BINDER
Best conditions for your success

Operating Manual

Translation of the original operating manual

BINDER CO_2 Control Module

Accessory for KB PRO, KBF/KBF-UL, KBF PRO (E7)

Accessory	For chamber size	Art. no.
CO_2 control range 0-20 vol.-%	260, 470, 720, 1060, 1600	8012-2138
CO_2 control range 0-1 vol.-%	260, 470, 720, 1060, 1600	8012-2140

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Content

Dear customer,

For the correct operation of the chambers, it is important that you read this operating manual completely and carefully and observe all instructions as indicated. Failure to read, understand and follow the instructions may result in personal injury. It can also lead to damage to the chamber and/or poor equipment performance.

1. Safety

1.1 Personnel Qualification

The chamber must only be installed, tested, and started up by personnel qualified for assembly, startup, and operation of the chamber. Qualified personnel are persons whose professional education, knowledge, experience and knowledge of relevant standards allow them to assess, carry out, and identify any potential hazards in the work assigned to them. They must have been trained and instructed, and be authorized, to work on the chamber.

The chamber should only be operated by laboratory personnel especially trained for this purpose and familiar with all precautionary measures required for working in a laboratory. Observe the national regulations on minimum age of laboratory personnel.

1.2 Operating manual

This operating manual is part of the components of delivery. Always keep it handy for reference in the vicinity of the chamber. If selling the unit, hand over the operating manual to the purchaser.

To avoid injuries and damage observe the safety instructions of the operating manual. Failure to follow instructions and safety precautions can lead to significant risks.

DANGER

Dangers due to failure to observe the instructions and safety precautions.

Serious injuries and chamber damage. Risk of death.

- Observe the safety instructions in this Operating Manual.
- Follow the operating procedures in this Operating Manual.
- Carefully read the complete operating instructions of the chamber prior to installing and using the chamber.
- Keep the operating manual for future reference

Make sure that all persons who use the chamber and its associated work equipment have read and understood the Operating Manual.

This Operating Manual is supplemented and updated as needed. Always use the most recent version of the Operating Manual. When in doubt, call the BINDER Service Hotline for information on the up-to-dateness and validity of this Operating Manual.

1.3 Legal considerations

This operating manual is for informational purposes only. It contains information for correct and safe installing, start-up, operation, decommissioning, cleaning and maintenance of the product. Note: the contents and the product described are subject to change without notice.

Understanding and observing the instructions in this operating manual are prerequisites for hazard-free use and safety during operation and maintenance. Images are to provide basic understanding. They may deviate from the actual version of the chamber. The actual scope of delivery can, due to optional or special design, or due to recent technical changes, deviate from the information and illustrations in these instructions this operating manual. In no event shall BINDER be held liable for any damages, direct or incidental arising out of or related to the use of this manual.

This operating manual cannot cover all conceivable applications. If you would like additional information, or if special problems arise that are not sufficiently addressed in this manual, please ask your dealer or contact us directly, e.g. by phone at the number located on page one of this manual

Furthermore, we emphasize that the contents of this operating manual are not part of an earlier or existing agreement, description, or legal relationship, nor do they modify such a relationship. All obligations on the part of BINDER derive from the respective purchase contract, which also contains the entire and exclusively valid statement of warranty administration and the general terms and conditions, as well as the legal regulations valid at the time the contract is concluded. The statements in this manual neither augment nor restrict the contractual warranty provisions.

1.3.1 Intellectual property

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Please visit www.binder-world.com for more information.

1.4 Structure of the safety instructions in the operating manual

In this operating manual, the following safety definitions and symbols indicate dangerous situations following the harmonization of ISO 3864-2 and ANSI Z535.6.

1.4.1 Signal word panel

Depending on the probability of serious consequences, potential dangers are identified with a signal word, the corresponding safety color, and if appropriate, the safety alert symbol.

DANGER
Indicates an imminently hazardous situation that, if not avoided, will result in death or serious (irreversible) injury.

WARNING
Indicates a potentially hazardous situation which, if not avoided, could result in death or serious (irreversible) injury.

CAUTION
Indicates a potentially hazardous situation which, if not avoided, may result in moderate or minor (reversible) injury.

NOTICE
Indicates a potentially hazardous situation which, if not avoided, may result in damage to the product and/or its functions or of a property in its proximity.

1.4.2 Safety alert symbol

Use of the safety alert symbol indicates a **risk of injury**.

Observe all measures that are marked with the safety alert symbol in order to avoid death or injury.

1.4.3 Pictograms

Warning signs			
 Electrical hazard	 Hot surface	 Explosive atmosphere	 Gas cylinders
 CO_2 suffocation and poisoning hazard	 Risk of corrosion and / or chemical burns	 Harmful substances	 Biohazard
 Pollution Hazard			
Mandatory action signs			
 Mandatory regulation	 Read operating instructions	 Disconnect the power plug	 Environment protection
 Wear protective gloves	 Wear safety goggles		
Prohibition signs			
 Do NOT touch	 Do NOT spray with water		

	**Information** to be observed in order to ensure optimum function of the product.

1.4.4 Word message panel structure

Type / cause of hazard. **Possible consequences.** ∅ Instruction how to avoid the hazard: prohibition ➢ Instruction how to avoid the hazard: mandatory action.

Observe all other notes and information not necessarily emphasized in the same way, in order to avoid disruptions that could result in direct or indirect injury or property damage.

1.5 Localization / position of safety and information labels on the accessory

The following labels are located on the chamber:

Pictograms (warning signs)	
	CO_2 suffocation and poisoning hazard

Information	
	QR-Code and URL to contact the BINDER Support Center

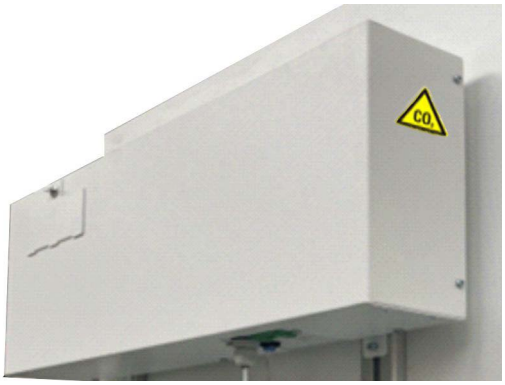


Figure 1: Position of labels on the right side of the CO_2 control box

	Keep safety labels complete and legible.

Replace safety labels that are no longer legible. Contact BINDER Service for these replacements.

1.6 Type plate

The type plate is located bottom right-hand on the front of the CO_2 control box.

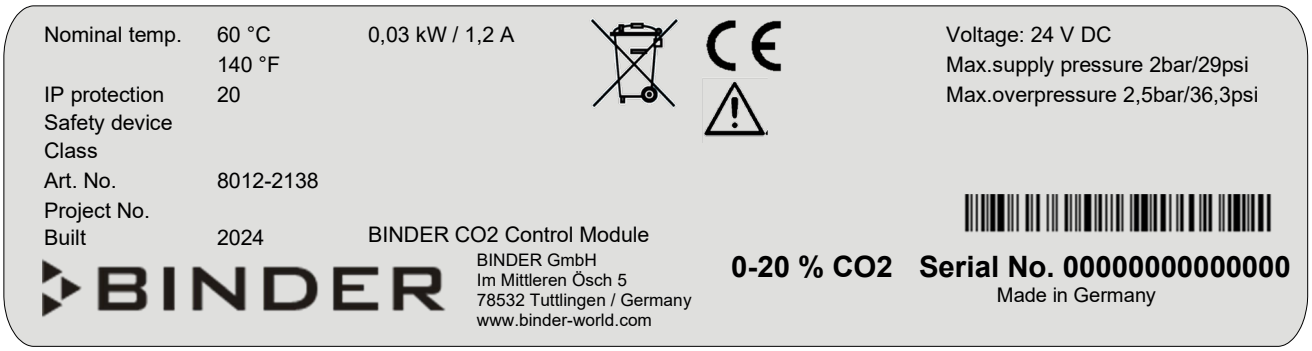


Figure 2: Type plate of CO_2 control module 0-20 vol.-%

Indications of the type plate (example)

Indication		Information
BINDER		Manufacturer: BINDER GmbH
BINDER CO2 Control Module		Model designation: CO_2 control module
0-20 % CO2		Type: CO_2 control range 0-20 vol.-%
0-1 % CO2		Type: CO_2 control range 0-1 vol.-%
Serial No.	00000000000000	Serial no. of the device
Built	2024	Year of construction
Nominal temperature	60 °C / 140 °F	Nominal temperature
IP protection	20	IP type of protection acc. to standard EN 60529
Temp. safety device	---	Temperature safety device acc. to standard DIN 12880:2007
Class	---	Class of temperature safety device
Art. No.	8012-2138	Art. no. of the device
Project No.	---	Optional: Special application acc. to project no.
0,03 kW		Nominal power
1,2 A		Nominal current
Voltage: 24 V DC		Nominal voltage
Max.supply pressure 2bar/29psi		Max. permissible CO_2 supply pressure
Max.overpressure 2,5bar/36,3psi		Max. permissible CO_2 overpressure

Symbols on the type plate

Symbol	Information
CE	CE conformity marking
	Electrical and electronic equipment manufactured / placed on the market in the EU after 13 August 2005 and be disposed of in separate collection according to Directive 2012/19/EU on waste electrical and electronic equipment (WEEE).
	Observe the safety instructions in the operating manual

1.7 UKCA Label

The sticker with UKCA Authorised Representative details sticks next to the type plate on the front of the CO_2 control box.

Figure 3: UKCA Label

Symbol on the sticker

Symbol	Information
UK CA	UKCA conformity marking

1.8 General safety instructions on installing and operating the BINDER CO_2 control module accessory

With regard to operating the CO_2 control module and to the installation location, please observe the local and national regulations relevant for your country (for Germany: DGUV guidelines 213-850 on safe working in laboratories, as well as DGUV guidelines 110-007, issued by the employers' liability insurance association).

BINDER GmbH is only responsible for the safety features of the CO_2 control module provided skilled electricians or qualified personnel authorized by BINDER perform all maintenance and repair, and if components relating to chamber safety are replaced in the event of failure with original spare parts.

NOTICE

Danger of overheating due to lack of ventilation.

Damage to the device.

∅ Do NOT install the BINDER chamber with accessory in unventilated recesses.

➢ Ensure sufficient ventilation for dispersal of the heat.

➢ Observe the prescribed minimum distances when installing the BINDER chamber.

Do not install or operate the accessory in hazardous locations. The device does not dispose of any measures of explosion protection.

DANGER

Danger of explosion due to combustible dusts or explosive mixtures in the vicinity of the chamber.

Serious injury or death from burns and / or explosion pressure.

∅ Do NOT operate the chamber in potentially explosive areas.

∅ Make sure that there are NO combustible dust or air-solvent mixtures in the vicinity of the accessory. This includes the inner chamber of the cooling incubator/climate chamber.

DANGER

Electrical hazard by water entering the device.

Deadly electric shock.

- ➢ The device must NOT become wet during operation, cleaning, or maintenance.
- ➢ Do NOT install the device in damp areas or in puddles.
- ➢ Set up the device in a splash-proof manner.

The BINDER CO_2 control module was produced in accordance with VDE regulations and were routinely tested in accordance to VDE 0411-1 (IEC 61010-1).

1.9 Precautions when handling CO_2

Carbon dioxide (CO_2) in high concentrations is hazardous to health. It is colorless and almost odorless and therefore practically imperceptible. Escaping CO_2 gas is heavier than air and accumulates at the ground or possibly in lower-lying parts of the building. There is danger of suffocation and poisoning. Hazards due to uncontrolled gas release must be effectively avoided. Vent out any CO_2 gas that may escape via good room ventilation or a suitable connection to an exhaust system. The installation of a CO_2 warning system is mandatory. It should be located 30 cm / *11.8 in* above ground. The signal must be visible from the outside.

GEFAHR

Danger of suffocation and poisoning due to high concentration of CO_2 (> 4 Vol.-%).

Death by suffocation.

- ∅ Do NOT set up the device in non-ventilated recesses.
- ➢ Ensure technical ventilation measures.
- ➢ Observe the relevant regulations for handling CO_2.
- ➢ Close the CO_2 supply when decommissioning the device.

Even when CO_2 or systems operated with CO_2 are handled carefully and appropriately, a residual risk remains, which can lead to life-threatening situations under certain circumstances. Therefore, we strongly recommend continuous monitoring of CO_2 concentration in the ambient air of the cooling incubator/climate chamber. It must be ensured permanently that the maximum permissible **occupational exposure limit** for CO_2 is not exceeded (chap. 3.4).

1.10 Precautions when handling gas cylinders

General information for safe handling of gas cylinders:

- Store and use gas cylinders only in well-ventilated locations.
- Open the gas cylinder valve slowly to avoid pressure surges.
- Secure gas cylinders during storage and use against falling (chaining).
- Transport gas cylinders with a cylinder cart, do not carry, roll, or throw them.
- Always close the valve even with apparently empty cylinders; screw on the cap when not in use. Return gas cylinders with the valve closed.
- Do not open gas cylinders by force. Mark them when damaged.
- Protect gas cylinders against fire, e.g. do not store together with flammable liquids.
- Observe relevant regulations for dealing with gas cylinders.

Secure the gas cylinders against falling and other mechanical damage.

WARNING

Risk of injury through sudden release of the stored pressure energy when the valve safety is torn off.

Injuries.

- ➢ Secure gas cylinders against falling (chaining).
- ➢ Transport gas cylinders with a cylinder cart.

The valve of the gas cylinder **always** must be closed before screwing on or unscrewing the gas hose.

WARNING

Risk of injury through sudden release of the stored pressure energy when opening the cylinder valve of a not connected cylinder.

Injuries.

- ➢ Close the gas cylinder valve before connecting or removing the gas hose.

After connecting the gas cylinder, check all gas connections for leaks (e.g. with leak spray or diluted soap solution).

1.11 Intended use

Following the instructions in this operating manual and conducting regular maintenance work (chap. 13) are part of the intended use.

Any use of the accessory that does not comply with the requirements specified in this Operating Manual shall be considered improper use.

Other applications than those described in this chapter are not approved.

It is also not permitted to make any modifications to the accessory yourself, as this would be contrary to the intended use.

Use

The „BINDER CO_2 control module“ accessory is intended for use with BINDER cooling incubators series KB PRO (E7) and BINDER constant climate chambers series KBF / KBF-UL and KBF PRO (E7). The CO_2 control works via the MB2 chamber controller.

The operating manuals for these chambers, in particular the safety instructions and the intended use, must be observed when using the accessory.

With the „CO_2 control module“ accessory the chambers permit keeping an exact CO_2 atmosphere inside. The chambers are not gas-tight. Vent out any gas that may escape via good room ventilation or a suitable connection to an exhaust system. The installation of a CO_2 warning system is mandatory.

The accessory does not dispose of any measures of explosion protection.

DANGER

Explosion or implosion hazard and danger of poisoning through the introduction of unsuitable loading material.

Poisoning. Serious injury or death from burns and / or explosion pressure.

∅ Do NOT introduce any substance combustible or explosive at working temperature into the chamber in which the accessory is used, in particular no energy sources such as batteries or lithium-ion batteries.

∅ NO explosive dust or air-solvent mixture into the chamber in which the accessory is used.

Contamination of the accessory by toxic, infectious or radioactive substances must be prevented

WARNING

Danger of intoxication and infection through contamination of the chamber with toxic, infectious or radioactive substances.

Damages to health.

➢ Protect the accessory from contamination by toxic, infectious or radioactive substances.

➢ Take suitable protective measures when introducing and removing toxic, infectious or radioactive material

In case of foreseeable use of the chamber there is no risk for the user through the integration of the chamber into systems or by special environmental or operating conditions in the sense of EN 61010-1:2010. For this, the intended use of the chamber and all its connections must be observed.

Medical devices

The accessory is not classified as medical devices as defined by the Medical Device Directive 93/42/EEC and Regulation (EU) No 2017/745.

Personnel Requirements

Only trained personnel with knowledge of the Operating Manual can set up and install the accessory, start it up, operate, clean, and take it out of operation. Service and repairs call for further technical requirements (e.g. electrical know-how), as well as knowledge of the service manual.

Installation site requirements

BINDER chambers and accessories are designed for setting up inside a building (indoor use).

The requirements described in the Operating Manual for installation site and ambient conditions (chap. 3.4) must be met.

WARNING: If customer should use chambers and accessories running in non-supervised continuous operation, we strongly recommend in case of inclusion of irrecoverable specimen or samples to split such specimen or samples and store them in at least two chambers, if this is feasible.

Relevant regulations for dealing with CO_2 and gas cylinders must be observed. The installation of a CO_2 warning system is mandatory. It should be located 30 cm / *11.8 in* above ground. The signal must be visible from the outside.

1.12 Foreseeable Misuse

Other applications of the accessory than those described in chap. 1.11 are not approved.

This expressly includes the following misuses (the list is not exhaustive), which pose risks despite the inherently safe construction and existing technical safety equipment:

- Non-observance of Operating Manual
- Non-observance of information and warnings on the cooling incubator/climate chamber (e.g. control unit messages, safety identifiers, warning signals)
- Installation, startup, operation, maintenance and repair of the cooling incubator/climate chamber and the accessory by untrained, insufficiently qualified, or unauthorized personnel
- Missed or delayed maintenance and testing
- Non-observance of traces of wear and tear
- Insertion of materials excluded or not permitted by this Operating Manual into the chamber in which the accessory is used
- Non-compliance with the admissible parameters for processing the respective material.
- Failure to comply with the relevant regulations for handling gas cylinders
- Failure to comply with the relevant regulations for handling CO_2
- Operation of the chamber without a functional CO_2 warning system at the installation site.
- Operation of the chamber without ventilation measures
- Installation, testing, service or repair in the presence of solvents
- Installation of replacement parts and use of accessories and operating resources not specified and authorized by the manufacturer
- Installation, startup, operation, maintenance or repair of the accessory in absence of operating instructions
- Bypassing or changing protective systems, operation of the accessory without the designated protective systems
- Non-observance of messages regarding cleaning and disinfection of the accessory.
- Spilling water or cleaning agent on the accessory, water penetrating into the chamber during operation, cleaning or maintenance.
- Cleaning activity while the cooling incubator/climate chamber or accessory is turned on.
- Operation of the accessory with a damaged housing or damaged power cord
- Continued operation of the accessory during an obvious malfunction
- Insertion of objects, particularly metallic objects, in louvers or other openings or slots on the accessory
- Human error (e.g. insufficient experience, qualification, stress, exhaustion, laziness)

To prevent these and other risks from incorrect operation, the operator shall issue operating instructions. Standard operating procedures (SOPs) are recommended.

1.13 Residual Risks

The unavoidable design features of a chamber or accessory, as well as its proper field of application, can also pose risks, even during correct operation. These residual risks include hazards which, despite the inherently safe design, existing technical protective equipment, safety precautions and supplementary protective measures, cannot be ruled out.

Messages on the chamber and accessory and in the Operating Manual warn of residual risks. The consequences of these residual risks and the measures required to prevent them are listed in the Operating Manual. Moreover, the operator must take measures to minimize hazards from unavoidable residual risks. This includes, in particular, issuing operating instructions.

The following list summarizes the hazards against which this Operating Manual warn, and specifies protective measures at the appropriate spots:

Unpacking, Transport, Installation

- Sliding or tilting of the accessory
- Setup of the accessory in unauthorized areas
- Installation of a damaged accessory
- Installation of an accessory with damaged power cord / power supply unit
- Inappropriate site of installation
- Missing protective conductor connection

Normal operation

- Assembly errors
- Emission of non-ionizing radiation from electrical operating resources

Cleaning and Decontamination

- Penetration of water into the CO_2 control box
- Inappropriate cleaning and decontamination agents

Malfunction and Damage

- Continued operation of the accessory during an obvious malfunction
- Contact with live parts during error status
- Operation of the accessory with damaged power cord of the power supply unit

Maintenance

- Maintenance work on live parts.
- Execution of maintenance work by untrained/insufficiently qualified personnel
- Electrical safety analysis during annual maintenance not performed

Trouble-shooting and Repairs

- Trouble-shooting of live parts without specified safety measures
- Absence of a plausibility check to rule out erroneous inscription of electrical components
- Performance of repair work by untrained/insufficiently qualified personnel
- Inappropriate repairs which do not meet the quality standard specified by BINDER
- Use of replacement parts other than BINDER original replacement parts
- Electrical safety analysis not performed after repairs

1.14 Operating instructions

Depending on the application and location of the chamber, the operator of the chamber must provide the relevant information for safe operation of the cooling incubator/climate chamber with accessory in a set of operating instructions.

	Keep these operating instructions with the chamber at all times in a place where they are clearly visible. They must be comprehensible and written in the language of the employees.

1.15 Measures to prevent accidents

The operator of the cooling incubator/climate chamber with CO_2 control module accessory must observe the local and national regulations (for Germany: the rule “Operation of work equipment. Operation of refrigeration systems, heat pumps and refrigeration equipment”, GUV-R 500 chap. 2.35) and take precautions to prevent accidents

The manufacturer took the following measures to prevent ignition and explosions:

- **Indications on the type plate**

  See operating manual chap. 1.6.

- **Operating manual**

  An operating manual is available for each chamber and accessory.

- **Safety, measurement, and control equipment**

  The safety, measuring, and control equipment is easily accessible.

- **Electrostatic charge**

  The interior parts are grounded.

- **Non-ionizing radiation**

  Non-ionizing radiation is not intentionally produced, but released only for technical reasons by electrical equipment (e.g. electric motors, power cables, solenoids). The accessory has no permanent magnets. If persons with active implants (e.g. pacemakers, defibrillators) keep a safe distance (distance of field source to implant) of 30 cm, an influence of these implants can be excluded with high probability.

- **Protection against touchable surfaces**

  Tested according to EN ISO 13732-1:2008.

- **Cleaning**

  See operating manual chap. 12.

2. Device description

2.1 Extension of the functionality of the KB PRO, KBF, and KBF PRO chambers with the CO_2 control module accessory

KB PRO cooling incubators and KBF und KBF PRO constant climate chambers with the CO_2 control module accessory are equipped with a multifunctional microprocessor display controller for temperature, CO_2 and humidity (KBF, KBF PRO) with a digital display accurate to one-tenth of a degree resp. 0.1 %. With its comprehensive program control functions, the display program controller MB2 permits the high precision performance of temperature, CO_2 and humidity (KBF, KBF PRO) cycles.

With the “CO_2 control module” accessory the chambers allow the setting of an exact CO_2 atmosphere in the interior.

CO_2 System: A highly precise, drift-free CO_2 infrared measuring system in combination with the permanent mixture of CO_2 gas through the high air circulation in the cooling incubator/climate chamber allows precise and constant CO_2 concentrations for long periods. This creates optimum growth conditions for cell cultures or plants. The gas enters the chamber via a fine filter (aseptic filter) with a high filtration efficiency that also filters the smallest particles. Subsequently, CO_2 is led into the cooling incubator/climate chamber via a hose.

The CO_2 sensor can be removed from the inner chamber by hand and cleaned with suitable detergents if needed.

Fast reaction times, maximum accuracy and selectivity characterize the CO_2 measuring procedure of the chamber The CO_2 sensor can be removed from the inner chamber by hand and cleaned with suitable detergents if needed. The accuracy of the CO_2 measuring system is based on an infrared measuring cell with NDIR (non-dispersive infrared) sensor, which continuously regulates to a reference value. Therefore, disturbance variables and aging phenomena in the measuring system are almost completely eliminated, so that this measuring system, in contrast to other measuring procedures, remains practically drift-free between calibrations and is entirely selective for CO_2.

The CO_2 measuring cell contains a measuring section inside, in which the absorption of infrared light depends on the number of CO_2 molecules in the beam path. This number of CO_2 molecules changes with the ambient pressure in relation to a constant volume. The distances between the molecules are consequently pressure-dependent. The collision frequency of the IR-beam with CO_2 molecules increases therefore by increasing pressure. For this reason, the ambient pressure must be compensated in order to correct the display reading of the CO_2 concentration in vol.-%. This is achieved by entering the altitude of the site above sea level (chap. 7).

Controller: All parameters are controlled via the MB2 chamber controller. It is not possible to operate the accessory without connection to the cooling incubator/climate chamber.

The efficient program controller is equipped with a multitude of operating functions, in addition to recorder and alarm functions. Programming of test cycles is easily accomplished via the modern MB2 touch screen controller and is also possible directly with a computer via Intranet in connection with the APT-COM™ 4 Multi Management Software (accessory). The chamber comes equipped with an Ethernet serial interface for computer communication. In addition, the BINDER APT-COM™ 4 Multi Management Software permits networking up to 100 chambers and connecting them to a PC for controlling and programming, as well as recording and representing temperature, CO_2 and humidity data.

CO_2 range: 0 vol.-% up to 20 vol.-% or 0 vol.-% up to 1 Vol.-%. Minimum concentration: ambient value.

	When using the BINDER CO_2 control module accessory, the accessories BINDER ICH-Q1B Light module or BINDER ICH light module with Quantum Control cannot be used at the same time. The accessory BINDER LED plant light module can be used at the same time as the BINDER CO_2 control module accessory.

2.2 Description of the CO_2 control module accessory

The CO_2 control module with analog output is available in two versions:

- Control range 0-20 vol.-% (default setting)
- Control range 0-1 vol.-%

Principle of CO_2 control: CO_2 control is carried out via the MB2 chamber controller. Operation without connection to the cooling incubator/climate chamber is not possible.

	To activate the CO_2 control functionality, you must upload a new controller data set to the MB2 chamber controller. The required file can be downloaded from the BINDER Website https://www.binder-world.com and transferred to the chamber controller using a USB stick (chap. 4.8). If the display and functionality of the MB2 chamber controller differs from that of the basic chamber without accessories, the corresponding menus are described in this manual.

