IKA

designed for scientists

ETS-D5

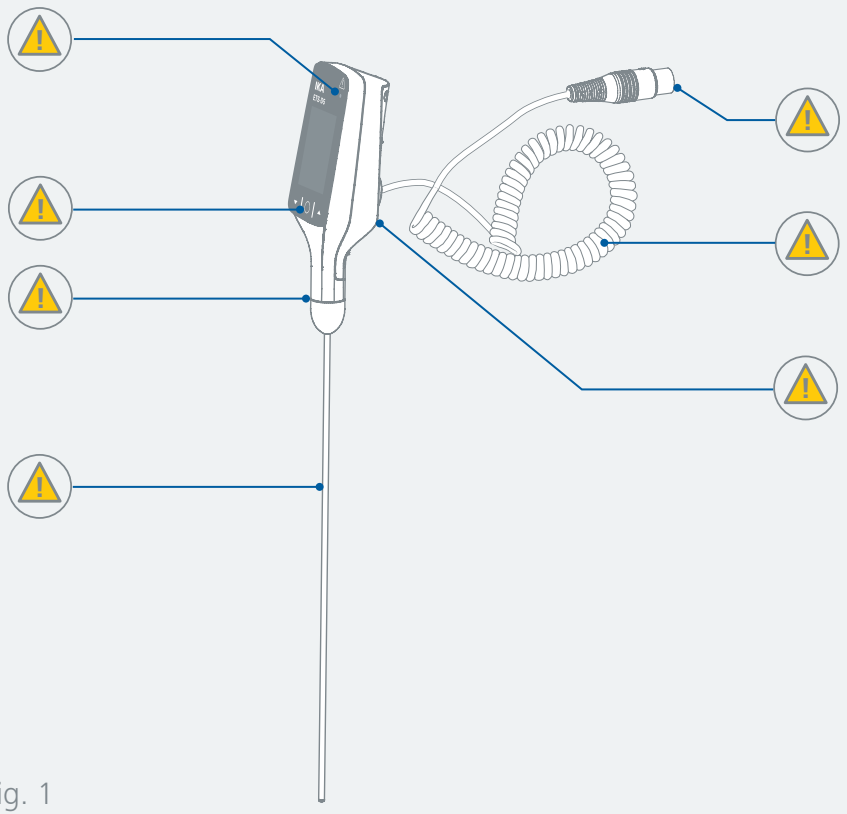


Fig. 1

Source language: German

EU Declaration of conformity

We declare under our sole responsibility that this product corresponds to the directives 2014/35/EU, 2014/30/EU and 2011/65/EU and conforms with the following standards or normative documents: EN 61010-1, 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.

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.

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.

Beep
Indicates action steps, for which beep sounds are to be heard.

Safety instructions

/// General information

› **Read the operating instructions in its entirety before using the device and follow the safety instructions. If this accessory is used with another device, observe also its operating 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.
› The device must only be used in a technically perfect condition.

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

/// Device design

Notice!
› The tip of the temperature sensor must be immersed at least 20 mm deep into the medium.
› Please ensure that the spiral cable does not come into contact with the heating plate.
› The stainless steel temperature sensor must not be used with aggressive media such as acids, caustic solutions or distilled water, due to the risk of corrosion. The H 66 glass sensor should be used in such cases.
› Only use glass encapsulated temperature sensors for electrolysis procedures.
› Always use the extension cable H 70 when the media being processed produces vapour. This ensures that the control unit does not come into contact with the vapour.

/// 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 the temperature sensor!
› The temperature sensor can reach dangerous temperatures. Pay attention to the residual heat on the temperature sensor after removing from the media.

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.
› 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 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.

› Do not touch the temperature sensor while measurements are being taken. This will prevent incorrect results.

/// 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.

/// Maintenance

› The device must only be opened by trained specialists, even during repair.

/// Disposal instructions

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

Intended use

/// Use

› The ETS-D5 device can be used for precise temperature measurement and control. It can be connected to any magnetic stirrer or heating plate that has a contact thermometer connection, provided this conforms with the requirements listed in the technical data (see "Technical Data").

