

IKA

designed for scientists

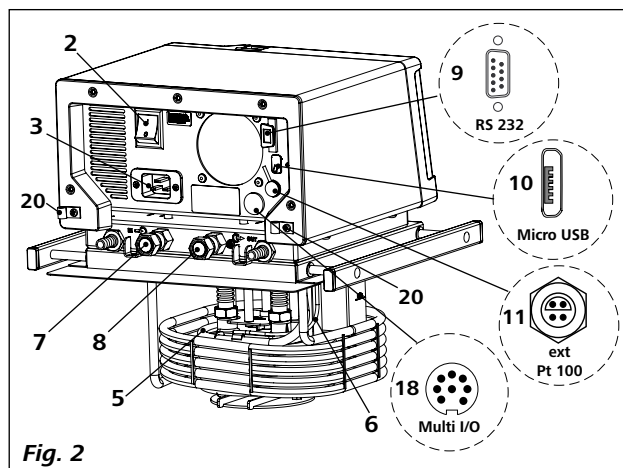
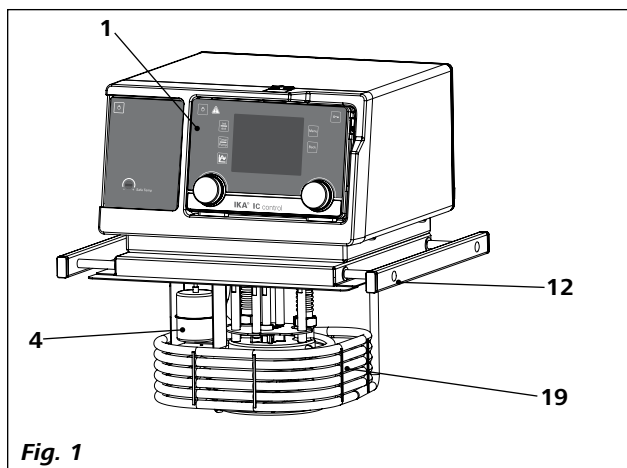
IC control
HBC 5 control
HBC 10 control



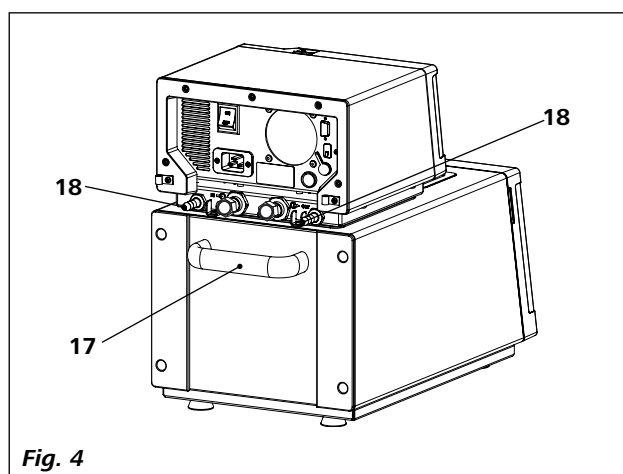
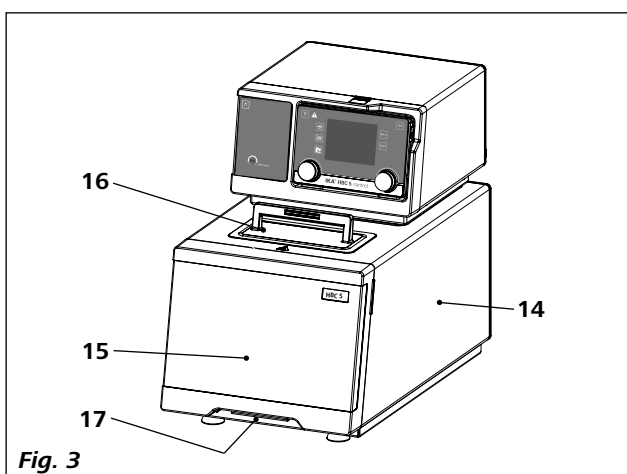
Operating instructions

EN

IC control, HBC 5 control, HBC 10 control:



HBC 5 control, HBC 10 control:



Item	Designation
1	Wireless Controller (WiCo)
2	Mains switch
3	Power socket
4	Buoyage
5	Heater
6	Pt 100 + Pt 1000 temperature sensor
7	Pump connection IN
8	Pump connection OUT
9	RS 232 port
10	USB port
11	External temperature sensor socket
12	Bridge (only for IC control)
13	Bath
14	Front cover
15	Filling lid
16	Handle
17	Connection cooling coil (only HBC control)
18	Multifunction terminal
19	Cooling coil
20	Cable clip

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Declaration of Conformity

We declare under our sole responsibility that this product corresponds to the regulations 2006/95/EC, 2004/108/EC, 1999/5/EC and 2011/65/EU and conforms with the standards or normative documents: EN 61010-1, -2-010, -2-051; EN 61326-1 and DIN 12876-1.

Bluetooth® module:
Directive: 1999/5/EC

Standards: EN 60950-1, EN 300328, EN 301489-17

Note for USA (FCC)

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)

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



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



Indicates a hazardous situation, which, if not avoided, can result in death, serious injury.



Indicates a potentially hazardous situation, which, if not avoided, can result in injury.



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



Reference to exposure to a hot surface!



Hot surface!

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, safety and accident prevention regulations.
- Set up the device in a spacious area on an even, stable, clean, non-slip, dry and fireproof surface.
- Do not operate the device in explosive atmospheres, with hazardous substances.
- Protect the device and accessories from bumping and impacting.
- Check the device and accessories for damage before each use. Do not use damaged components.
- Safe operation is only guaranteed with the accessories described in the "**Accessories**" section.
- The device must only be operated with the original mains cord.
- The socket for the mains cord must be easily accessible.
- Socket must be earthed (protective ground contact).
- The voltage stated on the type plate must correspond to the mains voltage.
- The device can only be disconnected from the mains supply by pulling out the mains plug or the connector plug.
- Disconnect the mains plug before attaching or changing any accessories.
- Disconnect the mains plug before cleaning, maintenance or moving the circulator.
- 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.



NOTICE

Coverings or parts that can be removed from the device without the aid of any tools must be put back on the device again to ensure safe operation, for example to keep foreign objects and liquids, etc. from getting into the device.

- The device may only be used as prescribed and as described in the operating instructions. This includes operation by instructed specialist personnel.
- When using critical or hazardous materials in your processes, **IKA®** recommends to use additional appropriate measures to ensure safety in the experiment. For example, users can implement measures that inhibit fire or explosions or comprehensive monitoring equipment.
- Process pathogenic material only in closed vessels under a suitable fume hood. Please contact **IKA®** application support if you have any question.



CAUTION

If the mains switch is not within reach when device is operating, an **EMERGENCY STOP** switch

that can be easily accessed must be installed in the work area.

- A laboratory circulator heats and circulates fluid according to specified parameters. This involves hazards due to high temperatures, fire and general hazards due to the device of electrical energy. The user safety can not be ensured simply with design requirements on the part of the device. Further hazard sources may arise due to the type of tempering fluid, e.g. by exceeding or undercutting certain temperature thresholds or by the breakage of the container and reaction with the heat carrier fluid. It is not possible to consider all eventualities. They remain largely subject to the judgment and responsibility of the operator. For this reason, it may become necessary for user to take other precautionary safety measures.
- Insufficient ventilation may result in the formation of explosive mixtures. Only use the device in well ventilated areas.



WARNING

The safety circuit (safe temperature) must be adjusted so that the maximum permissible temperature cannot be exceeded even in the event of a fault. Check the safe temperature circuit on a regular basis.

- Securely fix the **IC control** immersion circulator for use at the bath, so that it cannot tip over.
- When device is used for external circulation, extra precaution must be taken for hot fluid leakage due to damaged hose.
- Use suitable hoses for connection.
- Secure hoses and tubes against slippage and avoid kinks.
- Check hoses, tubes and bath at regular intervals for possible material fatigue (cracks/leaks).
- Mains cable should not get in contact with hot parts and fluids.
- If you are using plastic bath, observe the permitted working temperature range and fluids.



DANGER

Do not start up the device if:

- It is damaged or leaking
- Cable (not only supply cable) is damaged.

- Be careful when filling a hot bath.



CAUTION

At high operating temperatures, the temperature of housing parts, surfaces and tubes can exceed 70 °C.



CAUTION

It is dangerous to touch the heater. The temperature of the heater can be very high.

- After a power failure during operation, the device may start automatically (depending on operating mode).
- Transport the device with care.
- Do not transport or empty the bath while it is still hot. This may result in accidents, especially scalding injuries.



NOTICE

IC contrtol: In order to prevent the power cord fall into the medium, the mains cable should be always be secured with the cable clips (20, see Fig. 2).

Fluid:



CAUTION

Beware of the risk of burning due to delay in boiling!



WARNING

Only use fluids, which fulfill the requirements for safety, health and device compatibility. Be aware of the chemical hazards that may be associated with the bath fluid used. Observe all safety warnings for the fluids.

- Depending on the bath fluid used and the type of operation, toxic or flammable vapors can arise. Ensure suitable extraction.
- Do not use any fluid which may cause dangerous reactions during processing.
- Only use recommended bath fluid. Only use non-acid and non corroding fluid.



WARNING

Only process and heat up any fluid that has a flash point higher than the adjusted safe temperature limit that has been set. The safe temperature limit must always be set to at least 25 °C lower than the flash point of the fluid used. Examine regularly the function of the safety temperature limiter.



NOTICE

Never operate the device without sufficient heat carrier fluid! You should also be careful to ensure that the minimum clearances and immersion depths in the fluid are observed. Check the fluid level detection at a regular basis (see section "**Filling and draining**").

