Instructions for use

Cooling incubator

FRIOCELL 22, 55, 111, 222, 404, 707

CE

We are pleased to congratulate you on obtaining the cooling incubator with forced circulation of air and cooling which enables a timely, spatially precise moderate heating of samples. A unique cooling system offers an accurate and economical simulation of selected natural processes and reduces the evaporation of samples. They can be applied in the sphere of biotechnology, botany, zoology, food processing industry, cosmetics, chemistry etc. where it enables extreme short times of thermal condition regeneration.

The units meet technical and legislative requirements and they are designed according to respective EN standards. The units are made of high quality materials by using the latest technology. Each piece undergoes a careful output control.

Provided you will follow the instructions mentioned here the unit becomes your reliable and powerful partner.

Now these advantages will be available just for you. This unit will help to solve your everyday problems and it will become powerful assistant for you. This unit is very easy to use, nevertheless, we recommend you to read the Instructions for use carefully so that you could use all advantages of this unit and obtain complete knowledge for its optimal use.

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APPENDICES:
EC - DECLARATION OF CONFORMITY

1 GENERAL NOTES

Use FRIOCELL in such applications where you need to change the sample temperature from 0 °C to 99.9 °C (and/or from -9.9 to 99.9 °C) in different time modes.
In Peltier module version (hereinafter PM) from 5 °C to 70 °C at the ambient temperature of 22 °C.
FRIOCELL may be used in several ways, so please, read this manual carefully.

MMM's cooling incubators FRIOCELL are equipped with a microprocessor control with the following features:
1. Fuzzy-logic temperature controller and a thermo-sensor PT 100.
2. 4 preset programs P1 to P4, 2 programs P5 and P6 to set containing up to 16 steps.
3. Electronic timer with different time modes, see description of programs (page 10).
4. Settable ventilator speed from 10 to 100 % (100 % only in PM) in 10-percent intervals
5. Printing the protocol with real temperature and time values via interface RS 232 C.
6. Chip card reader to store data P1 to P4, P5, P6 and to record to the memory.
7. Foil covered touch buttons for easy programming.
8. 32 digit LCD display, illuminated. All parameters seen at once. (To your information, the display is already set up to be used in product ranges coming out in future.)

FRIOCELL is manufactured of high grade materials with the latest technology and is subjected to strict final tests leaving the plant. The inner chamber housing as well as the shelves are made of stainless steel. The coating is water based, gray on top of galvanized zinc coated sheet metal, safe for the environment.

2 IMPORTANT INSTRUCTIONS

2.1 UNPACKING AND CHECKING

Please check after unpacking if the unit and its accessories are complete and not damaged. **A possible damage is to be reported immediately to the forwarding agent!**

During the manipulation – in case of lifting the cabinet etc. – the cabinet cannot be hold by the rail or door. The cabinets of volumes 404 and 707 should be lifted by means of delivered hooks, the rolls are designed for local moving, not for longer transport.

The standard delivery consists of:
● the temperature cabinet
● two sieves
● one chip card SO for setting the safety thermostat and three chip cards for storing the set programs.

2.2 BEFORE PUTTING INTO OPERATION

● FRIOCELL has been designed in accordance with the requirements of EU Directives no. 2006/95/EC and 2004/108/EC and tested individually according to EN 61010 -1. **Before the device is put into operation for the first time, let the installed device stand motionless in an operating position for 2 hours.**

⚠ Before the first putting into operation keep the installed device for two hours at a standstill.

⚠ Put the material on the device sieves only; never put them on the device bottom!

⚠ Carrying capacity of the floor, where the unit will be placed, must correspond to the weight of the unit itself plus the weight of the maximum charge (see chapter **6 - Technical parameters).**

⚠ The unit must not be placed on a floor covering, which could cause a danger of fire or smothering in case of falling of hot objects out of the unit.

⚠ No inflammable, explosive or toxic stuff or materials which could give such stuff off may be inserted into the units!

