

IKA

designed for scientists

IKA RH basic IKA RH digital



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Fehlercodes (RH digital)

| Fehlercode | Ursache | Folge | Korrektur |
|------------|--|--------------------------|---|
| E3 | Geräteinnentemperatur zu hoch | Heizung aus | - Gerät ausschalten und abkühlen lassen. |
| E4 | Motor oder Magnetstäbchen blockiert | Heizung aus Motor aus | - Gerät ausschalten. - Achtung! Nur für autorisiertes Servicepersonal: Steckverbindung des Motors im Geräteinneren überprüfen. |
| E11 | Unterbrechung im Sicherheitskreis | Heizung aus | - Kontaktstecker (N) stecken. - Kontaktthermometer / Temperaturfühler stecken. - Defekte Verbindungskabel, Stecker oder Kontaktthermometer austauschen. |
| E21 | Test Sicherheitskreis fehlgeschlagen | | - Gerät ausschalten und nach ca 1 Minute wieder einschalten. Bei erneuter Fehleranzeige den IKA Service kontaktieren. |
| E22 | | | - Sicherheitstemperaturgrenze höher einstellen. |
| E29 | | | |
| E24 | Oberflächentemperatur (Temperatur des Regelfühlers): der Aufstellplatte ist höher als die eingestellte Sicherheitstemperaturgrenze | Heizung aus | - Gerät ausschalten, bis die Oberflächentemperatur der Aufstellplatte niedriger ist als die eingestellte Sicherheitstemperaturgrenze. - Sicherheitstemperaturgrenze höher einstellen. |
| E25 | Heizung- Schaltelementüberwachung | Heizung aus | - Gerät ausschalten. - Sicherheitstemperaturgrenze > 100 °C wählen, siehe auch Funktionstest "Sicherheitskreisabschaltung". - Achtung! Nur für autorisiertes Servicepersonal: Steckverbindung des Heizelements im Geräteinneren überprüfen. |
| E26 | Differenz Fühler Sicherheitstemperatur zu Fühler Regeltemperatur Regeltemperatur > (Sicherheitstemperatur + 40 K) | Heizung aus | - Gerät ausschalten. - Achtung! Nur für autorisiertes Servicepersonal: Steckverbindung der Temperaturfühler im Geräteinneren überprüfen. |

Lässt sich der Fehler durch die beschriebenen Maßnahmen nicht beseitigen oder wird ein anderer Fehlercode angezeigt:

- wenden Sie sich bitte an die Serviceabteilung,
- senden Sie das Gerät mit einer kurzen Fehlerbeschreibung ein.