- Continuous monitoring of the bath and the filling level of the bath fluid is required, especially at high temperatures.
- To ensure a sufficient fluid circulation, the viscosity of the bath fluid must not exceed of 50mm²/s at the lowest operating temperature.



NOTICE

If water is used at higher temperature, there is heavy loss of fluid due to the evaporation.

- Untreated tap water is not recommended. It is recommended to use distilled water or high purity water (ion exchangers) and add 0.1 g soda (sodium carbonate Na₂CO₃) /liter, to reduce corrosive properties.



CAUTION

Risk of burning caused by vapor or hot water at the outlet of the cooling coil.



NOTICE

Do not use the cooling coil with water at bath temperatures > 95° C.



NOTICE

For bath temperatures > 60°C make sure that the flow rate through the cooling coil is high enough.



NOTICE

Don't use following fluids:

- Untreated tap water
- Acids or bases
- Solutions with halides: chlorides, fluorides, bromides, iodides or sulfur
- Bleach (Sodium Hypochlorite)
- Solution with chromates or chromium salts
- Glycerine
- Ferrous water.



NOTICE

When changing the bath fluid from water to a heat transfer fluid for temperatures above 100 °C, remove the remaining water from the complete system (including hoses and external devices). When doing this, also open the stopper and union nuts caps of the pump outputs and inputs and blow compressed air through all the pump outputs and inputs! Beware of the risk of burning due to delay in boiling!

Battery pack RB 1 (for Wireless Controller):



NOTICE

If during operation the **battery pack RB 1** (rechargeable battery) becomes fully discharged, the device (**Station**) will continue to run or is shut down depending on the value settings for "**Time Out**", "**Safe Speed**" and "**Safe Temperature**". If the device is set so that it continues to run when the battery of the **Wireless Controller (WiCo)** is fully discharged, the only means of switching the station off are the "**safe STOP**", "**ON/OFF**" key and the "**Mains switch**"!

NOTICE

Please note the following safety instructions for the battery pack RB 1 (rechargeable battery):

- Keep the battery pack out of reach of children at all times.
- Store the battery pack in a cool, dry place.
- Never throw the battery pack into a fire. Keep it away from direct sunlight and temperatures above 60 °C. High temperatures will damage the battery pack and render it unusable. Temperatures above 100 °C may cause it to explode.
- Never throw the battery pack into water or expose it to moisture. Water may lead to a short-circuit, causing the battery pack to explode.
- Do not deform or crush the battery pack or damage it in any other way. This can cause battery fluid to leak and/or the battery pack to explode.
- When not in use, keep battery packs away from paperclips, coins, keys, nails, screws or other small metal objects which could cause the contacts to be bridged. Short-circuiting may result in an explosion.
- Explosion of a battery pack may release battery fluid and cause a fire.
- The lithium polymer battery pack must only be used and charged in **IKA®** products designed for use with this battery pack.
- When the battery pack is inserted it should slide in easily and without resistance. Do not force it.
- If the battery pack is removed for an extended period of time, store it in a sealed plastic bag to prevent short-circuiting due to moisture or contact with metal components.

- The operating temperature range of the battery pack is from 0 °C to + 45 °C. Note that the battery pack capacity will be reduced at temperatures below 20 °C.
- Only the rechargeable battery types recommended in the technical data may be used in the device!



Do not charge batteries that have leaked or that are discolored, deformed or damaged in any other way.

Disposal instructions:

- When disposing of the **IKA®** battery pack, please tape over the contacts with adhesive tape to prevent short-circuiting due to moisture or contact with metal components. Short-circuiting may result in an explosion.
- Do not throw used battery packs into your household waste. Dispose of them properly in accordance with statutory regulations.



End users are obliged by law to return all used disposable and rechargeable batteries. Throwing them into the household waste is prohibited. Disposable/rechargeable batteries containing harmful substances are marked with this symbol to indicate that they may not be disposed of as household waste.

- You can return used disposable and rechargeable batteries free of charge to your local authority collection site or to any battery retailer. In doing so you will be complying with statutory regulations and helping to protect the environment.
- Batteries must be disposed of in accordance with local and national regulations.

Correct use

• Use:

Use **IC (Immersion Circulator)** and **HBC (Heating Bath Circulator)**

- For heating and circulating fluids

Intended Use: tabletop device

• Range of use (indoor use only):

- Laboratories - Schools
- Pharmacies - Universities

• Wireless remote control:

Before using the wireless link between the **Wireless Controller (WiCo)** and the laboratory device, first check whether your region is included in the radio communication approval for the device. If it is not, remote control can also be performed using a USB cable.

This device is suitable for use in all areas except:

- Residential areas
- Areas that are connected directly to a low-voltage supply network that also supplies residential areas.

The safety of the user cannot be guaranteed:

- If the device is operated with accessories that are not supplied or recommended by the **IKA®**.
- If the device is operated improperly or in contrary to the **IKA®** specifications.
- If the device or the printed circuit board are modified by third parties.

Unpacking

• Unpacking:

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



NOTICE

Transport safety

Remove the transport protection under the buoyage

(4). For **HBC** device, you need to open the lid (15) and remove the protection.

• Delivery scope:

IC control, HBC control, HBC 10 control:

- **IC control** or **HBC 5 control** or **HBC 10 control** with the **Wireless Controller (WiCo)** according to the order
- Mains cables
- Hose olive NW 12 (2 pieces) see **Fig. 5**
- Screwdriver (use for safety circuit) see **Fig. 6**
- **WiCo** holder **WH10**
- **OS 1.0** power supply (for **WiCo**) see **Fig. 7**
- **RB 1** Battery pack
- USB 2.0 cable Micro A – Micro B
- USB 2.0 cable A – Micro B
- User guide
- A warranty card.

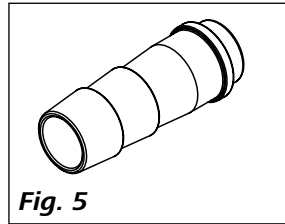


Fig. 5

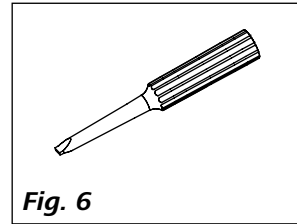


Fig. 6

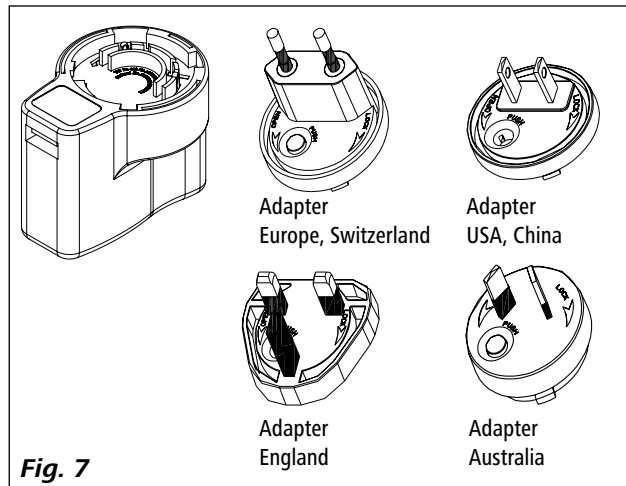


Fig. 7

Preparations

• Setting up:

- Place the device on an even, stable, clean, nonslip, dry and fireproof surface.
- Keep at least 20 cm of open space at the front and rear side.
- When a plastic bath is used, please ensure that the heater does not contact the bath.
- The place for installation should be large enough and provide sufficient air ventilation to ensure the room does not warm up excessively because of the heat from device radiates to the environment.
- Do not set up the device in the immediate vicinity of heat sources and do not expose to sun light.

• Connecting the tubings:

- Unscrew the union nuts and stoppers using a wrench from the pump connection **IN** (7) and **OUT** (8).

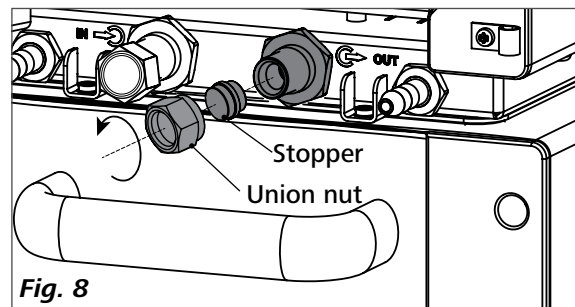
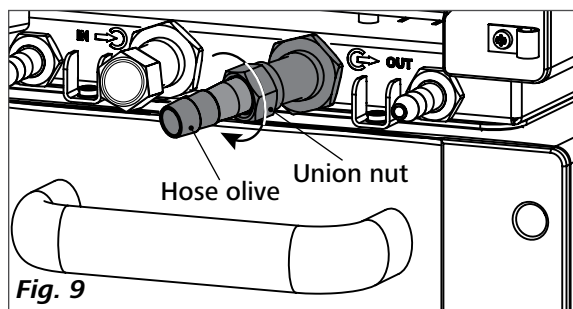


Fig. 8

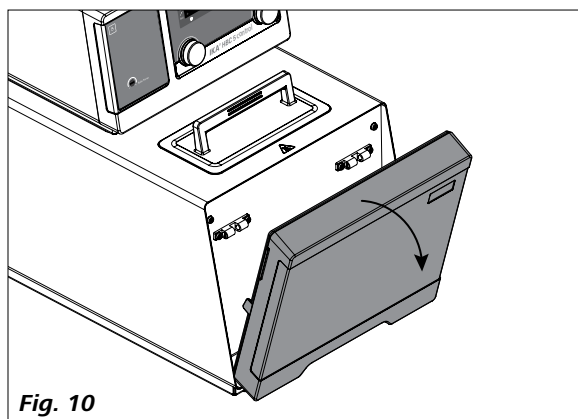
- Connect the hoses for circulating the external system to the pump connectors **M 16 x 1** for **IN** and **OUT** directly or with the olives.
- Screw the hose olive to the pump connection **IN** and **OUT** with union nuts. Slide the hoses (NW 12) onto the olives. The hoses must be secured with suitable clamps.



