

# Operating Manual

APT.Line KB

Cooled incubators

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## EG - KONFORMITÄTSERKLÄRUNG EC - Declaration of Conformity

(nach 73/23/EWG)  
(acc. to 73/23/EEC)

<b>Erzeugnis/Product:</b>	Kühlbrutschrank Cooled incubator
<b>Typenbezeichnung/Type:</b>	KB 53, KB 115, KB 240, KB 400, KB 720
<b>Nennspannung/Nominal voltage:</b>	1/N/PE AC; 230V; 50/60Hz
<b>Nennaufnahme: Nominal power:</b>	KB 53: 0,46 kW; KB 115: 0,46 kW; KB 240: 0,93 kW; KB 400: 1,10 kW; KB 720: 1,35 kW;

**Dieses Erzeugnis entspricht den folgenden Produktspezifikationen:  
This unit corresponds to the following product specification:**

**Sicherheit/safety:**

EN 61010-1: 1993 und IEC 66E(CO) mit IEC 66(Sec)75: 1993; DIN 12880-1: 11.78

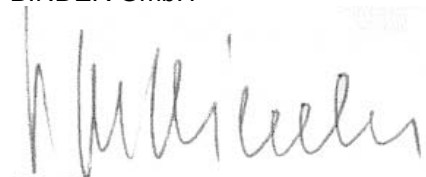
**EMV/EMC:**

EN 55014: 1993; EN 50082-1: 1994

Dieses Gerät entspricht den Anforderungen der Niederspannungsrichtlinie 73/23/EWG und der EMV-Richtlinie 89/336/EWG und trägt entsprechend die Kennzeichnung CE.

This unit corresponds to the demands of the low tension directive 73/23/EEC and to the directive 89/336/EEC and, corresponding to this, it bears the CE-mark.

BINDER GmbH



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Geschäftsführender Gesellschafter  
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## 1. Information notice regarding the operating manual

Dear customer,

To ensure correct operation of the cooled incubator system you must read and understand the operating manual in full. In accordance with CE directives important sections are denoted by the following symbols:

### Symbols used



This symbol draws your attention to information in the operating manual which you should read, in order to avoid injuries to people. The procedure should only be continued if the specified conditions have been understood and fulfilled.



This symbol draws your attention to information in the operating manual which you should read, in order to prevent damage to the product.



Information which describes the operation of the equipment, in order to prevent accidents due to electric shock or damage to the equipment due to excess voltage.



Information which must be observed.



Technical information



General information



This symbol draws your attention to hot surfaces which can lead to burning upon contact

## 2. Factory calibration

This unit became calibrated and justified in factory. Calibration and justification are performed using standardised test instructions according to the QM-system of DIN EN ISO 9001 applied by WTB Binder (certified in December 1996 by TÜV CERT under registration number 70 100 M 926). All test equipment used are subject to the administration of measurement and test equipment which is also constituent part of the QM-systems of DIN EN ISO 9001. They are controlled and calibrated in relation to a DKD-Standard on regular intervals.

### 3. Unit overview

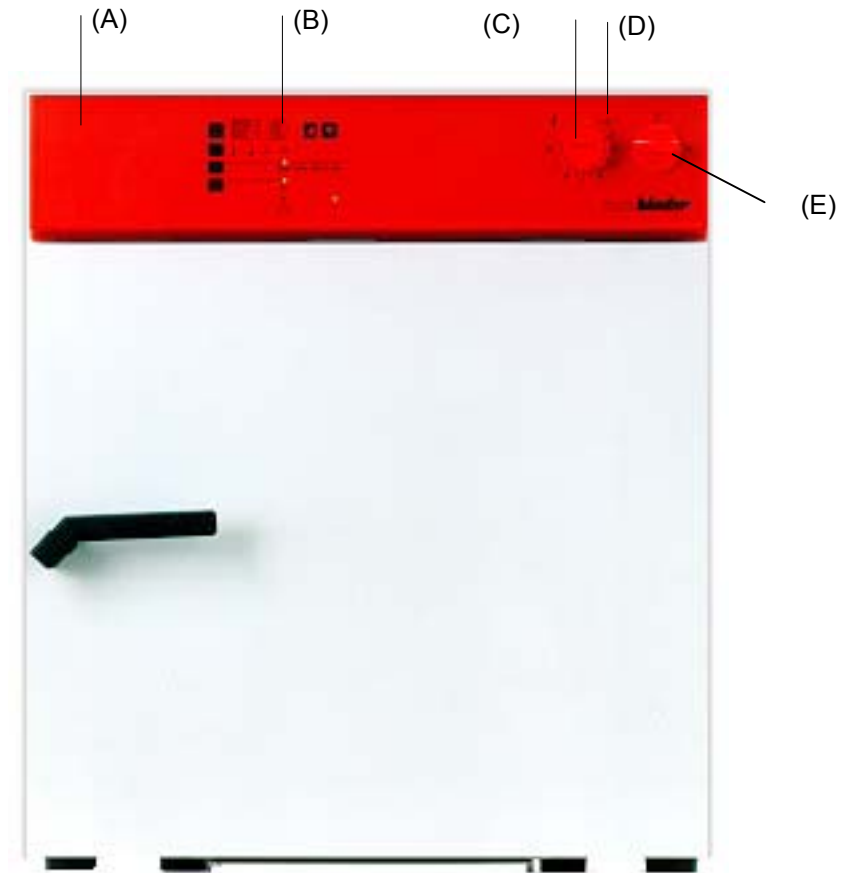


Figure 1: KB 115 Cooled Incubator

- A) Instrument box
- B) Temperature controller RD2
- C) Safety device TWW class 3.1
- D) Red alarm lamp for TWW
- E) Main on/off switch

### 3.1 Unit description

With your new KB cooled incubator from BINDER GmbH, you have purchased a quality product characterized by a high degree of economy.

The APT.Line concept impresses with its practical handling. Thanks to their clear arrangement, all unit functions are easy and comfortable to use. The major features, however, are easy cleaning of all unit parts and avoidance of undesired contamination.

A high level of precision, reliability, and safety for all growth parameters ensures optimum incubation conditions. Moreover, the KB cooled incubator is designed for maximum usability - even in continuous operation year after year. With its universal unit concept, the KB fulfills all technical and application-specific requirements arising in experimentation such as in the areas of biotechnology, medicine, the nutrition industry, pharmaceutical and cosmetics industries, botany, and zoology.

Two important temperature technologies have been combined to achieve perfect temperature control. The newly developed DCT cooling system, a direct cooling process, in conjunction with the APT.Line preheating chamber technology, satisfies the unique prerequisites for attaining highly-precise temperature control from 0°C-99.9°C and particularly short recovery times after opening the door.

The cooling system is distinguished by direct, precise, and rapid temperature conduction. Large-area labyrinth evaporator plates are integrated into the outer walls of the preheating chamber system. In contrast to the indirect systems, such as the air-jacket system, they conduct the cold directly to the atmosphere of the working space.

The APT.Line preheating chamber system guarantees an unheard of high level of spatial and time-based temperature precision, thanks to the direct and distributed air circulation into the interior. The temperature is regulated exactly to a tenth of a degree. This is especially important for maintaining temperatures - especially with full chambers - and for rapid restoration of optimum growth conditions after opening the door. The inner glass door ensures that the temperature remains constant when observing the incubation process. The air turbine supports exact attainment and maintenance of the desired temperature accuracy. The fan speed is digitally adjustable from 0-100%. The heating and cooling systems are microprocessor regulated to a tenth of a degree.

### 3.2 Proper use KB

The cooled incubator KB are designed for exact temperation of harmless materials. Because of their precise temperature accuracy these devices are especially useful for incubation of cultures at a standard temperature of 37°C. The solvent content must not be explosive or flammable. In other words, it must not at any time, irrespective of its concentration in the steam room, be able to form an explosive mixture with air. The drying temperature must lie below the flash point or below the sublimation point of the charging material.

The user should be informed about the physical and chemical properties of the charging material, as well as the contained moisture constituent and its behaviour under addition of heat energy.

The user must inform himself about any potential health risks caused by the charging material, the contained moisture constituent or by reaction products which may arise during the drying process. The user must take adequate measures to exclude such risks prior commissioning the temperature chamber.



