

memmert

Experts in Thermostatics

HPP



OPERATING MANUAL

HPP 108/749

Constant climate chamber with Peltier cooling

Manufacturer and customer service

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Date 02/2011

We reserve the right to make changes.

About this manual

Purpose and target group

This manual describes the setup, function, transport, operation and maintenance of constant climate chambers of types HPP 108 and HPP 749. It is intended for use by accordingly trained staff of the operator who are in charge of operating and / or maintaining the constant climate chamber.

If you as the user intend to work with the constant climate chamber, you should read this manual carefully before starting work with the unit. Familiarise yourself with the safety regulations. Only perform the work that is described in this manual. If there is something you do not understand, or certain information is missing, ask your superior or get in touch with the manufacturer. Do not do anything without authorisation.

Optional equipment

The constant climate chamber can be optionally equipped with an LED interior light to simulate daylight. In this manual, information related to this is marked with the word "optional". This means that this information is only relevant for appliances that include this function.

Other documents to be observed:

- ▶ for service and repair work (see page 57) – a separate service manual
- ▶ for controlling the constant climate chamber with the Memmert computer software "Celsius" (see page 38) of the separate manual for this
- ▶ calibration documents

Storage and transfer

This instruction manual for the constant climate chamber should always be kept in a place where those working with the constant climate chamber have access to it. It is the responsibility of the operator to ensure that persons who are working with or will work with the constant climate chamber are informed as to the whereabouts of this instruction manual. We recommend that it is always kept in a safe space close to the constant climate chamber. Make sure that the instruction manual is not damaged by heat or humidity. If the constant climate chamber is sold on or transported and then set up again at a different location, this instruction manual must also go with it.

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1. Safety regulations

1.1 Terms and icons used

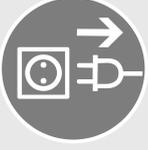
In this manual, certain common terms and icons are used to warn you of dangers or to give you hints that are important in avoiding injury or damage. Observe and follow these hints and regulations to avoid accidents and damage. These terms and icons are explained below.

1.1.1 Terms used

“Warning” is always used whenever you or somebody else could be injured if you do not observe the accompanying safety regulation.

“Caution” is used for information that is important for avoiding damage.

1.1.2 Icons used

| Prohibition sign (forbidding an action) | | | | |
|---|--|---|--|---|
|  | Do not tilt appliance |  | Do not lift appliance without assistance | |
| Warning icons (warning of a danger) | | | | |
|  | Danger of electrical shock |  | Explosive atmosphere |  Dangerous gases/vapours |
| Regulation signs (stipulate an action) | | | | |
|  | Disconnect the mains plug |  | Wear gloves |  Wear safety shoes |
|  | Observe information in separate manual | | | |
| Other icons | | | | |
|  | Important or useful additional information | | | |

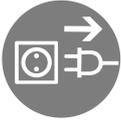
1.2 Product safety and dangers

Constant climate chambers of types HPP 108 and HPP 749 are technically well-developed, manufactured using high-quality materials and are tested for many hours in the factory. They contain the latest technology and comply with recognised technical safety regulations. But there are still dangers involved, even when the appliance is used as intended. These dangers are described below.



Warning!

After removing covers, live parts may be exposed. You may receive an electric shock if you touch these parts. Disconnect the mains plug before removing any covers. Any work inside the unit may only be performed by qualified electricians.



Warning!

When loading the chamber with an unsuitable load, poisonous or explosive vapours or gases may be produced. This could cause the chamber to explode and people could be badly injured or poisoned.



The chamber may only be loaded with materials/test objects which do not form any poisonous or explosive vapours when heated up (see also chapter Intended use on page 12).

1.3 Requirements of the operating personnel

The constant climate chamber may only be operated and maintained by persons who are of legal age and who have received instructions for the constant climate chamber. Personnel who are to be trained, instructed or who are undergoing general training may only work on the constant climate chamber under the continuous supervision of an experienced person.

Repairs may only be performed by qualified electricians. In this case, the regulations in the separate service manual must be observed.

1.4 Responsibility of the owner

The owner of the constant climate chamber

- ▶ is responsible for the flawless condition of the constant climate chamber and for the constant climate chamber being operated in accordance with its intended use (see page 12);
- ▶ is responsible for ensuring that persons who are to operate or service the constant climate chamber are qualified to do this, have received instructions about the constant climate chamber and are familiar with this operating manual;
- ▶ must know about the applicable regulations, requirements and work protection regulations and train staff accordingly;
- ▶ is responsible for ensuring that unauthorised persons have no access to the constant climate chamber;
- ▶ is responsible for ensuring that the maintenance plan is adhered to and that maintenance work is properly carried out (see page 56);
- ▶ ensures, for example through corresponding instructions and inspections, that the constant climate chamber and its surroundings are kept clean and tidy;
- ▶ is responsible for ensuring that personal protective clothing is worn by operating personnel, e.g. work clothes, safety shoes, protective gloves.

1.5 Changes and conversions

No independent conversions or alterations may be made to the constant climate chamber. No parts may be added or inserted which have not been approved by the manufacturer.

Independent conversions or alterations result in the EC declaration of conformity (see page 13) losing its validity, and the constant climate chamber may no longer be operated.

The manufacturer is not liable for any damage, danger or injuries that result from independent conversions or alterations, or from non-observation of the regulations in this manual.

1.6 Behaviour in case of malfunctions and irregularities

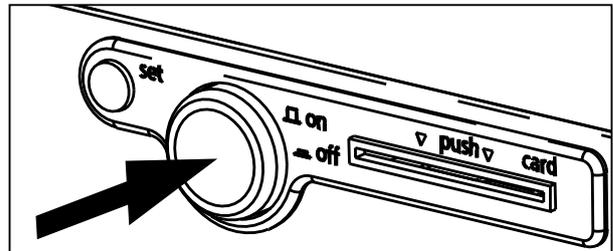
The constant climate chamber may only be used when in a flawless condition. If you as the operator notice irregularities, malfunctions or damage, immediately put the constant climate chamber out of service and inform your superiors.



You can find information on eliminating malfunctions from page 39.

1.7 Switching off the constant climate chamber in an emergency

Push main switch on front side of appliance (Fig. 1). This causes the constant climate chamber to switch off.



*Fig. 1
Switch off constant climate chamber by
pressing main switch*

2. Design and description

2.1 Construction



Fig. 2 HPP Constant climate chamber

- 1 Controller/user interface (see page 23)
- 2 Set key
- 3 Main switch / push-turn control (see page 23)
- 4 Door seal
- 5 Interior seal
- 6 Chamber fan
- 7 Sliding shelf
- 8 Heating ribs
- 9 Nameplate (underneath door)
- 10 Door knob
- 11 Card reader

2.2 Description

The constant climate chamber can heat the interior up to 70 °C and cool it down to 5°C. For this purpose, low-noise, long-life and energy-saving Peltier cooling and heating technology is used. In heating operation, a part of the required energy is extracted from the surroundings (heat pump principle).

Humidity in the interior can be regulated between 10 and 90 % rh (rh = relative humidity). The humidity is increased by water from a tank being evaporated and fed into the interior, and is reduced through condensation on a Peltier module.

2.3 Working range

The temperature-humidity diagram (Fig. 3) specifies at what range of temperature and humidity a permanent, condensation-free operation is possible.

i Caution: If the appliance is in operation at the upper level or outside the working range for long periods, puddles of water may form inside the chamber and water may force its way out of the door seal.

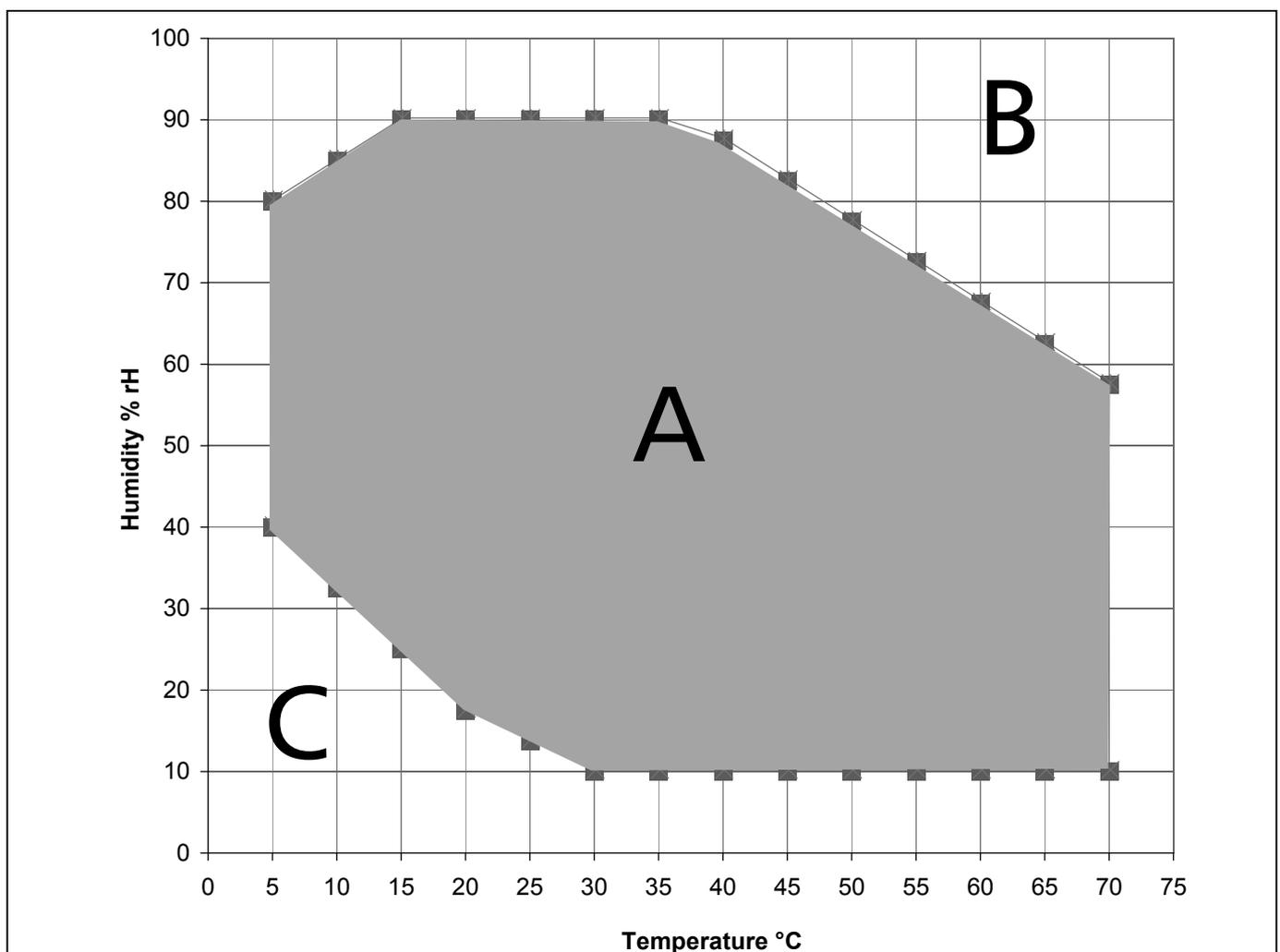


Fig. 3 Temperature-humidity working range

Range A:

In this range, temperature and humidity can be combined as you please, without resulting in any significant condensation. If there are extreme ambient conditions, the working range may be restricted.

Range B:

If the specified range is exceeded upwards, e.g. 80 % rh at 60°C, the hot steam fed in will immediately condense, due to the dew-point, at the coldest point in the appliance.

Range C:

At low temperatures and low relative air humidity, the effective range is heavily dependent on the degree of humidity of the chamber load.

2.4 Basic equipment

- ▶ Low-noise, long-life and energy-saving Peltier cooling and heating technology (in heating mode, part of the energy required is extracted from the surroundings = heat pump principle)
- ▶ Electronic fuzzy-supported PID process controller with permanent performance adjustments and time-saving self-diagnosis system to quickly locate errors (see pages 38 and 45)
- ▶ Alphanumeric text display
- ▶ Control of the appliance and logging the actual values with a preformatted empty MEMoryCard XL (storage capacity 32 kByte, reprogrammable for up to 40 ramp segments and in addition 135 hours of log memory for temperature and humidity with a scanning interval of 1 minute)
- ▶ Programme sequence control for up to 40 ramp segments
- ▶ Integrated week time switch with group function (e.g. all working days)
- ▶ Retracting push-turn control for simple operation
- ▶ Optical alarm display
- ▶ Integrated horn as alarm if limit values are crossed, as acoustic signal when programme ends and to confirm input (button click)
- ▶ Digital monitoring control for overtemperature, undertemperature and automatic temperature monitor (ASF)
- ▶ Two separate Pt100 temperature sensors DIN class A in a 4-wire circuit for control and monitoring
- ▶ Parallel printer port (PCL3-compatible)
- ▶ USB interface for computer-based temperature control programmes and to read out the controller's internal log memory
- ▶ MEMMERT software "Celsius" for remote control of the chamber via computer (see page 37) and to read out the internal controller log memory
- ▶ As an optional accessory, external card reader for MEMory-Card XL for connection to the PC-USB interface, printer cable (parallel, shielded)- 25-pin
- ▶ Language setting (German, English, French, Spanish, Italian)
- ▶ Capacitive humidity sensor
- ▶ Active humidity control guarantees that setpoint humidity is quickly achieved, with short recovery times, and avoiding condensation formation

- ▶ 7 different ramp close statements for sophisticated temperature-control tasks
- ▶ Acoustic and visual signals if temperature or humidity limits are crossed, and if water tank is empty
- ▶ Internal log memory with 1024 kB as a ring memory for all temperature and humidity values, errors and settings with realtime and date, logging for approx. 3 months with a 1-minute logging interval
- ▶ Calibration possible without separate computer: 3-point calibration on controller for temperature and 2-point calibration for humidity at 20 % rh and 90 % rh
- ▶ LED interior light (light panels) in various light colours (optional)

2.5 Material

For the outer housing, MEMMERT uses stainless steel (W.St.No. 1.4016 = ASTM 430), for the interior, stainless steel (W.St.No. 1.4301 = ASTM 304) is used, which stands out through its high stability, optimal hygienic properties and corrosion-resistance towards many (but not all!) chemical compounds (caution for example with chlorine compounds).

The chamber load for the appliance must be carefully checked with respect to chemical compatibility with the materials mentioned.

A resistance table for all these materials can be requested from the MEMMERT.

2.6 Intended use

Constant climate chambers HPP may be used exclusively for temperature and climate testing of materials and substances in the context of the procedures and specifications described in this manual. Any other use is improper, and may result in hazards and damage.

The test chambers are not explosion-proof (they do not comply with workplace health & safety regulation VBG 24). The chambers may only be loaded with materials and substances which cannot produce any toxic or explosive vapours at temperature ranges up to 70 °C, and which themselves cannot explode, burst or ignite.

The test chambers may not be used for drying, vaporising and branding paints or similar materials, the solvents of which could form an explosive mixture when combined with air. If there is any doubt as to the composition of materials, they must not be loaded into the constant climate chamber. Potentially explosive gas-air mixtures must not be produced, either in the interior of the chamber or in the direct vicinity of the appliance.

2.7 EC declaration of conformity



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EC Declaration of Conformity

Manufacturer's name and address: MEMMERT GmbH + Co. KG
Äußere Rittersbacher Straße 38
D-91126 Schwabach

Product: Constant-Climature-Chamber
Type: HPP ...
Sizes: 108/749
Nominal voltage: AC 230 V 50 / 60Hz
alternative AC 115 V 50/60 Hz

The designated product is in conformity with the European EMC-Directive

2004/108/EEC
including amendments

Council Directive of 03 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility.

Full compliance with the standards listed below proves the conformity of the designated product with the essential protection requirements of the above-mentioned EC Directive:

DIN EN 61326-1:2006-10
DIN EN 61000-3-11:2001-04

EN 61326-1:2006
EN 61000-3-11 :2000

The designated product is in conformity with the European Low Voltage Directive

2006/95/EEC
including amendments

Council Directive on the approximation of the laws of the Member States relating to Electrical equipment for use within certain voltage limits.

Full compliance with the standards listed below proves the conformity of the designated product with the essential protection requirements of the above-mentioned EC Directive:

DIN EN 61 010-1 (VDE 0411 part 1):2002-08
DIN EN 61 010-2-010 (VDE 0411 part 2-010):2004-06

EN 61 010-1:2001
EN 61 010-2-010:2003

Schwabach, 23.07.08

(Legally binding signature of the issuer)

This declaration certifies compliance with the above mentioned directives but does not include a property assurance. The safety note given in the product documentation which are part of the supply, must be observed.

2.8 Designation (nameplate)

The nameplate provides information about the appliance model, manufacturer and technical data. It is attached to the front of the appliance, on the right beneath the door (see page 9).