Note: Please note the permissible temperature range of hoses. For hot fluids we recommend the **IKA® LT 5.20** hoses. When the external system is not necessary, please seal the pump connectors **IN** and **OUT** with the existing union nuts and stoppers.


• Filling and draining:

- Before filling the fluid into the bath, open the front cover as indicated in following figure.

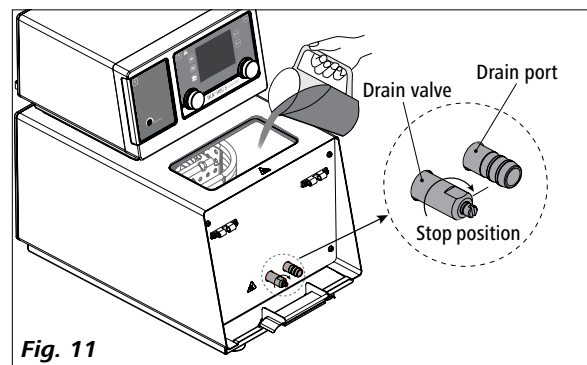


- Check and make sure that the drain valve is closed (the stop position in clockwise direction, see **Fig. 11**).

Note: Please note information in chapter “**Commissioning**”.

- Connect the mains plug and turn on the device with mains switch (2).
- The low level icon () appears on the display of the **Wireless Controller (WiCo)**.

- Open the lid (15) and fill fluid to the bath.



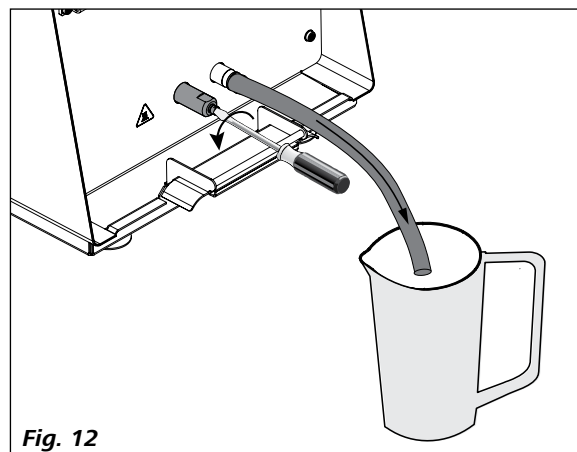
NOTICE

Note: Pay attention to the fluid level information on the display:

-  — **Low level**
-  — **High level**

(see “**Fluid level**” in section “**Working with Wireless Controller (WiCo)**”).

- To drain the fluid from the bath, connect a hose to the drain port and turn the drain valve in counter clockwise direction with a straight screwdriver.



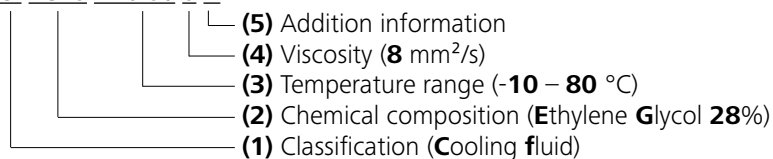
• **Fluid (Standard information for IKA® fluid):**

IKA® Designation	Operating temperature range for open bath application (°C)	Operating temperature range for closed bath applications (°C)	Safety temperature (°C)	Flash point (°C)
CF.EG28.N10.80.8	-10 ... 80	-10 ... 80	90	115
CF.EG39.N20.80.16	-20 ... 80	-20 ... 80	90	115
CF.EG44.N25.80.19	-25 ... 80	-25 ... 80	90	115
CF.EG48.N30.80.22	-30 ... 80	-30 ... 80	90	115
UF.Si.N30.150.10LV	-30 ... 130	-30 ... 150	145 ❶	>170
HF.Si.20.200.50	20 ... 200	20 ... 200	255	>280
HF.Si.20.250.50A	20 ... 200	20 ... 250	255	>280
H ₂ O (Water) ❷	5 ... 95	5 ... 95	-	-
Customized 1 ❸				
Customized 2 ❸				

Check the suitability of the fluid according to your application.

Nomenclature for **IKA®** fluid:

CF.EG28.N10.80.8 --



(1) Classification:

HF: Heating Fluid

CF: Cooling Fluid

UF: Universal Fluid

(2) Chemical composition:

Si: Silicone oil

EG: Ethylene Glycol

(3) Temperature range: (Minimum temperature. Maximum temperature)

N: Negative Temperature

(4) Viscosity:

Viscosity at 25 °C for **H**eating **F**luid (**HF**)

Viscosity at -20 °C for **C**ooling **F**luid (**CF**)

Viscosity at 25 °C for **U**niversal **F**luid (**UF**)

Dynamic viscosity [mPa.s] is a product of kinematic viscosity [mm²/s] and density [kg/m³] of the fluid divided by 1000.

(5) Additional information:

A: Oil **A**dditives

LV: Low **V**iscosity

❶ Note: for open bath application!

❷ Note: Tap water may be unsuitable for operation because the calcium carbonate content may cause calcification. High purity water (from ion exchangers) and distilled or bi-distilled water are unsuitable for operation due to corrosive properties of these media. High purity water and distillates are suitable as a medium after adding 0.1 g soda (Na₂CO₃, sodium carbonate) per liter of water.

❸ Note: The temperature limit values are adjustable in accordance with the fluid used.

- **Cooling coil:**

When the set temperature close to the ambient temperature, the cooling coil should be used for counter-cooling due to the self-heating.

Connect the water supply and return line hoses to the cooling coil connectors (see **Fig. 2**).

For bath temperatures > 95 °C do not use the cooling coil with water.

For bath temperatures > 60 °C make sure that the flow rate through the cooling coil is high enough, to avoid excessive calcification.

- **Charging the Battery Pack RB 1 (rechargeable battery):**

The battery pack of the **WiCo** can be charged by any of the following means:

- On the **station**
- Via a **USB cable** at the PC or **station**
- Via an **OS 1.0** power supply unit.

- **Changing battery to WiCo:**

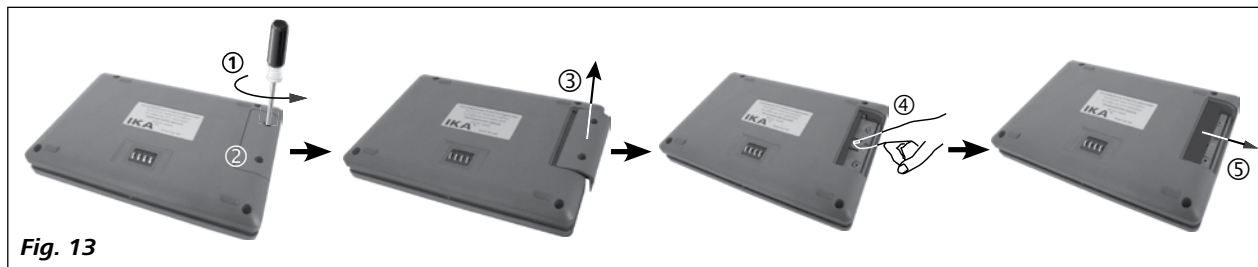


Fig. 13



NOTICE

Please comply with the relevant safety instructions in the "Safety instructions" section for the RB 1 battery pack!

- **WiCo – holder WH 10:**

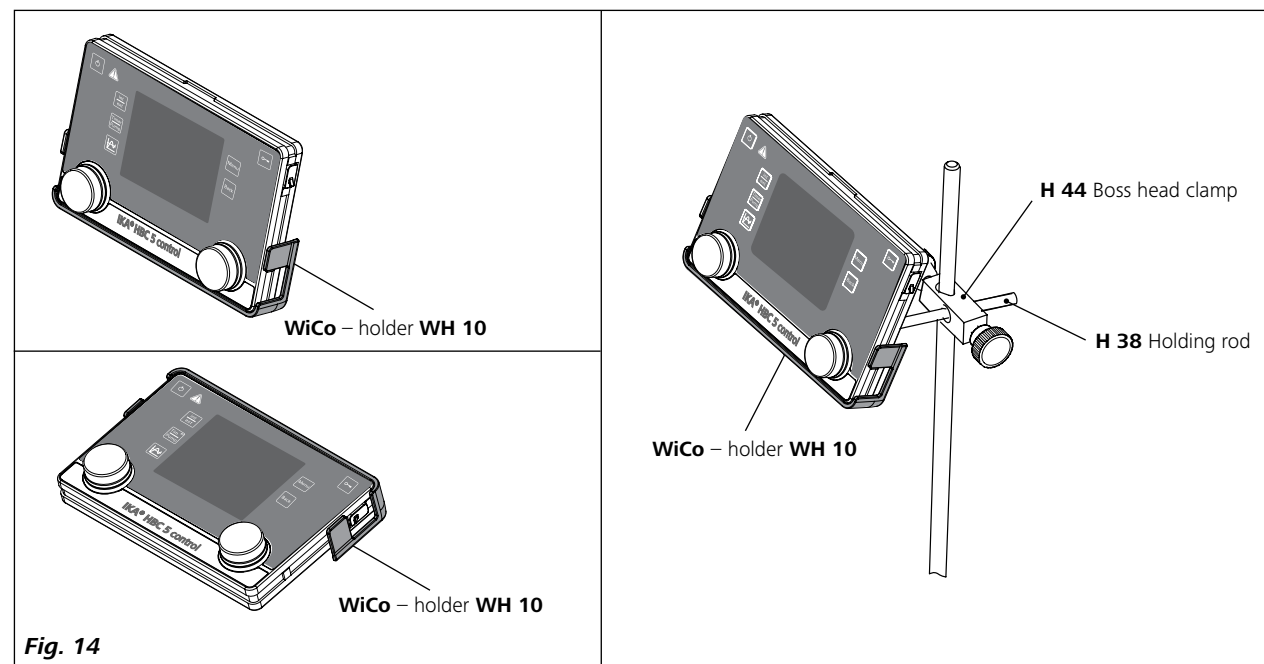


Fig. 14

Operator panel and display

• station (IC station/HBC station):