Special features of the control range 0-1 vol.%:

Since different CO_2 sensors are used for both possible control ranges, it is necessary to activate the controller function “CO2 measuring range 0…1 Vol.%”:in the controller menu for the control range 0-1 vol.-% so that the measured value can be converted correctly. This is required for fixed value operation (chap. 8.3) and for all program sections in the time program (chap. 9.7.3) or week program (chap. 10.6.5)

Note: In the “Device info” controller menu, the value for the analog input shows the value that has not yet been converted by a factor of 20.

CO_2 control module: The CO_2 control module consists of the CO_2 control box with connections and a CO_2 sensor with a holder. It works with 24V low voltage via a power supply unit with adapters.

All necessary connection and fastening material as well as the power supply are included (scope of delivery chap. 3.1).

The housing of the CO_2 control box is RAL 9003 powder-coated. All corners and edges are also completely coated.

The CO_2 control box is provided with a **CO_2 warning sticker**. Two further warning stickers are included with the accessory. Attach these to the cooling incubator/climate chamber (chap. 4.1.2).

Connections and control elements on the CO_2 control box:

- 24 V DC Connection for power supply via power supply unit
- Gas Out connection (6mm hose to the cooling incubator/climate chamber)
- Gas In Quick acting closure socket (from the gas cylinder) (additional accessory: gas cylinder changer)
- "DATA IN" Ethernet socket (controller control from the cooling incubator/climate chamber)
- Connection for CO_2 sensor
- Analog output
- Flap for changing the gas fine filter

2.3 Chamber overview: Cooling incubator/climate chamber with CO_2 control module

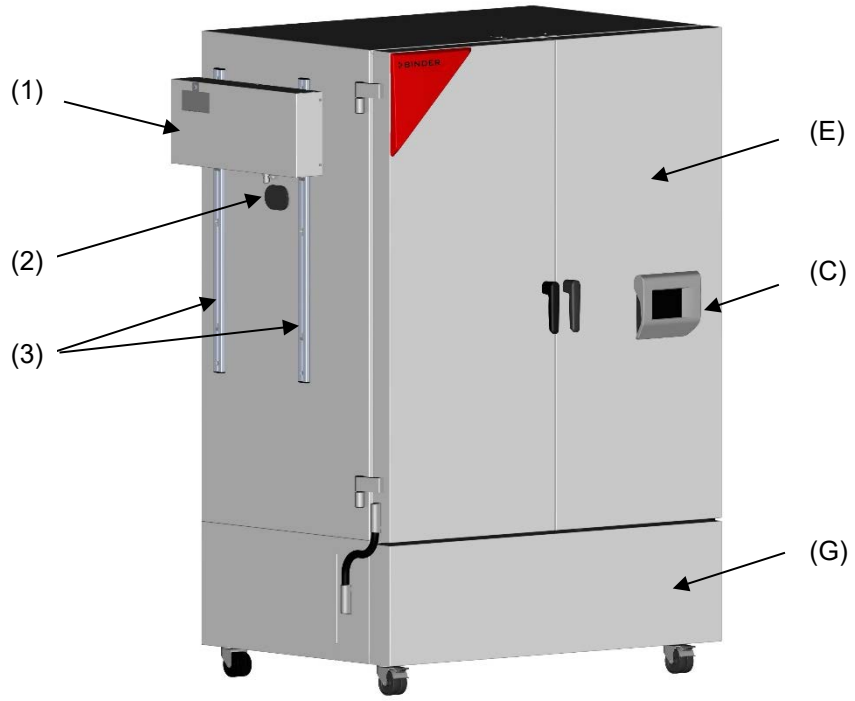


Figure 4: CO_2 control module, mounted on the cooling incubator/climate chamber (example KBF PRO 720)

(1)	CO_2 control box	(E)	Outer chamber door(s)
(2)	Elongated access port	(C)	Ergonomically adjustable control terminal (chamber sizes from 470)
(3)	Mounting rails	(G)	refrigerating machine and humidity generation module

2.4 Chamber overview: CO_2 control box

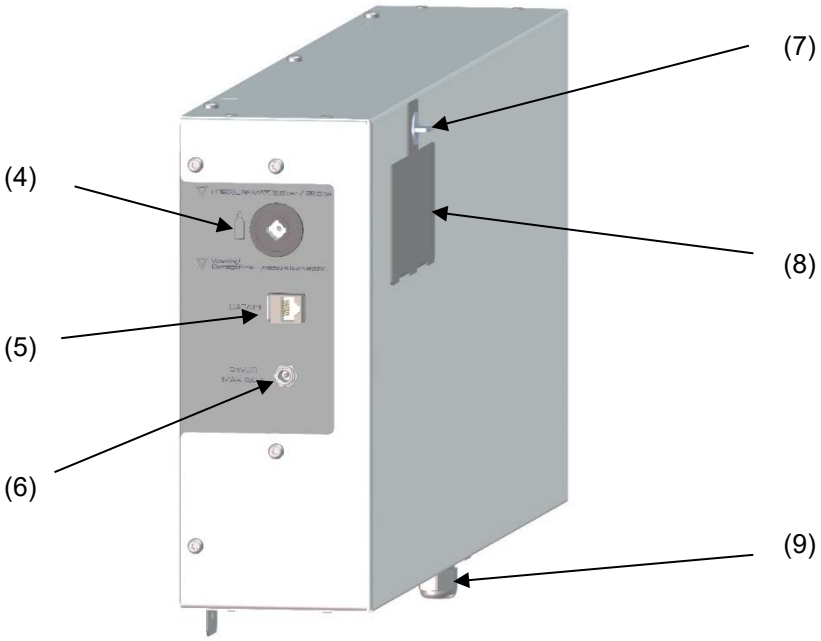


Figure 5: CO_2 control box, view from left

(4) Quick acting closure socket for CO_2

(5) Data bus “DATA IN” for connection to socket (M) on the cooling incubator/climate chamber

(6) Connection of the 24 V power supply unit for power supply (chap. 4.7)

(7) Locking of the maintenance flap

(8) Maintenance flap for changing the filter (chap. 2.6.1)

(9) Sensor connection

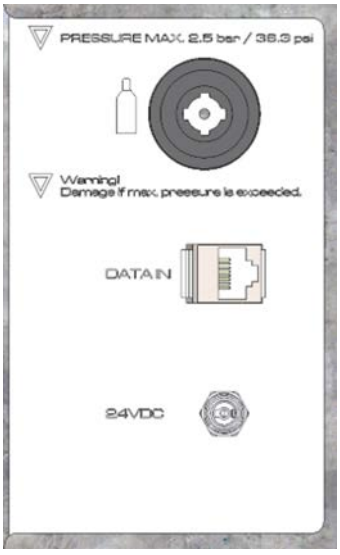


Figure 6: Connection panel on the left side of the CO_2 control box

Figure 7: CO_2 control box, view from below

(4) Quick acting closure socket for CO_2

(5) Data bus “DATA IN” for connection to socket (M) on the cooling incubator/climate chamber

(6) Connection of the 24 V power supply unit for power supply (chap. 4.7)

(8) Maintenance flap for changing the filter (chap. 2.6.1)

(9) Cable gland with cable for CO_2 sensor

(10) Analog output

(11) CO_2 outlet, hose connection to the cooling incubator/climate chamber

2.5 Connection panel on the rear of the cooling incubator/climate chamber

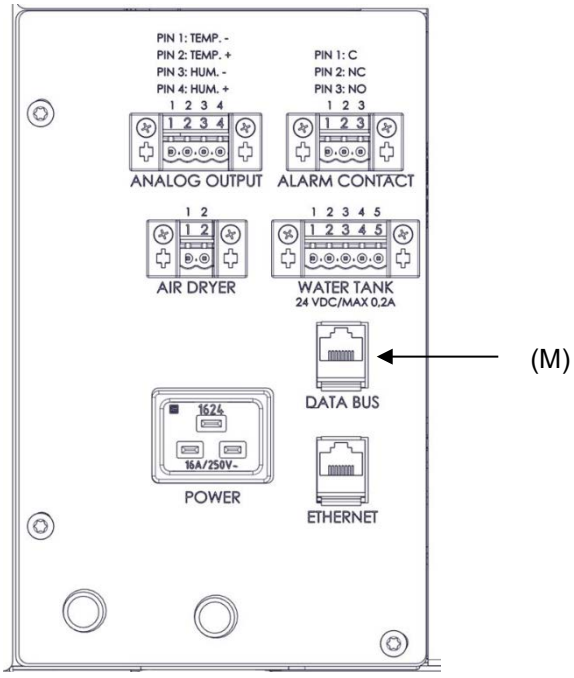


Figure 8: Connection panel of the cooling incubator/climate chamber (example KBF PRO) on the chamber rear, with optional equipment

(M) Data Bus to connect CO_2 control module to socket (5) of the CO_2 control box

2.6 Gas fine filter

The incoming gas used in the operation passes through a fine filter (aseptic filter, filtration efficiency 99.99 %, particle size 0.45 µm). This fine filter prevents dirt accumulating in the gas inlet valves and the tubes leading into the inner chamber, which could be in the gas cylinder or in the supply tubes.

When using gas with a technical grade of 99.5 %, we recommend changing the fine gas filter once a year. Please consult BINDER Service. When using gases with less pureness, the changing intervals should be shorter.

2.6.1 Replacing the gas fine filter

- Turn off the CO_2 control box.
- Close the CO_2 gas supply.
- Open the butterfly screw on the front of the CO_2 control box and remove the cover.

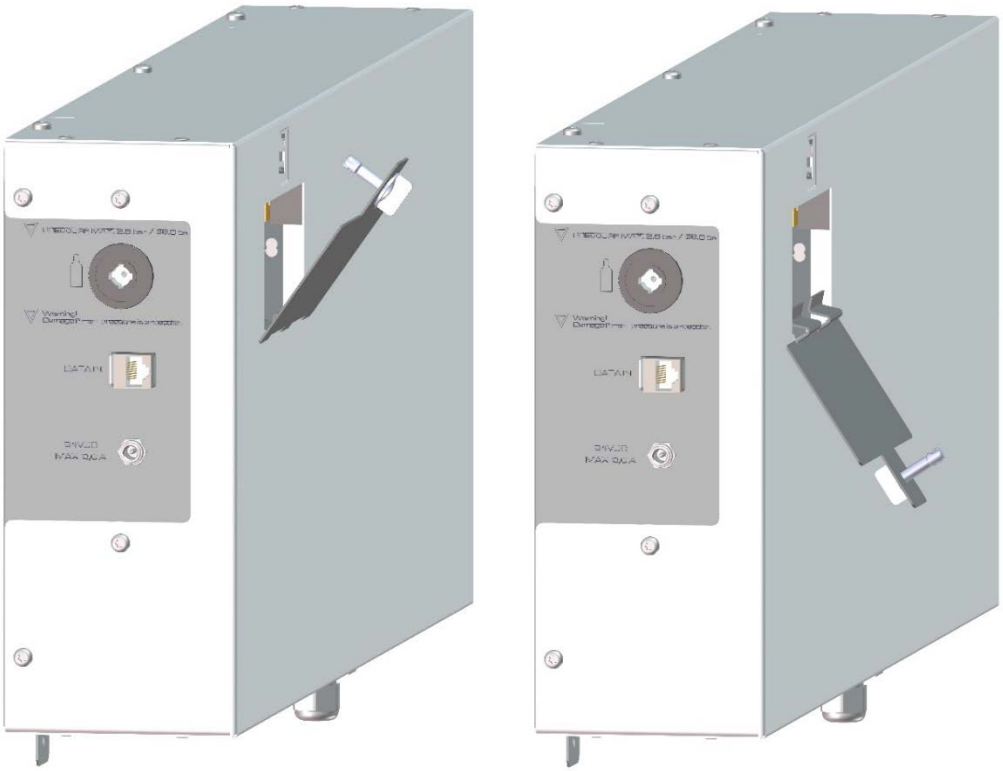


Figure 9: Opening and removing the gas fine filter cover

Figure 10: Location of the gas fine filter behind the cover

- Remove the fine gas filter from the gas hoses on both sides. To do this, loosen the threaded connections on both sides of the filter.
- Then insert a new filter. Make sure that the threaded connections on both sides are screwed back on completely tightly so that there are no leaks.
- Reinstall the cover and lock it with the butterfly screw.

	After Replacing the gas fine filter check all gas connections for leaks (e.g. with leak spray or diluted soap solution).

3. Scope of delivery, transportation, storage, and installation

3.1 Scope of delivery of the CO_2 control module

- CO_2 control box
- CO_2 sensor with cable
- 2 CO_2 warning stickers
- 24V power supply unit with adapters
- Operating manual art. no. 7001-0576
- 2 mounting rails with screws (4 x M8, 2 x M5)
- 2 Silicone foam plugs for elongated access port
- Patch cable for the data exchange between the CO_2 control box and chamber
- Hose set for gas connection

3.2 Unpacking, and checking the equipment

After unpacking, please check the accessory based on the delivery receipt for completeness and for transportation damage. Inform the carrier immediately if transportation damage has occurred.

Please remove any transportation protection devices and adhesives in/on the accessory and remove the operating manuals and accessory material from the packaging.

If you need to return the accessory, please use the original packing and observe the guidelines for safe lifting and transportation (chap. 3.3).

For disposal of the transport packing, see chap. 14.1.

Note on second-hand devices (Ex-Demo-Units):

Second-hand devices are devices that were used for a short time for tests or exhibitions. They are thoroughly tested before resale. BINDER ensures that the device is technically sound and will work flawlessly.

Second-hand devices are marked with a sticker on the device. Please remove the sticker before commissioning the devices.

3.3 Guidelines for safe transportation and storage

If possible, use the original packaging for transport. You can order transport packing for mov shipping purposes from BINDER service.

Permissible ambient temperature range during transport and storage: -10 °C / *14 °F* to to +60 °C / *140 °F*.

Intermediate storage of the accessory is possible in a closed and dry room. Observe the guidelines for temporary decommissioning (chap. 14.2).

When after storage in a cold location you transfer the accessory to its warmer installation site, condensation may form. Before start-up, wait at least one hour until the accessory has attained ambient temperature and is completely dry.

3.4 Location of installation and ambient conditions

The accessory is designed for setting up inside a building (indoor use).

	**NOTICE**
	Danger of overheating due to lack of ventilation. **Damage to the device.** ∅ Do NOT install the accessory in unventilated recesses. ➢ Ensure sufficient ventilation for dispersal of the heat. ➢ Observe the prescribed minimum distances when installing the accessory.

Do not install or operate the accessory in potentially explosive areas.

	**DANGER**
	Danger of explosion due to combustible dusts or explosive mixtures in the vicinity of the device. **Serious injury or death from burns and / or explosion pressure.** ∅ Do NOT operate the accessory in potentially explosive areas. ➢ KEEP explosive dust or air-solvent mixtures AWAY from the vicinity of the accessory.

Notes on handling carbon dioxide (CO_2)

Carbon dioxide (CO_2) in high concentrations is hazardous to health. It is colorless and almost odorless and therefore practically imperceptible. Escaping CO_2 gas is heavier than air and accumulates at the ground or possibly in lower-lying parts of the building. There is danger of suffocation and poisoning. Hazards due to uncontrolled gas release must be effectively avoided. Vent out any CO_2 gas that may escape via good room ventilation or a suitable connection to an exhaust system. The installation of a CO_2 warning system is mandatory. It should be located 30 cm / *11.8 in* above ground. The signal must be visible from the outside.

	**DANGER**
	Danger of suffocation and poisoning by high concentration of CO_2 (> 4 Vol.-%). **Death by suffocation.** ∅ Do NOT set up chambers in non-ventilated recesses. ➢ Ensure technical ventilation measures. ➢ Observe the relevant regulations for handling CO_2.

Observe the **occupational exposure limit OEL** for CO_2 set by the national authorities (formerly maximum permitted workplace concentration). Check compliance when operating all chambers located in the room.

- OEL for Germany: 5000 ml/m³ (ppm) = 0,5 vol.-%

	The chamber is not completely gastight.

Even when CO_2 or systems operated with CO_2 are handled carefully and appropriately, a residual risk remains, which can lead to life-threatening situations under certain circumstances. Therefore, we strongly recommend continuous monitoring of CO_2 concentration in the ambient air of the cooling incubator/climate chamber. It must be ensured permanently that the maximum permissible **occupational exposure limit** for CO_2 is not exceeded.

4. Installation and connections

4.1 Installation of the CO_2 control box on the cooling incubator/climate chamber

4.1.1 Installation of the mounting rails

Note the orientation of the mounting rails.

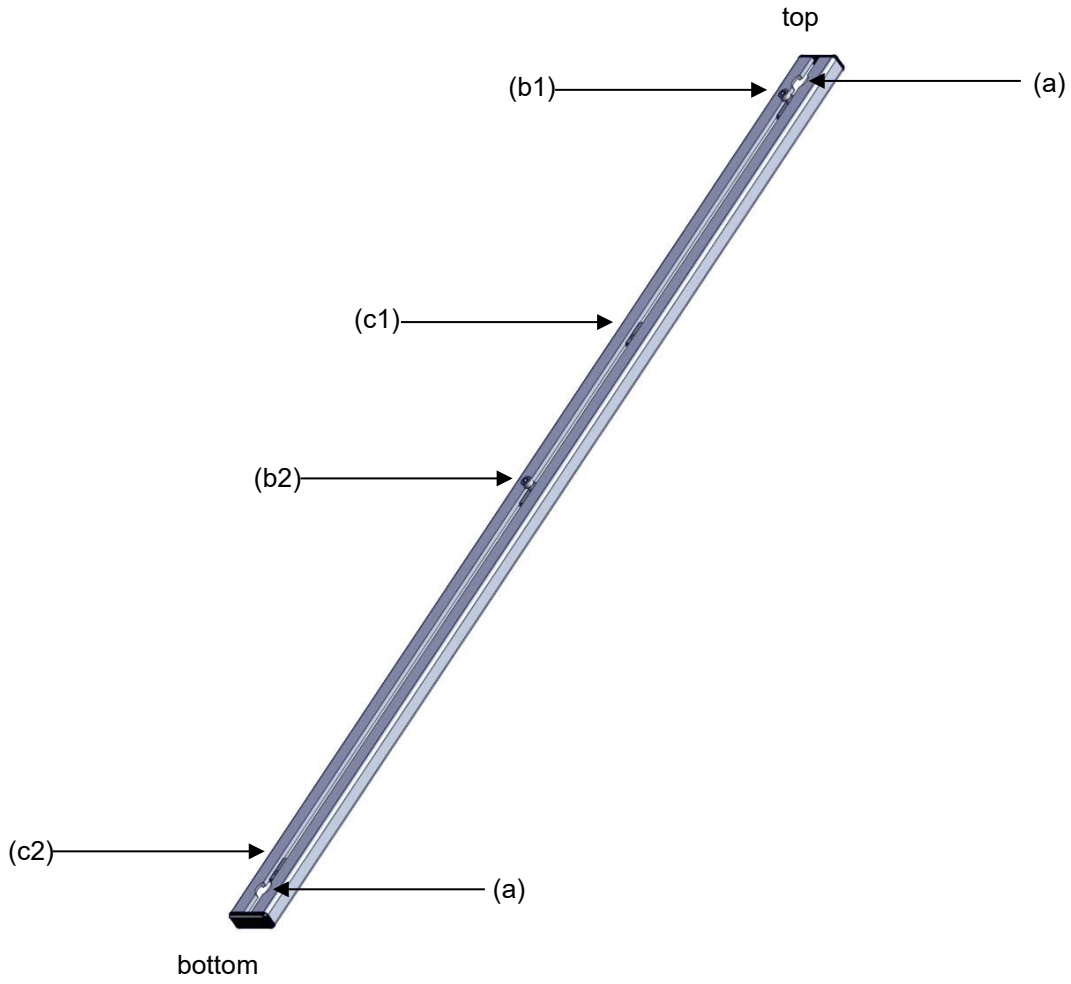


Figure 11: Mounting rail (delivery condition)

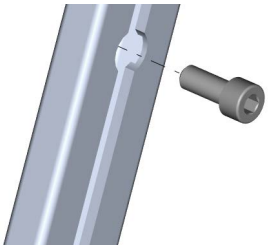
(a) Holes for M8 screws for mounting the rails on the chamber side

(b) Screws for hanging the accessory, pre-assembled

- (b1) for CO_2 control box
- (b2) for ICH-Q1B light box (ICH-Q1B light system) or plant light box (LED plant light system)

(c) Movable mounts for M5 screws for attaching the accessory

- (c1) for CO_2 control box
- (c2) for ICH-Q1B light box (ICH-Q1B light system) or plant light box (LED plant light system)



Screw the two mounting rails onto the left side of the chamber. Use 2 of the 4 supplied M8 screws for each rail at position (a) of the rail.

Figure 12: Cooling incubator/climate chamber with installed mounting rails

	The mounting rails also serve to attach the BINDER LED Plant Light module accessory (Art. no. 8012-2439).

4.1.2 Attaching the CO_2 warning stickers

The accessory comes with two CO_2 warning stickers. Attach them as follows on the cooling incubator/climate chamber:

- Next to the access port on the left side of the cooling incubator/climate chamber
- Visibly on one of the doors of the cooling incubator/climate chamber

4.1.3 Installing the CO_2 control box

- Hang the CO_2 control box at the upper end of the mounting rails into the upper one of the pre-assembled screws (b1).
- Then screw the CO_2 control box onto the two rails in position (c1) using the two M5 screws provided.

Figure 13: Screwing the CO_2 control box

4.2 Connectiong the CO_2 sensor

Procedure

- The cooling incubator/climate chamber and the CO_2 control box must be turned off.

  The CO_2 sensor is permanently connected to the CO_2 control box and the sensor cable is routed to the outside via the cable gland (9).
- Insert the connecting cable with the sensor into the chamber through the elongated access port

Figure 14: Position of the CO_2 sensor cable with cable gland (9) and access port

- Insert the CO_2 sensor into the holding tube. The marking on the sensor and on the holding tube must match. The sensor must click in correctly and sit tightly in the connection socket

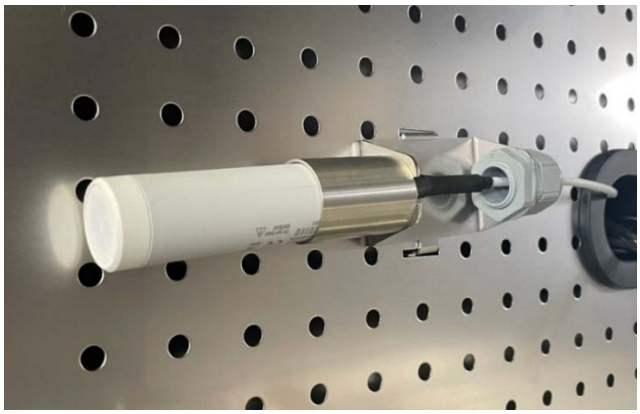


Figure 15: Plugged-in CO_2 sensor,
fastening clip on the inner wall inside the cooling incubator/climate chamber, mounted

NOTICE

Danger of damage to the CO_2 sensor by connecting or removing it during operation.
Damage to the CO_2 sensor.
➢ Connect or remove the CO_2 sensor only with the chamber turned off.

- Open the door of the inner chamber of the cooling incubator/climate chamber and attach the fastening clip to the side wall by inserting the bracket into the slots in the side wall
  - Chambers up to size 720: to the left of the elongated access port there are 2 slots for the fastening clip
  - Chambers from size 1020 on: use the slots which are provided for attaching the rails for the racks.

Place the sensor to the left of the elongated access port so that it faces forwards (towards the door).

The CO_2 sensor is temperature resistant up to a maximum temperature of 60 °C / *140 °F*.

NOTICE

Danger of damage to the CO_2 sensor by excess temperature.
Damage to the CO_2 sensor.
∅ Do NOT autoclave the CO_2 Sensor.
∅ Do NOT expose the CO_2 sensor to hot-air sterilization.

Avoid strong shocks when handling the CO_2 sensor.

NOTICE

Danger of damage to the CO_2 sensor by shocks.
Damage to the CO_2 sensor.
➢ Avoid strong shocks of the CO_2 sensor (by putting it down hard, or dropping).

Calibration/adjustment

After installing the CO_2 control module, a calibration/adjustment should be carried out by the BINDER Service before commissioning. After adjustment, the CO_2 sensor should only be used for the cooling incubator/climate chamber in which the adjustment was carried out. To avoid confusion, an adhesive label with a serial number is adhered to the sensor head. When exchanging the sensor, you must repeat the CO_2 adjustment.

	**NOTICE** **Danger of confusing CO_2 sensors.** **Invalid calibration.** ➢ Do NOT change the CO_2 sensor head. ➢ Note down the serial number of the CO_2 sensor.

4.3 Connecting the CO_2 hose for the gas supply in the interior

Figure 16: Connecting the CO_2 hose on the CO_2 control box

(9) Cable gland for the CO_2 sensor

(10) Analog output

(11) CO_2 outlet, connection of the hose leading to the cooling incubator/climate chamber

Then guide the hose through the elongated access port into the interior of the cooling incubator/climate chamber. The end of the gas hose remains free and should protrude 20mm into the interior.

Before each use, check whether the hose is safely guided through the opening into the cooling incubator/climate chamber. This is the only way to ensure that the CO_2 gas is directed into the interior and not into the environment.

	**DANGER** **Danger of suffocation and poisoning by high concentration of CO_2 (> 4 Vol.-%).** **Death by suffocation.** ➢ Before each use with CO_2, check that the CO_2 hose is safely guided through the access port into the cooling incubator/climate chamber ➢ Ensure technical ventilation measures. ➢ Observe the relevant regulations for handling CO_2. ➢ Close the CO_2 supply when decommissioning the chamber.