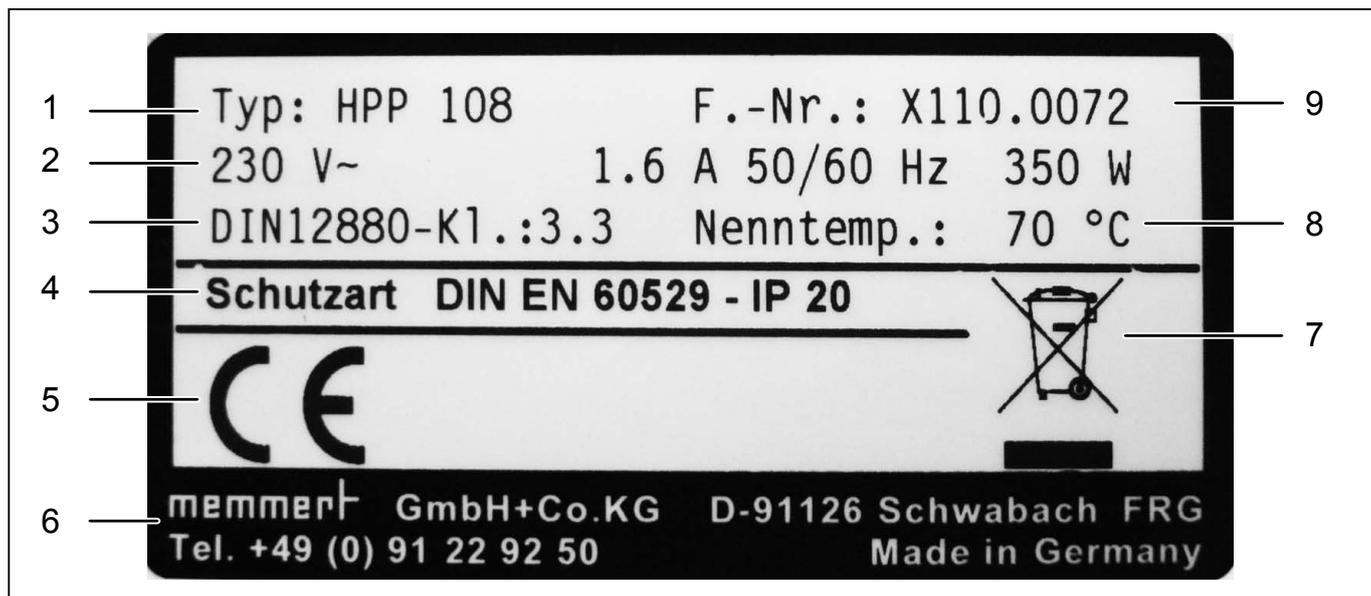


Fig. 4 Nameplate

- 1 Type designation
- 2 Connection values
- 3 Applied standard
- 4 Protection type
- 5 CE conformity

- 6 Address of manufacturer
- 7 Disposal note
- 8 Nominal temperature range
- 9 Factory number

2.9 Technical data

| Model | HPP 108 | HPP 746 |
|--------------------------------|---------|---------|
| Chamber width A* [mm] | 560 | 1040 |
| Chamber height B* [mm] | 480 | 1200 |
| Chamber depth C* [mm] | 400 | 600 |
| Appliance width D* [mm] | 710 | 1190 |
| Appliance depth F* [mm] | 640 | 825 |
| Appliance height E* [mm] | 760 | 1620 |
| Chamber volume [litres] | 108 | 749 |
| Weight [kg] | 66/70 | 218/278 |
| Performance [W] | 350 | 1050 |
| Max. number of sliding shelves | 5 | 14 |

* see Fig. 5 on page 16.

| Model | HPP 108 | HPP 746 |
|----------------------------------|---|---------|
| Max. load per sliding shelf [kg] | 30 | 30 |
| Max. load per appliance [kg] | 60 | 160 |
| Electrical equipment | | |
| Operating voltage | see nameplate | |
| Current consumption | see nameplate | |
| Protection class | 1 (acc. to EN 61010) | |
| Protection type | IP 20 (EN 60529) | |
| Interference-suppressed | Class B acc. to EN 55011 | |
| Fuses | Appliance: 250 V/15 A (appliance) Controller: 100 mA (230 V) or 200 mA (115 V) | |
| Temperature | <ul style="list-style-type: none"> ▶ Temperature recording: Pt100 in a 4-wire circuit ▶ Adjustment range: 0 °C to 70 °C Adjustment precision: 0.1 °C ▶ Working temperature range: 5 °C to 70 °C ▶ Temperature variation (time): ±0.1 °C ▶ Spatial deviation: max. ±0.3 °C bei 37° | |
| Monitoring | <ul style="list-style-type: none"> ▶ Temperature recording: Pt100 in a 4-wire circuit ▶ Settings range -5 °C to +75 °C ▶ Adjustment precision: 0.1 °C | |
| Humidity | <p>The relative humidity in the chamber is measured by a capacitive humidity sensor and displayed digitally in percent</p> <ul style="list-style-type: none"> ▶ Measurement precision of the humidity sensor: 0.5 % rh ▶ Adjustment range: 10 bis 90 % rh, off* ▶ Adjustment precision: 1 % rh ▶ Display range: 1 bis 98 % rh ▶ Temperature variation (time): max. ±1.5 % rh <p>* Setting off: Humidity control disabled</p> | |

* see Fig. 5 on page 16.

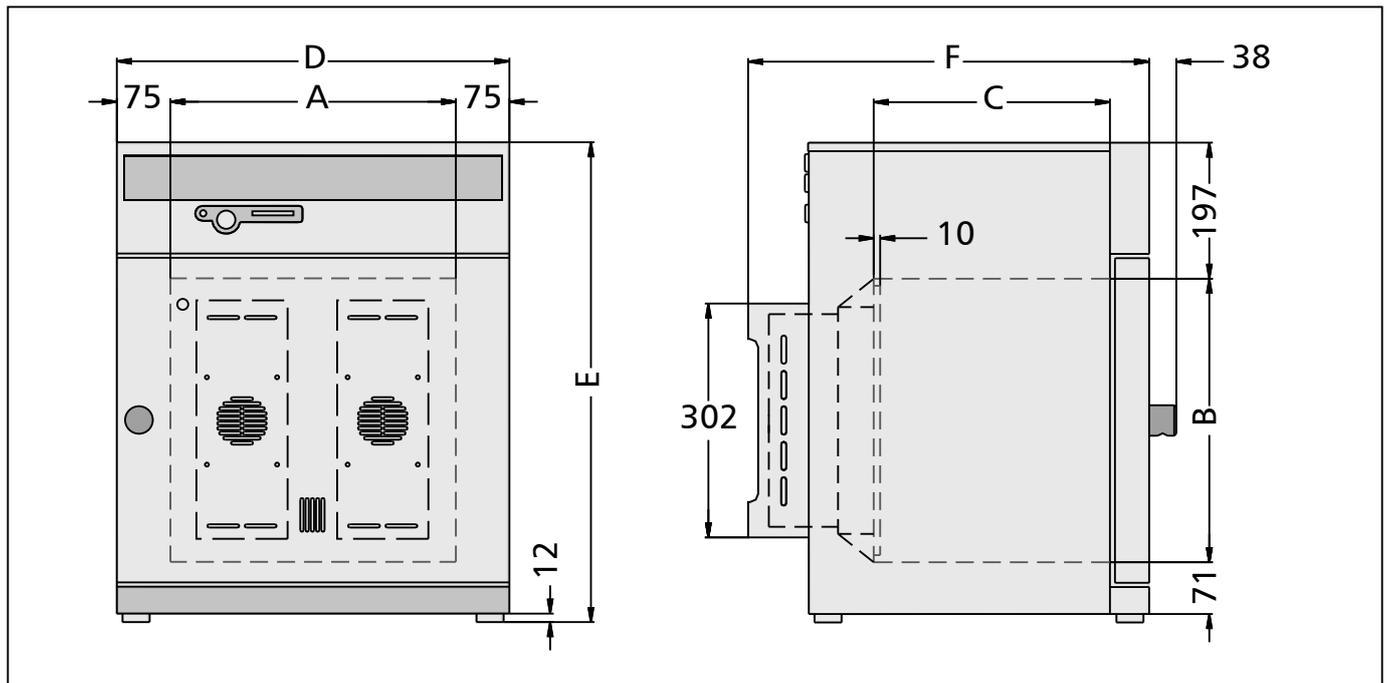


Fig. 5 Dimensions of constant climate chambers HPP

2.10 Ambient conditions

- ▶ The constant climate chamber may only be used in enclosed rooms and under the following environmental conditions:
 - Ambient temperature: 16 °C to 28°C
 - Humidity: max. 70 % not condensing
 - Degree of pollution: 2
 - Altitude of installation: max. 2,000 m above sea level
- ▶ The constant climate chamber may not be used in areas where there is a risk of explosions. The ambient air must not contain any explosive dusts, gases, vapours or gas-air mixtures. The constant climate chamber is not explosion-proof.
- ▶ Heavy dust production or aggressive vapours in the vicinity of the appliance could lead to sedimentation in the chamber interior and as a consequence, could result in short circuits or damage to electrical parts. For this reason, sufficient measures should be taken to prevent large clouds of dust or aggressive vapours from developing.

2.11 Electrical connection

Observe the country-specific regulations when making connections (e.g. in Germany DIN VDE 0100 with residual current device).

This appliance is intended for operation on an electrical power system with a system impedance Z_{\max} at the point of transfer (service line) of a maximum of 0.292 ohm. The operator must ensure that the constant climate chamber is operated only on an electrical power system that meets these requirements. You can ask your local energy supply company what the system impedance is.

2.12 Standard accessories

- ▶ Sliding shelf
- ▶ Water tank with connection hose

3. Delivery, transport and setting up

3.1 Safety regulations

**Warning!**

You may get your hands or feet squashed when transporting and installing the constant climate chamber. You should wear protective gloves and work shoes.

**Warning!**

Because of the weight of the constant climate chamber, you could cause yourself an injury if you try to lift it. At least two people are needed to carry the constant climate chamber HPP 108, and four for the constant climate chamber HPP 749.

**Warning!**

The constant climate chamber could fall over and seriously injure you. Never tilt the constant climate chamber and only transport it in an upright position.

3.2 Delivery

The constant climate chamber can be packaged in cardboard or in a box, and is delivered on a wooden pallet.

3.2.1 Unpacking

Remove the cardboard packaging by pulling upwards or cutting carefully along an edge.

3.2.2 Checking for completeness and transport damage

- ▶ Check the delivery note to ensure that the delivery is complete.
- ▶ Check the constant climate chamber for damage.

If you notice deviations from the delivery note, damage or irregularities, do not put the constant climate chamber into operation, but inform the haulage company and the manufacturer.

3.2.3 Disposal of packaging material

Dispose of the packaging material (cardboard, wood) in accordance with the appropriate regulations for the material in your country.

3.3 Storage after delivery

If the constant climate chamber is initially to be stored after delivery: Read the storage conditions from page 58.

3.4 Setup

The installation site must be flat and horizontal and must be able to reliably bear the weight of the constant climate chamber (see chapter Technical data on page 14). Do not place the appliance on a flammable surface.

An 230 V/16 A/115 V power connection (see nameplate) must be available at the installation site.

The distance between the wall and the rear of the chamber must be at least 15 cm. The clearance from the ceiling must not be less than 20 cm and the side clearance from the wall must not be less than 8 cm (Fig. 6). Sufficient air circulation in the vicinity of the chamber must be guaranteed at all times.

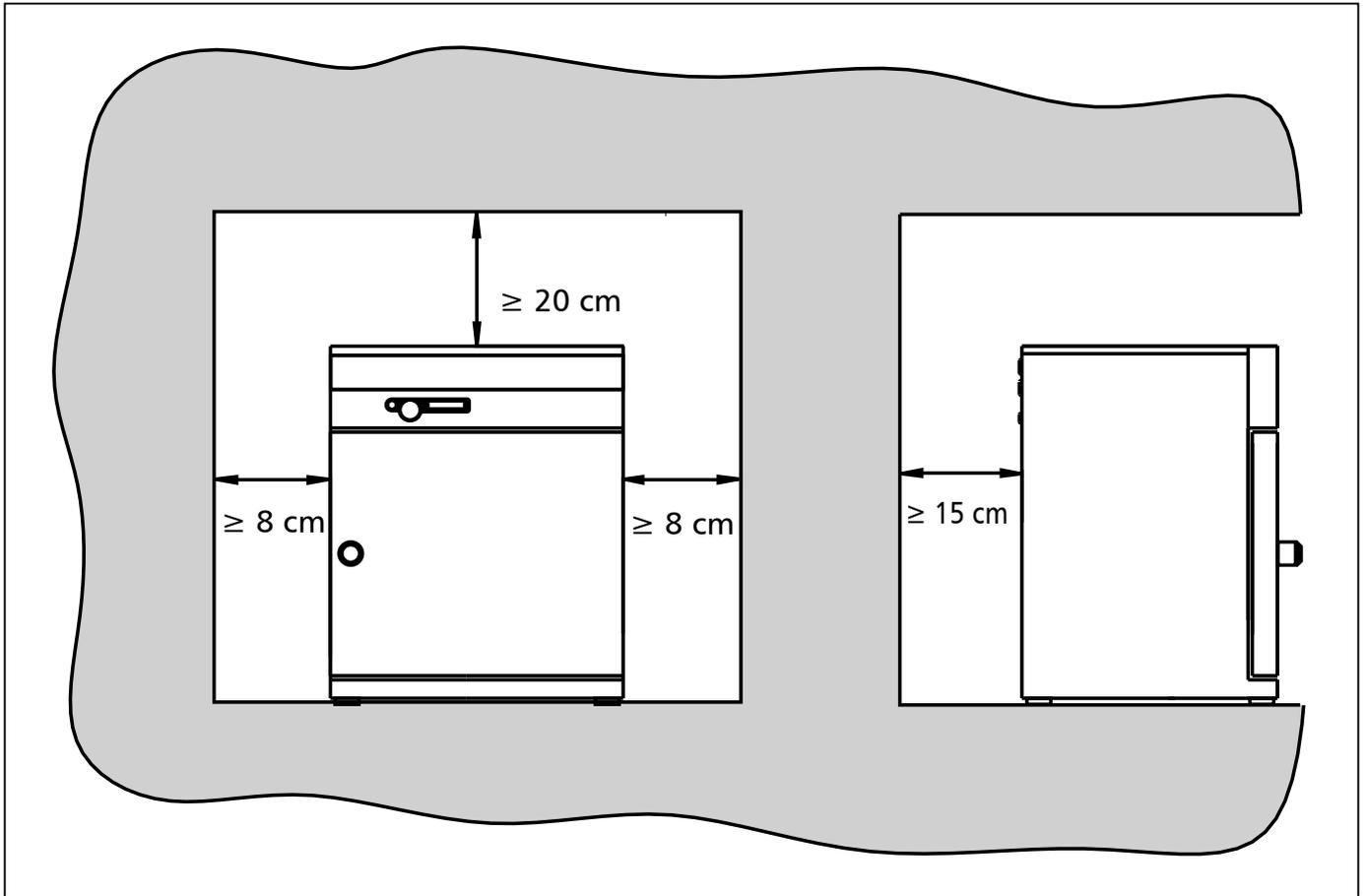


Fig. 6 Minimum clearance from walls and ceiling

3.4.1 Setting up options

i Read the assembly instructions for the respective accessory part.

Floor/table

The chambers may be placed on the floor. Constant climate chambers HPP 108 may be placed on a table (work surface), if the table is flat and horizontal and able to bear the weight of the constant climate chamber.

Base

The chamber can be placed on a base (available as an accessory) (Fig. 7).

Stackable model (HPP 108 only)

Two constant climate chambers HPP 108 can be placed on top of one another. Please ensure that the chamber with the lower working temperature is always used as the lower chamber:



Warning!

Danger through contact with electrical voltage. Remove the mains plug if the chamber is already connected to the power supply.

1. Remove the housing cover from the lower chamber.
2. Insert the drilling template (supplied with the foot alignment) into the overturned lid.
3. Mark the drilling point and drill with a 4.2 mm diameter drill bit.
4. Screw the foot alignments to the top of the lid with the screws and nuts supplied (Fig. 8).
5. Put the covers back on.

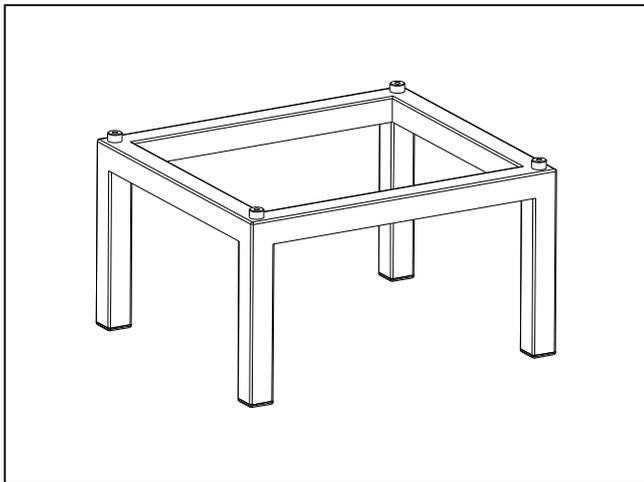


Fig. 7
Base

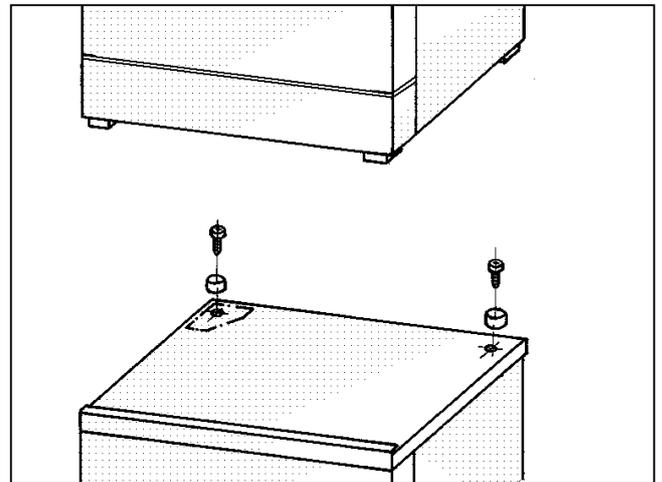


Fig. 8
Attaching the foot alignments when two chambers are placed on top of one another

4. Putting into operation

4.1 Checking

4.1.1 Check the door and adjust if necessary

The door may have been twisted during transport. You should therefore check whether the door closes properly and the seals are in the correct position. Adjust door if necessary (description on page 57).