**The device can be operated in a temperature range of 0°C up to + 99,9°C.**

### 3.3 KB control panel

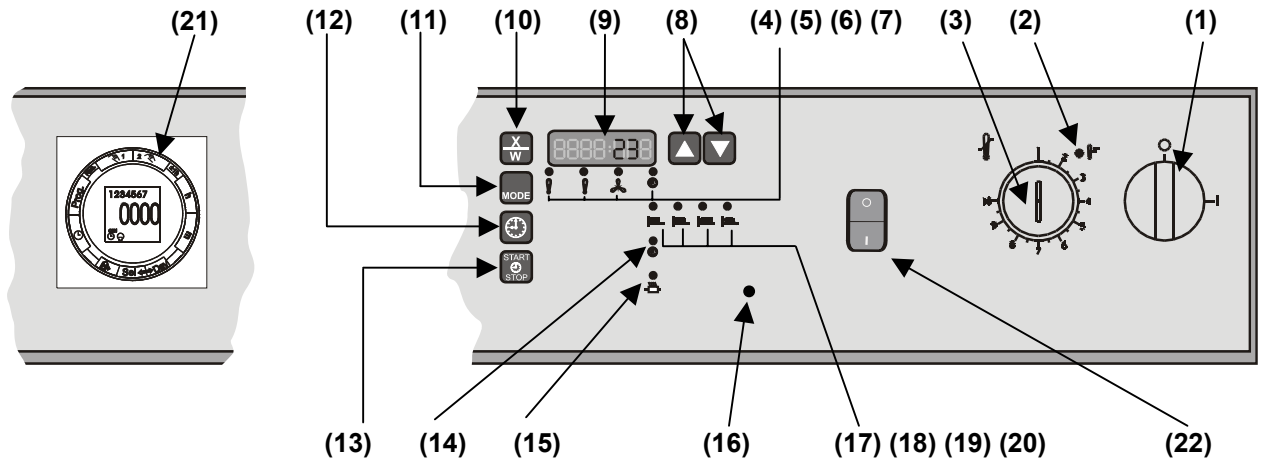


Figure 2: KB control panel

1. On / off switch (main switch)
2. Red alarm lamp for TWW
3. Safety device (TWW class 3.1)
4. LED, set first set point
5. LED, set second set point (optional)
6. LED, set fan speed
7. LED, set timer
8. Up /down button
9. Digital display
10. Current value / set point button
11. Mode button (function button)
12. Function button for timer operation
13. Start/stop button (for activating temperature control)
14. LED, timer on
15. LED, heating on
16. LED green (ready)
17. LED, continuous operation
18. LED, timer delayed off
19. LED, timer delayed on
20. LED, timer temperature-dependent delayed off
21. Week program timer (option)
22. Interior illumination switch (option)



## 4. Warranty

BINDER equipment is manufactured with great care and subjected to a detailed quality control test before delivery (VDE test of every appliance). If your appliance should nevertheless have a material or manufacturing fault, you have a legal warranty claim against the company from which you obtained your BINDER appliance. The term of guarantee amounts 24 months for new devices.

1. During the guarantee period we will correct any faults which may arise in your BINDER appliance free of charge, insofar as the cause is a material or manufacturing fault. Faulty parts which are replaced in the process become our property.
2. If during the guarantee period a fault occurs in your BINDER appliance, please notify the company from which you obtained your appliance, or notify us directly.
3. The guarantee period begins when the new BINDER appliance arrives at the ultimate buyer (Germany / Europe) or from the time of shipment (overseas). Observance of the guarantee period must be demonstrated by submission of the invoice or delivery note.
4. Faulty equipment will be repaired at our discretion free of charge. Replaced parts become our property.
5. For BINDER equipment the ultimate buyer can only demand that repairs be conducted at the location where the appliance is set up if transportation is either extremely expensive or the buyer cannot be expected to accept transportation. Otherwise the appliance must be sent to the nearest firm from which you obtained the appliance or to us.
6. If the appliance is sent back it must be shipped in original or equivalent packing.
7. Guarantee claims cannot be made if the fault has occurred as a result of repairs or interventions by persons not authorised by us to conduct them. The same applies if our equipment has been provided with additional parts or accessories not matched to our equipment and if the use of these parts was the cause of the fault.
8. The guarantee period is not prolonged by work conducted in the scope of the guarantee.
9. Further or other claims, especially claims to restitution of damage outside the equipment, are excluded unless they are provided for in law.
10. Devices sent back to our factory for repair or because of other reasons are only accepted if returned under a authorisation number previously given by BINDER. This authorisation number has to be pinned up at a good visible place on the original packaging of the device respectively must be written clearly on the delivery papers. It is possibly that the acceptance of the device at the factory is denied in case the device arrives without this authorisation number. The authorisation number is given under following circumstances / after getting the following information:
  - Device type and serial number
  - Date of purchase
  - Name and address of the distributor
  - Nature of the fault / detailed error description
  - Complete address / Contact / best time to ring-up at the site
  - Previously faxed declaration of harmlessness



### Important note:

Work conducted in the scope of a guarantee, repair and maintenance work may only be effected by persons or workshops authorised by us. Otherwise BINDER conducts the work itself. If a fault arises and no contact person is known, please call us and we will name your nearest authorised workshop.

If you call us, please supply the following information:

- appliance type and serial number
- date of purchase (see invoice / receipt)
- type of fault / description of error
- your full address and the location of the appliance (building, department)
- at what times you might be contacted

**Our telephone hotline:** + 49 - 74 62 / 94 73-99  
**Our fax hotline:** + 49 - 74 62 / 94 73-98  
**Our e-mail hotline** [service@binder-world.com](mailto:service@binder-world.com)

## 5. Transportation, storage, and installation



### 5.1 Hints for safe lifting and transportation

- The KB cooled incubator has to be fixed with transport straps in order to avoid sliding or tilting.
- The rollers of the unit (model 720) can be blocked by brakes.
- The unit must not be transported without its original packaging.
- Lifting the unit:  
Model 240 and 720: Due to its weight, the unit cannot be lifted by hand safely. Technical devices are to be used. A stacker truck is to be used only from the front or back, **not** from the sides. Attention: Danger of damaging the unit!
- The unit must not be lifted or transported using either the door handle or the door.

### 5.2 Unpacking and checking the equipment

After having unpacked, please check the unit and its accessories for completeness and for possible transportation damage. If transportation damage has occurred, the carrier must be informed immediately. Please remove any transportation protection devices and adhesives in and on the unit and take out the operating manuals and accessory equipment.



### 5.3 Location of installation and ambient conditions

The KB cooled incubator should be set up at ground level. To guarantee optimum functioning, the appliance should be set up using a spirit level. If several units of the same size are stood side by side, make sure that a minimum distance of 160 mm is maintained between the units. The KB units **cannot** be stacked.

#### Permissible temperature range

Storage: -10°C ... 60 °C

Operation: 5°C ... 32 °C

Installation height max. 2000 m above sea level.

Pollution degree acc. to IEC 1010-1: 2

Over-voltage category acc. to IEC 1010-1 II

#### Permissible humidity

Place of installation must be dry (max. 70% r.h., non-condensing)

The ambient temperature should not be substantially higher than the indicated ambient temperature of 22° C to which the specified technical data relate. In the case of different ambient conditions, deviations from the indicated data are possible.

The maximal permissible ambient temperature is 32° C

The KB cooled incubator should only be installed at even and well-ventilated locations.



## 6. Safety information

With regard to operation of the cooled incubator and the installation location, the ZH 1/119 laboratory guidelines (for Germany) of the employers' liability insurance association should be observed. The unit must not be installed in unventilated recesses.



### Attention: Danger of explosion !

The unit does not dispose of any measures of explosion protection!

No substance combustible or explosive at working temperature may be introduced into the cooled incubator KB. The formation of explosive dust or air-solvent mixture formation has to be prevented.

In case a solvent is contained, this content must not be explosive or inflammable. In other words, it must not at any time, irrespective of its concentration in the steam room, be able to form an explosive mixture with air. The temperature must lie below the flash point or below the sublimation point of the charging material. The user should be informed about the physical and chemical properties of the charging material, as well as the contained moisture constituent and its behaviour under addition of heat energy.

The user must inform himself about any potential health risks caused by the charging material, the contained moisture constituent or by reaction products which may arise during the temperature process. The user must take adequate measures to exclude such risks prior to putting the cooled incubator into operation.



### Attention: Danger of burning!

The access ports (option) might become hot during operation.

Do not touch !

The chambers are constructed in accordance to VDE regulations and routinely tested in accordance to VDE 0113.

## 7. Putting into operation



After checking the power supply, (see nameplate for ratings) the unit can be turned on with the main switch (1). The current temperature in the unit's interior appears in the display. The unit's fuse is on the rear panel next to the unit connection cable (see nameplate for electrical data of fuse insert).



### 7.1 Temperature control adjustments

Figure (2) shows the arrangement of the temperature control. The safety device (3) must be reset every time the set point for temperature has been changed. Only then can it be guaranteed that the unit will function correctly.

### 7.2 Temperature control

After the main switch (1) is switched on, the green LED (16) lights up. The display of the temperature controller shows the current value. Pressing button  (10) displays the set point. The previously set timer operation (17, 18, 19, 20) is displayed. When the unit is switched on, the "heating on" LED  (15) lights up depending on the set point.