4.4 Inserting the silicone foam plugs

- Lead the sensor cable with the holder and hose through the access port into the device
- Insert both silicone foam plugs into the elongated access port (one from the inside and one from the outside)
- Guide the sensor cable and gas hose through the existing slots.
- Make sure the supplied CO_2 warning sticker is attached to the left outside of the cooling incubator/climate chamber next to the elongated access port.

4.5 CO_2 connection

General information for safe handling of gas cylinders:

- Store and use gas cylinders only in well-ventilated areas.
- Open the gas cylinder valve slowly to avoid pressure surges.
- Secure gas cylinders during storage and use against falling (chaining).
- Transport gas cylinders with a cylinder cart, do not carry, roll, or throw them.
- Always close the valve even with apparently empty cylinders; screw on the cap when not in use. Return gas cylinders with the valve closed.
- Do not open gas cylinders by force. Mark them when damaged.
- Protect gas cylinders against fire, e.g. do not store together with flammable liquids.
- Observe relevant regulations for dealing with gas cylinders.

Secure the gas cylinders against falling and other mechanical damage.

WARNING

Risk of injury through sudden release of the stored pressure energy when the valve safety is torn off.

Injuries.

- ➢ Secure gas cylinders against falling (chaining).
- ➢ Transport gas cylinders with a cylinder cart.

The valve of the gas cylinder **always** must be closed before screwing on or unscrewing the gas hose.

WARNING

Risk of injury through sudden release of the stored pressure energy when opening the cylinder valve of a not connected cylinder.

Injuries.

- ➢ Close the gas cylinder valve before connecting or removing the gas hose.

After connecting the gas cylinder, check all gas connections for leaks (e.g. with leak spray or diluted soap solution).

Carbon dioxide (CO_2) in high concentrations is hazardous to health. It is colorless and almost odorless and therefore practically imperceptible. Escaping CO_2 gas is heavier than air and accumulates at the ground or possibly in lower-lying parts of the building. There is danger of suffocation and poisoning. Hazards due to uncontrolled gas release must be effectively avoided. Vent out any CO_2 gas that may escape via good room ventilation or a suitable connection to an exhaust system. The installation of a CO_2 warning system is mandatory. It should be located 30 cm / *11.8 in* above ground. The signal must be visible from the outside.

DANGER

Danger of suffocation and poisoning by high concentration of CO_2 (> 4 Vol.-%).
Death by suffocation.

∅ Do NOT set up chambers in non-ventilated recesses.
➢ Ensure technical ventilation measures.
➢ Observe the relevant regulations for handling CO_2.
➢ Close the CO_2 supply when decommissioning the chamber.

The CO_2 gas necessary for operation must have a technical grade of 99.5 %.

The gas connections must be established by qualified personnel who are trained in handling the respective gases and familiar with the required safety measures.

4.5.1 Ensuring the correct CO_2 output pressure

A gas supply pressure above 2.5 bar / *36 psi* will result in chamber damage.

Use a pressure reducer and make sure to avoid any excessive outlet pressure when connecting the gas hose to the chamber.

The real outlet pressure of gas cylinders, sets of gas cylinders or central gas supplies am on the second manometer must **not** exceed 2.5 bar / *36 psi*.

NOTICE

Danger of damage by excessive outlet pressure > 2.5 bar / *36 psi*.
Damage to the chamber.

∅ The outlet pressure must NOT exceed the indicated value of 2.5 bar / *36 psi.*
➢ Before connecting, check the outlet pressure on the pressure reducer of the cylinder.
➢ Adjust the outlet pressure to 2.0 bar / *29 psi* above the ambient pressure.

Observe the correct outlet pressure also when replacing the gas cylinders.

4.5.2 Establishing the connection to the CO_2 control box

Connect the supplied gas hose (internal diameter 6 mm / *0.24 inches*) to the pressure reducer of the gas cylinders or central gas supply and secure the connection with the supplied hose clamp.

Always lay gas hoses in such a way that they do not pose a tripping hazard.

Connect the pre-assembled hose nozzle of the gas hose to the quick acting closure socket (4) DN 6 on the left side of the CO_2 control box. To remove the connection, you can pull the hose nozzle off the quick acting closure socket.

The quick acting closure socket is degreased and supplied with a FKM gasket.

Only use the supplied hose nozzle to connect to the quick acting closure socket.
Otherwise, the quick acting closure socket may leak, and/or it may become impossible to connect the original hose nozzle. In this case, please contact BINDER Service.

4.5.3 Leak test

After connecting the gas cylinder, check all gas connections for leaks (e.g. with leak spray or diluted soap solution.

	The recovery times of the gas concentrations inside the chamber after opening the door refer to a connection pressure of 2.0 bar / 29 psi. Decreasing supply pressure will result in longer recovery times.

4.5.4 Conversion table for gas inlet pressures, bar – psi

bar	psi	bar	psi	bar	psi
1	14.5	3	43.5	5	72.5
1.5	21.7	3.5	50.7	5.5	79.7
2	29.0	4	58.0	6	87.0
2.5	36.3	4.5	65.2		

4.6 Establishing the data connection between the CO_2 control box and the cooling incubator/climate chamber

Use the supplied patch cable for the data connection from the CO_2 control box to the cooling incubator/climate chamber. Connect the connection (5) “DATA IN” on the CO_2 control box to the socket (M) “DATA BUS” on the cooling incubator/climate chamber.

4.7 Electrical connection

Insert the appropriate adapter into the supplied power supply unit

Figure 17: Power supply unit with adapters

Connect the power supply unit to the connector (6) on the left side of the CO_2 control box

- CO_2 control box: extra low voltage 24V
- Power supply unit input 120-240 V
- Power plug: Power supply unit with country-specific adapters

- Use only the original connection cables from BINDER according to the above specification.
- Prior to connection and start-up, check the power supply voltage. Compare the values to the specified data located on the chamber's type plate (bottom right-hand on the front of the CO_2 control box, see chap. 1.6).

NOTICE

Danger of incorrect power supply voltage due to improper connection.

Damage to the chamber.

- ➢ Check the power supply voltage before connection and start-up.
- ➢ Compare the power supply voltage with the data indicated on the type plate.

- When connecting the chamber, please observe the regulations specified by the local electricity supply company as well as the local and national regulations (VDE directives for Germany).
- Make sure that there is sufficient current protection in accordance with the number of devices that are to be operated. We recommend the use of a residual current circuit breaker.
- Pollution degree (acc. to IEC 61010-1): 2
- Over-voltage category (acc. to IEC 61010-1): II

See also electrical data (chap. 15).

To completely separate the chamber from the power supply, you must disconnect the plug of the power supply unit. Install the device in a way that the power plug is easily accessible and can be easily pulled in case of danger.

4.8 Uploading the controller data set

To activate the CO_2 control functionality, you must upload a new controller data set (configuration) to the MB2 chamber controller.

Proceed as described below.

1. Have a USB stick ready

- Have an empty USB stick ready for transfer to the chamber controller.

	The USB stick must be formatted with FAT32 and have at least 8GB of memory.

Note: If you want to back up any programs you have already created before the update, you will need an additional USB stick. The procedure for doing this is described in the manual of the cooling incubator/climatic chamber.

2. Download the controller data set from BINDER Website and save it on USB stick

- Go to the BINDER Website https://www.binder-world.com auf.
- Select *Service - Download-Center - Products - Controller data sets.*
- Select your appropriate chamber model.
- Select the controller data set that matches your accessories. Please take into account the availability of the “Flexible Pt 100 temperature sensor” option for object temperature display/control.
- Download the selected controller data set. This is a ZIP file.
- Unzip the ZIP file and copy the included file “KONFIG337.SET” to the empty USB stick. This file must not be in a subfolder, but must be accessible at the top level of the USB stick.

3. If necessary, log in to the chamber controller with “Admin” authorization level (or higher level)

To upload the configuration, at least an “Admin” authorization is required. If you have logged in with “User” authorization level, you need to change to “Admin” authorization level (or higher).

Logging in with a different authorization on the chamber controller is described in the chapter „User change“ in the operating manual of the cooling incubator/climate chamber.

- Perform log-in, if necessary.

4. Insert the USB-stick into the chamber controller

The USB port is located in the triangular instrument panel (chamber sizes 130, 260) or in the adjustable control terminal (chamber sizes 470, 720, 1060, 1600).

- Insert the USB-stick with the new controller data set into the USB interface of the chamber controller. The “USB” menu opens.

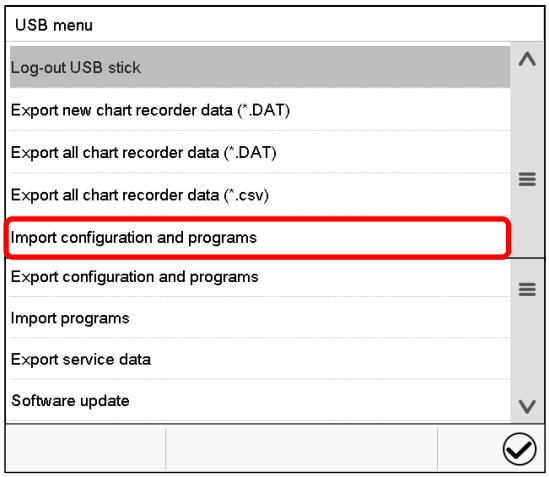


Figure 18: USB menu, available functions with “Admin” authorization level

5. Uploading the controller data set to the chamber controller

- In the USB menu, select the function “**Import configuration and programs**” and press the ***Confirm*** icon. Confirm the subsequent query with the ***Confirm*** icon.
- The controller data set is transferred from the USB stick to the chamber controller. The controller will then restart.
- Select the convenient language, time zone etc. as described in the chapter “Controller settings upon start up” in the operating manual of the cooling incubator/climate chamber.
- The “USB” menu opens again.

6. Removing the USB stick

- In the USB menu, select the “**Log-out USB stick**” function and press the ***Confirm*** icon. Confirm the subsequent query with the ***Confirm*** icon.
- You can now remove the USB stick from the port.

5. Functional overview of the MB2 chamber controller CO_2 control module accessory

The menus shown are those that have an extended range of functions thanks to the CO_2 control module accessory. Representation use the example KBF / KBF PRO (including humidity).

The MB2 chamber controller controls following parameters inside the chamber:

- Temperature in °C
- Humidity in % r.h
- Carbon dioxide concentration in vol.-%
- Fan speed in %

You can enter the desired set point values in fixed value operation mode directly on the display surface or via the setpoint menu. For program operation the controller offers programming week and time programs. In addition, there is a timer program available (stopwatch function).

The controller offers various notifications and alarm messages with visual and audible indication and remote alarms via e-mail, an event list (trace file) and the graphical display of the measuring values in the chart recorder view. The MB2 program controller permits programming temperature and humidity cycles, and specifying the fan speed and special controller functions for each program section. You can enter values or programs directly at the controller or use the APT-COM™ 4 Multi Management Software (accessory) specially developed by BINDER.

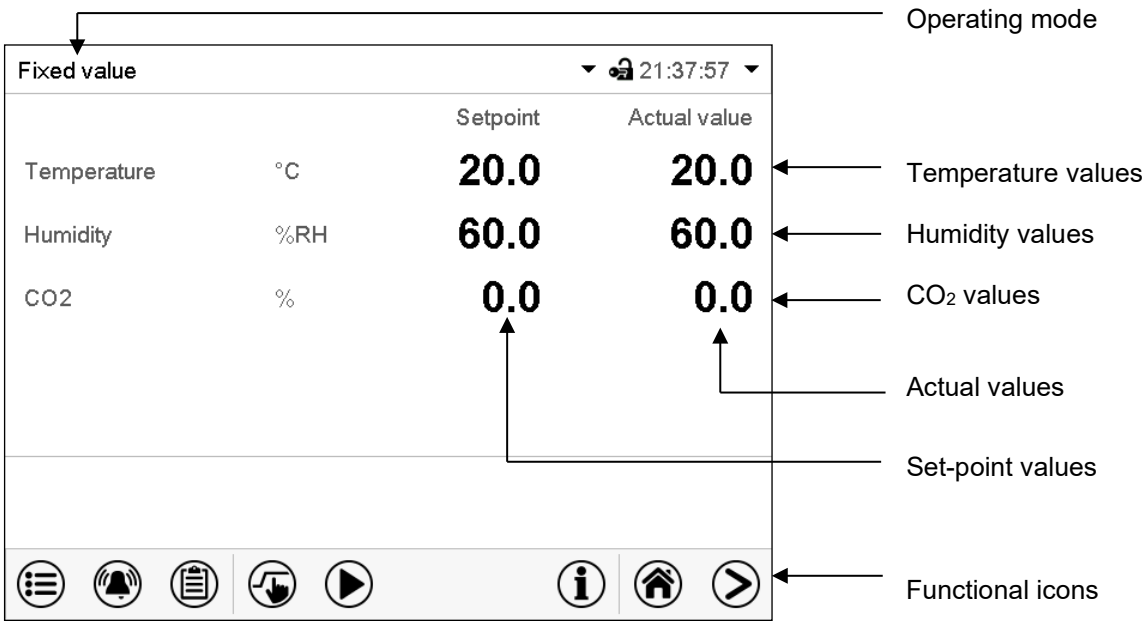


Figure 19: Normal display of the MB2 program controller (sample values)

5.1 Operating functions in normal display

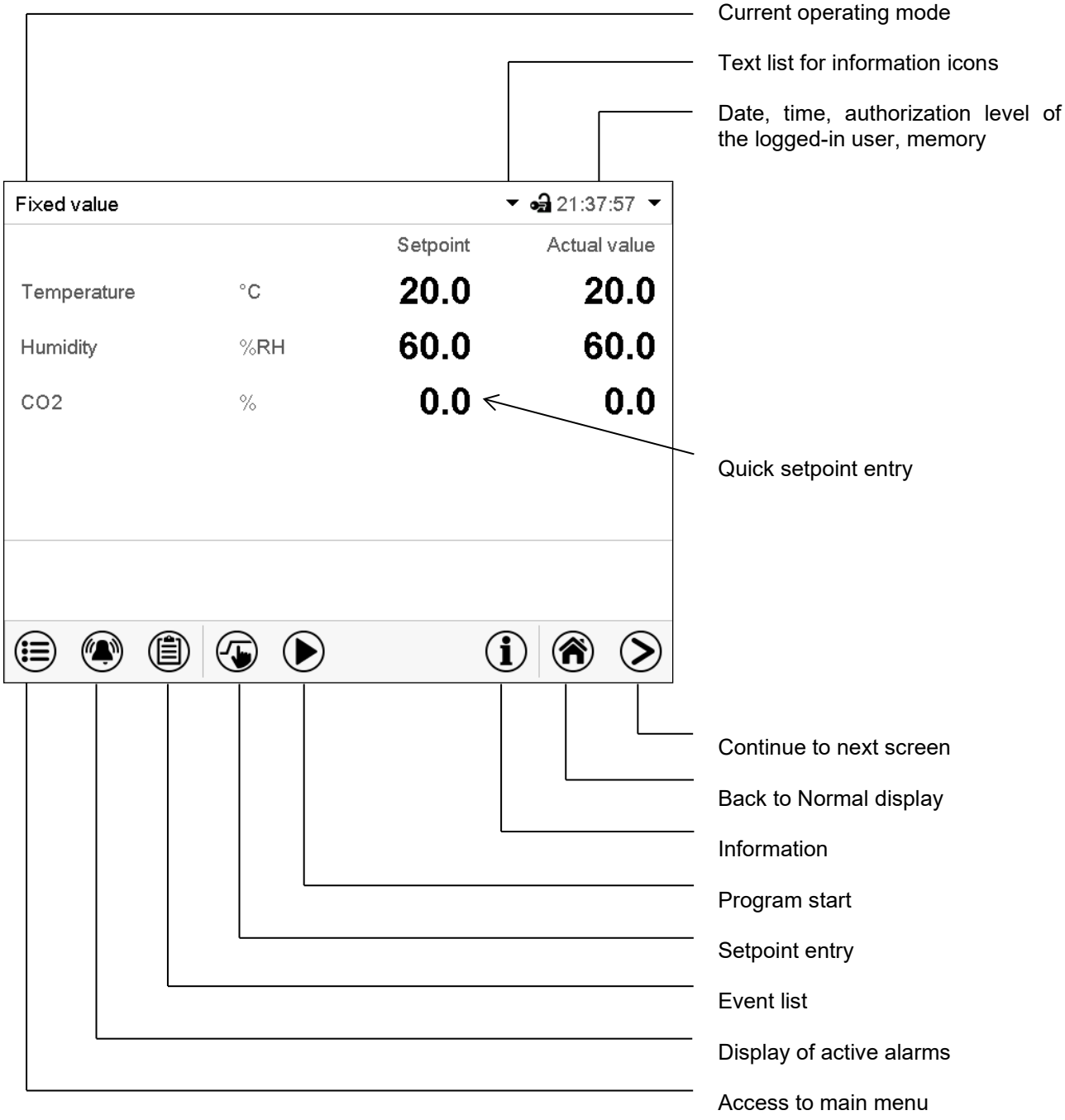
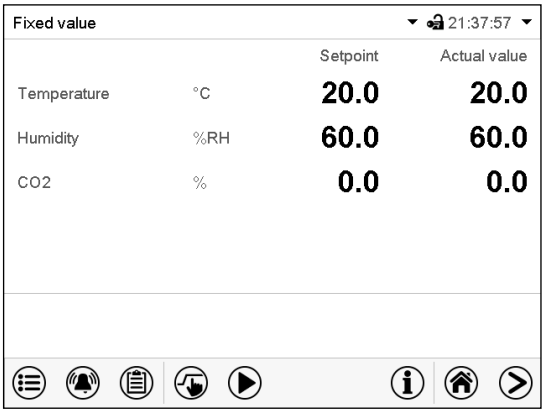


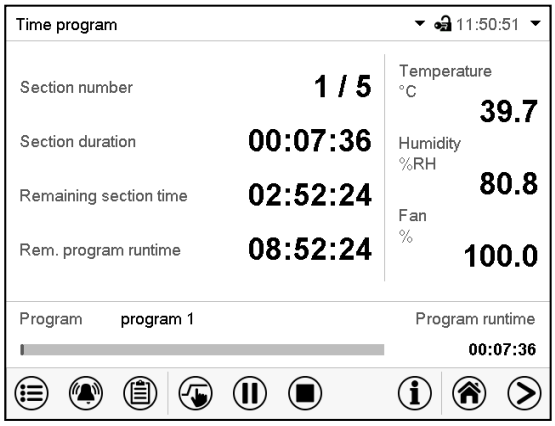
Figure 20: Operating functions of the MB2 controller in normal display (example values)

5.2 Display views: Normal display, program display, chart-recorder display

	Press the ***Change view*** icon to toggle between normal display, program display and chart-recorder display.
	Press the ***Normal display*** icon to return from program display and chart recorder display back to Normal display.



Normal display (actual values / setpoint values)



Program display (example: time program)

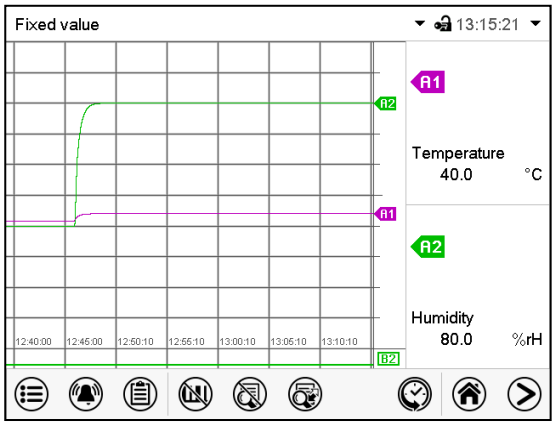


Chart recorder display

5.3 Controller icons overview

Navigation icons in Normal display

Icon	Signification	Function
	***Main menu***	Access from Normal display to the main menu
	***Alarm***	Access from Normal display to the list of active alarms
	***Event list***	Access from Normal display to the event list
	***Setpoint setting***	Access from Normal display to the setpoint entry menu: setpoint entry for Fixed value operation, turning on/off humidity control, safety controller settings
	***Program start***	Start a previously entered time or week program, continue a paused time program
	***Program pause***	Pause a running time program
	***Program cancelling***	Cancel a running time or week program
	***Information***	Information on program operation, setpoints, actual values, and the safety controller
	***Normal display***	Return from program display or chart recorder display to Normal display
	***Change view***	Toggle between Normal display, program display, and chart recorder display

Functional icons in individual menus

Icon	Signification	Function
	***Back***	Return from each menu to Normal display
	***Update***	Update the event list and alarm messages
	***Confirm***	Take over the entries and exit the menu / continue menu sequence.
	***Close***	Exit the menu / cancel menu sequence. Entries are not taken over. When terminating a menu sequence, an information window appears, which must be confirmed.
	***Reset alarm***	Acknowledge the alarm and mute the buzzer.
	***Change keyboard***	Change between uppercase and lower case characters, digits and special characters
	***Edit***	Edit settings of time and week programs

Functional icons in the chart recorder display

Icon	Signification	Function
	***Show legend***	Show legend
	***Hide legend***	Hide legend
	***Switch legend***	Switch between legend pages
	***Show indications***	Show indication “Door open” (B2)
	***Hide indications***	Hide indication “Door open” (B2)
	***History display***	Pause chart recorder and change to history display. Data recording continues.
	***Curve selection***	Go to “Curve selection” submenu in the history display
	***Search***	Go to “Search” submenu in the history display to select the required instant
	***Zoom***	Go to “Zoom” submenu in the history display to select the zoom factor
	***Show scroll buttons***	Show scroll buttons in the history display to scroll to an instant
	***Hide scroll buttons***	Hide scroll buttons in the history display to scroll to an instant

Information icons referring to chamber conditions

Icon	Text information	Condition
	“Idle mode”	Controller is in Idle mode
	“Temperature range”	Current actual temperature value outside the tolerance range
	“Humidity range”	Current actual humidity value outside the tolerance range
	“Door open”	Chamber door is open
	“Humidity off”	The humidification / dehumidification system is turned off
	“CO2 pressure alarm off”	CO_2 pressure alarm deactivated

Information icon for data processing

Icon	Information
	Waiting icon: Data processing is running. Remaining time to touch the display when calibrating the touchscreen.

5.4 Operating modes

The MB2 program controller operates in the following operating modes:

- **Idle mode**

  The controller is not functional, i.e., there is no heating or refrigeration and no humidification or dehumidification, no CO_2 inlet. The fan is off. The chamber approximates ambient values.

  You can activate and deactivate this operating mode with the “Idle mode” control contact in Fixed value operating mode (chap. 8.3), time program operation (chap. 9.7.3) and week program operation (chap. 10.6.5).

- Fixed value operating mode

  The controller operates as a fixed-point controller, i.e., set-points for temperature, humidity, CO_2 , and fan speed can be defined, which are then maintained until the next manual change (chap. 8.1).

- Timer program operation

  Stopwatch function: during an entered duration the controller constantly equilibrates to the setpoints entered in Fixed value operation mode.

- **Time program operation**

  An entered time program for temperature, humidity, and CO_2 is running. The controller offers 25 program memory places with 100 program sections each. The total number of program sections of all programs is unlimited

- **Week program operation**

  An entered week program for temperature, humidity, and CO_2 is running. The controller offers 5 program memory places with 100 switching points each. The switching points can be distributed over all days of the week.

5.5 Performance when opening the door

A door contact switch monitors the open or closed position of the chamber door. When you open the door, the fan starts running with minimum speed. The CO_2 gas inlet is interrupted immediately as soon as the door is opened.

After 60 seconds from opening the door, heating, refrigeration, humidification, dehumidification and fan turn off.

After closing the door, heating, refrigeration, humidification, dehumidification and fan turn on again.

6. Start up

6.1 Turning on the cooling incubator/climate chamber

- After connecting the supply lines (chap. 4), turn on the cooling incubator/climate chamber by the On/Off switch (H). The ready-to-use indicator (signal triangle) is lit in green.

  When the On/Off switch (H) is turned on and yet the controller display is dark, the display is in stand-by mode. Press on the touchscreen to activate it.

- KBF / KBF PRO: Open the water-tap for freshwater supply. Alternatively, fill the freshwater can (accessory).

- Check whether CO_2 control is activated (chap. 6.2).

	**0-1 vol.-% CO_2 control range:** Activate the controller function “CO2 meas.range 0…1 Vol.%” so that the correct conversion of the measured value can take place (chap. 8.3).

- KBF / KBF PRO: The humidifying and dehumidifying system must be activated (deactivated controller function “Humidity off”, chap. 8.3), and setting “Control on”, chap. 6.2).

After the first turning on of the chamber or after an interruption of the power supply the relative humidity will increase after a delay of about 20 minutes. During this period, the relative humidity can drop considerably.

Warming chambers may release odors in the first few days after commissioning. This is not a quality defect. To reduce odors quickly we recommend running the disinfection program once or twice and in a well-ventilated location.

	WARNING: If customer should use a BINDER chamber running in non-supervised continuous operation, we strongly recommend in case of inclusion of irrecoverable specimen or samples to split such specimen or samples and store them in at least two chambers, if this is feasible.

Before each use, check whether the hose is safely guided through the opening into the cooling incubator/climate chamber. This is the only way to ensure that the CO_2 gas is directed into the interior and not into the environment.

