IKA

designed for scientists

RCT basic / RCT basic anodized
(**RCT** B / **RCT** B AN)
RET basic / RET basic anodized
(**RET** B / **RET** B AN)

ENGLISH

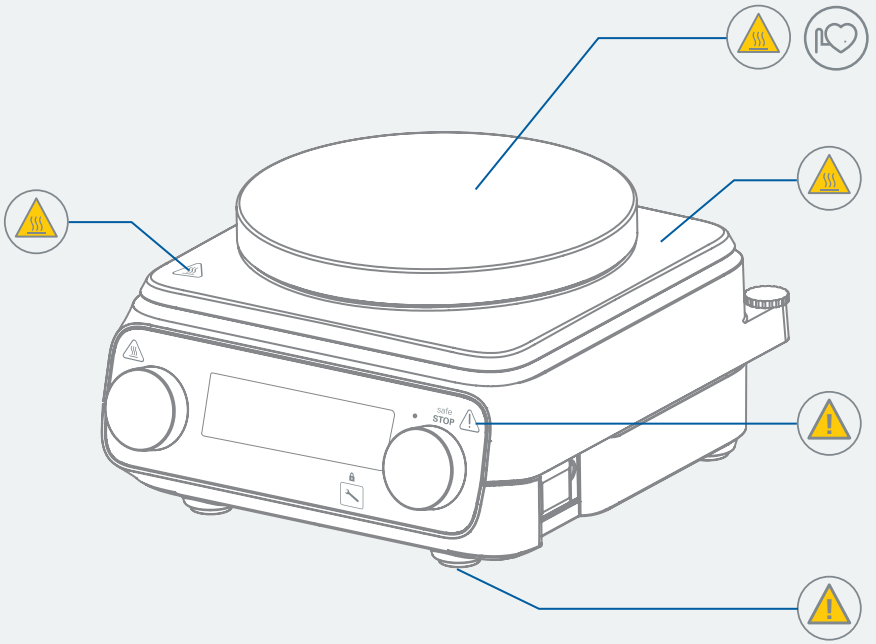


Fig. 1

Source language: German

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.

Wireless module: (only for RET B / RET B AN)
Directive: 2014/53/EU Standards: EN 60950-1, EN 300328, EN 301489-1, EN 301489-17

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

Note for USA (FCC) (only for RET B / RET B AN)

This equipment complies with Part 15 of the FCC rules. Any changes or modifications not expressly approved by the Manufacturer could void the user's authority to operate the equipment. This device complies with Part 15 of the FCC rules subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept all interference received, including interference that may cause undesired operation.

NOTE:
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules.
These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.
This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Note for Canada (IC) (only for RET B / RET B AN)

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:
(1) This device may not cause interference
(2) This device must accept any interference, including interference that may cause undesired operation of the device.
This device complies with Health Canada's Safety Code 6 / IC RSS-210. The installer of this device should ensure that RF radiation is not emitted in excess of the Health Canada's requirement.

Explication of warning symbols

/// Warning symbols

Danger! Indicates an (extremely) hazardous situation, which, if not avoided, will result in death, serious injury.

Warning! Indicates a 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.

Notice! Indicates practices which, if not avoided, can result in equipment damage.

Attention! Indicates the risks due to magnetism.

Danger! Indicates the exposure to a hot surface.

/// General Symbols

A— Position number
Indicates device components relevant to actions.

Correct / result
Indicates the correct execution or the result of an action step.

Wrong
Indicates the incorrect execution of an action step.

Note
Indicates steps of actions that require particular attention.

Safety instructions

/// General information

› **Read the operating instructions completely before starting up and follow the safety instructions.**
› Keep the operating instructions in a place where it can be accessed by everyone.
› Ensure that only trained staff work with the device.
› Follow the safety instructions, guidelines, occupational health and safety and accident prevention regulations.
This includes, in particular, measures to control foreseeable malfunctions, such as preventing the unintentional release or leakage of media in the event of a malfunction. Failure to take these measures may result in serious injury, contamination, equipment damage, or operational disruption.
› The device must only be used in a technically perfect condition.

Notice!
› Pay attention to the marked sites in **Fig. 1**.

/// Device design

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

Caution!
› Device is partially made of glass:
- Glass surface can be damaged by impact.
- If glass surface is damaged it could cause injury, don`t use the device anymore.

Notice!
› Set up the device in a spacious area on an even, stable, clean, non-slip, dry and fireproof surface.
› Observe the minimum distances:
- between devices min. 100 mm,
- between device and wall min. 100 mm,
- above the device min. 800 mm.
› The feet of the device must be clean and undamaged.
› Keep the base plate clean.
› Ensure that the power cord set / temperature sensor cable does not touch the heating plate.
› Do not cover the device, even partially e.g. with metallic plates or film. This may result in overheating.

/// Working with the device

Danger!
› 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.

Danger!
› 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.

Warning!
› 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.
› 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.
› 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) °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.

Caution!
› 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 speed if:
- medium splashes out of vessel because the speed is too high,
- device is not running smoothly,
- container moves on the base plate,
- an error message is displayed.
› The heating plate can heat up due to the action of the magnets at high motor speeds, even if the heater is switched off.
› 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)

/// Accessories

› Protect the device and accessories from bumps and impacts.

› Check the device and accessories for damage before each use. Do not use damaged components.
› Safe operation is guaranteed only with the use of original IKA accessories.
› Ensure that the external temperature sensor is inserted into the medium to a depth of at least 20 mm when connected.
› Always disconnect the plug before attaching accessories.
› 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.
› Observe the operating instructions of the accessories.

/// Power supply / Switching off the device

Warning!
› The device will automatically restart in operating mode **R** following any interruption to the power supply.

› The voltage stated on the type plate must correspond to the power voltage.
› The device can only be disconnected from the power supply by pulling out the power plug or the connector plug.
› The socket for the power cord must be easily accessible.
› Socket must be earthed (protective ground contact).

/// Maintenance

› The device must only be opened by trained specialists, even during repair. The device must be unplugged from the power supply before opening. Live parts inside the device may still be live for some time after unplugging from the power supply.

/// Disposal instructions

› The device, accessories and packaging must be disposed of in accordance with local and national regulations.

Intended use

/// Use

› The magnetic stirrer is suitable for mixing and / or heating substances.

/// Area of use

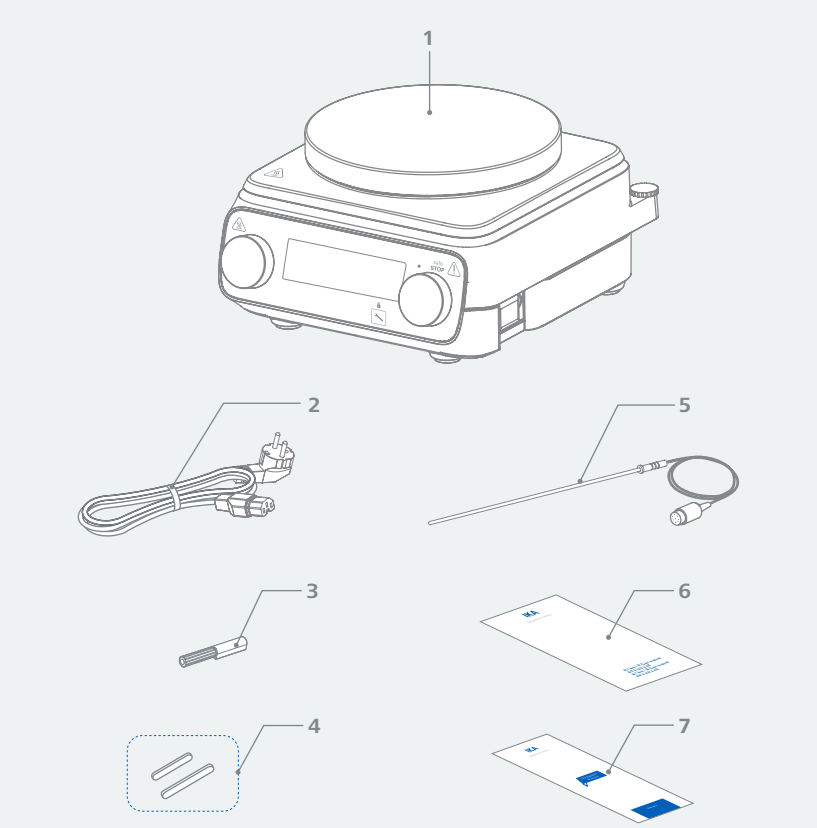
› Indoor environments similar to that a laboratory of research, teaching, trade or industry area.
› The safety of the user cannot be guaranteed:
- if the device is operated with accessories that are not supplied or recommended by the manufacturer,
- if the device is operated improperly or contrary to the manufacture's specifications,
- if the device or the printed circuit board are modified by third parties.