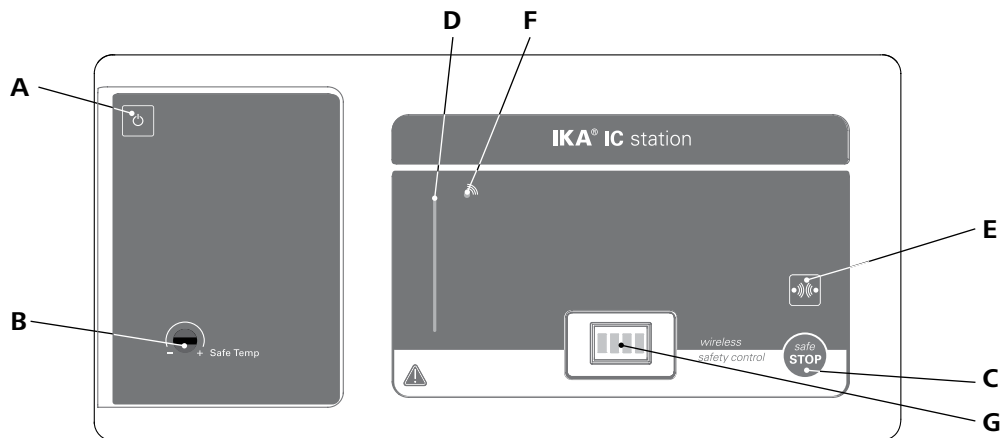


Fig. 15

Item	Designation	Function
A	ON/OFF button:	Switch on/off the station .
B	Adjustable safety circuit:	Adjust the safety temperature limit with delivered screwdriver.
C	"safe STOP" button:	Safe stop the working of the circulator in emergency.
D	LED bar:	Display different status of the circulator with different color.
E	Bluetooth® searching button:	Search the Wireless Controller (WiCo) when the Bluetooth® is active.
F	Bluetooth® LED:	Bluetooth® indicator.
G	Contacts:	Communicate and charge the WiCo .

• Wireless Controller (WiCo):

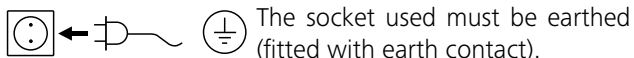


Fig. 16

Item	Designation	Function
J	Rotating/pressing knob:	Navigation, selecting and changing the settings in the menu Set the pump speed value Start/Stop the pump function
K	Rotating/pressing knob:	Set the temperature value Start/Stop the heating function
L	ON/OFF button:	Switch the WiCo on and off
M	"Menu" button:	Press it once: main menu is displayed Press it a second time: back to the working screen
N	"Back" button:	Return to the previous menu level
O	Key button:	Lock/Unlock the knobs and keys
P	"int/ext" button:	Switch between the internal and external temperature display and control
R	"Timer/Pump" button:	Switch between the timer and pump display
S	Graph button:	Display time/temperature graph

Commissioning

Check whether the voltage given on the type plate corresponds to the available mains voltage.



If these conditions have been met, the machine is ready for operation when the mains plug is plugged in.

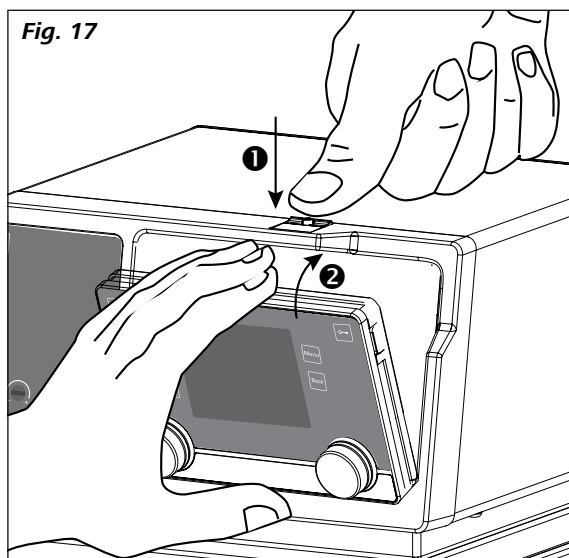
If these conditions are not met, safe operation is not guaranteed and the machine could be damaged.

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

The battery in the **Wireless Controller (WiCo)** must be charged at the **station** before the first use of the device.

Mounting the Wireless Controller to the station:

Put the **WiCo** into the holder at the **station** while pressing the release button.



If the **WiCo** should be permanently attached to the **station**, we strictly recommend to fasten the unlocking button with the integrated screw (turn counter clock wise).

After switch on the mains switch (2) at the rear side of the **station**, the screen of the **WiCo** displays the device designation and the software version after a beep.



Fig. 18

After several seconds, screen display the information of **WiCo**.

Information	
Internal Max:	95 °C
Internal Min:	5 °C
External Max:	95 °C
External Min:	5 °C
Fluid	H ₂ O (Water)

Fig. 19

Then the working screen in standby status appears and the device is ready for operation.

A	
0.00	
int °C	
— — —	— — —
ext °C	Safe Temp °C
int	0.00
	set °C
	1000
	Pump rpm

Fig. 20

Change the temperature setting with left knob (K).

Change the pump speed setting with the right knob (J).

In standby status, press the left knob (K). The device starts heating function and the pump begins to run.

In work status, press the right knob (J) to stop operation of the pump. The heating function and the pump stops.

Note: In standby status, press the right knob (J) to start the pump function, the heating function will not be activated.

In working status, press the left knob (K) to stop the heating function, the pump keep running.

When the **WiCo** is switched on without being connected to the **station**, the green LED bar (D) and the green Bluetooth® LED (F) on circulator lights up.

The controls of the **WiCo** allow locked by pressing the key button (O), so no accidental changes during operation are possible (key symbol appears in the display).


By pressing the key button (O) again, the controls are released (key symbol disappears from the display).

NOTICE

In an emergency, the device functions can be turned off by pressing the "**safe STOP**"

button **(C)** at the front of the **station**. The LED bar **(D)** changed from green color into red color.

A message appears in the display indicates that the **station** was forced off. To restart, press the "**ON/OFF**" **(A)** or the mains switch **(2)** off and on.

If the Bluetooth® function of the **WiCo** is activated, the Bluetooth® icon  appears on the screen and the user can search the **WiCo** by pressing the searching key **(E)**. Then, a beep is heard.

Setting the safety temperature

Adjust the safety temperature with screwdriver included with the device.

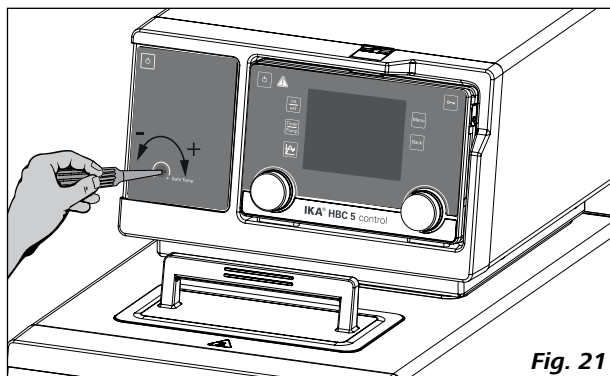


Fig. 21

The safety temperature setting will appear on the display.

Factory setting: maximum value


Adjustment range: 0 – 260 °C


WARNING

Note: The safe temperature limit must always be set to at least 25 °C lower than the flash point of the fluid used.

Useful information

The **station** is controlled via a **Wireless Controller (WiCo)**. If the **WiCo** is mounted on the **station**, data is exchanged between the **station** and **WiCo** via the contacts **(G)**. The screen of the **WiCo** displays the home icon .

The **WiCo** is equipped with a USB socket (Universal Serial Bus) with which the **WiCo** can be connected with **station**, the USB icon  appears on the screen.

If the **WiCo** is not connected with the **station** via a USB cable, the data exchange between the **station** and the **WiCo** via Bluetooth®. In this case, the Bluetooth® icon  is displayed.

Depending on the structure of the building, the **Wireless Controller** can be operated at a distance up to 15 m from the **station**, using the Bluetooth® connection.

The **WiCo** could be either installed on the **station** or put on a safe place where is accessed easily by the user during operation.

If the **WiCo** is mounted on the **station**, the battery is charged through the contacts **(G)**.

The battery could also be charged via the USB socket on the **Wireless Controller** (See "**Charging the Battery Pack RB 1 (rechargeable battery)**" in "**Preparations**" section).

Working with Wireless Controller (WiCo)

• Working screen at the time of delivery:

The start and information screen (see section "**Commissioning**") appears for a few seconds after the **WiCo** is switched on. After this, the following working screen appears automatically in the display.

