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Operating and Maintenance Instructions for Jacobsen Germination Table Type 5000 - 5300

Version E/50-53/02-2001

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1 General

1.1 General View

Exhaust Air

Water Supply Connections

Control Panel

Mains Plug

Door Lock Control Box

1   2

1.2 Nameplate

The nameplate is located at the right side above the water supply connections. In case of failures or for spare-part orders, please indicate the unit type (1) and the serial no. (2).

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Mergenthalerstraße 8, D-30880 Laatzen, Germany

| Typ Type | | Nr. No. | | Baujahr Model | |

| | kW | | Volt | | A | | Hz |

| Kältemittel Refrigerant | | Füllgewicht Filling Weight | | kg | Zul. Betriebsüberdruck Admissible working overpressure | | bar |

Vor Reparaturen am Apparat diesen vom Stromnetz trennen
Prior to repairs disconnect unit from mains
Made in Europe

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1.3 General

RUMED Jacobsen germinators are offering optimum conditions for seed germination tests. A defined quantity of seed will be deposited on circular filter papers which will be arranged above a temperature-conditioned water basin. Below the circular filter, a germination spiral is provided into which a wick will be hung. A constant moistening of the filter paper is achieved by a wick being led through a slot between the covering plates and reaching into the temperature-conditioned water below. Optimum climatic conditions and reduction of the evaporation rate is effected by a plastic cover dome covering the circular filter with the seed.
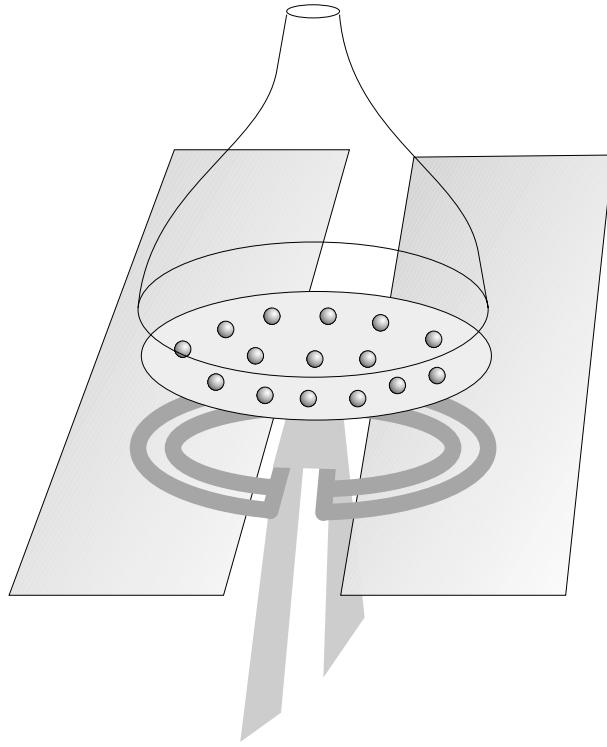
The germination rate can be defined by counting the germs and by comparison with the number of seeds. Jakobsen germinators can be delivered with and without automatic day/night temperature alternation and in two unit sizes, each. The standard germinators with day/night temperature alternation are equipped with an electronic temperature programme controller, as well as with CFC-free refrigerating units.

Experiences of almost 50 years are standing for a low-maintenance construction ensuring longevity of the unit.

1.4 Exterior Dimensions and Weight

Model	Germ Cover Domes	Cooling	Exterior Dimensions [mm]			Weight [kg]	
			Height	Width	Depth	Shipping Weight	Operating Weight
5000	120	not included	880	1155	900	95	170
5100	120	included	880	1155	900	115	190
5200	180	not included	880	1645	900	125	240
5300	180	included	880	1645	900	150	265

2 Transportation, Storage and Installation

2.1 Transportation

The standard domestic shipment of the unit will be effected unpacked in a van. The unit should be transported carefully in standing position. In case a short-time tilting of the unit should be unavoidable, for reasons of f. ex. passing doors, it might be possible that oil of the cooling machine will enter into the evaporator. This oil must flow back to the cooling machine. For this reason take care that after transportations the unit should not be started before expiration of 4 hours. The unit is recommended to be stored in dry rooms at temperatures between +10°C and +30°C. The shipment within European countries is mostly effected in stable cartons on a palette. Seaworthy and air-freight cases are generally conserved for 12 months and the units are welded in an aluminium wrapping. Condensation due to passing of different climatic zones is avoided by drying agent bags which are to be removed prior to initial starting of the machine.
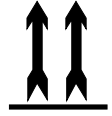
Accessories, as Operating Instructions, paper substrate, paper wicks, cover domes, germination spirals and water drain hose, as well as the water connecting hose are located in the water tub.

2.2 Installation

Do not cover the ventilation slots; even a partial covering of the slots may lead to a heat accumulation. Uncovered ventilation slots are very important for a faultless operation of the cooling machine!

The ventilation grids being located in front of the air inlet and exhaust openings are mounted for optical reasons and are protecting the units being located behind from mechanical damage. Do not insert any filter mats, since this will cause insufficient ventilation of the units which might result in damage!

Installation of the unit in level position is indispensable! The floor of the installation place must be even and horizontal. Slight unevennesses can be balanced by the adjustable foots of the unit.

Before opening the control box for maintenance purposes by means of the delivered key for the switch cabinet, make sure that the mains plug is disconnected!

Remove the white blocking device of the key (transport safety device) prior to initial opening. The key cannot be withdrawn while the door is opened.
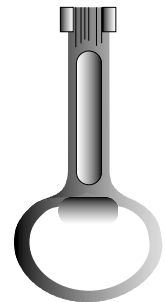
2.3 Power Supply

Current (A.C.) and voltage at the installation place must coincide with the indications on the name-plate of the unit. The nameplate is located at the right side above the water supply connections.

Connection is to be made to a duly earthed socket (a separately secured socket is recommended).

A two-pole residual current operated device with a response time of 10 milliseconds is mounted for the personnel's safety. All the units are equiped with combined universal plugs according to the German or French standard. British, Swiss or other Standards upon request.

2.4 Connection of Water Supply

2.4.1 Fresh Water

Connect the germination basin tightly to a $^3/_4$" tap water cock by means of the furnished water hose. Strictly observe the regulations for gas and water installation DVGW!

When using the germination basin, the tap cock must be opened, since evaporation losses will be automatically balanced through the opto-electronic level measuring by means of a solenoid valve.

The fresh water supply is effected by an U-shaped pipe at the right side of the germination table. Do not extend the pipe with a hose or similar material, since - in case of failure - water might be sucked from the germination basin and led to the public drinking water supply. An adjustable throttle in the water intake retards the water flow and keeps it almost depressurized. This is particularly important during the automatic filling for the balancing of the evaporation losses.

The different water pressure conditions of each installation place might require corresponding adjustment of the throttle.

2.4.2 Waste Water

Lead the waste water connection which is also used as safety overflow depressurized to a water outlet pipe with a minimum size of 3/4". The customer's waste water connection must be equiped with a stink trap. Check the proper functioning of the safety overflow after installation. For this purpose, the relay in the control box which is marked with K1 is to be actuated manually. Observe, that only skilled personnel should perform the check. Upon the start of the overflowing, the water level should not raise (draining of water, see chapter 9.1). If the water level is raising due to high line pressure, readjust the throttle in the water intake being located in the control box at the right top side directly behind the solenoid valve. Prior to adjustment, unscrew the cover with a fork wrench (size 17 mm). After that, adjust the throttle with a screw driver until the water intake is reduced to an amount which can be discharged by the safety overflow (Turning clockwise reduces the water intake, turning anticlockwise increases the water intake). The throttle is factory-adjusted to: 1 ½ rotations opened (close totally in clockwise direction and then open 1 ½ rotations anticlockwise). When the throttle had been adjusted, replace the cover and screw it down.

2.4.3 Water Circuit

The water flows through the germination basin from the left to the right side and reaches the circulation pump through the floor drain and a filter. Having passed the heating element with integrated overtemperature protection and the cooler, the additionally temperature-conditioned water reenters the basin through nozzles at the left side. The temperature sensor is located between the filter and the circulation pump.

The safety overflow (stand pipe) is installed in the basin at the right front side. It should never be closed and periodically checked by the customer (see waste water).