Unpacking

/// Unpacking

› Unpack the device carefully. Any damage should immediately be reported to the carrier (mail, rail or freight forwarding company).

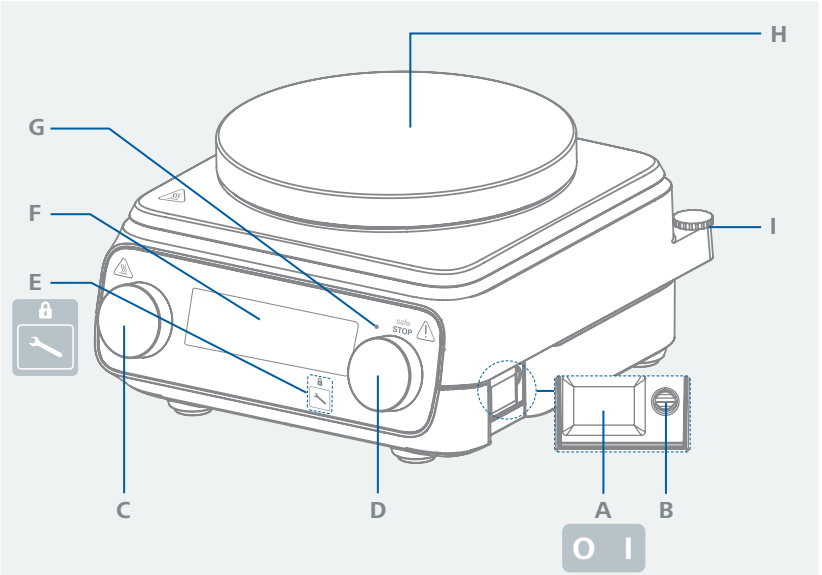
/// Scope of delivery



1	**RCT** B / **RCT** B AN / **RET** B / **RET** B AN	5	Temperature sensor **PT 1000.60**
2	Power cord set	6	User guide
3	Screwdriver (safety circuit)	7	Warranty card
4	Magnetic stirring bar **IKAFLON 30 round** and **IKAFLON 40 round**		

Operator panel and display

/// Operator panel



A	Power switch (left "O"« off, right "I" « on)	**H**	Heating plate
B	Adjustable safety circuit	**I**	Threaded hole for stand
C	Rotating / pressing knob - Temperature setting	**J**	Connection for PT 1000 temperature sensor series, temperature probes or contact plugs
D	Rotating / pressing knob - Speed setting / Menu selection / safeSTOP *	**K**	Ethernet Interface (RET B / RET B AN)
E	Menu / Lock button *	**L**	USB C Interface
F	Display	**M**	RS 232 Interface
G	Standby LED	**N**	Power socket

Note:

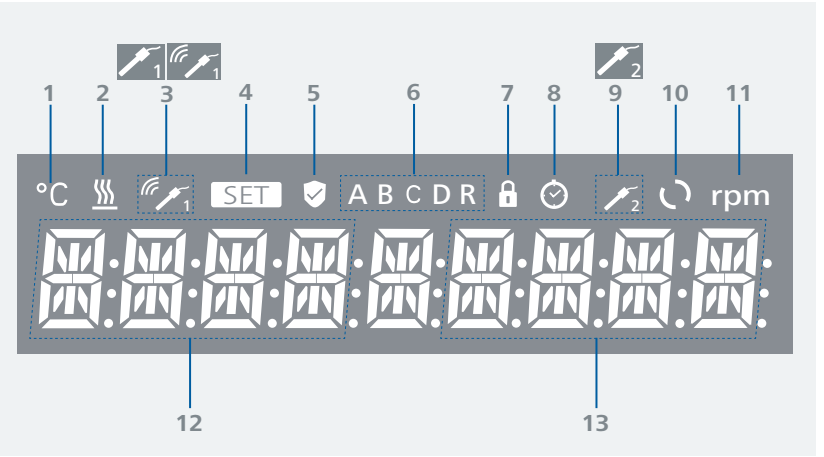
safe STOP (safeSTOP)

The "safeSTOP" function allows the device functions to be switched off while it is being controlled via an external source (e.g. IKA HUB or labworld*soft*®).
The device displays "safeSTOP".
To deactivate the "safeSTOP" function, restart the device.

(LOCK button)

The lock function can be used to lock the rotating / pressing knobs and the menu button to prevent accidental changes.
An active lock is indicated by the symbol on the display.
Press and hold the lock button for 3 seconds to activate / deactivate the function.

/// Display



1	Temperature unit	**8**	Timer / counter
2	Heating function activated	**9**	Two sensors connected
3	One sensor connected	**10**	Stirring function activated
4	Set temperature display	**11**	Speed unit
5	Safety function activated	**12**	Temperature value
6	Operating mode	**13**	Speed value
7	All buttons and knobs locked		

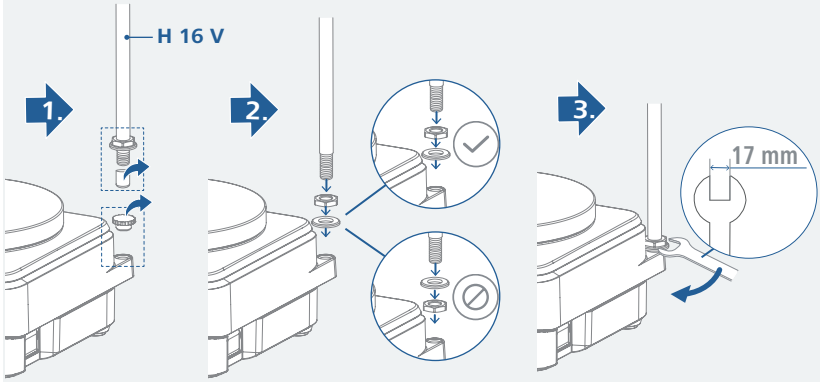
Installation

/// Assembling H 16 V / H 38 / H 44 / H 16.3 (accessories)

› Review the mounting and safety instructions of the IKA boss head clamp prior to using it.
› The device must not be suspended from the support rod!