⚠ Unit is not designed for warming of liquids.

⚠ The units may not be used in an environment with a risk of flammable or explosive substances (such as anaesthetics) presence.

⚠ Every mounting and demounting of the unit's parts may be carried out only after disconnecting the unit from the mains by pulling the supply cord out of the socket.

● Installation of the unit is carried out by connecting to the mains and connecting to the water source and the drain. Parameters of the electric connections are specified in chapter **2.5 - Electric installation and other conditions.**

⚠ If the unit is not used for a longer time, disconnect it from the mains by pulling the connecting cord out of the socket.

⚠ The mains cord must not come into contact with hot parts of the unit.

⚠ Protection of the heating cabinet, its surroundings and the processed material against inadmissible temperature exceeding is ensured by a protective thermostat corresponding to EN 61010-2-010.

⚠ The devices must always stand on the legs (or wheels) on a flat mat (floor). Do not incline! Do not turn over!

⚠ Minimum distance of the rear and side wall of the unit from other objects and walls is 100 mm. In 22-liter models, free space of 100 mm should be left above the device in addition to the above mentioned distance requirements.

⚠ Shifting the upper sheet of the inner chamber out and in must be carried out carefully, there is a danger of cutting the chamber seal through as a consequence of careless manipulation.

⚠ After the device is positioned to the desired place, turn and brake the wheels (404 and 707 models only). The front wheels shall be turned forwards while the back ones backwards, in line with the device side walls, to provide the device with the maximum possible backward and forward stability.

2.3 OPERATION

⚠ Check regularly the protective thermostat function (see chapter Checking the Protective Thermostat Function in the Service Instructions).

⚠ If the device is used in another that specified way, the protection provided by the device could be impaired.

2.4 PERMITTED LOADS

size	weight [kg]/tray	total weight [kg]
22	10	25
55	20	50
111	20	50
222	30	70
404	30	100
707	50	130

2.5 WIRING AND OTHER CONDITIONS

Basic data for connection:		
Mains connection:	FC 22 FC 55-707	**100 - 240V/50(60)Hz** **1x230V/50(60)Hz** 1x115V/50(60)Hz
(standard types are marked with bold face)		
Mains voltage variation		±10 %
Protection against dangerous contact - class:		I
External circuits isolation:		
– double isolation		
Type of unit plug:		
– as a standard CEE-7/VII, IEC-83/CH, 16 A/250 V (or another according to the type)		
Socket protection:		
– 16 A (acc. tech. parameters in the Instructions fo use of the unit)		
Protection according to EN 60529:	IP 20	
Overvoltage category according to (IEC 664 - EN 61010):		
– II in case of pollution degree 2		
Fuses on the rear wall of the upper piece	Blow-out fuse T16A/1500	
Ambient conditions:		
– ambient temperature: +5 °C to +40 °C – max.relative humidity: 80 % at 31 °C – maximal altitude: 3000 m		

3 DESCRIPTION OF THE COOLING INCUBATOR

3.1 GENERAL VIEW

3.1.1 VERSION WITH THE COMPRESSOR

3.1.2 VERSION WITH THE PELTIER MODULE
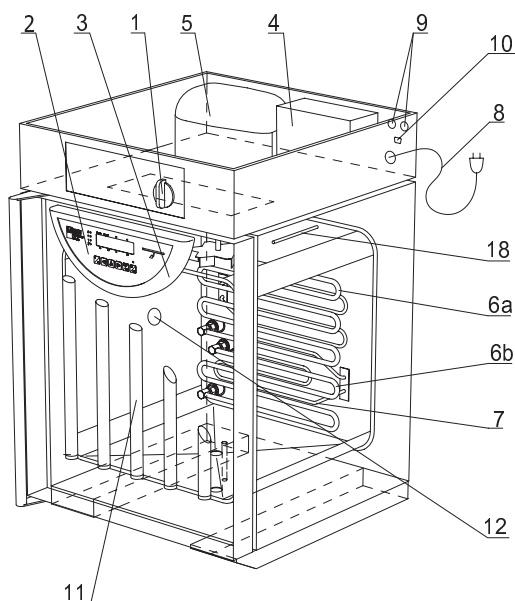
1. Mains switch
2. Operating panel
3. Plastic cover of the regulator
4. Condenser
5. Compressor (coolant R134a, CFC-free)
6. Cooling snakelike tubing
7. Heating elements in the site of heating
8. Connection to mains
9. Fuses T16A/1500
10. Interface for protocol printer (RS 232 C)
11. Door lighting - optional
12. Position of the inner switch socket - optional
18. Thermo-sensor PT 100
19. Peltier module.