3 Commissioning

3.1 General

For commissioning of the unit, the covering plates are to be removed (the short sides of the edge plates being some smaller are tangent-bent to facilitate the removal of the first plate). Remove the accessories from the water basin. Clean the water basin using a damp cloth prior to initial filling. Remove the protective cap of the level measuring probe in the left lateral wall of the water basin, since otherwise the level measuring probe will not be able to switch-off the water intake (the protective cap is only a transport safety device).

> ***Do not deposit any metallic objects on or into the unit for reasons of extraneous rust formation which might affect the stainless steel surface of the unit!***

Replace the covering plates prior to filling the basin to avoid any disturbance of the level measuring system due to action of secondary light sources. The heating capacity will be controlled continuously and contactlessly by a solid state relay. Upon request of cooling capacity, the refrigerating unit starts running, and the solenoid valve cooling will be opened. If there will be momentarily no demand for cooling capacity, the solenoid valve cooling will be closed, and the bypass valve in the cooling circuit will be opened. If the temperature controller did not request cooling for more than 10 minutes, the refrigerating unit will be switched-off again.

When filling of the water basin is completed, the germinator can be charged. Hang a paper wick into the germination spiral and position the germination spiral on the covering plates of the germinator in such a way, that the paper wick will be led through the slot between the covering plates and that it will reach into the water below. Place a sheet of paper substrate on the germination spiral.

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Wrong!

In this position, the germination spiral will be jammed in the cover dome!
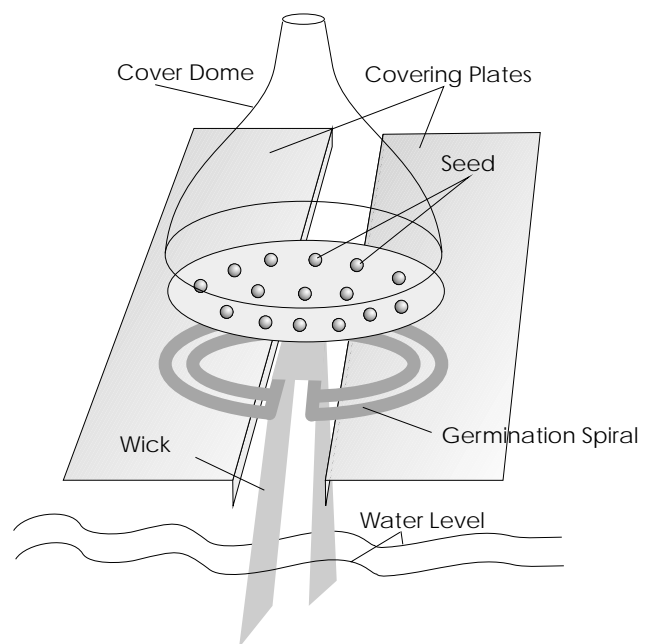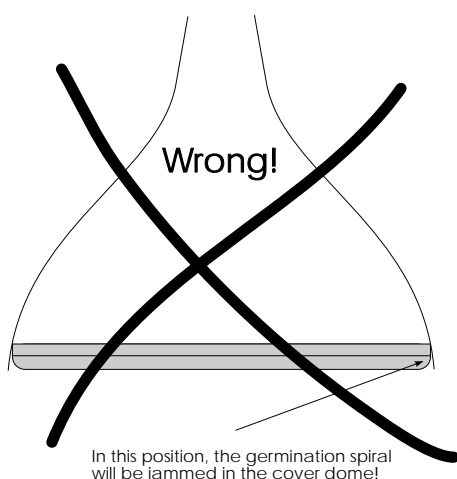
The moisture in the paper wick will be transferred to the paper substrate. Now, the seed can be placed on the moistened and temperature-conditioned paper substrate using a vacuum counter or a by hand using tweezers. Avoid any contact of the deposited seed, since healthy seed might be infected by diseased seed, which might have an influence on the result of the germination test. According to the ISTA-regulations, 400 seed grains per test must be germinated. The paper substrate being charged with the seed will be covered by a dome with an aperture for ventilation to reduce the evaporation rate and to keep the climatic conditions as constant as possible.

Right!

Rounded edge of the germination spiral to the top!
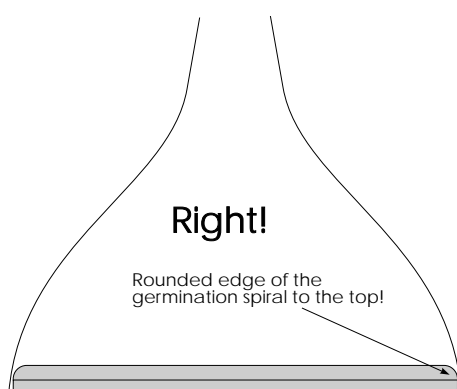
When placing the cover domes on the germination spirals, observe the exact orientation of the germination spirals. The rounded edge of the germination spirals must be directed to the top to avoid, that the cover domes might get jammed on the germination spiral. Separation of the cover domes from the germination spiral is very difficult! For dark germination, the cover dome is recommended to be lacquered in black.

3.2 Specimen Sensor

The temperature in the paper substrate can be detected by means of the specimen sensor. The measurement of temperature is effected as true to reality as possible. The sensor measures the temperature directly at the bottom side of the paper substrate, so that the upper side of the paper substrate can be charged as usual. Further, a measurement of temperature under real conditions is ensured. The specimen sensor can be integrated into an optional temperature or peripherals control software.

3.3 Insertion of the Specimen Sensor

- Insert the paper wick from below and lead it around the specimen sensor
- Insert the specimen sensor including paper wick carefully into the center part of the double germination spiral
- Draw both sides of the paper wick to below
- Place the paper substrate on it and charge the seed as usual

Attention:

The wicks and the paper substrate should consist of wet-strength paper! Otherwise, there is the risk, that the paper might dissolve and clog the filter or the pump.

3.4 Initial Fill and Refill

The unit is equipped with an automatic level control.

A normal refill cycle (replacement of the evaporated water) should be shorter than 5 min. Longer refill times might be caused by a partially opened drain valve..

When starting the germinator, the water level in the basin will be checked.

Should the water level be too low, the prompt: "Initial filling?" will be displayed.

Acknowledgement of the prompt will release the initial fill time. After that, the unit attempts to reach the correct water level for 60 min. If the message after the start is acknowledged with No or if it is not acknowledged, only a normal refill cycle (5 min) is available. If the required level will not be reached within the admissible refill time, the water supply will be disconnected for reasons of safety.

The message "Refill Time" will be logged in the alarm memory.

Adapt the parameters "Refill Time" and "Initial Fill Time" to the local conditions (low water pressure), if required.

4 Start-up

4.1 General

... The unit can be switched on and off by means of the softkey ON/OFF ⬚ .

Since the connection and disconnection is effected by a software switch, the mains plug is always to be withdrawn in case of maintenance tasks to ensure that the unit is completely disconnected from the mains.
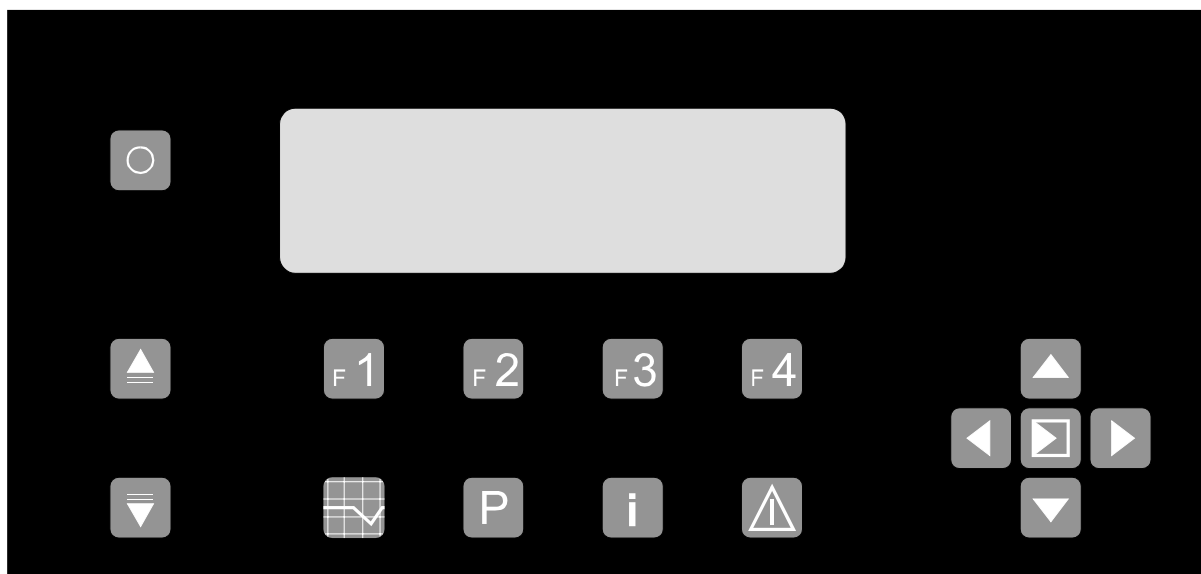
When the unit is reconnected to mains (insertion of the plug into the socket), the display of the controller will be lighting for some seconds, and the controller will be returned to that operating mode which had been active prior to disconnection from mains (withdrawal of the mains plug).
Connection and disconnection can only be effected on entry of the password of operating level 1.

