C) [RH basic]** or with the button **(H** or **I) [RH digital]** to set the target temperature to the desired "Safe Temp" and wait until this is attained, at which point the "Heating" LED **(F)** goes out.
- Turn the "Safe Temp" setting screw **(B)** slowly anticlockwise until the heating function switches off and the indicator lamp **(E)** blinking (RH basic) or the display shows E24 (RH digital)...
- Then, turn the "Safe Temp" setting screw **(B)** slightly clockwise. Switch the device off and on again at the main switch **(A)**. After this, the device is ready to operate.

Heating function

The unit has a built-in 600 w heating plate with a stainless steel surface. The heating plate is kept at a constant temperature by a control circuit. Two temperature sensors are built into the heating plate.

RH basic

The heating plate temperature is set using the "Temp" rotary knob **(C)** with its associated scale. The scale values range from approx. room temperature to max. 320 °C. When the setting is **0** the device heating does not switch on.

When the heating function is activated, the "Heating" LED **(F)** lights up.

RH digital

The heating function is started by pressing the button **(G)**. The heating plate temperature can be set within the range 50 °C to 320 °C in 5 °C increments by pressing the buttons **(I)** or **(H)**. The current temperature setting is shown on display and device operates at this temperature.

Controlling the Medium temperature limit via Contact Thermometer

The preferable method for controlling the average temperature is with the ETS-D or contact thermometer. Adjust set point temperature. After a brief heat-up period, you will reach set temp. This method provides practically no temperature drift and only minor fluctuations of temperature.

In addition to precise control function, the adjustable "MAX-TEMP" function makes the ETS-D a temperature limiter that has a direct effect on the average temperature. When this "MAXTEMP" is exceeded, because of a defect in the control circuit, "safe temp" or "set point temp" on RH, the ETS-D immediately turns off the separate circuit of RH

The stirring function will continue to run at the speed that was set before the malfunction.
A 6-pin jack is located on the rear side of the instrument for connecting the ETS-D, contact thermometer or contact plug. The electronics of the instrument returns a test current which must flow through connector pins 3 and 5 for the heating plate to heat up.

Safety contact thermometers
acc. to DIN 12 878 class 2 or acc. Gerstel are connected with a three-wire cable, the test current flows through the contact thermometer.

Safety function*:*
If the test current is interrupted because of breakage of contact thermometer or unplugging of thermometer, the heating cuts off.

Contact thermometer without safety circuit
Acc. to DIN 12 878 class 0. The instrument only heats if the test current circuit is closed by an electrical connection of the plug pins 3 and 5.

2-wire connecting cables:
Connect plug pins 3 and 5 of the instrument plug.
3-wire connecting cables:
The test current circuit can also be produced in the terminal head of the contact thermometer (connect plug pins 2 and 3)-Safety Advantage!
A 3-wire cable with the required bridge is an available accessory.

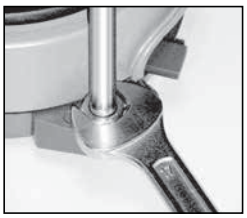
Settings

For the detailed instructions for settings and limit values, please refer to the operating instructions for the instrument you are connecting.

The desired average temperature can be adjusted on the ETS-D or contact thermometer. In addition, a "MAXTEMP" can be set for the ETS-D. A maximum average temperature can be set on the ETS-D to avoid malfunctions in combination with the RH. The required surface temperature of the heating plate can be selected with the temperature rotary knob or button.
Adjusting the temperature of device to the maximum adjustable temperature will result in the fastest possible heating time, but the average temperature may fluctuate to values above the set-point temperature on the contact thermometer. By adjusting the temperature rotary knob or button to approximately twice the set-point value of contact thermometer (with a set-point of 60 °C, the temperature of device would be set to 120 °C), you will reach a good compromise between a fast heating time and overshooting the set point.
If you adjust the temperature of device to exactly the set-point temperature, the medium will not reach the set-point temperature because some loss of the heat will always occur between the heating plate and the medium.
The maximum heating plate temperature can be adjusted with the "Safe Temp" screw.

Assembling the stand

- Remove threaded plug (**R)**
- Remove the protective cap from the support rod
- Put the washer between housing and nut
- Screw the support rod onto the device by hand until the end stop is reached
- Use an A/f 17 wrench to tighten the nut
- Accessories should be attached using boss head clamps.

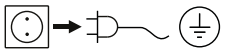


Note:
For bath attachments with diameters greater than 180 mm, use the support rod H 16 V with the extension H 16.1.

Maintenance and Cleaning

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

Cleaning

 Disconnect main plug prior to cleaning!

Only use cleaning agents recommended by **IKA®**.