/// Area of use

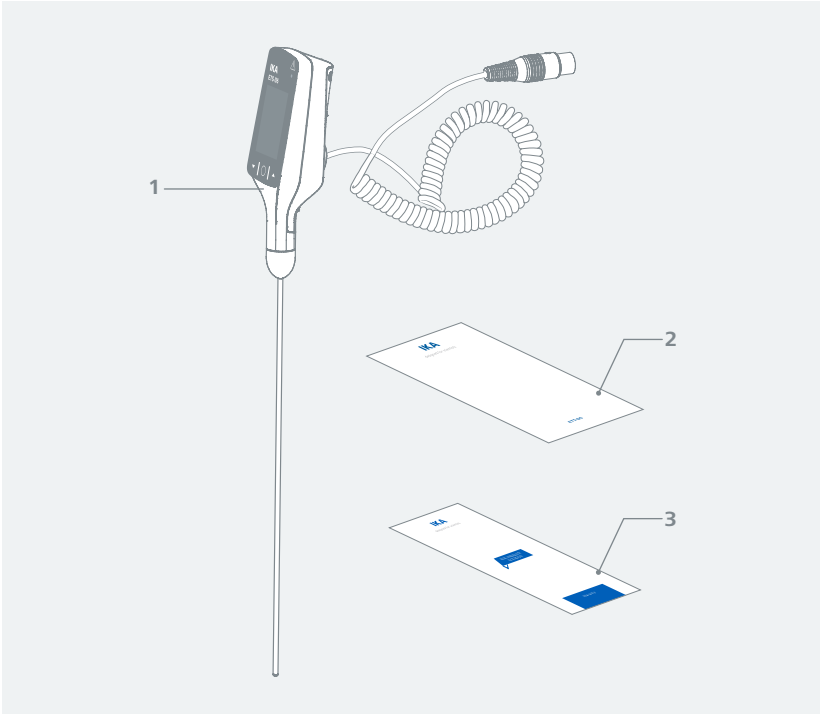
› Indoor environments similar to that a laboratory of research, teaching, trade or industry area.
› The safety of the user cannot be guaranteed:
  - if the device is operated with accessories that are not supplied or recommended by the manufacturer,
  - if the device is operated improperly or contrary 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).