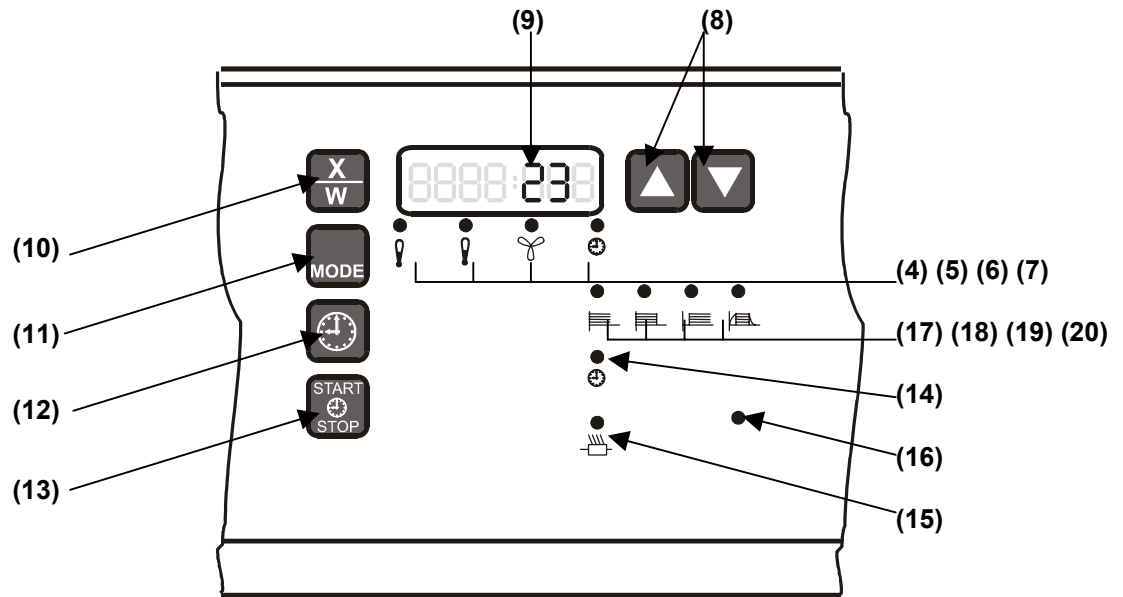










Figure 3: Temperature controller

### 7.2.1 Entering first set point

1. Press Mode button  (11) once
2. LED  (4) lights up
3. Enter desired set point using the   buttons (8)

### 7.2.2 Entering second set point (option)



This setting is active only in connection with the option "two channel week program timer" (see chapter 9.3)

1. Press mode button  (11) twice
2. LED  (5) lights up
3. Enter desired set point using buttons   (8)






If a button is not pressed within 10 seconds, the display reverts automatically to the original current value. Each time the set point is changed the TWW safety device setting should be observed again (chapter 8).





### 7.2.3 "Heating on" display

The LED  (15) shows "heating on". If LED  (15) flashes, the set point is being maintained.

### 7.2.4 Entering heat output (0-100%)

1. Depress mode button  (11) for longer than 5 seconds
2. Display (9) shows the gradient of the gradient function (see section 7.2.8)
3. On repeated depression, the heat output is shown (H xxx : xxx = heat output in %)
4. Using the   buttons (8) the heat output can be set from 0% to 100%

## 7.2.5 Setting fan speed (0-100%)


1. Press the mode button  (11) 3 times
2. LED  (6) lights up
3. Using the   buttons (8) the fan speed can be set in steps of 10% between 0% and 100%. 100% corresponds to the maximum speed.



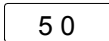





**If the fan is operated below 100%, the temperature levels and the spatial temperature distribution are no longer identical to the manufacturer's specifications. This function should only be used for special applications.**


## 7.2.6 Selecting timer operation

The unit provides four different timer functions (see section 7.2.7).

Prior to each selection of timer operation, turn off the temperature control with the Start/Stop button. By pressing the Mode button  (11) four times, the unit is readied to program the time functions.

1. LED  (7) lights up
2. Select the applicable timer function by pressing the  (12) button.
3. The corresponding time is shown in the display  (9)
4. The time is changed with the   (8) buttons.
5. By pressing the Start/Stop button  (13) the relevant timer function is activated

## 7.2.7 Timer operation display

The LED  (14) displays the state of the timer operation. If the LED flashes, the control is in the waiting period. If the LED is lit constantly, the unit is being heated to the set point and regulated.

### Continuous operation (17)

The set point is maintained indefinitely. A defined setting has no meaning.

#### a) Delayed off (18)

After the defined time has elapsed, the heating and fan motor are switched off.

#### b) Delayed on (19)

After the time set has passed, the heating and fan motor are switched on.

#### c) Temperature-controlled delayed off (20)







The defined time only begins to run when the current value is 1°C below the set point. After the defined time has expired, the heating and fan motor are switched off.



**The defined parameters are not deleted when the main switch is switched off.**

### Example:

The unit is to heat up to a temperature of 50°C, maintain this temperature and then switch off after three hours.



1. Turn off the temperature controller with the  button (13).
2. Set 50°C as the set point (see section 7.2.1)
3. Press the Mode button  (11) 4 times; LED  (7) will light
4. Press the clock symbol  (12) repeatedly until “temperature-dependent delayed off“ lights up; LED (18)
5. Use the  buttons (8) to enter the desired time: 3.00 h
6. Press the start/stop button  (13)

The unit is only in timer operation if the timer operation LED  (14) is lit!



## 7.2.8 Entering temperature gradient (1-10°C)

Temperature gradients can be programmed in order to prolong heating-up times by a defined amount. This may be necessary in order to avoid temperature stresses in the material under treatment during the heat-up phase. Temperature gradients should only be used when required. The use of temperature gradients can delay heating-up times considerably.


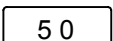

1. Press Mode button  (11) longer than 5 seconds.
2. The gradient of the set point will then appear in the display, and it can then be set with the  buttons (8) to between 1°C and 10°C per minute.



**A heat-up rate of 4°C/min. can be regarded as a realistic maximum. If “Off“ appears in the display, no gradient has been entered. The unit is being heated at maximum heat output.**

## 7.2.9 Setting printer intervals via the keyboard

The print intervals of the RS 232 interface can be set to between 1 and 255 min.

1. Press Mode button  (11) longer than 5 seconds.
2. In the display  (9) the gradient of the temperature function or OFF appears.
3. After depressing again, the heat output is shown.
4. After pressing again, a “P“ (Print Time) appears in the display.
5. Using the  buttons (8) the printer time intervals can be set to between 1 and 255 min
6. After about 10 seconds the control returns to the normal display.

The current temperature is output to the serial interface at the specified intervals.

### RS 232C printer interface (serial interface)

The connection cable to the printer must not be longer than 2 m. A connection cable with shielding at both ends must be used.

Configuration of the serial interface RS 232 (monolog):

Baud rate:	9,600
Data bits:	8
Stop bits:	1
Parity:	None

## 8. Safety device

### 8.1 Class 3.1 safety device (TWW) (DIN 12880)

The safety device (TWW) serves to protect the cooled incubator, its environment and the material under treatment from excess temperatures.

Please also observe the laboratory guidelines ZH 1/119.

#### Function:

The TWW is functionally and electrically independent of the temperature control system. If an error occurs, it performs the regulatory function.

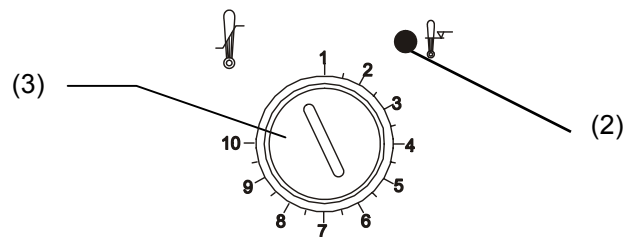


Figure 4: Safety device

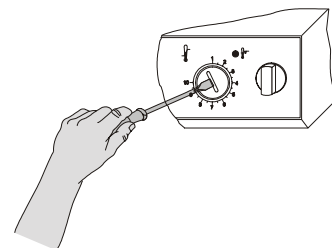
If the control knob is turned to its end-stop, the TWW functions as a safety device for the unit. If it is set to a temperature somewhat higher than that selected on the control, it functions as a protective device for the material under treatment. If the safety device has assumed the regulation function (identifiable by the red alarm lamp (2) lighting up), proceed as follows:

- Disconnect the unit from the mains
- The cause of the fault must be examined and rectified by a technician
- Start up the unit again as described in chapter 7.

#### Adjustment:

To check the response temperature of the TWW, put the unit into operation and then set the desired set point at the temperature controller.

- Turn the control knob of the TWW with a screwdriver or coin to its end-stop (unit protection)
- When the set point is reached, reset the TWW to its trip point (turn it to the left)
- The trip point is identifiable by the red alarm lamp (2)



The optimum setting for the TWW is obtained by turning the control knob clockwise by approximately one scale division, which extinguishes the red alarm lamp (2). The sections of the scale from 1-10 correspond to the temperature range from 5°C to 100°C and serve as a setting aid.

## 8.2 Class 3.3 safety device (option)

Optionally, the unit can be equipped with an additional safety device (TWW class 3.2). The device is set as for the TWW class 3.1. However, a minimum value for the temperature is set that the unit will not fall below due to the regulatory function of the class 3.2 TWW. This protection against excessively low temperatures can, for example, serve to protect sensitive loads from undercooling. The combination of the class 3.1 TWW and class 3.2 TWW can be regarded as a class 3.3 TWW.