Technische Daten

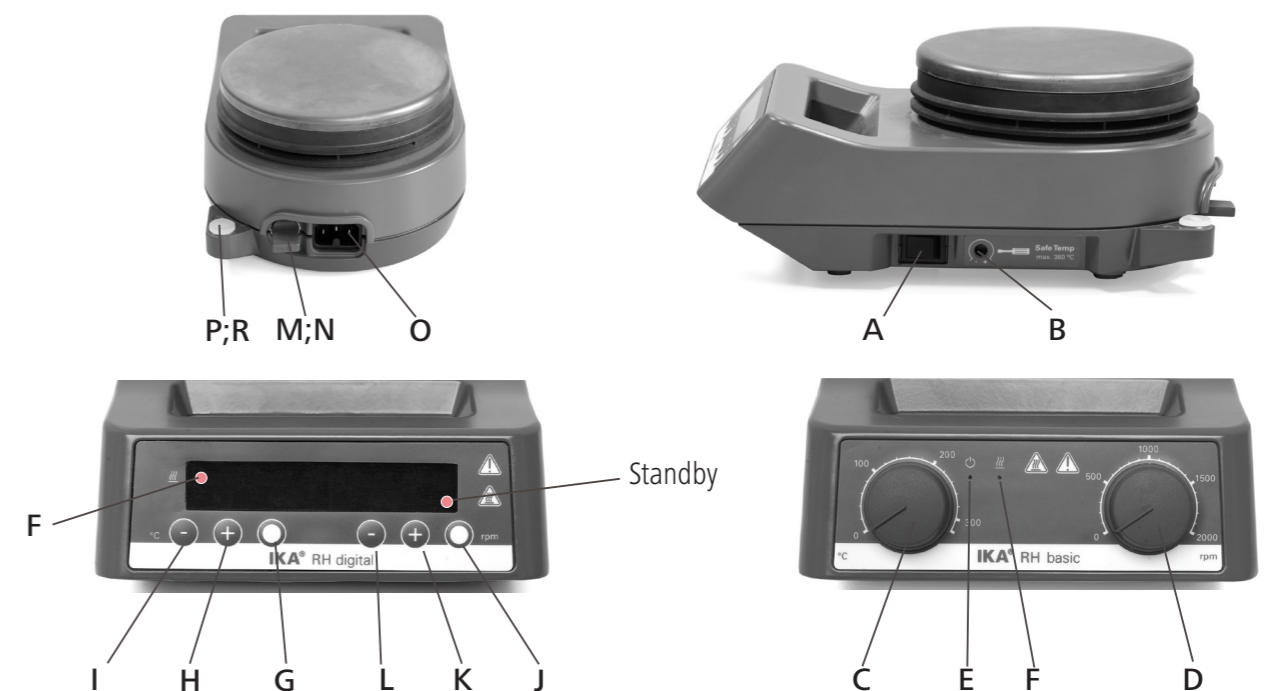
| Gerät | | |
|--|------------|--|
| Betriebsspannungsbereich - Nennspannung | Vac | 230±10% / 115±10% / 100±10% |
| Frequenz | Hz | 50/60 |
| Leistungsaufnahme (+10%) maximal | W | 620 |
| Eigenerwärmung Heizplatte durch max. Rühren (RT: 22 °C / Dauer: 1 h) | K | +12 |
| Zul. Einschaltdauer | % | 100 |
| Zul. Umgebungstemperatur | °C | +5 bis +40 |
| Zul. relative Feuchte | % | 80 |
| Schutzart nach DIN EN 60529 | - | IP 21 |
| Schutzklasse | - | I |
| Überspannungskategorie | - | II |
| Verschmutzungsgrad | - | 2 |
| Geräteinsatz über NN | m | max. 2000 |
| Abmessung (B x T x H) | mm | 250 x 160 x 100 |
| Gewicht | kg | 2.8 |
| Motor | | |
| Drehzahlbereich | rpm | 0; 100-2000 |
| Nennleistungsaufnahme | W | 20 |
| Einstellaufösung (digital/basic) | rpm | 50 / Skala |
| Drehzahlabweichung (ohne Last) bei Nennspannung: | % | ±10 |
| | rpm | ±100 |
| Max. Rührmenge (bez. auf Wasser) | ltr | 15 |
| Aufstellplatte | | |
| Abmessung (Ø) | mm | 135 |
| Material | - | rostfreier Edelstahl / weiß emailliert |
| Heizen | | |
| Heizleistung (-5%/+10%) bei Nennspannung | W | 600 |
| Einstell- und Anzeigaufösung (digital/basic) | K | 5 / Skala |
| Oberflächentemperatur | °C | Raumtemperatur320 |
| Regelhysterese Heizplatte bei Nennspannung (ohne Gefäß, Heizplattenmitte bei 100 °C) | K | ±20 |
| Elektronisches Thermometer | - | DIN 12878 |
| Einstellbarer Sicherheitskreis | | |
| Sicherheitstemperaturgrenze (einstellbar) | °C | 100-360 |

Technische Änderungen vorbehalten!

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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

EU Declaration of conformity

We declare under our sole responsibility that this product corresponds to the directives 2014/35/EU, 2006/42/EC, 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 and EN ISO 12100.

A copy of the complete Declaration of Conformity or further declarations of conformity can be requested at sales@ika.com.

Warranty

In accordance with IKA Terms and Conditions of Sale, 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 - 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 parts of the housing and the heating plate.



The heating plate can reach dangerous temperatures. Pay attention to the residual heat on the heating plate after switching off the stirrer.

The device may only be transported when the heating plate has cooled down.

Device design:

Do not use the device in explosive atmospheres, it is not EX-protected.

With substances capable of forming an explosive mixture, appropriate safety measures must be applied, e.g. working under a fume hood.

To avoid body injury and property damage, observe the relevant safety and accident prevention measures when processing hazardous materials.

- 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

The safety temperature must be set in accordance with EN 61010-2-010 Chapter "Requirements for devices containing or using flammable liquids".

- The surface temperature of the flammable medium that is exposed to air may not exceed its flash point.

A danger usually arises if a medium is heated in open vessels.

- The surface temperature of the heating device (e.g. the mounting plate) may not exceed the value of $(t - 25) \text{ }^\circ\text{C}$ (= set value of the safety circuit) on the surface of the flammable medium and in contact with air, whereby t is the fire point of the liquid.

A danger usually arises if a medium is heated in glass vessels (glass breakage).