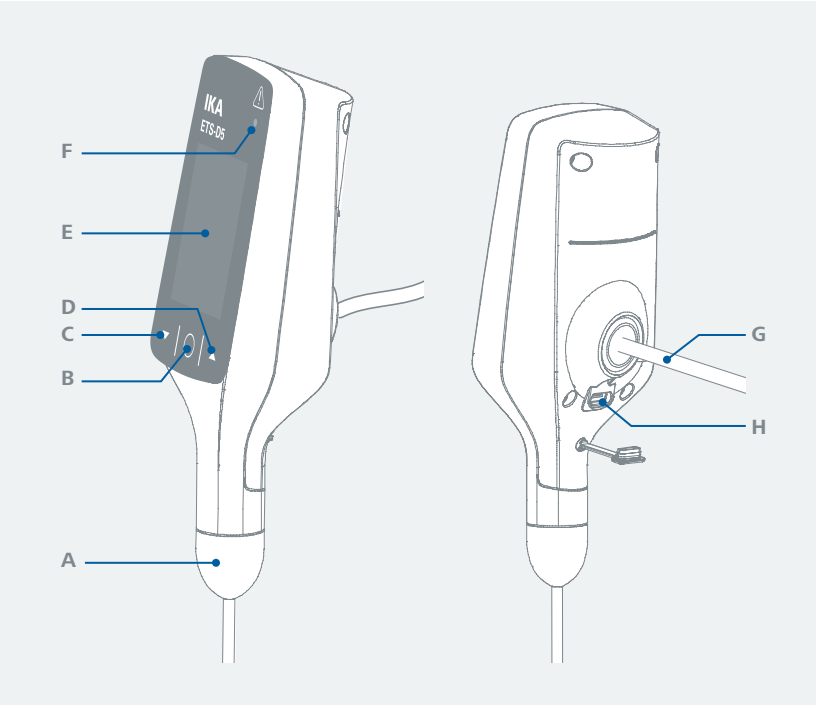
/// Scope of delivery



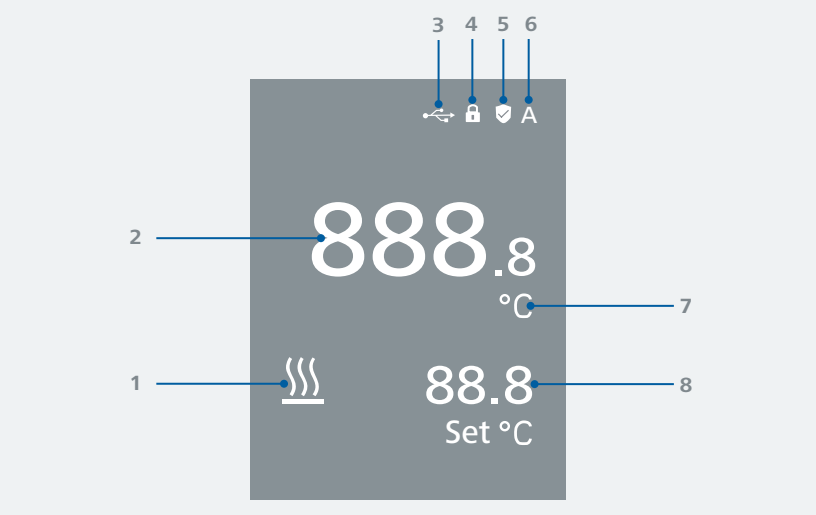
1	ETS-D5
2	User guide
3	Warranty card

Operator panel and display

/// Operator panel



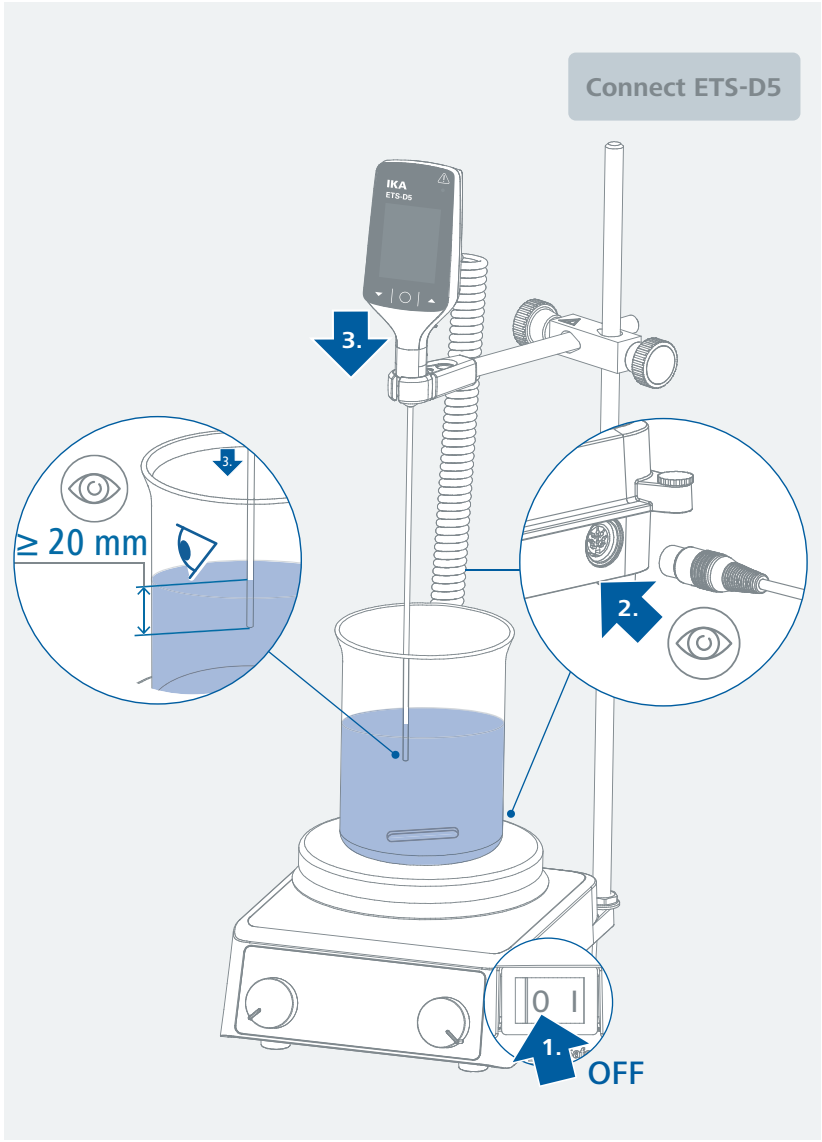
A	Replaceable temperature sensor H 62.51
B	Menu button
C	Button “Down“
D	Button “Up“
E	Display
F	Status LED
G	Thermometer connector cable
H	USB-C port