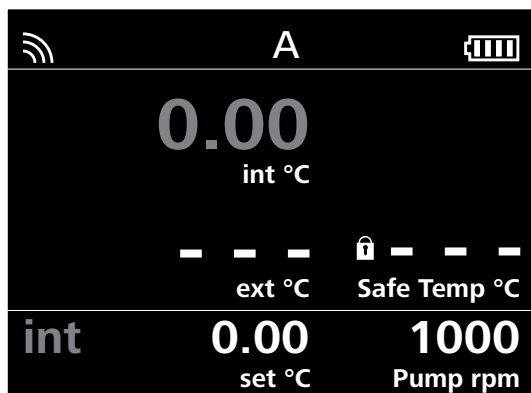


Fig. 22

Note: The wireless symbol  appears only when the **station** is switched on.

• Explanation of symbols on the working screen:

The symbols displayed change depending on the status and settings of the **WiCo** and the **station**. The screen below shows the most significant symbols on the working screen.

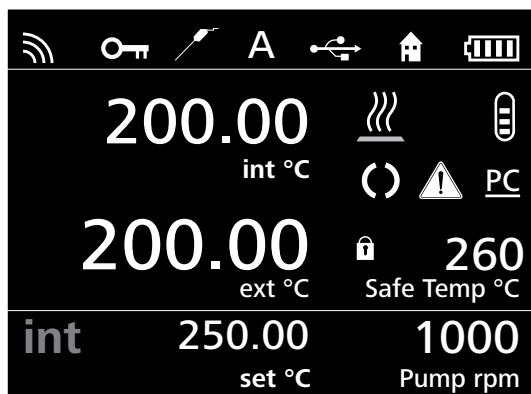


Fig. 23

Bluetooth®:

This symbol means the **station** and the **WiCo** are communicating via Bluetooth®. The symbol no longer appears if no Bluetooth® communication is being performed.

Key:

This symbol means that the function of the keys and the rotary knobs for controlling the **WiCo** are disabled. The symbol no longer appears if the functions are enabled once again by pressing the key button a second time.



Temperature Sensor:

This symbol appears when the external temperature sensor is connected.

A Operating Mode:

This symbol indicates the operating mode currently selected (A, B, C).



USB:

This symbol means the **WiCo** is communicating or the battery is charged via a USB cable. The symbol no longer appears if no USB cable is being used for communicating with the **station**.



Home:

This symbol means that the **WiCo** is connected to the **station** and is communicating with the **station** via the **contacts**.

The symbol no longer appears if the **WiCo** is removed from the **station**.



Battery pack:




This symbol indicates the charging status of the **RB 1 battery pack** within the **WiCo**.

The charging symbol appears if the **WiCo**

- Is connected to a PC via a USB cable
- Is connected to a Circulation **station** via a USB cable
- Is connected to the power supply unit **OS 1.0** via a USB cable
- Is connected to the **station** via the charger contacts.




Heating


This symbol indicates that the heating function is active.  →  →  indicate active heating process.



Fluid level

This symbol indicates fluid level.

The red symbol  means the fluid is above the maximum fluid level. Excess fluid should be drained out.

The red symbol  means the fluid is below the minimum fluid level. Please add fluid.



Pump:

This symbol indicates that the pump is activated.



Warning:

This symbol indicates that warning is active.



PC Control:

This symbol means that either the **station** or the **WiCo** is connected to a computer and is being controlled from the computer.



Program Control:

This symbol indicates that the **WiCo** is controlled by a program (see "**PROGRAMS**").

• Menu navigation and structure:

Menu navigation:



Fig. 24

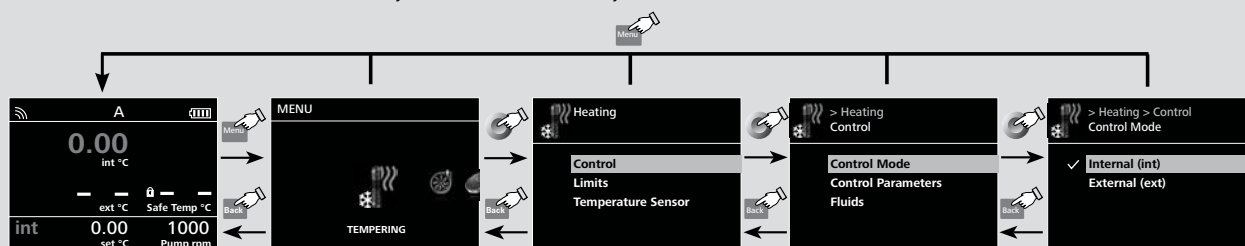
Control elements for menu navigation

- ☞ Press the **"Menu"** key (M).
- ☞ Select the menu by turning the right rotating/pressing knob (J) to the right or left.
- ☞ Open the menu item by pressing the right rotating/pressing knob (J).
- ☞ Turn the rotating/pressing knob (J) to select the desired menu option and edit the values or settings.
- ☞ Press the rotating/pressing knob (J) to get into sub menu items to active/inactive to switch settings or to confirm settings ("OK").
- ☞ Press the **"Back"** button (N) to a setting or cancel to return to the previous menu.
- ☞ Press the **"Menu"** button (M) to return directly to the working screen.

Note: When the tempering or pump functions are active, the menu is locked. On the display, the active menu option is highlighted in yellow. The active status of a menu item is marked with a check (✓).

Menu navigation: → Press the **"Menu"** key (M) and rotate rotating/pressing knob (J)

← Press the **"Back"** key (N) or the **"Menu"** key (M)














Note: If you press the **"Menu"** key (M), the system skips directly back to the working screen.

If you press the **"Back"** key (N), the system skips back to the previous screen.

Fig. 25

Menu structure:

										Factory settings	
	TEMPERING	Control	Control Mode	Internal (int)						activated	
				External (ext)						-	
			Control Parameters	Automatic	Accurate						activated
					Fast						-
				Manual	Internal (Kp, Ti, Td, Ts, Prop_Bp, Prop_Bn)						yes
		External (Kp, Ti, Td, Ts, Prop_Bp, Prop_Bn)						yes			
		Information						yes			
		Fluid	CF.EG28.N10.80.8						-		
			CF.EG39.N20.80.16						-		
			CF.EG44.N25.80.19						-		
CF.EG48.N30.80.22						-					
UF.Si.N30.150.10LV						-					
HF.Si.20.200.50						-					
HF.Si.20.250.50A						-					
H ₂ O (Water)						activated					
Customized 1						-					
Customized 2						-					
Limits	External (ext)	Maximum						95 °C			
		Minimum						5 °C			
	I ΔT (int-ext) I	100 °C									
		100 %									
	Temperature sensor	Power Output	Heating						-		
Calibration											
Internal		2 Point Calibration						-			
		3 Point Calibration						-			
External		2 Point Calibration						-			
	3 Point Calibration						-				
Reset Calibration										-	
	PUMP	Limits	Speed	Maximum						4600 rpm	
				Minimum						1000 rpm	
	TIMER	Set	0.7 bar						-		
			00:00 [hh:mm]						-		
	MODE	Display	A						activated		
			B						-		
			C						-		
	DISPLAY	Main screen	Pump						activated		
			Timer						-		
	GRAPH	Automatic						activated		
								activated		
								activated		
								activated		
								-		
		Manual	Axis Assignment	Set Temperature						activated	
				Actual Internal Temp.						activated	
			Actual External Temp.						activated		
			Axis Scaling	X-Axis	15 min						-
					30 min						activated
60 min						-					
Y-Axis	120 min						-				
	Maximum						95 °C				
Minimum						5 °C					
	PROGRAMS	Program 1						-			
							-			
	MODULES	Program 10						-			
		M1 - Valve	ON						-	
				Default Status							
			Refill	Open						activated	
		Closed						-			
		M2 - Output		Alarm	Start						Level 1
			Stop						Level 4		
			Error						-		
		Switch	Warning						-		
			Default Status								
Open						activated					
Closed						-					
M3 - Input	Ext. Standby	ON						-			
		Default Status									
		Open						activated			
Closed						-					
	OUTGAS	Speed						1000 rpm			
		Interval						10 s			
	SAFETY	Time out	Set	00:30 [mm:ss]						-	
				Speed						1000 rpm	
				Temperature						30.00 °C	
		Password						000			
		Languages									
	SETTINGS	English	activated								
			Deutsch						-		
								-		
		Display	Background	Black						activated	
				White						-	
			Brightness	Standard Mode						100%	
		Battery Mode						40%			
		Firmware update Info						-			
		Sounds						-			
		Key Tone						-			
Factory Settings										-	
Bluetooth										activated	
Information											
Tempering										yes	
Pump										yes	
Safety										yes	
Software										yes	
Intro										yes	
Firmware update Info										yes	

• Menu (Details):



TEMPERING:

Control:

Control Mode:

Internal (int): The temperature is regulated according to the internal temperature sensor (Fig. 2 Item 6).

Extern (ext): The temperature is regulated according to the external temperature sensor (Fig. 2 Item 11).

Control parameters:

Automatic: The optimal control parameters for PID temperature control are determined automatically. This is the recommended mode.

Selecting "**Automatic**" allows you to set the dynamics for temperature control:

Accurate: precise tempering without overshooting.

Fast: fast tempering with minimal overshooting.

Manual: The control parameters for PID temperature control can be set manually.

"**Manual**" should only be used in the event of special temperature control requirements.

When "**Manual**" is selected, the following parameters can be set for "**Internal (int)**" and "**External (ext)**" temperature control:

Kp: Proportional coefficient

The proportional coefficient **Kp** is the controller amplification and determines how strongly the control deviation (the difference between the target temperature and actual temperature) directly affects the control variable (on-time of the heater). **Kp**-values that are too large can lead to the controller overshooting.

Ti: Integral time

The integral time **Ti** (s) is the correction time and determines how strongly the duration of the control deviation affects the control variable. **Ti** compensates for an existing control deviation. A high **Ti** means a smaller and slower effect on the control variable. **Ti**-values that are too small can lead to instability of the controller.