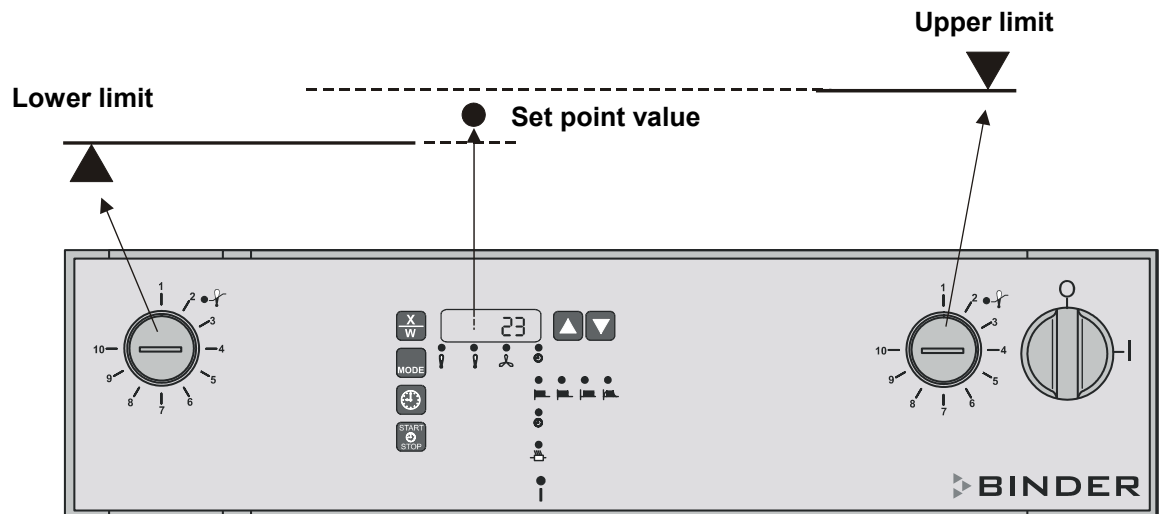


Figure 5: Safety device class 3.3



## 9. Options

### 9.1 Mechanical program timer with day program

**Function:**

The option mechanical day program timer allows the unit to be turned on and off under program control. In this case, the day program timer turns the heating and fan motor on and off. The temperature control display remains continuously active to permit readout of the current value.

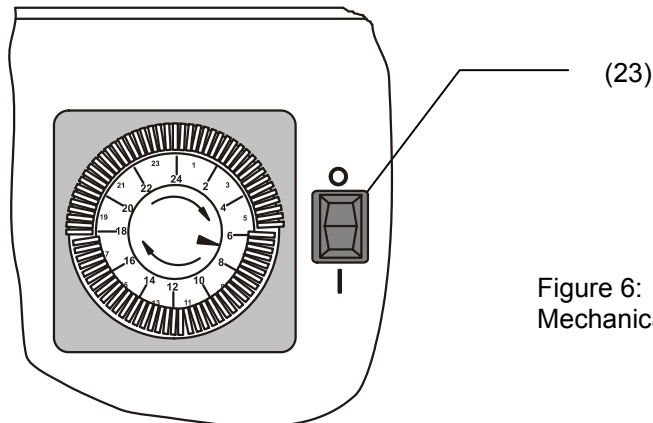


Figure 6:  
Mechanical day program timer

**Setting:**

At start of operation, set the time of day on the program dial by turning to the right. Set desired timer on/off points by engaging the sliders. Engaged red segments of the scale show the on operating times. The minimum on/off frequency is 15 minutes. If the switch (23) is in position "1", the unit is under timer control.



The RD2 temperature controller must be set for continuous operation .

### 9.2 Mechanical program timer with week program (option)

**Function:**

The option mechanical week program timer enables the unit to be tuned on and off under program control. In this case, the week program timer turns on and off the heating and the fan motor. The temperature control display remains continuously active to permit readout of the current value.

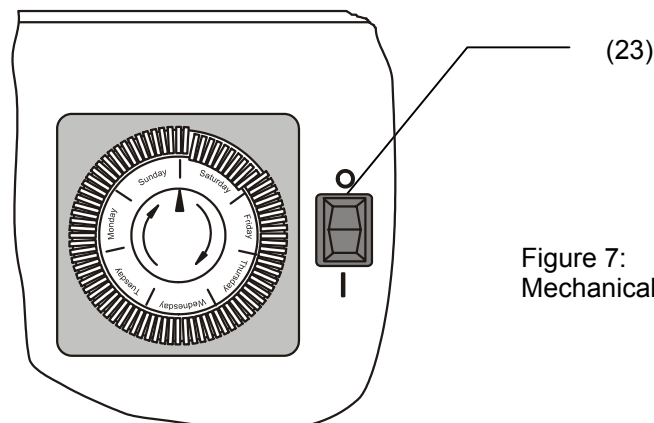


Figure 7:  
Mechanical week program timer

**Setting:**

At start of operation, set the time of day on the program dial by turning to the right. Set desired timer on/off points by engaging the sliders. The minimum on/off frequency is 2 hours. If the switch (23) is in position "1", the unit is under timer control and the multifunction timer is inactive.



The RD 2 temperature controller must be set for continuous operation.

## 9.3 Digital two channel program timer with week program

### 9.3.1 Overview

#### Function

This timer offers on two different control channels the following functions:

**Channel 1** controls the temperature cycle device which allows to toggle between two different temperature set points set at the temperature controller (see chap. 7.2.1 and 7.2.2). Channel 1 ON means that the second temperature set point is valid. Channel 1 OFF means that the first temperature set point is valid.

**Channel 2** enables turning the unit on and off under program control. In this case, the week program timer turns on and off the heating and fan motor. The temperature controller display remains continuously active to permit readout of the current value and output with the APT-COM software.

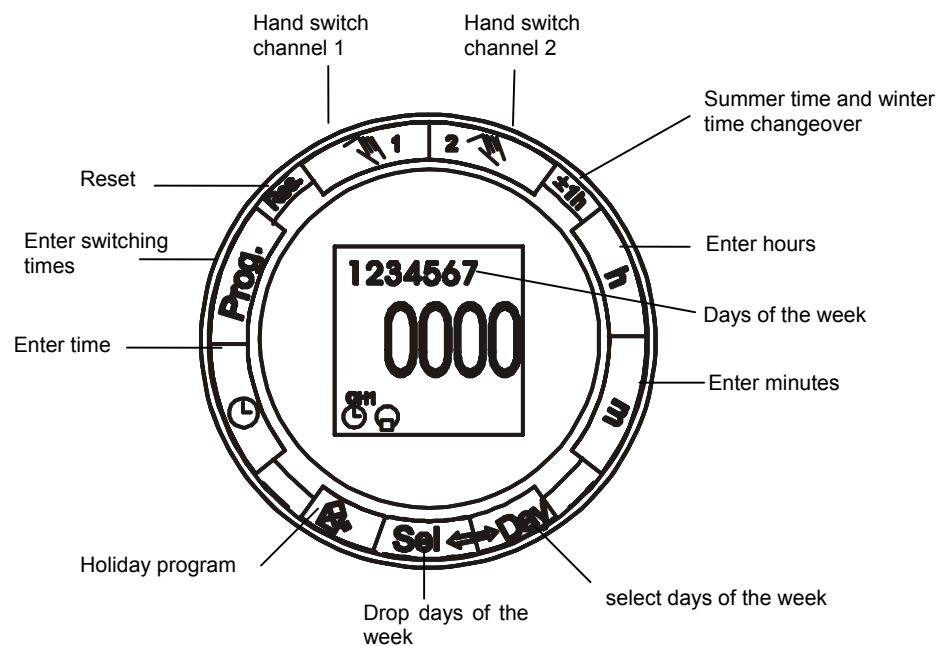















Figure 8: Digital week program timer

#### Two channel program timer toggling states overview:

<b>Program operation</b> 	 = ON  = OFF
The on/off times correspond to the entered program. The toggling states are displayed according to the entered program.	
<b>Manual operation</b> 	 = currently ON  = currently OFF
If the current on/off state is changed manually, the next on/off command is carried out automatically after the entered program.	
<b>Continuous operation</b>  	 = Continuous ON  = Continuous OFF
Return to automatic operation from states  or  possible only by pressing the  button The program has no effect.	

### 9.3.2 Operating the unit without using the two channel digital week program timer

In case the timer should be without function the first channel has to be set in continuous operation mode (hand mode) to OFF and the second channel to ON:

#### State clock program inactive

Channel 1 [☐] = continuous OFF	to set the first temperature set point valid
Channel 2 [●] = continuous ON	to hold the chamber permanently running

Return from the toggling states [●] or [☐] to automatic mode is possible only by pressing the respective channel buttons.

To toggle between the operating modes and toggling states the two hand buttons have to be pressed as long as the desired symbols appear.