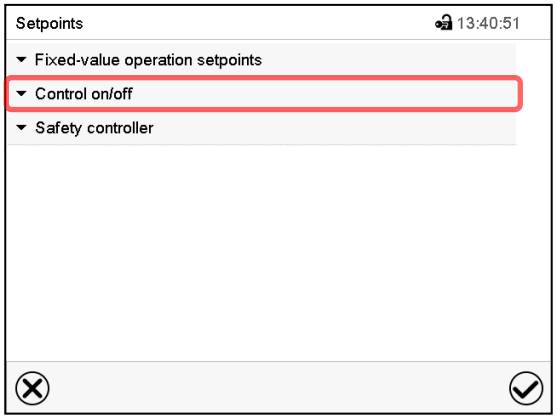
	**DANGER** **Danger of suffocation and poisoning by high concentration of CO_2 (> 4 Vol.-%).** **Death by suffocation.** ➢ Before each use with CO_2, check that the CO_2 hose is safely guided through the access port into the cooling incubator/climate chamber ➢ Ensure technical ventilation measures. ➢ Observe the relevant regulations for handling CO_2. ➢ Close the CO_2 supply when decommissioning the chamber.

6.2 Turning on/off humidity control and CO_2 control

KBF / KBF PRO: Turning off humidity control is required when operating the chamber without water connection in order to avoid humidity alarms.

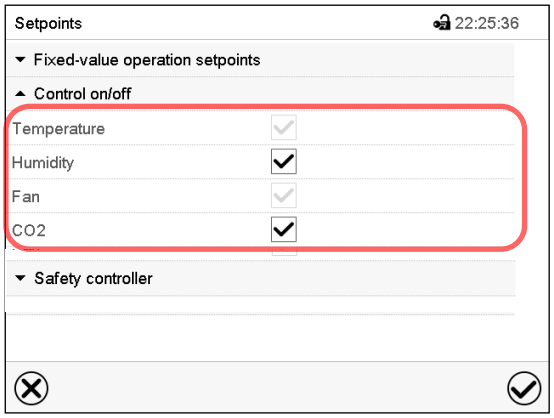
If the CO2 control is not to be used, it can also be switched off in this menu.

	Press the ***Setpoint setting*** icon to access the “Setpoint” setting menu from Normal display.



“Setpoints” menu.

Select “Control on/off”.



You can turn humidity control (humidification and dehumidification, KBF / KBF PRO) and CO_2 control on or off.

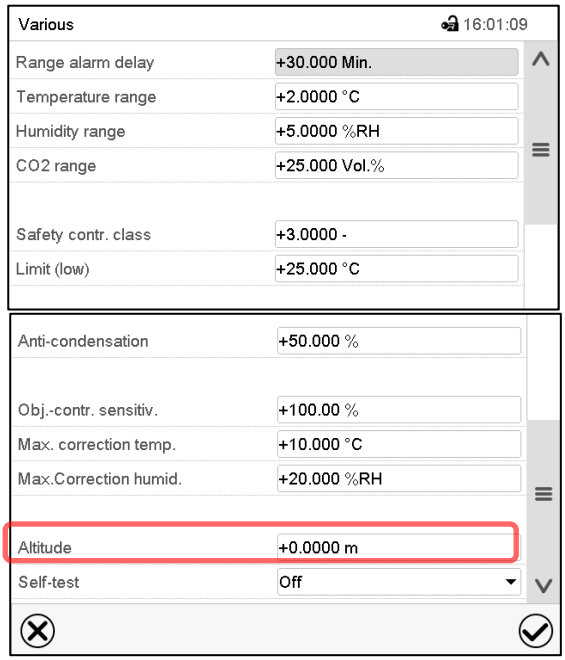
If the checkbox is marked, the corresponding control is active. Mark / unmark the checkbox to change the setting.

7. Entry of the altitude

After first turning on the chamber, enter the altitude of the site above sea level into the controller. This entry serves to correct the calculation of CO_2 concentration in vol.-% from the measurement of partial pressure. The setting will remain stored after shutting the power off.

Required access level: “Admin”.

Path: ***Main menu > Settings > Various***



Submenu “Various”.

Scroll all the way down to access the “Altitude” function.

- Select the field “Altitude“ and enter the desired altitude. Entry range: 0 m up to 3000 m. Confirm entry with ***Confirm*** icon.

Unit of altitude above sea level for entry and displayed value: meter [m].

Correlation of feet [ft] to meter [m]:

1 ft = 0,305 m = 0,000305 km

1 m = 100 cm = 3.28 ft = 39,37 in

1 km = 1000 m = 3280,83 ft

8. Set-point entry in “Fixed value” operating mode

In Fixed value operating mode, you can enter set-points for temperature, humidity, CO_2, fan speed, and the switching-state of special controller functions.

All settings made in Fixed value operating mode remain valid until the next manual change. They are saved also when turning off the chamber or in case of toggling to Idle Mode or Program Mode.

	Setting ranges	**Control ranges**
Temperature KB PRO	-20 °C / *-4 °F* up to 100 °C / *212 °F*	-20 °C / *-4 °F* up to 100 °C / *212 °F*
Temperature KBF / KBF-UL	-5 °C / *41 °F* up to 70 °C / *158 °F.*	0 ºC / *32 °F* up to 70 °C / *158 °F* without humidity 10 °C / *50 °F* up to 70 °C / *158 °F* with humidity
Temperature KBF PRO	-20 °C / *-4 °F* up to 100 °C / *212 °F*	-20 °C / *-4 °F* up to 100 °C / *212 °F* without humidity 10 °C / *50 °F* up to 90 °C / *194 °F* with humidity
Humidity KBF / KBF-UL	0 % r.h. up to 80 % r.h.	10 % r.h. to 80 % r.h. see climatic diagrams
Humidity KBF PRO	0 % r.h. up to 98 % r.h.	0 % r.h. to 98 % r.h. see climatic diagrams
CO_2	0 vol.-% up to 20 vol.-% or 0 vol.-% up to 1 vol.-% Minimum concentration: ambient value	
Fan speed	40% up to 100 %	

Temperature: Equilibration time is 4 hours max.

Humidity: Equilibration time is approx. 1 hour.

CO_2: After a few minutes, the CO_2 concentration equilibrates automatically to the value of 5 vol.-% CO_2 or 0.5 vol.-% CO_2 pre-set in factory

	Reduce the fan speed only if required, because the spatial distribution of temperature and humidity will also be reduced. **Technical data refers to 100% fan speed.**

KBF / KBF PRO: For the control range of temperature and relative humidity, see the temperature / humidity diagrams.

	KBF / KBF PRO: When operating without humidity by setting “Control off” (chap. 6.2), the humidity tolerance range function is automatically deactivated. When operating without humidity by activated controller function “Humidity off” (chap. 8.3), set the humidity tolerance range to “0” in order to avoid tolerance range alarms (chap. 11.4).

	When setting a lower CO_2 setpoint, the CO_2 gas must be able to escape first. Open both chamber doors for this purpose. Vent out any escaping gas via good room ventilation or a suitable connection to an exhaust system. Observe the relevant regulations for handling CO_2.

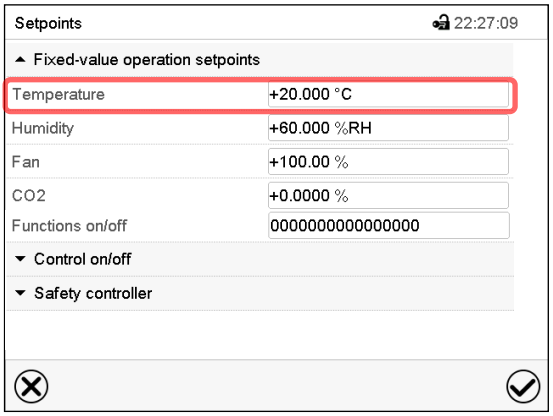
	**0-1 vol.-% CO_2 control range:** Activate the controller function “CO2 meas.range 0…1 Vol.%” so that the correct conversion of the measured value can take place (chap. 8.3).

The CO_2 sensor is temperature resistant up to a maximum temperature of 60 °C / *140 °F*.

	NOTICE
	Danger of damage to the CO_2 sensor by excess temperature. **Damage to the CO_2 sensor.** ∅ Do NOT set the temperature set-point above 60 °C / *140 °F*.

8.1 Setpoint entry for temperature, humidity, CO_2 and fan speed through the "Setpoints" menu

	Press the ***Setpoint setting*** icon to access the "Setpoint" setting menu from Normal display.



"Setpoints" menu.

Select "Fixed value operation setpoints" to access the individual parameters.

- Select the field "Temperature" and enter the desired temperature setpoint.

  KBF / KBF-UL setting range: -5 °C up to 70 °C, KB PRO / KBF PRO setting range: -20 °C up to 100 °C.

  Confirm entry with ***Confirm*** icon.
- Select the field "Humidity" and enter the desired humidity setpoint.

  KBF / KBF-UL setting range: 0% r.h. up to 80% r.h., KBF PRO setting range: 0% r.h. up to 100% r.h.

  Confirm entry with ***Confirm*** icon.
- Select the field "CO2" and enter the desired CO_2 setpoint.

  Setting range: 0 vol.-% up to 20 vol.-% or 0 vol.-% up to 1 vol.-%.

  Confirm entry with ***Confirm*** icon.
- Select the field "Fan" and enter the desired fan speed setpoint.

  Setting range: 40% up to 100% fan speed.

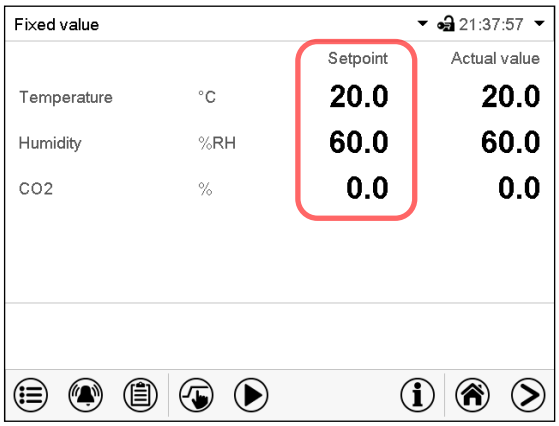
  Confirm entry with ***Confirm*** icon.

	When entering a value outside the setting range, the message: "Value outside of limits! (Min: xxx, Max: xxx)" appears (xxx is a wildcard for the limits of the respective parameter). Press the ***Confirm*** icon and repeat the entry with a correct value.

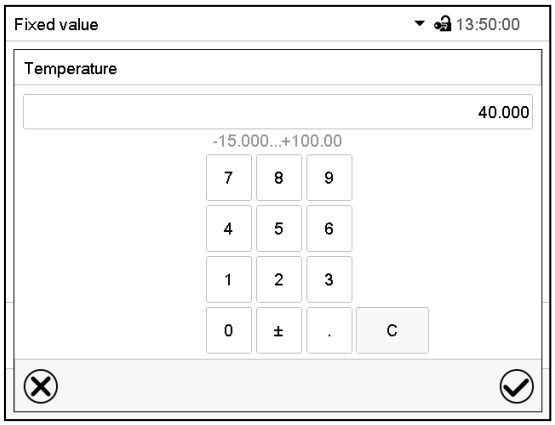
After completing the settings, press the ***Confirm*** icon to take over the entries and exit the menu, **or** press the ***Close*** icon to exit the menu without taking over the entries.

8.2 Direct setpoint entry via Normal display

Alternatively you can also enter the setpoints directly via Normal display.



Normal display. Select the setpoint you want to change.



Example: “Temperature” entry menu. Enter the desired setpoint.

8.3 Special controller functions

	Press the ***Setpoint setting*** icon to access the “Setpoint” setting menu from Normal display.

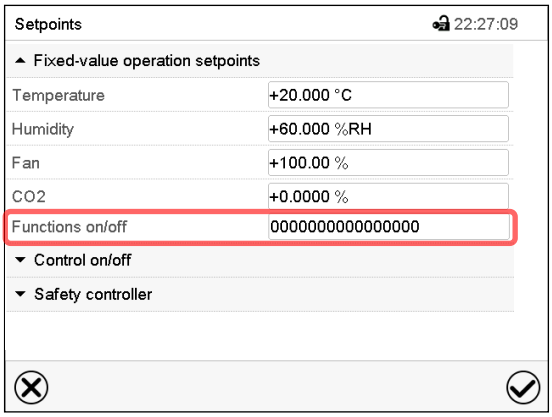
You can define the switching state of up to 16 controller functions. They are used to activate / deactivate special controller functions.

- Controller function “Idle mode” activates / deactivates the operating mode “Idle mode”.
- Controller function “Humidification off”: Turns off humidification.
- Controller function “Dehumidification off”: Turns off dehumidification.
- Controller function “Internal light”: Activates the continuous interior light (option)
- Controller function “Door lock”: Activates the electro mechanical door lock (option)
- Controller function “Compressed air dryer”: Activates the compressed air dryer (option)
- Controller function “Object temp. control”: Activates the object temperature control (option)
- Controller function „CO2 meas.range 0…1 Vol.%“: Activates the CO_2 measurement 0-1 Vol.-%

The other controller functions are without function.

	**0-1 vol.-% CO_2 control range:** Activate the controller function “CO2 meas.range 0…1 Vol.%” so that the correct conversion of the measured value can take place (chap. 8.3).

Use the “Setpoints” menu to configure the special controller functions.



Setpoints” menu.

Select the field “Functions on/off”.

“Functions on/off” entry menu with options.

Mark / unmark the checkbox to activate / deactivate the desired function and press the ***Confirm*** icon

Activated controller function: switching status “1” (On)

Deactivated controller function: switching status “0” (Off)

The controller functions count from right to left.

Example:

Activated controller function “Idle mode” = 000000000000000**1**

Deactivated controller function “Idle mode” = 000000000000000**0**

9. Time programs

The MB2 program controller permits programming time programs with real-time reference. It offers 25 program memory positions with up to 100 program sections each. Hot-air disinfection is always program 1.

For each program section you can enter set-points for temperature, humidity, CO_2, fan speed, section duration, type of set-point transition (ramp or step) and the tolerance ranges.

	If the safety controller has been set to “limit” mode, check the setting of the safety controller when changing the temperature set-point.

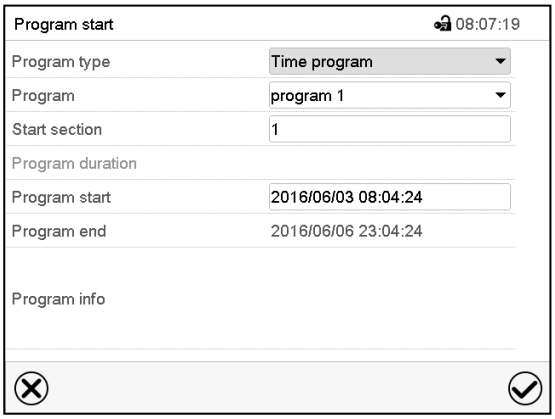
	Reduce the fan speed only if required, because the spatial distribution of temperature and humidity will also be reduced. **Technical data refers to 100% fan speed.**

Programming remains saved in case of a power failure or after turning off the unit.

Path: ***Main menu > Programs> Time program***

9.1 Starting an existing time program

	In Normal display press the ***Program start*** icon to access the “Program start” menu.



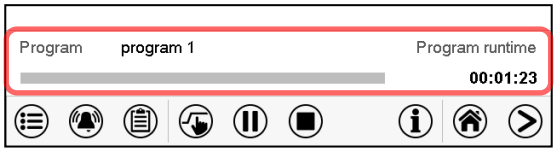
“Program start” menu

- In the field “Program type” select the setting “Time program”.
- In the field “Program” select the desired program.
- Select the field “Program start” and enter the desired program start time in the “Program start” entry menu. Press the ***Confirm*** icon. The program delay time until program start begins.

The program end is adapted automatically depending on the entered program duration.

After completing the settings, press the ***Confirm*** icon to take over the entries and exit the menu. The program starts running.

If instead you press the ***Close*** icon to exit the menu without taking over the entries, the program will not start.



Normal display. Information on the bottom of the screen indicates the currently running program and the time already passed. The grey bar shows how much time of the whole time is elapsed. If program duration has been set to infinite, the grey bar is not displayed.

9.1.1 Performance during program delay time

During the configured program delay time until program start, the controller equilibrates to the current set-points of Fixed value operation mode. Modifications of these setpoints are effective. When the configured moment for program start is reached, the program delay time ends and the program starts running.

9.2 Stopping a running time program

9.2.1 Pausing a running time program

	Press the ***Program pause*** icon to interrupt the program.

The program is paused. The program runtime stops running down, the time display flashes.

There are the following options:

	Press the ***Program start*** icon to continue the program
	Press the ***Cancelling*** icon to cancel the program

9.2.2 Cancelling a running time program

	Press the ***Program cancelling*** icon to cancel the program.

A confirmation prompt is displayed. Press the ***Confirm*** icon to confirm that the program shall really be cancelled.

After confirming the message, the controller changes to Fixed value operation mode. Temperature and humidity will then equilibrate to the setpoints of Fixed value operation mode.

9.3 Performance after the end of the program

After the end of the program the message “Device changes to fixed value operation mode” appears on the screen.

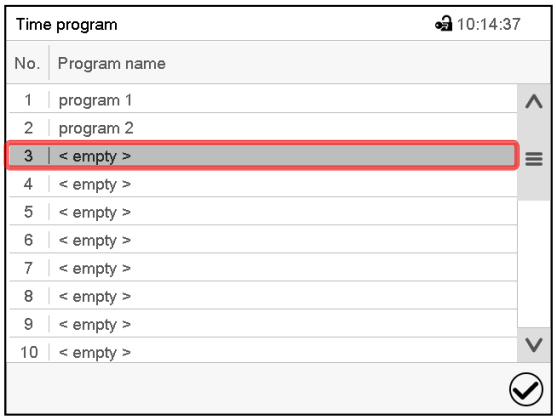
Press the ***Confirm*** icon.

As long as the message has not been confirmed, the setpoint of the last program section remains effective. Program the last section as desired. If e.g. heating, refrigeration, humidification and dehumidification shall turn off, activate the “Idle mode” controller function in the last program section.

After confirming the message, the controller changes to Fixed value operation mode. Temperature and humidity will then equilibrate to the setpoints of Fixed value operation mode.

9.4 Creating a new time program

Path: ***Main menu > Programs > Time program***



"Time program" menu:
overview of the existing programs.

Select an empty program place.

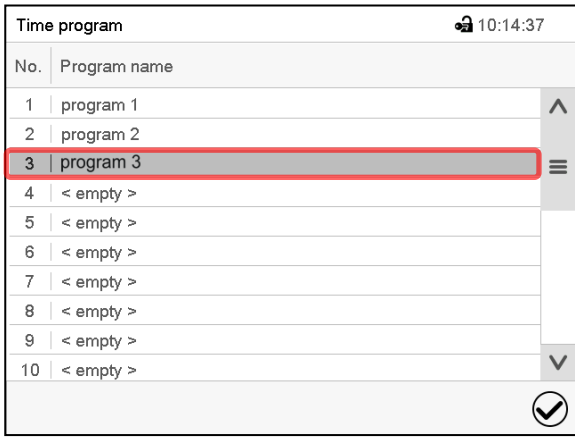
Enter the program name and, if desired, additional program information in the corresponding fields.

Press the ***Confirm*** icon.

The program view opens (chap. 9.5).

9.5 Program editor: program management

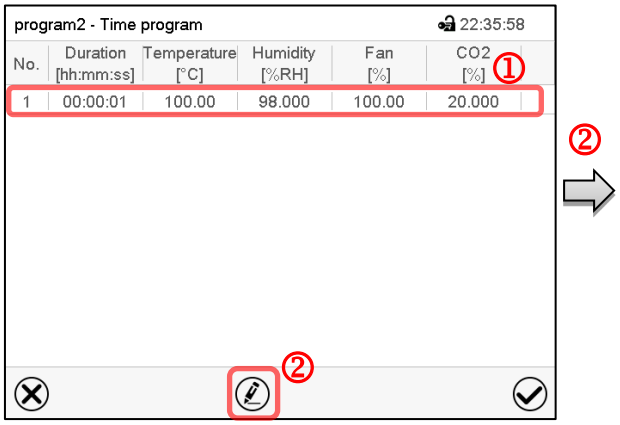
Path: ***Main menu > Programs > Time program***



"Time program" menu:
overview of the existing programs.

Select an existing program (example: program 3) or create a new program (chap. 9.4).

The program view opens.



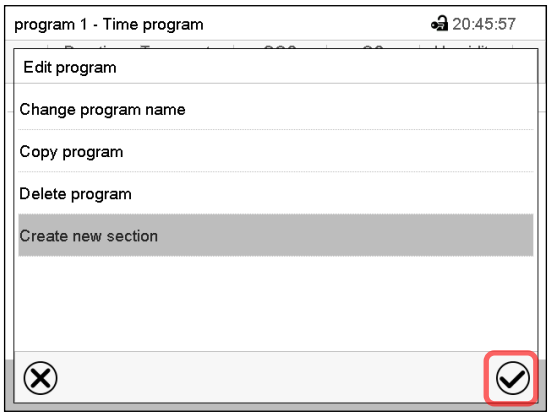
Program view (example: program 3).

If a new program has been created, there is just one program section.

There are the following options:

① Select a program section to open the section editor (chap. 9.6)

② Press the ***Edit*** icon to open the program editor

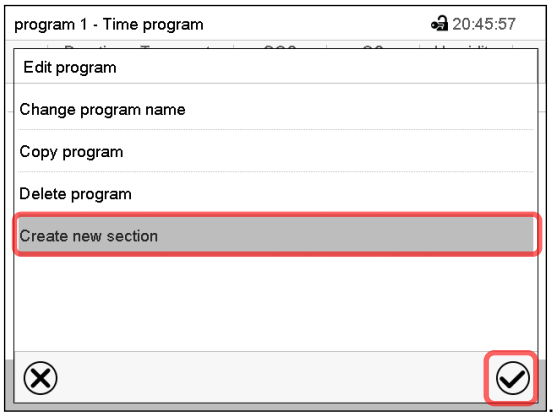


Program editor: “Edit program” menu

Select the desired function and press the ***Confirm*** icon.

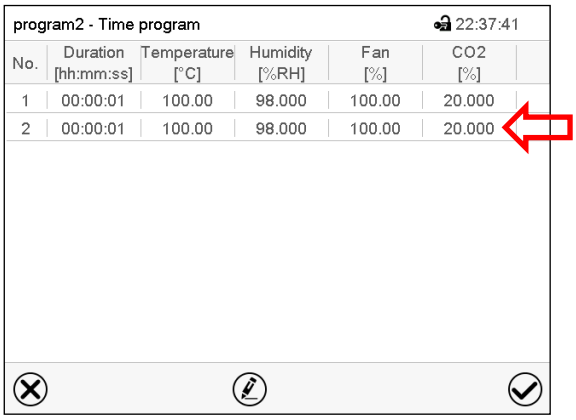
The program editor offers following options:

- Change the program name
- Copy program
- Replace program: Replacing an new or an existing program with the copied program. This menu point is visible only after a program has been copied.
- Delete program
- Create new section



To add a new section, select “Create new section” and press the ***Confirm*** icon.

The program view opens.



Program view.

A new section is always added at the very bottom (example: section 2).

9.5.1 Deleting a time program

Path: ***Main menu > Programs > Time program***

In the “Time program” menu select the program to be deleted. The program view opens.

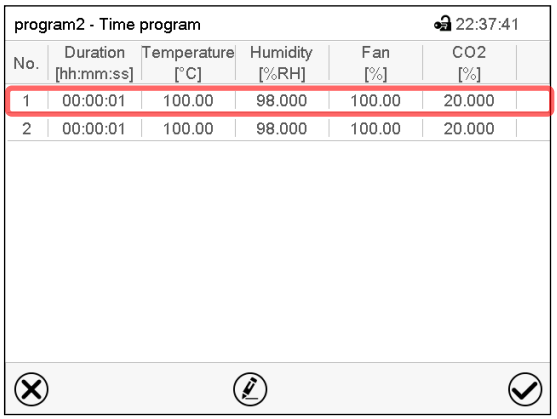
In the **program view** press the ***Edit*** icon to open the program editor

In the **program editor** select “Delete program” and press the ***Confirm*** icon.
The program is deleted. The controller returns to the program view.

9.6 Section editor: section management

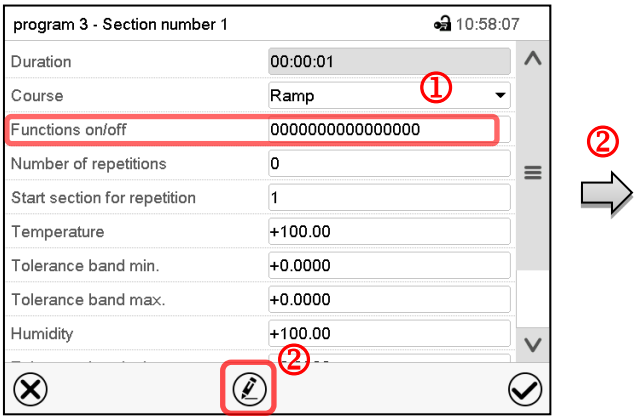
Path: ***Main menu > Programs > Time program***

Select the desired program.



Program view.

Select the desired program section (example: section 1)



Section view (example: section 1).

There are the following options:

① Select a parameter to enter or modify the according value (chap. 9.7)

② Press the ***Edit*** icon to open the program editor

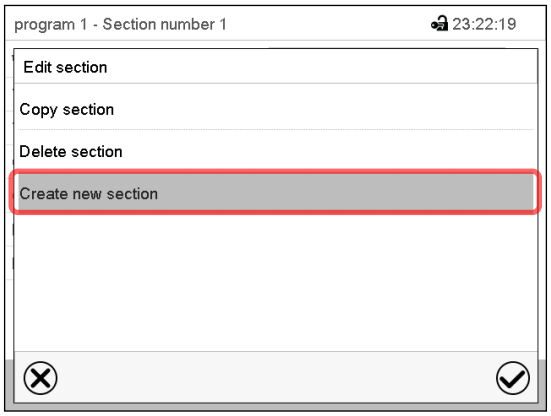
Section editor: “Edit section” menu

Select the desired function and press the ***Confirm*** icon.