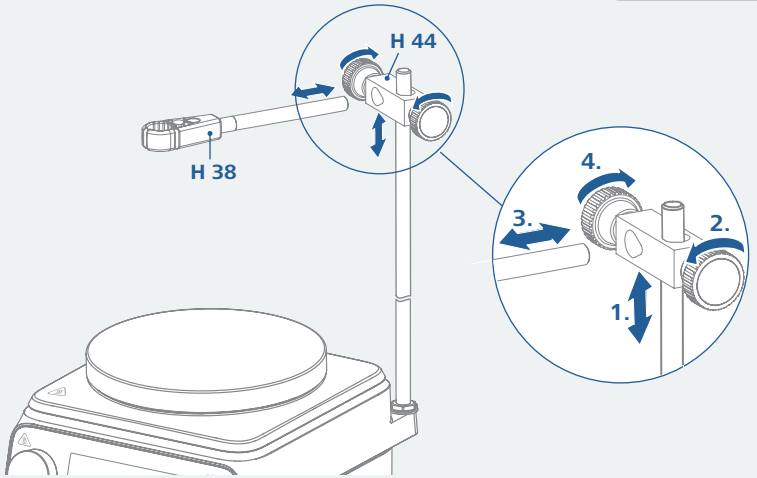
1

H 16 V

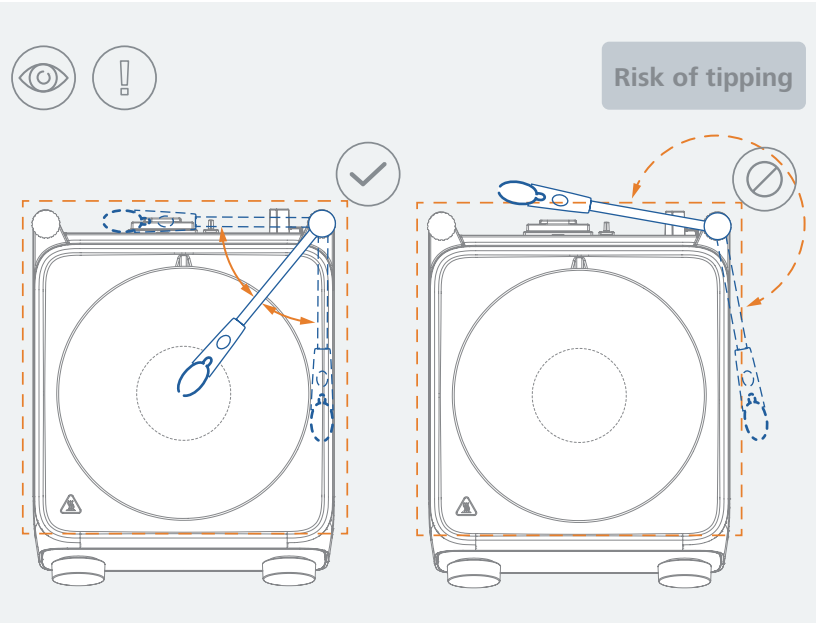


2

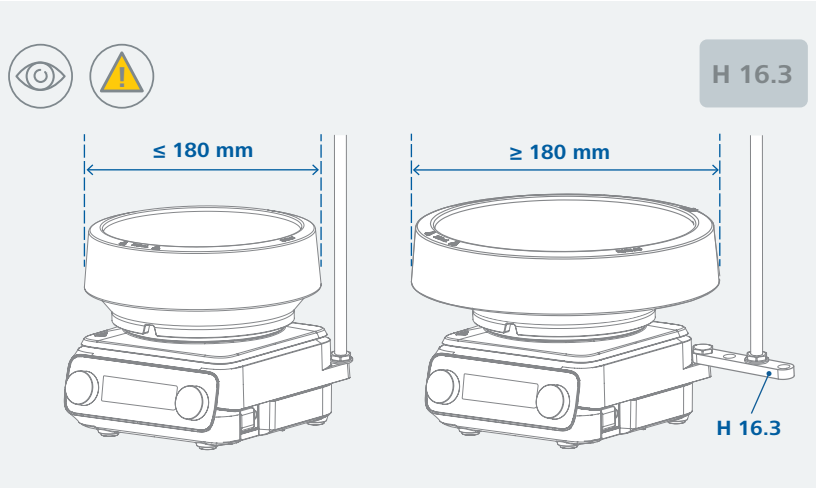
H 38 / H 44



Risk of tipping!
› Make sure that the center of mass of the attached device does not protrude over the safe area indicated below with a dotted rectangle.



Notice!
› When using bath attachments with a diameter over 180 mm, use support rod in conjunction with an extension.



/// Connecting an external temperature sensor / thermometer

Connect:

1. PT1000 / ETS-D5
› Switch off the device via the power switch.
› Connect the contact thermometers or temperature sensor PT 1000 (single sensor) to the connection.
› Switch on the device via the power switch.

2. PT wireless / ETS-D7
› Switch on the device via the power switch.
› Start the “PAIR” function to establish the wireless connection between the main device and the wireless sensors.

3. PT wireless + USB cable / ETS-D7 + USB cable
› Switch off the device via the power switch.
› Connect the wireless sensors and main device using the USB C-C cable.
› Switch on the device via the power switch.

Display for the selected sensor combination:

Caution!
› It is not permitted to disconnect the external temperature sensor while the device heating function is on. If it is disconnected abnormally, please restart the device.

1. PT 1000
› The set and actual temperature of the connected PT 1000 sensor is shown on the left-hand side of the display.
› The following symbol lights up at the same time: 

2. ETS-D5
› Follow the operating instructions of the contact thermometer. The set and actual temperature of the heating plate is shown on the left-hand side of the display.
› The following symbol lights up at the same time: 
Note: In this case, a PT wireless / ETS-D7 cannot be connected at the same time.

3. PT wireless
› The set and actual temperature of the connected PT wireless sensor is shown on the left-hand side of the display.
› The following symbol lights up at the same time: 

4. ETS-D7
› The set and actual temperature of the connected ETS-D7 sensor is shown on the left-hand side of the display.
› The following symbol lights up at the same time: 

5. PT wireless (USB C-C cable)
› The set and actual temperature of the connected PT wireless sensor is shown on the left-hand side of the display.
› The following symbol lights up at the same time: 

6. ETS-D7 (USB C-C cable)
› The set and actual temperature of the connected ETS-D7 sensor is shown on the left-hand side of the display.
› The following symbol lights up at the same time: 

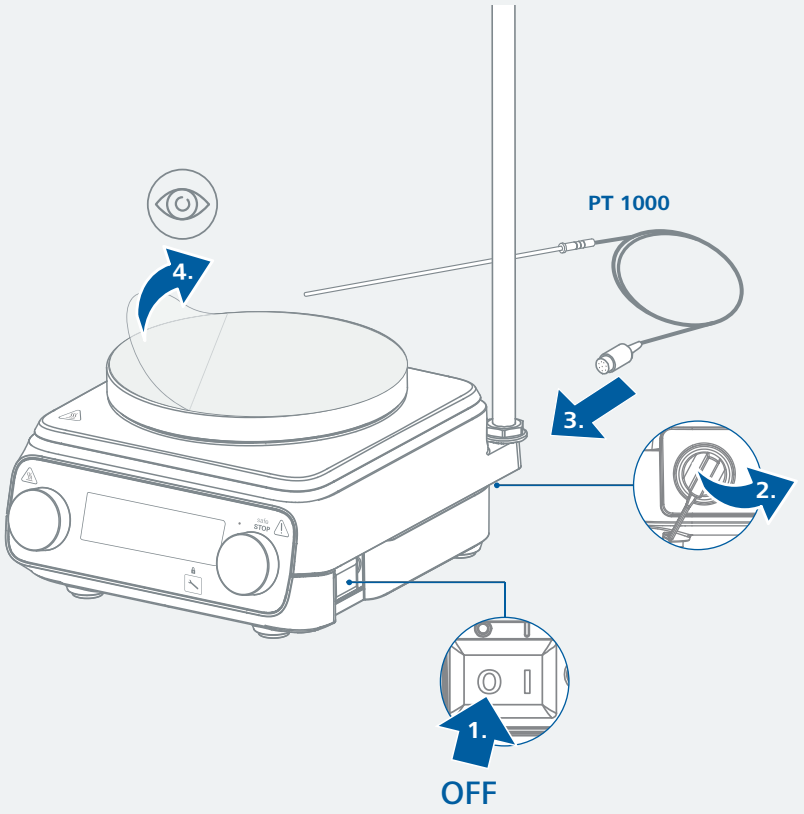
7. PT 1000 + PT wireless
› The actual temperature value of the carrier (heating blocks) will be measured by PT 1000. The following symbol lights up at the same time: 
› The actual temperature value of the medium will be measured by PT wireless. The following symbol lights up at the same time: 

8. PT 1000 + ETS-D7
› The actual temperature value of the carrier (heating blocks) will be measured by PT 1000. The following symbol lights up at the same time: 
› The actual temperature value of the medium will be measured by ETS-D7. The following symbol lights up at the same time: 

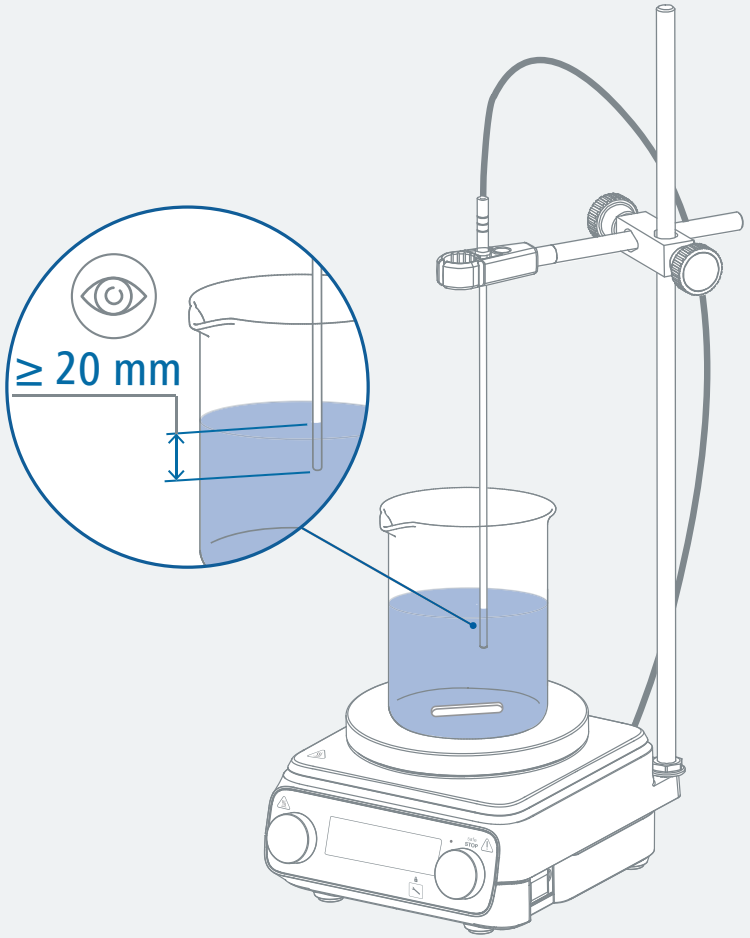
9. PT 1000 + PT wireless (USB C-C cable)
› The actual temperature value of the carrier (heating blocks) will be measured by PT 1000. The following symbol lights up at the same time: 
› The actual temperature value of the medium will be measured by PT wireless (USB C-C cable). The following symbol lights up at the same time: 