### 9.3.3 Short description 2 channel week program timer

#### Overview:

Following steps have to be at least carried out at the week program timer to operate programmed temperature cycles and ON/OFF turnings of the light facility:

- Step 1: Check for free memory places, if necessary, delete with reset.
- Step 2: Setting the current time and week day
- Step 3: Setting the switching times for temperature and/or for heating and fan facilities and the according week days
- Step 4: Setting the operating mode for the beginning
- Step 5: Setting the first and the second temperature set point at the temperature controller according to chap. 7.2.1 and 7.2.2.
- Step 6: Setting the temperature controller to continuous operation mode (acc. to chap. 7.2.7) and activate the controller via the start/stop button.

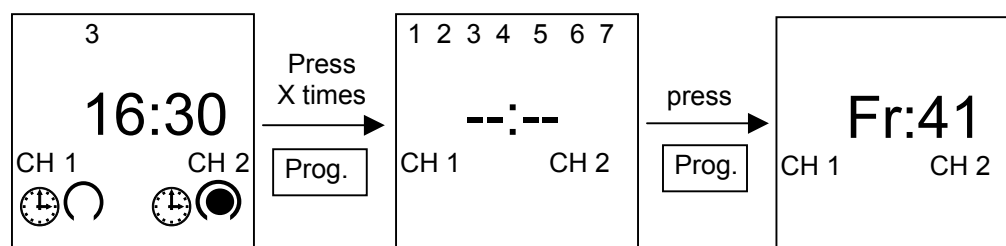
#### Step 1 : Check for free memory places

42 program memory places are available.

Each switching time occupies one memory place.

For each switching time, the toggling state of one single channel or of both channels together can be modified.

Check for free memory places:



Example:  
41 memory places  
are still available.  
One is occupied.

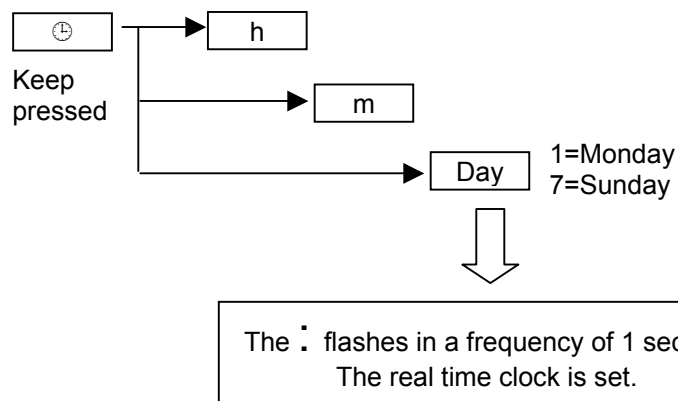
In case some of the memory places are already occupied, the corresponding program sections will be executed together with newly entered programs. Therefore it might be necessary to delete memory places before entering own program sections.

Press the **Res.** button with a pencil or similar object. This will place the timer in the default state, i.e., all former settings of switching times as well as the real time setting are cleared.

Press the **Res.**

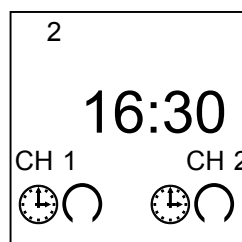
- before each restart
- to delete all on/off times and the time of day
- after approx. 2 seconds, **0000** appears in the display.

### Step 2 : Setting of the current time and weekday:

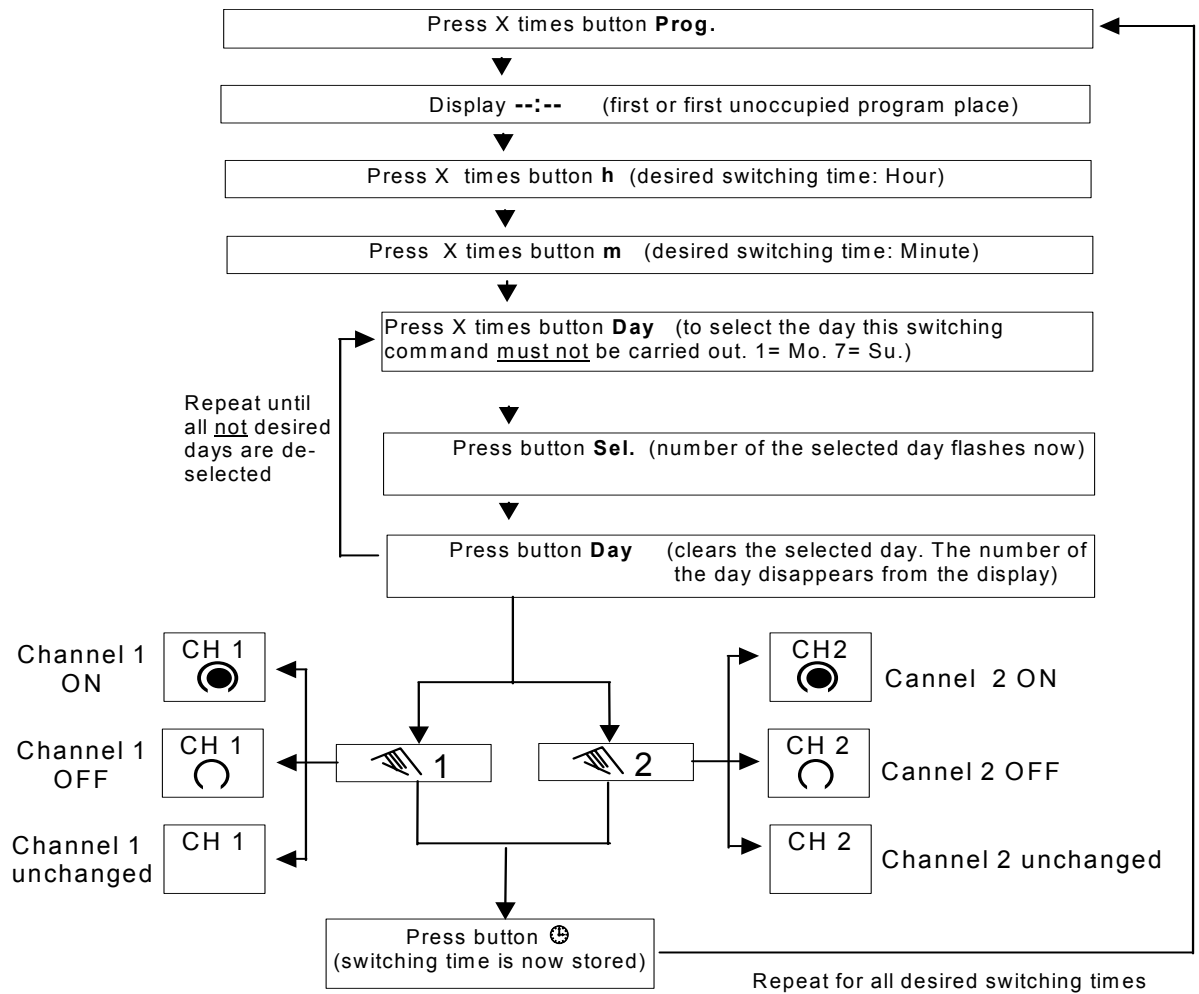


### Example:

The current time:  
Tuesday 16:30 (=4:30 pm)

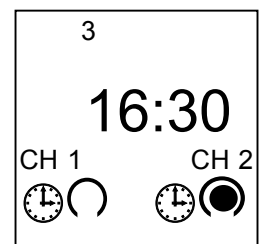


### Step 3 : Programming of the switching times for program operation:



#### Example result:

Current time: Wednesday 16:30 (4:30pm).  
 Both channels are in program operation.  
 Channel 1 is currently OFF,  
 this means first temperature set point is active.  
 Channel 2 is currently ON,  
 this means heating/cooling and fan are active.