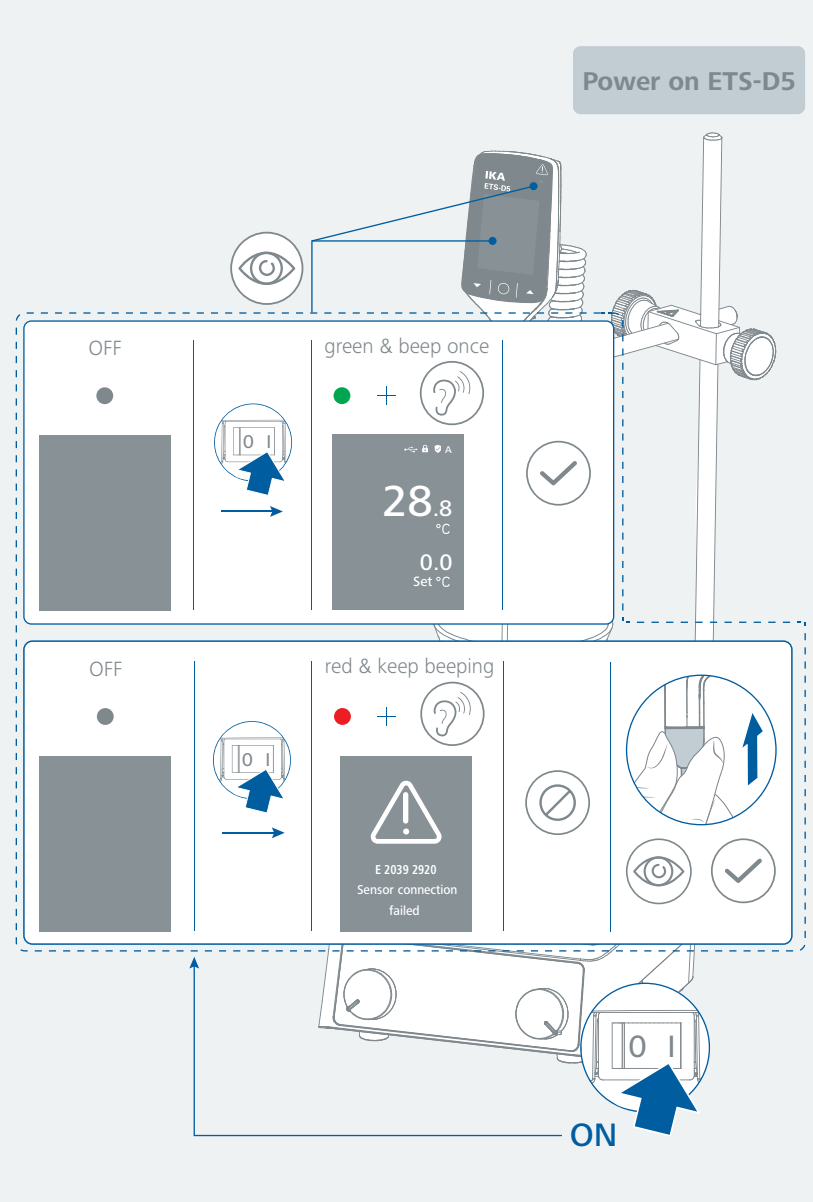
1	Heating function activated
2	Actual temperature value
3	USB cable connected
4	All buttons locked
5	Safety function
6	Operating mode
7	Temperature unit
8	Set temperature value