3.2 USEFUL SPACE

Useful space - see the illustration. Nr.1, where X(H) = 10 % of the chamber depth, X(Š) = 10 % of the chamber width, X(V)1 distance of the bottom shelf to the bottom of the chamber. The required temperature accuracy - see chapter **6 - Parameters of the Unit** - is achieved only within the space defined above (in connection with DIN 12 880 - marked with thick lines, thinner lines mark the inner chamber walls). (It means, that over the last upper tray the limits from chapter **6 - Parameters of the unit –** are not obligatory).

3.3 CONNECTOR RS-232C - FOR PROTOCOL PRINTER
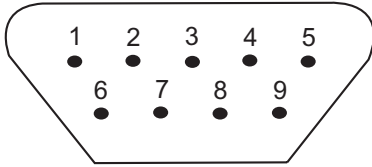
Fig. 6: Interface for protocol printer

9 pin Canon connector on the case

Pin	Signal
2	RXD
3	TXD
5	GND
6	DSR

25 pin Canon connector on the printer

Pin	Signal
2	TXD
3	RXD
7	GND
20	DTR

Interface parameters:

Baud:	9600
Stopbit:	1
Parity:	none
Databit:	8

Devices connected with of connector RS 232C must fulfill valid regulations and be approved by a competent testing laboratory.

3.4 OPERATING PANEL
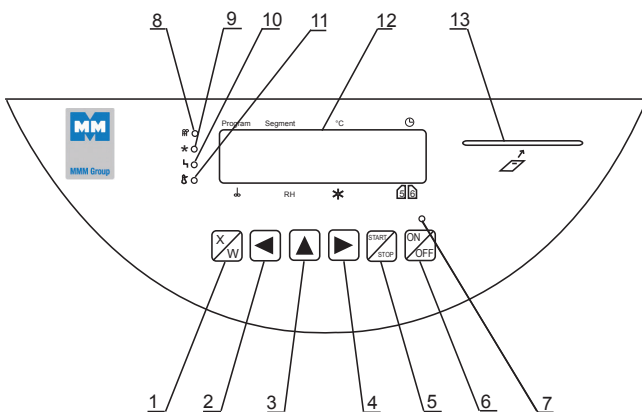
1. Key of activation of setting-up mode
2/4. Cursor steering turning to the left/right
3. Setting-up value in parameter
5. Key starting the program
6. Switch (ON - on, OFF - stand by)
7. Indicator light
   - shines after switching on the switch
8. Indicator light heating
   - shines: state of temperature regulator
   - heating active
9. Indicator light cooling
   - shines: state of temperature regulator
   - cooling active
10. Indicator light – failure
11. Indicator light of safety thermostat
   - shines: temperature surpassed the limit
     set on the safety thermostat - heating is
     off/ see paragraph Set safety thermostat
12. Display
13. Port for inserting the chip card

Segment: Partial or full graphic representation of the program coarse.

°C: Temperature display

🕐: Process time

⌀: Fan speed display in % (steps of 10%)
(In case of volume 22 only 100 %)

RH: % relative humidity

☼ Setting-up intensity of exposition light in the door

56 Positions are used for specific purposes - see descriptions in text.

4 FUNCTION AND OPERATING

Function of indicator lights and control keys is described in paragraph **3 - Description of the unit.**

4.1 CONNECTING TO MAINS

Compare the nominal voltage and device' s input values indicated on the index plate with the supply voltage. If the supply parameters correspond with the unit parameters, connect the unit' s plug with the supply socket.