4.1.2 Checking the temperature sensor

Due to strong vibrations during transport, the temperature sensors could have moved out of position in their holders in the ceiling of the working chamber.

Before operating for the first time, check the temperature sensor for its correct positioning and if necessary adjust its position in the holder (Fig. 9). Open the door to do this (see page 22)

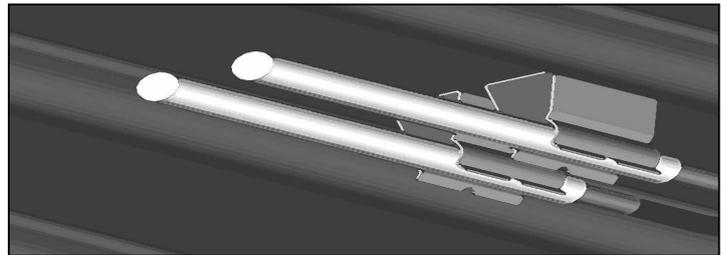


Fig. 9 Temperature sensor on the ceiling of the interior

4.2 Fill up and connect the water tank

Fill the water tank supplied with water and connect it with the enclosed tube to the "H2O" connection on the rear of the chamber (Fig. 10).

Water specification

To generate steam, only either

- ▶ steam-distilled water (aqua dest) may be used
or
- ▶ demineralised/desalinated water (aqua dem) in accordance with VDE 0510/DIN EN 50272, provided the regulations are strictly maintained (conductivity of production $\leq 10 \mu\text{S}/\text{cm}$). Battery water in accordance with VDE 0510 can be obtained in all large chemist's, supermarkets, DIY stores and wholesalers. VDE 0510/DIN EN 50272 must be explicitly marked on the label.

Otherwise, limescale in the steam generators, steam piping and tube pumps may impair the the functionality of the appliance.

The water used must have a pH value of > 5 and < 7 .

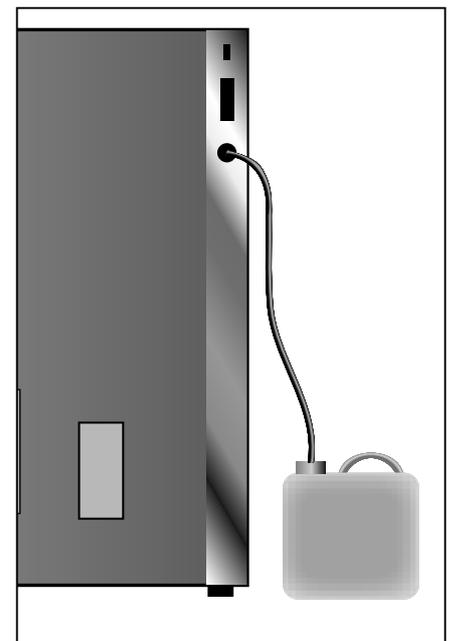


Fig. 10 Water connection

4.3 Electrical connections

**Caution:**

Observe the country-specific regulations when making connections (e.g. in Germany DIN VDE 0100 with residual current device (RCD)). Remember the connected loads and power values (see nameplate and also chapter "Technical data" on page 14).

The constant climate chamber is intended for operation on an electrical power system with a system impedance Z_{\max} at the point of transfer (service line) of a maximum of 0.292 ohm. The operator must ensure that the constant climate chamber is operated only on an electrical power system that meets these requirements. If necessary, you can ask your local energy supply company what the system impedance is.

Only appliances may be connected to external connections whose interfaces comply with the requirements for safety extra-low voltage (e.g. computer, printer).

4.4 Switching on

To switch on the appliance, press the main switch on the front of the appliance (Fig. 11).

**Caution:**

The first time the appliance is operated, it must not be left unattended until it has reached the steady state.

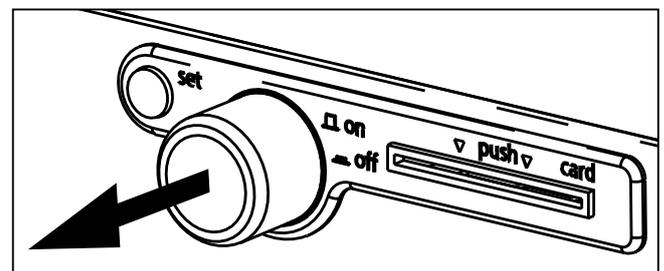


Fig. 11 Switching on the constant climate chamber

5. Operation and control

5.1 Operating personnel

The constant climate chamber may only be operated by persons who are of legal age, and who have received instructions for the constant climate chamber. Personnel who are to be trained, instructed or who are undergoing general training may only work with the constant climate chamber under the continuous supervision of an experienced person.

5.2 Opening the door

- ▶ To open the door, turn the handle to the right (Fig. 12).
- ▶ To close, press in the door knob.

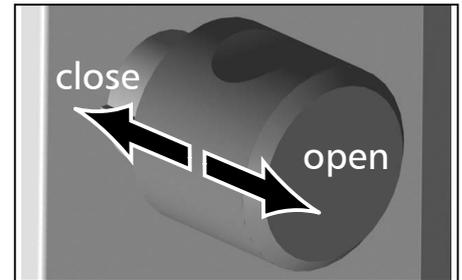


Fig. 12 Opening and closing the door

5.3 Loading the constant climate chamber



Warning

When loading the chamber with an unsuitable load, poisonous or explosive vapours or gases may be produced. This could cause the chamber to explode, and people could be badly injured or poisoned.



The chamber may only be loaded with materials/test objects which do not form any toxic or explosive vapours when heated up and cannot ignite (see also chapter "Intended use" on page 12). If there is any doubt as to the composition of materials, they must not be loaded into the constant climate chamber.

i Caution:

Check the chamber load for chemical compatibility with the materials of the constant climate chamber (see page 12).

Replacing sliding shelf/shelves. The maximum quantity, and load capacity of the sliding shelves can be found in table in chapter "Technical data" on page 14.

The chamber must not be loaded too tightly, so that proper air circulation in the working chamber is guaranteed. Do not place any of the chamber load on the floor, touching the side walls or right below the ceiling of the working chamber (Fig. 13, see also the "correct loading" sticker on the appliance).

If the load is unfavourable (too close together) it may take longer than normal to reach the set temperature under some circumstances.

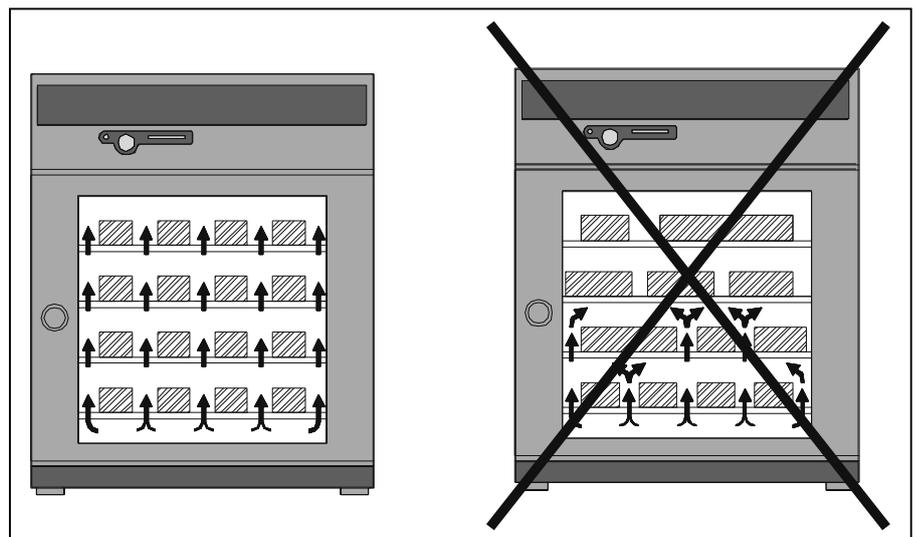


Fig. 13 Correct placement of the chamber load

5.4 Basic information on operation

5.4.1 Switching appliance on and off

The constant climate chamber is switched on and off by pressing the main switch / push-turn control on the front of the appliance:

- ▶ Switching on: press the main switch so that it comes out of the appliance (Fig. 14).
- ▶ Switching off: press the main switch so that it retracts back into the appliance (Fig. 15).

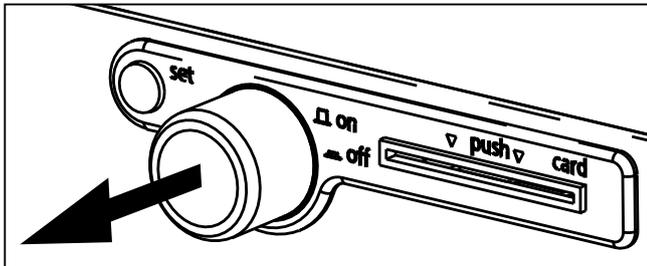


Fig. 14 Switching on the constant climate chamber

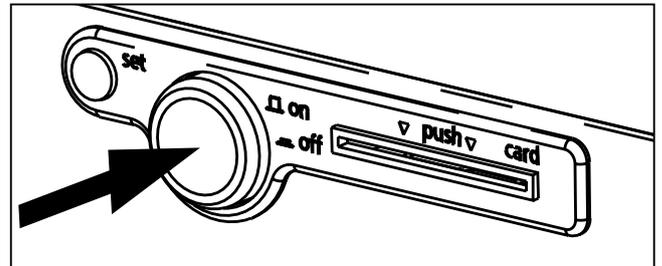


Fig. 15 Switching off the constant climate chamber

5.4.2 User interface/controller

In normal and programme modes, the desired parameters are entered on the operating panel of the controller on the front of the appliance (Fig. 16). Basic settings, as well as those for time and printing, can also be made here. In addition, programmed and current parameters are displayed, as well as warning messages:

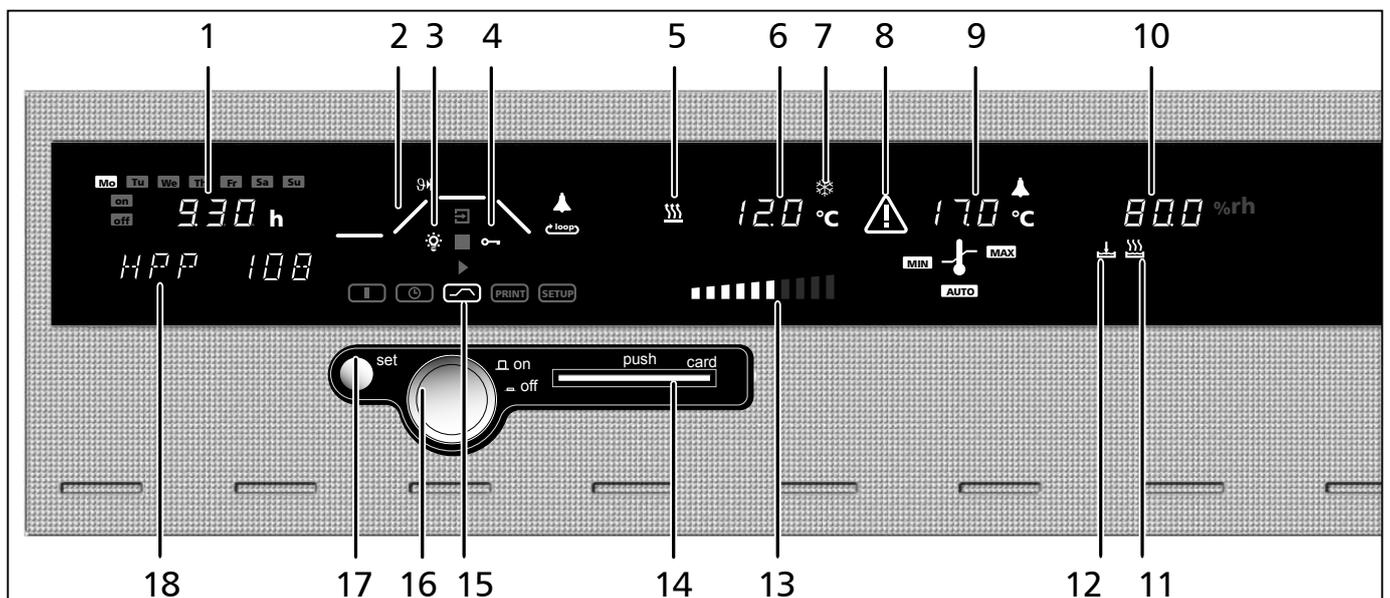
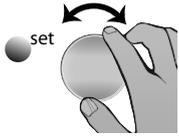


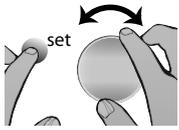
Fig. 16 Operating panel

- | | |
|---|--|
| 1 Time display | 10 Humidity display |
| 2 Programme mode display (see page 29) | 11 Display: Appliance is humidified |
| 3 Interior lighting active (optional) | 12 Warning: Water tank empty |
| 4 Display: Appliance locked with user-ID card (see page 55) | 13 Interior light (optional) |
| 5 Display: appliance is heating up | 14 Chipcard reader |
| 6 Temperature display | 15 Operating mode display (see page 24) |
| 7 Display: appliance is cooling down | 16 Main switch /push-turn control |
| 8 Temperature monitoring warning (see page 43) | 17 Set key |
| 9 Temperature monitoring (see page 43) | 18 Alphanumeric text display for error and status messages |

5.4.3 Basic operation



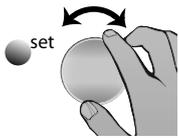
All settings are selected by turning the push/turn control to the left or right ...



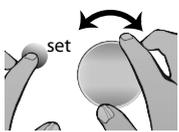
...and adjusted by turning it with the SET key held down.

5.4.4 Setting parameters

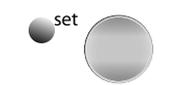
Normally, all setting actions on the operating panel described on the following pages are made in the same way:



1. Select the desired parameter with the push/turn control (menu item, e.g. temperature); then all other parameters go dark and the selected one flashes.



2. With the SET key held down, set the desired value (e.g. 58.0°C) with the push/turn control.



3. Release the SET key, and the programme is started. The display briefly shows the value set, flashing. Then the current temperature is displayed and the constant climate chamber begins to heat up or cool down to the set temperature.

4. Settings for other parameters are made in the same way.



The control returns automatically to the main menu if the push/turn key or SET key is not used for approx. 30 seconds.

5.5 Operating modes

Constant climate chambers HPP can be operated in four different ways:

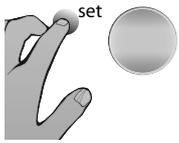
- ▶ Normal mode: The constant climate chamber runs in permanent operation at the temperature and humidity values set on the operating panel. Operation in this mode is described from page 25.
- ▶ Week time switch: The constant climate chamber runs at the set values only at certain times. Operation in this mode is described from page 27.
- ▶ Programme mode: Time sequences of temperature and humidity and fan values are programmed (so-called ramps), which the test chamber automatically works through one after another. Operation in this mode is described from page 29.
- ▶ Interface mode with computer/laptop (optional, see page 38).

| | | | | |
|------------------------------|--------------------------------------|------------------------------------|--------------------------|--|
| | | | | |
| Normal mode (see page 25) | Week time switch (see page 27) | Programme mode (see page 29) | Printer (see page 41) | Basic appliance settings (see page 41) |

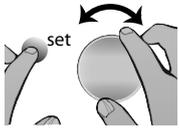
Fig. 17 Operating modes

5.6 Operating mode settings

1. Switch on the appliance by pressing the main switch (main switch comes out of appliance, see page 23).



2. Keep the SET key depressed for approx. three seconds and the selected mode starts flashing.



3. Select the desired operating mode/function (normal mode, week time switch, programming mode, printer or basic appliance settings) by turning control with SET key held down.



4. Release the SET key, and the selected operating mode is saved.

5.6.1 Normal mode

In this operating mode, the constant climate chamber runs in permanent operation at the values set on the operating panel (see above). Example of settings: See next chapter 5.6.2.

1. Load the constant climate chamber (see page 22).
2. Switch on appliance. To do this, press the push-turn control on the operating panel so that it comes out of the appliance (see page 23).

3. Select the normal operating mode  with the push/turn control:



4. As described above, set the individual parameters with the push-turn control and the SET key:

Temperature setpoint

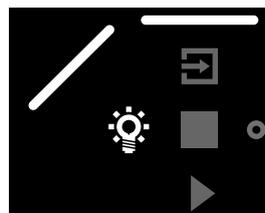
Adjustment range: 0°C to 70°C

200°C

TEMP

Interior light (optional)

Adjustment range: 0 % to 100 % in steps of 10%



- i** The interior lighting can only be activated at a working temperature of up to 40 °C.



Temperature monitoring

Adjustment range:
MIN MAX AUTO
(see also page 43)



LO-ALARM

RSF-ALARM

HI-ALARM

Humidity setpoint

Adjustment range: 10 to 90 %rh,
OFF

900 %rh

HUMIDITY

- i** Not all combinations of temperature and humidity are possible (see also page 10).