Contamination	**Cleaning agents**
Dyes	isopropyl alcohol
Building materials	water containing tenside/isopropyl alcohol
Cosmetics	water containing tenside/isopropyl alcohol
Foodstuffs	water containing tenside
Fuels	water containing tenside

- When cleaning, do not allow moisture to get into the unit.
- Wear the proper protective gloves during cleaning of the devices.
- Before performing a non-recommended method of cleaning or decontamination, the user must ascertain with **IKA®** that this method will not destroy the instrument.

Spare parts order

When ordering spare parts, please give:
- Machine type
- Serial number, see type plate
- Software Version (second displayed segment when the device is on)
- Item and designation of the spare part please see **www.ika.com**.

Repair

Please send instrument in for repair only after it has been cleaned and is free from any materials which may constitute a health hazard.
For this you should request the "**Decontamination Clearance Certificate**" from **IKA®**, or use the download printout of it from the **IKA®** website **www.ika.com**.
Return the instrument in its original packaging. Storage packaging is not sufficient. Also, please use suitable shipping package materials.

Information for Care and Maintenance of the Heating Plate with Technical Enamel Coating

The technical enamel makes the heating plate easier to care fort and more resistant to acids and bases. Because of it, however, the heating plate is also more susceptible to extreme fluctuations in temperature and the force of impact. This can result in cracks forming or the coating flaking off.
Make certain that the bottom of the placing vessel is even, clean and dry. The bottom of the placing vessel must not have any sharp grooves, sides or edges. Remove residues of bases and immedialety.
We recommend most strongly that you clean the heating plate regularly.

Error Codes (RH digital)

Error code	Cause	Effect	Solution
E3	Temperature inside device is too high	Heating off	- Switch off device and allow to cool down.
E4	Motor or magnetic rods blockage	Heating off Motor off	- Switch off device. - *Warning! Only to be carried out by authorized service personnel:* *Carry out an internal test on the device to check the plug-in connector for the motor.*
E11	Break in safety circuit	Heating off	- Plug in contact plug (**N**). - Plug in contact thermometer/temperature sensor. - Replace faulty connecting cable, plug, or contact thermometer.
E21 E22 E29	Failure in safety circuit test		- Switch off and switch on again after about 1 minute. When fault is indicated again, please contact with **IKA**® service. - Set a higher safe temperature limit.
E24	Surface temperature **(Temperature of control sensor)** of the heating plate is higher than the set safe temperature limit	Heating off	- Switch off device until the surface temperature of the heating plate is lower than the selected safe temperature limit. - Set a higher safe temperature limit.
E25	Heating and switching element monitoring	Heating off	- Switch off device. - Safety temperature limit > 100 °C See also "Functional check of inactivating the safety circuit". - *Warning! Only to be carried out by authorized service personnel:* *Carry out an internal test on the device to check the plug-in connector for the heating element.*
E26	Difference between temperature of safety sensor and temperature of control sensor **Control temperature** > (Safety temperature + 40 K)	Heating off	- Switch off device. - *Warning! Only to be carried out by authorized service personnel:* *Carry out an internal test on the device to check the plug-in connector for the temperature sensor.*

If the actions described fail to resolve the fault or another error code is displayed then take one of the following steps:
- Please contact the service department;
- Send the device for repair, including a short description of the fault.

Technical data

Device		
Operating Voltage Range - Rated voltage	**Vac**	230±10% / 115±10% / 100±10%
Frequency	**Hz**	50/60
Power consumption (+10%) max.	**W**	620
Permissible duration of operation	**%**	100
Permissible ambient temperature	**°C**	+5 to +40
Permissible relative humidity	**%**	80
Protection type acc. DIN EN 60529		IP 21
Protection class		I
Overvoltage category		II
Contamination level		2
Operation at a terrestrial altitude	**m**	max. 2000
Dimensions (W x D x H)	**mm**	250 x 160 x 100
Weight	**kg**	2.8
Motor		
Speed range	**rpm**	0; 100-2000
Power consumption	**W**	20
Setting resolution (digital/basic)	**rpm**	50/Scale
Speed stability (no load) at rated voltage		
≥ 500 rpm	**%**	±10
< 500 rpm	**rpm**	±100
Stirred quantity max.(H_2O)	**ltr**	15
Heating plate		
Dimensions (Ø)	**mm**	135
Material		stainless steel / enameled white
Heating		
Heating power (-5%/+10%) at rated voltage	**W**	600
Adjustment and display resolution (digital/basic)	**K**	5/Scale
Surface temperature	**°C**	ambient temperature ...320
Hysteresis of heating plate at rated voltage no container, center of heating plate at 100 °C	**K**	±20
Electronic Thermometer		DIN 12878
Adjustable safety circuit		
Safety temperature limit (adjustable)	**°C**	100-360