10. PT 1000 + ETS-D7 (USB C-C cable)
› The actual temperature value of the carrier (heating blocks) will be measured by PT 1000. The following symbol lights up at the same time: 
› The actual temperature value of the medium will be measured by ETS-D7(USB C-C cable). The following symbol lights up at the same time: 

Connect PT 1000

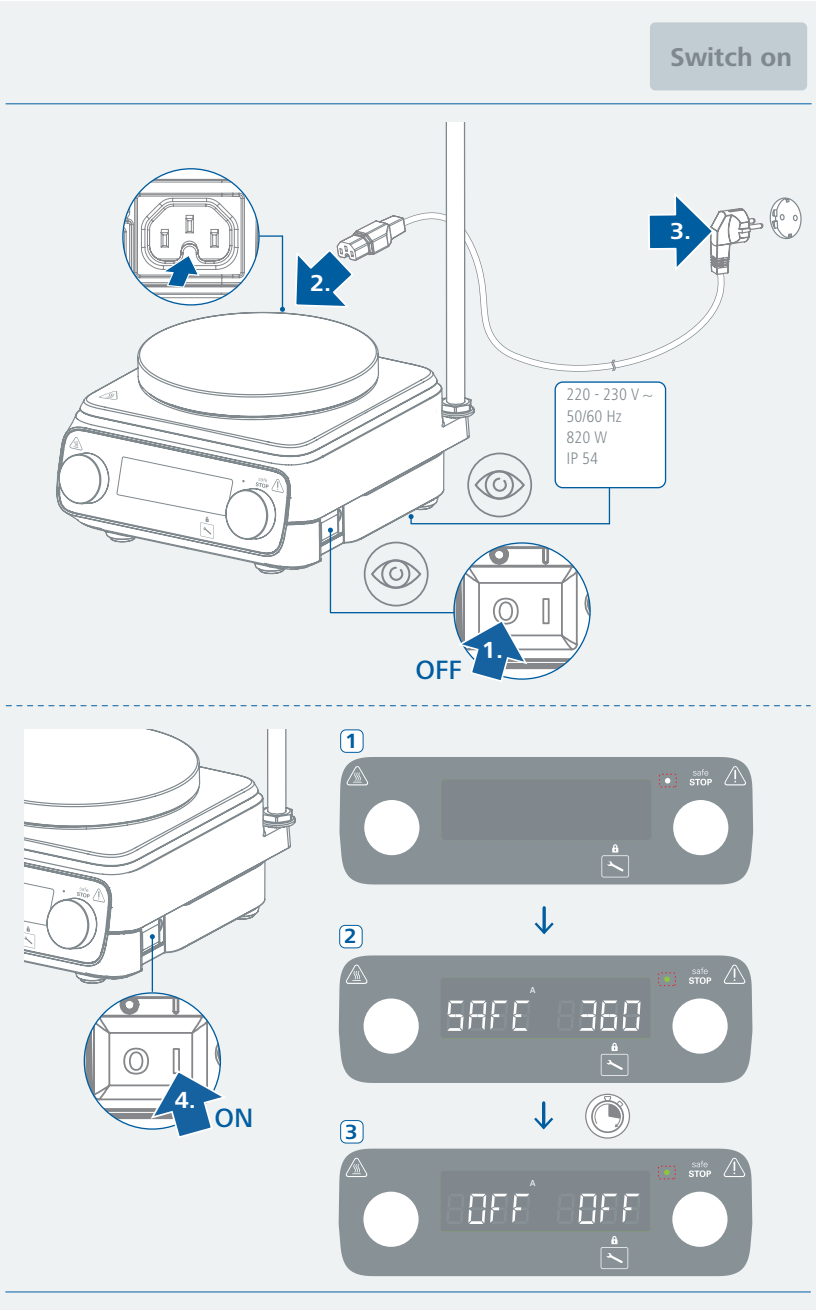


Immersion depth



Operation

/// Switching on



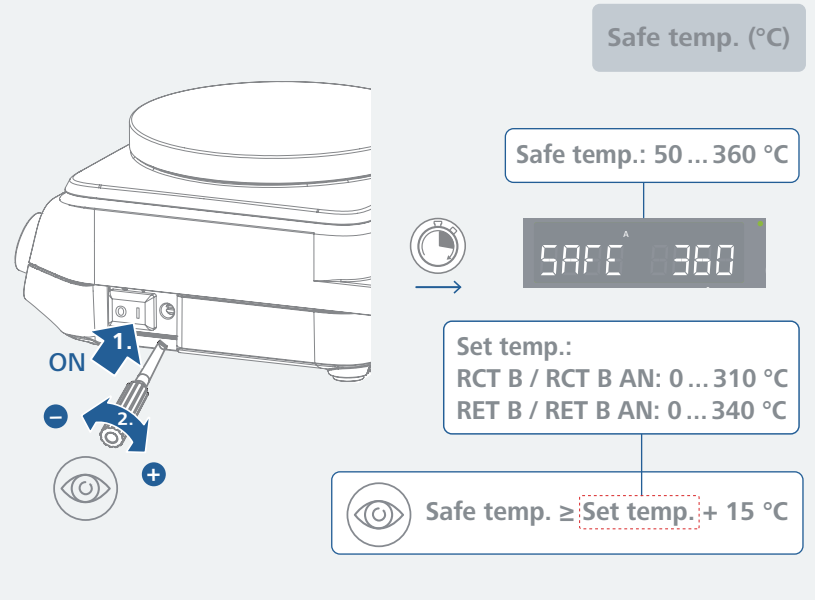
/// Heating

Setting the safety temperature limit:
The maximum achievable heating plate temperature is restricted by an adjustable safety temperature limit. Once this limit has been reached, the device stops heating.

Notice!
The denominated temperatures should always refer to the center of the heating plate.