After the first start-up (cold unit), the display might appear to be not uniform and poor in contrast. This effect will, however, disappear, as soon as the working temperature of the display is reached.

If required, the contrast can be adjusted in the actual value screen using the keys ⬚ ⬚ .

4.2 The Operating Panel

4.3 The Keys and Their Functions

The General Keys ...	
○	Softkey On/Off Special function: Abortion at password entry
▷|	Enter key in the centre of the cursor key set
◁	Cursor to the left
▲	Cursor up
▼	Cursor down
▷	Cursor to the right
▲ ▼	In case of a screen with several pages, these keys are used to scroll (Page up, Page down)
F1 ... F4	The functions of the control keys are indicated by the lower screen footer (partly changing meaning)
The Hotkeys ...	
	Upon a keystroke, the "actual" actual value screen will appear. When the actual value screen is displayed, a change between "actual value screen with symbols" and "actual value screen with details" will be effected.
P	Changes to the programme menu (create, edit, invoke programmes etc.)
i	Display of the e nameplate with serial No. etc.
⚠	Changes to the alarm memory. In case of a horn sound, the first keystroke will stop the horn signal; the second keystroke changes to the alarm memory....

4.4 General Operation

Data input is facilitated by means of plain text menus with selection by luminous bars. The function of the control keys F1 ... F4 may vary and is indicated in the foot row of the screen. Use the cursor keys to move the luminous bar or the cursor to the desired menu item. Use the key ▷| to acknowledge the selection. The selected menu item will be executed. If a numerical value is selected for modification, the cursor will be flashing in the digit to be changed. The value can be changed by means of the keys ▲ ▼. Holding the key longer will change the value quickly (scrolling by increments with carry over). Repeated pressing will change the value slowly (also with carry over).

Selection of the digit to be changed is effected using the keys ◁ ▷ .

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Editing is to be finished by pressing the key ▶. Use the key F4 to abort the present input. The old value will appear again. Observe that the abort function is only concerning the present field. When having left a field using the key ▶, the values are stored!

Attention: If the programme control is active, the setpoints for single setpoint control cannot be changed during programme flow, since they are part of the programme. The reason is, that all profiles being not occupied are using the setpoint for single setpoint control during programme execution.

4.5 Passwords

4.5.1 General

Any essential entry at the controller is protected by entry of a password. The mere display of data and scrolling through the screen pages can be effected without entry of a password.

4.5.2 Password Entry

All passwords have 4 digits. On delivery of the unit, default values have been assigned to the passwords.
The default values of the passwords can be drawn from the following table:

Configuration Level	RUMED	****
Service Level	Service	****
Operating Level 2	Customer / Technician or Experienced User	2000
Operating Level 1	Customer	1000

4.5.3 The "Hidden Ten-key Keyboard"

Entry of the password is effected by a "hidden ten-key keyboard".

▲		F 1	F 2	F 3	F 4
0		1	2	3	4
▼		📉	P	i	⚠
5		6	7	8	9

The numerals are to be entered using that "hidden ten-key keyboard", and they are to be acknowledged using the key [▶] . It is not required to enter zero values behind the decimal point, since they will be added automatically. This means, the entry of 2000 can be effected by means of the following keystrokes, [F2] [▲] [▲] [▲] [▶] as well as in short-form by the following keystrokes [F2] [▶].

4.5.4 Abort of the Password Entry

... in case of an erroneous entry is either effected by actuation of the key [○] or after 30 seconds without any entry and flashing cursor.

4.5.5 Validity of The Password

... Once having entered the password, the corresponding access levels are released (i. e. no further request to enter a password) until there has been no keystroke for approx. 2 minutes, or until an entry requires the next higher level. A higher level releases automatically the lower levels.

4.5.6 How to change a Password

... The passwords can be changed using the menu items **Parameters -> Passwords**. Modification of a password requires knowledge of the old password.

The new password is to be acknowledged using the key [▶] .

Since the password is still released after the modification, press the key [▶] for a second acknowledgement and for a check of the new password and press the key [▶] once more to acknowledge again. Should a password be forgotten, it can be released by the next higher password level. If the next higher password level is unknown, consult the after-sales-service...

4.5.7 How to "Delete" a Password

... Should you desire to gain access to a level without entry of a password (accelerated operation), use the menu items **Parameters -> Passwords** and change the password to "0000". From this moment, all further entries for that level can be effected without any request to enter a password.

4.6 The Hotkey "INFO" [i]

4.6.1 The e-Nameplate of the Unit

During operation of the unit, the electronic nameplate can be called by pressing the key [i].

The nameplate gives information about the detailed type of the unit, its denomination, the serial number of the unit and of the control, the software version of the control, the temperature range and, if applicable, the humidity range of the unit..

```
RUMED® Type 5100
Jacobsen Keimapparat
SN# : 0815/4711      (6194000/80/99999)
Softwareversion   : 05.17
Temperaturbereich :      5°C  -   40°C

Uhrzeit    Service    English    Zurück
```
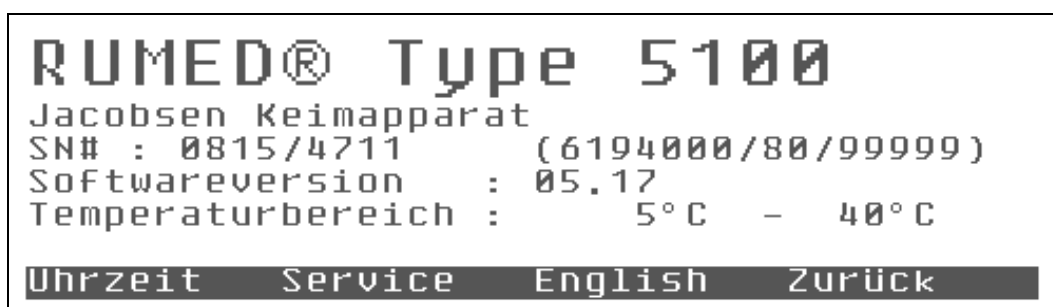
4.6.2 Multilingual Operation of the Unit ...

The key [F3] is used to change between the two languages being loaded. The standard combination is German/English.

(Other operating languages are being prepared. Please contact us....)

```
RUMED® Type 5100
Jacobsen Germination Table
SN# : 0815/4711      (6194000/80/99999)
Softwareversion   : 05.17
Temperature-Range :      5°C  -   40°C

Time       Service    Deutsch    Back
```
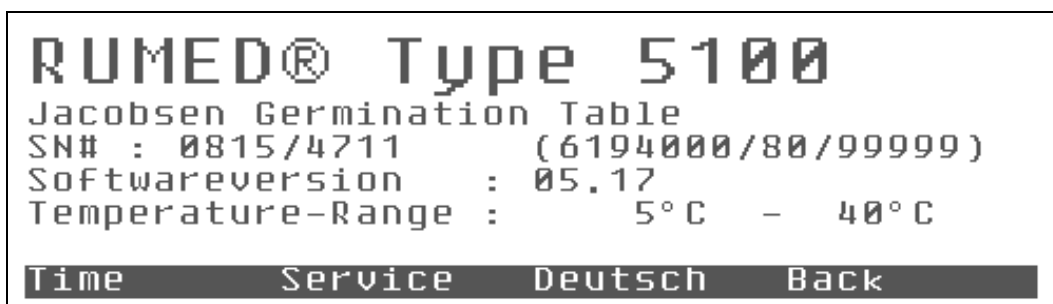
4.6.3 In the Area Service ...