If a setting made by the user (medium temperature or safety temperature) could bring a flammable medium into a state in which the conditions mentioned above could be exceeded, additional measures must be introduced that will protect the user from this danger.

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.



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

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 combustible 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 guaranteed only with the use of original IKA accessories.

• Always disconnect the plug before attaching accessories.

• Observe the operating instructions of the accessories.

• Ensure that the external temperature sensor is inserted into the medium to a depth of at least 20 mm 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.

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

For protection of the equipment

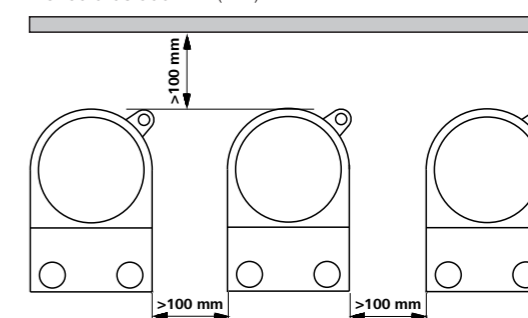
• The appliance may only be opened by experts.

• 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
- Screwdriver
- H102 protective cover (RHb)
- H103 protective cover (RHd)
- Operating Instructions
- H 102.1 Protection handle
- H103 protective cover (RHd)
- Stirring bar 20, 30 and 40 mm

Intended use

• Use

- For mixing and/or heating liquids.

• Area of use

Indoor environments similar to that a laboratory of research, teaching, trade or industry area.

The safety of the user cannot be guaranteed:

- if the device is operated with accessories that are not supplied or recommended by the manufacturer,
- if the device is operated improperly or contrary to the manufacturer's specifications,
- if the device or the 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.

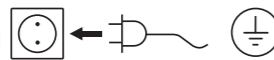
RH basic

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.

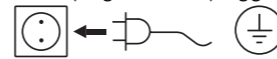
The device is now ready to operate. If the heating function is switched on, the LED (**F**) lights up, indicating that the heating process is active.

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

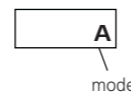
All settings will be stored if the device is switched off or disconnected from the power supply. The agitation and heating functions will be set to OFF when the device is powered on.

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 using a contact thermometer

The preferable method for controlling the average temperature is with contact thermometer. After the set point temperature has been adjusted, this results in a short heating-up time, practically no temperature drift and only minor fluctuation in temperature.

A 6-pin jack is located on the rear side of the device for connecting the PT 1000 series, contact thermometer or the contact plug. The electronics of the devices returns a test current that must flow via connector pins 3 and 5 for the heating plate to heat up.

Safety function:

If the test current is interrupted because of e.g. breakage of contact thermometer or falling out of the cable plug, the heating cuts off.

Settings:

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

The desired medium temperature can be adjusted on the contact thermometer. The required surface temperature of the heating plate can be selected with the rotating / pressing knob or button.

Adjusting the temperature of device to the maximum adjustable temperature will result in the fastest possible heating time. However, the medium temperature may fluctuate to values above the set-point temperature on the contact thermometer. By adjusting the rotating /

pressing knob or button to approximately twice the set-point value of contact thermometer (with a setpoint 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 over-shooting the set point. If you adjust the temperature of the 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 is limited to the adjustable safety temperature limit in the event of a control circuit malfunction. (See "Setting the safety temperature limit")

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 only subject to the natural wear and tear of components and their statistical failure rate.

Cleaning

For cleaning disconnect the mains plug!

Use only cleaning agents which have been approved by IKA to clean IKA devices.

Water containing surfactant / isopropyl alcohol.

Wear protective gloves during cleaning 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 device when cleaning.

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

Spare parts order

When ordering spare parts, please give:

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

Repair

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

For repair, please request the "Safety Declaration (Decontamination Certificate)" from IKA or use the download printout of it from 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.

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

The technical enamel makes the heating plate easier to care for 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 immediately. 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. <i>- 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.</i> |
| 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". <i>- 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.</i> |
| E26 | Difference between temperature of safety sensor and temperature of control sensor (Control temperature > (Safety temperature + 40 K)) | Heating off | - Switch off device. <i>- 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.</i> |

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 |
| Self-heating of the heating plate by max. stirring (RT: 22 °C / duration:1 h) | K | +12 |
| 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: | % | ±10 |
| | rpm | ±100 |
| Stirred quantity max.(H ₂ O) | 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, heating plate centre at 100 °C) | K | ±20 |
| Electronic Thermometer | - | DIN 12878 |
| Adjustable safety circuit | | |
| Safety temperature limit (adjustable) | °C | 100-360 |

Subject to technical changes!