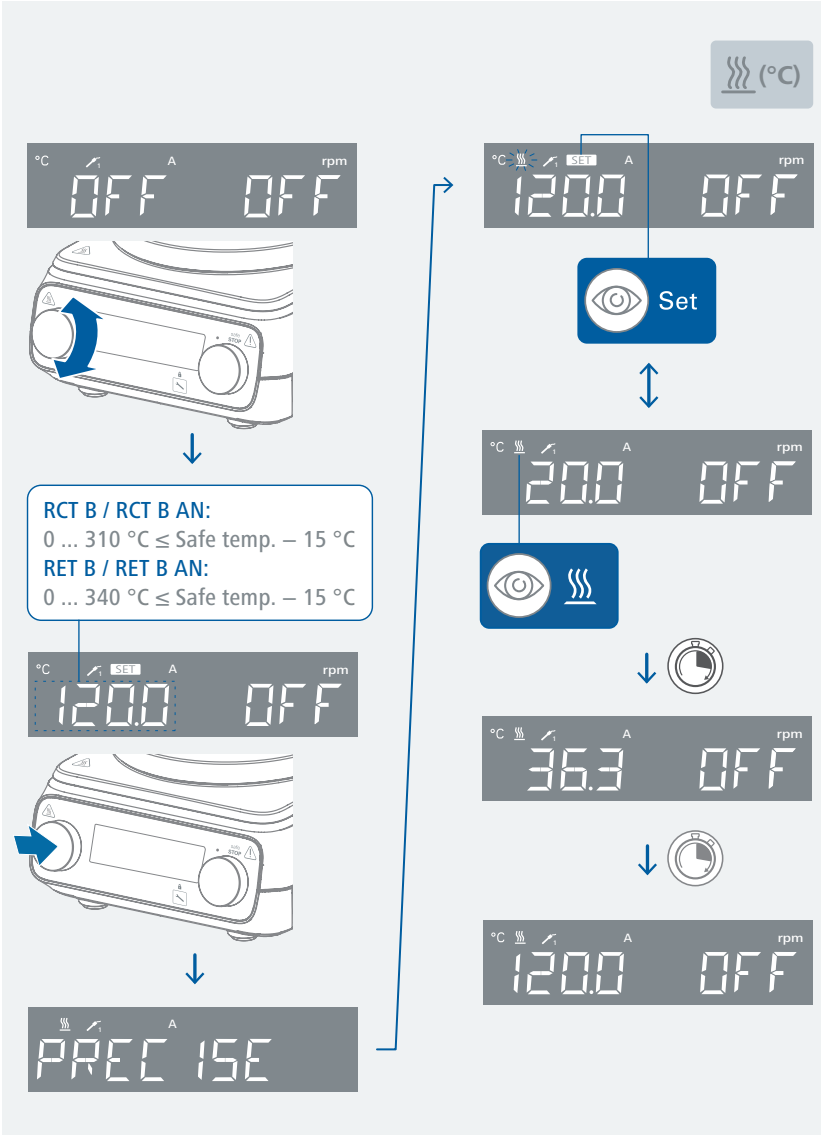
Warning!
The safety temperature limit must always be set at least 25 °C lower than the fire point of the media to be processed!
The adjustable maximum heating plate temperature must always be set at least 15 °C under the set safety temperature limit.
Setting range: see section "Technical data".

After switching on the device, the safety temperature limit 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.



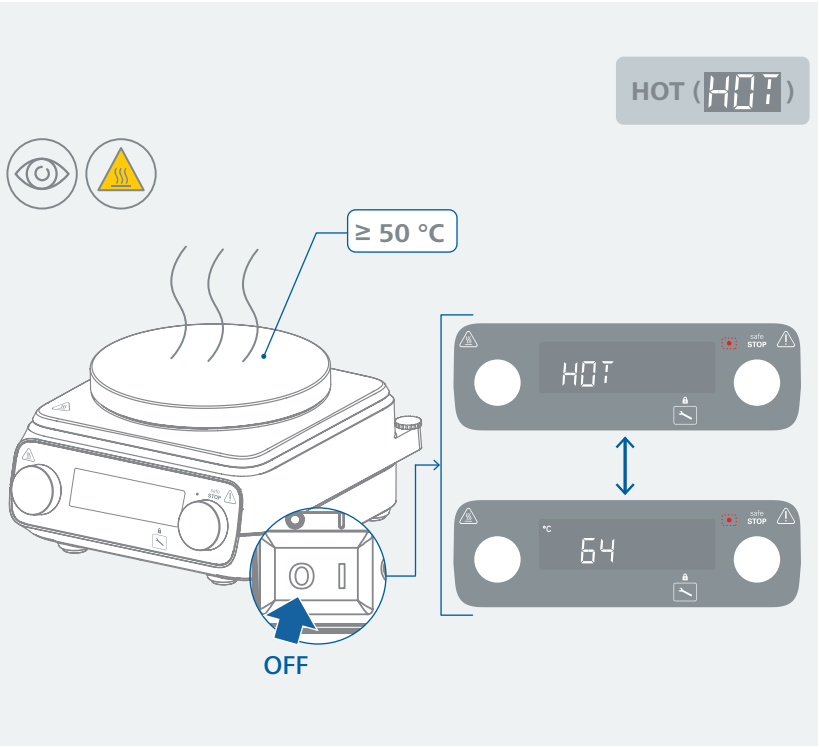
Start heating:

› Set the safety temperature limit. (see “Setting the safety temperature limit”)
› Set the target temperature using the rotating / pressing knob (C).
The set temperature value is shown on the left of the display.
› Press the rotating / pressing knob (C) to start the heating function.
› The set temperature control mode is displayed for a short time.



General information for heating:

› The set and actual temperature values are shown on the display alternately.
› When the heating function is switched on, the heating LED indicator “” lights.
› When the device is switched off while the heating plate temperature is higher than 50 °C, the display shows “HOT” and the actual heating plate temperature value alternately.



/// Controlling the medium temperature limit using a contact thermometer

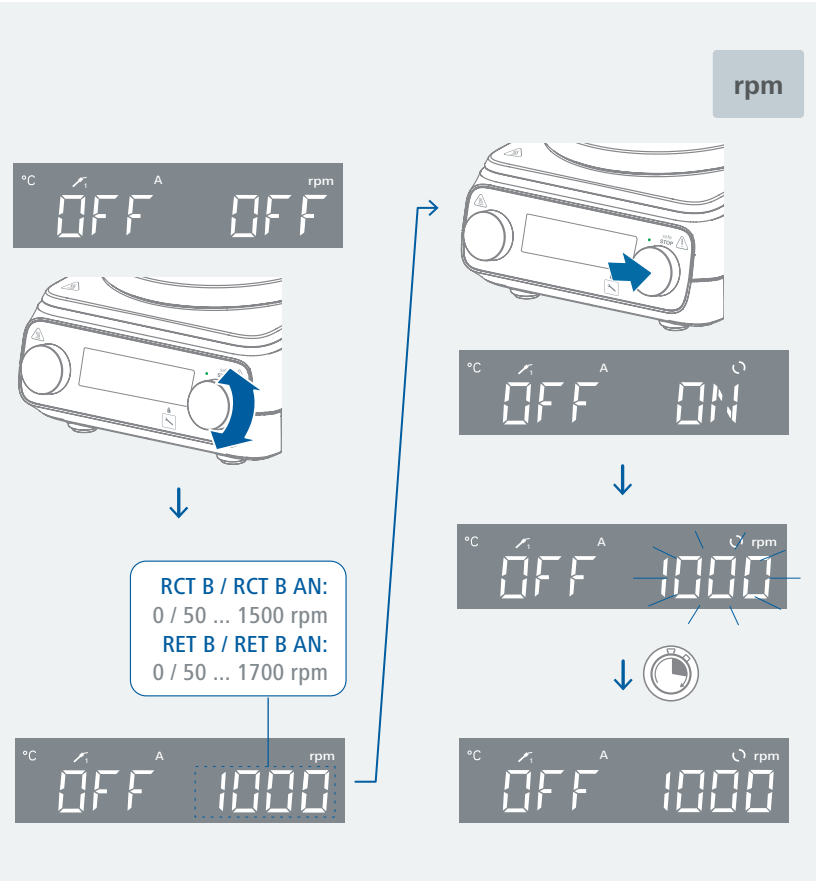
A 6-pin jack is located on the rear side of the device for connecting the PT 1000 series, contact thermometer or the contact plug. The electronics of the devices returns a test current that must flow via connector pins 3 and 5 for the heating plate to heat up.

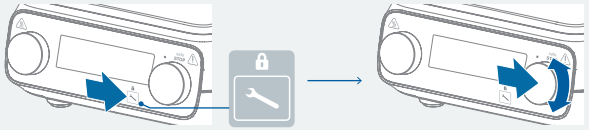
Safety function:
If the test current is interrupted because of e.g. breakage of contact thermometer or falling out of the cable plug, the heating cuts off.

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 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 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 adjusted safety temperature limit in the event of a control circuit malfunction. (See “Setting the safety temperature limit”)

/// Stirring

› Set the speed using the rotating / pressing knob (D).
The set speed value is shown on the right of the display.
› Press the rotating / pressing knob (D) to start the stirring function.
The speed value blinks until reaching the set value.





