

# Operating Manual

APT.line<sup>®</sup> FP

Heating/drying ovens with program control  
and forced convection

with microprocessor program controller RD3

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**EG - KONFORMITÄTSERKLÄRUNG**  
**EC - DECLARATION OF CONFORMITY**  
**CE - DECLARATION DE CONFORMITE**

**Anbieter / Supplier / Fournisseur:** BINDER GmbH  
**Anschrift / Address / Adresse :** Im Mittleren Ösch 5, D-78532 Tuttlingen  
**Produkt / Product / Produit:** Wärme-/Trockenschränke mit Programmregelung und forcierter Umluft  
Heating/drying ovens with program control and forced convection  
Etuves universelles à régulation programmable et circulation d'air forcée  
**Typenbezeichnung / Type / Type** FP 53, FP 115, FP 240, FP 400, FP 720

**Die oben beschriebenen Produkte sind konform mit folgenden harmonisierten Normen:**  
**The products described above are in conformity with the following harmonized standards:**  
**Les produits décrits ci-dessus sont conformes aux normes harmonisées suivantes:**

**Sicherheit / safety / sécurité:**

IEC/CEI 61010-1:2001 Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte – Teil 1: Allgemeine Anforderungen  
Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements  
Règles de sécurité pour appareils électriques de mesurage, de régulation et de laboratoire – Partie 1 : Prescriptions générales

IEC/CEI 61010-2-010:2003 Sicherheitsbestimmungen für elektrische Meß-, Steuer-, Regel- und Laborgeräte – Teil 2-010: Besondere Anforderungen an Laborgeräte für das Erhitzen von Stoffen  
Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 2-010: Particular requirements for laboratory equipment for the heating of materials  
Règles de sécurité pour appareils électriques de mesurage, de régulation et de laboratoire. Partie 2-010 : Prescriptions particulières pour appareils de laboratoire utilisés pour l'échauffement des matières

**EMV / EMC / CEM:**

IEC/CEI 61326:1997 + A1:1998 + A2:2000 Elektrische Betriebsmittel für Leittechnik und Laboreinsatz – EMV-Anforderungen  
Electrical equipment for measurement, control and laboratory use – EMC requirements  
Matériels électriques de mesure, de commande et de laboratoire – Prescriptions relatives à la CEM

**Die oben beschriebenen Produkte sind konform mit folgenden EG-Richtlinien:**  
**The products described above are in conformity with the following EC guidelines:**  
**Les produits décrits ci-dessus sont conformes aux directives CE suivantes:**

Niederspannungsrichtlinie  
73/23/EWG, Änderung 93/68/EWG  
Low voltage directive  
73/23/EEC, amended 93/68/EEC  
Directive basse tension  
73/23/CEE, modifiée 93/68/CEE

Richtlinie 73/23/EWG des Rates vom 19. Februar 1973 zur Angleichung der Rechtsvorschriften der Mitgliedstaaten betreffend elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen

Council Directive of 19 February 1973 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits (73/23/EEC)

Directive 73/23/CEE du Conseil, du 19 février 1973, concernant le rapprochement des législations des États membres relatives au matériel électrique destiné à être employé dans certaines limites de tension

EMV-Richtlinie  
89/336/EWG, Änderung 93/68/EWG  
EMC Directive  
89/336/EEC, amended 93/68/EEC  
Directive CEM  
89/336/CEE, modifiée 93/68/CEE

Richtlinie 89/336/EWG des Rates vom 3. Mai 1989 zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit

Council Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility

Directive 89/336/CEE du Conseil du 3 mai 1989 concernant le rapprochement des législations des États membres relatives à la compatibilité électromagnétique

Die oben beschriebenen Produkte tragen entsprechend die Kennzeichnung CE.  
The products described above, corresponding to this, bear the CE-mark  
Les produits décrits ci-dessus, en correspondance, portent l'indication CE.

D-78532 Tuttlingen, 10.01.2006

BINDER GmbH



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Geschäftsführender Gesellschafter  
Managing Director  
Directeur général



Dr.-Ing. V. Kek  
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**Dear customer,**

For the proper operation of the heating/drying oven FP, it is necessary to read this operating manual completely and carefully and to observe the given instructions.

## 1. Safety

This operating manual is part of the scope of delivery. Always keep it at hand.

To avoid injuries and damage observe the safety instructions of the operating manual.

	 <b>WARNING</b>
	<p><b>Failure to observe the safety instructions.</b></p> <p><b>Serious injuries and unit damage.</b></p> <ul style="list-style-type: none"> <li>➤ Observe the safety instructions in this operating manual.</li> <li>➤ Carefully read the complete operating instructions of the heating/drying oven FP.</li> </ul>

### 1.1 Legal considerations

This operating manual contains information necessary for the intended use, correct installation, start-up and operation, and for the maintenance of the unit.

Understanding and observing the instructions in this operating manual are prerequisites for hazard-free use and safety during operation and maintenance.

This operating manual cannot cover all conceivable applications. If you would like additional information, or if special problems arise that you feel are not sufficiently addressed in this manual, please ask your dealer or contact us directly.

Furthermore, we note that the contents of this operating manual are not part of an earlier or existing agreement, promise, or legal relationship, nor do they modify such a relationship. All obligations on the part of BINDER derive from the respective purchase contract, which also contains the entire and exclusively valid statement of warranty administration. The statements in this manual neither augment nor restrict the contractual warranty provisions.

### 1.2 Structure of the safety instructions

In this operating manual, the following harmonized denominations and symbols indicate dangerous situations in accordance with ISO 3864-2 and ANSI Z535.4.

#### Signal word panel

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

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

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

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

<b>CAUTION</b>	
Indicates a potentially hazardous situation which, if not avoided, may result in damage of the product and/or its functions or of a property in its ambience.	















### Safety alert symbol



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

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

### Pictograms

Warning signs			
	Electrical hazard.		Explosive substances
	Hot surface		Inhalation hazard
	Tipover hazard		Pollution Hazard
Mandatory action signs			
	Mandatory regulation		Lift with several persons
	Read operating instructions		Lift with mechanical assistance
	Pull the power plug		Environment protection
Prohibition signs			
	Do NOT touch		Do NOT spray with water



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

### Word message panel structure

**Type / cause of hazard.**

**Possible consequences.**

- ⊘ Instruction how to avoid the hazard: prohibition
- Instruction how to avoid the hazard: mandatory action

Observe the other notes and information not specially emphasized in the same way, in order to avoid disturbances which could result in direct or indirect injuries or property damage.

### 1.3 Localization / position of safety labels at the unit

Following labels are located on the unit:



Pictograms (Warning signs)	Service label
 <p>Hot surface</p>	



Figure 1: Position of labels at the unit



Keep safety labels complete and legible.



## 1.4 Type plate

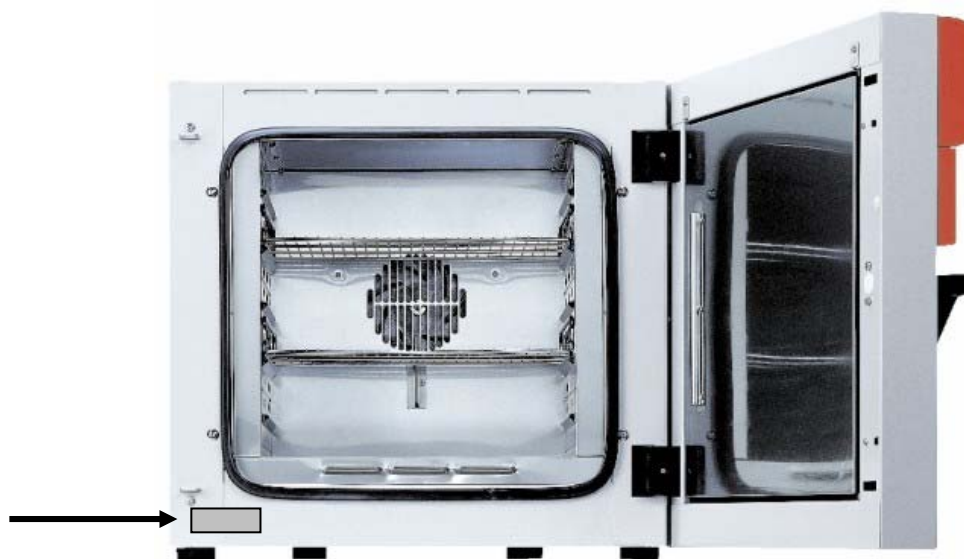


Figure 2: Position of type plate

Nenntemperatur	300°C	1,60 kW
	572°F	230 V 1 N ~
Schutzart	IP 20	7,0 A
Temp. Schutz	DIN 12880	50/60 Hz
Klasse	2.0	
Artikel-Nr.	9020-0227	US PATS 4585923 / 5222612 / 5309981
Projekt-Nr.		5405194 / 5601143 / 5773287 / 6079403

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**FP 115 # 00-00000**  
Made in Germany

Figure 3: Type plate (example of FP 115 regular unit)


Indications of the type plate		Information
Nenntemperatur	300°C 572°F	Nominal temperature
Schutzart	IP 20	IP type of protection 20 acc. to EN 60529
Temp. Schutz	DIN 12880	Temperature safety device acc. to standard DIN 12880
Klasse	2.0	Temperature safety device, class 2
Artikel-Nr.	9020-0227	Art. No. 9020-0227
Projekt-Nr.	---	(Special application acc. to project no.)
	1,60 kW	Nominal power 1.60 kW
	230 V 1 N ~	Nominal voltage 230 V ± 10%, single-phase unit
	7,0 A	Nominal current 7.0 Amp
	50/60 Hz	Mains frequency 50/60 Hz
FP 115		Model FP 115
# 00-00000		Serial No. 00-00000

## 1.5 General safety instructions on installing and operating the heating/drying oven FP

With regard to operating the heating/drying oven FP and to the installation location, please observe the regulations BGR 120 of the German professional association of the chemical industry (formerly ZH 1/119 laboratory guidelines of the employers' liability insurance association) (for Germany).

The BINDER GmbH is responsible for safety-related unit properties only if skilled electricians or qualified personnel authorized by BINDER perform all maintenance and repair, and if components relating to chamber safety are replaced in case of failure with original spare parts.



To operate the unit, use only original BINDER accessories or accessories of third-party suppliers authorized by BINDER. The user is responsible for any risk when using unauthorized accessories.

	<b>CAUTION</b>
	<p><b>Danger of overheating.</b>  <b>Damage of the unit.</b></p> <ul style="list-style-type: none"> <li>⊘ Do not install the unit in unventilated recesses.</li> <li>➤ Ensure sufficient ventilation for carrying-off the heat.</li> </ul>

The heating/drying oven FP must NOT be operated in hazardous locations.

	 <b>DANGER</b>
	<p><b>Explosion hazard.</b>  <b>Danger of life.</b></p> <ul style="list-style-type: none"> <li>⊘ Do NOT operate the unit in potentially explosive areas.</li> <li>⊘ NO explosive dust or air-solvent mixture in the ambience.</li> </ul>

The heating/drying oven FP does not dispose of any measures of explosion protection.



	 <b>DANGER</b>
	<p><b>Explosion hazard.</b>  <b>Danger of life.</b></p> <ul style="list-style-type: none"> <li>⊘ Do NOT introduce any substance combustible or explosive at working temperature into the heating/drying oven.</li> <li>⊘ NO explosive dust or air-solvent mixture in the inner chamber.</li> </ul>

Any solvent contained in the charging material must not be explosive or inflammable. I.e., irrespective of the solvent concentration in the steam room, NO explosive mixture with air will form. The temperature inside the chamber must lie below the flash point or below the sublimation point of the charging material. Keep informed about the physical and chemical properties of the charging material, as well as the contained moisture constituent and its behavior under addition of heat energy.

Keep informed 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. Take adequate measures to exclude such risks prior to putting the heating/drying oven into operation.

	 <b>DANGER</b>
	<p><b>Electrical hazard.</b></p> <p><b>Danger of life.</b></p> <p>Ø The unit must NOT become wet during operation or maintenance.</p>

The heating/drying ovens have been produced in accordance to the VDE regulations and were routinely tested in accordance to VDE 0411.


	 <b>CAUTION</b>
	<p><b>The inner chamber, the outgoing air pipe, the door window (option) and the access ports will become hot during operation.</b></p> <p><b>Danger of burning.</b></p> <p>Ø Do NOT touch the inner surfaces, the outgoing air pipe, the door window, the access ports, and the charging material during operation.</p>


## 1.6 Intended use

Heating/drying ovens FP are suitable for drying and heat treatment of solid or pulverized charging material, as well as bulk material, using the supply of heat. The ovens are suitable for harmless charging material. A mixture of any component of the charging material with air must NOT be explosive. The operating temperature must lie below the flash point or below the sublimation point of the charging material.

### Other applications are not approved.

Do NOT use the unit for drying purpose, especially if greater quantities of steam leading to condensation will be set free.

	<p>Due to the special demands of the Medical Device Directive (MDD), these ovens are not qualified for sterilization of medical devices as defined by the directive 93/42/EWG.</p>
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	<p>Respecting the instructions in this operating manual and conducting regular maintenance work (chap. 14.1) is part of the intended use.</p>
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## 2. Warranty

BINDER products are manufactured with great care and checked carefully prior to delivery (VDE-piece checked).