... the working hour meters of the unit can be found

There are up to 4 working hour meters:

Climatic Test Cabinet, Refrigerating Machine, Lighting, Humidification

```
Elapsed time
Incubator                    0 h
Service Incubator in        16 h
Chiller                      0 h
Maintenance-Free
Light                        0 h
Service    Test              Back
```

The feature "maintenance-free" below the respective working hour meter does not mean, that the corresponding unit is really maintenance-free, but only no service interval had been defined. (Please contact your service partner...)

4.6.4 Test in the Area Service ...

... is a menu item being meant for the service personnel. It includes functions for specific tests of the individual contactors, valves, relays and other units, if there should really be a problem, once.... Use the key [F 4] to return.

4.7 Time

4.7.1 General

... The real-time clock is equipped with a power reserve of approx. 5 - 7 days. Usually, the units should arrive at the customer with a clock being adjusted correctly. Should the transport have taken more time than usually or should the unit have been disconnected from mains for an extended period ...

4.7.2 If the Time is to be Set ...

If the clock is to be **set** actually, use the keys [◄] [►] to move to the values to be corrected and set the correct values using the keys [▼] [▲] . The clock will be stopped as soon as the adjustment procedure is started. The digits of the seconds are stopped ... the minutes and seconds are to be set to the next full or half minute and ....

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```
Clock Settings
     08.06.2000 Thu 07:26:26



Set        + 1 h     - 1 h      Back
```

... the key `F 1` is to be pressed for **"setting"** right at the correct moment. The seconds will be **"starting to count"** and the synchronization of clock is finished.

```
Clock Settings
     08.06.2000 Thu 08:35:00




Set                            Back
```

Attention: using `F 4` without having pressed the `F 1` key first will result in "No Synchronisation"

.... Return using the key `F 4` .

4.7.3 Summertime/Wintertime ...

.... The clock can be easily changed from summertime to wintertime and vice-versa. Use the keys `F 2` and `F 3` to set the time by +1 h and -1h. While the time is being increased or reduced by 1 hour, the clock continues running. so in this case you do not have to use the `F 1` key for **"setting"** because the clock was not stopped.

```
Clock Settings
     08.06.2000 Thu 08:35:04



Set        + 1 h     - 1 h      Back
```

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4.8 Single Setpoint Control

4.8.1 Setpoints

When being in the actual value screen, the setpoints for the single setpoint control will be displayed on pressing the key ▣1 for **"Setpoints".**

A menu with illuminated bars offers the control variables, which can be selected for the corresponding unit.

Use the keys ▲ ▼ to move the illuminated bar to the setpoint to be modified and select it by pressing the key ▣ .

The cursor will be flashing. Use the keys ◀ ▶ to move the cursor to the value to be modified, and use the keys ▲ ▼ to increase or reduce the value.

The new value will be saved by acknowledgement with the key ▣ .

When editing the value, the function ESC is assigned to the key ▣4 , i. e. when pressing the key ▣4 , the old value will appear again. That abort function is only possible during an active entry.

4.8.2 Setpoint ranges

The ranges being admissible for a modification of setpoints are preset by the parameters being specific for each unit.

4.8.3 Take-over of the Values

The values will be taken over by pressing the key ▣4 when leaving the setpoint menu. The new setpoints will then be approached with the ramps being entered in the setpoint menu. If there are parameters to which no ramp can be assigned, they will be taken over with a setpoint jump.

Attention: If the programme control is active, the setpoints for single setpoint control cannot be changed during programme flow, since they are part of the programme. The reason is, that all profiles being not occupied are using the setpoint for single setpoint control during programme execution.

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4.9 Programme

4.9.1 General

Press the hotkey [P] to call the menu **"Programme"**.

```
Programme
Programme 1          +
Programme 2          +     Active
Programme 3          −
Programme 4          −
          Stop                Back
```
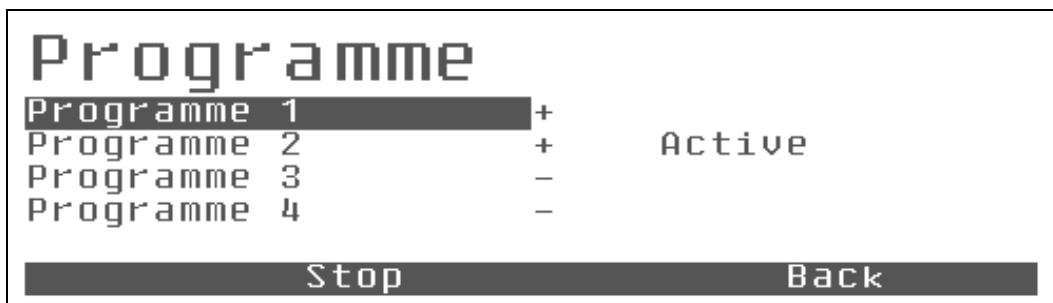
In case of a programme control, 1 to 4 programmes are at choice, depending on the execution. In case of units with single setpoint control with lighting only 1 programme with 1 lighting profile is available. In the overview, programmes being already occupied are marked with **+,** programmes being not occupied are marked with **-**. Programmes being just active are displayed with the word **"active"** (see above).

Active programmes can neither be deleted nor modified. Modification of an active programme is not possible before the programme is terminated.

4.9.2 How to Select a Programme

```
Programme
Programme 1          +
Programme 2          +     Active
Programme 3          −
Programme 4          −
          Stop                Back
```
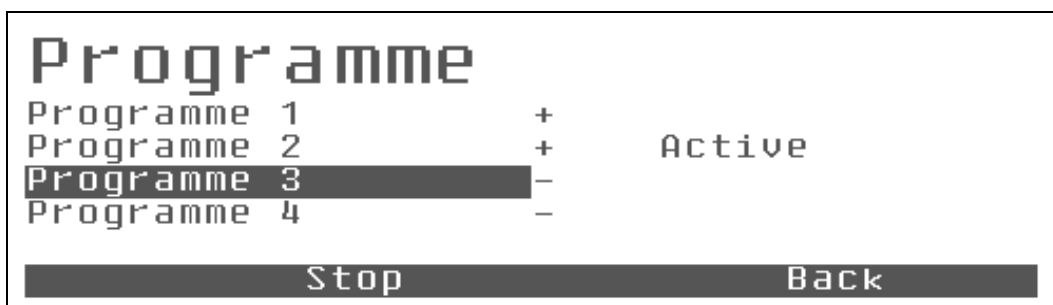
Use the cursor keys [▲] [▼] to move to the desired programme and press the key [▷] to confirm the selection. The next submenu is used to select the programme type. The programmes, day programme, week programme, real-time programme and process time programme are available.

```
Programme 3
Type                 Daily-Cycle


Profile                      Back
```
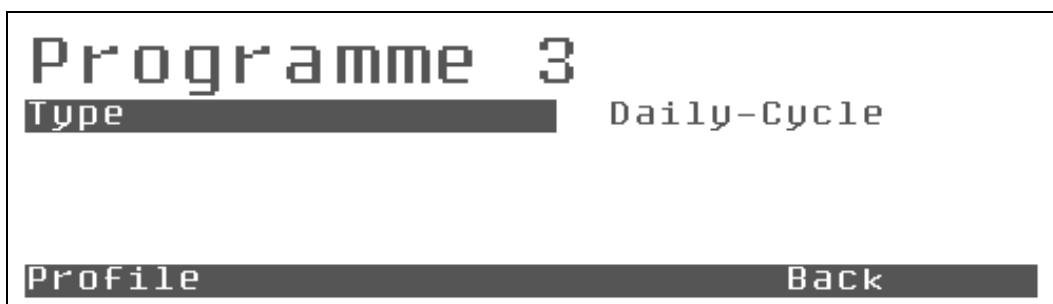
The type of an occupied programme cannot be modified. Any modification results in a deletion of the programme

(Request for acknowledgement: Delete profiles?)

The key ⌐F 1⌐ is used to call the menu **Profiles**.