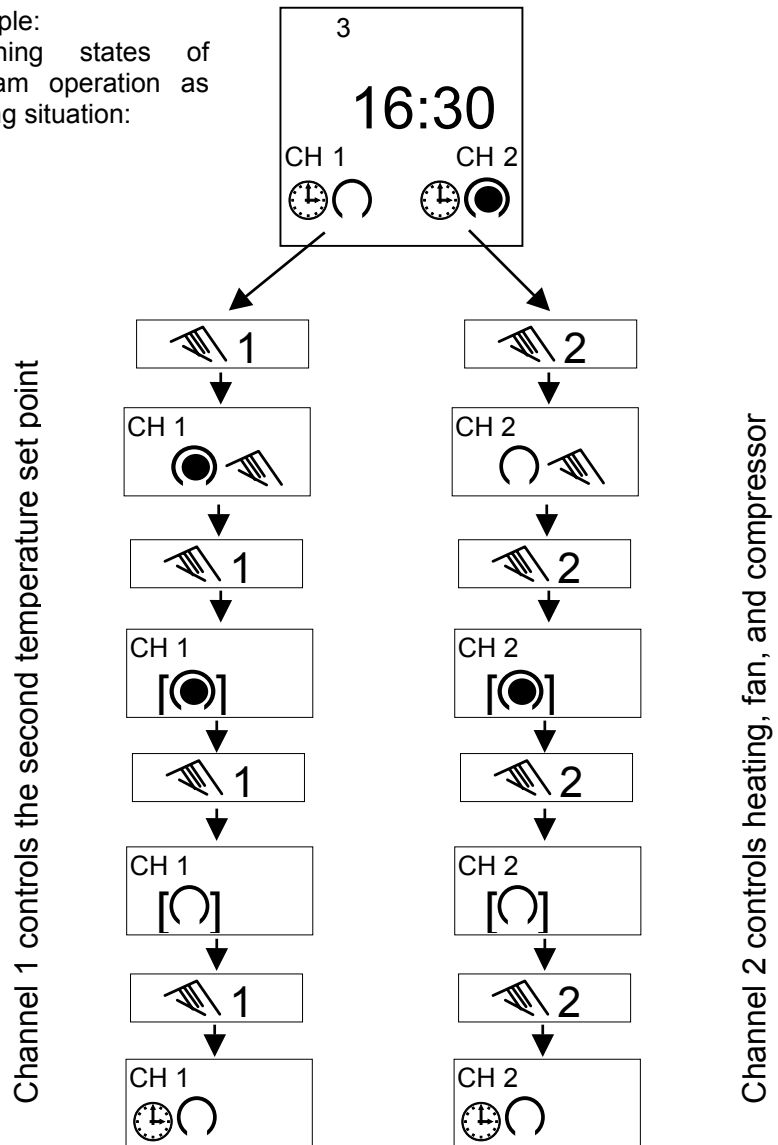


#### Step 4 : Settings in manual mode:

The current toggling states of the two channels can be changed any time by the buttons.

The entered program is not affected by this and keeps on running at the background.

Example:  
Switching states of  
program operation as  
starting situation:



### 9.3.4 Comprehensive operating manual for the week program timer

The steps marked with ► are required to execute a timer program.

#### 9.3.41. Reset ►

Press the **Res** button with a pencil or similar object. This will place the timer in the default state.

- before each restart
- to delete all on/off times and the time of day
- after approx. 2 seconds, **0000** appears in the display.

#### 9.3.42. Entering time of day and current day of week ►

1. After pressing the **Res** button (see 9.3.41)
2. During daylight saving time, press the  $\pm h$  button once
3. Hold the  $\oplus$  button down during steps 4-6
4. Use the **h** button to enter the hour
5. Use the **m** button to enter the minutes
6. Use the **Day** button to enter the current day (1=Mo....7=Su)
7. Release the  $\oplus$  button

The colon now blinks at one-second intervals.



If the h/m buttons are pressed longer than 2 seconds, the values appear in rapid succession.

#### 9.3.43. Free channel assignment

Each on/off command  $\odot$  or  $\circ$  can be freely assigned to channels 1 and 2 or 1 or 2 as desired.


#### 9.3.44. Manual on/off toggling

The  $\text{h/h}$  buttons can be used at any time to toggle the current switch state. The entered on/off program, however, is not changed as a result.


<b>Program operation</b> $\oplus$	$\oplus \odot$ = ON $\oplus \circ$ = OFF
The on/off times correspond to the entered program. The toggling states are displayed according to the entered program.	
<b>Manual operation</b> $\text{h/h}$	$\odot \text{h/h}$ = currently ON $\circ \text{h/h}$ = currently OFF
If the current on/off state is changed manually, the next on/off command is carried out automatically after the entered program.	
<b>Continuous operation</b> $\odot$ $\circ$	$\odot$ = Continuous ON $\circ$ = Continuous OFF
Return to automatic operation from states $\odot$ or $\circ$ possible only by pressing the $\text{h/h}$ button The program has no effect.	


### 9.3.45. Entering on/off times ►

You have 42 memory positions available. Each on/off time requires one memory position.

1. Press the **Prog.** button repeatedly until an available memory position --:-- is displayed.
2. Use the  button to select on/off functions for channels 1 or 2 ● = ON or ○ = OFF.
3. Use the **h** button: to set the hours.
4. Use the **m** button: to set the minutes.

If an on/off command is to apply every day, continue with step 5. If an on/off command is to be issued on only one day or on certain days, skip step 5 and continue with step 6. If an on/off command is to be issued every day, skip steps 6-8 and continue with step 9.

5. Use the **Prog.** button to save  
or
6. Use the **Day** button to select a day on which the command is not to be issued (cursor blinks)
7. Use the **Sel** button to confirm this day (day of week and cursor blink)
8. Press the **Day** button (day is deselected). Repeat steps 6-8 for each day that is to be selected
9. Use the **Prog.** button to save (the next memory position will be displayed)  
or
10. Save using the  button


When the  button is pressed, the timer switches to the automatic state and displays the current time.

Begin each additional on/off time and the corresponding setting ● = ON or ○ = OFF with 0.






**If an entry is incomplete, the display segments not yet selected will flash.**

If you have deselected a day on which the on/off command should be issued:

1. Use the **Day** button to reselect the deselected day (day of week and cursor blink)
2. Use the **Sel** button to confirm this day (cursor blinks)
3. Press the **Day** button (day is again selected)
4. Use the **Prog.** button to save (the next available memory location will be displayed)  
or
5. Use the  button to save

#### Example:

The first set point is 55°C (daytime temperature). The second set point of 30°C (nighttime temperature) is to be active from 21 p.m. to 6 a.m.

- At the temperature controller, enter the 1st set point and the 2nd set point (see chapters 7.2.1 **Fehler! Verweisquelle konnte nicht gefunden werden.** and 7.2.2)
- Press the **Prog.** button
- Press button  1 to turn on channel 1 = ●
- Use the **h** and **m** buttons to enter 21:00 (start time 2nd set point)
- Press the **Prog.** button again and press button  1 repeatedly until the symbol ○ appears next to channel 1.
- Using the buttons **h** and **m**, enter 06:00 (change to 1st set point)
- Channel to has to be set to continuously ●
- The temperature controller must be set for continuous operation
-  starts automatic operation



**The automatic on/off function is ensured only if the  button was previously selected.**



### 9.3.46. Setting daylight saving and standard time

Press the  $\pm 1h$  button once.

### 9.3.47. Inactivating the automatic time change

Regularly, the automatic time changer-over summer/winter is not active.

1. Press the  $\pm 1h$  and **Day** buttons once simultaneously
2. Press the h button until - - appears (after the last day in the respective month)
3. Press the  $\oplus$  button. The timer switches to the current operational state.

At this point, the time change can be performed manually by pressing  $\pm 1h$  once, or new data can be entered.

### 9.3.48. Retrieving the programmed on/off times

1. Press the **Prog.** button repeatedly
  - shows all entered on/off times beginning with the first memory location
  - thereafter, the first available memory location --:-- is shown
  - If all memory locations are assigned, **FR 00** appears in the display.
2. Press the  $\oplus$  button.

The timer switches to automatic operation and shows the current time of day.

### 9.3.49. Changing the programmed on/off times

1. Press the **Prog.** button repeatedly until the on/off time to be changed is displayed.
2. The new data can then be entered as described under chap. 9.3.45.



#### Note on saving on/off times

If, after entering on/off times (see chap. 9.3.45), programming is not terminated with the  $\oplus$  button, an automatic save of the entire on/off command is nevertheless performed after about 90 seconds. The timer then switches to automatic operation and again shows the current time.

### 9.3.410. Deleting individual on/off times

1. Press the **Prog** button repeatedly until the on/off time to be deleted is displayed.
2. Using the h or m buttons, set - - and press the  $\oplus$  button for about 3 seconds.

The on/off time is deleted. After releasing the button, the current time is displayed.

### 9.3.411. AM/PM time display



If the  $\pm 1h$  and h buttons are pressed simultaneously, the time display switches to AM/PM mode.

### 9.3.412. Holiday program




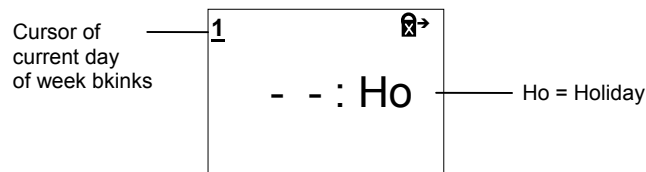
The holiday program has priority over the standard week program. The holiday program can be entered only when all 7 days (1,2,3,4,5,6,7) are selected.

#### Entry of on/off times as described under chap. 9.3.45, points 1-4

For each on/off time, the  button must be pressed as well. Save the holiday on/off times with the **Prog.** or  buttons.


#### Enter duration and start of holiday program

1. After entry of on/off times for the holiday program
2. Press  button once. The following graphic appears:

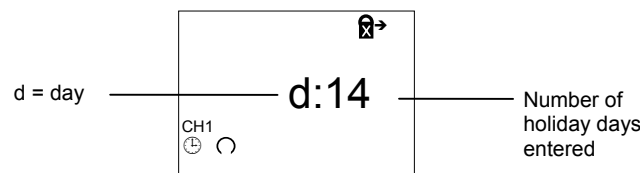


**Graph I**

If the holiday program is to begin on a day other than the current day - max. 6 days in advance - use the **Day** button to select the day on which the holiday program is to start. If the holiday program is to apply for up to 99 days, continue with steps 4 and 5. If the holiday program is to apply indefinitely, omit step 4 and continue with step 5.