1. Should your BINDER product have a material defect or manufacturing fault, we shall repair it – as long as it is a new BINDER product – free of charge if the defect or fault occurs within 12 months after delivery. This period will be extended to 24 months, starting from delivery, provided that all maintenance and potential repair work within the first 12 months is carried out by us or authorized service stations.
2. Should you discover a defect or fault in your BINDER product within the aforementioned period, please inform the company from which you purchased the BINDER product or BINDER directly.
3. All above-mentioned periods or deadlines shall begin with the delivery of a new BINDER product to the end buyer. Producing the invoice or delivery note shall bring evidence of deadline keeping.
4. In case a BINDER product has a defect or fault, we shall either replace the defective product with a new one or repair the defective product at our discretion (so called supplementary performance – “Nacherfüllung”). All parts replaced in the course of such repair shall become our property. Deadlines mentioned under above number 1 shall not be prolonged by repair work or substitution. In case supplementary performance should fail, usual warranty rights according to German Law (withdrawal from contract or price reduction) shall apply, provided the defect or fault occurs within the first 12 months. Should the 24 month-period be relevant and supplementary performance fail, you shall only be entitled to a price reduction.
5. Should the defect occur within 12 months after delivery, we shall take over all costs necessary for the repair of the defect, especially transportation, travel and labor costs, in so far as there is no cost increase due to the product being brought to another location than the place of delivery. However, we shall decide whether the defect will be repaired at the location where the BINDER product is operating or whether the BINDER product has to be sent to us. In case the 24 month-period should be relevant, please send the defective BINDER product at your expense to BINDER or the company from which you purchased the BINDER product. We shall repair the BINDER product at your premises only if transportation costs are excessively high. The customer shall be liable for any risk of sudden destruction or deterioration.
6. Should you have to send back a BINDER product, the BINDER product will have to be supplied in its original packaging or any similar suitable packaging.
7. All warranty claims as laid down in this document basically become invalid:
  - if the defect or fault is caused by repair or intervention by non-authorized persons. With authorized persons, we mean only Binder service engineers and service engineers of our service partners.
  - the same applies if you have attached non-suitable parts or accessories to the BINDER products, which are not original BINDER spare parts, and if those parts or accessories have caused the defect or fault.
  - parts that become used due to natural wear and tear, e.g. door seals, lamps, lights (enumeration not exhaustive)
  - defects caused by external intervention like e.g. fall or blow
  - defects arising from non-compliance with operating instructions, improper use, abnormal ambient conditions, overload or absence of care/maintenance
  - in the case of devices that were converted or redesigned by non-authorized third parties
  - in case of minor deviations from the set quality that are irrelevant to the value and usability of the device
8. All rights or claims beyond the ones described above, especially concerning the right of compensation for potential damages which might be caused by BINDER products shall be excluded provided that such exclusion is not prohibited by governing law.

9. Should you send a BINDER product to us for repair or any other reasons, we shall only accept the BINDER product upon presentation of a so-called **authorization number** that has previously been issued to you. We shall issue the authorization number after receiving your complaint in writing or via telephone prior to your **sending (back)** the BINDER product to us. The authorization number will be issued following the receipt of the information mentioned below:

- BINDER product type and serial number
- Date of purchase
- Name and address of the dealer from which you bought the BINDER product
- Exact description of defect or fault
- Your full address; if possible contact person and availability of that person
- Exact location of the BINDER product
- **Contamination clearance certificate via fax in advance!**

The authorization number needs to be applied to the packaging in such a way that it can be easily recognized or be recorded clearly in the delivery documents. **For security reasons we cannot accept your delivery if it does not carry an authorization number!**

#### **IMPORTANT NOTICE:**

Any warranty repair maintenance or service work may only be carried out by persons or companies being properly authorized by us. If you do not know an authorized service station, please contact us and we will name you our service partner closest to you. Otherwise, we will carry out the necessary work ourselves.

Date: November 2003

### **3. Unit description**

BINDER heating/drying ovens with forced convection FP are equipped with the electronic program controller RD3 with digital display. This allows programming of temperature cycles and an individual fan speed setting for each program section.

The APT.line® preheating chamber system guarantees high level of spatial and time-based temperature precision, thanks to the direct and distributed air circulation into the interior.

The air turbine supports exact attainment and maintenance of the desired temperature accuracy. The fan speed is digitally adjustable from 0 % to 100%.

All unit functions are easy and comfortable to use thanks to their clear arrangement. Major features are easy cleaning of all unit parts and avoidance of undesired contamination.

The inner chamber, the pre-heating chamber and the inside of the doors are all made of stainless steel (material no. 1.4301 in Germany). The housing is RAL 7035 powder-coated. All corners and edges are completely coated.

The heating/drying oven FP is regularly equipped with a serial interface RS 422 for computer communication, e.g. via the communication software APT-COM® 3 DataControlSystem (option, chap. 13.1). For further options, see chap. 16.5.

The model FP 720 is equipped with four castors. Both front castors can be locked by brakes.

The units can be operated in a temperature range of 5°C above ambient temperature up to +300°C.

### 3.1 Unit overview

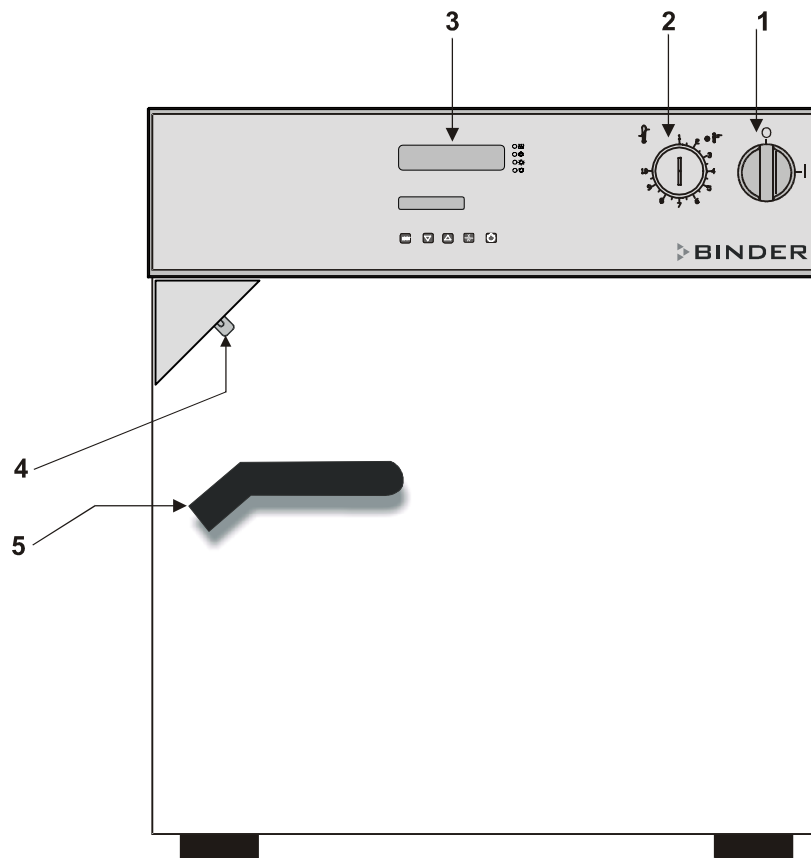


Figure 4: Heating/drying oven FP (example: model FP 53)

- (1) Main switch on/Off
- (2) Safety device class 2 or class 3.1 (option)
- (3) Program controller RD3
- (4) Lever for ventilation slide
- (5) Door handle

## 3.2 Control panel

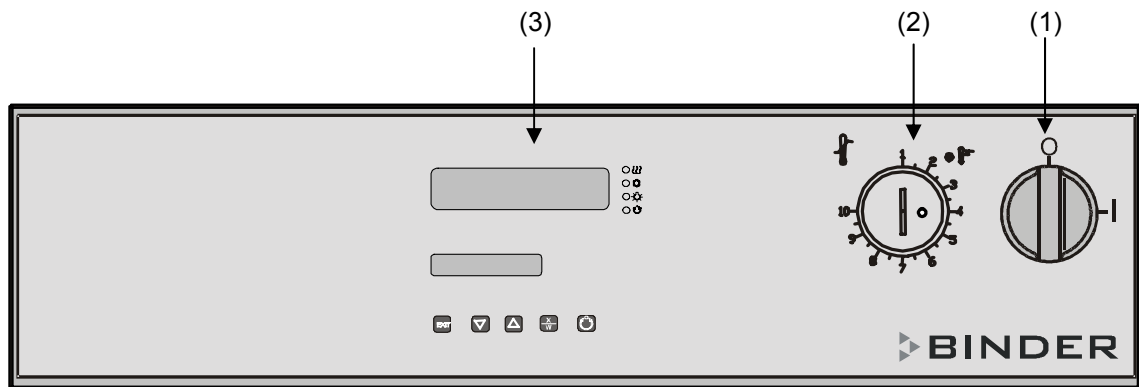


Figure 5: Control panel of standard unit




- (1) Main on/off switch
- (2) Safety device class 2
- (3) Program controller RD3

## 4. Scope of delivery, transportation, storage, and installation

### 4.1 Unpacking, and checking equipment and scope of delivery

After having unpacked, please check the unit and its optional accessories, if any, based on the delivery note for completeness and for transportation damage. If transportation damage has occurred, immediately inform the carrier.

Please remove any transportation protection devices and adhesives in / on the unit and at the doors and take out the operating manuals and accessory equipment.




  	<p style="text-align: center;"><b>CAUTION</b></p> <p><b>Sliding or tilting of the unit.</b></p> <p><b>Damage of the unit.</b></p> <ul style="list-style-type: none"> <li>Ø Do NOT lift or transport the unit using either the door handle or the door.</li> <li>Ø Do NOT lift units 400 and 720 by hand.</li> <li>➤ Lift units 53, 115, and 240 near the 4 unit feet from the pallet by aid of 4 persons.</li> <li>Ø Lift units 400 and 720 using technical devices (fork lifter) from the pallet. Set the fork lifter only from the rear in the middle of the unit. Make sure to place all the lateral supports of the unit on the forks.</li> </ul>
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If necessary to send back the unit, please use the original packing and respect the advice for safe lifting and transportation (chap. 4.2).

For disposal of the transport packing, see chap. 15.1.

## 4.2 Advice for safe lifting and transportation

The front castors of units 720 can be blocked by brakes. Respect the advice for temporal decommissioning (chap. 15.2).

  	<b>CAUTION</b>
	<p><b>Sliding or tilting of the unit.</b></p> <p><b>Damage of the unit.</b></p> <ul style="list-style-type: none"> <li>➤ Transport the unit only in its original packaging.</li> <li>➤ Secure the unit with transport straps for transport.</li> <li>Ø Do NOT lift or transport the unit using either the door handle or the door.</li> <li>Ø Do NOT lift units 400 and 720 by hand.</li> <li>➤ Lift units size 53, 115, and 240 near the 4 unit feet by aid of 4 persons and place it on a transport pallet with wheels. Push the pallet to the desired site and then lift the unit near the 4 unit feet from the pallet.</li> <li>➤ Place units size 400 and 720 using technical devices (fork lifter) on the transport pallet. Set the fork lifter only from the rear in the middle of the unit. Make sure to place all the lateral supports of the unit on the forks.</li> <li>Ø Transport units size 400 and 720 ONLY with the original transport pallet. Set the fork lifter only to the pallet. Without the pallet the unit is in imminent danger of overturning.</li> </ul>

- Permissible ambient temperature range: -10°C to +60°C.

You can order transport packing and pallets for transport purpose at the BINDER Service.

## 4.3 Storage


Intermediate storage of the unit is possible in a closed and dry room. Respect the advice for temporal decommissioning (chap. 15.2).

- Permissible ambient temperature range: -10°C to +60°C.
- Permissible ambient humidity: max. 70 % r.H., non-condensing

If following storage in a cold location the unit is transferred to the installation site for start-up, condensation is possible. Wait at least one hour until the chamber has attained ambient temperature and is completely dry.

## 4.4 Location of installation and ambient conditions

Set up the heating/drying oven FP on a plane and non-flammable surface, free from vibration at a well-ventilated, dry location and align it using a spirit level. The site of installation must be capable of supporting the unit's weight (see technical data, chap. 16.4).

	<b>CAUTION</b>
	<p><b>Danger of overheating.</b></p> <p><b>Damage of the unit.</b></p> <ul style="list-style-type: none"> <li>Ø Do NOT set up units in non-ventilated recesses.</li> <li>➤ Ensure sufficient ventilation for carrying-off the heat.</li> </ul>



- Permissible ambient temperature range: +18°C to +40°C. At elevated ambient temperature values, fluctuations in temperature can occur.



The ambient temperature should not be substantially higher than the indicated ambient temperature of +25°C to which the specified technical data relate. In the case of different ambient conditions, deviations from the indicated data are possible.

- Permissible ambient humidity: 70 % r.H. max., non-condensing.
- Installation height: max. 2000 m above sea level.

When placing several units of the same size side by side, maintain a minimum distance of 250 mm between each unit. Wall distances: rear 100 mm, sides 160 mm.

Two devices up to size 115l can be piled on top of each other. For this purpose, place rubber pads under all four feet of the upper unit to prevent the device from slipping.



### CAUTION

**Sliding or tilting of the upper unit.**

**Damage of the units.**

Ø When stacking, place rubber pads under all four feet of the upper unit.

The unit must NOT be installed and operated in hazardous locations.



### DANGER

**Explosion hazard.**

**Danger of life.**

Ø Do NOT operate the unit in potentially explosive areas.

Ø NO explosive dust or air-solvent mixture in the ambience.