Installation

› Connect the device to the thermometer connector of the magnetic stirrer or heating plate. Be sure to follow all the safety instructions.
› Securely attach the device to a stand (e.g., using the H 38 holding rod). Ensure that the temperature sensor is immersed at least 20 mm deep into the medium.



› The device switches on automatically when the connected magnetic stirrer / heating plate is switched on. The status LED will light up green, the display will be on, and the device is ready to use.
Note: If the connection between the temperature sensor and the device is faulty, an error message will appear on the device display, the status LED will light up red continuously, and an acoustic signal will be heard. You can stop the acoustic signal by pressing the menu button.



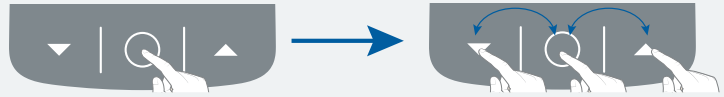
Operation

/// Menu navigation

Menu button
› Press one second to access the menu and confirm the menu settings.
› Press and hold for three seconds to lock or unlock the device.
› Press and hold for three seconds to return to the main screen if you are already in a sub-menu.

Button “Up / down“
› Press briefly to set the temperature or to switch menu options.

/// Menu structure



		Factory settings
Operating mode	A	✓
	B	-
	C	-
	D	-
	Back	-
Temp control mode	Precise	✓
	Fast	-
	Block	-
	Back	-
Limits	Temperature	Max. temperature
	Heating rate	100%
	Back	-
Safety	Safe temp	Max. safe temperature
	Sensor timeout	5 min
	Temperature drop	On
	Delta temperature	Off
	Back	-
Adjust temperature	1-point adjustment	-
	2-point adjustment	-
	3-point adjustment	-
	Reset	-
	Back	-
Settings	Languages	English
	Units	°C
	Factory settings	-
	Information	-
	Back	-
Back		-

Operating mode:

A (factory setting)
After power on / power failure set values are not saved.

B
After power on / power failure set values are saved.

C
Set values cannot be changed.
After power on / power failure set values are saved.

D
Confirmation request for set value changes if functions are active.
After power on / power failure set values are not saved.

Temp control mode:

Precise (factory setting)
Good control results, minimized overshooting, slow rise in temperature.

Fast
Maximum heating rate, increased overshooting.

Block
Good control results, minimized overshooting, slow rise in temperature for block application.

Limits:

Temperature
This menu option limits the maximum set temperature.
Setting range: - 20 °C … 400 °C, 1 °C / step
Factory setting: Max. temperature

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

Safety:

Safe temp
This menu option limits the maximum safe temperature.
If the actual temperature exceeds the "Safe temp" value, the device switches off the heating function and displays an error code.
Setting range: 50 °C … 415 °C, 1 °C / step
Factory setting: Max. safe temperature

Sensor timeout
If no temperature rise is detected at the temperature sensor during the time set in "Sensor timeout", the heating function of the device is switched off.
Setting range: Off / 0.5 ... 30 min
Factory setting: 5 min
Note:
If time limit is set to "Off", the function is disabled.
This function will only be active if:
- sensor temperature is < 50 °C
- difference between target temperature and sensor temperature > 5 K

Temperature drop
When this function is activated, the device detects a rapid drop in temperature. The heating function is switched off when this is detected.
Factory setting: On
Note: If "Off" is selected, the function is disabled.

Delta temperature
In this menu item, the user can set the permissible temperature deviation between the actual temperature and the setpoint temperature. The device stops the heating function and displays an error if the actual temperature exceeds the value "setpoint temperature + Delta temperature".
Setting range: Off / 5 ... 50 K (5 K / step)
Factory setting: Off
Note: If the value is set to "Off," the function is disabled.