3. With the **Sel.** button, enter the desired number of holiday days (1 to at most 99 days)
4. Press the  button to save the entries.


If the current day is given as the holiday start, the display shows:



**Graph II**

**Graph II** remains until the holiday days have been worked off. For example, d:10, d:09, d:08....., etc.



By again pressing and holding the  button, the day of the week, time of day, and current on/off state -  = ON or  = OFF - can be queried.

If a day other than the current day was specified as the holiday start, the current time is displayed after the  button is pressed. At the start of the selected day, the holiday program is then started at midnight and the duration shown (**Graph II**).

After the entered holiday days have passed, the display shows the current time.



#### Canceling the holiday program

If the holiday program has started, press the  button once.  
If the holiday program has not yet started, press the  button twice.

## 9.4 Protocol printer

The protocol printer is connected via the printer interface (RS232) for the output of numeric and graphic temperature data. The printer interval is set on the temperature controller of the unit as described in chap. 7.2.9.

Configuration of the RS232 serial interface (monologue):

Baud rate:	9,600
Data bits:	8
Stop bit:	1
Parity:	none



Figure 9: Protocol printer

## 9.5 APT-COM communication software

The unit is equipped as standard with an RS 232 serial interface, to which the BINDER APT-COM communication software can be connected. The respective current temperature value is stored here in adjustable intervals, and the controller can be graphically programmed via PC. The APT-COM system enables networking of up to 30 units. More detailed information regarding this can be found in the BINDER communication software operating manual.

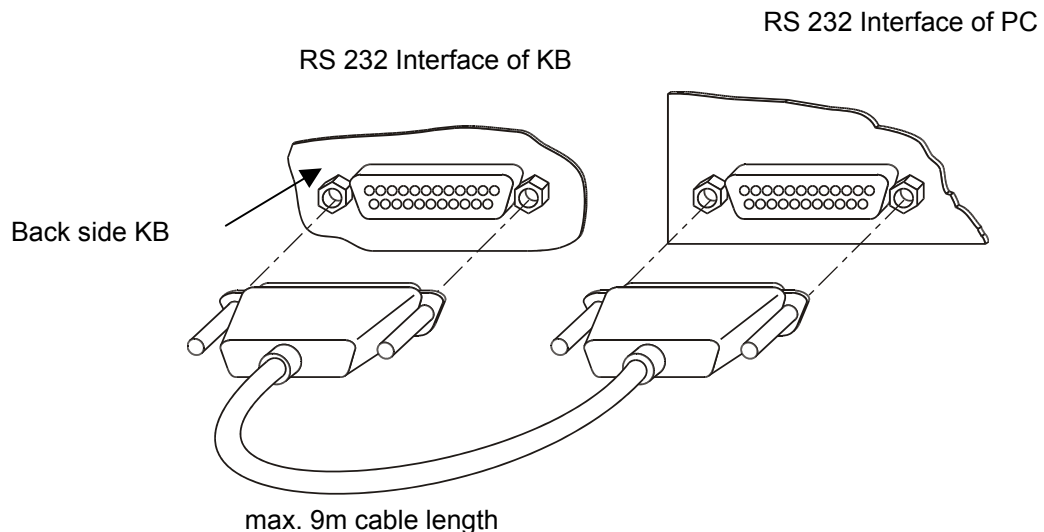


Figure 10: KB – PC connection diagram for APT-COM

## 10. Specific notes on cooling operation

### Defrosting:

BINDER cooled incubators are built to be highly diffusion-tight. Due to the adverse effects on temperature accuracy, automatic cyclical defrosting has not been implemented. Nevertheless, the humidity in the air can condense on the evaporator plates. The DCT cooling system largely prevents icing on the evaporator plates.



### **Ensure that the door is always closed securely!**

Two cases must be distinguished:

1. At temperatures over +5°C, the air thaws the ice layer independently. Defrosting is performed continuously and independently.
2. Since the evaporator can ice up at very low temperatures, the unit should be defrosted manually. To do this, open the door and turn the cooling system off. Set a temperature of 30-40°C, and allow the unit to operate for about 15-30 minutes.

Defrosting of the unit is now complete.



### **Excessive frosting of the evaporator is indicated by reduced cooling performance.**



**After one or two days operation at –10°C a thin ice layer can cover the inner unit door and the glass door. The amount depends of the ambient temperature and humidity. This does not influence the proper function of the cooling system.**

**With a set-point < 0°C cooling performance decreases due to the increasing amount of ice on the evaporators. For this reason, regular defrosting (about once a week) must be observed.**

## 11. Maintenance



### 11.1 Maintenance intervals

The operator is responsible for ensuring that the multifunctional test chamber is serviced at regular intervals, or at least once a year, by a specialist electrician or personnel authorized by BINDER. The unit must be disconnected from the mains power supply before maintenance work starts.

We recommend that you enter into a maintenance agreement.  
Please consult the BINDER service department.

**Service hotline:** ++49 (0) 74 62 / 94 73-99  
**Service fax:** ++49 (0) 74 62 / 94 73-98  
**Service e-mail:** [service@binder-world.com](mailto:service@binder-world.com)

### 11.2 Cleaning and decontamination of equipment parts



#### Danger of electric shock!

If the unit will become wet during operation or cleaning, the user is in danger of electric shock !

Water or cleaning agents must not be spilled over the inner and outer surfaces. In order to clean the unit, it has to be free of voltage and must be completely dry before switching it on again.

**Exterior surfaces:** Clean with normal retail acid-free household cleaners.

**Instrument panel,  
Interior, racks:** Clean with normal retail acid-free and solvent-free household cleaners or alcohol solutions.

In case of impurity of the interior with biological or chemical hazardous goods there are 2 possible procedures. For every decontamination method care must be taken for adequate personal safety. The correct procedure depends on the constitution of the contamination and the loaded material.

- The inner chamber can be sprinkled with standard acid-free disinfectants. The unit must be disconnected from the power supply during the decontamination. The power plug must be pulled! Before start-up the unit has to be absolute dried out and ventilated, because explosive gases might be built during the decontamination process.
- Strongly contaminated inner chamber parts can be removed if necessary by an engineer for cleaning, or can be exchanged. The inner chamber parts can be sterilised in a sterilizer or autoclave.

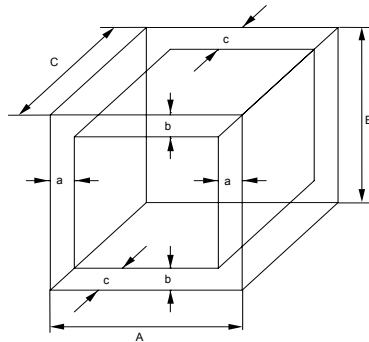


**To avoid corrosion at the device it is not allowed to use acidic or chlorine cleaning detergents.**

## 12. Technical data

### 12.1 Effective working space

The effective working space illustrated below is calculated as follows:



A, B, C = Internal dimensions (W, H, D)  
a, b, c = Wall clearances

$$a = 0.1 * A$$

$$b = 0.1 * B$$

$$c = 0.1 * C$$

$$V_{\text{WORK}} = (A - 2 * a) * (B - 2 * b) * (C - 2 * c)$$



**The technical data are related to the so defined usable space.**

**Do not place samples outside this usable volume.**

**Do not load this volume more than half to enable sufficient air flow inside the chamber.**

**Do not divide the usable volume into separate parts with large area samples.**

**The samples should not be placed too close to each other in order to allow circulation between them and therefore a homogenous distribution of temperature and humidity.**

### 12.2 Spare parts

Extract from our spare parts list

Pos.	Description	Part. No.
1	Temperature safety device class. 3.1	5006-0035
2	PT-100 sensor straight	5002-0008
3	Door sealing KB 53	6005-0066
4	Door sealing KB 115	6005-0067
5	Door sealing KB 240	6005-0068
6	Door sealing KB 720	6005-0071