Td: Differential time

The differential time **Td** (s) is the derivative time and determines how strongly the rate of change of the control deviation affects the control variable. **Td** compensates for rapid control deviations. A high **Td** means a smaller and slower effect on the control variable. **Td**-values that are too large can lead to instability of the controller.

Ts: Sampling time

The sampling time **Ts** (s) is the time interval over which the control deviation is determined and the respective control variable (dependent on **Kp**, **Ti** and **Td**) is calculated.

Ts must be adjusted to match the response characteristic (total of all time constants) of the closed loop controlled system, so that the control variable can deliver a uniform and measurable change in the control deviation. **Ts** values that are too small or too large can lead to instability of the controller.

Fluids:

Under the option "**Fluids**", a variety of heat transfer fluids can be selected.

The selected fluid limits the setting range of the target temperature. See table in the section "**Fluids**".

The maximum and minimum temperature values of the selected fluid can be set within these limitations.

Limits:

Under the option "**External (ext)**", the maximum and minimum temperature for external temperature control can be set.

Under "**I Δ T (int - ext) I**", the maximum difference between the internal and external temperature can be set.

Under "**Power Output**", the maximum heating output can be set as a percentage.

Temperature sensor

The internal and external temperature measurement can be calibrated and compensated for.

By "**Calibration (Reset Calibration)**", the calibration value for the internal or the external temperature sensor will be deleted.



PUMP

Limits:

In "**Limits**" option, the user is allowed to set the maximum and minimum speed to the pump, and also the maximum pressure.



TIMER

Set:

The user can set a target time (duration).

When device functions are started normally, this time is displayed on the working screen. The device functions stop automatically once this time has expired. The running time is then displayed again on the display.

Note: To deactivate the target time specification, set the target time to 00:00.

Display:

Activate the timer display on the main display (working screen).



MODE

Operating Mode A:

After power-on/power failure no automatic restart of functions.

Operating Mode B:

After power-on/power failure automatic restart of functions, depending on previous settings.

Operating mode C:

Set values (set in **A** or **B**) cannot be changed.

After power-on/power failure automatic restart of functions, depending on previous settings.



DISPLAY

In the "**Display**" menu the user can specify what information will be displayed on the screen.



GRAPH

In this menu, you can set the options for the time-temperature diagram.

Automatic:

The scaling of the temperature axis (Y-axis) is automatically determined, depending on the target temperature and the actual internal and external temperature.

The time axis (X-axis) is permanently scaled to 30 minutes.

Manual:

Axis Assignment:

The temperature values to be displayed can be selected.

Axis scaling:

Scaling of the time (X) and temperature axis (Y) can be selected or set.



PROGRAMS

Under programs, 10 user-defined temperature-time profiles can be created. In addition, the pump speed and behaviour of the external switching outputs (**MODULE M1** and **M2**) can be defined. A program can consist of up to 10 segments.

Once a program has been selected, the following options are available:

Start: Starts the program upon request of loop mode.

Infinite loop: Upon completion of the last segment, the program continues with the first segment until the user ends the program by stopping a device function.

Loop Count: Indicates the total number of loop cycles until program end.

Note: At the end of the program all device functions are switched off.

Edit: Edit/change program parameters.

Seg No.: Segment number.

Ctrl. Sensor (int/ext): Determines whether control is through the internal (int) or external (ext) temperature sensor.

Temp.: Target temperature.

Ctrl.Mode (Time / +/- x.xx K): In "**Ctrl.Mode Time**" the target values and settings of the segment are valid for the duration indicated in the column "**Time hh:mm**".

Afterwards, the next program segment is automatically executed.

In "**Ctrl.Mode +/- x.xx K**", the hysteresis (tolerance) of the actual temperature to the target temperature is set (e.g. +/- 0.1 K). The target values and settings of the segment are valid until the actual temperature reaches the target temperature +/- hysteresis for the first time.

Afterwards, the next program segment is automatically executed.

Pump rpm: Target speed of pump.

M1 (ON / OFF): MODULES M1-Valve:

OFF: M1 valve in initial state

ON: M1 valve in inverted initial state.

Note: The initial state of the M1 valve is defined in "**MODULES M1-Valve**" in "**Default Status**" as "**Open**" or "**Closed**".

M2 (ON/OFF): MODULES M2-Output switch

OFF: M2-output switch in initial state.

ON: M2-output switch in inverted initial state.

Note: The initial state of the M2-Output switch is defined in "**MODULES M2-Output-Switch**" in "**Default Status**" as "**Open**" or "**Closed**".

Delete: Deletes the selection highlighted in yellow (segment or program).

Insert: Inserts a new program segment after the selected segment.

Save: Saves changes.

View: Temperature-time overview displays for the program with segments of the selected program.

Note: If hysteresis is set as "**Ctrl.Mode +/-x.xx K**" for one or more segments in the program, the duration of the program cannot be determined.

Press and turn the knob (**J**) to display the segment details.

Cancel: Cancels the process.

Note: Once the program has been started, the program no., segment no. (active/total) and the remaining duration of the segment or hysteresis are displayed in the graph.



MODULES:

In "**Modules**" the multifunction connection (18) outputs and inputs can be configured. The outputs M1 and M2 can be controlled via "**PROGRAMS**".

M1-Valve:

An output to control an external valve, which can be built into the external pump circuit or the cooling coil inlet, for example.

ON:

Switches the external valve to the active state (inverted initial state).

Note: When the "**PROGRAMS**" is started, the M1 segment settings have higher priority.

Default Status:

Defines the default state (OFF) of the external valve as "**Open**" or "**Closed**".

Refill:

Uses the external M1 valve to automatically check the level when operating with water. Observe "**Default Status**" setting.

Low level: Sets the valve switch-on point (ON).

High level: Sets the valve switch-off point (OFF).

Note: Prior to using the "**Refill**" option check the function of the buoyage (4).

The "**Refill**" option has higher priority than the program M1 segment settings.

M2-Output:

Alarm:

Activates the alarm output (switch contact).

Error: In the event of an error the "**M2-Output — Switch**" is activated (ON, inverted initial state).

Warning: In the event of a warning the "**M2-Output — Switch**" is activated (ON, inverted initial state)

When "**Warning**" is activated, "**Error**" is simultaneously activated.

Default Status: Defines the default state (OFF) of the "**M2-Output — Alarm**" as "**Open**" or "**Closed**".

Switch:

Activates the switch output.

ON: Switches output into the active state (inverted initial state).

Note: When the "**Program**" is started, the M1 segment settings have higher priority.

Default Status: Defines the initial state (OFF) of the switch output as "**Open**" or "**Closed**".

M3-Input:

Ext. Standby:

External standby input to stop the device functions Temper and Pump.

ON: Activates the ext. standby function. Device functions are stopped in the event of an inverted initial state (ON) at the input.

Default Status: Defines the default state (OFF) of the input as "**Open**" (high level) or "**Closed**" (low level).



OUTGAS

In the option, the user is allowed to set the outgas speed in range of 1000 rpm to 4600 rpm and outgas interval from 10 seconds to 240 seconds.

This function can be used when filling external devices such as laboratory reactors.



SAFETY

Time out:

In the menu "**Time out**", the user can determine a time limit in the event of a communication breakdown between the station and the **Wireless Controller**. The station continues to work with the preset target values until the preset time value has expired. Following that, the station runs using the preset safety temperature and safety speed.

Note: The initial time out is 30 seconds and the user can define up to 60 minutes for this time limit.

Speed:

In the "**Speed**" menu, the user can specify a appropriate and safe speed for specified temperature.

Note: The factory setting of the safe speed is 1000 rpm and is activated after the time limit is set (see "**Time out**").

Temperature:

In the "**Temperature**" menu, the user can specify a temperature that is appropriate and safe for the circulating task.

Note: The initial safe temperature is 30 °C and is activated after the time limit is set (see "**Time out**").

Password:

In the "**Password**" menu, the menu settings can be locked by a 3-digit password.



SETTING

Languages:

The "**Language**" option allows the user to select the desired language.

Display:

The "**Display**" option allows the user to change the background color and brightness of the working screen.

Sound:

The "**Sound**" option allows the user to activate/deactivate the key tone.

Factory Settings:

Select the "**Factory settings**" option by turning and pressing the rotary/push knob. The system requests confirmation to restore the factory settings. Pressing the "**OK**" button resets all the system settings to the original standard values set at dispatch from the factory (see "**Menu structure**").

Bluetooth®:

The "**Bluetooth®**" option allows the user to activate/deactivate the "Bluetooth®" function. A tick shows that the option is activated.

Information:

The "**Information**" option offers the user an overview of the most important system settings of the device.

Interface and output

The device can be connected to a PC and operated with the laboratory software labworldsoft® through the RS 232 port (9), USB port (10) or USB port on the **Wireless Controller (WiCo)**.

Note: 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. The USB interface can also be used to update firmware.

USB device drivers:

First, download the latest driver for **IKA®** devices with USB interface from:

<http://www.ika.com/ika/lws/download/usb-driver.zip>.

Install the driver by running the setup file. Then 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.

RS 232 interface:

Configuration

- The functions of the interface connections between the stirrer machine 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 stirrer machine to the computer takes place only at the computer's request.

Command syntax and format:

The following applies to the command set:

- Commands are generally sent from the computer (Master) to the device (Slave).
- The device sends only at the computer's request. Even fault indications cannot be sent spontaneously from the device to the computer (automation system).
- Commands 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 CR LF (Code: hex 0x0d 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 serve only as low level commands for communication between the device and the PC. With a suitable terminal or communications programme these commands can be transmitted directly to the circulator equipment. The **IKA®** software package, Labworldsoft®, provides a convenient tool for controlling circulating equipment and collecting data under MS Windows, and includes graphical entry features, for pump motor speed ramps for example.