4.2 SWITCHING OF THE INSTRUMENT

Place and connect the instrument with the volume of 22 into the mains so that the plug is easy accessible, because it serves also as the uncoupling device of the instrument, no mains switch is in this version.
In case of other volumes, turn the mains switch, which is placed on the superstructure (or extension – in case of volumes 404, 707) panel to the position I.

Press the **ON/OFF** (the control light above the switch comes on), display comes on and the device is ready for running. Continue the procedure as follows.
LCD shows all parameters for your convenience at once. Cursor is placed below all 32 digits of LCD in a so called cursor line and is always placed only below one of the digits.
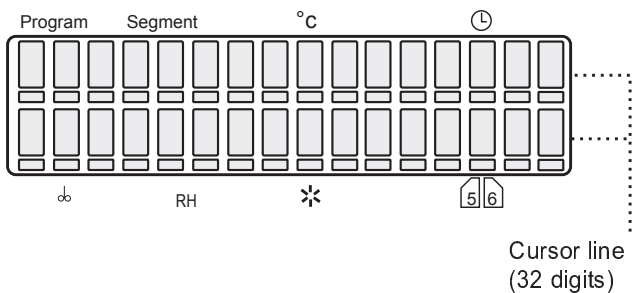
PARAMETER CHANGE
Move the cursor horizontally by pressing ◄►.
Change the parameter above the cursor by pressing ▲.

4.3 GENERAL SETUP OF FRIOCELL

FRIOCELL – MMM' s product – offers a wide range of customer's benefits. In order to make them active, there are fundamental inputs required. To achieve this the following service mode containing 10 different services is here.

4.3.1 ACTIVATING THE SERVICE MODE

Press simultaneously buttons ▲► for 2 seconds. LCD shows Service 01. By pressing the buttons ◄ and ► you can change between the single service modes Service 01 – Service 07, Service 41, 58 and 60.

4.2.2 SERVICE 01 – P1 – P6 PROGRAMMES SAVING

By means of this service, you can save the P1 to P6 programmes to the device manufacturer's chip card. Before the parameters are recorded to the chip card, a correct card must be inserted in the device panel slot. The cards can be ordered from the device supplier.
Check whether the card is inserted in the reader! At first, open the programme saving service by means of **START/STOP**.
The display shows: "P1 ÷ 6 → MMM CCard", Save by means of **X/W**. Correct saving will be confirmed five seconds later by a text "Done" on the display. Press **START/STOP** for the second time. This will allow you entering another service. If the display shows "Wrong MMM Ccard", check the chip card and repeat the procedure.

4.3.3 SERVICE 02 – PROGRAMME RENEWAL/DOWNLOAD FROM THE CHIP CARD TO THE DEVICE

By means of this service, you can download the P1 to P6 programmes, saved originally on the chip card, to the device memory. The programmes in the memory will be rewritten by the new ones. Check whether the chip card is inserted in the reader. Press **START/STOP** at first to open the programme download service. The display shows: "MMM CCard → P1 ÷ 6". Press **X/W** to download. Correct download is confirmed by the text "Done" on the display. Press **START/STOP** for the second time, which will enable you switching to another service. If you see "Wrong MMM Ccard", check the chip card and repeat the procedure.

ATTENTION!
Use the original chip card only, provided by the manufacturer. Older cards ending "16" cannot be used.

4.3.4 SERVICE 03 – SET THE REAL TIME AND DATE

Pressing **START/STOP** you enter the service. Set the real time and date by pressing buttons ◄► and ▲.

Position	1	2	3	4	5	6	7	8	9	10	11
Content	D	F	m	t	:	_	R	R	R	R	-

12	13	14	15	16
M	M	-	D	D

Cursor in position 6: Select the data separator by the key ▲. There are the following possibilities: Dash (-), stroke (/), dot (.), colon (:). Dash is default. The key ◄ takes you back to the time setting.