The section editor offers following options:

- Copy section
- Replace section: Replacing an existing section with the copied section. This menu point is visible only after a section has been copied.
- Insert section: Adding the copied section. This menu point is visible only after a section has been copied.
- Delete section
- Add new section

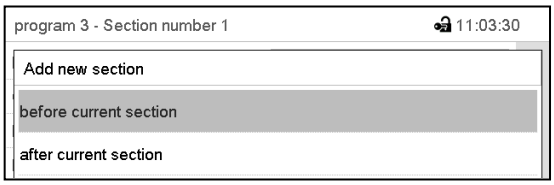
9.6.1 Add a new program section



Section editor: “Edit section” menu.

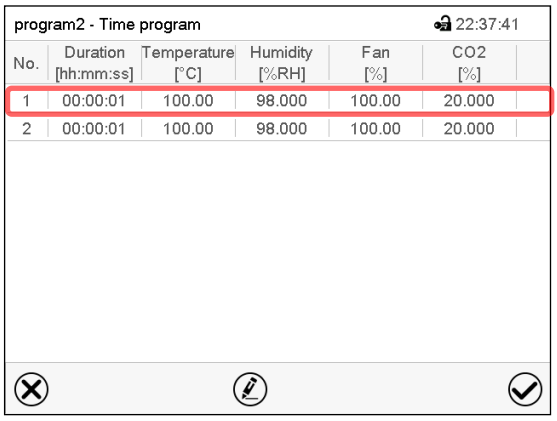
Select “Create new section” and press the ***Confirm*** icon.

Then select whether to insert the new section before or after the current section.



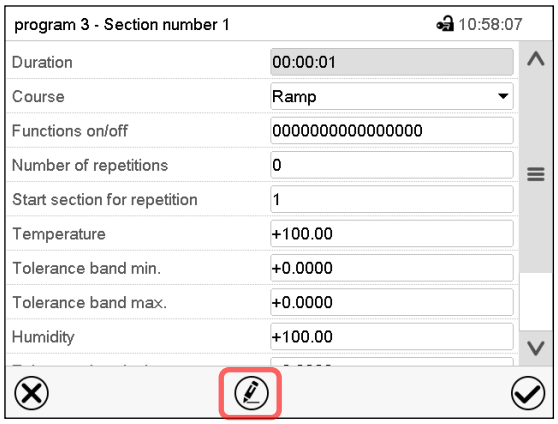
Press the ***Confirm*** icon. The new section opens.

9.6.2 Copy and insert or replace a program section



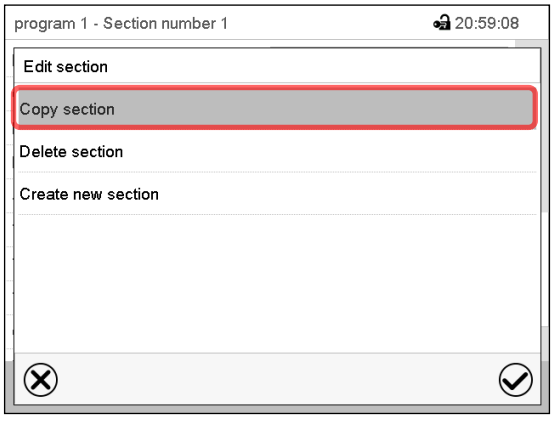
Program view.

Select the program section to be copied (example: section 1)



Section view (example: section 1).

Press the ***Edit*** icon to open the section editor.

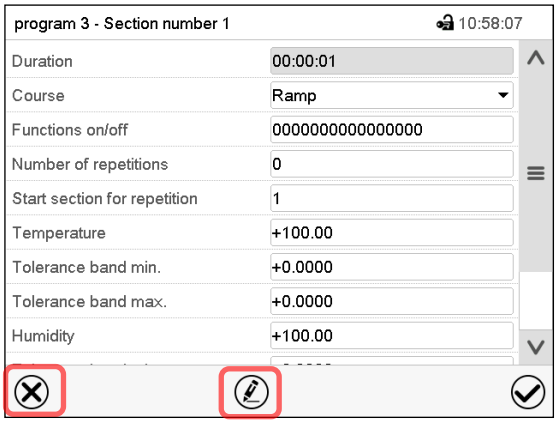


Section editor: “Edit section” menu

Select “Copy section” and press the ***Confirm*** icon.

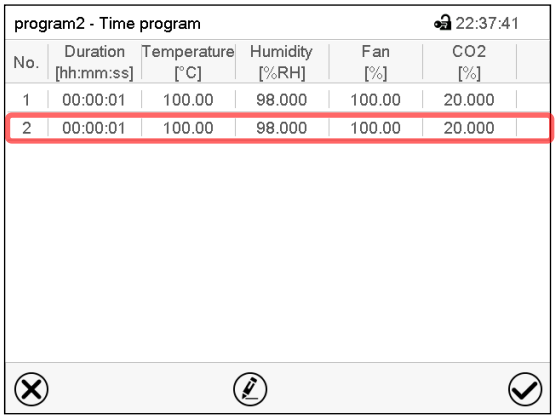
The current section (example: section 1) is copied.

The controller returns to the section view.



Section view (example: section 1).

Press the ***Close*** icon to change to the program view, if you want to select another section to be replaced or before or after which the copied section shall be inserted…

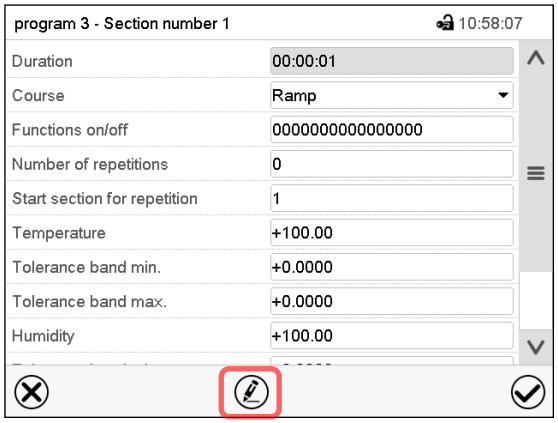


Program view.

Select the section to be replaced or before or after which the copied section shall be inserted (example: section 2) and press the ***Confirm*** icon.

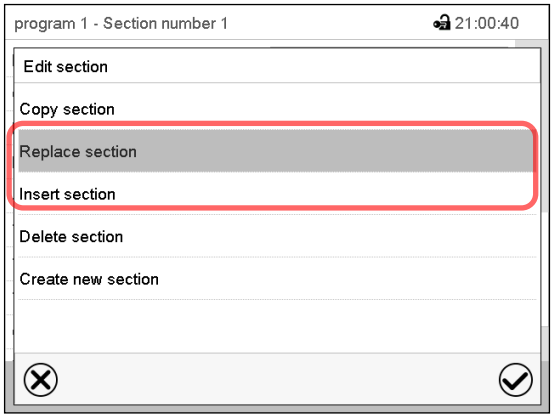
or

Press the ***Edit*** icon to open the section editor if you want the current section to be replaced or the copied section to be inserted before or after it



Section view (example: section 1).

Press the ***Edit*** icon to open the section editor



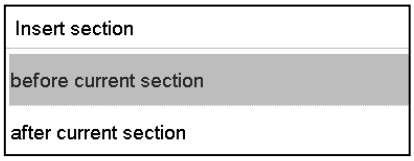
Section editor: “Edit section” menu

Select “Replace section” to replace the selected section with the copied section

or

Select “Insert section” to additionally add the copied section.

In this case select whether to insert it before or after the selected section.



Press the ***Confirm*** icon

9.6.3 Deleting a program section

In the **program view** select the program section to be deleted. The section view opens.

In the **section view** press the ***Edit*** icon to open the section editor

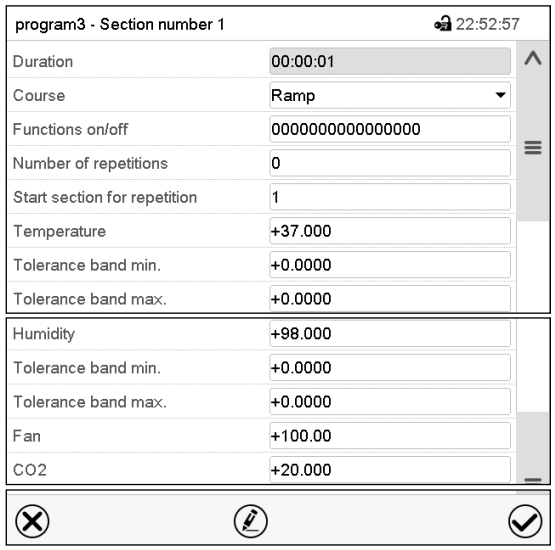
In the **section editor** select “Delete section” and press the ***Confirm*** icon.
The section is deleted. The controller returns to the section view.

9.7 Value entry for a program section

Path: ***Main menu > Programs > Time program***

Select the desired program and section.

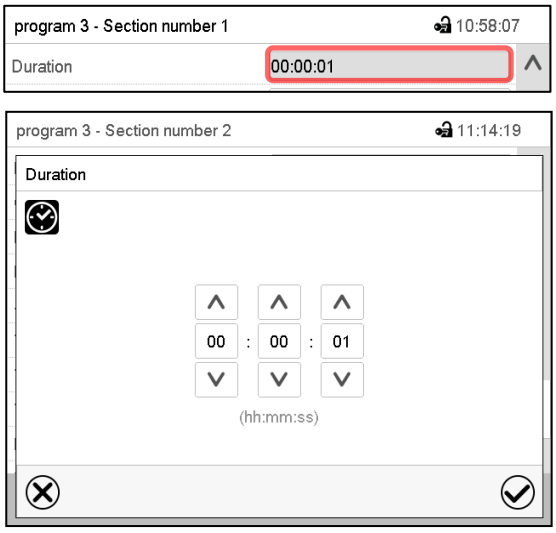
The section view gives access to all parameters of a program section. You can enter or modify the values.



Program name and section number
Section duration
Type of setpoint transition: ramp or step
Special controller functions
Repeating one or several sections within a program
Temperature set-point
Temperature tolerance range: minimum and maximum
Humidity set-point
Humidity tolerance range: minimum and maximum
Fan speed set-point
CO_2 set-point

The setting and control ranges for the individual parameters are the same as for “Fixed value” operating mode (chap. 8).

9.7.1 Section duration



Section view (partial view).

Select the field “Duration” indicating the time.

“Duration” entry menu.

Enter the desired section duration with the arrow keys and press the ***Confirm*** icon.

Setting range: 0 up to 99 hours 59 min 59 sec.

9.7.2 Set-point ramp and set-point step

You can define the type of temperature and humidity transitions for each individual program section.

“Ramp” mode: Gradual changes of temperature, CO_2, and humidity

The set-point of a given program section functions as the section’s start temperature. During the section’s duration, the set-point gradually passes to the set-point of the subsequent program section. The actual value follows the continually changing set-point.

If the last program section is in “ramp” mode and the setpoint shall change within this section, then you must program an additional section (with the shortest possible section duration) to provide the target temperature of the last program section. Otherwise, the setpoint would remain constant during the section’s duration.

Programming in the “ramp” mode allows all kinds of temperature, CO_2, and humidity transitions:

- Gradual changes of temperature, CO_2, and humidity

  The setpoint changes its value gradually during the entered section duration. The actual value follows the continually moving set-point at any time.

- Program sections with constant temperature, CO_2, and humidity

  The setpoints (initial values) of two subsequent program sections are identical; so the temperature and humidity remain constant during the entire duration of the first program section.

- Sudden changes of temperature, CO_2, and humidity

  Steps can be programmed in ramp mode as temperature or humidity changes (ramps) that occur during a very short interval. If the duration of this transitional program section is very short (minimum entry 1 sec), the temperature or humidity change will proceed rapidly within the minimum amount of time.

“Step” mode: Sudden changes of temperature, CO_2, and humidity

The set-point of any program section functions as the section’s target value. At the start of the program section, the unit heats up or cools down and humidifies/dehumidifies the chamber with the maximum speed to reach the entered value; and then it holds it for the remaining section time. Therefore the set-point temperature remains constant for the section’s duration. These changes occur rapidly within the minimum amount of time (minimum entry: 1 second).

Programming in the “step” mode allows only two kinds of temperature, CO_2, and humidity transitions:

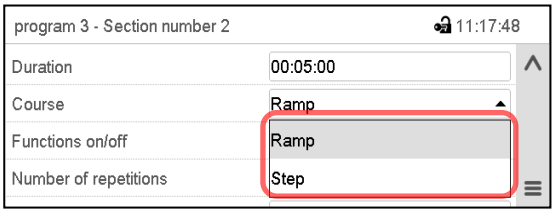
- Programming gradual changes of temperature, CO_2, and humidity (ramps) is impossible in the “step” mode
- Program sections with constant temperature, CO_2, and humidity

  The setpoints (target values) of two subsequent program sections are identical; so the temperature, CO_2, and humidity remain constant during the entire duration of the first program section.

- Sudden changes of temperature, CO_2, and humidity

  The entered setpoint of the section is reached as fast as possible and then held constant for the remaining section duration.

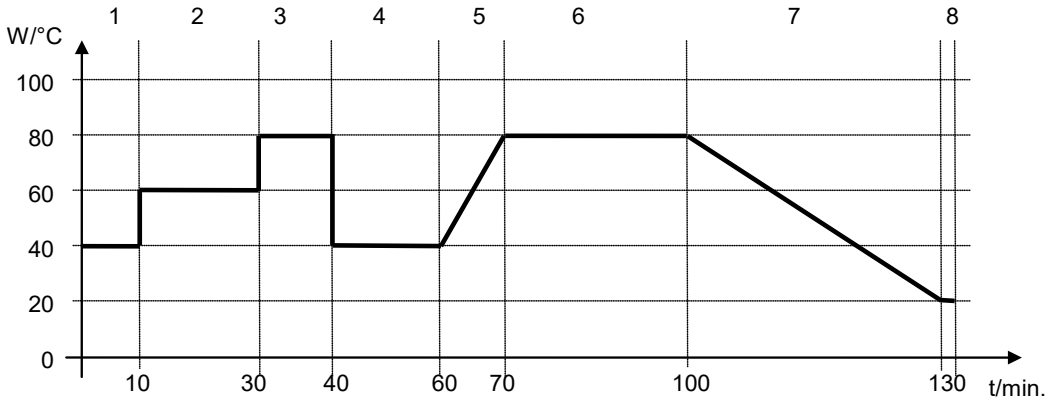
Selecting the setting “Ramp” or “Step”



Section view (partial view).

In the field “Course” select the desired setting “Ramp” or “Step”.

“Ramp” and “Step” mode example (representation of a temperature course)



Corresponding program table

Section No.	Duration [hh:mm:ss]	Temperature [°C]	Humidity [% rH]	CO_2 [Vol.-%]	Fan [%]	Ramp / Step
1	00:10:00	40.0	xxxx	xxxx	xxxx	Step
2	00:20:00	60.0	xxxx	xxxx	xxxx	Step
3	00:10:00	80.0	xxxx	xxxx	xxxx	Step
4	00:20:00	40.0	xxxx	xxxx	xxxx	Step
5	00:10:00	40.0	xxxx	xxxx	xxxx	Ramp
6	00:30:00	80.0	xxxx	xxxx	xxxx	Ramp
7	00:30:00	80.0	xxxx	xxxx	xxxx	Ramp
8	00:00:01	20.0	xxxx	xxxx	xxxx	Ramp

9.7.3 Special controller functions

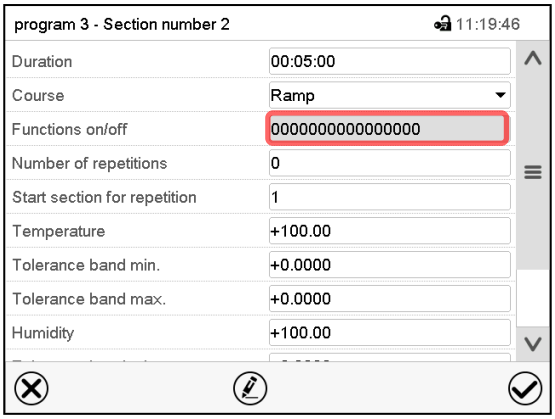
You can define the switching state of up to 16 controller functions. They are used to activate / deactivate special controller functions.

- Controller function “Idle mode” activates / deactivates the operating mode “Idle mode”.
- Controller function “Humidification off”: Turns off humidification.
- Controller function “Dehumidification off”: Turns off dehumidification.
- Controller function “Internal light”: Activates the continuous interior light (option)
- Controller function “Door lock”: Activates the electro mechanical door lock (option)
- Controller function “Compressed air dryer”: Activates the compressed air dryer (option)
- Controller function “Object temp. control”: Activates the object temperature control (option)
- Controller function „CO2 meas.range 0…1 Vol.%“: Activates the CO_2 measurement 0-1 Vol.-%

The other controller functions are without function.

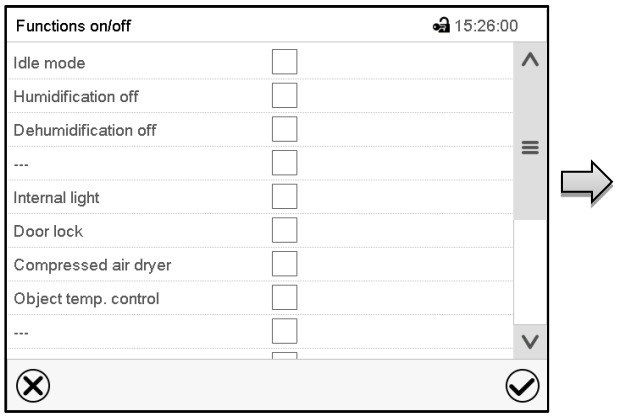
	**0-1 vol.-% CO_2 control range:** Activate the controller function “CO2 meas.range 0…1 Vol.%” so that the correct conversion of the measured value can take place.

Use the setting “Functions on/off” to configure the special controller functions.



Section view.

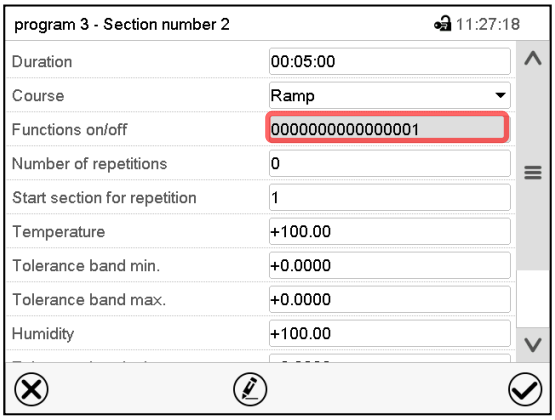
Select the field “Functions on/off”.



“Functions on/off” entry menu with options.

Mark / unmark the checkbox of the desired function to activate / deactivate it and press the ***Confirm*** icon.

The controller returns to the section view.



Section view indicating the controller functions.

Activated controller function: switching status “1” (On)

Deactivated controller function: switching status “0” (Off)

The controller functions count from right to left.

Example:

Activated controller function “Idle mode” = 000000000000000**1**

Deactivated controller function “Idle mode” = 000000000000000**0**

9.7.4 Setpoint entry

The CO_2 sensor is temperature resistant up to a maximum temperature of 60 °C / *140 °F*.

	NOTICE
	Danger of damage to the CO_2 sensor by excess temperature. **Damage to the CO_2 sensor.** ∅ In program operating mode, make sure NOT to exceed the temperature of 60 °C / *140 °F*.

- Select the field “Temperature” and enter the desired temperature setpoint.

  KBF / KBF-UL setting range: -5 °C up to 70 °C, KBF PRO setting range: -20 °C up to 100 °C.

  Confirm entry with ***Confirm*** icon. The controller returns to the section view.

- Select the field “Humidity” and enter the desired humidity setpoint.

  KBF / KBF-UL setting range: 0% r.h. up to 80% r.h., KBF PRO setting range: 0% r.h. up to 100% r.h.

  Confirm entry with ***Confirm*** icon. The controller returns to the section view.
- Select the field “CO2” and enter the desired CO_2 setpoint.

  Setting range: 0 vol.-% up to 20 vol.-% or 0 vol.-% up to 1 vol.-%.

  Confirm entry with ***Confirm*** icon. The controller returns to the section view.
- Select the field “Fan” and enter the desired fan speed setpoint.

  Setting range: 40% up to 100% fan speed.

  Confirm entry with ***Confirm*** icon. The controller returns to the section view.

	**0-1 vol.-% CO_2 control range:** Activate the controller function “CO2 meas.range 0…1 Vol.%” so that the correct conversion of the measured value can take place (chap. 9.7.3).

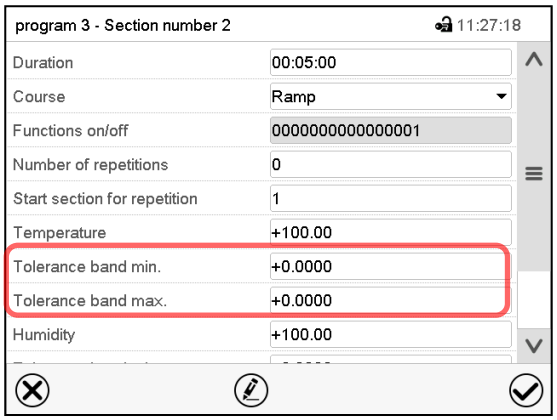
9.7.5 Tolerance range

You can specify a temperature and humidity program tolerance range for each program section with different values for the tolerance minimum and maximum. When the actual value exceeds the given threshold, the program is paused. This is indicated on the display (see below). When the actual temperature is situated again within the entered tolerance limits, the program automatically continues. Therefore, the duration of the program may be extended due to the programming of tolerances.

	Programming of tolerances may extend program duration.

An entry of “-99999” for the tolerance minimum means “minus infinite” and an entry of “999999” for the tolerance maximum means “plus infinite”. Entry of these values will never lead to program interruption. The entry of “0” for the tolerance minimum and/or maximum deactivates the respective tolerance function.

When requesting rapid value transitions, we recommend not programming tolerance values in order to enable the maximum heating-up, cooling-down, humidification or dehumidification speed.



Section view, showing the temperature tolerance band

- Select the field “Tolerance band min” and enter the desired lower tolerance band value. Setting range: -99999 to 99999. Confirm entry with ***Confirm*** icon. The controller returns to the section view.
- Select the field “Tolerance band max” and enter the desired upper tolerance band value. Setting range: -99999 to 99999. Confirm entry with ***Confirm*** icon. The controller returns to the section view.

Set the tolerance ranges for other parameters accordingly, if desired.

If one of the actual values (temperature and/or humidity) is outside the program tolerance range the whole program course is interrupted. During this program interruption time the controller equilibrates to the setpoints of the current section.

The screen header indicates “Program pause (tolerance band)”. The program runtime indication flashes and does not proceed any further.

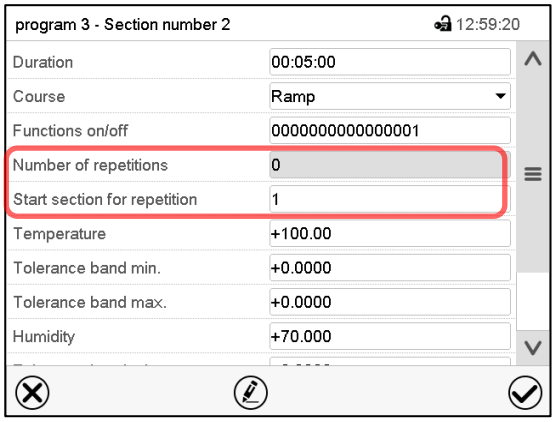
When the temperature or humidity values are back within the entered program tolerance range, the program continues automatically.

9.7.6 Repeating one or several sections within a time program

You can repeat several subsequent sections together. It is not possible to define the start section the same time also as the target section, therefore you cannot repeat a single individual section.

Enter the desired number of repetitions in the field “Number of repetitions” and the number of the section to start the repetition cycle with in the field “Start section for repetition” To have sections repeated infinitely, enter the number of repetitions as “-1”.

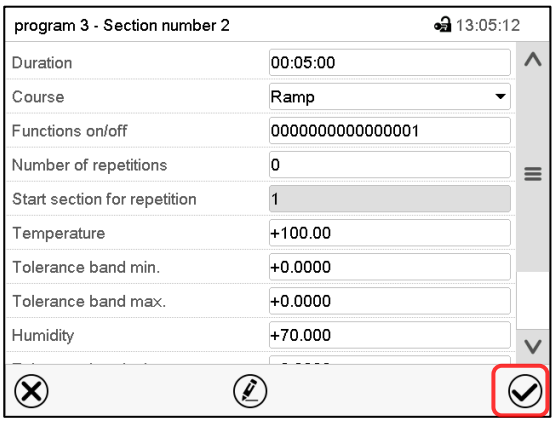
The selected sections are repeated as many times as selected. Then the program continues.



Section view, showing the repetition function

- Select the field “Number of repetitions” and enter the desired number of repetitions. Setting range: 1 to 99, and -1 for infinite. Confirm entry with ***Confirm*** icon. The controller returns to the section view.
- Select the field “Start section for repetition” and enter the section number, at which the repetition should start. Setting range: 1 up to the section before the currently selected section. Confirm entry with ***Confirm*** icon. The controller returns to the section view.