Commands:

Commands	Function
IN_PV_1	Read the external actual temperature
IN_PV_2	Read the internal actual temperature
IN_PV_3	Read the safety actual temperature
IN_PV_4	Read the pump actual speed
IN_SP_1	Read the internal setting temperature (if 0: internal control) Read the external setting temperature (if 1: external control)
IN_SP_3	Read the safety setting temperature
IN_SP_4	Read the pump setting speed
IN_TMODE	Read temperature control 0: internal control 1: external control
OUT_SP_1 xxx	Set the internal setting temperature XXX (if 0: internal control) Set the external setting temperature XXX (if 1: external control)
OUT_SP_12@n	Set the WD safety temperature with echo of the set (defined) value.
OUT_SP_4 xxx	Set the pump speed XXX
OUT_SP_42@n	Set the WD-safety speed with echo of the set (defined) value.
OUT_TMODE_0	Set to Internal temperature control
OUT_TMODE_1	Set to External temperature control
OUT_WD1@n	Start the watchdog mode 1 and set the time for the watchdog to n (20...1500) seconds. Echo of the Watchdog time. During a WD1-event, the heating and pump functions are switched off. This command needs to be send within the watchdog time.
OUT_WD2@n	Start the watchdog mode 2 and set the watchdog time to n (20...1500) seconds. Echo of the watchdog time. During a WD2-event, the set temperature is changed to the WD safety temperature and the pump set speed is set to the WD safety speed. This command needs to be send within the watchdog time.
RESET	Reset the PC control and stop the device functions.
START_1	Start the heating function
START_4	Start the pump function
STOP_1	Stop the heating function
STOP_4	Stop the pump function

PC 1.1 Cable:

This cable is required to connect RS 232 port (9) to a PC.

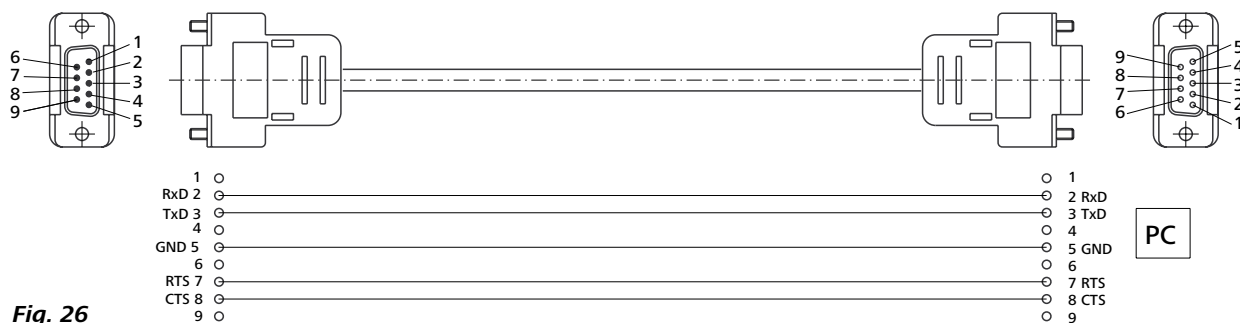
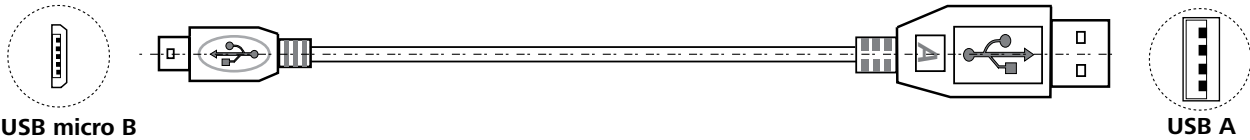


Fig. 26

USB 2.0 Kabel A - Micro B:

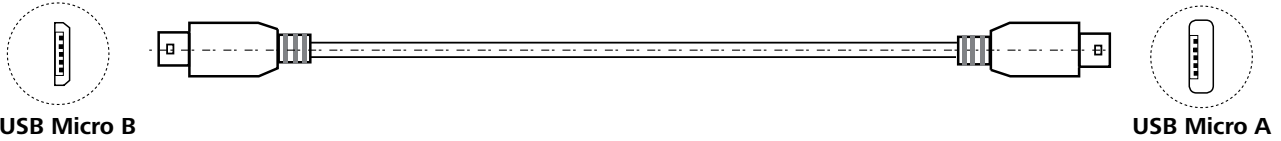
This cable is required to connect USB interface (10) to a PC.



USB micro B
Fig. 27

USB 2.0 Kabel Micro A - Micro B:

This cable is required to connect the **WiCo** to **station**.



USB Micro B
Fig. 28

Connection WiCo to Station:



Fig. 29

Connection the device to PC:

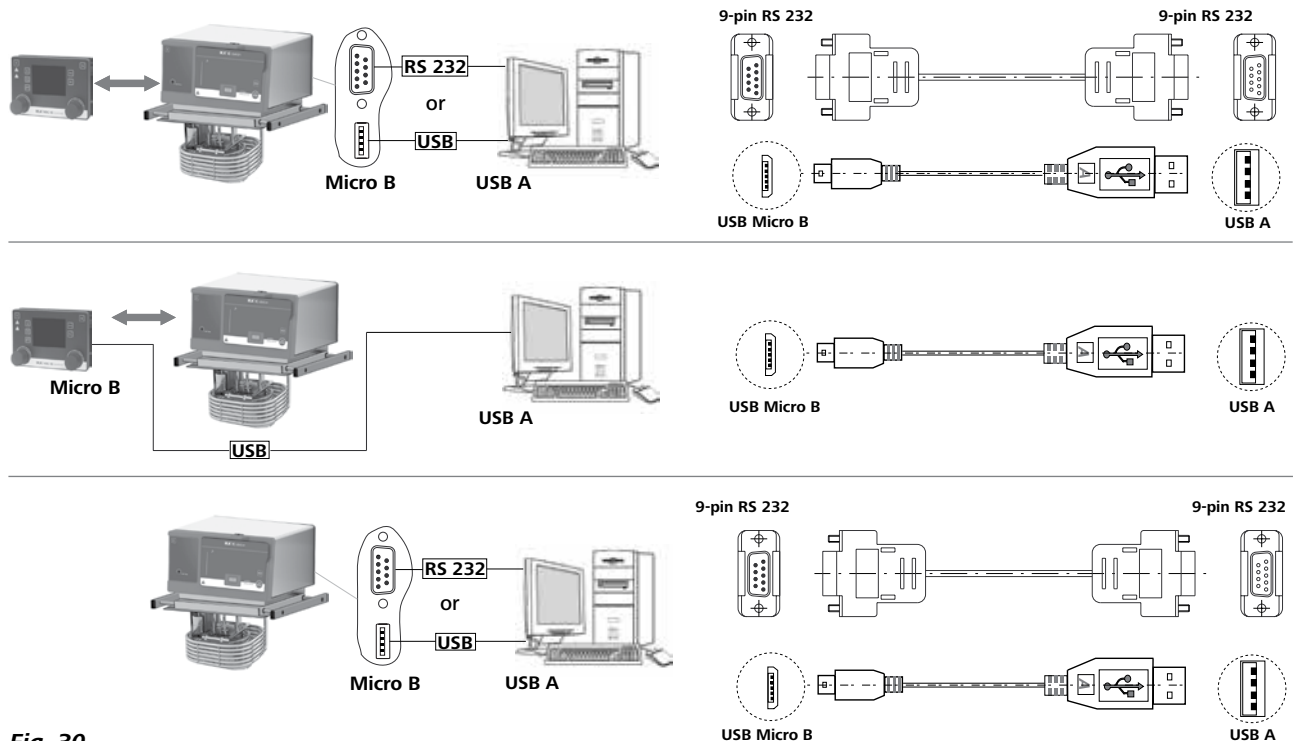
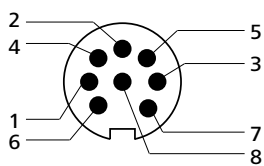


Fig. 30

Multifunction interface:



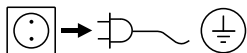
- 1 M1 Output Valve + (+24Vdc/max. 0.8A)
- 2 M1 Output Valve -
- 3 M2 Output Alarm/Switch 1 (max. 30Vdc/ac/max. 1A)
- 4 M2 Output Alarm/Switch 2
- 5 M3 Input standby + (+5V ca. 10mA)
- 6 M3 Input standby - (0V only for Standby)
- 7 --- (reserved for later use, do not connect!)
- 8 --- (reserved for later use, do not connect!)

Fig. 31

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:



Disconnect main plug prior to cleaning!

Use only cleaning agents which have been approved by **IKA®** to clean **IKA®** device.

Dirt	Cleaning agent
Dye	isopropyl alcohol
Construction material	water containing tenside/isopropyl alcohol
Cosmetics	water containing tenside/isopropyl alcohol
Foodstuffs	water containing tenside
Fuel	water containing tenside

For materials which are not listed, please request information from IKA® application support.

Wear protective gloves while cleaning the device.

Electrical device 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 performing a non-recommended method of cleaning or decontamination, the user must ascertain with **IKA®** that this method will not damage the device.

Spare parts order:

When ordering spare parts, please give:

- Machine type
- Serial number, see type plate
- Item and designation of the spare part, see **www.ika.com**, spare parts diagram and spare parts list.
- Software version.

Repair:

Please send instrument for repair only after it has been cleaned and is free from any materials which may constitute a health hazard.

For this you should request the “**Decontamination Certificate**” from **IKA®**, or use the download printout of it from the **IKA®** website **www.ika.com**.

Return the instrument in its original packaging. Storage packaging is not sufficient. Please also use suitable transport packaging.

Error codes

Any malfunctions during operation will be identified by an error message on the display.