```
Profile    Programme 3
Temp. Profile        –
Humidity Profile     –
Light Profile        –
Fan Profile          –
Contact-Profile      –
Copy      Insert     Preview    Back
```
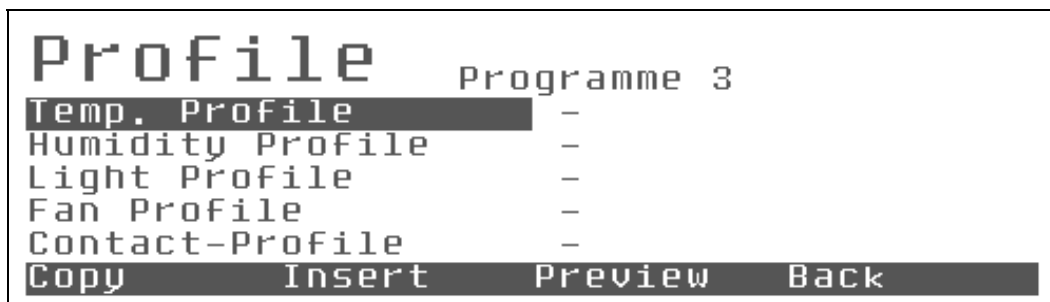
Each programme consists of several profiles (temperature profile, humidity profile etc.)

Occupied profiles are marked with **+,** and empty profiles are marked with **-**.

Use the cursor keys ▲ ▼ to move to the desired profile and press the key ▶ to confirm the selection.

Note: If your cabinet has single setpoint control there is only a "light profile"

Attention: there will be alway a "Light Profile"


```
Programme 3
Temp. Profile
No.   Day   Time   Setpoint
 1          End

Insert     Delete     Shift     Back
```
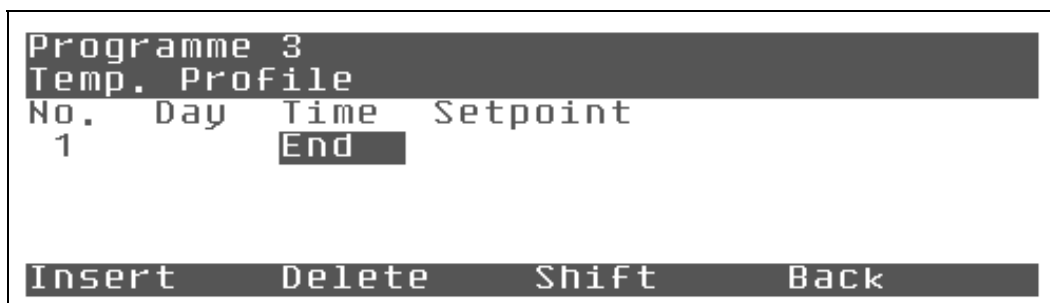
The key ▶ is to be pressed to insert a new programme step.


```
Programme 3
Temp. Profile
No.   Day   Time   Setpoint
 1     1    00:00      0 °C
 2          End

Insert     Delete     Shift     Back
```
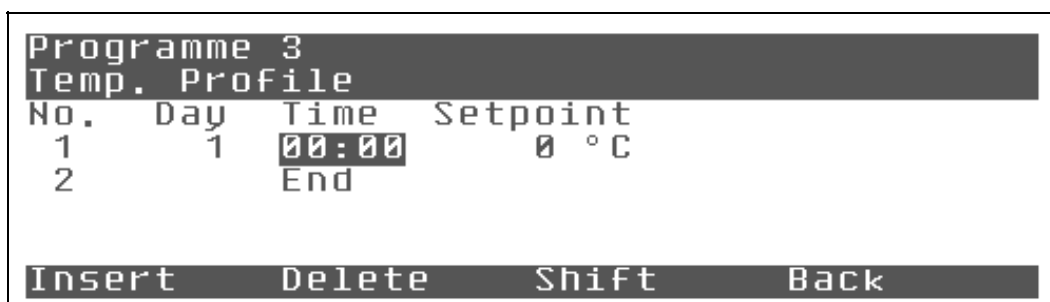
The cursor is flashing at the digits of the hours. Set the desired value using the keys ▲ ▼ . If required, the keys ◀ ▶ can be used to move the cursor to the digits to be modified, and the key ▶ is used to acknowledge the entry. The cursor moves to the next column. If the key ▶ is pressed again, the setpoint input field will be activated and the cursor will be flashing. The desired setpoint can now be adjusted using the cursor keys. Acknowledge using the key   .

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```
Programme 3
Temp. Profile
No.   Day   Time   Setpoint
  1     1   06:00        0  ° C
  2           End


Insert      Delete       Shift       Back
```
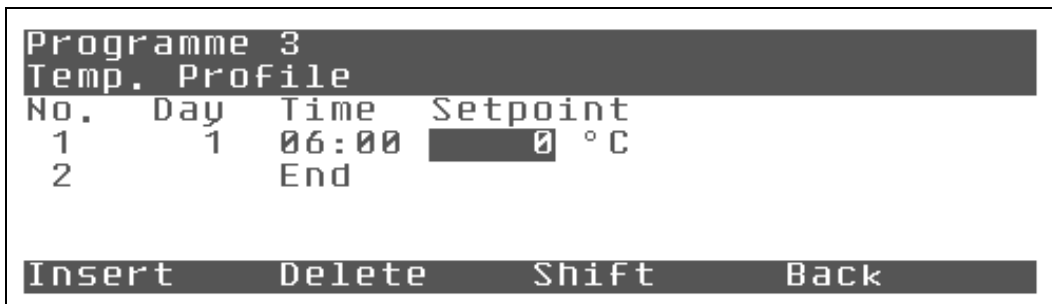
Pressing ▶ a second time will activate the setpoint entry. Use the ▲ ▼ to modify the setpoint and use the ▶ key for acknowledge.

.

.

```
Programme 3
Temp. Profile
No.   Day   Time   Setpoint
  2     1   08:00       30  ° C
  3     1   19:00       30  ° C
  4     1   21:00       20  ° C
  5           End
Insert      Delete       Shift       Back
```
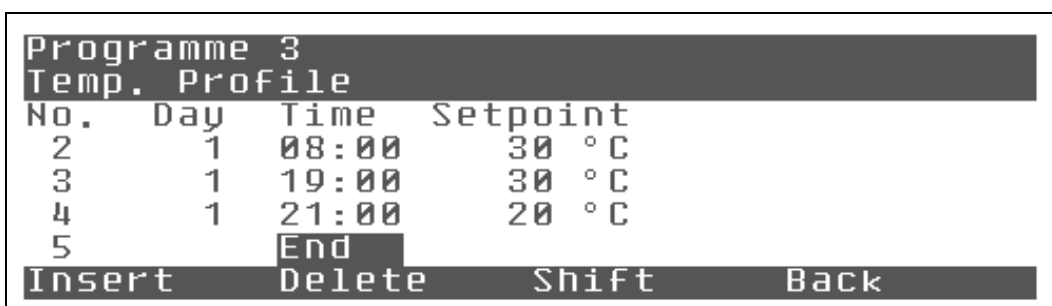
The keys ▲ ▼ are used to scroll through the rows, and the keys ▲ ▼ are used to scroll through the pages of the programme.

```
Programme 3
Temp. Profile
No.   Day   Time   Setpoint
  1     1   06:00       20  ° C
  2     1   08:00       30  ° C
  3     1   19:00       30  ° C
  4     1   21:00       20  ° C
Insert      Delete       Shift       Back
```
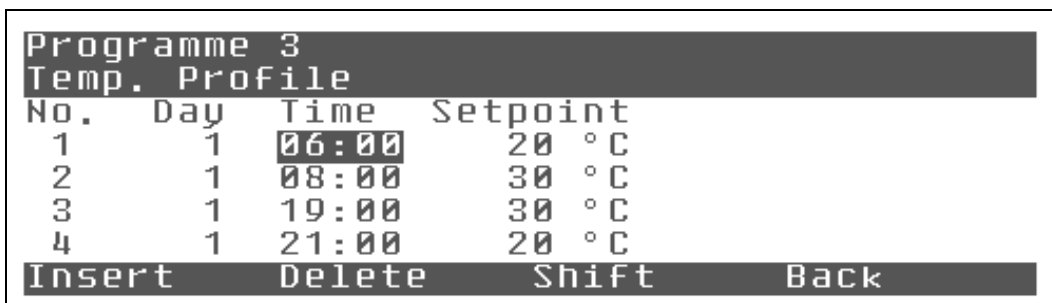
The key F 4 **"Back"** is used to leave the edited profile and to call the next higher level **"Profiles"**.

```
Profile        Programme 3
Temp. Profile            +
Humidity Profile         –
Light Profile            –
Fan Profile              –
Contact-Profile          –
Copy        Insert      Preview      Back
```
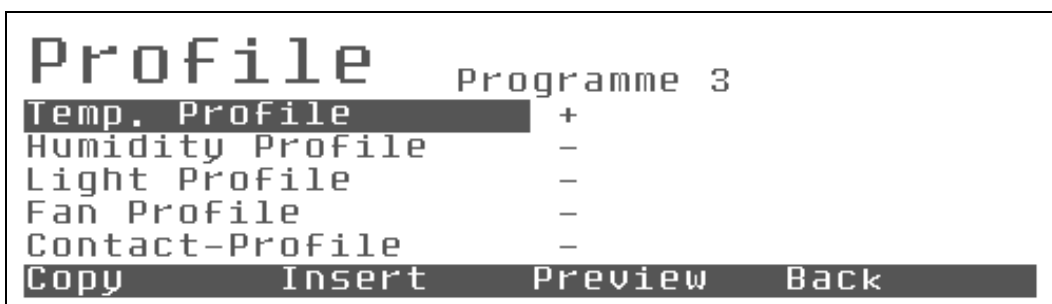
The temperature profile is now marked with **+**.