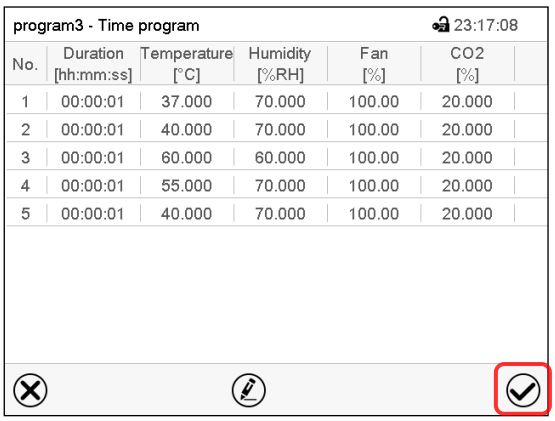
9.7.7 Saving the time program



Section view.

After the all desired values of the program section have been configured, press the ***Confirm*** icon to take over the programming.

The controller changes to the program view.



Program view.

Press the ***Confirm*** icon to take over the programming.

The controller changes to the Normal display.

	To save the programming it is absolutely required to press the ***Confirm*** icon. Otherwise all settings will be lost! There is no confirmation prompt!

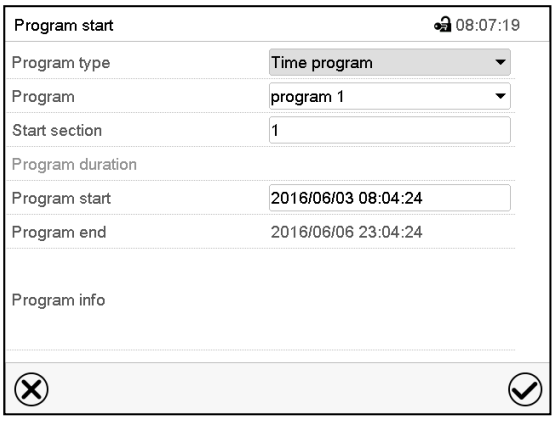
10. Week programs

The MB2 program controller permits programming week programs with real-time reference. It offers 5 week program places in total with up to 100 shift points for each week program.

Path: ***Main menu > Programs> Week program***

10.1 Starting an existing week program

	In Normal display press the ***Program start*** icon to access the “Program start” menu.



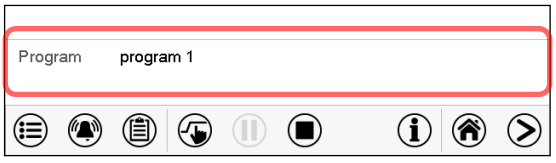
“Program start” menu.

- In the field “Program type” select the setting “Week program”.
- In the field “Program” select the desired program.
- There are no further settings available in the “Program start” menu for week programs, as they are needed only for time programs.

After completing the settings, press the ***Confirm*** icon to take over the entries and exit the menu. The program starts running.

If instead you press the ***Close*** icon to exit the menu without taking over the entries, the program will not start.

After starting the week program, the previously entered week program setpoints are active and will be equilibrated according to the current time.



Information on the bottom of the screen indicates the currently running program.

10.2 Cancelling a running week program

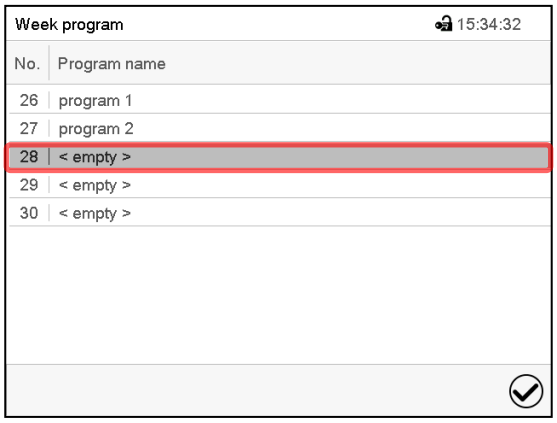
	Press the ***Program cancelling*** icon to cancel the program.

A confirmation prompt is displayed. Press the ***Confirm*** icon to confirm that the program shall really be cancelled.

After confirming the message, the controller changes to Fixed value operation mode. Temperature and humidity will then equilibrate to the setpoints of Fixed value operation mode.

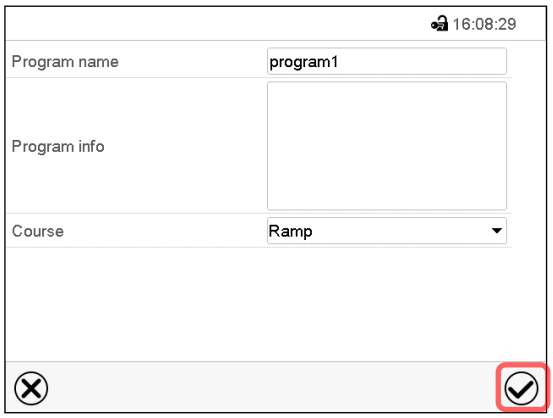
10.3 Creating a new week program

Path: ***Main menu > Programs > Week program***



“Week program” menu:
overview of the existing programs.

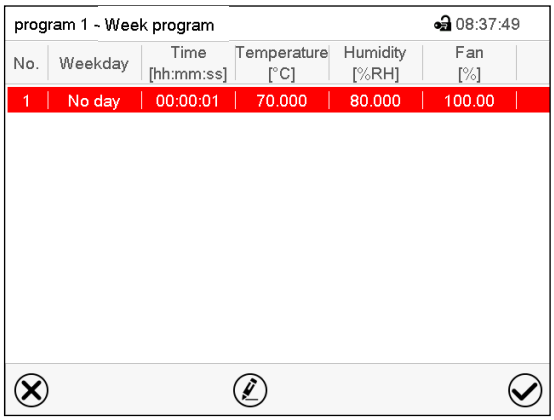
Select an empty program place.



Enter the program name and, if desired, additional program information in the corresponding fields.

Select the set-point course “Ramp” or “Step” (chap. 10.6.1).

Press the ***Confirm*** icon. The program view opens.

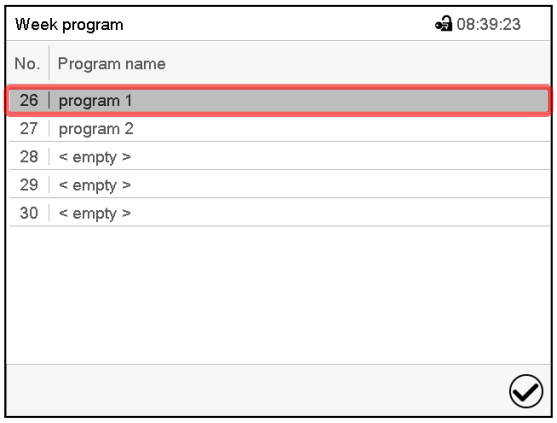


Program view.

For the first section no weekday is specified. Therefore, the section is first marked in red and cannot be saved.

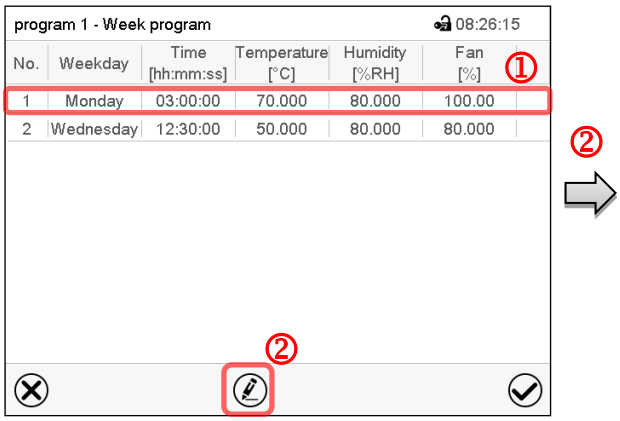
10.4 Program editor: program management

Path: ***Main menu > Programs > Week program***



"Week program" menu:
overview of the existing programs.

Select an existing program (example: program 1).



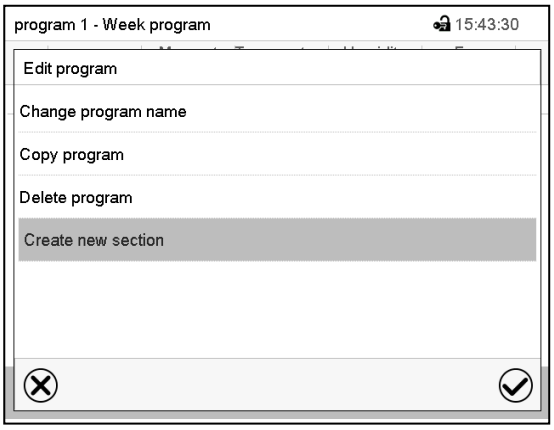
Program view (example: program 1).

If a new program has been created, there is just one program section.

There are the following options:

① Select a program section to open the section editor (chap. 10.5)

② Press the ***Edit*** icon to open the program editor

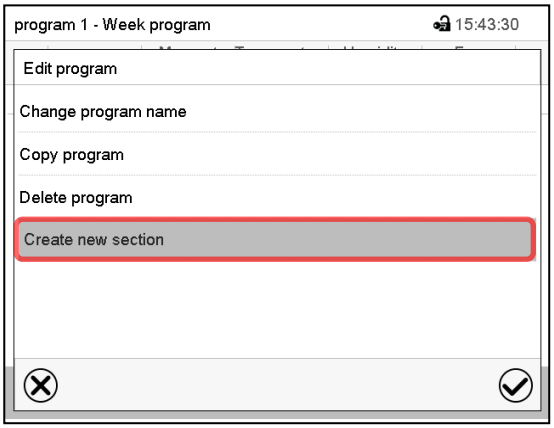


Program editor: "Edit program" menu.

Select the desired function and press the ***Confirm*** icon.

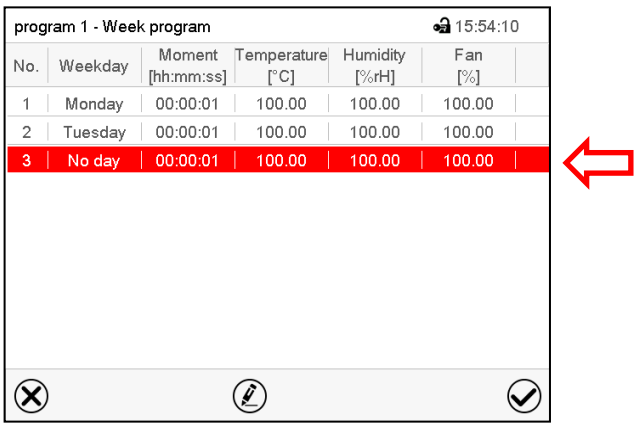
The program editor offers following options:

- Change program name. This menu also offers to configure the ramp / step mode setting (chap. 10.6.1).
- Copy program
- Replace program: Replacing a new or an existing program with the copied program. This menu point is visible only after a section has been copied.
- Delete program
- Create new section



To add a new section, select “Create new section” and press the ***Confirm*** icon.

The program view opens.



Program view.

With a new section no weekday is specified. Therefore, the section is first marked in red and cannot be saved.

A new section is always added at the very bottom (example: section 3). When the section start is specified the sections are automatically arranged in the correct chronological order.

10.4.1 Deleting a week program

Path: ***Main menu > Programs > Week program***

In the “Week program” menu select the program to be deleted. The program view opens.

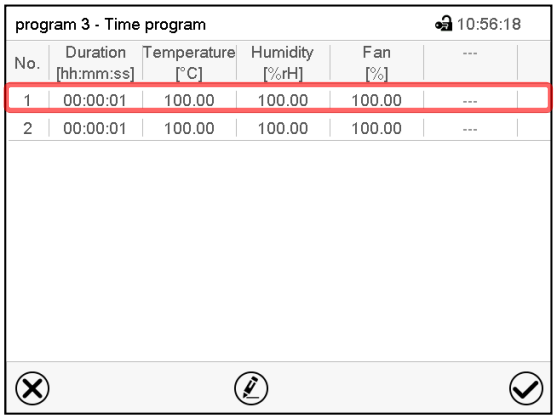
In the **program view** press the ***Edit*** icon to open the program editor

In the **program editor** select “Delete program” and press the ***Confirm*** icon.
The program is deleted. The controller returns to the program view.

10.5 Section editor: section management

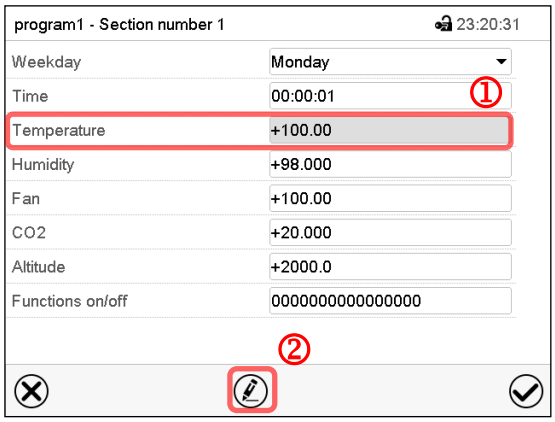
Path: ***Main menu > Programs > Week program***

Select the desired program.



Program view.

Select the desired program section (example: section 1)

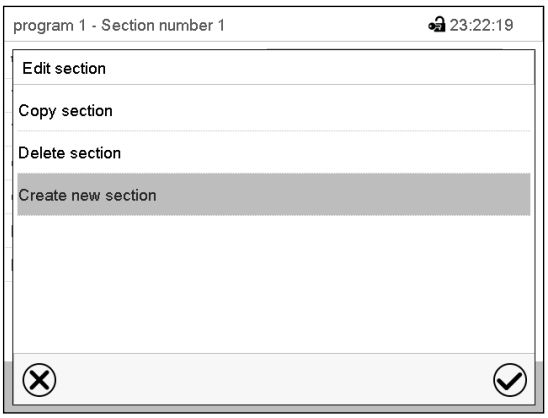


Section view (example: section 1).

There are the following options:

① Select a parameter to enter or modify the according value (chap. 10.6)

② Press the ***Edit*** icon to open the program editor



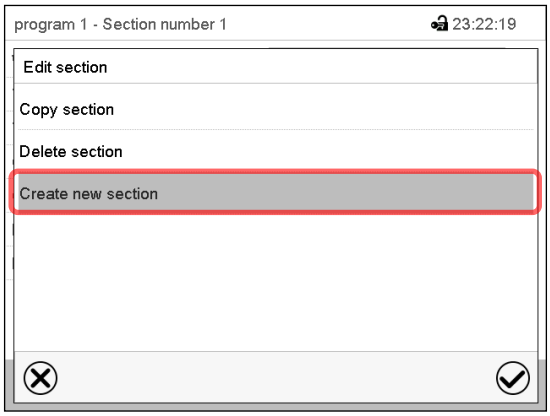
Section editor: “Edit section” menu

Select the desired function and press the ***Confirm*** icon.

The section editor offers following options:

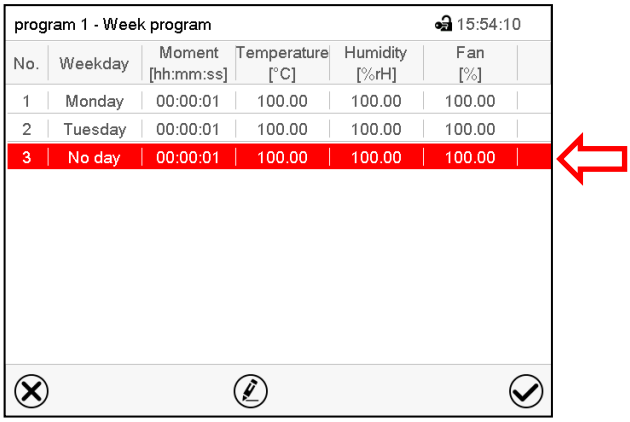
- Copy section
- Replace section: Replacing an existing section with the copied section. This menu point is visible only after a section has been copied.
- Insert section: Adding the copied section. This menu point is visible only after a section has been copied.
- Delete section
- Create new section

10.5.1 Add a new program section



Section editor: “Edit section” menu.

Select “Create new section” and press the ***Confirm*** icon.

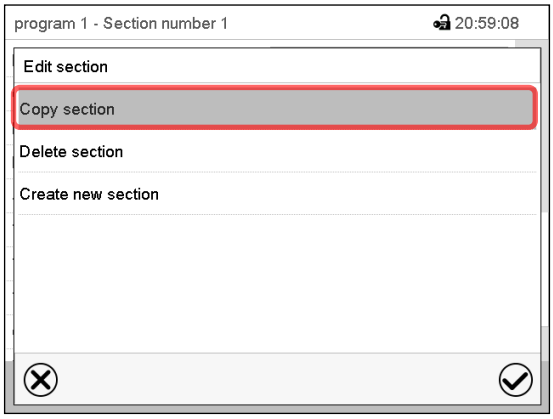


Program view.

With a new section no weekday is specified. Therefore, the section is first marked in red and cannot be saved.

A new section is always added at the very bottom (example: section 3). When the section start is specified the sections are automatically arranged in the correct chronological order.

10.5.2 Copy and insert or replace a program section

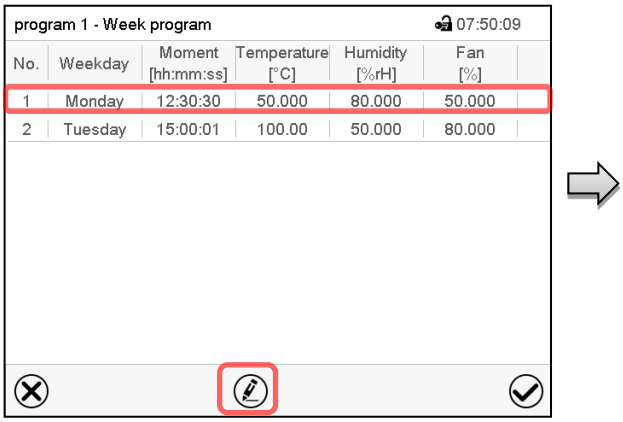


Section editor: “Edit section” menu

Select “Copy section” and press the ***Confirm*** icon.

The current section (example: section 1) is copied.

The controller returns to the program view.

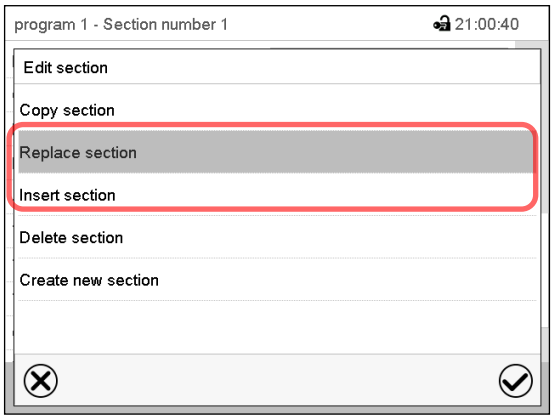


Program view

Select the section to be replaced or before or after which the copied section shall be inserted (example: section 2).

Press the ***Confirm*** icon

The controller returns to the section editor



Section editor: “Edit section” menu

Select “Replace section” to replace the selected section with the copied section

or

Select “Insert section” to additionally add the copied section.

Press the ***Confirm*** icon.

If you selected “Insert section” the sections are automatically arranged in the correct chronological order.

10.5.3 Deleting a program section

In the **program view** select the program section to be deleted. The section view opens.

In the **section view** press the ***Edit*** icon to open the section editor

In the **section editor** select “Delete section” and press the ***Confirm*** icon.
The section is deleted. The controller returns to the section view.

10.6 Value entry for a program section

Path: ***Main menu > Programs > Week program***

Select the desired program and section.

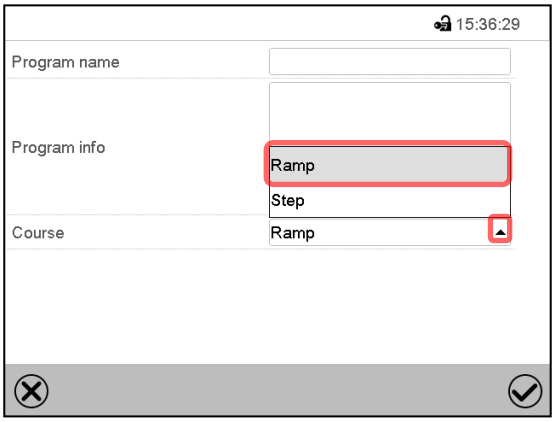
The setting and control ranges for the individual parameters are the same as for “Fixed value” operating mode (chap. 8).

10.6.1 Set-point ramp and set-point step modes

The explanation of the settings “Ramp” or “Step” is given in chap. 9.7.2.

You can define the type of temperature, humidity and CO_2 transitions for the entire week program.

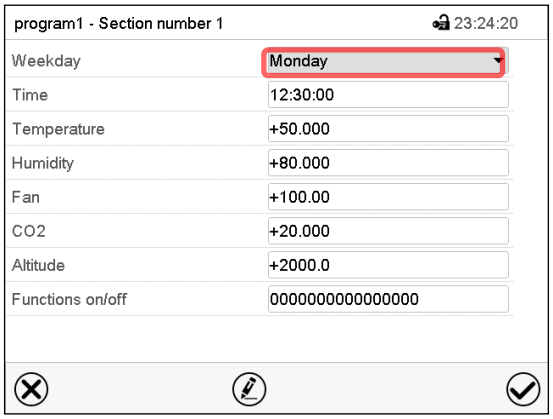
Select the desired program and press the ***Edit*** icon to open the program editor. In the program editor select the “Change program name” function and press the ***Confirm*** icon.



"Change program name" menu.

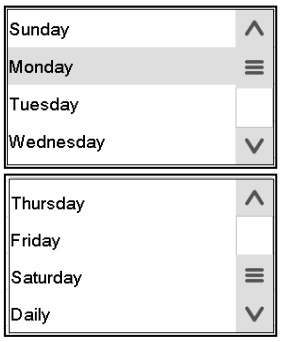
In the field "Course" select the desired setting "Ramp" or "Step" and press the ***Confirm*** icon.

10.6.2 Weekday



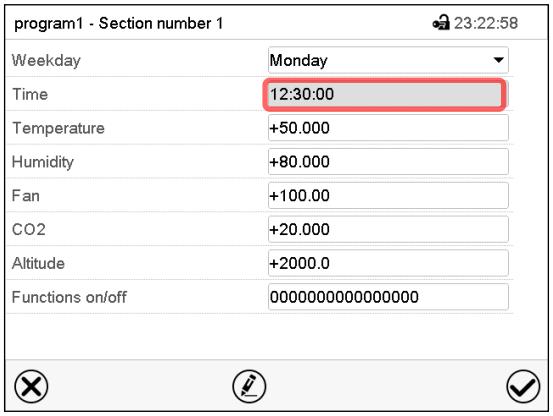
Section view.

In the field "Weekday" select the desired weekday.



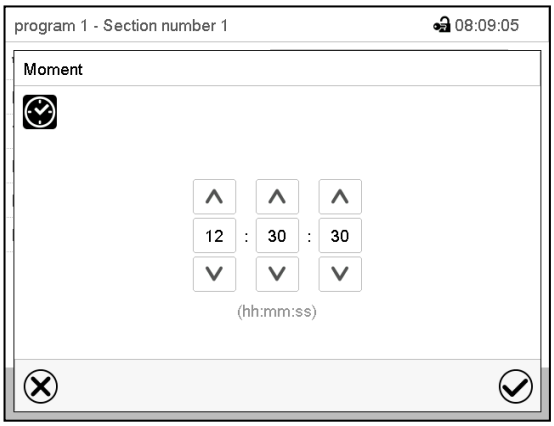
With "Daily" selected, this section will run every day at the same time.

10.6.3 Start time



Section view.

Select the field "Moment".



Entry menu "Moment".

Select with the arrow keys the desired start moment of the section and press the ***Confirm*** icon.

10.6.4 Setpoint entry

The CO_2 sensor is temperature resistant up to a maximum temperature of 60 °C / *140 °F*.

NOTICE

Danger of damage to the CO_2 sensor by excess temperature.

Damage to the CO_2 sensor.

∅ In program operating mode, make sure NOT to exceed the temperature of 60 °C / *140 °F*.

- Select the field “Temperature” and enter the desired temperature setpoint.

  KBF / KBF-UL setting range: -5 °C up to 70 °C, KBF PRO setting range: -20 °C up to 100 °C.

  Confirm entry with ***Confirm*** icon. The controller returns to the section view.
- Select the field “Humidity” and enter the desired humidity setpoint.

  KBF / KBF-UL setting range: 0% r.h. up to 80% r.h., KBF PRO setting range: 0% r.h. up to 100% r.h.

  Confirm entry with ***Confirm*** icon. The controller returns to the section view.
- Select the field “CO2” and enter the desired CO_2 setpoint.

  Setting range: 0 vol.-% up to 20 vol.-% or 0 vol.-% up to 1 vol.-%.

  Confirm entry with ***Confirm*** icon. The controller returns to the section view.
- Select the field “Fan” and enter the desired fan speed setpoint.

  Setting range: 40% up to 100% fan speed.

  Confirm entry with ***Confirm*** icon. The controller returns to the section view.

0-1 vol.-% CO_2 control range: Activate the controller function “CO2 meas.range 0…1 Vol.%” so that the correct conversion of the measured value can take place (chap. 10.6.5).

10.6.5 Special controller functions

You can define the switching state of up to 16 controller functions. They are used to activate / deactivate special controller functions.

- Controller function “Idle mode” activates / deactivates the operating mode “Idle mode”.
- Controller function “Humidification off”: Turns off humidification.
- Controller function “Dehumidification off”: Turns off dehumidification.
- Controller function “Internal light”: Activates the continuous interior light (option)
- Controller function “Door lock”: Activates the electro mechanical door lock (option)
- Controller function “Compressed air dryer”: Activates the compressed air dryer (option)
- Controller function “Object temp. control”: Activates the object temperature control (option)
- Controller function „CO2 meas.range 0…1 Vol.%“: Activates the CO_2 measurement 0-1 Vol.-%

The other controller functions are without function.