## 5. Installation of the equipment

### 5.1 Electrical connection

- **FP 53, FP 115, FP 240:**

Shockproof plug, mains voltage 230 V (1N~) +/- 10 %, 50/60 Hz

Fixed mains connection cable of 1800 mm in length

- **FP 400, FP 720:**

CEE plug 5 poles, mains voltage 400 V (3N~) +/- 10 %, 50/60 Hz

Fixed mains connection cable of 2700 mm in length

- **FP 53-UL, FP 115-UL:**

NEMA plug 5-20P, mains voltage 115 V (1N~) +/- 10 %, 60 Hz


Fixed mains connection cable of 1800 mm in length

- **FP 240-UL, FP 400-UL, FP 720-UL:**

NEMA plug L21-20P, mains voltage 208 V (3N~) +/- 10 %, 60 Hz

Fixed mains connection cable of 2700 mm in length


- Prior to connection and start-up, check the mains voltage. Compare the values to the data specified on the type plate of the unit (unit front behind the door, bottom left-hand, chap. 1.4).
- When connecting, please observe the regulations specified by the local electricity supply company and as well as the VDE directives (for Germany)
- Pollution degree (acc. to IEC 1010-1): 2
- Over-voltage category (acc. to IEC 1010-1): II



	<b>CAUTION</b>
	<p><b>Danger of incorrect mains voltage.</b></p> <p><b>Damage of the equipment.</b></p> <ul style="list-style-type: none"> <li>➤ Check the mains voltage before connection and start-up.</li> <li>➤ Compare the mains voltage to the data indicated on the type plate.</li> </ul>

See also electrical data (chap. 16.4).

## 5.2 Connection to a suction plant (optional)

When directly connecting a suction plant the spatial temperature exactitude, the heating-up and the recovering times and the maximum temperature will be negatively influenced. So no suction plant should be directly connected to the outgoing air pipe.

	<p>Active suction from the oven must only be effected together with extraneous air. Perforate the connecting piece to the suction device or place an exhaust funnel at some distance to the outgoing air pipe.</p>
---	--

	 <b>CAUTION</b>
	<p><b>The exhaust duct will become hot during operation.</b></p> <p><b>Danger of burning.</b></p> <p>⊘ Do NOT touch the exhaust duct during operation.</p>

## 6. Start up

Having connected the electrical supply (chap. 5.1), switch on the unit by the main switch (1).

### 6.1 Air change

Opening the air flap in the outgoing air pipe serves to adjust the air change.

Without connecting a suction plant:

- If the air flap is open and the fan is operating, fresh air comes in via aeration gaps.
- If the air flap is completely open, the spatial temperature accuracy can be negatively influenced.

## 6.2 Settings at the RD3 program controller

After turning the unit on with the main switch (1) the controller is in Normal Display / fixed value operation mode.

Depending on the temperature value entered before LED (3a) is lit if the heating is active, or no LED if the actual temperature equals the set-point.

In Display 1 of the controller the actual temperature value is displayed.

In Display 2 of the controller the temperature set-point is displayed.

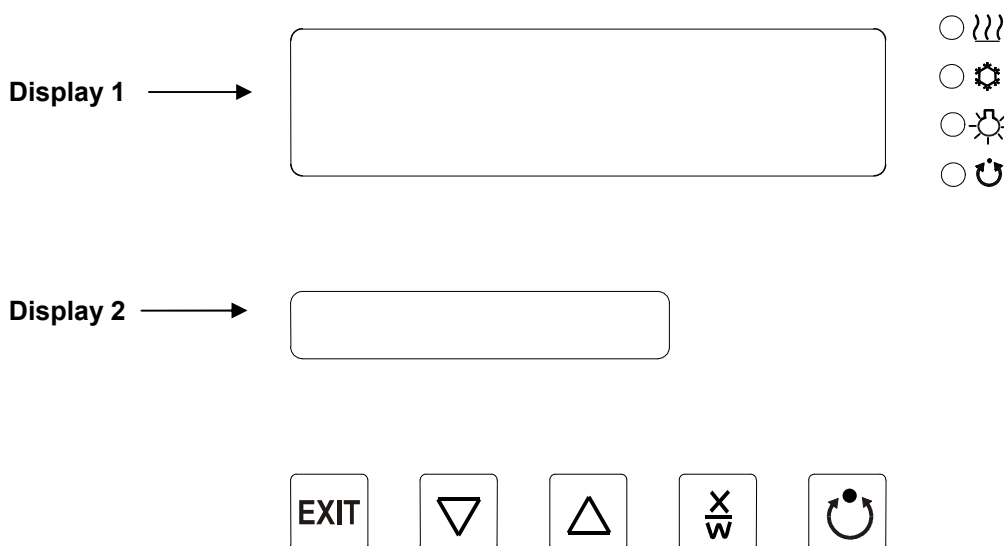


Figure 6: RD3 program controller

### LED function indications and their signification:

(3a) (yellow) ○ } } } Heating active


(3b) (yellow) ○ No function

(3c) (yellow) ○ No function

(3d) (green) ○ ↻ Illuminates: program operation  
Flashes: program interruption due to exceeding of the tolerance limits

The program controller RD3 allows programming of temperature cycles. For each program section also the fan speed can be regulated.

Two programs with up to 10 sections each or one program with up to 20 sections can be entered (setting in the user level, chap. 10).

	When changing from 2 programs to 1 program or vice-versa, existing programs are deleted
---	---

The maximum length of an individual program section can be set to either 99 hs 59 min or to 999 hs 59 min (setting in the user level, chap. 10). This setting is then valid for all program sections.

Programming can be done directly via the controller keyboard or graphically at the computer using the software APT-COM<sup>®</sup> 3 DataControlSystem (option, chap. 13.1) specially developed by BINDER.

## 6.3 General indications

The program controller RD3 offers several functional levels:

### Normal Display / fixed value operation:

- Display of the actual value of temperature (display 1) and of the actual temperature set-point (display 2).
- The chamber is in fixed value operating mode, adjusting to the entered set-points.

### Fixed value entry mode (chap. 7)

- Entry of set-points for temperature and fan speed in fixed value operating mode

### Program editor (chap. 8)

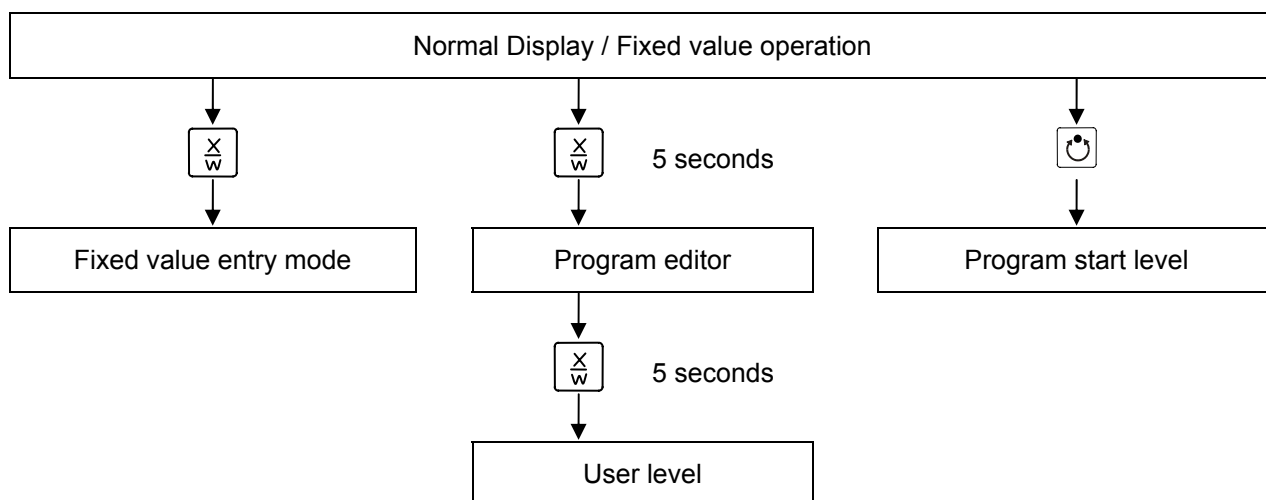
- Two programs with up to 10 sections each or one program with up to 20 sections can be entered. Entry of set-points for temperature and fan speed in all program sections (chap. 8.2).
- Deleting a program section (chap. 8.4)

### Program start level (chap. 9)

- Selection of an entered program
- Entry of settings affecting the program course, as start delay time or number of program cycles
- Program start

### User level (chap. 10)

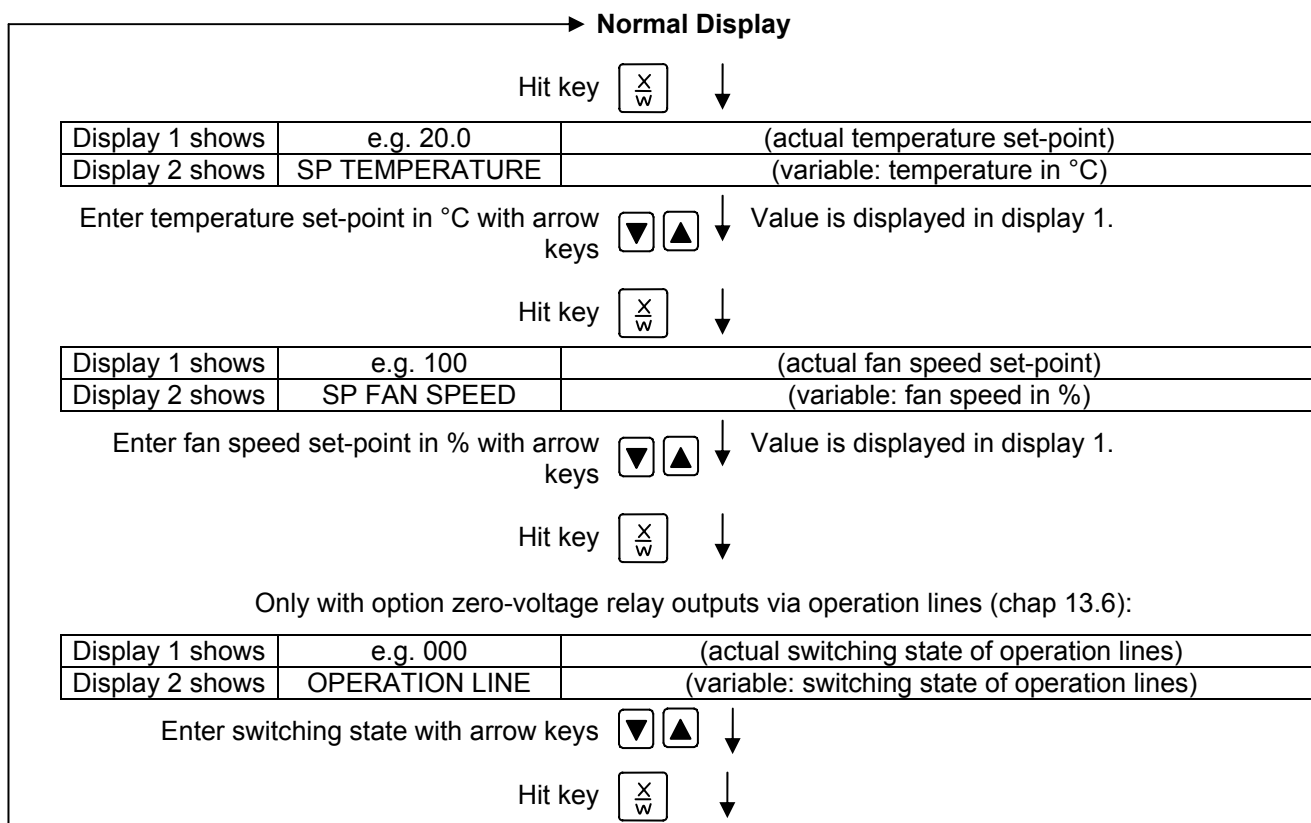
- User specific controller settings



If no button is touched during more than 120 sec. the controller returns from the actual level to Normal Display.

## 7. Fixed value entry mode

**Basic entry principle:** Call up the individual parameters with button X/W one after the other. Enter the values with the arrow keys. A value flashing once after 2 seconds indicates that it has been taken over to the controller.



If no button is hit for more than 120 sec, or if the EXIT button is hit, the controller changes to Normal Display.



When changing the set-point, check the setting of the safety device (chap. 10).



If the fan is operated with less than 100 % speed, the temperature performance and the spatial exactitude of the temperature can differ from the manufacturer's specifications. Do reduce the fan speed only if absolutely necessary due to special requirements.

The values entered in fixed-value entry mode remain valid after program run-off and are then equilibrated.

## 8. Program editor

### 8.1 Selecting between set-point ramp and set-point step

Set-points always refer to the start of a program section, i.e., at the beginning of each program section, the entered set-point will be reached. During program section operation, the temperature gradually passes to the set-point entered for the following program section.

By appropriate design of the program section timing, all kinds of temperature transitions can be programmed:

- **Gradual temperature changes “set-point ramp”**

The set-point gradually moves from one set-point to the one of the following program section during a given interval. The actual temperature value (X) follows the continually moving set-point (W) at any moment.

- **Program sections with constant temperature**

The initial values of two subsequent program sections are identical; therefore the temperature is kept constant during the whole time of the first program section.

- **Sudden temperature changes “set-point step”**

Steps are temperature changes (ramps) that occur during a very short interval. Two program sections with an identical set-point are followed by a section with a different set-point. If the duration of this transitional program section is very short (minimum entry 1 min), the temperature change will proceed rapidly in the possible minimum time.