A visual plausibility check of the edited profile is effected by means of the menu item **"Preview"**.

```
Programme 3              Temp. Profile
max:  30°C
                                                    Day
                                                     1


Preview
min:  20°C
                                             Back
```
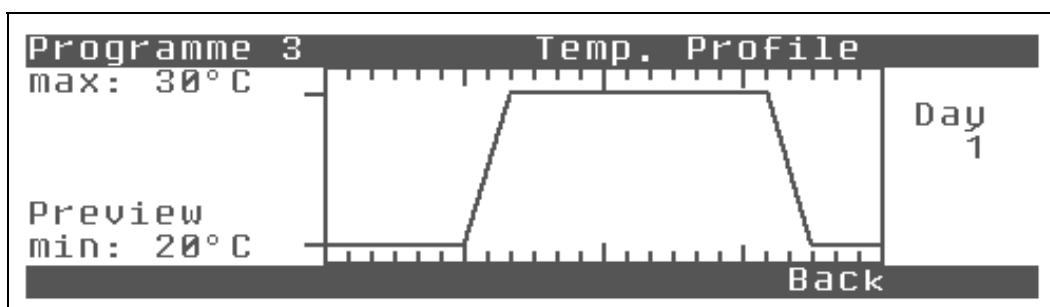
If that day/night profile shall include a constant humidity, the desired humidity setpoint can be entered as setpoint in the setpoint menu, or the humidity profile can be entered in one single step.
This is the preferable method, since the desired single setpoint will be stored with the other profiles.

On principle, the following is valid: If a programme is started, which is containing profiles being not filled-in, the controller will take-over that value as single setpoint for the control parameters which have been set below "Setpoints". After the programme start, neither the setpoints nor the active programme can be modified. Any modification requires the abortion of the active programme.

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4.9.3 How to Start a Programme

```
Programme
Programme 1          +
Programme 2          +
Programme 3          +
Programme 4          –

Start                      Back
```
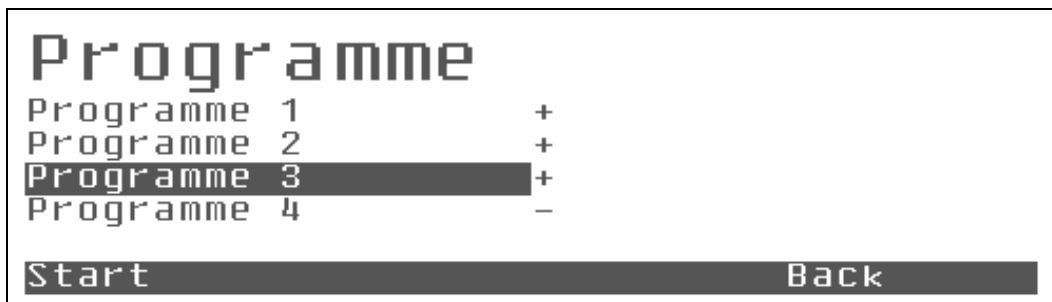
The programme is started from the menu **"Programme"**. Starting of a programme is only possible, when no other programme is active. In that case, the menu point **"Start"** will not be offered.

Press the key 🔲F1 **"Start"** to call the start menu....

```
Programme 3

Start at    :    Tue  09.01.2001 06:00

Now!        :    Mon  08.01.2001 06:00

Start      Now!                 Back
```
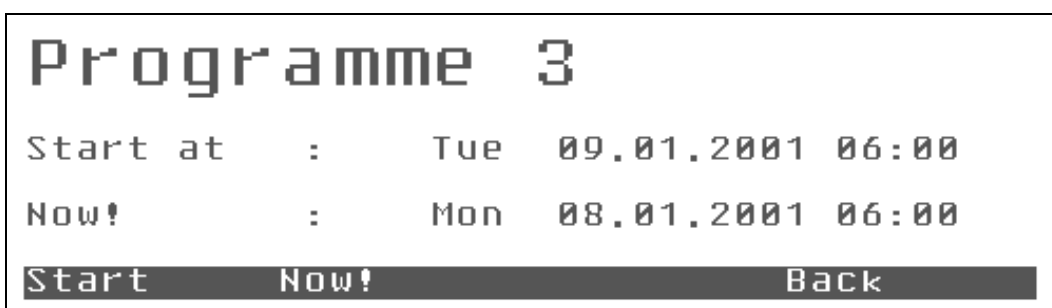
The program to be started will be displayed (here: programme 3).

The starting options **"Now!"** and **"Start"** will be offered.
In case of day, week and real-time programmes the most usual method is **"Now!"**. Immediately means, that the controller will search in the profile for the setpoints and ramps being valid for the actual moment, and that they will be controlled with the maximum admissible ramps. After being synchronized into the programme flow, the controller follows the preset profiles.

The menu item **"Start"** means, that the controller will start a full programme cycle on the next possible date. Until the actual start, it will be controlled to the adjusted single setpoint values, and the message **"Preselection Programme 3"** will be displayed.

For all profiles being not occupied, is the setpoint being valid for the programme execution (i. e. empty profile --> Setpoint for single setpoint control).

Process-time programmes can always be invoked immediately or "in the future", i. e. delayed. Consequently, always complete cycles will be run.

4.9.4 How to stop a Programme

To abort an active programme press ⬚P to select **"Programme"**.

```
Programme
Programme 1           +
Programme 2           +
Programme 3           +      Active
Programme 4           −

           Stop                    Back
```
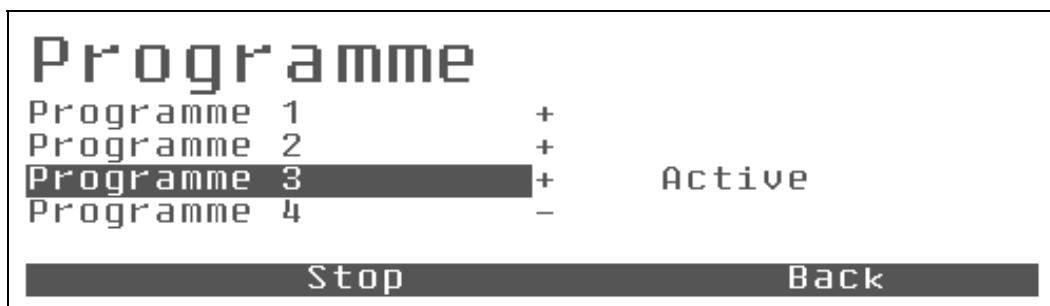
If a programme is active the ⬚F2 key is used for **"Stop"** .