Cursor in position 7: Select the data format by the key ▲. There are the following possibilities for the Czech language: RRRR-MM-DD, RRRR-DD-MM, MM-DD-RRRR, DD-MM-RRRR. The default values are RRRR-MM-DD (Czech), YYYY-MM-DD (English), JJJJ-MM-TT (German), AAAA-MM-JJ (French). The key ► takes you back to the time setting.

The service shall be terminated and closed by pressing the button **START/STOP**. The data format on the display: hour:min_day.month.year. The selected format will be shown both on the LCD display and the printer.

4.3.5 SERVICE 04 — SET INTERVAL ON PRINTER

To print protocols device can be set up (optional) with a printer, which is connected by a cable to the printer interface – see chapter Printing the protocol. Enter the service by **START/STOP** and set the interval:

Pressing ▲ select one of the following choices:
- printer OFF
- switched over to PC (application SW WarmComm – data are sent to PC)
- interval 10 s
- interval 01 min
- interval 01 h.

By pressing ◄ move the cursor to the position 10/01 seconds, minutes or hours. By pressing ▲ you can change the printer interval within the following range:

10 to 50 s (step 10 s)
01 to 59 min (step 1 min)
01 to 12 h (step 1 h).

To quit the service press **START/STOP** again.

Only one unit is active, either seconds, minutes, or hours!

Enter the printer menu by a subsequent cursor move to the display edge.
Select the printer type by means of ▲.
Printer = 1 ... Printer Citizen
Printer = 2 ... Thermoprinter DPT 6333-V.24

Terminate and close the service by **START/STOP** pressing.

4.3.6 SERVICE 05 — SELECT LANGUAGE

Pressing **START/STOP** you enter the service. To select the language use button ▲. To quit the service press **START/STOP** again.

4.3.7 SERVICE 06 – SETTING THE SWITCHING TIMES OF THE INNER SOCKET (OPTIONAL) AND THE FAN RUN

A) Switching times setting
With help of this service you can set the time of the inner socket periodic switching on and off.
Press **START/STOP** to enter the service.
On the bottom line of LCD there is a read out: "on: XXPP off: YYQQ", where
XX is the number of time units during which the socket is on for a part of a period (00 – 99)
YY is the number of time units during which the socket is off for a part of a period (00-99)
PP time units for switching on (min or hr)
QQ time units for switching off (min or hr)
Move the cursor by pressing ◄► change the number of the time units or unit by pressing ▲ If XX = 00, the socket will never be on, if XX ≠ 00 and YY = 00, the socket is on all the time after the start.

B) Setting the fan run after the programme termination
Leave the "inner socket" setting by means of ◄► and by pressing ▲, set:
a) "Prog" – the fan runs only during the P1-P6 run;
b) "TXX°C" – the fan keeps running after the programme termination till the temperature decrease below the preset value XX °C;
c) "Door" - the fan keeps running after the programme termination and switches off after the door opening (applied only for units with a closed door sensor);
d) "alws" – the fan keeps running till the cabinet is switched off by the **ON/OFF** button.

4.3.8 SERVICE 07 — ADJUSTING PROTECTIVE THERMOSTAT

Protective thermostat serves for protection of the thermal cabinet, its surrounding and treated material against inadmissible exceeding of or inadmissible drop below the set temperature