Adjust temperature:

To reduce temperature deviations due to tolerances, the user can adjust the temperature sensor together with the device. A calibrated temperature reference meter is required.
The device is pre-calibrated before shipping. Sensor tolerances in accordance with DIN IEC 751 Class A are not taken into account.
The complete measurement chain can be calibrated in order to eliminate the effects of the contact resistance at the plug connector and the sensor tolerances (inclusive of temperature drift).
The calibration process is started using the "Adjust temperature" menu:
1-point adjustment: -20 …400 °C, 0.1 °C / step
2-point adjustment: -20 …400 °C, 0.1 °C / step
3-point adjustment: -20 …400 °C, 0.1 °C / step
The following items are required:
- An additional temperature measuring device with an accuracy of at least ±0.05 °C
- Max. three stable, constant temperature sources (media at different, controlled temperatures)

The steps are as follows:
› Immerse both temperature sensors in the medium. Wait until the display on the temperature measurement device has stabilised.
› Enter the measured temperature on the ETS-D5 using the up and down buttons.
› Confirm the value entered using the menu button.

Reset
This menu option restores the adjusted temperature parameters to the Factory settings.

Settings:

Languages

The “Languages” option allows the user to select the desired language.
A check mark indicates the language selected for the system.

Units

The “Units” option allows the user to select the unit of measurement for the temperature value displayed on the display in “°C” or “°F.”
A check mark indicates the unit of measurement selected for the system.
Factory setting: °C

Factory settings

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

Information

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

Back:

This menu option allows the screen to return to the main screen.

Interfaces and outputs

The device software can be updated with a PC via the 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.
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.

/// 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).

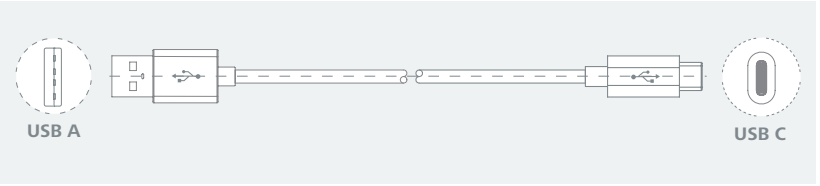
The above details correspond as far as possible to the recommendations of the NAMUR working party (NAMUR recommendations for the design of electrical plug connections for analogue and digital signal transmission on individual items of laboratory control equipment, rev. 1.1).

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.

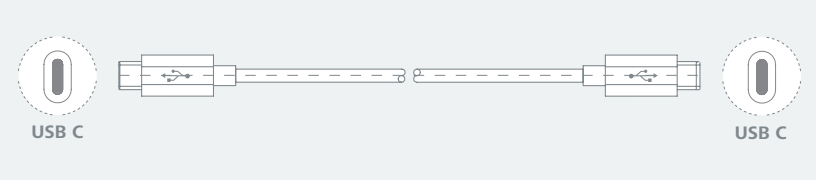
NAMUR Commands	Function
IN_NAME	Read the device name
IN_PV_1	Read medium actual temperature
IN_SP_1	Read set temperature
OUT_SP_1 x (x = -20 ... 400)	Adjust the set temperature
RESET	Switch to normal operating mode

/// Connections between device and external devices

USB-A to USB-C cable:
This cable is required to connect the USB port to a PC or terminal device.



USB-C to USB-C cable:
This cable is required to connect the USB port to a PC or terminal device.