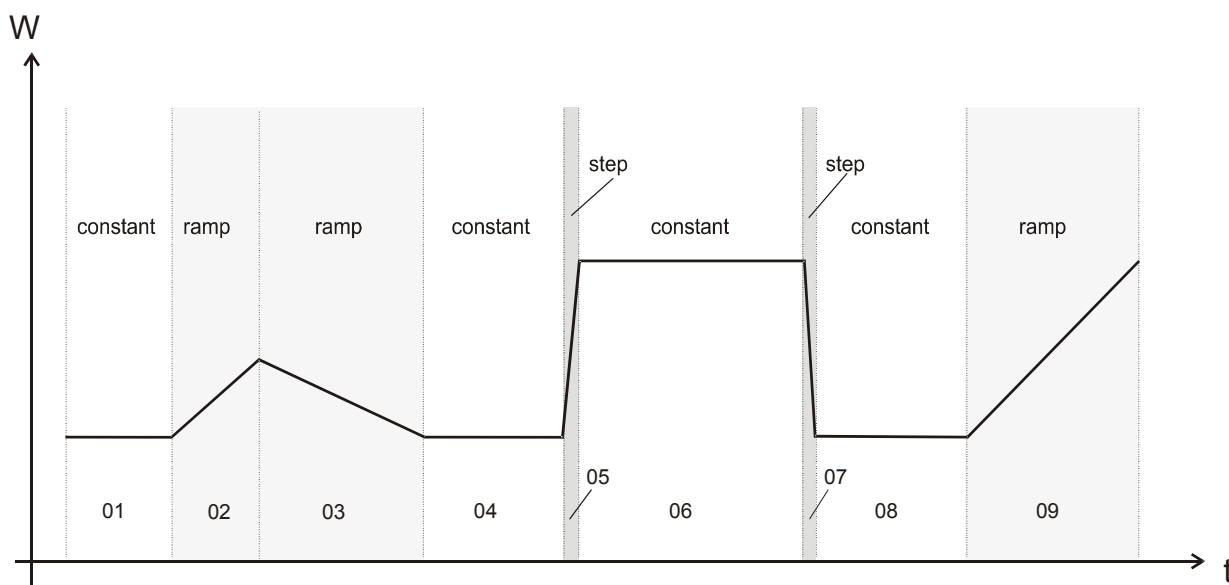
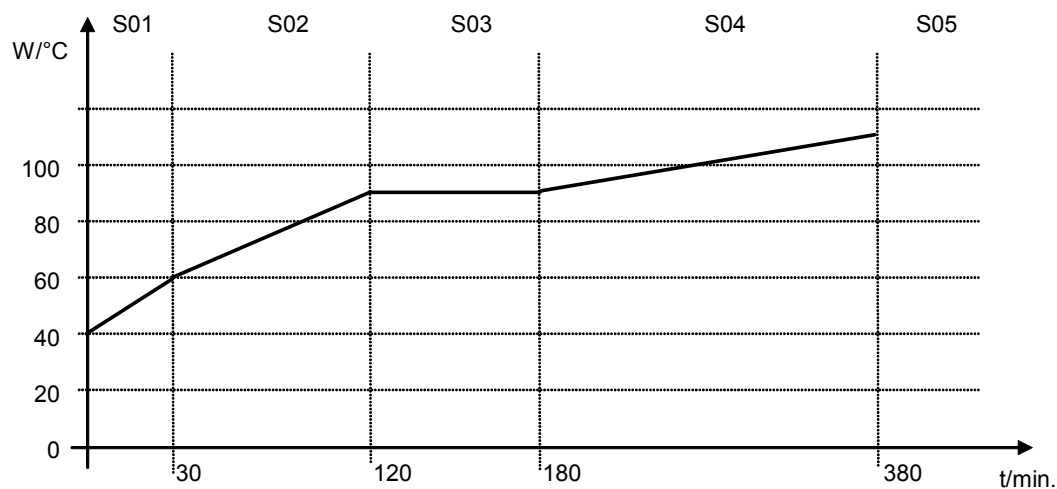


Figure 7: Possible temperature transitions

### Program entry as set-point ramp (example):



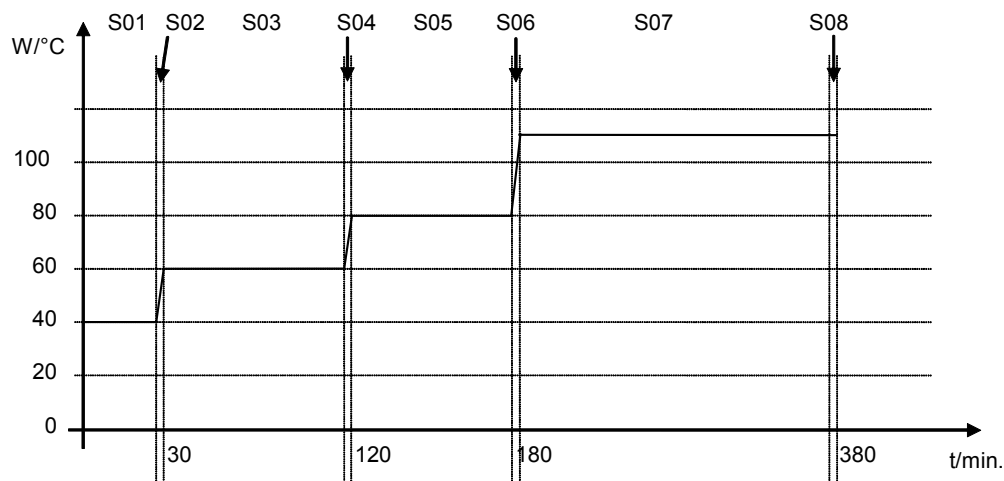
Program table corresponding to the diagram:

Section	Temperature set-point [°C]	Section length [hh.mm]	Fan speed [%]	Operation lines *
SEC	TEMP	TIME	FAN	O.LINE
S01	40	00:30	50	000
S02	60	01:30	100	000
S03	90	01:00	100	000
S04	90	03:20	100	000
S05	110	00:01	100	000

\* Only with option zero-voltage relay outputs via operation lines, see chap 13.6.

The values of such a program table can now be entered to the RD3 program controller (chap. 8.2).

### Program entry as set-point step (example):



Program table corresponding to the diagram:

Section	Temperature set-point [°C]	Section length [hh.mm]	Fan speed [%]	Operation lines *
SEC	TEMP	TIME	FAN	O.LINE
S01	40	00:30	50	000
S02	40	00:01	100	000
S03	60	01:30	100	000
S04	60	00:01	100	000
S05	80	01:00	100	000
S06	80	00:01	100	000
S07	110	03:20	100	000
S08	110	00:01	100	000

\* Only with option zero-voltage relay outputs via operation lines, see chap 13.6.

The values of such a program table can now be entered to the RD3 program controller (chap. 8.2).

### Advice for the programming of the different temperature transitions

The end point of the desired cycle must be programmed with an additional section (in our examples S05 for set-point ramp and S08 for set-point step) with a section time of at least one minute. Otherwise the program will stop one section too early because the program line is incomplete.

If the tolerance limits set in the user level (chap. 10) are exceeded, the program is halted until the actual temperature value is again situated in the tolerance range. During this program interruption the LED (3d) flashes. Therefore, the duration of the program might be extended due to the programming of tolerances.

The programming is conserved even in case of power failure or after switching off the unit.

## 8.2 Set-point entry for program operation

From Normal Display the program editor is accessed by hitting button X/W for 5 sec. Here the set-points are entered one after the other in all program sections of a selected program.

Two programs with up to 10 sections each or one program with up to 20 sections can be entered (setting in the user level, chap. 10).

In order to avoid incorrect programming the values of the program course should be entered into a table (template in chap. 8.3).

Program table (example):

Section	Temperature set-point [°C]	Section length [hh.mm]	Fan speed [%]	Operation lines *
SEC	TEMP	TIME	FAN	O.LINE
S01	40	00:30	50	000
S02	60	01:30	100	000
S03	90	01:00	100	000
S04	90	03:20	100	000
S05	110	00:01	100	000

\* Only with option zero-voltage relay outputs via operation lines, see chap 13.6.

The values of a program section are kept constant during the section length.

The values of the program table can now be entered to the RD3 program controller.




## Step 1 – Selecting the program and the program section:



### Normal Display

Press down key  ↓ for 5 sec.

Display 1 shows	e.g. 0000	
Display 2 shows	PROGRAM EDITOR	(you are in the program editor)

Hit program key  ↓


Display 1 shows	0000	
Display 2 shows	UserCod? 0000	(enter user code)

Enter user code with arrow keys   ↓ e.g. **0001**  
(basic setting, adjustable in the user level, chap. 10).  
Value is displayed in both displays.

Automatically forward after 2 sec.

Display 1 shows	e.g. 01	(program P01 selected)
Display 2 shows	--- : --- PRG.	(program can be selected)
alternating	CONTINUE X/W	(information: to 1 <sup>st</sup> program section with X/W)

Select program P01 or P02 with arrow keys   ↓ Value is displayed in display 1.



Hit key  ↓

In the selected program P01 or P02, program sections can be selected:

Display 1 shows	e.g. 01	(section S01 selected)
Display 2 shows	P01: --- SEC.	section S01 has already been created.
alternating	CONTINUE X/W	enter new set-points for the individual variables with button X/W

or:

Display 1 shows	e.g. 01	(section S01 selected)
Display 2 shows	P01: --- SEC.	section S01 has not yet been created.
alternating	NEW SEC. X/W	enter set-points for the individual variables with button X/W

Select sections S01 to S10 or to S20 with arrow keys   ↓

If no program section has been entered yet the display switches back to 01 with all entries > 01, because all sections have to be entered one after, and each new section is created as NEWSEC.


If e.g. already three program sections have been entered, the next section to be entered is S04. Before this, no section > S04 can be selected.








## Next step – entry of set-points in the desired program sections:

**Basic entry principle:** The parameters of individual program sections are called up with button X/W one after the other. The values of the individual parameters can be entered with the arrow keys. A value flashes once after 2 seconds thus indicating that it has been taken over to the controller. If several parameters are to be skipped (e.g. in order to change a parameter in a posterior program section), the parameters can be rapidly jumped over by holding pressed down the X/W key. If no button is hit during more than 120 sec the controller switches back to Normal Display. The program entered so far remains saved.

Hit key  ↓


Display 1 shows	e.g. 40.0 <sup>°C</sup>	(actual temperature set-point)
Display 2 shows	S01: TEMP 40.0	(variable: temperature in °C)
alternating	CONTINUE X/W	(information: go on with X/W)

Enter temperature set-point of S01 in °C  
with arrow keys   ↓

Hit key  ↓


Display 1 shows	e.g. 00.30	(actual section length set-point)
Display 2 shows	S01: TIME 00:30	(variable: section length in hh:mm)
alternating	CONTINUE X/W	(information: go on with X/W)

Enter section length set-point of S01 in  
hh:mm with arrow keys   ↓ Value is displayed in both displays.

Hit key  ↓

Display 1 shows	e.g. 50	(actual fan speed set-point)
Display 2 shows	S01:FAN 50	(variable: fan speed in %)
alternating	CONTINUE X/W	(information: go on with X/W)


Enter fan speed set-point of S01 in % with  
arrow keys   ↓ Value is displayed in both displays.

Hit key  ↓

Only with option zero-voltage relay outputs via operation lines (chap 13.6):

Display 1 shows	e.g. 000	(actually set switching state)
Display 2 shows	S01:O.LINE 000	(variable: switching state)
alternating	CONTINUE X/W	(Information: go on with X/W)

Enter switching state with arrow keys   ↓

Hit key  ↓





### Selecting the next program sections to be entered



Display 1 shows	e.g. 02	(section S02 selected)
Display 2 shows alternating	P01: --- SEC. CONTINUE X/W	Section S02 has already been created. enter new set-points for the individual parameters with X/W.

or:

Display 1 shows	e.g. 02	(section S02 selected)
Display 2 shows alternating	P01: --- SEC. NEW SEC. X/W	Section S02 has not yet been created. enter set-points for the individual parameters with X/W


Select the next section to be entered with  
arrow keys   ↓


Display 1 shows	e.g. 60.0 <sup>°C</sup>	(actual temperature set-point)
Display 2 shows alternating	S02:TEMP 60.0 CONTINUE X/W	(variable: temperature in °C) (information: go on with X/W)

Enter the temperature set-point of S02 in °C  
with arrow keys   ↓

Etc.

If all sections up to S10 or up to S20 have been programmed follows again section S01. In order to quit the entry mode hit several times the EXIT button or wait 120 sec → the controller returns to Normal Display.

	When changing the set-point, check the setting of the safety device (chap. 10).
---	---

	If the fan is operated with less than 100 % speed, the temperature performance and the spatial exactitude of the temperature can differ from the manufacturer's specifications. The fan speed rate should only be reduced if absolutely necessary to meet special requirements.
---	---

### 8.3 Program table template

<b>Program editor</b>	
<b>Program title</b>	
<b>Project</b>	
<b>Program No.</b>	
<b>Date:</b>	

Section	Temperature set-point [°C]	Section length [hh.mm]	Fan speed [%]	Operation lines *
SEC	TEMP	TIME	FAN	O.LINE
S01				
S02				
S03				
S04				
S05				
S06				
S07				
S08				
S09				
S10				
S11				
S12				
S13				
S14				
S15				
S16				
S17				
S18				
S19				
S20				

\* Only with option zero-voltage relay outputs via operation lines, see chap 13.6.