(e.g. it prevents damage or destroying of material samples in case of a damage to the temperature regulator or unintentional setting of higher – or lower - temperature in the unit's chamber than the respective sample is able to bear).
Enter the service by pressing **START/STOP**.
On the lower line of the display –
in the position 9,10 (symbols ZZ on the display) – set the by you selected lower temperature limit (adjustable in the range from –19 °C to + 39 °C),
in the position 12, 13, 14 (symbols XXX on display) – set the by you selected higher temperature limit (adjustable in the range from 0 °C to +130 °C - for is pre-set in PM models 0°C to + 100 °C),
in the position 16 (symbol Y on display) – set the type of the protective thermostat 3 – complies with class 3 according to EN 61010 (in case of suppressing the set temperature in the chamber the thermostat switches off the heating bodies, the indicator protective thermostat lights up, the acoustic alarm starts up and the report "Protective Thermost." alters with the previous data on the display, the unit does not heat even if the indicator heating is still lighting. After the drop of the temperature in the chamber below the set protective thermostat limit the unit continues its operation (e.g. the heating switches on) – the indicator protective thermostat switches off; the acoustic alarm is still active and the report "Protective Thermost." alters with the data of the actual conditions on the display – these two signals of the non-standard condition can be cancelled by depressing **START/STOP**.
A similar course – with mirror symmetry – occurs in case the temperature drops below the lower temperature limit (the cooling switches off instead of the heating).

Insert the chip card SO (safety thermostat). into the reading unit on the control panel and confirm the setting of temperature and thermostat type by pressing X/W. Take the chip card SO off (safety thermostat).

Quit the service by another pressing **START/STOP**.
Note: If a program is started, whose set temperature is outside the limits given by setting the safety thermostat, the display reports error 05 – error of setting the safety thermostat.

Check of the safety thermostat function is described in chapter Function of safety thermostats.

4.3.9 SERVICE 12 – SERIAL NUMBER DISPLAYING

Open the service by pressing **START/STOP**. It is not possible to change displayed data. Finish the service by pressing **START/STOP** again.

4.3.10 SERVICE 41 – SETTING OF TEMPERATURE LIMITATION

The setting can be applied only in those programme segments where the regulation is carried out at constant temperature (the ramps are not guarded).

Before starting: The display shows: "Service 41" and "Temp.tolerance".

After starting: The lower line of the display shows: "+XX.X°C -YY.Y°C" where "XX.X" means the upper deviation of the temperature (from 0 to + 20) and "YY.Y" means the lower deviation of the temperature (from - 20 to 0). If a situation occurs during the programme run when the chamber temperature is below the set temperature minus the lower deviation, the process stops and error 2 is displayed. If a situation occurs during the programme run when the chamber temperature exceeds the set temperature plus the upper deviation, the process stops and error 3 is displayed. In the end of the bottom line the Y/N switch is used for setting the error type (H = critical, S = soft error). The initial setting is "H".
Exit the service by pressing the button **START/STOP**.

4.3.11 SERVICE 53 – SETTING OF AUTOMATIC DEFROSTING

Applied only in devices equipped with automatic defrosting. Before switching on: The display shows "Service 53" and "Defrosting."
After switching on: The lower line of the display shows the text "Defrosting" and either "OFF" or "ON" – automatic defrosting is switched off or on, respectively. "**OFF/ON**" can be changed by means of ▲. Leave the service by pressing the **START/STOP** button.

4.3.12 SERVICE 58 – DOOR BLOCKING

This service is available only in the unit equipped with the door blocking – see the chapter Optional Equipment.

Open the service by pressing **START/STOP**. Select one of the following possibilities by means of ▲ button:
1. "Inactive" – the door is unblocked permanently;
2. "Manual" – the door can be blocked/unblocked by means of buttons ◄ and ►;
3. "Automatic" – the door is blocked automatically after lapse of certain set time. The period of time can be set within the range from 2 to 9 seconds. Unblock the door by means of the buttons ◄ and ►.

You can select "C" on the last position of the display. In such case, the door can be unblocked only after the SO card is inserted.

S	e	r	v	i	c	e		5	8				
A	u	t	o	m	.	a	f	t	e	r		2	s		C

4.3.13   SERVICE 62 – ALARM SETTING

The service allows alarm switching on or off under the following situations:
a) Unit switching on;
b) Unit error;
c) Erroneous button pressing by the operator;
d) Button pressing;
e) Programme start;
f) Programme end;
g) Door opening during a programme run (only in units equipped with a door switch).