Factory settings

- IDENTIFY — only visible if a wireless sensor is connected
- PH — Only visible if a wireless sensor is connected and the TEMP PH display option is activated.
- T — Only visible if two sensors are connected and a timer is set.
- MODE
  - A — ✓
  - B — -
  - C — -
  - D — -
  - R — -
- TEMP MODE
  - PRECISE — ✓
  - FAST — -
  - BLOCK S — -
  - BLOCK M — -
  - BLOCK L — -
- LIMITS
  - TEMP — max. set TEMP.
  - CARRIER — max. set TEMP.
  - SPEED — max. set rpm
  - HEAT RATE — 100 %
- DISPLAY
  - TEMP RPM — ✓
  - SET ACT — -
  - TEMP PH — -
- SAFETY
  - SENS TIME — 5 MIN
  - TEMP DROP — ON
  - DELTA T — OFF
- ADJUST
  - START — -
  - RESET — ✓

Factory settings

- PAIR
  - SENSOR — PAIRING — PAIRED / FAILED
  - HUB — PAIRING — PAIRED / FAILED
- UNPAIR
  - SENSOR — CONFIRM — UNPAIRED / CANCEL
  - HUB — CONFIRM — UNPAIRED / CANCEL
  - CANCEL
- TIMER
  - SET TIME — OFF
  - STOP HEAT — YES / NO — ✓ / -
  - STOP STIR — YES / NO — ✓ / -
  - SET DELAY — YES / NO — - / ✓
  - RESTART — -
- IP ADRESS
  - ETHERNET — -
  - WIFI — -
- OV.STIRRER
  - USB — ON / OFF — - / -
  - RS 232 — ON / OFF — - / -
  - PAIR — PAIRING — PAIRED / FAILED — - / -
  - UNPAIR — CONFIRM — UNPAIRED / CANCEL — - / -
  - MIN SPEED — -
- RESET — CONFIRM / CANCEL — - / -
- INFO — -

/// Menu details

IDENTIFY (Identify):

A wirelessly connected device can be identified in the “IDENTIFY” menu option. This menu option is only visible if there is an active wireless connection.

pH:

The current pH value is displayed in the “pH” menu option. This menu option is only visible if a wireless sensor with pH function is connected and the “TEMP PH” display option is activated.

T (Timer value):

The current timer value is displayed in the “Timer value” menu option.
This menu option is only visible if two sensors are connected at the same time and a timer is set.

MODE (Operating mode):

The “MODE” menu option defines the behavior of the device functions after switching on / switching off the device.

Mode A (factory setting)
After power on / power failure no automatic restart of functions.
The set target values are not saved.

Mode B:
After power on / power failure no automatic restart of functions.
The set target values are saved.

Mode C
After power on / power failure no automatic restart of functions.
The set target values are saved but cannot be changed.

Mode D
After power on / power failure no automatic restart of functions.
The set safety temperature must be confirmed manually after switching on the device.
Confirmation request for set value changes if functions are active.
The set target values are not saved.

Mode R
After power on / power failure automatic restart of functions, depending on previous settings.
The set target values are saved.

TEMP MODE (Temperature control mode):

Factory setting: PRECISE
In the “TEMP MODE” menu option, the temperature control behavior can be selected in conjunction with a connected temperature sensor.

PRECISE

Good control results, minimized overshooting, slow rise in temperature.

FAST

Maximum heating rate, increased overshooting.

BLOCK S

Good control results, minimized overshooting, slow rise in temperature for small load.

BLOCK M

Good control results, minimized overshooting, slow rise in temperature for medium load.

BLOCK L

Good control results, minimized overshooting, slow rise in temperature for larger load.

Block S (small)	Block M (medium)	Block L (large)
H 135.101 Block 16 x 4 ml	H 135.108 Block 250 ml	H 135.40 Flask carrier 1000 ml without handle
H 135.102 Block 16 x 8 ml	H 135.25 Flask carrier 250 ml without handle	H 135.41 Flask carrier 1000 ml with handle
H 135.103 Block 9 x 16 ml	H 135.26 Flask carrier 250 ml with handle	H 135.50 Flask carrier 2000 ml without handle
H 135.104 Block 4 x 20 ml	H 135.30 Flask carrier 500 ml without handle	H 135.51 Flask carrier 2000 ml with handle
H 135.105 Block 4 x 30 ml	H 135.31 Flask carrier 500 ml with handle	
H 135.106 Block 4 x 40 ml		
H 135.107 Block 100 ml		
H 135.20 Flask carrier 100 ml without handle		
H 135.21 Flask carrier 100 ml with handle		

LIMITS:

In the menu option “LIMITIS”, various setpoint values can be limited.

TEMP
This menu option limits the maximum set temperature.
Setting range:
RCT B / RCT B AN: OFF ... 310 °C (1 °C / step)
RET B / RET B AN: OFF ... 340 °C (1 °C / step)
Factory setting: max. set TEMP
Note: If the temperature value is set to “OFF”, the heating function is disabled.

CARRIER
This menu option limits the maximum set temperature of the heating carriers such as the heating blocks and is only accessible when 2 external temperature sensors are connected at the same time.
Setting range:
RCT B / RCT B AN: 50 ... 310 °C (1 °C / step)
RET B / RET B AN: 50 ... 340 °C (1 °C / step)
Factory setting: max. set TEMP

SPEED
This menu option limits the maximum set speed.
Setting range:
RCT B / RCT B AN: OFF ... 1500 rpm (10 rpm / step)
RET B / RET B AN: OFF ... 1700 rpm (10 rpm / step)
Factory setting: max. set rpm
Note: If the speed value is set to “OFF”, the stirring function is disabled.

HEAT RATE
This menu option limits the maximum heating power in percentage.
Setting values: 25%, 50%, 75% and 100%
Factory setting: 100%

DISPLAY:

In the “DISPLAY” menu option, the values that are shown on the main screen can be defined.
Factory setting: TEMP RPM

TEMP RPM

Left side: Temperature value
Right side: Speed value

SET ACT

Left side: Set temperature value
Right side: Actual temperature value
Note: SET ACT cannot be selected if the timer function has been activated.

TEMP PH

Left side: Temperature value
Right side: pH value
Note:
- This menu option is only visible if a wireless sensor with pH function is connected.
- Temperature range for pH function: 0 ... 130 °C

SAFETY (safety function):

In the “SAFETY” menu option, various safety settings can be configured.
This menu option is only visible if an external temperature sensor is connected.

SENS TIME
If no temperature rise is detected at the temperature sensor during the time set in SENS TIME, the heating function of the device is switched off.
Setting range: OFF - (0.5 ... 30) minutes
Factory setting: 5 minutes
The selected “SENS TIME” value will be shown on the display when the device starts up if the sensor is connected.
Note:
This function will only be active if:
- sensor temperature is < 50 °C
- difference between set temperature and actual temperature > 5 K.

TEMP DROP
A rapid drop in temperature can be detected by activating this menu option.
Factory setting: ON

DELTA T
A permissible temperature deviation from the setpoint temperature can be set in this menu option. If this limit, “set temperature + DELTA T”, is exceeded, the heating function of the device is switched off.
Setting range: 5 ... 50 K (5 K / step)
Factory setting: OFF
Note: The “set temp + DELTA T” value will be limited by the max. set temperature.

ADJUST:

To reduce temperature deviations due to tolerances, the user can adjust the temperature sensor together with the device.
Note: Adjustment is only possible with the “PT 1000” or “PT wireless” sensors.
2-point calibration: Calibration using two temperatures
Calibration range: 40 ... 200 °C
A calibrated temperature reference meter is required.

PAIR (Connect):

In the “PAIR” menu option, a wireless connection to a sensor or the IKA HUB can be established.
This menu option is only visible if at least one free connection is available.
Note: The accessory USB WD is required for the RCT B / RCT B AN to use the wireless connection.

UNPAIR (Disconnect):

In the menu option “UNPAIR”, an existing wireless connection can be disconnected.
This menu option is only visible if there is at least one wireless connection.

TIMER (Timer):

In the “TIMER” menu option, a single timer can be set. You can also specify how the heating or stirring function should behave after the timer has expired.

SET TIME:
SET TIME range: OFF… 59:59 MIN:S (1 S / step) / 99:59 H:MIN (1 M / step)
Factory setting: OFF
Turn and press the rotating / pressing knob (D) and set a timer value.
The timer starts as soon as the first device function is started (heating or stirring).
If the timer is stopped manually by switching off all functions or if the timer value expires, the last set timer value is displayed.
Note: If the timer value is set to “OFF”, the timer function is deactivated.

STOP HEAT:
In this menu option, you can decide whether the heating function should stop or continue after the timer has expired.

STOP STIR:
In this menu option, you can decide whether the stirring function should stop or continue after the timer has expired.

SET DELAY:
If the “SET DELAY” menu option is activated, the timer only starts when the set temperature is reached. As long as the set temperature is not reached, “WAIT” and the timer value will be displayed alternately.
The timer function starts immediately once the set temperature is reached.