5.6.2 Settings example normal mode

At a humidity of 70 % rh and 60 % light intensity (optional), the climate chamber should heat up to 37 °C (Fig. 18).

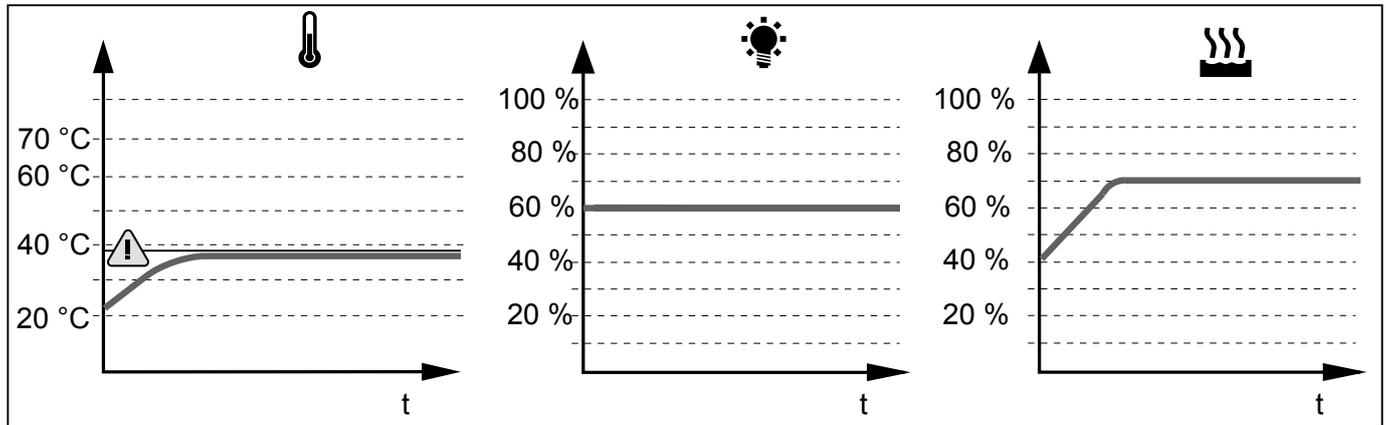


Fig. 18 Example for normal mode

1. Setting the normal operating mode:

Keep the SET key depressed for approx. 3 seconds and the current operating mode then begins to flash.

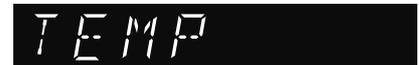
Select the operating mode  with the push-turn control, while the SET key is held down. After you let go of the SET key, the control is in the normal operating mode.



2. Setting the temperature setpoint:

Hold down the SET key and set the desired temperature setpoint of 37.0 °C with the push-turn control.

Release the SET key; the appliance will briefly flash, showing the temperature setpoint. Then the current temperature appears on the display and the controller begins to move to the set temperature of 37.0 °C.



▶ Heating up is indicated by the  icon.

▶ Cooling down is indicated by the green cooling symbol .

3. Adjusting the light intensity (optional):

Turn the push-turn control to the right until the lighting display flashes. With the SET key held down, set the light intensity to 60 % with the push-turn control (six bars light up). Release the SET key. The interior light is now at 60 % intensity.



4. Setting the monitoring temperature:

Turn the push-turn control to the right until the monitoring temperature and the **MIN-** or **MAX-**icon flashes. Hold down the SET key and with the MIN- push-turn control set the overtemperature limit to 38.5 °C and the undertemperature limit to 35.5 °C. Turn the push-turn control to the right until the monitoring temperature and the **AUTO** icons flash. Hold down the SET key and set to  with the push-turn control.



 The tolerance band is set in the SETUP menu (see page 42).

5. Setting the humidity setpoint:

Turn the push-turn control to the right until the humidity display flashes. Hold down the SET key and set the desired humidity setpoint of 70.0 % RH WITH THE PUSH-TURN CONTROL. After releasing the SET key the humidity setpoint briefly flashes. Then the current humidity value appears on the display and the controller begins to move to the set value.



i The humidification process is indicated by the  symbol.

The constant climate chamber is now running in permanent operation with the set values.

5.6.3 Week time switch

In this operating mode, the week time switch is active and the constant climate chamber switches on and off at the time programmed.



During the OFF phase of the week time switch, the constant climate chamber is in standby mode. The heating and cooling functions are switched off and the controller display shows the time, dimmed. During the ON phase, the constant climate chamber works with the set values for temperature and humidity.

The sequence of the week time switch repeats itself each week.

In total, a maximum of nine time blocks can be programmed, consisting of the switching on and switching off times:



By turning the push/turn control, the following parameters can be selected and altered, as described in the chapter "Basic information on operation" on page 23:

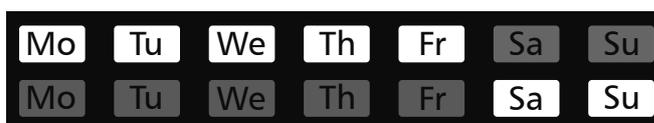
Weekday

Adjustment range: Monday to Sunday



Day groups

Adjustment range: Working days Mo–Fr
Weekend Sat–Sun



No switch on time: ----

Appliance not switched on on this day



Switch on time (on)

Adjustment range: 00:00 to 23:59 hours



Switch off time (off)

Adjustment range: One minute beyond the switch on time up to 24:00



By turning further to the right, parameters (temperature setpoint etc.) can be selected as in the normal operating mode.

If no settings (temperature setpoint etc.) are made for the ON phase, the values from the normal operating mode are used by the controller.

For reasons of safety, you should always check that only one switch on time is programmed in the desired time blocks and days.

Direct setting of the temperature setpoint:

If the controller is in standby mode or the week time switch is in the ON phase, the temperature setpoint can be directly accessed by briefly pressing the SET key. By turning the control to the right, you are returned to temperature monitoring and humidity. By turning to the left, you come back to the settings for the individual time blocks.

5.6.4 Settings example week time switch

The constant climate chamber should be switched on at 07.30 from Monday to Friday (working day group) and switched off at 18.00. In addition, it should operate on Saturdays from 10.00 to 14.00 (Fig. 19).

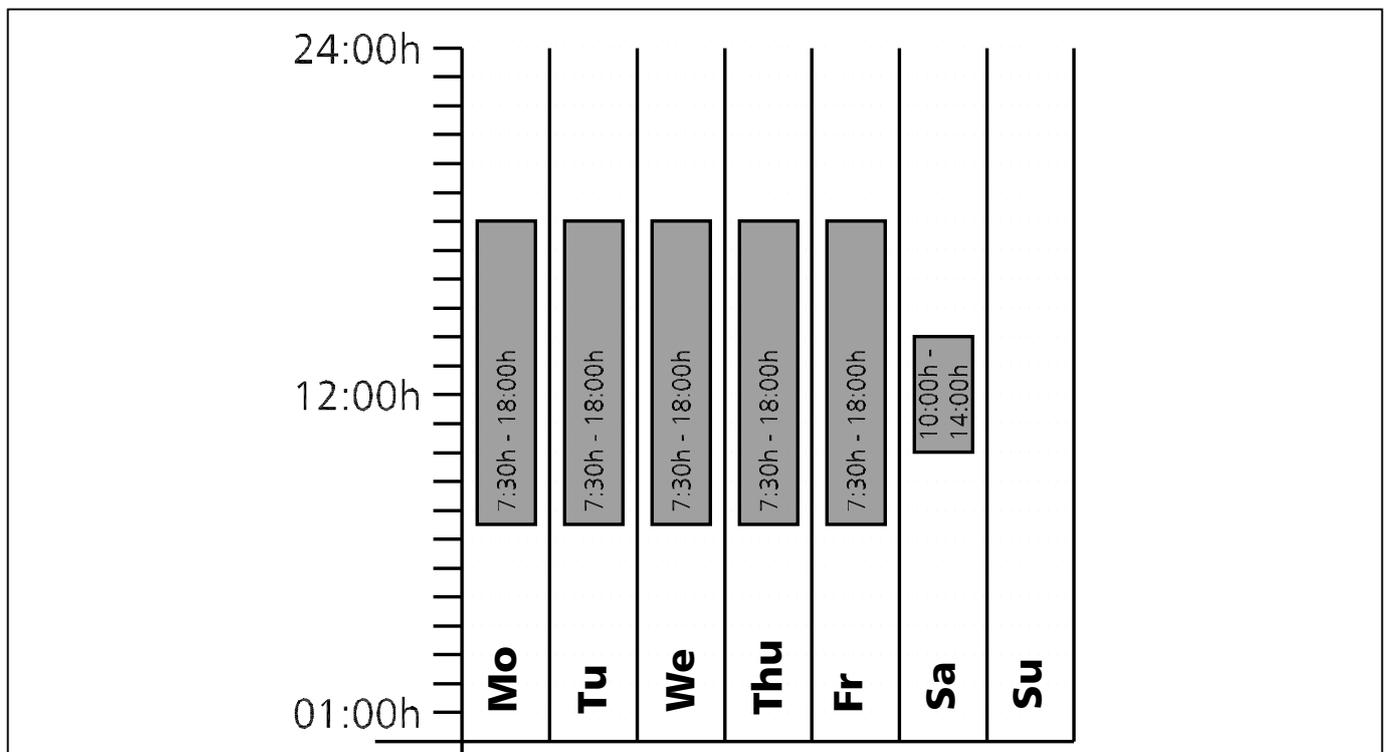


Fig. 19 Operation with week time switch (example)

1. Setting the week time switch operating mode

Hold the SET key down for approx. three seconds; the current operating mode then begins to flash. Select the week time switch operating mode with the push-turn control, while the SET key is held down.

Release the SET key, the control is now in the week time switch operating mode.



2. Switch on Mo-Fr at 07.30

Turning the push/turn control to the left and select "Mo-Fr on" (group working days).

Hold down the SET key and set the desired switch-on time with the push/turn switch to 07:30.



3. Switch off Mo-Fr at 18.00

Select "Mo-Fr off" (group working days) with the push/turn control.

Hold down the SET key and set the desired switch-off time with the push/turn switch to 18:00.



4. Switch on Saturday at 10:00

With the push/turn control, select the "SAT ON" icon.

Hold down the SET key and set the desired switch-on time with the push-turn switch to 10:00.



5. Switch off on Sa at 14:00

With the push/turn control, select the "SAT OFF" anwählen.

Hold down the SET key and set the desired switch-off time with the push-turn switch to 14:00.



5.6.5 Programme mode

In this operating mode, up to 40 freely programmable sequences (ramps) can be set with various combinations of temperature and humidity, which the constant climate chamber then processes automatically one after another.



i Not all combinations of temperature and humidity are possible (see also page 10).

Setting the programming operating mode

1. Press the SET key and keep it held down.
2. Select the programming mode with the push/turn control, while the SET key is held down.
3. Select the EDIT  function with the push-turn control.



You can now select and modify the following parameters in turn (see also the adjustment example on page 34):



4. Delayed programme start: Switch-on day

Adjustment range: Monday to Sunday, workdays Mo-Fr, weekends Sa-Sun, every day Mon-Sun or no days. If no week day is set, the appliance starts immediately (**INSTANT START**) after the start of the programme. In the example shown: Switch-on day Monday.



5. Delayed programme start: Switch-on time

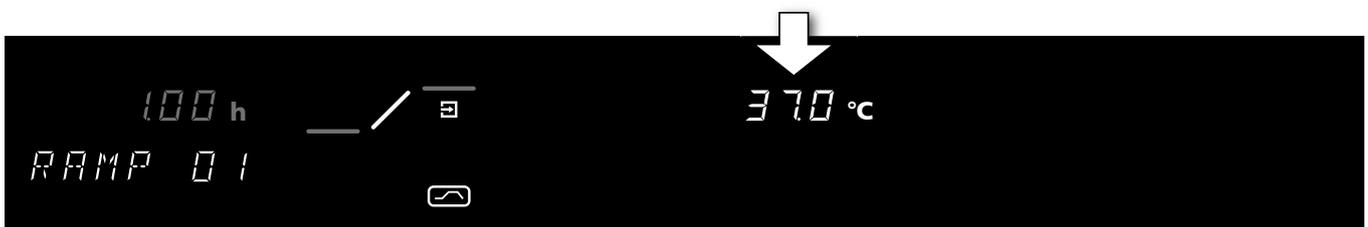
Adjustment range: 00:00 to 23:59 (shown: Switch-on time 8:00)

i If no switch-on day is shown, then no switch-on time can be selected, and the programme starts immediately (**INSTANT START**). In the example shown: Switch-on time 8:00.



6. Duration of first ramp segment

Adjustment range: 1 minute to 999 hours. In the example shown: Duration of first ramp segment: 1:00 hour.



7. Setpoint temperature/temperature to end of ramp segment

Adjustment range: 5 °C ... 70 °C. In the example shown: temperature 37.0 °C.

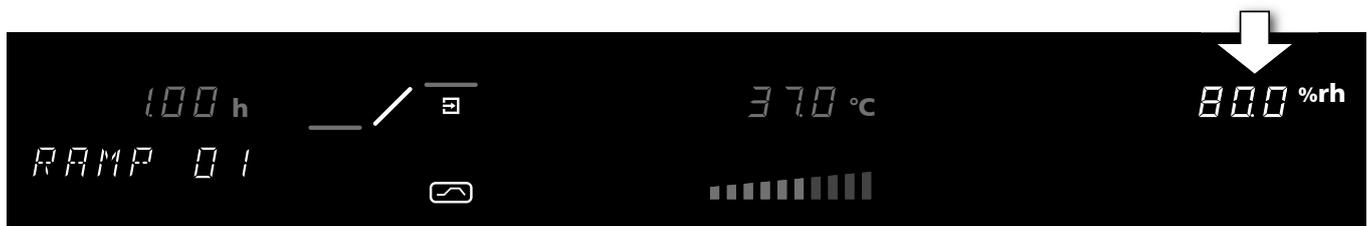


8. Light intensity during the first ramp segment (optional):

Adjustment range: 0 % to 100 % in steps of 10%. In the example shown: Light intensity 60 % (six bars are lit up).



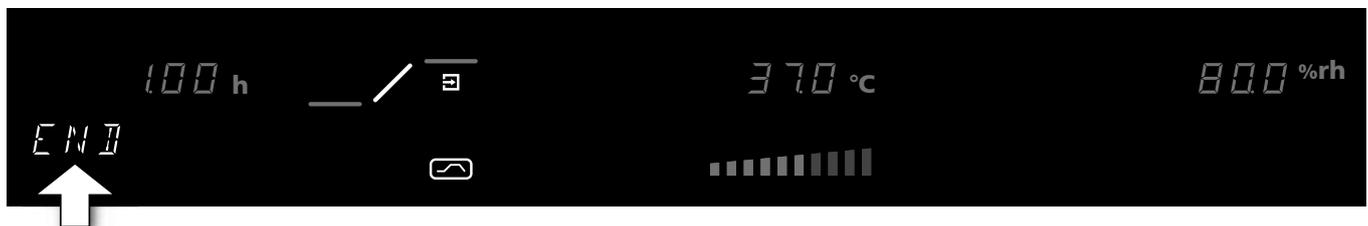
The interior lighting can only be activated at a working temperature of up to 40 °C.



9. Setpoint humidity/humidity to end of ramp segment

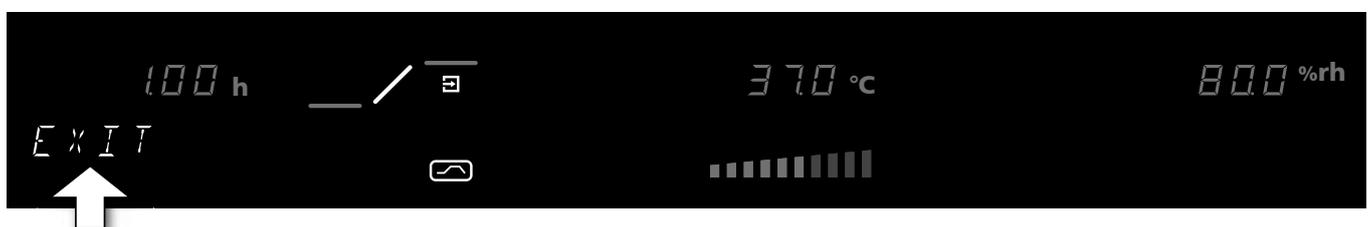
Adjustment range: 10 to 90 % rh. In the example shown: humidity 80.0 % rh.

Each ramp must be completed with a close statement connecting the ramp to the next one. These commands thus control the programme sequence:



10. Close statement of the ramp segment

Setting: NEXT, SPLWT (T), SPLWT (H), SPLWT (TH), LOOP, HOLD, END (shown: command end, see also chapter 5.6.6 "Close statements for ramp segments").



11. Programme write mode Leave EDIT

Turn push/turn control to the right until EXIT appears in the display, and press the SET key briefly to confirm.

After releasing the SET key ...