Select the desired program and section. You can set the controller functions in the “Functions on/off” field.

0-1 vol.-% CO_2 control range: Activate the controller function “CO2 meas.range 0…1 Vol.%” so that the correct conversion of the measured value can take place.

For details please refer to chap. 9.7.3.

11. Notification and alarm functions

11.1 Notification and alarm messages overview

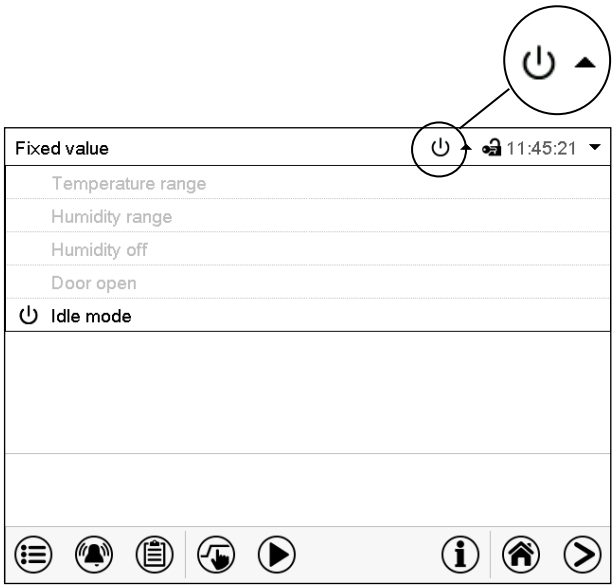
11.1.1 Notifications

Notifications are indicated by **information icons** displayed in the screen header in Normal display

An information icon serves as an indication of a certain condition.

If this condition persists, in some cases an alarm will be triggered after a fix or configurable interval. As long as the condition persists, the information icon therefore continues to be displayed also in state of alarm. If during alarm the conditions ends, e.g., if during a tolerance range alarm the actual value returns to within the tolerance range, the information icon disappears, whereas the alarm will continue until manual acknowledgement.

Press the flash icon next to the information icon to access the corresponding text information.



Normal display showing the text information.

The currently valid information texts are highlighted in black (example: “Idle mode”)

Condition	Information icon	Text information	Start after condition occurred
The controller is in Idle mode (chap. 5.4).		“Idle mode”	immediately
The current actual temperature value is outside the tolerance range (chap. 11.4)		“Temperature range”	immediately
The current actual humidity value is outside the tolerance range (chap. 11.4)		“Humidity range”	immediately
The humidification / dehumidification system is turned off (via controller function and/or by setting “Control on/off”) *or* Temperature setpoint below 0 °C or above 95 °C		“Humidity off”	immediately
CO_2 control turned off		“CO_2 off”	immediately
Chamber door open		“Door open”	immediately

Notifications are not shown in the event list.

11.1.2 Alarm messages

Condition	Alarm message	Start after condition occurred	Zero-voltage relay alarm output (option)
The current actual temperature value is outside the tolerance range (chap. 11.4)	“Temperature range alarm”	after configurable time	time as alarm start
The current actual humidity value is outside the tolerance range (chap. 11.4)	“Humidity range alarm”	after configurable time	time as alarm start
The current actual CO_2 value is outside the tolerance range (chap. 11.4)	“CO2 range	after configurable time	time as alarm start
Open chamber door	“Door open	after 5 minutes	----
Power failure	---	----	immediately
Setpoint of the safety controller exceeded	“Safety controller(high)”	immediately	----
Setpoint of the safety controller fallen below	“Safety controller(low)”	immediately	----
Door sensor defective	“Door sensor”	immediately	
Temperature sensor defective	e.g. “- - - - ” or “<-<-<” or “>->->”	immediately	----
Safety controller temperature sensor defective	“Safety controller sensor”	immediately	----
Patch cable for the data connection between CO_2 control box and cooling incubator/climate chamber not connected *OR* power supply unit of the CO_2 control box not connected	“CO2 module”	immediately	----
CO_2 sensor not correctly inserted into the holding tube	“CO2 sensor not ready”	immediately	----
Condensation on the CO_2 sensor head. Dry the filter cap (see chap. 13.3). *If after drying the message reappears:* CO_2 sensor may be defective. Contact BINDER Service.	“CO2 sensor not ready”	immediately	----
Condensation on the CO_2 sensor head for longer than 6 hours. Dry the filter cap (see chap. 13.3). *OR* CO_2 sensor defective. Contact BINDER Service.	“CO2 sensor fault”	immediately	----
With activated CO_2 control: CO_2 gas supply pressure too low (< 0,3 bar).	“CO2 pressure”	immediately	----

Alarm messages are displayed in the list of active alarms until acknowledging them. They are also shown in the event list.

Open door

The CO_2 gas inlet is interrupted immediately as soon as the door is opened. After 60 seconds from opening the door, heating, refrigeration, humidification, dehumidification and fan turn off.

Proceed as follows: Close the door. The alarm message is cancelled.

Low gas cylinder pressure

This alarm indication shows the pressure drop of the CO_2 admissions below a value of < 0.3 bar / *4.4 psi.* Check that the gas cylinder is open. If yes, you must replace the gas cylinder

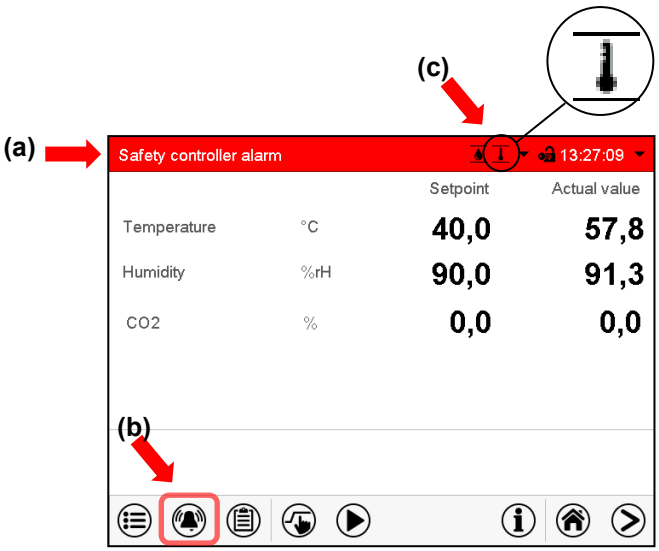
With activated CO_2 control:

- Visual indication on the controller at CO_2 pressure drop: “Low pressure CO2”

Proceed as follows: Confirm the alarm on the controller. Replace the corresponding gas cylinder. Observe the precautions and the maximum outlet pressure.

11.2 State of alarm

1. Visual indications in Normal display: alarm message, screen header flashing in red color
2. Audible alert, if the buzzer is enabled.
3. Switching the zero-voltage relay alarm output (option) to transmit the alarm e.g., to a central monitoring system.



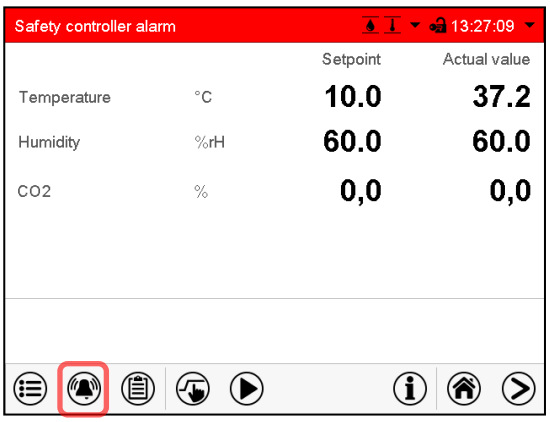
Normal display in state of alarm (example).

(a) Screen header flashing in red color and showing the alarm message

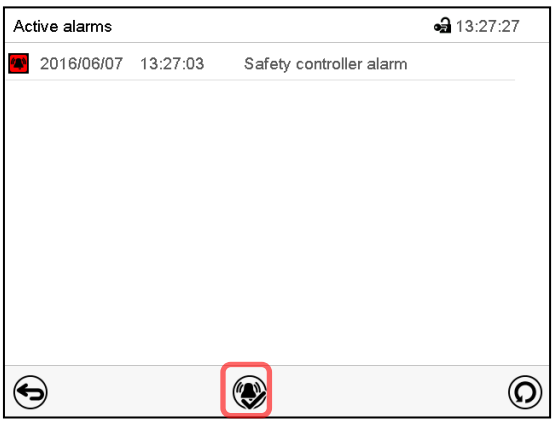
(b) ***Alarm*** icon on the bottom of the screen: change to the list of active alarms and alarm acknowledgement

(c) If applicable, information icon in the screen header. Indication of a certain condition

11.3 Resetting an alarm, list of active alarms



Normal display in state of alarm (example).
Press the ***Alarm*** icon



List of active alarms.
Press the ***Reset alarm*** icon.

Pressing the ***Reset alarm*** icon mutes the buzzer for all active alarms. The icon then disappears.

- Acknowledging while the alarm condition persists: Only the buzzer turns off. The visual alarm indication remains on the controller display. The alarm remains in the list of active alarms.

  When the alarm condition has ended, the visual alarm indication is automatically cleared. After closing and reopening the display or pressing the refresh button at the bottom right, the alarm is then no longer in the list of active alarms.

- Acknowledging after the alarm condition has ended: The buzzer and the visual alarm indication are reset together. After pressing the refresh button at the bottom right, the alarm is then no longer in the list of active alarms.

- The zero-voltage relay alarm output resets together with the alarm.

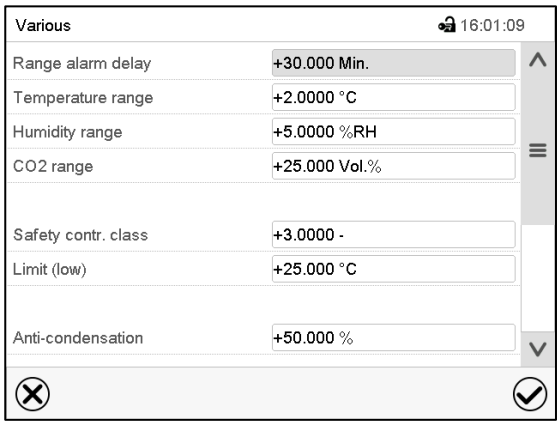
11.4 Tolerance range settings

In this menu you can set for each parameter individually (temperature, humidity, CO_2) the deviation between the actual value and setpoint which that shall cause a tolerance range alarm.

This function only activates after the set-point has been reached once.

Also you can specify the delay time after which the range alarm will be triggered.

Path: ***Main menu > Settings > Various***



Submenu “Various”.

- Select the field “Range alarm delay” and enter the time in minutes, after which the range alarm shall be triggered. Setting range: 15 min to 120 min. Confirm entry with ***Confirm*** icon.
- Select the field “Temperature range” and enter the desired value for the temperature range. Setting range: 2 °C to 10 °C. Confirm entry with ***Confirm*** icon.
- Select the field “Humidity range” and enter the desired value for the humidity range. Setting range: 5% r.h. to 20% r.h. Confirm entry with ***Confirm*** icon.
- Select the field “CO2 range” and enter the desired value for the CO_2 range. Setting range: 1 vol.-% to 10 vol.-%. Confirm entry with ***Confirm*** icon.
- After completing the settings, press the ***Confirm*** icon to take over the entries and exit the menu, **or** press the ***Close*** icon to exit the menu without taking over the entries.

If there are actual values outside the tolerance range the following information icons for the corresponding parameter are displayed:

Icon	Signification	Information
	“Temperature range”	The temperature value is outside the tolerance range
	“Humidity range”	The humidity value is outside the tolerance range
	“CO2 range	The CO_2 value is outside the tolerance range

If the condition persists, an alarm is triggered after the configured interval (“range alarm delay”). It is visually indicated in Normal display. If the alarm buzzer is activated there is an audible alert. The zero-voltage relay alarm output (option) switches to transmit the alarm. The alarm is shown in the list of active alarms (chap. 11.3).

11.5 Analog outputs for CO_2 on the CO_2 control box

The CO_2 control box is equipped with analog outputs 4-20 mA for CO_2. These outputs allow transmitting data to external data registration systems or devices.

The connection is realized as a socket (10) on the bottom of the CO_2 control box as follows.

ANALOG OUTPUT 4-20 mA DC

PIN 1: CO_2 +
PIN 2: CO_2 –
PINs 3+4 are not used.

CO_2 range: 0 vol.-% up to 20 vol.-% or 0 vol.-% up to 1 vol.-%
A suitable plug is enclosed.

Figure 21: Pin configuration of the socket “ANALOG OUTPUT” (10) for analog outputs

12. Cleaning and decontamination

Clean the chamber and accessory after each use in order to prevent potential corrosion damage by ingredients of the loading material.

Prior to renewed startup, allow the chamber and accessory to completely dry after all cleaning and decontamination measures.

DANGER

Electrical hazard by water entering the chamber.
Deadly electric shock.

- ∅ Do NOT spill water or cleaning agents over the inner and outer chamber surfaces.
- ∅ Do NOT put ANY cleaning aids (cloth or brush) into slots or openings on the chamber.
- ➢ Before cleaning, turn off the cooling incubator/climate chamber at the On/Off switch (H) and disconnect the power plug. Let the chamber cool down to ambient temperature.
- ➢ Disconnect the CO_2 control box from the power supply (pull the plug of the power supply unit).
- ➢ Completely dry the chamber and accessory before turning it on again.

12.1 Cleaning

Disconnect the chamber from the power supply before cleaning. Pull the power plug.

	The interior of the chamber must be kept clean. Thoroughly remove any residues of test material.

Wipe the surfaces with a moistened towel. In addition, you can use the following cleaning agents:

Exterior surfaces of the CO_2 control box	Standard commercial cleaning detergents free from acid or halides. Alcohol-based solutions. We recommend using the neutral cleaning agent Art. No. 1002-0016.
CO_2 sensor	Alcohol-based solutions Do not immerse the CO_2 sensor into the solution. Disinfection with alcohol or an alcohol-based surface disinfectant without corrosive effect, free from acid or halides. We recommend using the disinfectant spray Art. No. 1002-0022.

Do not use cleaning agents that may cause a hazard due to reaction with components of the device or the loading material. If there is doubt regarding the suitability of cleaning products, please contact BINDER service.

We recommend using the neutral cleaning agent Art. No. 1002-0016 for a thorough cleaning.
Any corrosive damage that may arise following use of other cleaning agents is excluded from liability by BINDER GmbH.
Any corrosive damage caused by a lack of cleaning, is excluded from liability by BINDER GmbH.

NOTICE

Danger of corrosion by using unsuitable cleaners.
Damage to the accessory.
∅ Do NOT use acidic or chlorine cleaning detergents.
∅ Do NOT use a neutral cleaning agent on other kind of surfaces.

For surface protection, perform cleaning as quickly as possible.
After cleaning completely remove cleaning agents from the surfaces with a moistened towel. Let the chamber dry.

Soapsuds may contain chlorides and must therefore NOT be used for cleaning.

With every cleaning method, always use adequate personal safety controls.

Following cleaning, leave the chamber door open or remove the access port plugs.

The neutral cleaning agent may cause health problems in contact with skin and if ingested. Follow the operating instructions and safety hints labeled on the bottle of the neutral cleaning agent.

Recommended precautions: To protect the eyes use sealed protective goggles. Wear gloves. Suitable protective gloves in full contact with media: butyl or nitrile rubber, penetration time >480 minutes.

CAUTION

Danger of chemical burns through contact with skin or ingestion of the neutral cleaning agent.

Skin and eye damage. Environmental damage.

∅ Do not ingest the neutral cleaning agent. Keep it away from food and beverages.

∅ Do NOT empty the neutral cleaning agent into drains.

➢ Wear protective gloves and goggles.

➢ Avoid skin contact with the neutral cleaning agent.

12.2 Decontamination / chemical disinfection of the CO_2 control box

The operator must ensure that proper decontamination is performed in case a contamination of the chamber by hazardous substances has occurred.

Disconnect the chamber from the power supply prior to chemical decontamination. Pull the power plug.

Do not use decontamination agents that may cause a hazard due to reaction with components of the device or the loading material. If there is doubt regarding the suitability of cleaning products, please contact BINDER service.

You can use the following disinfectants:

Exterior surfaces of the CO_2 control box	Standard commercial surface disinfectants free from acid or halides. Alcohol-based solutions. We recommend using the disinfectant spray Art. No. 1002-0022.

	For chemical disinfection, we recommend using the disinfectant spray Art. No. 1002-0022. Any corrosive damage that may arise following use of other disinfectants is excluded from liability by BINDER GmbH.

	With every decontamination / disinfection method, always use adequate personal safety controls.

In case of contamination of the interior by biologically or chemically hazardous material, there are two possible procedures depending on the type of contamination and loading material:

1. Spray the inner chamber with an appropriate disinfectant.

   Before start-up, the chamber must be absolutely dry and ventilated, as explosive gases may form during the decontamination process.

2. If necessary, have strongly contaminated inner chamber parts removed by an engineer for cleaning, or have them exchanged. Sterilize the inner chamber parts in a sterilizer or autoclave.

	In case of eye contact, the disinfectant spray may cause eye damage due to chemical burns. Follow the operating instructions and safety hints labeled on the bottle of the disinfectant spray.

Recommended precautions: To protect the eyes use sealed protective goggles.

CAUTION

Danger of chemical burns through eye contact with the disinfectant spray.

Eye damage. Environmental damage

∅ Do NOT empty the disinfectant into drains.

➢ Wear protective goggles.

After using the disinfectant spray, allow the device to dry thoroughly, and aerate it sufficiently.

12.3 Disinfection of the CO_2 sensor

To ensure complete disinfection and proper function of the sensor, BINDER recommends a wipe disinfection of the sensor head with pure alcohol or non-corrosive alcohol-based surface disinfectants. The disinfectant must be non-corrosive and free of chlorine or any acid. We recommend using the disinfectant Art. No. 1002-0022. Avoid strong shocks when handling the CO_2 sensor.

NOTICE

Danger of damage to the CO_2 sensor through improper handling (excess temperature, immersion into liquids, shocks).

Damage to the CO_2 sensor.

∅ Do NOT immerse the CO_2 sensor into liquids.

∅ Do NOT expose the CO_2 sensor to autoclaving.

∅ Do NOT expose the CO_2 sensor to hot-air sterilization.

➢ Avoid strong shocks of the CO_2 sensor (by putting it down hard, or dropping).

We recommend regular disinfection of the CO_2 sensor.

NOTICE

Danger of damage to the CO_2 sensor when connecting or removing it during operation.

Damage to the CO_2 sensor.

➢ Connect or remove the CO_2 sensor only with the chamber turned off.

Recommended procedure:

- Turn off the chamber
- Pull out the sensor
- Spray the sensor head with alcohol or wipe it clean with a soaked cloth. Observe the reaction time of the disinfectant used.
- Before reinserting the CO_2 sensor, it must be completely dry.
- The filter in the front of the sensor only needs replacing when damaged or dirty.

The CO_2 sensor head was especially adjusted for the specific chamber. To avoid confusion, an adhesive label with a serial number is adhered to the sensor head. When exchanging the sensor, repeat CO_2 adjustment.

NOTICE

Danger of confusing CO_2 sensors.

Invalid calibration.

- ➢ Do NOT change the CO_2 sensor head.
- ➢ Note down the serial number of the CO_2 sensor.

13. Maintenance and service, troubleshooting, repair, testing

13.1 General information, personnel qualification

- **Maintenance**

  See chap. 13.2

- **Simple troubleshooting**

  Chap. 13.3 describes troubleshooting by operating personnel. It does not require technical intervention into the chamber, nor disassembly of chamber parts.

  For personnel requirements please refer to chap. 1.1.

- **Detailed troubleshooting**

  If errors cannot be identified with simple troubleshooting, further troubleshooting must be performed by BINDER Service or by BINDER qualified service partners or technicians.

- **Repair**

  Repair of the chamber can be performed by BINDER Service or by BINDER qualified service partners or technicians.

  After maintenance, the chamber must be tested prior to resuming operation.

- **Electrical testing**

  To prevent the risk of electrical shock from the electrical equipment of the chamber, an annual repeat inspection as well as a test prior to initial startup and prior to resuming operation after maintenance or repair, are required. This test must meet the requirements of the competent public authorities. We recommend testing under EN 50678/VDE 0701 and EN 50699/VDE 0702.

13.2 Maintenance intervals, service

DANGER

Electrical hazard during live maintenance work.

Deadly electric shock.

- ∅ The chamber must NOT become wet during operation or maintenance works.
- ∅ Do NOT remove the rear panel of the chamber.
- ➢ Disconnect the cooling incubator/climate chamber before conducting maintenance work. Turn off the On/Off switch (H) and pull the power plug.
- ➢ Disconnect the CO_2 control box from the power supply (pull the plug of the power supply unit).
- ➢ Make sure that general maintenance work will be conducted by licensed electricians or experts authorized by BINDER.

	The warranty becomes void if maintenance work is conducted by non-authorized personnel.

We recommend a calibration/adjustment of the CO_2 sensor. Please contact BINDER Service. When exchanging the sensor, you must repeat the CO_2 adjustment.

We recommend taking out a maintenance agreement. Please consult BINDER Service:

BINDER telephone hotline:	+49 (0) 7462 2005 555
BINDER fax hotline:	+49 (0) 7462 2005 93555
BINDER service hotline USA:	+1 866 885 9794 or +1 631 224 4340 x3 (toll-free in the USA)
BINDER service hotline Asia Pacific:	+852 390 705 04 or +852 390 705 03
BINDER Internet website	http://www.binder-world.com
BINDER address	BINDER GmbH, post office box 102, 78502 Tuttlingen, Germany

International customers, please contact your local BINDER distributor.

13.3 Troubleshooting

Defects and shortcomings can compromise the operational safety of the chamber and can lead to risks and damage to equipment and persons. If there are is a technical fault or shortcoming, take the chamber out of operation and inform BINDER Service. If you are not sure whether there is a technical fault, proceed according to the following list. If you cannot clearly identify an error or there is a technical fault, please contact BINDER Service.

	Only qualified service personnel authorized by BINDER must perform repair. Repaired chambers must comply with the BINDER quality standards.

Fault description	Possible cause	Required measures
Excess CO_2 concentration. Having reached the setpoint, CO_2 exceeds the setpoint by more than the set tolerance range value (more than 10 min.) Alarm message “CO2 range”	Temporary disturbance of the CO_2control.	Acknowledge the alarm on the controller. Turn off the chamber. Open the chamber doors for approx. 5 minutes. Observe the general information for safe handling of CO_2 (chap. 1.9). Turn on the chamber again. Upon renewed alarm, contact BINDER service.
	Temporary disturbance of the CO_2control.	Acknowledge the alarm on the controller. Contact BINDER Service.
Recovery time (up to 5 vol.-% CO_2) after doors were open for 2 minutes is < 2 minutes	CO_2 sensor system defective.	Contact BINDER Service.
Too low CO_2 concentration. Having reached the setpoint, CO_2 falls below the setpoint by more than the set tolerance range value (more than 10 min.) ***or*** CO_2 doesn’t reach the tolerance range within 3 hours from turning on the chamber or closing the door. Alarm message “CO_2 range”	Temporary disturbance of the CO_2control.	Acknowledge the alarm on the controller. Turn off the chamber. After approx. 5 minutes turn on the chamber again. Upon renewed alarm, contact BINDER service.
	CO_2 sensor defective.	Acknowledge the alarm on the controller. Contact BINDER Service.

Fault description	Possible cause	Required measures
Too low gas concentration. The concentration of CO_2 or O_2 (chamber with O_2 control) does not reach the adjusted set value.	Door gaskets defective.	Replace door gaskets
	Doors not closed properly.	Close door properly.
	Connected gas cylinder is empty or not opened.	Open or replace gas cylinder.
	Gas cylinder is not connected correctly.	Correctly connect the gas cylinder.
	Gas hose is dirty or obstructed.	Check the tube system for dirt accumulation or obstruction, clean or replace it.
Recovery time (up to 5 vol.-% CO_2) after doors were open for 2 minutes is > 10 minutes.	Obstructed gas supply.	Check gas supply (cylinder, connections, hose system).
	Insufficient CO_2 input pressure	
Unusually high gas consumption.	Door gaskets defective.	Replace door gaskets
	Gas sensor not adjusted.	Calibrate the sensor.
	Gas sensor defective.	Contact BINDER Service
	Gas fine filter not connected correctly.	Connect fine filter correctly.
The displayed actual value of CO_2 deviates largely compared with a reference method.	CO_2 control not adjusted.	Calibrate and adjust CO_2 control.
	CO_2 sensor defective.	Contact BINDER Service
Condensation on the glass door and on the CO_2 sensor head under the filter cap. Alarm message: “CO2 sensor not ready”. After 6 hours with no user reaction, this message is replaced by the alarm message: “CO2 sensor fault”.	Outer door open and inner glass door closed for more than 5 minutes	Acknowledge the alarm on the controller. Remove the filter cap and let it dry until there is no visible condensation. Plug on the filter cap. *If after drying the alarm message reappears*, contact BINDER Service.
	Power failure for more than 5 minutes	
	CO_2 sensor defective	Acknowledge the alarm on the controller. Contact BINDER Service.

13.4 Sending the accessory back to BINDER GmbH

If you return a BINDER product to us for repair or any other reason, we will only accept the product upon presentation of an **authorization number** (RMA number) that has previously been issued to you. An authorization number will be issued after receiving your complaint either in writing or by telephone **prior** to your sending the BINDER product back to us. The authorization number will be issued following receipt of the information below:

- BINDER product type and serial number
- Date of purchase
- Name and address of the dealer from which you bought the BINDER product
- Exact description of the defect or fault
- Complete address, contact person and availability of that person
- Exact location of the BINDER product in your facility
- A contamination clearance certificate (chap. 17) must be faxed in advance

The authorization number must be applied to the packaging in such a way that it can be easily recognized or be recorded clearly in the delivery documents.