Enter the service by pressing **START/STOP**. The individual options can be displayed by means of ◄► button. The cursor is in the rightmost position. Switch over by means of ▲ button between 0 (the alarm is off) and 1 (the alarm is on).
Terminate the service by pressing **START/STOP**.

Note: Door opening is signalled only in units equipped with a door switch. If the alarm is switched off and the door is opened during the programme run, the display will show a flashing message "Door open". If the alarm is switched on, it sounds in addition to the displayed message. The alarm can be cancelled temporarily by pressing any ◄ ▲ ► button. By the door closing, the alarm is renewed; i.e. the operator will be informed acoustically about any subsequent door opening again.

4.3.14   SERVICE 64 – P6 PROGRAMME SHIFTING

The programme start will be shifted to a new time. For more details, see Programme P6.

4.3.15   SERVICE 09 – CANCEL THE SERVICE MODE

Cancel the service mode by pressing **START/STOP**. Then you can freely modify and activate the programs.

4.3.16   SETTING THE EXPOSURE LIGHTING

Programs P1 to P4, P5, P6.

There are following paragraphs extended:
Setting of program P1
Setting of program P2
Setting of program P3
Setting of program P4 – segment T1
Setting of program P4 – segment T2
Description of program P5 and its control
Description of programm P6 and its control.

By pressing ◄► place the cursor to the position ☼ and by pressing ▲ select the lighting.

P1 to P4: after reaching the set temperature in the just adjusted horizontal segment – or at P3 also at the time delayed period – there is possible to set the illumunation at steps of 10 % of maximum illumination. 0 % (totally off) is at display shown as „OFF", 100 % is shown as „ON". The illumination is constant during the whole time as the segment continues.

P5, P6: there is possible to set the illumination at steps of 10 % of maximum illumination at every (horizontal or cross) segment. 0 % (totally off) is at display shown as „OFF", 100 % is shown as „ON".

a) **Door lighting (one type of the lighting source):**
Rough lighting quantity in the VIS range from 400 to 700 nm (while 100 % and 22 °C are preset) on the level of the chamber entry (in the middle of the entry area) – measured with the luxmeter sensor positioned upright to the falling beams. White daylight 4000 °K, ambient temperature 22 °C:
FC 111: 10 kLux ±5 %, FC 222: 10 kLux ±5 %, FC 404 and 707: 13 kLux ± 5 %

b) Shelf lighting (one type of the lighting source):
See the chapter 6 Parameters, table 6.2.

4.3.17 SERVICE 60 – RACKS WITH EXPOSURE LIGHTING – PHOTOVALUES SETTING

There are two possibilities how to set the lighting:
A) No possibility to control the illuminated shelves: Cumulated light doses and overall times at the individual shelves can only be displayed/zeroed.

Service 60 selection:

S	e	r	v	i	c	e		6	0				
P	h	o	t	o	v	a	l	u	e	s		s	e	t	.

Displaying examples after Service 60 activation:

S	e	r	v	i	c	e		6	0				
1	:	e	V	i						1	6	.	3

S	e	r	v	i	c	e		6	0				
2	:	t	U	V			0	d	0	0	h	0	0	m

S	e	r	v	i	c	e		6	0				
3	:	-											

Explanatory notes:
- Select the measuring channel (1 to 3) by means of ▲ on the second line, first position. The given variable type or sign " -" (dash) is displayed after the colon if the channel is not measuring any light variable.
- Select the type of variable displayed by means of ▲ on the second line, third position. There are the following possibilities: "e" (exposure) or "t" (time). The variable displayed is zeroed by **X/W** pressing. If both the exposure and time have to be zeroed, exposure (e) must be displayed and **X/W** pressed, and then time (t) must be displayed and **X/W** pressed again.
- The second line, fourth position displays either "UV" or "Vi" depending on whether the ultraviolet (UV) or visible (Vi) light measurement has been set on this channel. The type of the measured light variable is set by the manufacturer or service technician.