- ▶ ... a new programme can be created as described above, or an existing one be edited  EDIT
- ▶ ... the programme can be stopped  STOP
- ▶ ... the programme can be started  START

5.6.6 Close statements for ramp segments

Each ramp must be completed with a close statement connecting the ramp to the next one. These commands thus control the programme sequence:

| | |
|------------------------|--|
| <code>NEXT</code> | NEXT Connect the next programme segment. |
| <code>SPWT (T)</code> | SET-POINT WAIT (T – temperature) Wait until setpoint has been reached. Appliance starts the next programme segment only when the programmed setpoint temperature has been reached, even if the set heating up time has already elapsed. |
| <code>SPWT (H)</code> | SET-POINT WAIT (H – humidity) Wait until setpoint humidity has been reached. Appliance starts the next programme segment only when the programmed setpoint humidity has been reached, even if the set heating up time has already elapsed. |
| <code>SPWT (TH)</code> | SET-POINT WAIT (TH – temperatur and humidity) Wait until the setpoint temperature and setpoint humidity has been reached. Appliance starts the next programme segment only when the programmed setpoint temperature and programmed setpoint humidity have been reached, even if the set heating up time has already elapsed. |
| <code>LOOP</code> | Ramp repeat function The programme entered is repeated after all programmed segments have been run. 1-99 = repeats CONT = endless loop repeat function |
| <code>HOLD</code> | Programme end while maintaining the temperature and humidity of last programme ramp |
| <code>END</code> | Programme end, switching off the heating /cooling function and humidity |

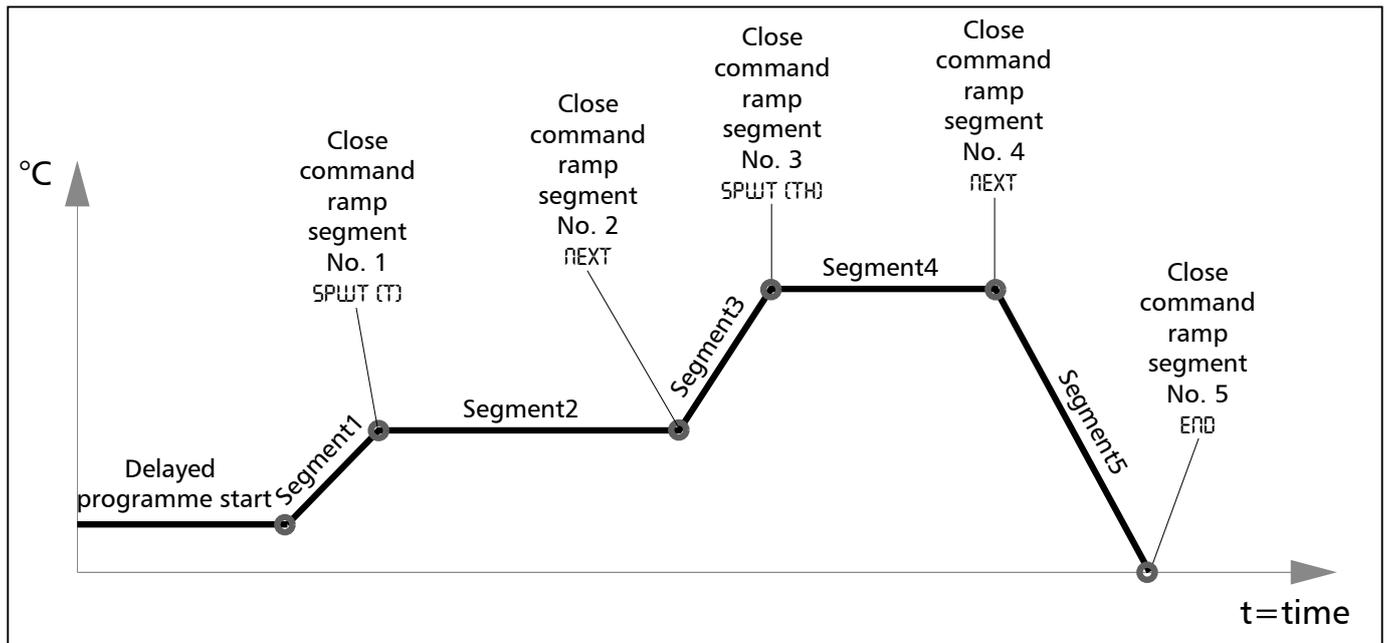


Fig. 20 Schematic example of the use of ramp segment close statements

5.6.7 Settings example programming mode

On Monday at 8:00, the constant climate chamber should heat up to 37 °C, with 50 % light intensity (optional), as quickly as possible and reach a relative humidity of 70 % rh. Once the temperature and humidity have been reached, the constant climate chamber should retain the setpoint values for 45 minutes at 80 % light intensity and then cool down within one hour, at a light intensity of 30 %, to a humidity of 50 % rh and 15 °C (Fig. 21).

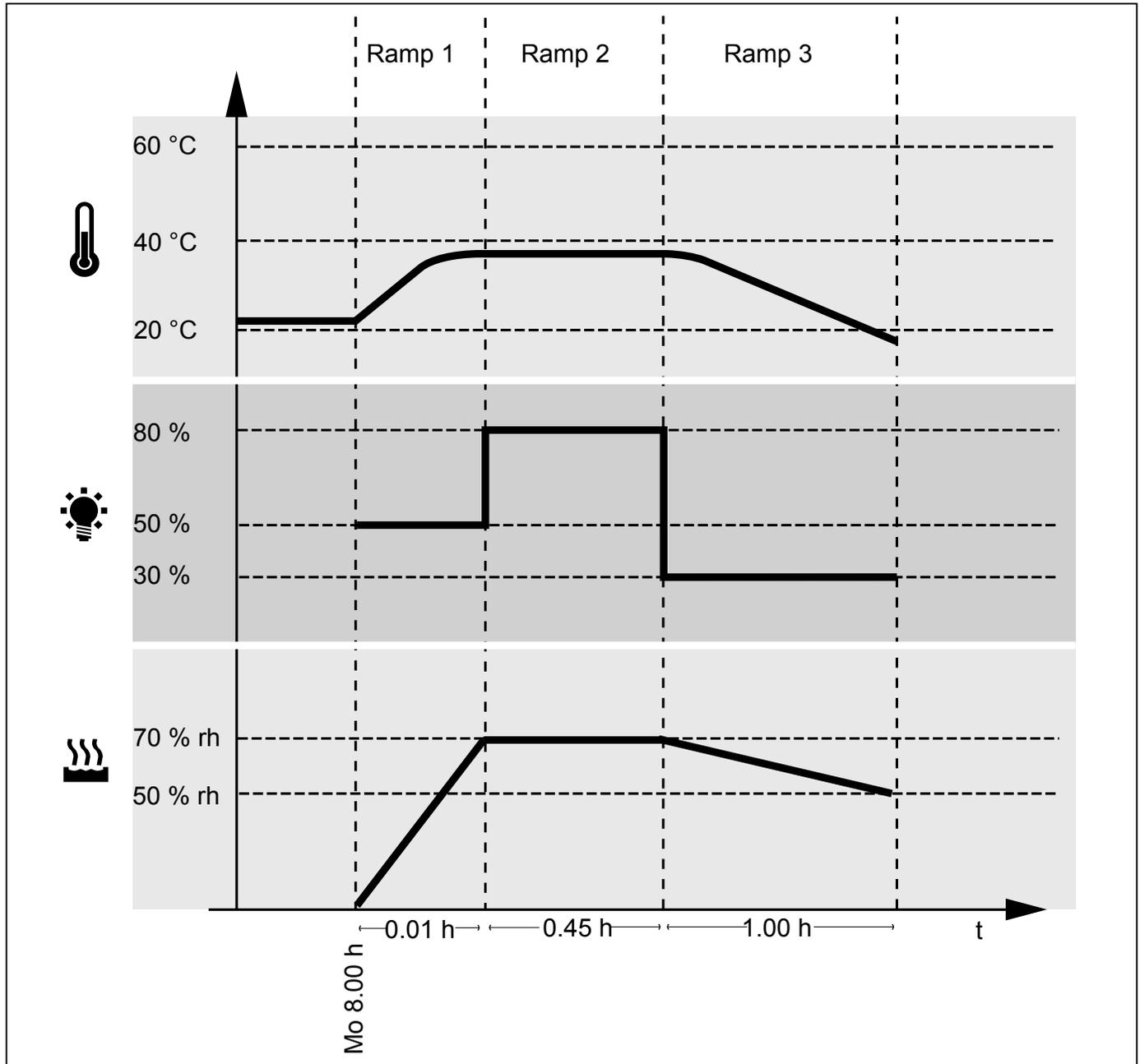


Fig. 21 Settings example programming mode

i Before programming ramp sequences, especially before programming complicated ones, it is recommended that you prepare a similar plan to ensure that you enter the required ramp commands correctly, as described below. For better orientation, it is recommended that you programme large programmes graphically on the computer using the "Celsius" software.

1. Setting the programme operating mode:
Hold the SET key down for approx. three seconds; the current operating mode then begins to flash. Select the programme operating mode with the push/turn control while holding down the Set key.
After releasing the SET key, the controller is in the programme mode.



2. Edit programme:
Select EDIT with the push/turn control while holding down the SET key.
After releasing the SET key, the controller is in the programme write mode.



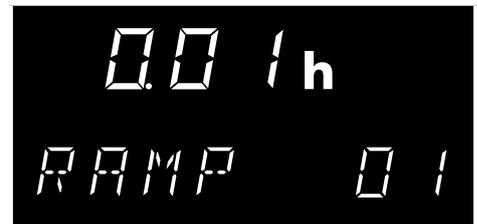
3. Weekday for delayed programme start:
Set the start day **Mo** by turning the push-turn control while the SET key is held down.



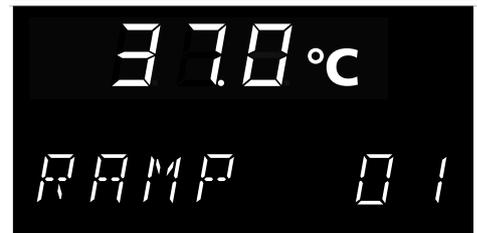
4. Set the time for delayed programme start:
Select the time display with the push/turn control.
Hold down the SET key and adjust the time to **8:00** with the push/turn control.



5. Set the duration of the first ramp segment:
Turn the push/turn control to the right until the time display flashes.
Hold down the SET key and adjust the time to **0:01** with the push/turn control.



6. Set the temperature of the first ramp segment:
Turn the push/turn control to the right until the temperature display flashes.
Hold down the SET key and set the desired temperature setpoint to **37.0 °C** with the push/turn control.



7. Setting the light intensity of the first ramp segment (optional):
Turn the push-turn control to the right until the lighting display flashes.
Hold down the SET key and set the desired light intensity of 50 % (five bars are lit up).



8. Set the relative humidity of the first ramp segment:
Turn the push/turn control to the right until the humidity display flashes.
Hold down the SET key and set the desired humidity setpoint to **70.0 %rh** with the push/turn control.



9. Set the close statement of the first ramp segment:
Turn the push/turn control to the right until a segment close statement, e.g. **END**, appears.
Hold down the SET key and set the close statement **SPWT [TH]** with the push/turn control.



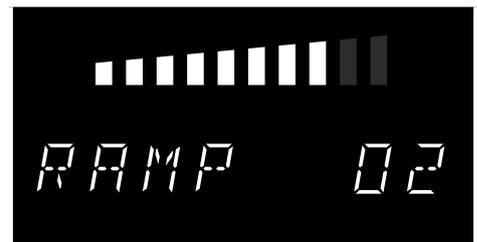
10. Set the duration of the second ramp segment:
Turn the push/turn control to the right until the time display flashes.
Hold down the SET key and adjust the time to **0:45** with the push/turn control.



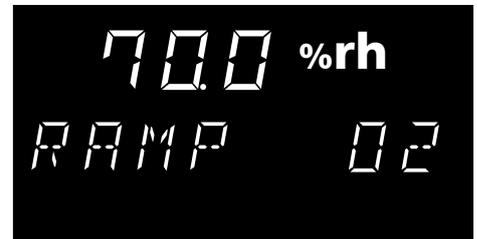
11. Set the temperature of the second ramp segment:
Turn the push/turn control to the right until the temperature display flashes.
Hold down the SET key and set the desired temperature setpoint to **37.0 °C** with the push/turn control.



12. Setting the light intensity of the second ramp segment (optional):
Turn the push-turn control to the right until the lighting display flashes.
Hold down the SET key and set the desired light intensity of 80 % (eight bars are lit up).



13. Set the relative humidity of the second ramp segment:
Turn the push/turn control to the right until the humidity display flashes.
Hold down the SET key and set the desired humidity setpoint to **70.0 % rh** with the push/turn control.



14. Set the close statement of the second ramp segment:
Turn the push/turn control to the right until a segment close statement, e.g. **END**, appears.
Hold down the SET key and set the close statement **NEXT** with the push/turn control.



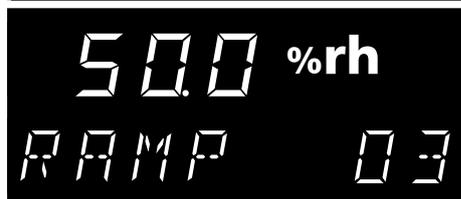
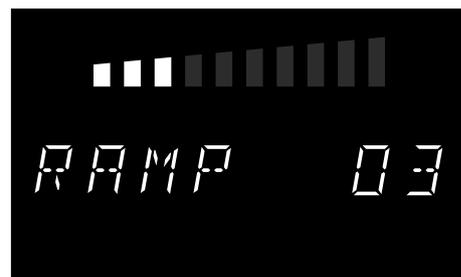
15. Set the time for the third ramp segment:
Select the time display with the push/turn control.
Hold down the SET key and set the time **1:00** with the push/turn control.



16. Set the temperature of the third ramp segment:
Turn the push/turn control to the right until the temperature display flashes.
Hold down the SET key and set to **15.0 °C** with the push/turn control.



17. Setting the light intensity of the third ramp segment (optional):
Turn the push-turn control to the right until the lighting display flashes.
Hold down the SET key and set the desired light intensity of 30 % with the push-turn control (three bars are lit up).
18. Set the relative humidity of the third ramp segment:
Turn the push/turn control to the right until the humidity display flashes.
Hold down the SET key and set the desired humidity setpoint to 50.0 % rh with the push/turn control.
19. Adjust the close statement of the third ramp segment:
Turn push/turn control to the right until a close statement appears in the display, e.g. END, and press the SET key briefly to confirm.
20. Leave the EDIT programme write mode:
Turn push/turn control to the right until EXIT appears in the display, and press the SET key briefly to confirm.
21. Set temperature monitoring:
Turn the push-turn control to the right and adjust the temperature monitoring (for more detailed information on this, see page 43).
22. Start programme:
Turn the push/turn control to the right until the stop icon ■ flashes.
Hold down the SET key and select the start icon ► with the push-turn control. Release the SET key, and the programme is started.



5.6.8 Operation with computer/laptop (optional)

The constant climate chamber can optionally be used, controlled and programmed with a computer/laptop. It has corresponding communication interfaces on the rear side for this purpose (see page 50).



The control of the appliance with the "Celsius" software is described in its own separate manual.

5.7 Ending operation

1. Switch off appliance. To do this, press the main switch on the operating panel so that it clicks home into the appliance (see Fig. 22).
2. Open the door
3. Remove the chamber load.
4. Check the freshwater tank and fill up if necessary (see page 21).

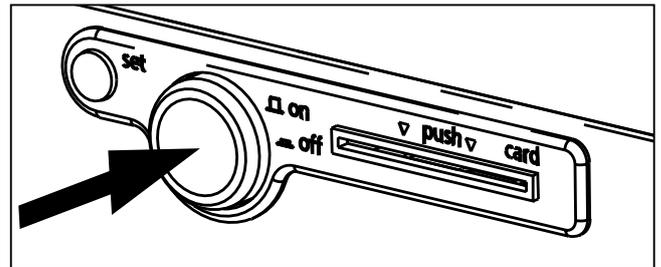


Fig. 22 Switching off the constant climate chamber

6. Malfunctions, warning and error messages



Warning!

After removing covers, live parts may be exposed. You may receive an electric shock if you touch these parts. Malfunctions requiring intervention inside the appliance may only be rectified by electricians. You must read the separate service manual for this.

Do not try and solve the error yourself, but contact an authorised customer service point for MEMMERT appliances or contact the MEMMERT customer services department directly (see page 2).

In case of enquiries, please always specify the model and appliance number on the nameplate (see page 14).

6.1 Warning messages temperature monitoring/humidification

See page 46.

| Error description | Cause of error | Rectifying errors | See |
|--|--|---|----------------|
| General faults | | | |
| Controller display does not light up | Power supply interrupted | Check power supply | |
| | Miniature fuse or appliance fuse faulty | Check fuse, replace if necessary | Service manual |
| | Mainboard faulty | Replace power module | Service manual |
| Appliance cannot be operated | Appliance locked by UserID card | Undo lock with UserID card | page 55 |
| | Push/turn control faulty | Replace main switch module with push/turn control | Service manual |
| Error messages in monitoring display | | | |
| Caution icon  flashes | Monitoring controller has switched off heater, since temperature difference between operating and monitoring controller is too small | Increase temperature difference between monitoring temperature and working temperature. | page 44 |
| | | Replace Pt100 temperature sensor of monitoring controller if necessary | Service manual |
| Malfunctions in humidification/dehumidification | | | |
| Humidification doesn't work | No water supply | Fill water tank, check that tube is correctly connected | page 20 |
| Dehumidification doesn't work | Fault in the dehumidification system | | Service manual |

For malfunctions that are not listed here or for error messages on the display (e.g. E-3), please read the service manual for the appliance or contact the MEMMERT customer service if the error correction suggested here is not successful.

6.2 Power failure

In case of a power failure, the constant climate chamber operates as follows:

In normal and  week time switch operating modes 

After the power supply has been restored, operation is continued with the parameters set. The time and the duration of the power failure is documented in the log memory (see page 52).