At the standard device the operation lines (O.LINE) are without any function.


## 8.4 Deleting a program section

A program section is deleted from the program by setting the section duration to Zero.



### Normal display

Press down Hit key  ↓ for 5 sec.

Display 1 shows	e.g. 0000	
Display 2 shows	PROGRAM EDITOR	(you are in the program editor)

Hit program key  ↓

Display 1 shows	0000	
Display 2 shows	UserCod? 0000	(enter user code)

Enter the user code with arrow keys   ↓ e.g. **0001**  
(basic setting, adjustable in the user level, chap. 10).  
Value is displayed in both displays.

Automatically forward after 2 sec

Display 1 shows	e.g. 01	(program P01 selected)
Display 2 shows	--- : --- PRG.	(program can be selected)
alternating	CONTINUE X/W	(information: to 1 <sup>st</sup> program section with X/W)

Select the desired program, e.g. P01, with arrow keys   ↓ Value is displayed in display1.

Hit key  ↓

In the selected program P01 or P02, program sections can be selected:

Display 1 shows	e.g. 01	(actual selected section: S01)
Display 2 shows	P01: --- SEC.	(program section can be selected)
alternating	CONTINUE X/W	(information: set-point entry with X/W)

Select desired section, e.g. S03, with arrow keys   ↓ (omitted if section S01 shall be deleted).



Hit key  ↓

Display 1 shows	e.g. 90.0 <sup>o</sup>	(actual temperature set-point)
Display 2 shows	S03:TEMP 90.0	(variable: temperature)
alternating	CONTINUE X/W	(information: go on with X/W)

No entry ↓

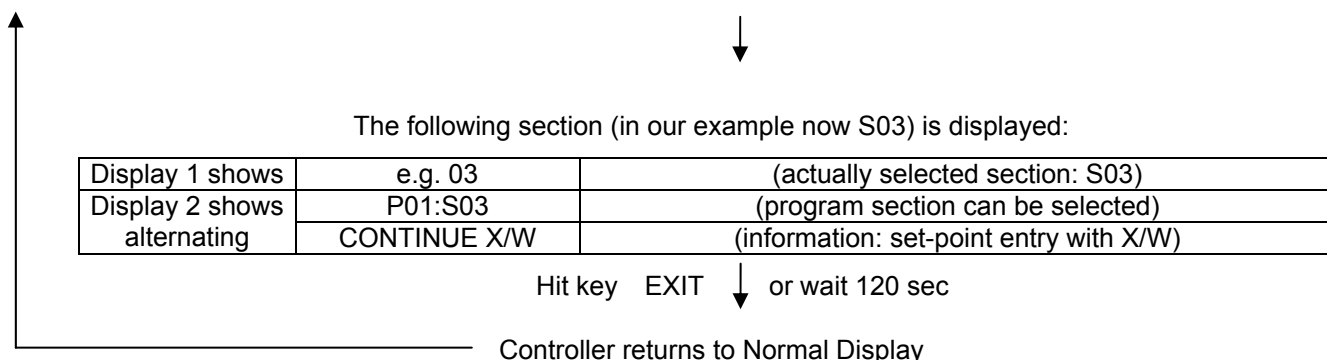
Hit key  ↓


Display 1 shows	e.g. 01.00	(actual section length)
Display 2 shows	S03:TIME 01:00	(variable: section length)
alternating	CONTINUE X/W	(information: go on with X/W)

Enter set-point **Zero** for section length in hh:mm of S03 with arrow keys   ↓ Value is displayed in display 2 or in both displays  
(display depends on maximum time setting in the user level chap. 10)

Display 1 shows	e.g. 00.00	(actual section length)
Display 2 shows	S03:TIME 00:00	(variable: section length)
alternating	DELETE SEC. X/W	(information: delete section with X/W)

Hit key  ↓





If you delete a program section which is followed by further sections, those following move up to the place of the deleted section.

In our example section S03 has been deleted. Sections S04, S05, etc., in case they have been programmed earlier, will now receive the preceding sections numbers, i.e., S04 is now called S03 etc.

It is thus not possible to temporarily inactivate a program section, but deletion leads to overwriting the section by the following one. To enter a section later to a program also the sections following the new one must be entered again.

## 9. Program start level

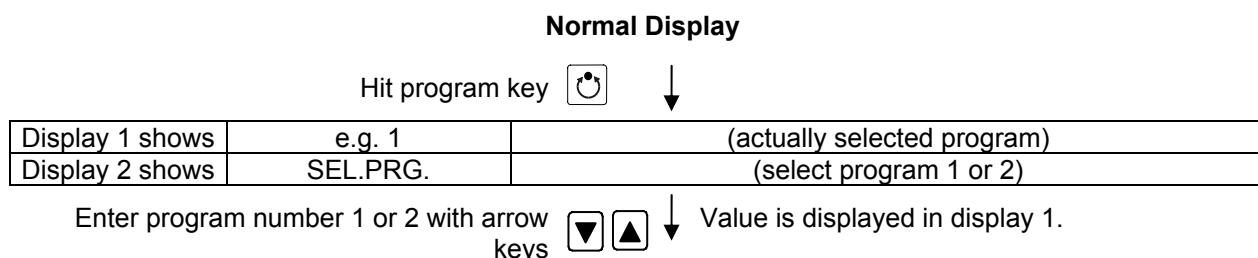
In a first step a program is selected. This on condition that a program has been entered previously (chap. 8.2) and that program type “2 programs with 10 sections each” has been selected in the user level (chap. 10).

Then the settings for the program course are defined. Two parameters can be set:


- Program delay time, i.e. a defined time before program start. It can be entered with precision of 1 min and is max. 99.59 (99 hs 59 min). If the value is 00.00 the program is started without any delay.
- Number of program cycles, i.e. the desired number of program repeats. Values from 1 to 99 can be entered. If the program is not to be repeated, enter value 0. For infinite repeats enter value –1. The program is repeated as a whole, it is not possible to repeat individual sections.

In a last step the selected program is started. These steps must be carried out subsequently.

### Step 1 – Program selection (only with program type “2 programs” set):




## Next step – entry of program course settings

Hit program key  ↓

Display 1 shows	e.g. 00.00	(entered delay time hh.mm)
Display 2 shows	RUN TIME	(enter delay time of program start)


Set delay time in hh.mm with arrow keys   ↓ Value is displayed in display 1.

Hit program key  ↓


Display 1 shows	e.g. -1	(actually selected number of program cycles)
Display 2 shows	REPEAT	(enter number of program cycles)

Select number of cycles -1, 0, 1 etc. with arrow keys   ↓ Value is displayed in display 1.

## Last step – program start:

Hit program key  ↓

Display 1 shows	e.g. 1	(selected program)
Display 2 shows	RUN PRG.	(Question: start selected program?)

Hit program key  ↓

Display 1 shows	e.g. 25.5°C	actual temperature value
Display 2 shows	P01:S01 00:29:39 (time running backwards)	(actual program P01, actual section S01, and remaining time of program section S01)


Program is running. The green LED (3d) lights up.


Additionally to the green LED (3d) indicating a running program LED (3a) is lit if the heating is active, or no LED if the actual temperature equals the set-point.




During program course the arrow keys and the EXIT button are not functional.



By hitting the program key  the program course can be terminated.

If during program course button  is hit, the entered set-points of the actually running program section are shown one after the other for 5 sec. each:

Display 1 shows	e.g. 65.5°C	(actual temperature value)
Display 2 shows	P01:S03 00:47:12	(actual program P01, actual section S03, and remaining time of program section S03)

Hit key  ↓

Display 1 shows	e.g. 90	(actual temperature set-point)
Display 2 shows	SP TEMPERATURE	

5 seconds ↓

Display 1 shows	e.g. 100	(actual fan speed setting)
Display 2 shows	SP FAN SPEED	

5 seconds ↓

Only with option zero-voltage relay outputs via operation lines:


Display 1 shows	e.g. 000	(actual operating contact setting)
Display 2 shows	OPERATION LINE	

After program runoff (and, if appropriate, of the program repeats) the controller returns to fixed value operation showing Normal Display and adjusting to the temperature and fan speed values that have been previously entered in the fixed value entry mode.

## 10. User level

In this menu the following parameters can be set (in brackets the corresponding abbreviated information given in display 2):

- **Unit address** (Address)  
Setting of controller address (1 to 255) for operation with the communication software APT-COM®.
- **User code** (User-cod)  
Modification of the user code setting (factory setting 0001) for access to the user level and the program editor.

	Keep in mind any modification of the user code. There is no access to these levels without a valid user code.
---	---

- **Decimal point position** (Decimal)  
Selection if integer values or one position after the decimal point can be entered. The integer representation is displayed in Display 2 (set-point entry) while the actual value in Display 1 is always displayed with one decimal point.
- **Buzzer** (Buzzer)  
**Inactive:** no acoustic signal (buzzer) in case of an alarm event.  
**Active:** in case of an alarm event (see chap. 11.2) an acoustic signal (buzzer) will run. It can be reset by hitting button EXIT.
- **Selection of controller menu language** (Language)  
**German, English, or French** can be selected.
- **Counter of operating hours** (Oper.hs)  
Information about the number of operating hours reached up to now or since the last reset. (no setting, display only).
- **Max. number of operating hours** (Op.limit)  
Entry of a limit number of operating hours, i.e., the maximal number of operating hours that can be run. Maximum setting: 9999. Reaching the limit has no effect.
- **Reset operating hours** (Op.back)  
Reset operating hours to zero.
- **Interface protocol** (Protocol)  

**“Modbus”:** The chamber interface can be used as a communication interface to connect it to a computer. This serves to control the chamber by the communication software APT-COM®. It is possible to read and write the values of all parameters.

**“Printer”:** A protocol printer (option) for data printouts can be connected to the chamber interface. The printer regularly protocols the actual temperature value with fixed formatting and with adjustable print intervals (chap. 13.2).  
In both cases an interface converter RS 422 / RS 232 is used.
- **Print interval** (Prt.-Inv.)  
Setting of the print interval in minutes. Function available only if setting “Printer” has been selected in the previous menu point.



- **Display illumination** (Disp.LED)

Selection between continuous display illumination and limited illumination that will automatically go off 300 sec after the last entry.

- **Program type selection** (PrgSelec)

Select between entry of two programs with up to 10 sections each or of one program with up to 20 sections.



When changing from 2 programs to 1 program or vice-versa, existing programs are deleted in the program editor!

- **Maximum section duration** (Prg.Time)

The maximum length of an individual program section can be set to either 99 hs 59 min or to 999 hs 59 min. This setting is then valid for all program sections.




When changing the maximum duration setting, pre-existing programs will be deleted in the program editor.

- **Tolerance limit range** (Tol.band)


Entry of a tolerance limit value in °C. If the actual value of temperature exceeds the set-point of a program section by more than the entered tolerance limit value, the program is halted (LED (3d) flashing) until the actual temperature value is again situated within the tolerance range.

Entry of "0" means tolerance limits off.


### Normal Display

Press down key  ↓ for 5 sec



Display 1 shows	e.g. 0000	
Display 2 shows	PROGRAM EDITOR	(you are in the program editor)

Press down key  ↓ for 5 sec

Display 1 shows	0000	
Display 2 shows	USER – LEVEL	(you are in the user level)

Hit program key  ↓


Display 1 shows	0000	
Display 2 shows	UserCod?	0000 (enter user code, display flashes)

Enter the user code with arrow keys   ↓ e.g. **0001** (basic setting, or the valid code in case it has been previously changed in this menu). Value is displayed in both displays.

Automatically forward after 2 sec

Display 1 shows	1	(actual address: 1)
Display 2 shows	Adress	1 (entry of unit address) (actual address: 1)

Enter the unit address with arrow keys   ↓ Address is displayed in both displays.

Hit key  ↓

Display 1 shows	1	(actually valid user code: 1)
Display 2 shows	User-cod 1	(change user code) (actually set: 1)

Enter a new value with arrow keys ▼ ▲

Value is displayed in both displays.

Hit key 

Display 1 shows	0000	(no function)
Display 2 shows	Decimal: XXX.X	(setting of decimal point position) (actual setting: XXX.X)

Select decimal point position with arrow keys ▼ ▲

Decimal point position XXX.X or XXXX. is displayed in display 2.

Hit key 

Display 1 shows	0000	(no function)
Display 2 shows	Buzzer : Active	(setting of the alarm buzzer) (actual setting: „Active“)

Select between “Active” and “Inactive” with arrow keys ▼ ▲

Setting is displayed in display 2.

Hit key 

Display 1 shows	0000	(no function)
Display 2 shows	Language :English	(selection of controller language) (actual setting: English)

Select between languages German, English, and French with arrow keys ▼ ▲

Setting is displayed in display 2.

Hit key 

Display 1 shows	e.g. 0004	(unit operating hours)
Display 2 shows	Oper.hs 0004:28	(operating hours up to now hhhh:mm) (actually displayed: 4 hs 28 min)

Hit key 

Display 1 shows	1000	(actual setting: 1000 hs)
Display 2 shows	Op.limit 1000:00	(maximum number of operating hours hhhh:mm (actual setting: 1000 hs)

Set value with arrow keys ▼ ▲

Setting is displayed in both displays.