After pressing ⬚F2 once **"Programme terminate ?"** .

```
Programme 3

         Programme Terminate     ?



                        Stop      Back
```

Press ⬚F3 for **"Stop"** , Password level 1 will be needed ...

```
Code input

Level       : User level 1
Input       : ****

0 = Back
```
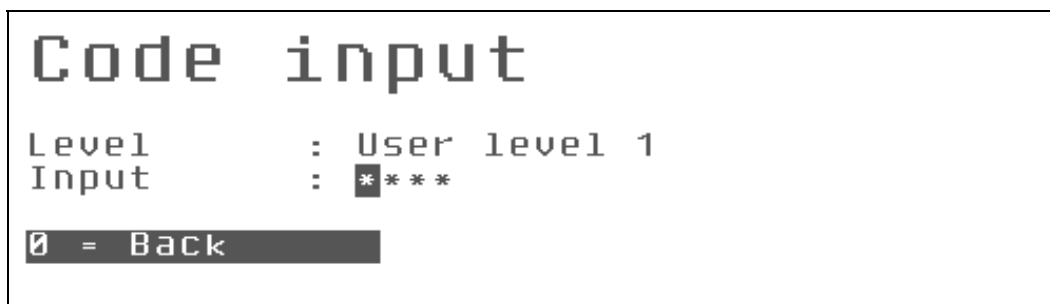
After aborting the programme the key ⬚F1 **„Starten"** is available again.

```
Programme
Programme 1           +
Programme 2           +
Programme 3           +
Programme 4           −

Start                             Back
```

Use ⬚F4 for **"back"**

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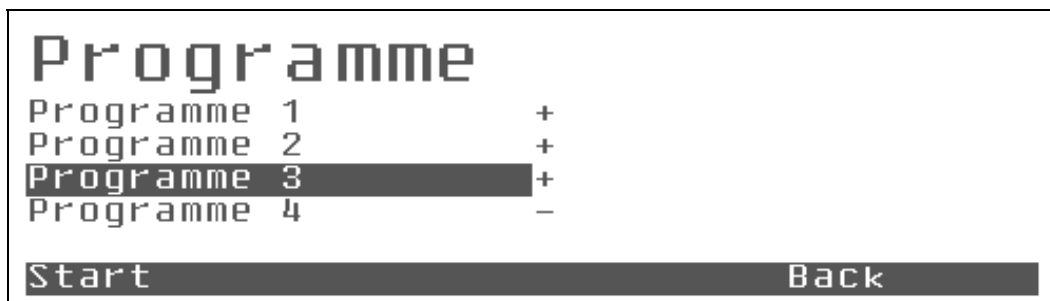
4.9.5 Example: Day/Night Cycle
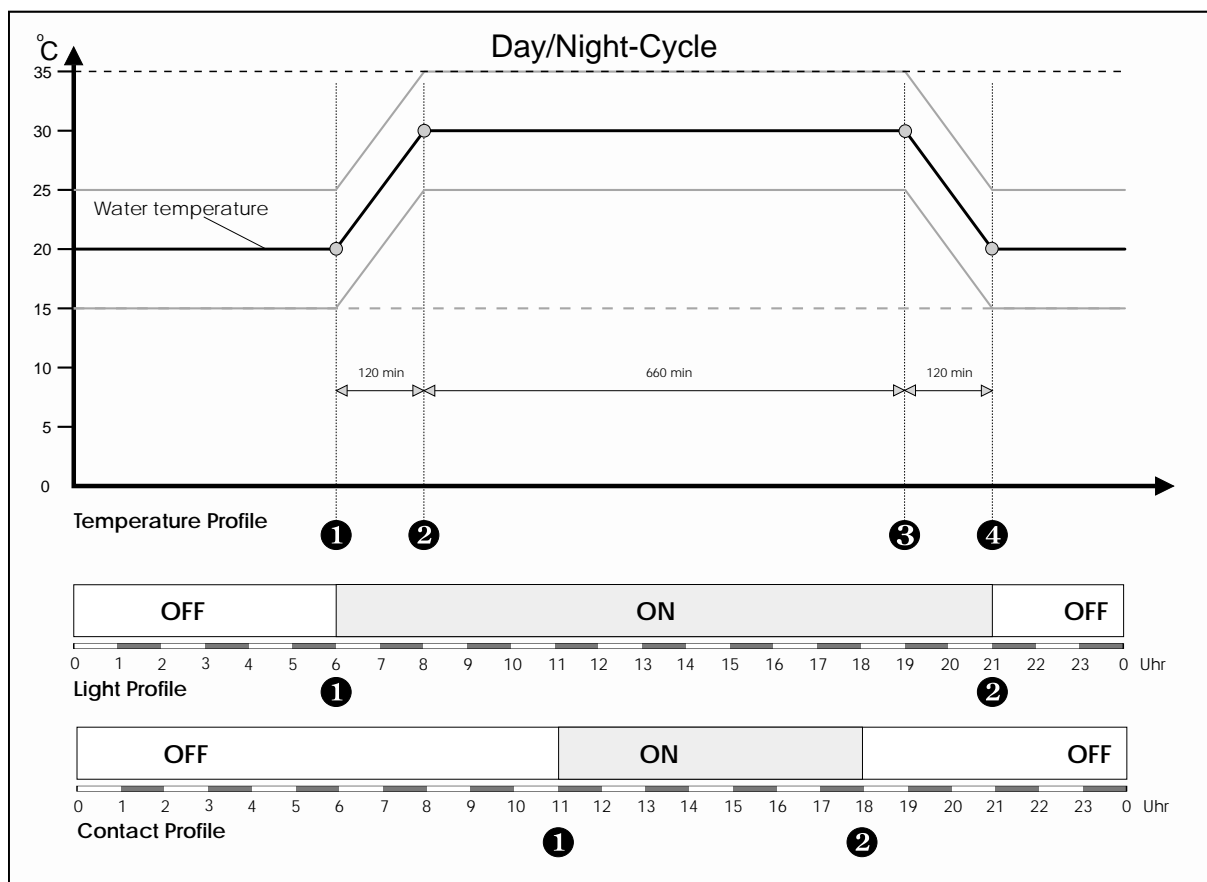
Example: Day/Night Alternation with 11 h and 30 °C, 9 h and 20 °C and two ramps with 2 h, each

Programme 3			
Temperature profile			
No.	**Day**	**Time**	**Setpoint**
1	1	06:00	20 °C
2	1	08:00	30 °C
3	1	19:00	30 °C
4	1	21:00	20 °C
5		End	

Programme 3			
Light profile			
No.	**Day**	**Time**	**Setpoint**
1	1	08:00	ON
2	1	21:00	OFF
3		End	

Programme 3 Contact profile			
No.	**Tag**	**Zeit**	**Sollwert**
1	1	11:00	ON
2	1	18:00	OFF
3		End	

4.9.6 Example: Weekly-Cycle

```
Programme 2
Type                 Weekly-Cycle



Profile                    Back
```

Programming of a week programme is identical to the programming of the day programme. The essential difference is the column "DAY". While "1" is shown in the day programme, "Mon" (for Monday) is shown in the week programme.

In the time field, the time 23:59 is no more the last possible time for a node point, but it is followed by "00:00", and the day field will make a carry over from "Mon" (for Monday) to "Tue" (for Tuesday).

```
Programme 2
Temp. Profile
No.   Day   Time   Setpoint
 2    Mon  08:00     30 °C
 3    Tue  19:00     30 °C
 4    Tue  21:00     20 °C
             End
Insert    Delete    Shift    Back
```
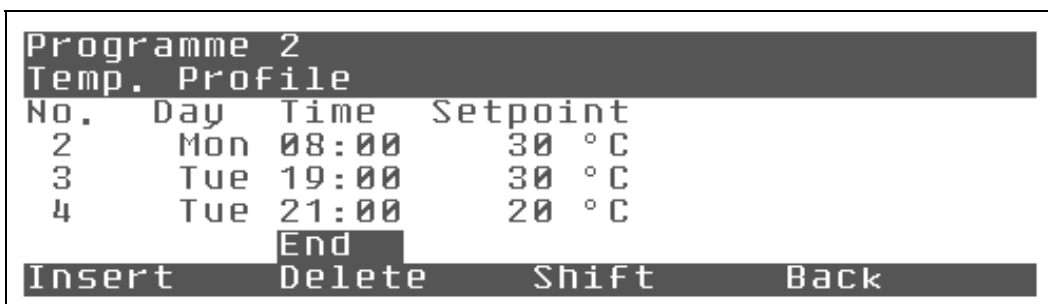
f no entry is to be made for a day, the cursor can be moved to the "day column", and the weekday can be set directly. As for the rest, the entry of the maximum 69 node points is to be effected like the entry of a day programme.

The 69 free node points can be distributed freely to the week.