In programming mode 

- ▶ After a power failure of less than 60 minutes, the current programme is continued from the point at which it was interrupted. The time and the duration of the power failure is documented in the log memory (see page 52).
- ▶ For a power failure of more than 60 minutes, the constant climate chamber starts in manual operating mode for safety reasons and all setpoint values are changed to safe default values (see table below).

For remote (computer) operation

If there is a power failure in remote operation, the constant climate chamber starts in manual operating mode for safety reasons and all setpoint values are changed to safe default values (see table). The programme can only be continued from the computer. The time and the duration of the power failure is documented in the log memory (see page 52).

| Parameters | Default value |
|-------------|---------------|
| Temperature | 20 °C |
| Humidity | 20 % rh |

7. Advanced functions

7.1 Printer

The constant climate chamber is equipped with a parallel printer port as standard, just as used in computers.

A standard PCL3-compatible inkjet printer which has a parallel port interface (e.g. HP DeskJet 5550 or HP DeskJet 9xx) can be connected to the printer port on the rear of the appliance (see page 10).

Make sure that a shielded interface cable is used. The shielding must be connected to the plug casing.

The controller has an internal log memory (see page 52). The log data can be printed out in this mode via the connected printer.

If a colour printer is connected, the various graphs are printed out in colour.

On a printout, the GLP header is also printed automatically, and contains the following details:

- ▶ Date of printout
- ▶ Period of log
- ▶ Consecutive page numbers
- ▶ Serial numbers and appliance name

By turning the push/turn control and holding down the SET key, the following parameters can be selected and altered one after another, as described in the chapter "Basic information on operation" on page 23:

Querying the date of the first print page

FIRST

Querying the date of the last print page

LAST

Starting graphical printout

GRAPH

Printing programme and configuration page

LIST

Leaving the print menu and returning to the main menu

EXIT

7.2 Basic appliance settings (Setup)

In this operating mode, the basic settings for the appliance can be made.



By turning the push/turn control, the following parameters can be selected and altered while the SET key is held down, as described in the chapter "Basic information on operation" on page 23:

Clock time in 24 hr. format

i Conversion to summer time is not automatic, but must be done manually.

1430 h

SET TIME

Date

The controller contains a calendar which automatically accounts for the different lengths of months, and for leap years.

3005

SET DATE

Weekday

Tu

SET DAY

Year

Adjustment range: from 2000 to 2100

2009

SET YEAR

Acoustic signal at programme end

ENDSOUND

Setting: OFF or ON

OFF ON

ENDSOUND

Acoustic Signal for alarm, e.g. over/undertemperature

ALARM SOUND

Setting: OFF or ON

OFF ON

ALARM SO

Communication address

Adjustment range: 0 to 15 (see chapter „Communication interfaces“ on page 50)

ADDRESS

Ratio between upper and lower heat (only for constant climate chambers HPP 749)

Adjustment range: -50% to +50% (see also chapter Heat output distribution (BALANCE) on page 47)

BALANCE

Tolerance band ASF

Adjustment range: 2 to 20 °C (see page 45)

ASF SET

Language

Setting: GERMAN, ENGLISH, FRANCAIS, ESPANOL and ITALIANO

GERMAN

Compensation correction values (CAL 1-3, RH20, RH90) for customer-side calibration of temperature and humidity (see chapter “Heat output distribution (BALANCE)” on page 47).

CAL 1

rh 20

Close setup

Save all settings and leave the SETUP mode

EXIT

The realtime clock, which is set in the SETUP, contains the date and clock time. The realtime clock is used for logging purposes in accordance with GLP. Date and clock time are specified on the log printout. On graphical printouts, the time axis is labeled with the realtime. The clock is battery-buffered and is independent of the mains connection. The integrated Lithium battery of the type CR 2032 has a lifetime of approx. 10 years.

7.3 Temperature monitoring and safety equipment

The monitoring temperature is measured via a separate Pt100 temperature sensor in the chamber interior (see Fig. 9 on page 20). The monitoring unit is used to protect the chamber load and as a protection for the appliance and surroundings.

Temperature monitoring can be adjusted independently of the operating modes.

i In ramp operation mode, the monitoring temperature must always be set at least 3 K above the maximum working temperature.

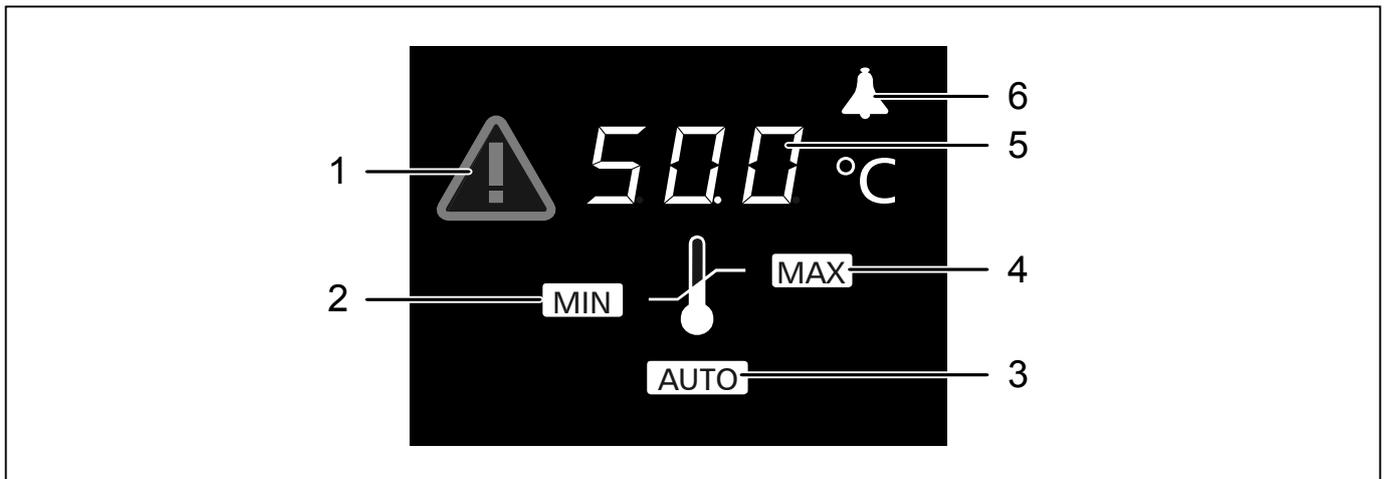


Fig. 23 Temperature monitoring display

- 1 Visual alarm icon
lit up: TB alarm
flashing: TWW alarm, TWB alarm, ASF alarm
- 2 Undertemperature protection
- 3 automatic temperature monitor (ASF, see page 45)
- 4 Overtemperature protection (TWW, TWB, see below)
- 5 Response temperature
- 6 Acoustic alarm icon

7.3.1 Electronic temperature monitoring (TWW)

Overtemperature protection

Adjustment range: -5 ... +75 °C

Setting:

Select the **MAX** icon with the push-turn control.

Hold down the SET key and adjust the temperature limits with the push/turn control.

Undertemperature protection

Adjustment range: -5 ... +75 °C

Setting:

Select the **MIN** icon with the push/turn control. Hold down the SET key and adjust the temperature limits with the push/turn control.

i The lower alarm limit value cannot be set higher than the top one. If no undertemperature protection is required, set the lowest temperature.

The manually set monitoring temperature **MIN** and **MAX** of the overtemperature control is monitored by an adjustable over/undertemperature controller (TWW) protection class 3.3 acc. to DIN 12880.

If the manually set monitoring temperature **MAX** is exceeded, the TWW takes over temperature control and begins to regulate the monitoring temperature (Fig. 24). The alarm icon flashes as a warning **!**.

If the acoustic alarm is switched on in the SETUP (see page 42), the TWW alarm is additionally signalled by an interval sound. If the SET key is pressed, the acoustic signal can be temporarily switched off until the next alarm event occurs.

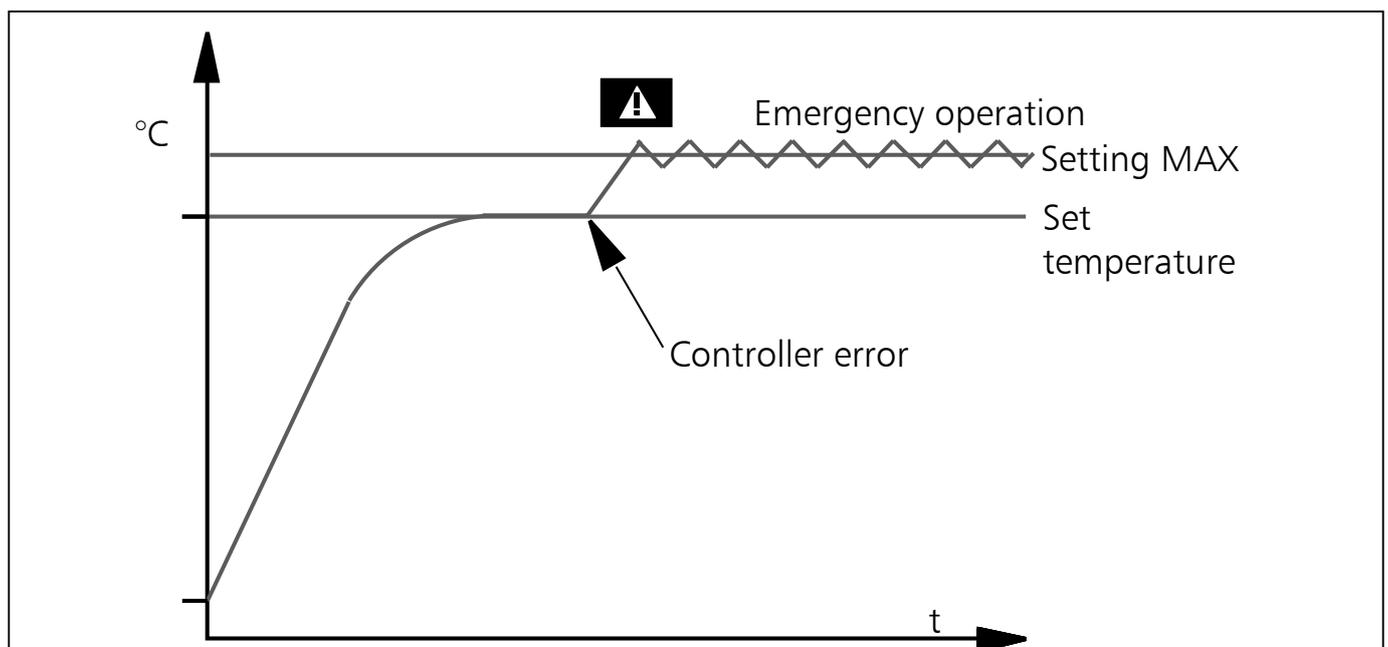
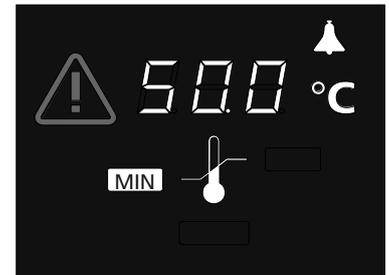
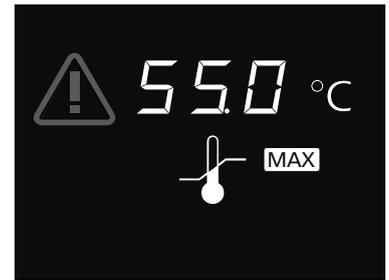


Fig. 24 Schematic diagram of how the TWW temperature monitoring functions

7.3.2 Automatic temperature monitor (ASF)

ASF is a monitoring device that automatically follows the set temperature setpoint within an adjustable tolerance band (Fig. 25).

The ASF is activated – if switched on – automatically if the actual temperature value reaches 50% of the set tolerance band of the setpoint (in the example $50^{\circ}\text{C} \pm 1^{\circ}\text{C}$) is reached for the first time (section A). The activation of the ASF is shown by the brightly lit **AUTO** icon.

When the temperature moves outside the set tolerance band around the setpoint (in the example in Fig. 25: $50^{\circ}\text{C} \pm 2^{\circ}\text{C}$) – e.g. if the door is opened during operation (section B of illustration) – the alarm is set off. This is shown by the flashing **AUTO** and **!** icons.

If the acoustic alarm is switched on in the SETUP (see page 42), the ASF alarm is additionally signalled by an interval sound. If the SET key is pressed, the acoustic signal can be temporarily switched off until the next alarm event occurs.

The ASF alarm goes off automatically as soon as 50% of the set tolerance band of the setpoint (in the example $50^{\circ}\text{C} \pm 1^{\circ}\text{C}$) is reached again (section C).

If the temperature setpoint is altered, the ASF is automatically disabled temporarily (see in the example: The setpoint is changed from 50°C auf 25°C , section D) until it has reached the tolerance range of the new temperature setpoint (section E).

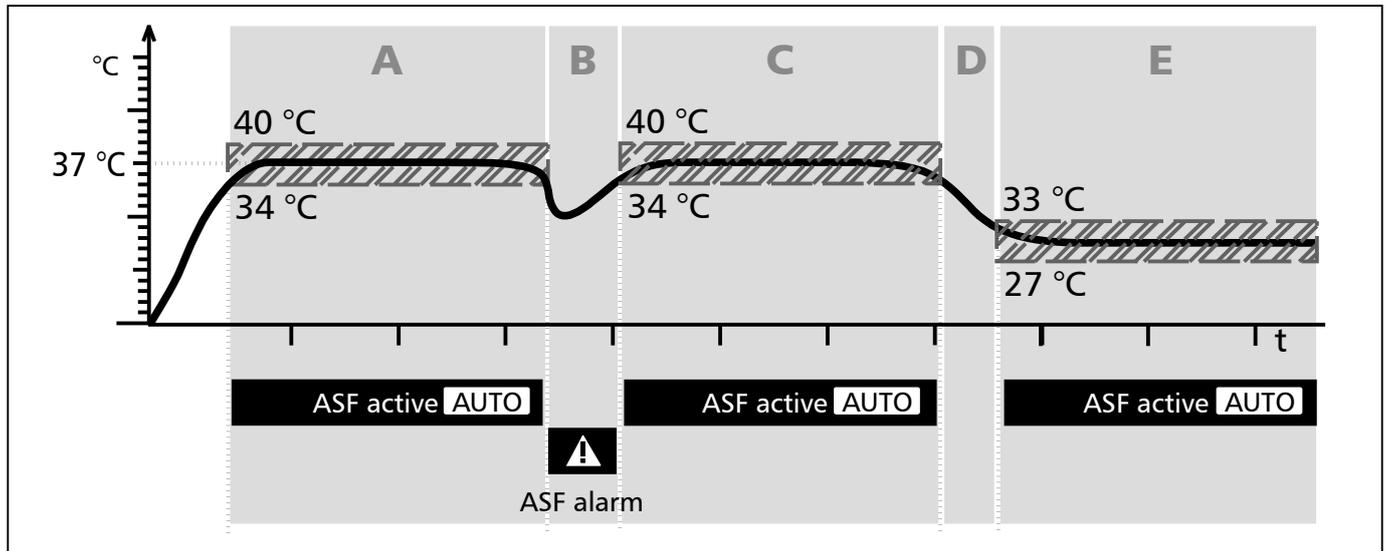
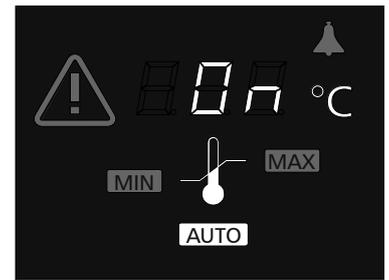
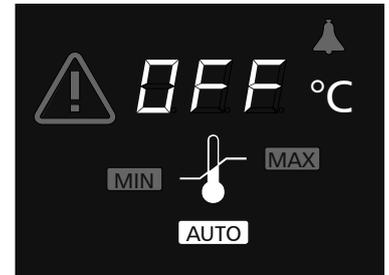


Fig. 25 Schematic diagram of how the ASF temperature monitoring functions

Switching on the automatic temperature monitor:
 Select the AUTO icon with the push/turn control.
 Hold down the SET key and set to  with the push-turn control.



Switching off the automatic temperature monitor:
 Select the AUTO icon with the push/turn control.
 Hold down the SET key and set to  with the push/turn control.



i The tolerance band for the ASF can be adjusted in the SETUP (see page 42).

7.3.3 Warning messages

A repeated acoustic signal indicates an error in the temperature control system or in the humidification system. It is set off in the following cases:

HI-ALARM

Overtemperature protection is triggered. Check the MAX setting and increase if necessary (see Chapter 7.3.1).

LO-ALARM

Undertemperature protection is triggered. Check the MIN setting and reduce if necessary (see Chapter 7.3.1).

ASF-ALAR

Automatic monitoring function is triggered. Check the tolerance value ASF-SET set in the SETUP menu (see page 42).

AH EMPTY

Water tank empty. Fill up with water (see page 20).

AH OVER

Humidity exceeds the preset setpoint for longer than 30 minutes. Open door for 30 sec. and wait to see if the controller steadily adjusts to the setpoint. If the error occurs again, contact the customer service.

i This monitoring function only begins to work after the humidity setpoint has been reached.
 The acoustic alarm can be temporarily switched off by pressing the SET key.

7.4 Heat output distribution (BALANCE)

For constant climate chambers HPP 749, application-specific correction of the heat output distribution (BALANCE) is possible between the upper and lower heating groups in the SETUP (setting: see page 42). The adjustment range is from -50% to $+50\%$.