	For security reasons we cannot accept a chamber delivery if it does not carry an authorization number.

Return address: BINDER GmbH, Abteilung Service, Gänsäcker 16, 78502 Tuttlingen, Germany

14. Disposal

14.1 Disposal of the transport packing

Packing element	Material	Disposal
Transport box with metal clamps	Cardboard	Paper recycling
	Metal	Metal recycling
Top cover	Cardboard	Paper recycling
Edge protection	Styropor® or PE foam	Plastic recycling
Bag for operating manual	PE foil	Plastic recycling
Insulating air cushion foil	PE foil	Plastic recycling

If recycling is not possible, all packing parts can also be disposed of with normal waste.

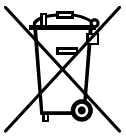
14.2 Decommissioning

- Turn off the cooling incubator/climate chamber at the On/Off switch (H) and disconnect it from the power supply (pull the power plug).
- Disconnect the CO_2 control box from the power supply (pull the plug of the power supply unit).
- Turn off the CO_2 supply. Remove the gas connection.
- Temporal decommissioning: See indications for appropriate storage.
- Final decommissioning: Dispose of the chamber as described in chap. 14.3 to 14.5.

14.3 Disposal of the accessory in the Federal Republic of Germany

According to Annex I of Directive 2012/19/EU of the European Parliament and of the Council on waste electrical and electronic equipment (WEEE), BINDER devices are classified as “monitoring and control instruments” (category 9) only intended for professional use”. They must not be disposed of at public collecting points.

The accessory bears the symbol for the marking of electrical and electronic equipment manufactured / placed on the market in the EU after 13 August 2005 and be disposed of in separate collection according to Directive 2012/19/EU on waste electrical and electronic equipment (WEEE) and German national law for electrical and electronic equipment (Elektro- und Elektronikgerätegesetz, ElektroG). WEEE marking: crossed-out wheeled bin. A significant part of the materials must be recycled in order to protect the environment.



At the end of the device’s service life, have the accessory disposed of according to the German national law for electrical and electronic equipment (Elektro- und Elektronikgerätegesetz, ElektroG from 20 October 2015, BGBl. I p. 1739) or contact BINDER service who will organize taking back and disposal of the chamber according to the German national law for electrical and electronic equipment (Elektro- und Elektronikgerätegesetz, ElektroG from 20 October 2015, BGBl. I p. 1739).

NOTICE

Danger of violation against existing law if not disposed of properly.

Failure to comply with applicable law.

∅ Do NOT dispose of BINDER devices at public collecting points.

➢ Have the device disposed of professionally at a recycling company which is certified according to the German national law for electrical and electronic equipment (Elektro- und Elektronikgerätegesetz, ElektroG from 20 October 2015, BGBl. I p. 1739).

or

➢ Instruct BINDER Service to dispose of the device. The general terms of payment and delivery of BINDER GmbH apply, which were valid at the time of purchasing the chamber.

Certified companies disassemble waste (used) BINDER equipment in primary substances for recycling according to Directive 2012/19/EU. The devices must be free from toxic, infectious or radioactive substances in order to eliminate any health hazards to the employees of the recycling companies.

Prior to handing the chamber over to a recycling company, it is the user's responsibility that it is free from toxic, infectious or radioactive substances.

- Prior to disposal, clean all introduced or residual toxic substances from the chamber.
- Prior to disposal, disinfect the chamber from all sources of infection. Be aware that sources of infection may also be located outside the inner chamber.
- If you cannot safely remove all toxic substances and sources of infection from the chamber, dispose of it as special waste according to national law.
- Fill out the contamination clearance certificate (chap. 17) and enclose it with the chamber.

WARNING

Danger of intoxication and infection through contamination of the chamber with toxic, infectious or radioactive substances.

Damages to health.

∅ NEVER take a chamber contaminated with toxic substances or sources of infection for recycling according to Directive 2012/19/EU.

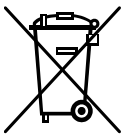
➢ Prior to disposal, remove all toxic substances and sources of infection from the chamber.

➢ A chamber from which all toxic substances or sources of infection cannot be safely removed must be considered as "special" waste according to national law. Dispose of it accordingly.

14.4 Disposal of the accessory in the member states of the EU except for the Federal Republic of Germany

According to Annex I of Directive 2012/19/EU of the European Parliament and of the Council on waste electrical and electronic equipment (WEEE), BINDER devices are classified as "monitoring and control instruments" (category 9) only intended for professional use". They must not be disposed of at public collecting points.

The accessory bears the symbol for the marking of electrical and electronic equipment manufactured / placed on the market in the EU after 13 August 2005 and be disposed of in separate collection according to the Directive 2012/19/EU on waste electrical and electronic equipment (WEEE). WEEE marking: crossed-out wheeled bin.



At the end of the device's service life, notify the distributor who sold you the device, who will take back and dispose of the chamber according to the Directive 2012/19/EU on waste electrical and electronic equipment (WEEE).

NOTICE

Danger of violation against existing law if not disposed of properly.

Failure to comply with applicable law.

∅ Do NOT dispose of BINDER devices at public collecting points.

➢ Have the device disposed of professionally at a recycling company that is certified according to conversion of the Directive 2012/19/EU into national law.

or

➢ Instruct the distributor who sold you the device to dispose of it. The agreements apply that were agreed with the distributor when purchasing the chamber (e.g. his general terms of payment and delivery).

➢ If your distributor is not able to take back and dispose of the chamber, please contact BINDER service.

Certified companies disassemble waste (used) BINDER equipment in primary substances for recycling according to Directive 2012/19/EU. The devices must be free from toxic, infectious or radioactive substances in order to eliminate any health hazards to the employees of the recycling companies.

Prior to handing the chamber over to a recycling company, it is the user's responsibility that it is free from toxic, infectious or radioactive substances.

- Prior to disposal, clean all introduced or residual toxic substances from the chamber.
- Prior to disposal, disinfect the chamber from all sources of infection. Be aware that sources of infection may also be located outside the inner chamber.
- If you cannot safely remove all sources of infection and toxic substances from the chamber, dispose of it as special waste according to national law.
- Fill out the contamination clearance certificate (chap. 17) and enclose it with the chamber.

WARNING

Danger of intoxication and infection through contamination of the chamber with toxic, infectious or radioactive substances.

Damages to health.

∅ NEVER take a chamber contaminated with toxic substances or sources of infection for recycling according to Directive 2012/19/EU.

➢ Prior to disposal, remove all toxic substances and sources of infection from the chamber.

➢ A chamber from which all toxic substances or sources of infection cannot be safely removed must be considered as "special" waste according to national law. Dispose of it accordingly.

14.5 Disposal of the accessory in non-member states of the EU

NOTICE

Danger of violation against existing law if not disposed of properly.

Failure to comply with applicable law. Alteration of the environment.

➢ For final decommissioning and disposal of the accessory, please contact BINDER service.

➢ Follow the statutory regulations for appropriate, environmentally friendly disposal.

15. Technical Data

Exterior dimensions of the CO_2 control box		
Length	mm / *inch*	608 / *23.94*
Height	mm / *inch*	287 / *11.30*
Depth	mm / *inch*	112 / *4.41*
Weight of the CO_2 control box		
Weight	kg / *lbs.*	6.5 / *14.3*
CO_2 data with 0-20 vol.-% system		
CO_2 control range	vol.-%	0-20
Recovery time after opening the doors for 30 s size 260	minutes	7
Recovery time after opening the doors for 30 s size 470	minutes	8
Recovery time after opening the doors for 30 s size 720	minutes	11
Recovery time after opening the doors for 30 s size 1060	minutes	15
Recovery time after opening the doors for 30 s size 1600	minutes	19
CO_2 data with 0-1 vol.-% system		
CO_2 control range	vol.-%	0-1
Recovery time after opening the doors for 30 s size 260	minutes	8
Recovery time after opening the doors for 30 s size 470	minutes	12
Recovery time after opening the doors for 30 s size 720	minutes	14
Recovery time after opening the doors for 30 s size 1060	minutes	20
Recovery time after opening the doors for 30 s size 1600	minutes	28
Electrical data		
System of protection acc. to EN 60529	IP	20
Nominal voltage	V	24 V DC
Power plug		Power supply unit with adapters
Nominal power	kW	0.03
Installation category acc. to IEC 61010-1		II
Pollution degree acc. to IEC 61010-1		2

All indications are average values, typical for chambers produced in series. We reserve the right to change technical specifications at any time.

16. Certificates and declarations of conformity

16.1 EU Declaration of Conformity

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EU-Konformitätserklärung / EU Declaration of Conformity / Déclaration de conformité UE / Declaración de conformidad UE / Dichiarazione di conformità UE / Декларация соответствия EU

Hersteller / Manufacturer / Fabricant / Fabricante / Fabbricante / Производитель	BINDER GmbH
Anschrift / Address / Adresse / Dirección / Indirizzo / Адрес	Im Mittleren Ösch 5, 78532 Tuttlingen, Germany
Produkt / Product / Produit / Producto / Prodotto / Продукт	BINDER CO_2-Begasungsmodul BINDER CO_2 Control Module BINDER Module de gazage au CO_2 BINDER Módulo de gasificación de CO_2 BINDER Modulo di gassificazione CO_2 BINDER Модуль для фумигации CO_2
Typenbezeichnung / Type / Type / Tipo / Tipo / Тип	Zubehör für KB PRO, KBF und KBF PRO (E7) Accessories for KB PRO, KBF and KBF PRO (E7) Accessoires pour KB PRO, KBF et KBF PRO (E7) Accesorios para KB PRO, KBF y KBF PRO (E7) Accessori per KB PRO, KBF e KBF PRO (E7) Аксессуары для KB PRO, KBF и KBF PRO (E7)
Art. No. / Art. no. / Réf. / Art. Nº / Art. n. / № арт.	8012-2138 8012-2140

Die oben beschriebenen Produkte sind konform mit folgenden EU-Richtlinien:
The products described above are in conformity with the following EU Directives:
Les produits décrits ci-dessus sont conformes aux directives UE suivantes:
Los productos descritos arriba cumplen con las siguientes directivas de la UE:
I prodotti sopra descritti sono conformi alle seguenti direttive UE:
Продукты, указанные выше, полностью соответствуют следующим EU руководствам:

- **2014/35/EU**
  Niederspannungsrichtlinie 2014/35/EU / Low voltage directive 2014/35/EU / Directive basse tension 2014/35/UE / Directiva sobre baja tensión 2014/35/UE / Direttiva Bassa tensione 2014/35/UE / Директива по низкому напряжению 2014/35/EU
- **2014/30/EU**
  EMV-Richtlinie 2014/30/EU / EMC Directive 2014/30/EU / Directive CEM 2014/30/UE / Directiva CEM 2014/30/UE / Direttiva EMC 2014/30/UE / Директива ЭМС 2014/30/EU
- **2011/65/EU, (EU) 2015/863**
  RoHS-Richtlinien 2011/65/EU und (EU) 2015/863 / RoHS Directives 2011/65/EU and (EU) 2015/863 / Directives RoHS 2011/65/UE et (UE) 2015/863 / Directivas RoHS 2011/65/UE y (UE) 2015/863 / Direttive RoHS 2011/65/UE et (UE) 2015/863 / Директивы RoHS 2011/65/EU и (EU) 2015/863

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Deutschland

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Fax: +49 (0) 74 62 / 20 05 - 100
info@binder-world.com
www.binder-world.com

Geschäftsführung:
Dipl.-Ing. Peter M. Binder,
Michael Binder-Pfaff, Peter Wimmer,
Benjamin Jeuthe
Amtsgericht Stuttgart, HRB 727150
Sitz der Gesellschaft: Tuttlingen
Ust.-ID.-Nr.: DE815021304

Kreissparkasse Tuttlingen
IBAN: DE05 6435 0070 0000 0022 66
SWIFT: SOLA DE S1TUT
Deutsche Bank Tuttlingen
IBAN: DE56 6537 0075 0213 8709 00
SWIFT: DEUT DE SS653

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Die oben beschriebenen Produkte tragen entsprechend die Kennzeichnung CE.
The products described above, corresponding to this, bear the CE-mark.
Les produits décrits ci-dessus, en correspondance, portent l'indication CE.
Los productos descritos arriba, en conformidad, llevan la indicación CE.
I prodotti sopra descritti, conformi a quanto sopra, portano il marchio CE.
Данные продукты в соответствии с изложенным выше маркированы знаком CE.

Die oben beschriebenen Produkte sind konform mit folgenden harmonisierten Normen:
The products described above are in conformity with the following harmonized standards:
Les produits décrits ci-dessus sont conformes aux normes harmonisées suivantes:
Los productos descritos arriba cumplen con las siguientes normas:
I prodotti sopra descritti sono conformi alle seguenti normative armonizzate:
Продукты, указанные выше, полностью соответствуют следующим стандартам:

2014/35/EU
• **EN 61010-1:2010+A1:2019+A1:2019/AC:2019** • **EN IEC 61010-2-012:2022 + A11:2022**
2014/30/EU
• **EN IEC 61326-1:2021**
2011/65/EU, (EU) 2015/863
• **EN IEC 63000:2018**

78532 Tuttlingen, 16.12.2024
BINDER GmbH

P. Wimmer
Chief Technology Officer
Chief Technology Officer (CTO)
Directeur de la technologie
Director de la tecnología
Direttore tecnico
Главный технический директор

J. Bollaender
Leiter F & E
Director R & D
Chef de service R&D
Responsable I & D
Direttore R & D
Глава департамента R&D

2 / 2

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16.2 UKCA Declaration of Conformity

BINDER
Best conditions for your success

UKCA Declaration of Conformity

Name and address of manufacturer	BINDER GmbH Im Mittleren Ösch 5, 78532 Tuttlingen, Germany
Name and address of UK Authorised Representative	Comply Express Ltd Unit C2, Coalport House, Stafford Park 1, Telford TF3 3BD
Object of the Declaration	BINDER CO_2 Control Module
Type Designation	Accessories for KB PRO, KBF and KBF PRO (E7)
BINDER Art. No.	8012-2138, 8012-2140

The Objects of the Declaration described above are in conformity with the relevant UK Regulations and UK Guidelines:

- **Electrical Equipment (Safety) Regulations 2016**
  Statutory Instruments 2016 No. 1101 – Consumer Protection Health and safety
- **Electromagnetic Compatibility Regulations 2016**
  Statutory Instruments 2016 No. 1091 – Electromagnetic Compatibility
- **The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012**
  Statutory Instruments 2012 No. 3032 – Environmental Protection

References of standards and/or technical specifications applied for this Declaration of Conformity, or parts thereof:

S.I. 2016 No. 1101:	EN 61010-1:2010+A1:2019+A1:2019/AC:2019 EN IEC 61010-2-012:2022 + A11:2022
S.I. 2016 No. 1091:	EN IEC 61326-1:2021
S.I. 2012 No. 3032:	EN IEC 63000:2018

This Declaration is issued under the sole responsibility of the manufacturer.

Tuttlingen	16.12.2024			
Place	Date	P. Wimmer Chief Technology Officer	J. Bollaender Director R & D	BINDER GmbH

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Deutsche Bank Tuttlingen
IBAN: DE56 6537 0075 0213 8709 00
SWIFT: DEUT DE SS653

17. Contamination clearance certificate

17.1 For chambers located outside USA and Canada

Declaration regarding safety and health

Erklärung zur Sicherheit und gesundheitlichen Unbedenklichkeit

The German Ordinance on Hazardous Substances (GefStofV), and the regulations regarding safety at the workplace, require that this form be filled out for all products that are returned to us, so that the safety and the health of our employees can be guaranteed

Die Sicherheit und Gesundheit unserer Mitarbeiter, die Gefahrstoffverordnung GefStofV und die Vorschriften zur Sicherheit am Arbeitsplatz machen es erforderlich, dass dieses Formblatt für alle Produkte, die an uns zurückgeschickt werden, ausgefüllt wird.

	Note: A repair is not possible without a completely filled out form. Ohne Vorliegen des vollständig ausgefüllten Formblattes ist eine Reparatur nicht möglich.

- A completely filled out form must be transmitted via Fax (+49 (0) 7462 2005 93555) or by letter in advance, so that this information is available before the equipment/component part arrives. A second copy of this form must accompany the equipment/component part. In addition, the carrier should be notified.

  Eine vollständig ausgefüllte Kopie dieses Formblattes soll per Fax unter Nr. +49 (0) 7462 2005 93555 oder Brief vorab an uns gesandt werden, so dass die Information vorliegt, bevor das Gerät/Bauteil eintrifft. Eine weitere Kopie soll dem Gerät/Bauteil beigefügt sein. Ggf. ist die Spedition zu informieren.

- Incomplete information or non-conformity with this procedure will inevitably lead to substantial delays in processing. Please understand the reason for this measure, which lies outside our area of influence, and will help us to speed up this procedure.

  Unvollständige Angaben oder Nichteinhalten dieses Ablaufs führen zwangsläufig zu beträchtlichen Verzögerungen in der Abwicklung. Bitte haben Sie Verständnis für Maßnahmen, die außerhalb unserer Einflussmöglichkeiten liegen und helfen Sie mit, den Ablauf zu beschleunigen.

- **Please print and fill out this form completely**

  Bitte unbedingt vollständig ausfüllen!

1.	**Unit/ component part / type** / Gerät / Bauteil / Typ:
2.	**Serial No. /** Serien-Nr.:
3.	**Details about utilized substances / biological substances** / Einzelheiten über die eingesetzten Substanzen/biologische Materialien:
3.1	**Designations** / Bezeichnungen:
a)	_____
b)	_____
c)	_____
3.2	**Safety measures required for handling these substances** / Vorsichtsmaßnahmen beim Umgang mit diesen Stoffen:
a)	_____
b)	_____
c)	_____

3.3 **Measures to be taken in case of skin contact or release into the atmosphere** / Maßnahmen bei Personenkontakt oder Freisetzung:

a) _____

b) _____

c) _____

d) _____

3.4 **Other important information that must be taken into account** / Weitere zu beachtende und wichtige Informationen:

a) _____

b) _____

c) _____

4. **Declaration on the risk of these substances** (please checkmark the applicable items) / Erklärung zur Gefährlichkeit der Stoffe (bitte Zutreffendes ankreuzen) :

❑ **4.1** **For non toxic, non radioactive, biologically harmless materials** / für nicht giftige, nicht radioaktive, biologisch ungefährliche Stoffe:

We hereby guarantee that the above-mentioned unit / component part… / Wir versichern, dass o.g. Gerät/Bauteil...

- ❑ Has not been exposed to or contains any toxic or otherwise hazardous substances / weder giftige noch sonstige gefährliche Stoffe enthält oder solche anhaften.
- ❑ That eventually generated reaction products are non-toxic and also do not represent a hazard / auch evtl. entstandene Reaktionsprodukte weder giftig sind noch sonst eine Gefährdung darstellen.
- ❑ Eventual residues of hazardous substances have been removed / evtl. Rückstände von Gefahrstoffen entfernt wurden.

❑ **4.2** **For toxic, radioactive, biologically harmful or hazardous substances, or any other hazard ous materials** / für giftige, radioaktive, biologisch bedenkliche bzw. gefährliche Stoffe oder anderweitig gefährliche Stoffe.

We hereby guarantee that … / Wir versichern, dass …

- ❑ The hazardous substances, which have come into contact with the above-mentioned equipment / component part, have been completely listed under item 3.1 and that all information in this regard is complete / die gefährlichen Stoffe, die mit dem o.g. Gerät/Bauteil in Kontakt kamen, in 3.1 aufgelistet sind und alle Angaben vollständig sind.
- ❑ That the unit /component part has not been in contact with radioactivity / das Gerät/Bauteil nicht mit Radioaktivität in Berührung kam

5. **Kind of transport / transporter** / Transportweg/Spediteur:

Transport by (means and name of transport company, etc.) Versendung durch (Name Spediteur o.ä.)

_____

Date of dispatch to BINDER GmbH / Tag der Absendung an BINDER GmbH:

_____

We hereby declare that the following measures have been taken / Wir erklären, dass folgende Maßnahmen getroffen wurden:

❑ Hazardous substances were removed from the unit including component parts, so that no hazard exists for any person in the handling or repair of these items / das Gerät/Bauteil wurde von Gefahrstoffen befreit, so dass bei Handhabung/Reparaturen für die betreffenden Person keinerlei Gefährdung besteht

❑ The unit was securely packaged and properly identified / das Gerät wurde sicher verpackt und vollständig gekennzeichnet.

❑ Information about the hazardousness of the shipment (if required) has been provided to the transporter / der Spediteur wurde (falls vorgeschrieben) über die Gefährlichkeit der Sendung informiert.

We hereby commit ourselves and guarantee that we will indemnify BINDER GmbH for all damages that are a consequence of incomplete or incorrect information provided by us, and that we will exempt BINDER GmbH from eventual damage claims by third parties./ Wir versichern, dass wir gegenüber BINDER für jeden Schaden, der durch unvollständige und unrichtige Angaben entsteht, haften und BINDER gegen eventuell entstehende Schadenansprüche Dritter freistellen.

We are aware that, in accordance with Article 823 of the German Civil Code (BGB), we are directly liable with regard to third parties, in this instance especially the employees of BINDER GmbH, who have been entrusted with the handling / repair of the unit / component. / Es ist uns bekannt, dass wir gegenüber Dritten – hier insbesondere mit der Handhabung/Reparatur des Geräts/des Bauteils betraute Mitarbeiter der Firma BINDER - gemäß §823 BGB direkt haften

Name: _____

Position/ Title: _____

Date / Datum: _____

Signature / Unterschrift: _____

Company stamp / Firmenstempel:

Equipment that is returned to the factory for repair must be accompanied by a completely filled out contamination clearance certificate. For service and maintenance on site, such a contamination clearance certificate must be submitted to the service technician before the start of any work. No repair or maintenance of the equipment is possible, without a properly filled out contamination clearance certificate.

17.2 For chambers located in USA and Canada

Product Return Authorization Request

Please complete this form and the Customer Decontamination Declaration (next 2 pages) and attach the required pictures. E-mail to: IDL_SalesOrderProcessing_USA@binder-world.com

After we have received and reviewed the complete information we will decide on the issue of a RMA number. Please be aware that size specifications, voltage specifications as well as performance specifications are available on the internet at www.binder-world.us at any time.

Take notice of shipping laws and regulations.

	Please fill:	
Reason for return request	○ Duplicate order	
	○ Duplicate shipment	
	○ Demo	*Page one completed by sales*
	○ Power Plug / Voltage	115V / 230 V / 208 V / 240V
	○ Size does not fit space	
	○ Transport Damage	Shock watch tripped? *(pictures)*
	○ Other (specify below)	
	_____	
Is there a replacement PO?	○ Yes ○ No	
If yes -> PO #		
If yes -> Date PO placed		
Purchase order number		
BINDER model number		
BINDER serial number		
Date unit was received		
Was the unit unboxed?	○ Yes ○ No	
Was the unit plugged in?	○ Yes ○ No	
Was the unit in operation?	○ Yes ○ No	
Pictures of unit attached? *Pictures of Packaging attached?*	○ Yes ○ No ○ Yes ○ No	Pictures have to be attached!

	Customer Contact Information	Distributor Contact Information
Name		
Company		
Address		
Phone		
E-mail		

Customer (End User) Decontamination Declaration

Health and Hazard Safety declaration

To protect the health of our employees and the safety at the workplace, we require that this form is completed by the user for all products and parts that are returned to us. (Distributors or Service Organizations cannot sign this form)

	NO RMA number will be issued without a completed form. Products or parts returned to our NY warehouse without an RMA number will be refused at the dock.

A second copy of the completed form must be attached to the outside of the shipping box.

1.	**Unit/ component part / type**:
2.	**Serial No.**
3.	**List any exposure to hazardous liquids, gasses or substances and radioactive material**
3.1	**List with MSDS sheets attached where available or needed (if there is not enough space available below, please attach a page):** a) _____ b) _____ c) _____
3.2	**Safety measures required for handling the list under 3.1** a) _____ b) _____ c) _____
3.3	**Measures to be taken in case of skin contact or release into the atmosphere**: a) _____ b) _____ c) _____ d) _____
3.4	**Other important information that must be considered**: a) _____ b) _____ c) _____

4. Declaration of Decontamination

For toxic, radioactive, biologically and chemically harmful or hazardous substances, or any other hazardous materials.

We hereby guarantee that

4.1 Any hazardous substances, which have come into contact with the above-mentioned equipment / component part, have been completely listed under item 3.1 and that all information in this regard is complete.

4.2 That the unit /component part has not been in contact with radioactivity

4.3 Any Hazardous substances were removed from the unit / component part, so that no hazard exists for a person in the shipping, handling or repair of these returned unit

4.4 The unit was securely packaged in the original undamaged packaging and properly identified on the outside of the packaging material with the unit designation, the RMA number and a copy of this declaration.

4.5 Shipping laws and regulations have not been violated.

I hereby commit and guarantee that we will indemnify BINDER Inc. for all damages that are a consequence of incomplete or incorrect information provided by us, and that we will indemnify and hold harmless BINDER Inc. from eventual damage claims by third parties.

Name: _____

Position: _____

Company: _____

Address: _____

Phone #: _____

Email: _____

Date: _____

Signature: _____

Equipment returned to the NY warehouse for repair must be accompanied by a completed customer decontamination declaration. For service and maintenance works on site, such a customer decontamination declaration must be submitted to the service technician before the start of work. No repair or maintenance of the equipment is possible without a completed form.