4.9.7 Functions for Advanced Programming

When having entered a very complicated week temperature profile, and a light profile shall be entered which is matching to that profile, the functions "Copy" and "Insert" of the menu "Profiles" can be used.

```
Profile      Programme 2
Temp. Profile          +
Humidity Profile       –
Light Profile          –
Fan Profile            –
Contact–Profile        –
Copy        Insert     Preview    Back
```

Select the time track (master track) to be copied and press ⬚F1⬚ to "Copy".

```
Profile      Programme 2
Temp. Profile          +        Copy
Humidity Profile       –
Light Profile          –
Fan Profile            –
Contact–Profile        –
Copy        Insert     Preview    Back
```

Now select the profile to which the same times shall be copied as support points and press <F2> to "Insert" it.

The track can also be copied to several tracks by one step. In this case e. g. to the light profile and the contact profile.

Attention: If the copied profile is inserted into a profile, which is already occupied, that profile will be overwritten completely!

Hint: This function can also be used to delete an occupied profile by copying an empty profile to an occupied profile.

```
Profile      Programme 2
Temp. Profile          +        Copy
Humidity Profile       –
Light Profile          +        inserted
Fan Profile            –
Contact–Profile        +        inserted
Copy        Insert     Preview    Back
```

The copied profile can be called by means of the key ⬚▶⬚ . The copied profile includes the same times as support points. The corresponding setpoint cannot be taken over. A standard value has been assigned to it.

The setpoints can now be adapted without thinking of the time track. If only a few values are to be adapted, it is recommendable to use to cursor keys to move to these values and to change them.

If the key ▶ is used, it lasts a little longer to move through the whole programme.

Press the key ▶ , and the actual value can be edited using the keys ▲ ▼ . If the value shall not be modified, press the key ▶ again and the value will be stored without modification. The luminous bar will be positioned on the next value.

The key ▶ can be used to select and edit quickly all values in the columns and rows of the programme. At the end of a row, the cursor will be moved to the first column of the next row.

Remark: The column week-day will be skipped, since it is to be changed very rarely, and thus, the simple input mode is the same for all programme types.

But observe: If the cursor is on the step end and the key ▶ is pressed, a new programme step will be inserted.

```
Programme 2
Light Profile
No.   Day   Time   Setpoint
 1    Mon  06:00    100 %
 2    Mon  08:00    Off
 3    Tue  19:00    Off
 4    Tue  21:00    Off
Insert      Delete      Shift      Back
```

4.9.8 Delete

It is also possible to "Delete" programme steps during this adaptation procedure by pressing the key F2 .

```
Programme 2
Light Profile
No.   Day   Time   Setpoint
 1    Mon  06:00    100 %
 2    Tue  21:00    Off
 3         End

Insert      Delete      Shift      Back
```

4.9.9 Insert

```
Programme 2
Light Profile
No.   Day   Time   Setpoint
 1    Mon  06:00    100 %
 2    Tue  21:00    Off
 3         End

Insert      Delete      Shift      Back
```

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When pressing the key [F 1] , a "harmless" programme step will be inserted, i. e. the highlighted step will be copied. There are now two identical programme steps.

```
Programme 2
Light Profile
No.   Day  Time  Setpoint
  1    Mon 06:00    100 %
  2    Mon 06:00    100 %
  3    Tue 21:00    Off
  4        End
Insert    Delete    Shift    Back
```

The inserted programme step can now be edited. Observe the following:

The time of the programme step can only vary within the time limits:

Time programme step n1 <= Time programme step n <= Time programme step n+1.

```
Programme 2
Light Profile
No.   Day  Time  Setpoint
  1    Mon 06:00    100 %
  2    Tue 21:00    100 %
  3    Tue 21:00    Off
  4        End
Insert    Delete    Shift    Back
```

4.9.10 Shift

When pressing the key [F 3], the function **"shift"** will be executed. This is an intelligent way to insert a new range into the programme, since it is not required to change all other segments.

If e. g. a ramp shall be a little flattened without changing the stop and ramp periods of the remaining programme, move the cursor to the final point of the ramp to be changed and press [F 3] **"Shift"**.

This **"shifting"** is not limited by the time of the next programme step, but the distance from the last programme step to the maximum possible end of the programme.

Note: These limits are required to avoid an unintentional shifting of the programme.

5 Hints, Alarms and Other Messages

5.1 General

Control2000 is equipped with an alarm memory to log up to 20 messages. If at least one message has not been acknowledged, a small "Attention" triangle will be displayed in the actual value screen to indicate an unacknowledged message.

In case of preliminary alarms, a large triangle will be displayed, and a sound can be hard in periodical intervals. A continuous sound indicates alarms and failures. The sound can be switched-off when pressing the hotkey "Alarm Memory" in any screen. When pressing the hotkey again, the alarm memory will be called. Here, you can scroll through the occurred messages, acknowledge the messages with operating level 1 and delete the messages with operating level 2. The alarm memory is organized as FIFO. The oldest messages will be displaced by the newest messages. An integrated priority avoids that a simple message "Door opened" will displace an unacknowledged temperature alarm.

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6 Service and Maintenance

6.1 Cleaning the Germination Basin

- Close the water intake and switch-off the germination table by means of the ⬛O key.

- *Unplug mains plug!*
- Open the door of the control box using the key for the switch cabinet.
- Drain the water by turning the waste water cock (being located in the upper right corner of the control box) by a quarter turn to the left.
- take off the germination plates, wait until the water basin is completely emptied.
- Wipe off the water basin (tenacious lime deposits can be removed by means of commercially available acid of vinegar).
- Empty loosen knurled nuts of the cover for the water channel.
- Clean the coarse filter being located in front of the pump in the water intake (follow the course of the thicker hose of the two hoses starting from the pump). Open the sealing cap by means of a suitable adjustable key, withdraw insert, clean and replace insert, replace and tighten sealing cap.
- Clean circulation pump, if necessary (see chapter "Maintenance of the Circulation Pump").
- Close the waste water cock and close the door with the key.
- Reconnect mains plug of the unit.
- Open the water intake and switch-on the germination table by means of the ⬛O key.
- acknowledge the "First Filling?" Question by pressing the ⬛F1 key.

6.2 Maintenance of the Circulation Pump

When the circulation pump is too badly soiled on the suction or pressure side, a loud noise will occur, and the pump should be thoroughly cleaned. Cleaning should be effected as follows:

- Close water intake and switch-off the germination table by means of the ⬛O key.

- *Unplug mains plug!*
- Open the door of the control box by means of the key for the switch cabinet.
- Drain the water by turning the waste water cock by a quarter turn to the right.
- Unplug mains plug of the pump.
- Clean the pump thoroughly with a cleaning brush.
- Reassemble the pump components in vice-versa sequence.
- Reconnect mains plug of the pump.
- Close the waste water cock and lock the door by means of the key.
- Reconnect mains plug of the unit.
- Open the water intake and switch-on the germination table by means of the ⬛O key.
- acknowledge the "First Filling?" Question by pressing the ⬛F1 key.

6.3 Incidentals and Spare Parts

Description	Package	Order-No.
Germ cover domes (75 mm Ø)	60 Pieces	5091
Germ spirals (70 mm Ø)	60 Pieces	5093
Paper substrates (70 mm Ø)	1000 Pieces	5095
Wicks	1000 Pieces	5097
Door Key	1	
Circulation Pump	1	
Set of brushes for circulation Pump	1 Set	

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7 Optional Accessories

7.1 Vakuum Seed Counter

The vacuum counter is used for counting
and depositing of seed on paper substrates
and is particularly suitable for seeds beeing
regularly shaped and relatively even, as for
example grain, brassica and trifolium sorts.
The counter consists of three main
components: a vacuum system with
connection hose, a number of counting
heads corresponding to the different seed

sorts and a valve to dissolve the vacuum. The vacuum can be adjusted by a potentiometer. The counting heads
with 100, 50 or 25 bores are smaller than the paper substrate, and are equipped with an edge to prevent the seed
from falling off. The diameter of the holes should be adapted to the size of the seed and the suction capacity of the
vacuum.

7.2 Seed Sorting System

The seed sorting system serves for separation of the light
and heavy grains of seed or hollow bodies generally. The
seed is filled from the top into the acrylic glass cylinder of the
seed sorting system. A blower with speed control blows
through the cylinder from bottom to top, and the seed falls
into one of the three collecting vessels attached to the
cylinder. Thus, the light seed is collected in the upper
vessels and the heavy seed in the lower collecting vessel.

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