Setting 0% restores the heating output distribution factory settings.

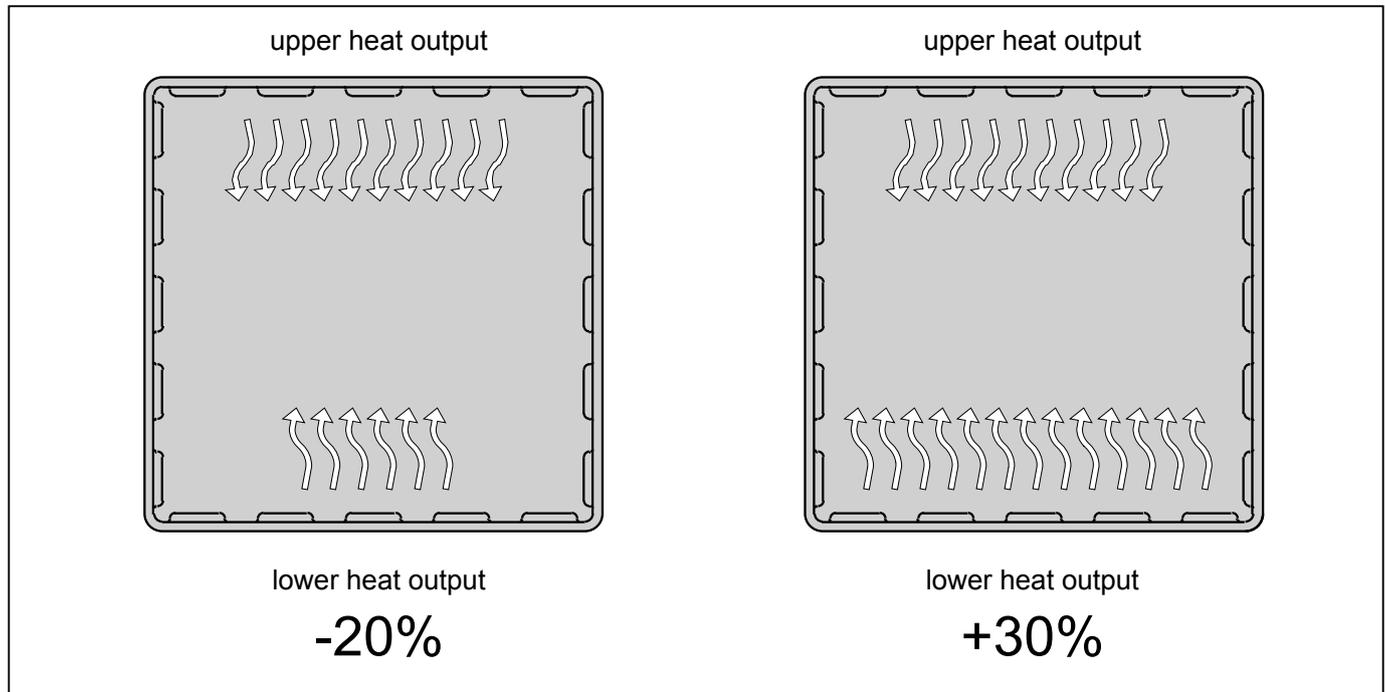


Fig. 26

Left: The -20% setting causes the lower heating groups to emit 20% less heat than the upper heating groups.

Right: The $+30\%$ setting causes the lower heating groups to emit 30% more heat than the upper heating groups.

7.5 Calibration

7.5.1 Temperature calibration

The constant climate chamber can be calibrated customer-specifically using three calibration temperatures of your choice:

- ▶ CAL.1 temperature calibration at low temperature
- ▶ CAL.2 temperature calibration at medium temperature
- ▶ CAL.3 temperature calibration at high temperature

For each selected balance point (Fig. 27) a positive or negative compensation correction value can be set between -4.9 °C and $+4.9\text{ °C}$. There must be a difference of at least 10 K between the individual balance points.

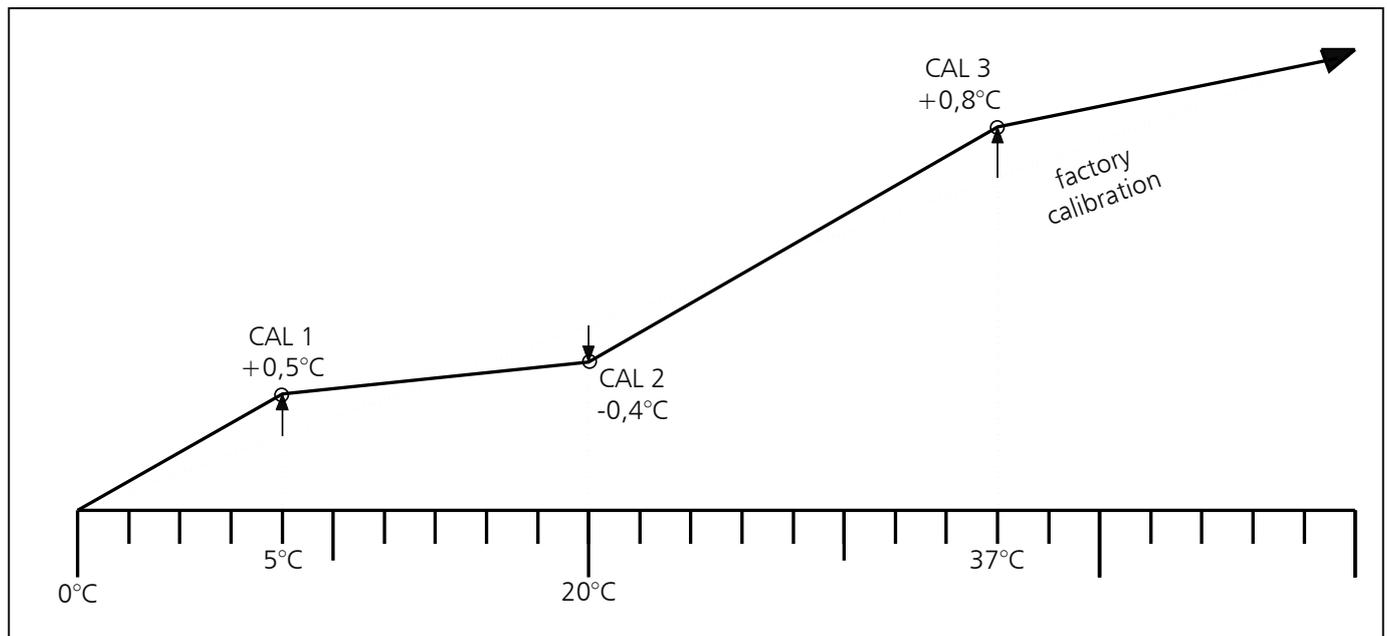


Fig. 27 Temperature calibration (example)

Setting:

1. Set the desired compensation temperature in the SETUP (see page 42) and set the accompanying compensation correction value to 0.0 °C .
2. With a reference instrument, measure the deviation in the stationary state in the selected compensation temperature.
3. Set the compensation correction value in the SETUP. If the measured reference temperature is too low, the compensation correction value must be set with a negative sign.
4. Perform a control measurement with the reference instrument.
5. Repeat the procedure for the other two balance points if necessary.

Example: Temperature deviation at 30 °C should be corrected.

1. Set compensation temperature CAL_2 in the SETUP to 30.0°C and set accompanying compensation correction value to 0.0°C:



2. With a calibrated reference instrument and at a set setpoint temperature of 30 °C in normal operation, an actual temperature of 29.6 °C is measured.
3. Set the compensation correction value for CAL_2 in the SETUP to -0.4°C:



4. After the calibration procedure, the reference instrument should now display 30°C.
5. With CAL_1 , another compensation temperature below CAL_2 can be programmed in the same way, and with CAL_3 , one lying above this.

i If all compensation correction values are set to 0.0°C, the factory calibration settings are restored.

7.5.2 Humidity calibration

The constant climate chamber can be calibrated for the individual customer by means of two balance points at 20 and at 90 % relative humidity. For each selected balance point, a positive or negative compensation correction value can be set between and -10 % and +10 % (Fig. 28).

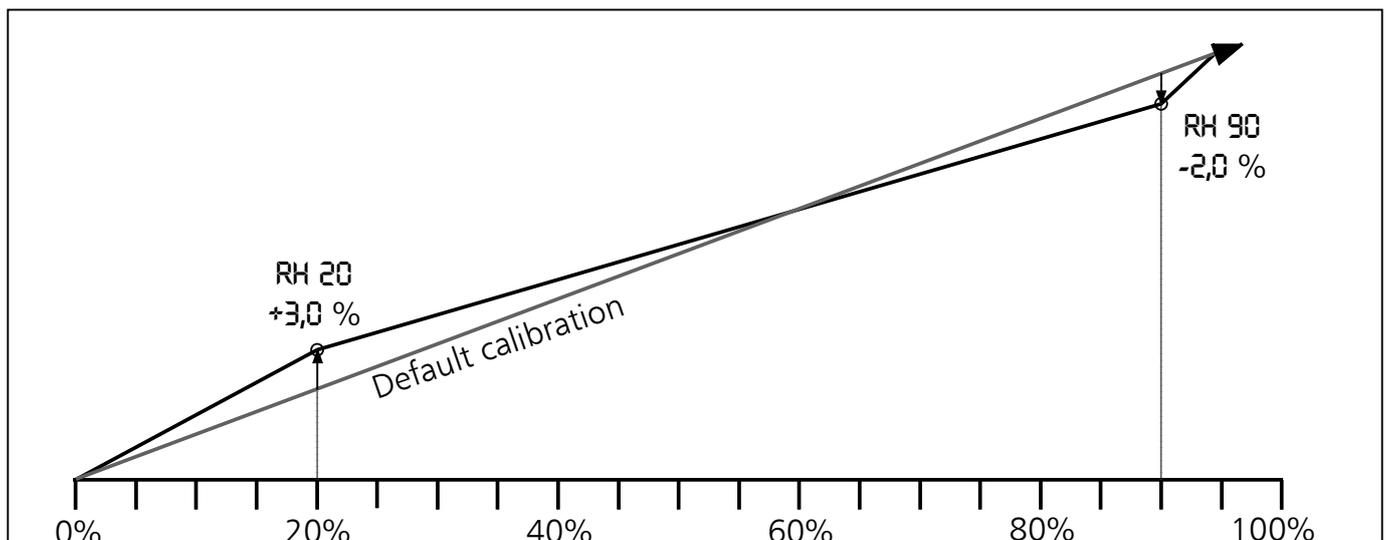


Fig. 28 Humidity calibration (example)

Setting:

1. Set the desired humidity balance point in the SETUP (see page 42) and set the accompanying compensation correction value to 0.0 %rh.
2. With a reference instrument, measure the deviation in the stationary state in the selected humidity balance point.
3. Set the compensation correction value in the SETUP. If the measured reference humidity is too low, the compensation correction value must be set with a negative sign.
4. Perform a control measurement with the reference instrument.

The procedure can be performed with humidity balance points of 20 % rh and 90 % rh.

Example: Humidity deviation at 90 % should be corrected.

1. Set humidity balance point in the SETUP to RH 90 and set the accompanying compensation correction value to 0.0 % rh:



2. With a calibrated reference instrument, an actual humidity of 88 % rh is measured at normal operation, with a set setpoint humidity of 90 % rh.
3. Set the compensation correction value in the SETUP for RH 90 to -2.0 % rh:



4. The reference instrument should display 90.0 % rh after the calibration procedure.

With RH 20, a further comparison can be programmed at 20 % relative humidity.

- i** If all compensation correction values are set to 0.0 % rh, the factory calibration settings are restored.

7.6 Communication interfaces

Depending on the model, the constant climate chamber can be fitted with different communication interfaces (USB, RS 232/485, Ethernet). These are located on the rear of the appliance.

7.6.1 USB interface

The chamber is fitted by default with a USB interface in accordance with the USB specification. With this interface it is possible to control and log the chamber remotely from the computer. For this, the "Celsius" software is used.

The chamber must be given a unique device address in the SETUP submenu, menu item ADDRESS, via which the computer communicates with the oven (see page 42). The default setting is ADDRESS 0. Using this, the appropriate incubator can be selected and programmed from the computer.

If several chambers are to be connected to a computer via USB interface, an appropriate interface on the computer and a separate cable are required for each chamber.

The maximum cable length is 5 m.

7.6.2 Communication interfaces RS232/RS485 (optional)

The chamber can be optionally equipped with a RS232 serial communication interface in accordance with DIN 12900-1 or a RS485 interface, instead of a USB interface (Fig. 29 and Fig. 30).

- ▶ With the RS232 interface, it is possible to control and log the chamber remotely from the computer. If several chambers are to be connected to a computer via RS232 interface, an appropriate interface on the computer and a separate cable are required for each chamber. The maximum cable length is 15 m.
- ▶ The RS485 interface enables the networking of several chambers (up to 16) with one computer via a shared two-wire cable. The computer needs to be equipped with either a RS485 interface or with an RS232/RS485 adapter.
- ▶ Connecting the wires is done individually with a shielded cable, depending on the installation site. The maximum total cable length is 150 m.

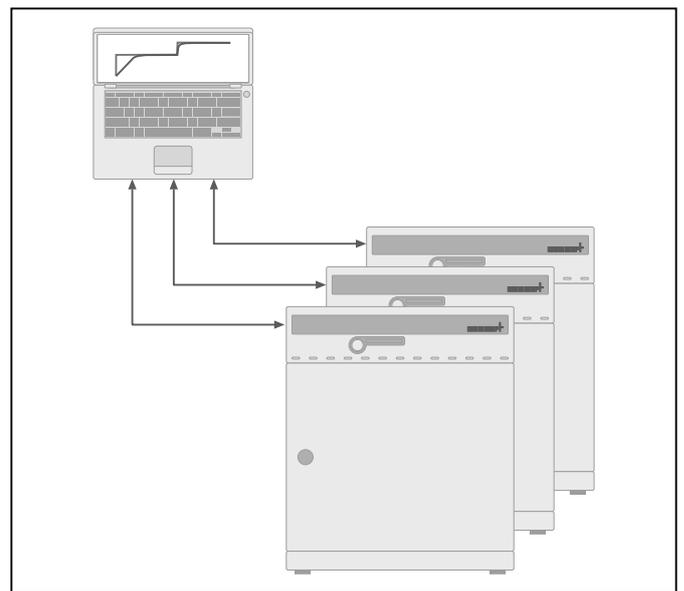
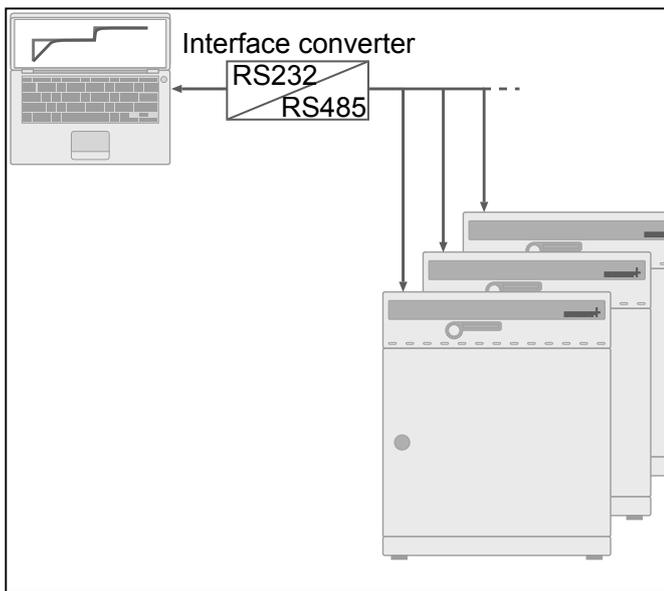


Fig. 29 PC RS 485 connection with adapter Fig. 30 PC RS 232 connection

In both cases, each chamber must be given a unique device address in the SETUP submenu, menu item ADDRESS (see page 42), via which the computer communicates with the chamber. The default setting is ADDRESS 0. Using this address, the appropriate oven can be selected and programmed from the computer.

The chamber can be connected to the computer using a shielded interface cable. The shielding must be connected to the plug casing.



If the serial port is not used, put on the cover included.

7.6.3 Connecting test chambers to a network with Ethernet interface

The constant climate chamber can optionally be equipped with an Ethernet instead of a USB interface.