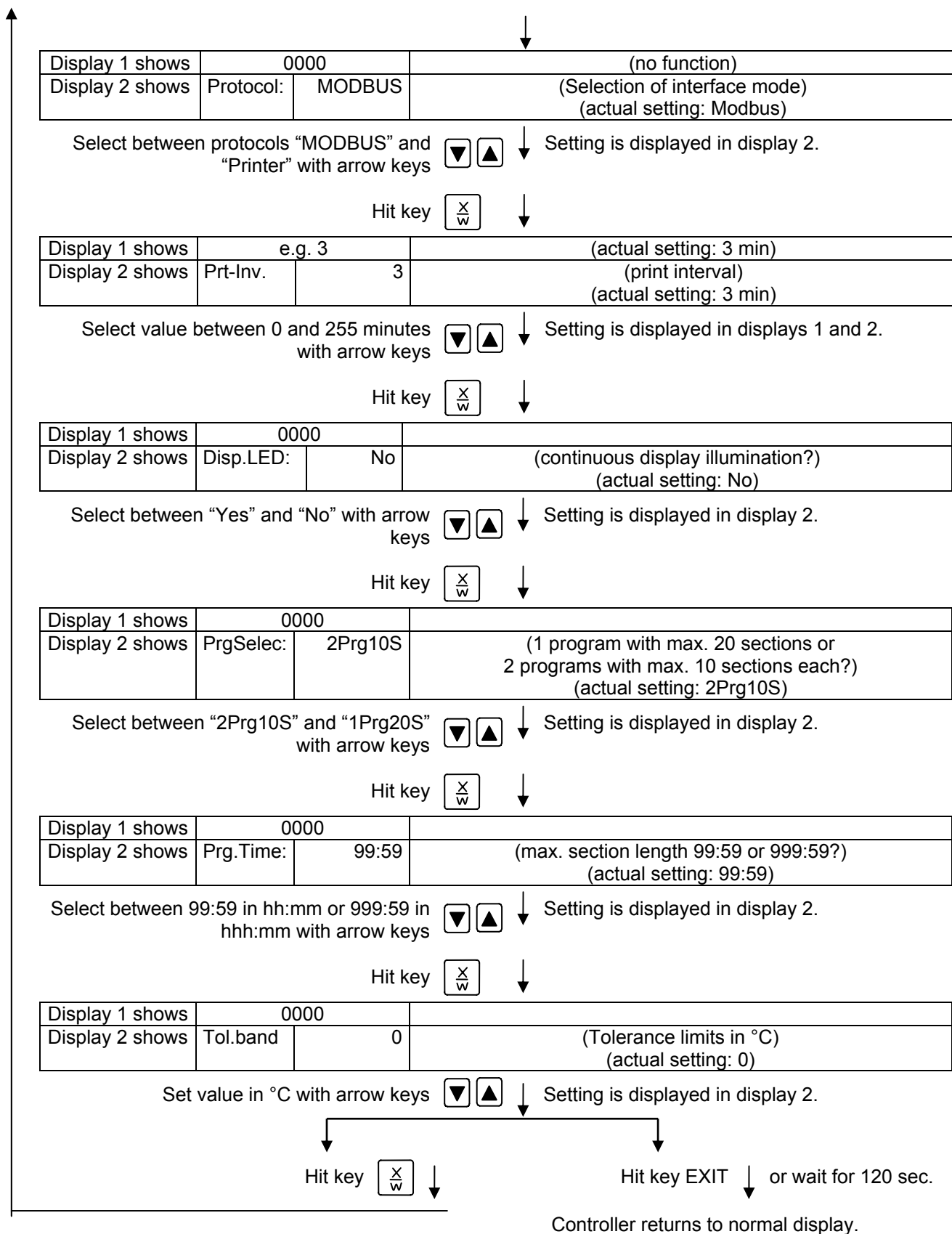
Hit key 

Display 1 shows	0000	(no function)
Display 2 shows	Op.back : No	(reset counter of operating hours ?) (actual setting: No)

Select between “Yes” and “No” with arrow keys ▼ ▲

Setting is displayed in display 2.

Hit key 



## 11. Behavior at failures

### 11.1 Behavior after power failure

Power failure during fixed-value operation (Normal Display): the entered parameters remain saved. After power return operation continues with the set parameters.

Power failure during program operation: After power return program course continues with the set-points that have been reached during program operation.

### 11.2 Alarm messages

Alarm messages, e.g. "RANGE ERROR CH1" in case of sensor rupture, are displayed in Display 2 only in Normal Display.

A buzzer can be activated / inactivated in the user level (chap. 10). It can be reset by pressing the EXIT button. The alarm text displayed in Normal Display goes off only if the alarm cause does not exist any more.

## 12. Temperature safety devices

### 12.1 Temperature safety device class 2 (DIN 12880)

The temperature safety device class 2 protects the unit, its environment and the charging material against impermissible excess temperatures.

Please also observe the regulations BGR 120 of the German professional association of the chemical industry (formerly ZH 1/119 laboratory guidelines of the employers' liability insurance association) (for Germany).

In the event of a fault in the temperature controller, the safety device (2) **permanently** switches off the unit. This status is reported visually by the indicator lamp (2a).

The operation of the safety device (2) is checked by moving it slowly anti-clockwise until it is switched off. The safety device cut-off is reported visually by the indicator lamp (2a).

The safety device is then released again by pressing the reset button (2b) and the unit is switched on as described.

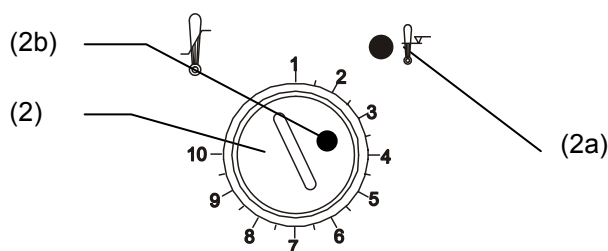


Figure 8: Safety thermostat class 2

#### Function:

The safety thermostat class 2 is functionally and electrically independent of the temperature control device and switches off **permanently** at all poles.

When the control knob (2) is set to the end stop (position 10), the safety thermostat class 2 acts as a unit protection device. If it is set somewhat higher than the set-point temperature selected on the controller, it acts as a material protection device.

When the safety device has switched off the unit, which can be seen from the illumination of the red alarm lamp (2a), perform the following steps:

- Disconnect the unit from the mains.
- Have the cause of the fault examined and rectified by a technician.
- Release safety thermostat class 2 by pressing reset button (2b).
- Restart the unit as described in chap. 6.

### Setting:

In order to check at which temperature the safety device activates, start the unit and set the required nominal value on the temperature controller.

The scale division from 1 to 10 corresponds to the temperature range from 30°C up to 320°C and serves as a setting aid.

- Turn the control knob (2) of the safety device using a coin to its end-stop (position 10) (unit protection).
- When the set point is reached, turn back the control knob (2) until its trip point (turn it anti-clockwise).
- The trip point is identifiable by the red alarm lamp (2a) lighting up; the reset button (2b) jumps out.
- The optimum setting of the safety device is obtained by turning the knob clockwise by around one graduation mark on the scale.
- Push the reset button (2b) in again.

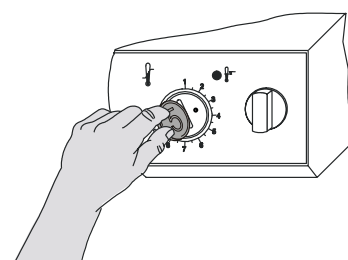


Figure 9: Setting the safety device class 2



The unit is only active with the reset button (2b) pushed in.

When the safety thermostat class 2 kicks in, the red alarm lamp (2a) illuminates, the reset button (2b) jumps out and the unit switches off permanently at all poles.



Check the safety thermostat with every change of the set point value and readjust it if necessary.

## 12.2 Temperature safety device class 3.1 (DIN 12880) (option)

The temperature safety device class 3.1 protects the unit, its environment and the charging material against impermissible excess temperatures. In the event of a fault, it limits the temperature inside the oven to the value set here.

Please also observe the regulations BGR 120 of the German professional association of the chemical industry (formerly ZH 1/119 laboratory guidelines of the employers' liability insurance association) (for Germany).

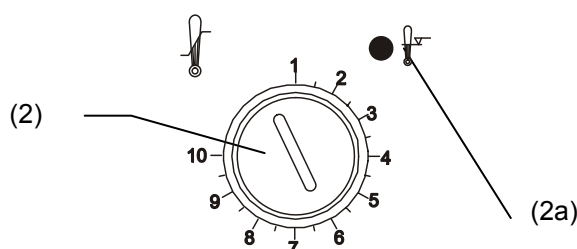


Figure 10: Temperature safety device class 3.3

### Function:

When the control knob (2) is set to the end stop (position 10), the safety thermostat class 3.1 acts as a unit protection device. If it is set somewhat higher than the set-point temperature selected on the controller, it acts as a material protection device.

When the safety device class 3.1 has taken over control, which can be seen from the illumination of the red alarm lamp (2a), perform the following steps:

- Disconnect the unit from the mains
- Have examined and rectified the cause of the fault by an expert
- Start up the unit again as described in chapter 6.

### Adjustment:

To check the response temperature of the safety device class 3.1, switch on the oven and set the desired set point at the temperature controller.

The sections of the scale from 1 to 10 correspond to the temperature range from 63°C to 350°C and serve as a setting aid.

- Turn the control knob (2) of the safety device using a coin to its end-stop (position 10) (unit protection).
- When the set point is reached, turn back the control knob (2) until its trip point (turn it anti-clockwise).
- The trip point is identifiable by the red alarm lamp (2a) lighting up.
- The optimum setting for the safety device is obtained by turning the control knob clockwise by approximately one scale division, which leads to extinguish the red alarm lamp.

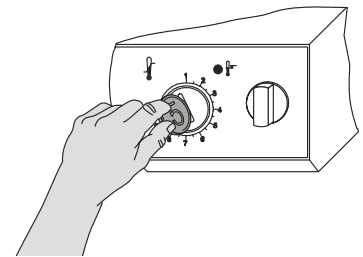


Figure 11: Setting the safety device class 3.1



Check the setting regularly and adjust it following changes of set-point.

## 13. Options

### 13.1 Communication software APT-COM<sup>®</sup> 3 DataControlSystem (option)

The unit is regularly equipped with a serial interface RS 422 to which the BINDER communication software APT-COM<sup>®</sup> 3 DataControlSystem can be connected. The connection to a computer is established using the FP interface via an interface converter RS 422 / RS 232.



Make sure that the interface mode is correctly set to "Modbus" in the user level (chap. 10).

In adjustable intervals the actual temperature, and fan speed values are put out. Programming can be performed graphically via PC. Up to 30 chambers with RS 422 interface can be cross linked. Further information can be obtained in the operating manual of the BINDER communication software APT-COM<sup>®</sup>.

Pin allocation of the RS 422 interface at the rear of the incubator:

Pin 2:	RxD (+)
Pin 3:	TxD (+)
Pin 4:	RxD (-)
Pin 5:	TxD (-)
Pin 7:	Ground

## 13.2 Protocol printer (option)

The protocol printer is connected using the FP interface via an interface converter RS 422 / RS 232.



Make sure that the interface mode is correctly set to "Printer" in the user level (chap. 10).



Figure 12: Protocol printer

Interface configuration:

Baud rate: 9600  
Stop bit: 1  
Parity: none

The actual temperature values are put out regularly with fixed formatting.

Printout: one printed line for each print interval with relative time stamp, temperature value with one decimal point, curve representation (see "Manual for Setting Matrix Printer Epson LX-300+", Art. No. 7001-0041). In every 5th line the set print interval "Ptime" in minutes is noted. The printer interval is set in the user level (chap. 10).

<b>Example:</b>	Temp.: 34.7	*
	Temp.: 35.6	*
	Temp.: 32.8	*
	Temp.: 30.1	*
	Ptime : 001.	*
	Temp.: 27.4	*
	Temp.: 26.9	*
	Temp.: 26.6	*
	Temp.: 26.4	*
	Ptime : 001.	*
	Temp.: 26.2	*

In this example the print interval is set to 1 min, i.e., every minute a new temperature value is printed.



In connection with the set print interval, referring to real time can be achieved by noting down the start time of the registration.

## 13.3 HEPA fresh air filter (option)

With this option, the introduced fresh air is cleaned by means of a high efficiency submicron particulate air filter type HEPA class H 14 (acc. to DIN EN 1822). Replace the filter insert, if necessary, by removing the metal cover of the filter at the left side of the unit (Art. No. 6014-0003).

### 13.4 Additional measuring channel for digital object temperature indicator with flexible temperature sensor Pt 100 (option)

The object temperature display enables the determination of the actual temperature of the specimen during the whole process. The object temperature is measured via a flexible Pt 100 temperature sensor and can be viewed at Display 2 of the RD3 controller.

The object temperature data are put out together with the data of the temperature controller to the RS 422 interface as a second measuring channel and can be documented by the communication software APT-COM<sup>®</sup> developed by BINDER (option, chap. 13.1).

The sensor top protective tube of the flexible Pt 100 can be immersed into liquid substances.

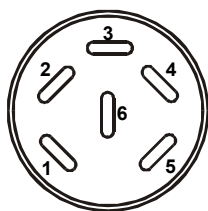
#### Technical data of the Pt 100 sensor:

- Three-wire technique
- Class B (DIN EN 60751)
- Temperature range up to 320°C
- Stainless steel protective tube 45 mm length, material no. 1.4501

### 13.5 Analog output for temperature (option)

With this option the chamber is equipped with an analog output 4-20 mA for temperature. This output can be used to transmit data to external data registration systems or devices.