Maintenance and cleaning

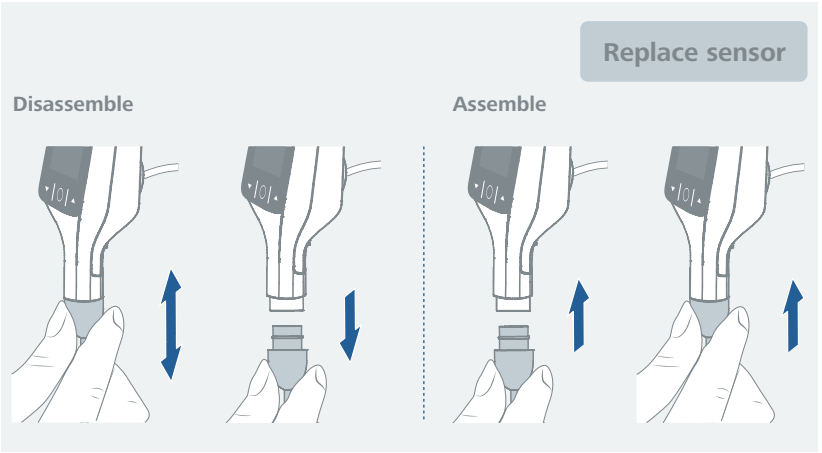
› The device is maintenance-free. It is only subject to the natural wear and tear of components and their statistical failure rate.

/// Cleaning

› To clean the device, disconnect it from the connected magnetic stirrer / heating plate.
› 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.

/// Replacing extension cable / sensor

› Pull the temperature sensor downwards with the cover cap until the plastic snap connection has been released.
› Slide the temperature sensor or extension cable back over the attachment on the device with the cover cap. Ensure that the new accessory is correctly installed and connected.



/// Ordering spare parts

› When ordering spare parts, please give:
- device type.
- serial number, see type plate.
- position number and description of spare part.
- 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.
› 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.imlab.eu**.

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:
- Disconnect the device from the connected magnetic stirrer / heating plate.
- Carry out corrective measures.
- Restart the device.

Error code | Causes | Effect | Solutions

E39: Temperature

20390008 - Temperature safety circuit cut-off

Causes	› actual temperature of medium is higher than the set "Safe temp"
Effect	› device stops working
Solutions	› switch off the device and allow the medium to cool down › increase the "Safe temp" value

20390023 - Temperature out of range

Causes	› medium temperature is higher than the maximum set temperature
Effect	› device stops working
Solutions	› switch off the device and allow the medium to cool down

20390024 - Temperature too high

Causes	› actual temperature of medium is higher than "set temperature + Delta temperature"
Effect	› device stops working
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 temperature" to be "Off"

20392920 - Temperature sensor fault	
Causes	› sensor not connected or defective › sensor short-circuit
Effect	› device stops working
Solutions	› assemble or connect temperature sensor correctly › replace temperature sensor

Sensor timeout - 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	› device stops working
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 “Sensor timeout” period

Temperature drop - Temperature sudden drop measured by temperature sensor	
Causes	› sudden Temperature drop measured by the 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	› device stops working
Solutions	› fix temperature sensor in position to make sure that it is immersed in the medium or heating block › set “Temperature drop” 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.

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.

Technical data

General data	
DC Voltage	8 ... 16 V
Current consumption	100 mA
USB-C interface	yes
Replaceable temperature sensor	H 62.51
Thermometer connector type (to main device)	MAS6 (DIN 45322)
Display	TFT
Capacitive touch button	yes
Acoustic warning	yes
Status LED	yes
Permissible ambient temperature	+5 ... +40 °C
Permissible relative humidity	80 %
Protection class according to DIN EN 60529	IP 54
Dimensions (W x D x H)	52 x 385 x 36 mm
Weight	156 g
Operation at a terrestrial altitude	max. 2000 m
Temperature controlling	
Temperature measuring range (with H 62 sensor)	-20 ... 400 °C
Temperature sensor type	PT 1000 DIN IEC 751 Class A
Set temperature resolution	0.1 K
Temperature measurement resolution (with H 62 sensor)	0.1 K
Temperature sensor measuring accuracy	±0.2 K + Tolerance PT 1000
Temperature control deviation (500 ml water in 600 ml glass beaker, 40 mm stirring bar, 600 rpm, 50 °C)	±0.5 K
Temperature operating mode	A, B, C, D
Temperature control mode	Precise, Fast, Block
Immersion depth min.	20 mm

Subject to technical changes!