RESTART:
This menu option allows the user to restart the timer function during operation.

IP ADRESS (IP address):

ETHERNET
In this menu option, the set IP address (Ethernet) is displayed.

WIFI
In this menu option, the set IP address (Wi-Fi®) is displayed.

OV.STIRRER:

This menu option allows the user to connect the EUROSTAR stirrers via USB, RS 232 cable or wirelessly, monitor the behavior of the connected EUROSTAR, and stop the heating function if an error occurs in the following cases:
- The EUROSTAR stirring speed is reduced to a certain minimum speed (see “MIN SPEED”).
- The connection signal cannot be detected.
- The connected EUROSTAR is in an error state.

MIN SPEED
This menu option allows the user to set the minimum speed limit for the EUROSTAR.

RESET (Reset):

In the “RESET” menu option, all changed menu settings can be reset to the factory settings.

INFO:

This menu option displays the most important device settings, such as the software version, in sequence.

Interfaces and outputs

The device can be operated by computer via an RS 232, USB or ethernet (RET B / RET B AN) interface using the laboratory software labworld*soft*®.
The device software can also be updated with a PC via the RS 232 or USB port.

Notice!
Please comply with the system requirements together with the operating instructions and help section included with the software.

/// USB interface

The Universal Serial Bus (USB) is a serial bus for connecting the device to the PC. Equipped with USB devices can be connected to a PC during operation (hot plugging). Connected devices and their properties are automatically recognized.

/// USB device drivers

Connect the IKA device through the USB data cable to the PC. The data communication is via a virtual COM port. Configuration, command syntax and commands of the virtual COM ports are as described in RS 232 interface.
From Windows 10 and onwards the standard Windows USB driver is automatically loaded and a COM port number is assigned (find details in Windows Device Manager: "USB Serial Port (COMxx)"). If you have problems with USB communication, first ask your IT system administrator whether access to the USB interface is restricted for data security reasons.

/// RS 232 interface

Configuration:
- The functions of the interface connections between the device and the automation system are chosen from the signals specified in EIA standard RS 232 in accordance with DIN 66 020 Part 1.
- For the electrical characteristics of the interface and the allocation of signal status, standard RS 232 applies in accordance with DIN 66 259 Part 1.
- Transmission procedure: asynchronous character transmission in start-stop mode.
- Type of transmission: full duplex.
- Character format: character representation in accordance with data format in DIN 66 022 for start-stop mode. 1 start bit; 7 character bits; 1 parity bit (even); 1 stop bit.
- Transmission speed: 9600 bit/s.
- Data flow control: none.
- Access procedure: data transfer from the device to the computer takes place only at the computer's request.

/// Ethernet interface (RET B / RET B AN)

After connecting the device to the local area network via the Ethernet cable, the IP address is automatically assigned by the DHCP protocol, the IP port number is fixed at 8080 (for IKA labworld*soft*®).
Note: Navigate to the menu option "IP ADRESS" to obtain the assigned IP address.

/// Command syntax and format

The following applies to the command set:
- Commands are generally sent from the computer (Leader) to the device (Follower).
- 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 are transmitted in capital letters.
- Commands and parameters including successive parameters are separated by at least one space (Code: hex 0x20).
- Each individual command (incl. parameters and data) and each response are terminated with Blank CR LF (Code: hex 0x20 hex 0x0d hex 0x20 hex 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).

The NAMUR commands and the additional specific IKA commands commissioning serve only as low level commands for communication between the device and the PC. With a suitable terminal or communications program these commands can be transmitted directly to the device. The IKA software package, labworld*soft*®, provides a convenient tool for controlling device and collecting data under MS Windows, and includes graphical entry features, for motor speed ramps for example.

NAMUR Commands	Function
IN_NAME	Read the device name
IN_PV_1	Read actual value of external temperature sensor
IN_PV_2	Read actual temperature hotplate
IN_PV_4	Read actual speed value
IN_PV_7	Read actual temperature carrier
IN_SP_1	Read set temperature value
IN_SP_3	Read set safety circuit temperature value
IN_SP_4	Read set speed value
OUT_SP_1 x (RCT B / RCT B AN: x = 0 ... 310 RET B / RET B AN: x = 0 ... 340)	Adjust the set temperature value
OUT_SP_4 x (RCT B / RCT B AN: x = 0 / 50 ... 1500 RET B / RET B AN: x = 0 / 50 ... 1700)	Adjust the set speed value
START_1	Start heating
STOP_1	Stop heating
START_4	Start stirring
STOP_4	Stop stirring
IN_SOFTWARE	Request software ID number and version
RESET	Switch to normal operating mode
SET_MODE_n (n = A, B, C, D or R)	Set operating mode
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_WD1 m	Watchdog mode 1: if event WD1 should occur, the heating and stirring functions are switched off and E03 (12031207) is displayed. Set watchdog time to m (20 - 1500) 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 - 1500) seconds, with watchdog time echo. This command launches the watchdog function and must be transmitted within the set watchdog time.

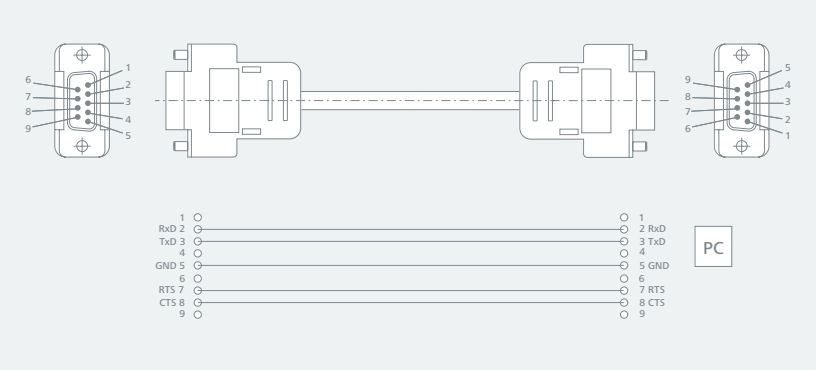
"Watchdog" functions, monitoring of the serial data flow:
If, once this function has been activated (see NAMUR commands), there is no retransmission of the command from the computer within the set time ("watchdog time"), the heating and stirring functions are switched off in accordance with the set "watchdog" function, or are further regulated to the safety limit 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 table 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 E03 (12031207) is displayed.

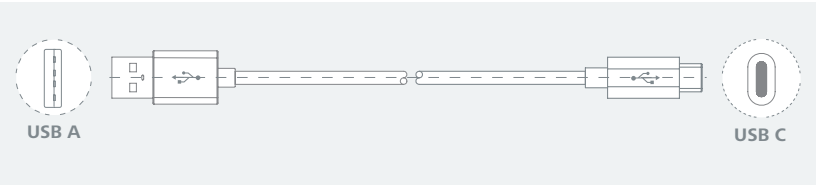
"Watchdog" – mode 2:
If there is an interruption in data communications (longer than the set watchdog time), the speed target value is changed to the WD safety speed limit and the temperature target value is changed to the WD safety temperature limit value. The warning WD is displayed.

/// Connections between device and external devices

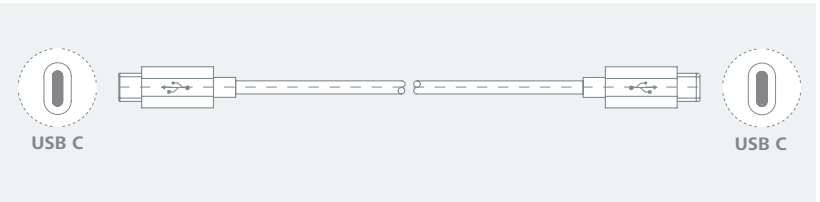
PC 1.1 cable:
This cable is required to connect RS 232 port to a PC.



USB cable A – C:
This cable is required to connect the USB port to a PC.



USB cable C – C:
This cable is required to connect the USB port to a PC or other external device.



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 the 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.

/// Ordering spare parts

› 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.

/// Repairs

› Please only send in devices 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 downloaded 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.

Accessories

› For accessories see **www.ika.com**.

Error codes

› The fault is shown by an error code on the display as following if the error occurs. Proceed as follows in such cases:
- Turn off the device by using the power switch.
- Carry out corrective measures.
- Restart the device.

Note: In case of a failure, press any of the rotating / pressing knobs for 1 second to display the full "error code".