The connection is carried out as a DIN socket at the back of the incubator as following:



#### ANALOG OUTPUT 4-20 mA DC

PIN 1: Temperature –

PIN 2: Temperature +

Temperature range: 0°C to 300°C

A suitable DIN plug is enclosed.

Figure 13: Pin configuration of the DIN socket

### 13.6 Zero-voltage relay outputs via operation lines (option)

Operation lines 1, 2 und 3 are used to switch any device connected to the zero-voltage relay outputs via a DIN socket at the rear of the incubator. The operation lines allow switching on and off the individual zero-voltage relay outputs through the program controller. They can be programmed in fixed value entry mode (chap. 7) as well as in the program editor (chap. 8.2) via the operation lines (switching state 0 = Off, switching state 1 = On).

Connection occurs via the DIN socket at the rear of the incubator:

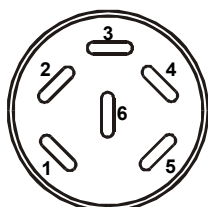
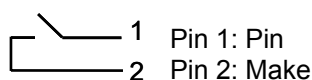


Figure 14: Pin configuration of the DIN socket

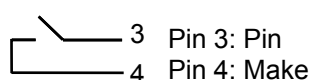
A suitable DIN plug is enclosed.

Operation line 1



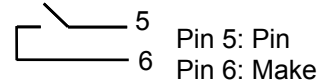
Switching state On: 1xx

Operation line 2



Switching state On: x1x



Operation line 3



Switching state On: xx1




**Maximum loading capacity of the switching contacts: 24V AC/DC – 2.5 A**

	 <b>DANGER</b>
	<p><b>Electrical hazard.</b></p> <p><b>Danger of life.</b></p> <p><b>Damage of switching contacts and connection socket.</b></p> <ul style="list-style-type: none"> <li>Ø Do NOT exceed the maximum switching load of 24V AC/DC – 2.5A.</li> <li>Ø Do NOT connect any devices with a higher loading capacity.</li> </ul>

### 13.7 Mostly gas-tight version (option for FP 53 and FP 115)

With this option the heating/drying oven is additionally sealed, so the loss when introducing gases is decreased. The unit is not completely gas-tight, so it is impossible to establish overpressure. The sealing diminishes the release of vapors via the housing that may be set free from the charging material when heated. Carrying-off via the regular evacuation duct, e.g. into a waste air installation, is likely to further reduce emissions.

	<p>The unit is not completely gas-tight. Gases from inside the heating/drying oven can escape into the surrounding atmosphere.</p> <p>Respect the maximum working place concentration of the released substance. Respect the relevant regulations.</p> <p>Any harmful gas that might escape has to be led out via good room ventilation or a suitable exhaust system. Place the unit, if necessary, below a gas vent.</p>
---	---



### 13.8 Inert gas connection (option for FP 53 and FP 115)


With this option, the heating/drying oven is equipped with two ports for inert gas (on top in the middle, and down at the right, both on the rear of the unit). Each of these ports can be used as inlet or outlet, depending on the nature of the inert gas (heavy gas: upper port as inlet, lighter gas: lower port as inlet).

Connect a flexible gas tube to the gas tube connection adapter (diameter 10mm) used for gas inlet, and secure it with hose clamps (not enclosed).

The unit is not gas-tight. Gases from inside the high performance temperature chamber can escape into the surrounding atmosphere.




Any gas that might escape has to be led out via good room ventilation or a suitable exhaust system

	 <b>WARNING</b>
	<p><b>High concentration of inert gas.</b></p> <p><b>Danger of poisoning.</b></p> <ul style="list-style-type: none"> <li>Ø Do NOT set up units in non-ventilated recesses</li> <li>➤ Ensure technical ventilation measures</li> <li>➤ Respect the relevant regulations for handling these gases.</li> </ul>


	<p>The “Mostly gas-tight version” (option for FP 53 and FP 115, chap. 13.7) reduces the loss of gas.</p>
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## 14. Maintenance, cleaning, and service

### 14.1 Maintenance intervals, service

 	 <b>DANGER</b>
	<p><b>Electrical hazard.</b></p> <p><b>Danger of life.</b></p> <ul style="list-style-type: none"> <li>➤ Put off-circuit the unit before conducting maintenance work. Pull the power plug.</li> <li>⊘ The unit must NOT become wet during operation or maintenance works.</li> <li>➤ Have all maintenance work conducted by professional electricians or experts authorized by BINDER.</li> </ul>

Have conducted regular maintenance work at least once a year.





	Change the door gasket in cold condition only. Otherwise the door gasket will be damaged.
---	---

We recommend entering a maintenance agreement. Please consult the BINDER service department.

BINDER telephone hotline:	+49 (0) 7462 2005 555
BINDER fax hotline:	+49 (0) 7462 2005 93555
BINDER e-mail hotline:	service@binder-world.com
BINDER service hotline USA:	+1 866 816 8191 (toll-free in the USA)
BINDER Asia Pacific:	+ 603 6204 2855
BINDER Internet homepage	<a href="http://www.binder-world.com">http://www.binder-world.com</a>
BINDER address	BINDER GmbH, post office box 102, D-78502 Tuttlingen

International customers, please contact your local BINDER distributor.

### 14.2 Cleaning and decontamination


  	 <b>DANGER</b>
	<p><b>Electrical hazard.</b></p> <p><b>Danger of life.</b></p> <ul style="list-style-type: none"> <li>⊘ Do NOT spill water or cleaning agents over the inner and outer surfaces.</li> <li>➤ Put off-circuit the chamber before cleaning. Pull the power plug.</li> <li>➤ Completely dry the appliance before switching it on again.</li> </ul>

#### Cleaning

Disconnect the chamber from the mains before cleaning. Pull the power plug!

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

Exterior surfaces inner chamber shelves door gaskets	Standard commercial cleaning detergents free from acid or Halogenide. Alcoholic solutions. We recommend using the neutral cleaning agent Art. No. 1002-0016.
Instrument panel	Standard commercial cleaning detergents free from acid or Halogenide. We recommend using the neutral cleaning agent Art. No. 1002-0016.

	<p>For surface protection, perform cleaning as fast as possible. After cleaning completely remove cleaning agents from the surfaces with a moistened towel.</p>
---	---

### Decontamination

Disconnect the chamber from the mains prior to decontamination. Pull the power plug.

You can use the following disinfectants:

Inner chamber	<p>Standard commercial surface disinfectants free from acid or Halogenide. Alcoholic solutions. We recommend using disinfectant Art. No. 1002-0022.</p>
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In case of impurity of the interior with biological or chemical hazardous goods, there are three possible procedures depending on the type of contamination and of the charging material.


(1) The heating/drying ovens FP can be hot air sterilized at 190°C for at least 30 minutes. All inflammable goods must be removed from the interior before.


(2) Spray the inner chamber with an appropriate disinfectant.

Before start-up, the unit must be absolute dry and ventilated, because explosive gases might form during the decontamination process.

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

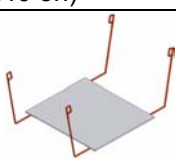
	<p>With every decontamination method, ensure adequate personal safety.</p>
---	--

	<b>CAUTION</b>
	<p><b>Danger of corrosion.</b> <b>Damage of the unit.</b> Ø Do NOT use acidic or chlorine cleaning detergents.</p>

	<p>We recommend using the neutral cleaning agent Art. No. Art. Nr. 1002-0016 for a thorough and mild cleaning.</p> <p>Any corrosive damage that might arise following use of other cleaning agents is excluded from liability by the BINDER GmbH.</p>
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## 15. Disposal

### 15.1 Disposal of the transport packing

Packing element	Material	Disposal
Straps to fix packing on pallet	Plastic	Plastic recycling
Wooden transport box (option) with metal screws	Non-wood (compressed matchwood, IPPC standard)	Wood recycling
	Metal	Metal recycling
Pallet (from size 115 on)	Solid wood (IPPC standard)	Wood recycling
Transport box with metal clamps	Cardboard	Paper recycling
	Metal	Metal recycling
Wooden sticks for stabilizing and for take out (from size 240 on)	Solid wood (IPPC standard)	Wood recycling
Foamed plastic stuffing (pallet, top cover)	PE foam	Plastic recycling
Top cover (from size 240 on)	Cardboard	Paper recycling
Take out assistance (sizes 240 and 400 only) 	Cardboard	Paper recycling
	Plastic	Plastic recycling
Edge protection	Styropor®	Plastic recycling
Protection of doors and racks	PE foam	Plastic recycling
Bag for operating manual	PE foil	Plastic recycling
Insulating air cushion foil (packing of optional accessories)	PE foil	Plastic recycling

If recycling is impossible, all packing parts can also be disposed of in the household waste.

### 15.2 Decommissioning

Switch off main switch (1). Disconnect the unit from the mains.



When switching off the main switch ON / OFF (1), the stored parameters remain saved.

- Temporal decommissioning: See indications for appropriate storage, chap. 4.3.
- Final decommissioning: Dispose of the unit as described in chap. 15.3.

### 15.3 Disposal of the unit



#### CAUTION

##### Alteration of the environment.

- For final decommissioning and disposal of the unit, please contact the BINDER service.
- Observe the regulations under public law for appropriate disposal protecting the environment.

The main board of the heating/drying oven includes a lithium cell. Please dispose of it according to the national regulations.

## 16. Technical description

### 16.1 Factory calibration and adjustment

This unit was calibrated and adjusted in factory. Calibration and adjustment were performed using standardized test instructions, according to the QM-system of DIN EN ISO 9001 applied by BINDER (certified since December 1996 by TÜV CERT under registration number 70 100 M 926). All test equipment used is subject to the administration of measurement and test equipment that is also constituent part of the BINDER QM-systems of DIN EN ISO 9001. They are controlled and calibrated in relation to a DKD-Standard on regular intervals.

Adjustment in factory in the center of the usable volume: 150°C.

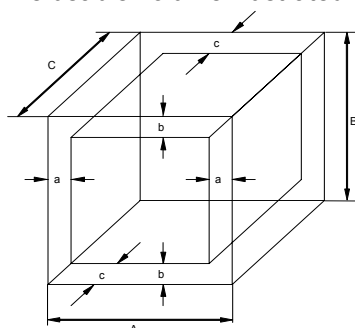
### 16.2 Over current protection

**Single-phase devices** are protected by one miniature fuse against over current, accessible from the outside. The miniature fuse is located at the rear of the chamber below the strain relief of the power cord. The fuse holder is equipped with a fuse clip 5mm x 20 mm. (CUL-Version 6,3x32 mm). The fuse may be replaced only with a substitute of the same ratings. Refer to the technical data of the respective device type.

**Three-phase devices** are equipped with internal fuses not accessible from outside. If these fuses are blown, please inform an electronic engineer or the BINDER service.

### 16.3 Definition of usable space

The usable volume illustrated below is calculated as follows:



A, B, C = internal dimensions (W, H, D)

a, b, c = wall separation

$$a = 0.1 \cdot A$$


$$b = 0.1 \cdot B$$

$$c = 0.1 \cdot C$$

$$V_{USE} = (A - 2 \cdot a) \cdot (B - 2 \cdot b) \cdot (C - 2 \cdot c)$$

Figure 15: Determination of the usable volume

The technical data refer to the so defined usable space.

	<p>Do NOT place samples outside this usable volume.</p> <p>Do NOT load this volume more than half to enable sufficient airflow inside the chamber.</p> <p>Do NOT divide the usable volume into separate parts with large area samples.</p> <p>Do NOT place samples too close to each other in order to allow circulation between them and thus obtain a homogenous distribution of temperature and humidity.</p>
---	--

## 16.4 Technical data

Unit size		53	115	240	400	720
<b>Exterior dimensions</b>						
Width	mm	634	834	1034	1234	1234
	inch	24.96	32.83	40.71	48.58	48.58
Height (incl. feet/roller)	mm	617	702	822	1022	1528
	inch	24.29	27.64	32.36	40.24	60.16
Depth	mm	575	645	745	765	865
	inch	22.64	25.39	29.33	30.12	34.06
incl. door handle, instrument panel, and exhaust duct	mm	105	105	105	105	105
	inch	4.13	4.13	4.13	4.13	4.13
Wall clearance rear	mm	100	100	100	100	100
	inch	3.94	3.94	3.94	3.94	3.94
Wall clearance side	mm	160	160	160	160	160
	inch	6.30	6.30	6.30	6.30	6.30
Exhaust duct, outer diameter	mm	52	52	52	52	52
	inch	2.05	2.05	2.05	2.05	2.05
Steam space volume	l	77	158	308	498	869
	cu.ft.	2.72	5.58	10.88	17.60	30.71
Number of door(s)		1	1	2	2	2
<b>Interior dimensions</b>						
Width	mm	400	600	800	1000	1000
	inch	15.75	23.62	31.50	39.37	39.37
Height	mm	400	480	600	800	1200
	inch	15.75	18.90	23.62	31.50	47.24
Depth	mm	330	400	500	500	600
	inch	12.99	15.75	19.69	19.69	23.62
Interior volume	l	53	115	240	400	720
	cu.ft.	1.9	4.1	8.6	14.3	25.7
Number of racks	regular / max.	2/5	2/6	2/7	2/10	2/16
Load per rack	Kg	15	20	30	35	45
	lbs	33	44	66	77	99
Permitted total load	Kg	40	50	70	90	120
	lbs	88	110	155	199	265
Weight (empty)	Kg	45	62	98	145	184
	lbs	99	137	216	320	406
<b>Temperature data</b>						
Temperature range, 5°C above ambient up to		°C	300	300	300	300
		°F	572	572	572	572
Temperature variation 1)	at 70°C	± °C	0.8	0.7	0.8	1
	at 150°C	± °C	2	1.8	2	2.5
	at 300°C	± °C	3.7	3.9	4.3	4.8
Temperature fluctuation		≤± °C	0.3	0.3	0.3	0.3
Heating up time 2)	to 70°C	Min	6	7	12	18
	to 150°C	Min	24	30	27	35
	to 250°C	Min	45	49	50	60
Recovery time after door was open for 30 sec 2)	at 70°C	Min	2	2	2	2
	at 150°C	Min	5	8	10	17
	at 300°C	Min	10	15	16	21
Air change	at 70°C	x/h	59	29	19	17
	at 150°C	x/h	64	32	20	18
	at 300°C	x/h	53	26	18	16