Proceed as follows in such cases:

- ☞ Switch off device using the main switch at the back of the device
- ☞ Carry out corrective measures
- ☞ Restart device

Error code	Effect	Cause	Solution
Error 01	Pump off Heating off	No external temperature sensor	- Check this sensor
Error 02	Pump off Heating off	Motor over current (rate current)	- Reduce pump motor speed - Use fluid with lower viscosity - Check if the pump impeller is blocked
Error 03	Pump off Heating off	Motor over current (max current)	- Reduce pump motor speed - Use fluid with lower viscosity - Check if the pump impeller is blocked
Error 04	Pump off Heating off	Motor hall signal missing	- Reduce pump motor speed - Use fluid with lower viscosity - Check if the pump impeller is blocked
Error 05	Pump off Heating off	Too high liquid level	- Check the liquid level and buoyage
Error 06	Pump off Heating off	Too low liquid level	- Check the liquid level and buoyage
Error 07	Pump off Heating off	Too high voltage	- Check the mains power
Error 08	Pump off Heating off	Too low voltage	- Check the mains power
Error 09	Pump off Heating off	Device internal temperature is too high	- Check the ambient temperature and let the device cool down
Error 10	Pump off Heating off	PC communication failure	- Check communication cable
Error 11	Pump off Heating off	Temperature difference between control sensor and safety sensor is too much	- Check safety temperature circuit and bath fluid
Error 12	Pump off Heating off	Safety temperature alarm	- Check the bath temperature measurement
Error 13	Pump off Heating off	Heater switched off by safety circuit	- Check safety temperature set value, liquid level
Error 14	Pump off Heating off	Fan error	- Check the fan and clean the grids at the rear side

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

- Contact the service department
- Send the device for repair, including a short description of the fault.

Accessories

	IC control	HBC 5 control	HBC 10 control
Tubing and hoses			
LT 5.20 metal hose (isolated M16 x 1)	•	•	•
LT 5.21 PTFE hose (isolated M16 x 1)	•	•	•
H.PVC.8 PVC hose (nominal width 8)	•	•	•
H.PVC.12 PVC hose (nominal width 12)	•	•	•
H.SI.8 silicone hose (nominal width 8)	•	•	•
H.SI.12 silicone hose (nominal width 12)	•	•	•
Tubing Insulations			
ISO. 8 insulation (8 mm)	•	•	•
ISO.12 insulation (12 mm)	•	•	•
Bath vessels			
IB eco 8 Plastic bath (8 litre)	•		
IB eco 18 Plastic bath (18 litre)	•		
IB pro 9 Stainless steel bath (9 litre)	•		
IB pro 12 stainless steel bath (12 litre)	•		
IB pro 20 stainless steel bath (20 litre)	•		
Bridges and Covers			
BS.IC small bridge (for IB pro 12 , IB eco 18 and IB pro 20)	•		
CM.IC medium cover (for IB pro 12)	•		
CL.IC large cover (for IB pro 20)	•		
Additional accessories			
Pt 100.30 temperature sensor	•	•	•
PC 1.1 cable (RS 232)	•	•	•
USB cable micro A – micro B 2.0	•	•	•
USB 2.0 cable A – micro B	•	•	•
OS 1.0 Power supply	•	•	•
RB 1 Battery pack	•	•	•
Labworldsoft®	•	•	•

See more accessories on www.ika.com.

Technical data

		IC control	HBC 5 control	HBC 10 control
Operating voltage	VAC	230 ± 10 % ... 100–115 ± 10 %		
Frequency	Hz	50 / 60		
Max. input Power	W	2650 (230 VAC) / 1400 (115 VAC)		
Working temperature range (RT+10 at 1000rpm)	°C	RT + 10 ... 250		
Operating temperature range (with external cooling)	°C	-20 ... 250		
Temperature stability – Internal temperature control 70°C, water (according to DIN12876)	K	± 0,01		
Temperature control		PID (Automatic/user setting)		
Temperature measurement, absolutely accuracy Internal (int) (adjustable by calibration)	K	± 0,2		
External (ext) (adjustable by calibration)	K	± 0,2		
External Pt 100.3 temperature sensor tolerance to DIN EN 60751 class A, ≤ ± (0.15 + 0.002 x T), e.g. at max. 100°C (adjustable by calibration)	K	± 0,35 (at 100°C)		
Temperature setting		Knob on Wireless Controller (WiCo)		
Temperature setting resolution	K	0,1		
Temperature display		TFT LCD on WiCo		
Temperature display resolution	K	0,01		
Classification according to DIN 12876-1		Class III (FL) suitable for flammable and non-flammable fluids		
Safety circuit (adjustable)	°C	0 ... 260		
Safety temperature display		TFT LCD on WiCo		
Heating capacity	W	2500 (230 VAC) / 1250 (115 VAC)		
Pump speed (adjustable)	rpm	1000 ... 4600		
Max. pump pressure/suction	bar	0,61 / 0,45		
Max. flow rate (at 0 bar)	l/min	31		
Bath volume	l	-/-	5–7	8–11
Sub-level protection		Yes		
Interface		RS 232, USB, Multi-function interface		
Permitted on-time	%	100		
Protection class according to EN 60529		IP 21		
Protection class		I		
Excess voltage category		II		
Contamination level		2		
Permitted ambient temperature	°C	+5 ... +40		
Permitted ambient humidity (relative)	%	80		
Dimension (W x D x H)	mm	285 x 291 x 313	275 x 500 x 406	275 x 510 x 456
Weight	kg	8,8	17,3	18,3
Operation at a terrestrial altitude	m	max. 2000		
Wireless Controller				
Permitted on time	%	100		
Max. communication distance (dependent on the building)	m	15		
Dimensions (W x D x H)	mm	160 x 40 x 105		
Weight	kg	0,3		
Ambient temperature	°C	+5 ... +40		
Ambient humidity (relative)	%	80		
Protection class according to EN 60529		IP 40		
Interface		USB		
RB 1 Battery pack				
Voltage	V	3,7		
Charging capacity	mAh	2000		
Charging time	h	4,5		
Working time	h	15		
Battery type		Lithium-polymer		

Subject to technical changes!

Warranty

In accordance with **IKA®** warranty conditions, the warranty period is 24 months. For claims under the warranty please contact your local dealer. You may also send the machine 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 manual.

Pump performance curve

Pump performance curve measured with water:

(Measurements done according DIN 12876-2 with water at 20°C; pump in a closed-loop circuit).

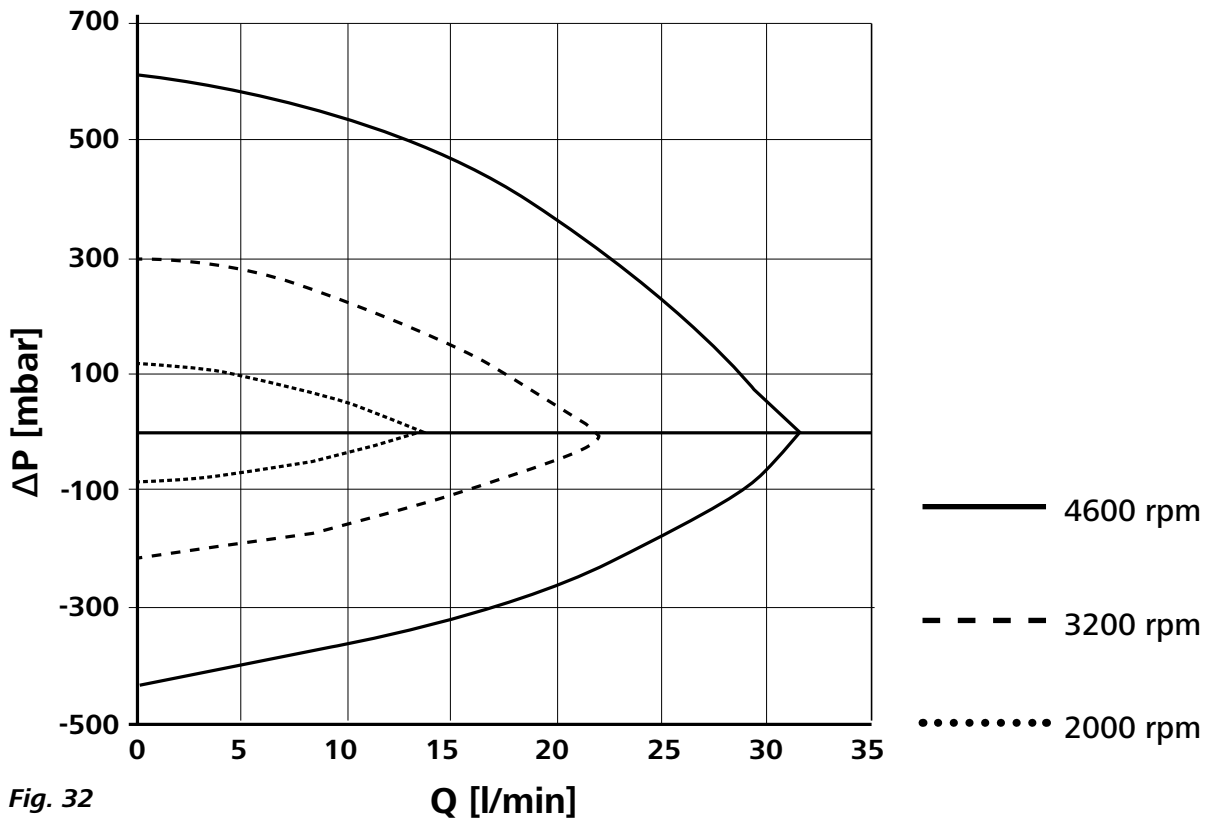


Fig. 32



designed for scientists

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Technical specifications may be changed without prior notice.