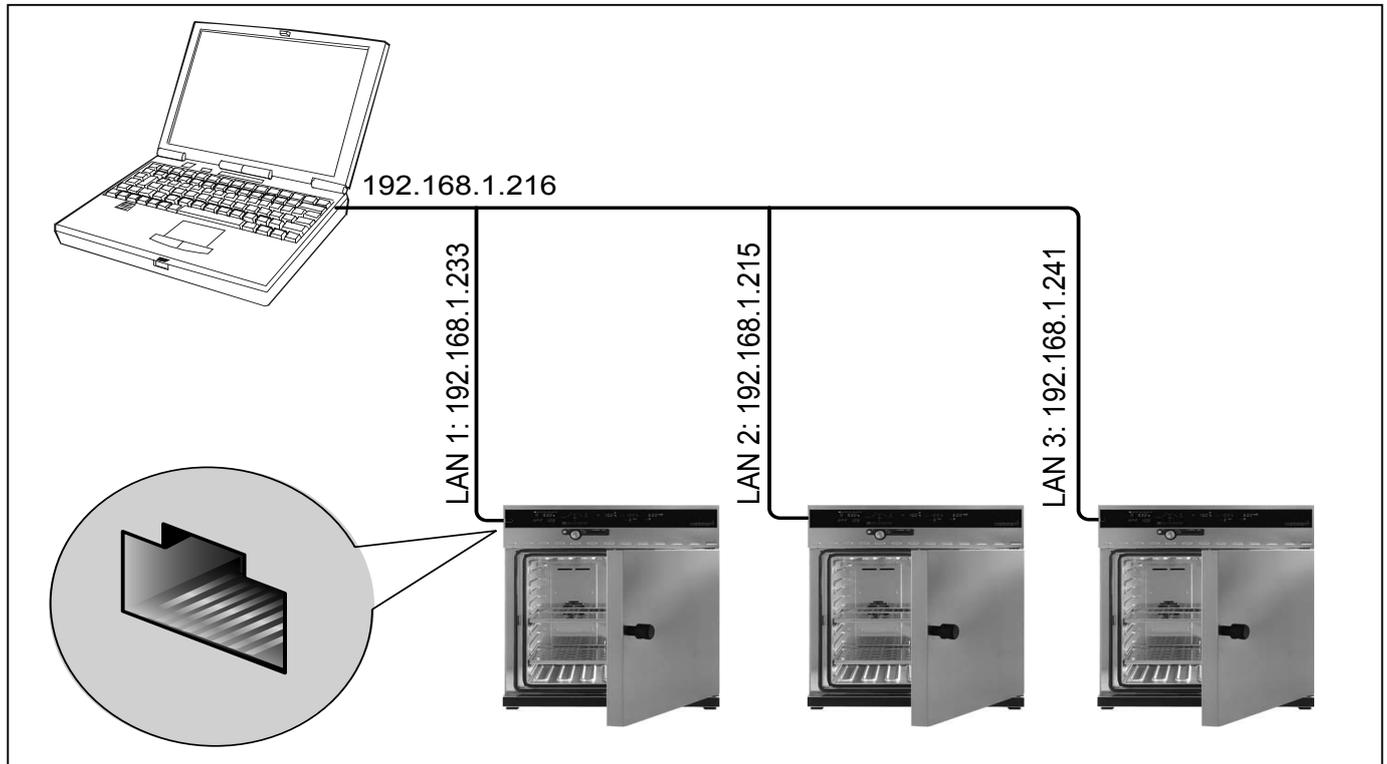


Fig. 31 Connecting one or more test chambers to a network using an Ethernet interface (schematic diagram)

For identification purposes, each appliance connected must have its own unique IP address. Each chamber is delivered by default with the IP address 192.168.100.100. The programme "XTADMIN", which can be found on the "Celsius" CD-ROM, can be used to change the IP address.



How the IP address is changed and the oven is logged on is described in the "Celsius" manual.

7.6.4 Log memory

The controller continually logs all relevant measured values, settings and error messages at 1-minute intervals.

The internal log memory is listed as a ring memory, i.e. the oldest log data are always overwritten automatically with new data.

The logging function cannot be switched off, but is always active. The measured data are stored in the controller, safe from manipulation. For documentation purposes the controller memory can be read out via the Celsius control software. Each dataset is stored with a unique timestamp.

The internal log memory has a size of 1024 kB. This corresponds to a storage capacity for about three months in permanent operation.

Since large amounts of data are stored during ramp mode, this can reduce the maximum logging time.

If the power supply is interrupted, the time of the power cut and the return of voltage are stored in the controller.

Reading in the log memory to the computer via USB interface

Using the "Celsius" programme, the log memory of the controller can be read out to a computer and from there be displayed graphically, printed out and stored. The log memory of the controller is not modified or deleted by the reading out.

Printing out log memory

(see also chapter "Printer" on page 41)

For a printout, the GLP header is also printed automatically, and contains the following details:

- ▶ Date of printout
- ▶ Period of log
- ▶ Consecutive page numbers
- ▶ Serial numbers and appliance name

i If the printer is not ready (e.g. ink cartridge or paper tray empty), no log data will be lost. Multiple printouts can also be made, since the log memory is not deleted after printing.

7.6.5 Memory card MEMoryCard XL

On the MEMoryCard XL (Fig. 32), a temperature control programme with up to 40 ramp segments can be programmed. This can be programmed directly on the controller or via the "Celsius" programme.



To programme the MEMoryCard XL with the computer and the "Celsius" software, please read the user manual for "Celsius" or the online help.

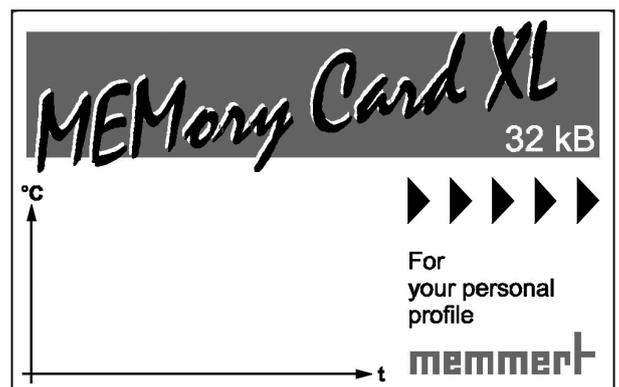


Fig. 32 MEMoryCard XL

For the sake of keeping an overview, it is recommended that you programme large programmes graphically on the computer. If a MEMoryCard XL is programmed, it can only be read in in the same type of chamber for which it was programmed.

The text field of the MEMoryCard XL can be filled individually with text or diagrams.

Directly programming the MEMoryCard XL via the constant climate chamber

1. Push the MEMoryCard XL into the card reader in the appliance operating panel (see Fig. 2 on page 9).
2. Programming the chamber as described in the "Programme mode" Chapter from page 29. The chosen settings are written directly to the card and stored on it. After the card is removed, the programme stored internally in the controller is activated again.

Programming the MEMoryCard XL on the computer via the constant climate chamber

1. Connect the computer with an interface cable to the USB interface of the chamber (see "USB interface" Chapter on page 50).
2. Push the MEMoryCard XL into the card reader in the appliance operating panel (see Fig. 2 on page 9).

3. Programme the chamber on the computer. The chosen settings are written and stored on the card.

i Via the "Celsius" software, the MEMoryCard XL can be provided with write protection. The programme on the card can then no longer be altered on the controller.

Programme alterations via the controller are only possible if the write protection has been disabled from the computer with the "Celsius" software.

Programming the MEMoryCard XL from the computer with the read-write device

Using the read-write device which can be purchased separately (Fig. 33), the MEMoryCard XL can be programmed offline on the computer with "Celsius" without the need for a constant climate chamber being connected. When you do this, make sure that the contacts on the MEMoryCard XL are pointing upwards to the markings on the read-write device.

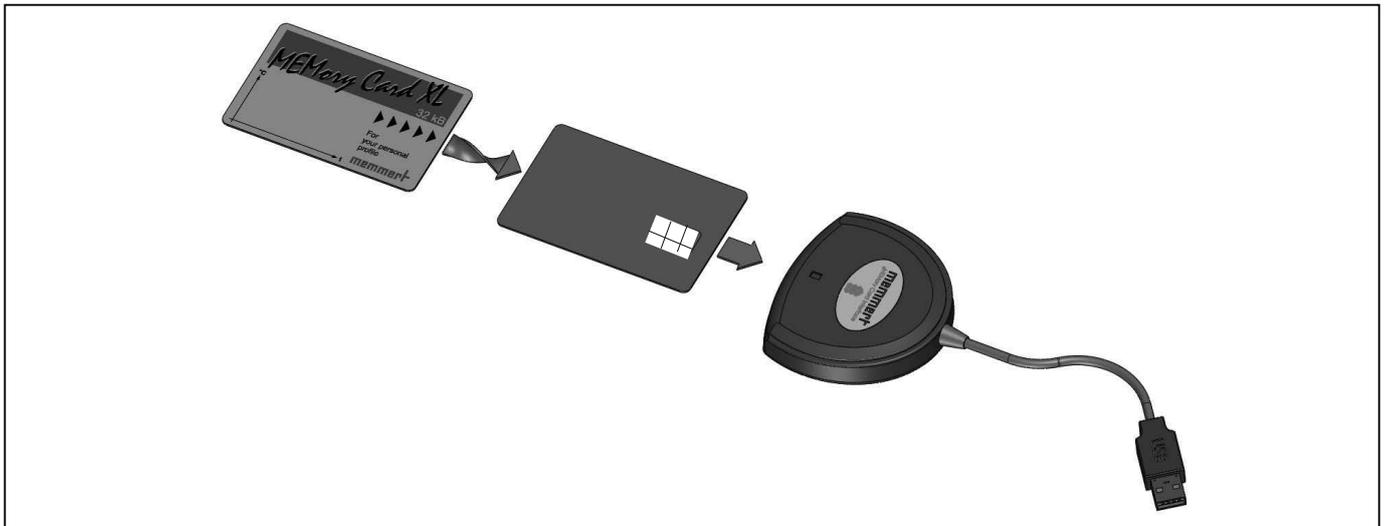


Fig. 33 Read-write device

i The programme remains stored on the MEMory-Card XL even after it is removed from the appliance. It can also be overwritten at any time with "Celsius" via the computer.

Logging on the MEMoryCard XL

During a programme sequence running from the chip card, the humidity and temperature setpoints are continually logged on the memory card. These can be read in via "Celsius" after the programme is finished and printed out. This is described in the "Celsius" user manual.

There is a certain amount of storage space available for logging, depending on the programme duration. The scanning rate is set automatically by the controller, depending on the programme duration.

The actual value can be logged on the MEMoryCard XL at one minute intervals for a programme lasting up to 135 hours. For programmes lasting longer, the scanning rate is lengthened to a maximum of 30 min.

i At each programme start, the logging is restarted and old log data is overwritten.

7.6.6 User ID card (optionally available as an accessory)

The device number of the appliance and an unique user number are stored in encrypted form on the User-ID card (Fig. 34). The User-ID card therefore works only in the appliance with the corresponding serial number.

Every login process with the User-ID card is logged in the internal Flash memory of the controller.

If the User-ID card has been inserted, the menu item **LOCK** also appears in the **SETUP** menu (see "Basic appliance settings (Setup)" from page 41). If the setting is set to **ON**, the constant climate chamber is locked against all alterations once the chip card is removed.

The lock via the User-ID card is displayed via the flashing key icon  on the operating panel (see page 9).

i If the constant climate chamber is locked via the User-ID card, no programme operation with the MEMoryCard XL is possible, since this card could be removed at any time and modified externally.



Fig. 34 User ID Card

8. Maintenance and servicing



Warning!

Disconnect the mains plug before any cleaning or maintenance work.

8.1 Cleaning

Regular cleaning of the easy to clean chamber interior prevents build up of material remains, which over time could impair the appearance and functionality of the stainless steel chamber. The metal surfaces of the chamber can be cleaned with normal stainless steel cleaning agents. Make sure that no rusty objects come into contact with the working chamber or with the stainless steel housing. Rust deposits lead to an infection of the stainless steel.

If rust spots should appear on the surface of the working chamber, due to impurities, immediately clean and polish the affected area.

Do not clean the operating panel, the plastic input module and other plastic parts of the chamber with caustic or solvent-based cleaning agents.

8.1.1 Cleaning the Peltier cooling modules

In order to guarantee the perfect function and long lifetime of your Peltier cooling modules, it is absolutely essential that you remove dust deposits from the heat sink on the rear of the appliance (with a vacuum cleaner, paintbrush or bottle brush, depending on the amount).

To make cleaning easier, the cover can be removed after the screws have been loosened (Fig. 35).

8.2 Regular maintenance

Every three months if in permanent operation

- ▶ Grease the moving parts of the doors (hinges and lock) with thin silicon grease and check that the hinge screws are not loose.
- ▶ Check that door seals fit tightly, adjust door if necessary (see chapter 8.3).

Annually:

- ▶ Grease the moving parts of the doors (hinges and lock) with thin silicon grease and check that the hinge screws are not loose.
- ▶ Check that door seals fit tightly, adjust door if necessary (see chapter 8.3).

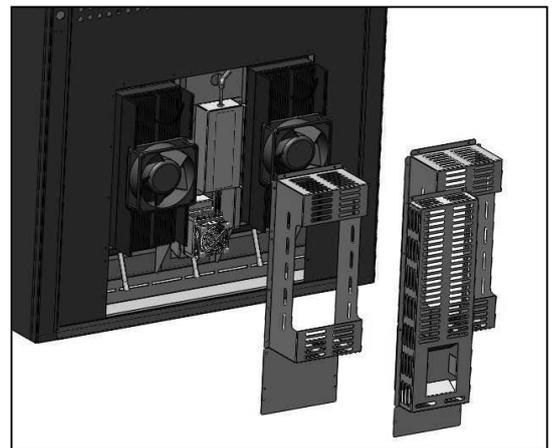


Fig. 35 Cover of the Peltier cooling modules on the rear of the appliance

8.3 Adjusting door

A well-closing door is indispensable for climate chambers. On Memmert appliances, the tight closing of the door is optimally guaranteed by a chamber seal and a door seal. In permanent operation, it is possible that the flexible seal material will begin to sag. To ensure that the door closes exactly, however, an adjustment may be necessary:

1. Undo mounting bolts (Fig. 36, 2) at the top and bottom of door.
2. The top section of the door hinge (1) can now be moved slightly in the direction of the arrow.
3. After undoing the Allen set screw (5), the door can be adjusted by turning the eccentric (3) with a screwdriver.

i The Allen set screw (5) is fixed with lock washer varnish. It can be undone with a jolting motion using a 2 mm Allen key.

4. Apply lock washer varnish to the Allen set screw (5) and screw tight the set screw.
5. Tighten the mounting bolts (2) again.

The locking plate (7) can also be adjusted in the direction of the arrows after undoing the screws (6) (Fig. 37). Afterwards, screw the locking plate back firmly.

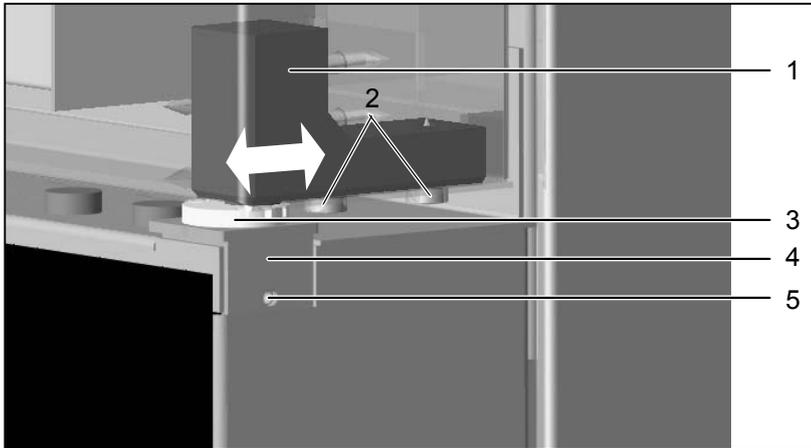


Fig. 36 Adjusting the door
 1 Upper section of the door hinge
 2 Mounting bolts
 3 Eccentric tappet
 4 Eccentric socket
 5 Allen set screw

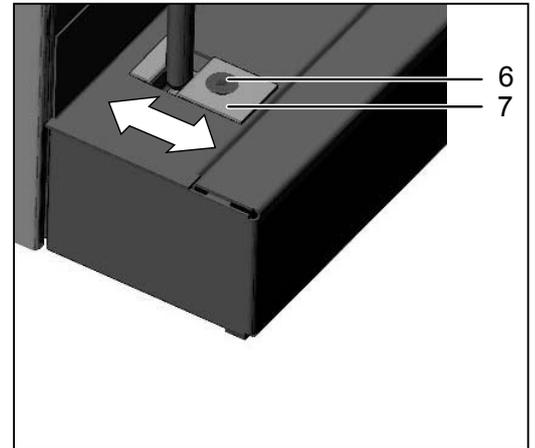


Fig. 37 Adjusting the locking plate
 6 Screw
 7 Locking plate

8.4 Repairs and service



Warning!

After removing covers, live parts may be exposed. You may receive an electric shock if you touch these parts. Disconnect the mains plug before removing any covers. Any work inside the unit may only be performed by qualified electricians.



Repairs and service work are described in a separate service manual.

9. Storage and disposal

9.1 Storage

The constant climate chamber may only be stored under the following conditions.

- ▶ dry and in an enclosed, dust-free room
- ▶ frost-free
- ▶ disconnected from the power supply

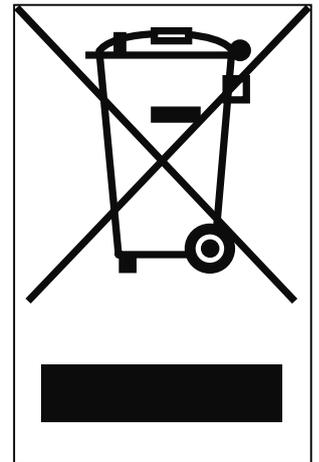
Before storage, remove the water tube and empty the water tank (see page 21).

9.2 Disposal

This product is subject to the directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE) of the European Parliament and of the EU Council of Ministers. This appliance has been brought to market after 13th August 2005 in countries which have already integrated this directive into their national laws. It may not be disposed of in normal household waste. To dispose, please contact your dealer or manufacturer. Any appliances that are infected, infectious or contaminated with materials that are a hazard to health are excluded from being taken back. Please observe the other regulations in this context.

Note for Germany:

The appliance may not be left at public or communal recycling or collection points.



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