Unit size		53	115	240	400	720
Electrical data						
IP system of protection acc. to EN 60529		20	20	20	20	20
Nominal voltage ( $\pm 10\%$ ) 50/60 Hz	V	230 1N~	230 1N~	230 1N~	400 3N~	400 3N~
Nominal power	kW	1.2	1.6	2.7	3.4	5.0
Energy consumption	at 70°C	W	145	230	370	570
	at 150°C	W	300	544	850	1200
	at 300°C	W	720	1100	1400	2340
Unit fuse 5 x 20 mm 230V / 10A / middle-time-lag (M)	A	10 A external	10 A external	16 A external	--	--
Over-current release category B		--	--	--	3 x 16A internal	3 x 16A internal
Mains plug		shock proof plug			CEE plug 5 poles	
Installation category acc. to IEC 1010-1		II	II	II	II	II
Pollution degree acc. to IEC 1010-1		2	2	2	2	2

#### Electrical connection data FP-UL acc. to CUL standard (for USA and Canada):

Unit size		53-UL	115-UL	240-UL	400-UL	720-UL
Electrical data						
Nominal voltage ( $\pm 10\%$ ) 60 Hz	V	115 1N~	115 1N~	208 3N~	208 3N~	208 3N~
Nominal power	kW	1.20	1.60	2.70	3.40	5.00
Mains plug	NEMA	5-20P	5-20P	L21-20P	L21-20P	L21-20P
Unit fuse 6,3 x 32 mm / 250V / super-time-lag TT	A	external	external	3 x internal	3 x internal	3 x internal
Installation category acc. to IEC 1010-1		II	II	II	II	II
Pollution degree acc. to IEC 1010-1		2	2	2	2	2

**Legend:** 1) without outer glass door 2) up to 98 % of the set value

All technical data are specified for units with standard equipment at an ambient temperature of +25°C and a mains voltage fluctuation of  $\pm 10$ . The temperature data are determined in accordance to DIN 12880, part 2, respecting the recommended wall clearances of 10 % of the height, width and depth of the inner chamber. Technical data refer to 100% fan speed.

**All indications are average values, typical for units produced in series. We reserve the right to alter technical specifications at all times.**



If the cabinet is fully loaded, the specified heating up times may vary according to the load.

## 16.5 Equipment and Options



To operate the heating/drying oven, use only original BINDER accessories or accessories of third-party suppliers authorized by BINDER. The user is responsible for any risk when using unauthorized accessories.

Unit size	53	115	240	400	720
Regular equipment					
Multifunction program controller RD3 with digital display	●	●	●	●	●
Temperature safety controller class 2 acc. to DIN 12880	●	●	●	●	●
Communication and printer interface RS 422	●	●	●	●	●
Rear exhaust duct, internal diameter 50 mm / 1,97 inch with ventilation slide	●	●	●	●	●
Adjustable air change by means of rear exhaust duct (50 mm) with ventilation flap and front ventilation slide	●	●	●	●	●
Four castors (2 lockable)	--	--	--	--	●

Unit size	53	115	240	400	720
<b>Options / accessories</b>					
Access ports with various diameters, with silicone plug	○	○	○	○	○
Rack, chrome-plated or stainless steel	○	○	○	○	○
Perforated rack, stainless steel	○	○	○	○	○
Rack lockings (4 pieces)	○	○	○	○	○
Rubber pads for safe stacking (4 pieces)	○	○	○	--	--
Reinforced rack stainless steel, with 1 set shelf lockings	--	--	○	○	○
Reinforced inner chamber with 2 reinforced racks	--	--	○	○	○
Temperature safety device class 3.1 acc. to DIN 12880, part 1	○	○	○	○	○
Door with window and interior lightning	○	○	○	○	○
Lockable door	○	○	○	○	○
Viton door gasket (temperature resistant up to 200°C)	○	○	○	○	○
Fresh air filter, class EU 14	○	○	○	○	○
Measurement of air change rate acc. to ASTM 2436	○	○	○	○	○
Additional measuring channel for digital object temperature indicator with flexible temperature sensor Pt 100	○	○	○	○	○
Construction almost gas-tight	○	○	--	--	--
Inertgas connection (gas inlet and outlet)	○	○	--	--	--
Increased air change by stronger fan	○	○	○	○	○
Analog output 4-20 mA for temperature with 6 pole DIN socket, DIN plug included	○	○	○	○	○
Zero-voltage relay outputs via DIN socket 6 poles	○	○	○	○	○
Serial printer with interface, for numerical and graphical temperature registration	○	○	○	○	○
2-channel pen recorder, external	○	○	○	○	○
Unit acc. to CUL standard in 115V 1N~60Hz	○	○	--	--	--
Unit acc. to CUL standard in 208 V 3N~60Hz	--	--	○	○	○
Factory calibration certificate	○	○	○	○	○
Extension to factory calibration certificate (additional value)	○	○	○	○	○
Measuring protocol acc. to DIN 12880, Part 2	○	○	○	○	○
Qualification folder	○	○	○	○	○
Evaporating dish with rim, small or large	○	○	○	○	○
Instrument tray with lid, small or large	○	○	○	○	○
Neutral cleaning agent (liquid concentrate)	○	○	○	○	○
Stable table on wheels with castors and locking brakes	○	○	○	○	--

**Legend:**

● Standard equipment      ○ Optional      -- Not available



## 16.6 Spare parts



The BINDER GmbH is responsible for safety-related unit properties only if skilled electricians or qualified personnel authorized by BINDER perform all maintenance and repair, and if components with relating to chamber safety are replaced in case of failure with original spare parts. The user is responsible for any risk when using unauthorized accessories.

### Accessories and spare parts:

Unit size	53	115	240	400	720
Description	Art. No.				
Rack, chrome-plated	6004-0002	6004-0003	6004-0004	6004-0005	6004-0006
Rack, stainless steel	6004-0007	6004-0008	6004-0009	6004-0011	6004-0010
Perforated rack, stainless steel	6004-0029	6004-0030	6004-0031	6004-0032	6004-0033
Door gasket silicone	6005-0095	6005-0096	6005-0097	6005-0069	6005-0099
Door gasket made of Viton (temperature resistant up to 200°C)	8012-0494	8012-0495	8012-0496	8012-0497	8012-0498
Stable table on wheels with castors and locking brakes	9051-0018	9051-0018	9051-0019	9051-0019	--
Rubber pads for safe stacking (4 pieces)	8012-0001	8012-0001	8012-0001	--	--
Unit fuse 5x20mm / 250V / 10Amp semi time lag (M)	5006-0012	5006-0012	--	--	--
Unit fuse 5x20mm / 250V / 16Amp semi time lag (M)	--	--	5006-0013	--	--
Over-current release category B 16 A	--	--	--	5006-0042	5006-0042
Controller RD3	5014-0081				
Thermostat class 2 30° to 320°C	5006-0031				
Turning knob for thermostat class 2	8009-0004				
Pilot lamp red	5008-0003				
Temperature sensor Pt 100 bend-off	5002-0022				
Rack lockings (4 pieces)	8012-0531				
Protocol printer	8012-0418				
2-channel pen recorder, external	8012-0152				
Fresh air filter, class EU 14	8012-0076				
Measurement of air change rate acc. to ASTM 2436	8012-0195				
Calibration certificate	8012-0030				
Extension for calibration certificate (additional value)	8012-0022				
Measuring protocol acc. to DIN 12880, Part 2	8012-0156				
Qualification folder	8012-0422				
Instrument tray with lid, small	4022-0123				
Instrument tray with lid, large	4022-0124				
Evaporating dish, small	4022-0125				
Evaporating dish, large	4022-0126				
Neutral cleaning agent, 1 kg	1002-0016				

## 17. Contamination clearance certificate

### Unbedenklichkeitsbescheinigung

#### Declaration of harmlessness with regard to safety and health

Erklärung zur Sicherheit and gesundheitlichen Unbedenklichkeit

The German Ordinance on Hazardous Substances (GefStoffV), and the regulations regarding safety at the workplace, require that this form be filled out for all products that are returned to us, so that the safety and health of our employees can be warranted. In the absence of a completely filled out form, a repair is not possible.

Die Sicherheit und Gesundheit unserer Mitarbeiter, die Gefahrstoffverordnung GefStoffV 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 completely filled out form should be transmitted by Fax (+49 (0) 7462 2005 93555) or by letter in advance to us, so that this information is available before the equipment/component part arrives. A second copy of this form should accompany the equipment/component part. Eventually the carrier should be informed.  
Eine vollständig ausgefüllte Kopie dieses Formblattes soll per Telefax (Nr. +49 (0) 7462 2005 93555) oder Brief vorab an uns gesandt werden, so dass die Information vorliegt, bevor das Gerät/Bauteil eintrifft. Eine weitere Kopie soll dem Gerät/Bauteil beigefügt sein. Ggf. ist auch die Spedition zu informieren.
- Incomplete information or non-conformity with this procedure will inevitably lead to substantial delays in processing. We hope you will have understanding for this measure, which lies outside of our area of influence, and that you will help us to speed up this procedure.  
Unvollständige Angaben oder Nichteinhalten dieses Ablaufs führen zwangsläufig zu beträchtlichen Verzögerungen in der Abwicklung. Bitte haben Sie Verständnis für Maßnahmen, die außerhalb unserer Einflussmöglichkeiten liegen und helfen Sie mit, den Ablauf beschleunigen.
- **Please fill out this form completely.**  
Bitte unbedingt vollständig ausfüllen!

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

<b>3.3</b>	<b>Measures to be taken in case of skin contact or release into the atmosphere / Maßnahmen bei Personenkontakt oder Freisetzung:</b> a) _____ b) _____ c) _____ d) _____
<b>3.4</b>	<b>Other important information that must be taken into account / Weitere zu beachtende und wichtige Informationen:</b> a) _____ b) _____ c) _____
<b>4.</b>	<b>Declaration on the risk of these substances (please checkmark the applicable items) / Erklärung zur Gefährlichkeit der Stoffe (bitte Zutreffendes ankreuzen) :</b> <input type="checkbox"/> <b>4.1 For non toxic, non radioactive, biologically harmless materials / für nicht giftige, nicht radioaktive, biologisch ungefährliche Stoffe:</b> <b>We herewith guarantee that the above-mentioned unit / component part... / Wir versichern, dass o.g. Gerät/Bauteil...</b> <input type="checkbox"/> Has not been exposed to or contains any toxic or otherwise hazardous substances / weder giftige noch sonstige gefährliche Stoffe enthält oder solche anhaften. <input type="checkbox"/> That eventually generated reaction products are non-toxic and also do not represent a hazard / auch evtl. entstandene Reaktionsprodukte weder giftig sind noch sonst eine Gefährdung darstellen. <input type="checkbox"/> Eventual residues of hazardous substances have been removed / evtl. Rückstände von Gefahrstoffen entfernt wurden. <input type="checkbox"/> <b>4.2 For toxic, radioactive, biologically harmful or hazardous substances, or any other hazardous materials / für giftige, radioaktive, biologisch bedenkliche bzw. gefährliche Stoffe oder anderweitig gefährliche Stoffe.</b> <b>We herewith guarantee that ... / Wir versichern, dass ...</b> <input type="checkbox"/> The hazardous substances, which have come into contact with the above-mentioned equipment/component part, have been completely listed under item 3.1 and that all information in this regard is complete / die gefährlichen Stoffe, die mit dem o.g. Gerät/Bauteil in Kontakt kamen, in 3.1 aufgelistet sind und alle Angaben vollständig sind. <input type="checkbox"/> That the unit /component part has not been in contact with radioactivity / das Gerät/Bauteil nicht mit Radioaktivität in Berührung kam
<b>5.</b>	<b>Kind of transport / transporter / Transportweg/Spediteur:</b> Transport by (means and name of transport company, etc.) Versendung durch (Name Spediteur o.ä.) _____ _____ Date of dispatch to BINDER GmbH / Tag der Absendung an BINDER GmbH: _____

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

- ☐ Hazardous substances were removed from the unit / component part, so that no hazard exists for corresponding persons in the handling or repair of these items / das Gerät/Bauteil wurde von Gefahrstoffen befreit, so dass bei Handhabung/Reparaturen für die betreffenden Person keinerlei Gefährdung besteht
- ☐ The unit was securely packaged and properly identified / das Gerät wurde sicher verpackt und vollständig gekennzeichnet.
- ☐ Information about the hazardousness of the shipment (if required) has been provided to the transporter / der Spediteur wurde (falls vorgeschrieben) über die Gefährlichkeit der Sendung informiert.

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

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

Name: \_\_\_\_\_

Position: \_\_\_\_\_

Date / Datum: \_\_\_\_\_

Signature / Unterschrift: \_\_\_\_\_

Company stamp / Firmenstempel:



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