## 12.3 Technical data sheet

		KB 53	KB 115	KB 240	KB 720	
<b>Exterior dimensions</b>						
Width	mm	634	834	1034	1234	
Height (incl. feet/roller)	mm	778	858	978	1686	
Depth	mm	575	645	745	865	
incl. door handle, I-panel, connection	mm	100	100	100	100	
Wall clearance	mm	100	100	100	100	
Wall clearance door open	mm	160	160	160	160	
Steam space volume	l	77	158	308	869	
<b>Interior dimensions</b>						
Width	mm	400	600	800	1000	
Height	mm	400	480	600	1200	
Depth	mm	330	400	500	600	
Interior volume	l	53	115	240	720	
Number of shelves	regular / max	2/4	2/5	2/7	2/15	
Load per shelf	kg	15	20	30	45	
Permitted total load	kg	40	50	70	120	
Weight (empty)	kg	72	97	145	262	
<b>Temperature data</b>						
<b>Temperature range 1)</b>		°C	0 - 99,9	0 - 99,9	0 - 99,9	0 - 99,9
Temperature variation	bei 10 °C	± °C	0,5	0,4	0,4	0,4
	bei 37°C	± °C	0,4	0,3	0,4	0,4
Temperature fluctuation when heating system is in operation		≤± °C	0,1	0,1	0,1	0,1
Temperature fluctuation when cooling system is in operation		≤± °C	0,3	0,3	0,3	0,3
Heating up time 1)	to 37°C	min	28	23	30	28
Cooling down time from room temp.1)	to 10°C	min	35	35	55	45
Recovery time after doors were open for 30 sec. 1)	at 37°C	min	5	5	5	5
	at 50°C	min	4	4	4	4
IP System of protection acc. to EN 50529			20	20	20	20
Nominal voltage (10%) 50/60 Hz		V	230	230	230	230
Nominal power		W	460	460	925	1350
Energy consumption 4)	bei 37°C	Wh/h	64	77	100	160
Overvoltage category acc. to IEC 1010-1			II	II	II	II
Pollution degree acc. to IEC 1010-1			2	2	2	2
Number of door(s)		number	1	1	2	2
Inner glass door(s)		number	1	1	2	2

## 12.4 Equipment and Options

	KB 53	KB 115	KB 240	KB 720
<b>Equipment</b>				
Microprocessor temperature controller with LED display, timer function, adjustable heating, fan speed regulator, ramp function	●	●	●	●
Temperature safety device class 3.1 acc. to DIN 12880	●	●	●	●
Communication interface RS 422 with adjustable printing intervals	●	●	●	●
Inner glass door	●	●	●	●
DCT® cooling system with refrigerant R134a	●	●	●	●
Four lockable castors	---	---	---	●
<b>Options / Accessories</b>				
Microprocessor program controller PD2 with LED display and various digital timer functions	○	○	○	○
Temperature safety device class 3.3 acc. to DIN 12880 2)	○	○	○	○
Shelves stainless steel	○	○	○	○
Lockable door	○	○	○	○
Interior lighting	○	○	○	○
Access ports 29 mm or 50 mm with silicone plugs	○	○	○	○
Rubber pads for safe stacking	○	○	○	---
Day or week program timers				
Digital week program timer with temperature cycling device and on/off setting of the unit 3)	○	○	○	○
Additional Pt 100 temperature sensor, fix or flexible, with external connection including LEMO plug (3-pins)	○	○	○	○
Temperature measurement acc. to DIN 12880-2 at 37°C or at specified temperature with measuring protocol and certificate	○	○	○	○
Temperature measurement with 9 measuring points at one temperature with measuring protocol and certificate	○	○	○	○
Calibration certificate	○	○	○	○
Water-proof interior socket 230 V	○	○	○	○
Protocol printer for a numerical and graphical temperature recording <sup>2)</sup>	○	○	○	○

Legend:

- Standard equipment
- Option
- Not available

With a set-point < 0°C cooling power decreases due to growing ice-layers on the defroster. verringert sich die Kühlleistung aufgrund des Eiszuwachses auf den Verdampfern. For this reason, regular defrosting (about once a week) must be observed.

1) At ambient temperature ≤ 20°C.

2) Not available together with option „ Digital week program timer “

3) Not available together with option " Temperature safety device class 3.3"

4) This value can be used for dimensioning air condition systems



### 13. Declaration of harmlessness

Unbedenklichkeitsbescheinigung

#### Declaration regarding the safety and the sanitary harmlessness

Erklärung zur Sicherheit und gesundheitlichen Unbedenklichkeit

The safety and health of our collaborators, the regulation "harmful material GefStofV" and the regulations regarding working place security make it necessary that this form is completed for all products returned to us. Without presenting this completed form, we are not able to effect any repair.

Die Sicherheit und Gesundheit unserer Mitarbeiter, die Gefahrstoffverordnung GefStofV und die Vorschriften zur Sicherheit am Arbeitsplatz machen es erforderlich, dass dieses Formblatt für alle Produkte, die an uns zurückgeschickt wird. Ohne Vorliegen des vollständig ausgefüllten Formblattes ist eine Reparatur nicht möglich.

a) A completed copy of this form should be sent to us in advance by telefax (No ++49 (0) 7462/947398 ) or by post, so that we have the information at our disposal before the unit/part has arrived. Another copy should be sent together with the unit/part. Eventually the carrier should be informed.

Eine vollständig ausgefüllte Kopie dieses Formblattes soll per Telefax (Nr. ++49 (0) 7462/ 947398 ) oder Brief vorab an uns gesandt werden, so dass die Information vorliegt, bevor das Gerät/Bauteil eintrifft. Eine weitere Kopie soll dem Gerät/Bauteil beigelegt sein. Ggf. ist auch die Spedition zu informieren.

b) Incomplete indications or non – compliance with this process will lead to considerable delays. We would like to ask for your comprehension for measures which are beyond our influence and please help us to expedite the procedure.

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

c) **Please fill in completely!**

Bitte unbedingt vollständig ausfüllen!

<b>1. Unit/part-type:</b> / Gerät/Bauteil – Typ:
<b>2. Serial – No. /</b> Serien – Nr.:
<b>3. Details about the substances / biological materials used</b> / Einzelheiten über die eingesetzten Substanzen/biologische Materialien:
<b>3.1 Designation</b> / Bezeichnungen:
a) .....
b) .....
c) .....
d) .....

**3.2 Precautions to follow when handling these materials /** Vorsichtsmaßnahmen beim Umgang mit diesen Stoffen:

- a) .....
- b) .....
- c) .....
- d) .....

**3.3 Measures in case of skin contact or release /** Maßnahmen bei Personenkontakt oder Freisetzung:

- a) .....
- b) .....
- c) .....
- d) .....

**3.4 Further important information or regulations to follow /** Weitere zu beachtende und wichtige Informationen:

- a) .....
- b) .....
- c) .....
- d) .....

**4. Declaration regarding the risk of these materials (please tick) /** Erklärung zur Gefährlichkeit der Stoffe (bitte Zutreffendes ankreuzen) :

**4.1 for non toxic, non radioactive, biologically non dangerous materials /** für nicht giftige, nicht radioaktive, biologisch ungefährliche Stoffe:

We assure, that the above – mentioned unit/part:./ Wir versichern, dass o.g. Gerät/Bauteil...

- does not contain any toxic or other dangerous materials / weder giftige noch sonstige gefährliche Stoffe enthält
- that eventual reaction products are neither toxic nor represent any risk / auch evtl. entstandene Reaktionsprodukte weder giftig sind noch sonst eine Gefährdung darstellen
- eventual residues of dangerous materials were removed / evtl. Rückstände von Gefahrstoffen entfernt wurden.

**4.2 for toxic, radioactive, biologically risky resp. dangerous materials or other dangerous materials /** für giftige, radioaktive, biologisch bedenkliche bzw. gefährliche Stoffe oder anderweitig gefährliche Stoffe.

We assure, that the dangerous materials with which the above-mentioned unit/part was in contact, are mentioned in 3.1 and that all indications are complete / Wir versichern, dass die gefährlichen Stoffe, die mit dem o.g. Gerät/Bauteil in Kontakt kamen, in 3.1 aufgelistet sind und alle Angaben vollständig sind.

**5. Kind of transport/forwarding agent /** Transportweg/Spediteur:

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

.....  
Date of shipment to BINDER GmbH / Tag der Absendung an BINDER GmbH:

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

- the unit/part was cleaned from dangerous materials, so that there will be no risk for the corresponding persons upon handling/repairing / das Gerät/Bauteil wurde von Gefahrstoffen befreit, so dass bei Handhabung/Reparaturen für die betreffenden Person keinerlei Gefährdung besteht
- the unit was carefully packed and completely marked / das Gerät wurde sicher verpackt und vollständig gekennzeichnet.
- the forwarding agent has been informed – if regulations require – about any risk relating to the shipment / der Spediteur wurde (falls vorgeschrieben) über die Gefährlichkeit der Sendung informiert.

We assure, that we will be liable for any damage cause to BINDER GmbH by any incomplete or incorrect indications and that we indemnify BINDER against eventual claims by a third party. / Wir versichern, dass wir gegenüber BINDER für jeden Schaden, der durch unvollständige und unrichtige Angaben entsteht, haften und BINDER gegen eventuell entstehende Schadensansprüche Dritter freistellen

We have been informed, that according to German law (§ 823 BGB) we are directly liable to any third party – including BINDER's staff, especially occupied with handling/repairing the unit/part. / Es ist uns bekannt, dass wir gegenüber Dritten – hier insbesondere mit der Handhabung/Reparatur des Geräts/des Bauteils betraute Mitarbeiter der Firma BINDER - gemäß §823 BGB direkt haften

**Name:** .....

**Position:** .....

**Date / Datum:** .....

**Signature / Unterschrift:** .....

**Company's seal / Firmenstempel:**



The declaration of harmlessness must be filled in and enclosed to the appliance when sending it back to the factory for repair. In case the service or maintenance works are carried out locally this declaration must be handed over to the service engineer prior to work. Without this declaration no service or maintenance works can be carried out.