Error code | Causes | Effect | Solutions

SENS TIME - No temperature increase measured by temperature sensor (selected time in menu)

Causes	› sensor not in medium › volume of medium to be measured too large › heat conductivity of medium to be measured too low › heat conductivity of the vessel is too low › in the case of indirect heating, the overall heat conductivity resistance is too large
Effect	› heating switched off
Solutions	› place the sensor in the medium › reduce the volume of the media › use a carrier fluid with better heat conductivity properties › replace the glass vessel with a metal pot › increase the "SENS TIME" period

TEMP DROP - Temperature sudden drop measured by external temperature sensor

Causes	› sudden temperature drop measured by the external temperature sensor › sensor is out of the medium accidently › sensor is out of the heating blocks accidently › fast temperature drop caused by adding more cold medium › not in contact with the medium
Effect	› heating switched off
Solutions	› fix external temperature sensor in position to make sure that it is immersed in the medium or heating block › set "TEMP DROP" to be "OFF"

E03: Communication

12031207 - Communication external timeout

Causes	› PC does not transmit any data within the set watchdog time › connection to PC interrupted
Effect	› heating switched off › motor switched off
Solutions	› change watchdog time › transmit data from PC within set watchdog time (OUT_WDx m) › check cable and plug

E14: Heater

12143808 - Heater temperature safety circuit cut-off

Causes	› safety temperature has been set to lower than the current temperature of the heating plate › disconnection of heating plate control temperature sensor
Effect	› heating switched off
Solutions	› leave the heating plate to cool › set the safety temperature higher

12140620 - Heater contact fault

Causes	› break in safety circuit › heater control circuit switch (TRIAC) short-circuited › safety relay has interrupted the heating circuit › heater or the supply line is disconnected › disconnection of heating plate safety temperature sensor
Effect	› heating switched off
Solutions	› plug in contact plug › plug in PT 1000 temperature sensor › replace faulty connecting cable, plug, or contact thermometer › switch device off, leave to cool and switch on again

12142704 - Heater safety circuit permitted deviation exceeded

Causes	› irregular temperature distribution across heating plate due to sporadic heat dissipation › defective control or safety temperature sensor
Effect	› heating switched off
Solutions	› switch device off, leave to cool and switch on again › ensure regular heat dissipation when using metal blocks, etc. on the flat surface of the heating plate

E24: Motor

12240010 - Motor blocked

Causes	› motor blocked or overloaded
Effect	› heating switched off › motor switched off
Solutions	› reduce load torque or use smaller magnetic rods › reduce target speed

E27: PCB

12273824 - PCB temperature too high

Causes	› heat accumulation between heating plate and housing › permitted ambient temperature exceeded
Effect	› heating switched off
Solutions	› switch device off, leave to cool and switch on again › change experiment › observe maximum permissible ambient temperature

E33: Safety temperature circuit

12332915 - Safety temperature circuit sensor disconnected

Causes	› target / current different of the adjustable safety circuit for minimum temperature monitoring
Effect	› heating switched off
Solutions	› after switching on, change the SAFE TEMP to a different value; if this solves the issue, the previous value can be reset by switching the device off and on again

12330020 - Safety temperature circuit fault

Causes	› safety relay does not open
Effect	› heating switched off
Solutions	› switch device off, leave to cool and switch on again

E38: Stirring

12381203 - Stirring external lower limit exceeded

Causes	› the EUROSTAR stirring speed is reduced to a certain minimum speed (see “MIN SPEED”) › the connected EUROSTAR is in an error state.
Effect	› heating switched off
Solutions	› run the connected EUROSTAR at a speed higher than “MIN SPEED”

12381215 - Stirring external disconnected

Causes	› the connection signal cannot be detected
Effect	› heating switched off
Solutions	› reconnect EUROSTAR

E40: External temperature

12400627 - External temperature contact short circuit

Causes	› short circuit in temperature sensor plug › short circuit in the cable or temperature sensor
Effect	› heating switched off
Solutions	› check the plug › replace the temperature sensor

12400024 - External temperature too high

Causes	› actual temperature of medium is higher than “set temperature + DELTA T” during heating
Effect	› heating switched off
Solutions	› change temperature control mode (FAST->PRECISE->BLOCK) › reduce the volume of the media › use a carrier fluid with better heat conductivity properties › replace the glass vessel with a metal pot › set “DELTA T” to be “OFF”

› If the actions described fails to resolve the fault or another error code is displayed:
- contact the service department.
- send the device for repair, including a short description of the fault.

Technical data

		RCT B	RCT B AN	RET B	RET B AN
General data					
Voltage		220 … 230 VAC ± 10% 115 VAC ± 10% 100 VAC ± 10%			
Frequency		50 / 60 Hz			
Power input		820 W (220 … 230 VAC / 115 VAC) 620 W (100 VAC)			
Power input standby		0.45 W			
Self-heating of the heating plate by max. stirring (RT: 22 °C / duration: 1 h)		+12 K		+15 K	
Timer		yes			
Timer display		LED			
Timer setting range		1 s … 99 h 59 m			
Interface	RS 232	yes			
	USB-C	yes			
	Ethernet	no		yes	
	Wi-Fi®	no		yes	
	WPAN (Wireless Personal Area Network)	Optional (USB WD)		yes	
pH measurement		Optional (with PT wireless, ETS-D7)			
Programming		Optional (with IKA HUB)			
Permissible ambient temperature		+ 5 … + 40 °C			
Permissible relative humidity		80 %			
Protection class according to DIN EN 60529		IP 54			
Protection class		I			
Contamination level		2			
Overvoltage category		II			
Plate material		Aluminium alloy	Aluminium with ceramic coating	Aluminium alloy	Aluminium with ceramic coating
Plate dimensions		Ø 135 mm			
Dimensions (W × D × H)		160 × 200 × 100 mm			
Weight		2.3 kg			
Operation at a terrestrial altitude		max. 2000 m			
Stirring function					
Number of stirring positions		1			
Max. stirring quantity (H_2O)		20 l			
Maximum load		25 kg			
Motor type		EC			
Motor output		9 W			
Speed range		0 / 50 … 1500 rpm		0 / 50 … 1700 rpm	

	RCT B	RCT B AN	RET B	RET B AN
Speed display set-value	LED			
Speed display actual-value	LED			
Speed setting	rotating / pressing knob			
Speed setting accuracy	10 rpm			
Direction of rotation	right			
Automatic reverse rotation	Optional (with IKA HUB)			
Intermittent mode	Optional (with IKA HUB)			
Viscosity trend measurement	no		Optional (with IKA HUB)	
Break detection stirring bar	no		Optional (with IKA HUB)	
Speed deviation (no load, nominal voltage, at 1500 rpm, ambient temperature +25 °C)	± 2 %			
Stirring bar length	20 … 80 mm			
Heating function				
Heat output	800 W (220 … 230 VAC / 115 VAC) 600 W (100 VAC)			
Heating temperature range	RT + device self-heating … 310 °C		RT + device self-heating … 340 °C	
Temperature setting range	0 … 310 °C		0 … 340 °C	
Temperature measure range with external sensor	-20 … 310 °C		-20 … 340 °C	
Temperature display set-value	LED			
Temperature display actual-value	LED			
Temperature setting	rotating / pressing knob			
Temperature setting resolution of heating plate	1 K			
Temperature setting resolution of medium	1 K		0.1 K	
Actual temperature display resolution	0.1 K			
Heating rate (1 l water in H 1500)	9 K/min (800 W) 7 K/min (600 W)			
Temperature control accuracy of heating plate (without vessel, heating plate centre at 100 °C)	± 5 K			
Adjustable safety circuit	(50 °C … 360 °C) ± 5 °C			
External temperature sensor / thermometer				
Connection for external temperature sensor / thermometer	PT 1000 series (excluding double PT 1000 sensors), ETS-D5, PT wireless, ETS-D7			
Temperature control accuracy (500 ml water in 600 ml glass beaker, 40 mm bar, 600 rpm, 50 °C)	± 0.5 K (with temperature sensor PT 1000) ± 0.5 K (with thermometer ETS-D5) ± 0.2 K (with PT wireless) ± 0.2 K (with ETS-D7)			
Temperature sensor PT 1000 deviation EN 60751 class A	≤ ± (0.15 + 0.002 × ITI)			
Sensor in medium detection	yes			

Subject to technical changes!

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 device direct 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 instructions.

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