- The cumulated dose is displayed in kiloLux-hours (eVi if visible light is measured) or miliwatt-hours/cm^2 (eUV if UV light is measured).
- The overall time (tVi or tUV) is displayed in minutes, hours, and days.

When checking the measured values during the programme operation (see chapter 4.11), the light variables are displayed in the following way:
- Actual value of the visible light (e.g."L-Vis1" if the irst channel measures the visible light) in klux,
- Actual value of the ultraviolet light (e.g. "L- UV_2 if the second channel measures the UV light) in mW/cm^2,
- Cumulative visible light dose (e.g. "eVi1") if the first channel measures the visible light) in kluxh kilolux-hours),
- Cumulative ultraviolet light dose (e.g. "eUV2") if the second channel measures the UV light) in mWh/cm^2 (milliwatt-hours per one square centimetre)
- Overal exposure time (e.g. tVi1, tUV2) in minutes, hours and days.

B) Illuminated shelves control allowed:
Parameters for the control of the individual shelves lighting can be displayed/set/zeroed, or the last finished light exposure protocol can be printed.

Position 1: Rack with lighting is selected; possibilities: 1, 2, or 3
(the racks are numbered from the top, i.e. the highest rack has the number 1); position 14 then will show the exposure type (UV, Vis – the exposure type is set at the factory or by the service technician – see the Service Instructions, Service Technician Menu).

Position 3: The displayed parameter is selected; possibilities:
a) T-W: Required time of switching on the given rack exposure in the format hhh:mm (hours and minutes);
b) T-X: Actual time of switching on the given rack exposure in the format hhh:mm (hours and minutes),
c) e-W: Rack without a photosensor: The input exposure value in a defined reference point, measured by external measuring device (kLux for Vis exposure, mW/cm^2 for UV exposure). Rack with a photosensor: Overall required exposure dose (kLuxh for Vis lighting, mW/cm^{2}h for UV lighting),

d) e-X : Total exposure dose.
Rack without lighting: The dose is calculated as a product of e-W and T-X (kLuxh for Vis exposure, mW/cm^{2}h for UV exposure). Rack with a photosensor: The dose is an integrated measured value.

e) Printout: Last protocol printing (started by **X/W** button).

Position 7-12: Setting of T-W and e-W parameters.

1		3				7	8	9		11	12		14		
		S	e	r	v	i	c	e		6	0				
1	:	T	-	W		0	6	0	:	0	0		V	i	s

	S	e	r	v	i	c	e		6	0				
2	:	P	r	i	n	t	o	u	t				U	V

T-W parameter can be set to any value ranging between 000:00 and 999:58. The time setting to 999:59 is understood as a continuously (indefinitely) switched on lighting (displayed in form oo:oo).

T-X and e-X parameters may be zeroed only (by pressing **X/W**).

Procedure:
1. Set the required temperature and/or humidity in the selected programme (P1 is the most suitable but any other can be used as well). Set the exposure to 100 % (ON).
2. Determine the required exposure dose.
3. Set the dose or time of the required dose.
   a) Racks without photosensors:
   - Set T-W time in Service 60 to a non-zero value;
   - Start the programme; wait till the required temperature is reached when the lighting is switched on;
   - Measure the exposure on the rack by means of an external measurer;
   - Calculate the required time of the dose as a ratio of the required dose and measured exposure;
   - In Service 60, enter the calculated time to the T-W parameter and the measured exposure to the e-W parameter;
   b) Rack with installed photosensor:
   - Zero the T-W parameter in Service 60; enter the required exposure dose to the e-W parameter.
4. Zero both parameters T-X and e-X in Service 60 (by **X/W** pressing).
5. Start the selected programme.

6. After the required temperature is reached, the lighting is switched on and measurement of the exposure time (dose) starts.
7. By means of ◄ or ► buttons, you can display (on the upper line of the display) all parameters during the programme run: T-W, T-X, e-W, e-X, and the state of Vis and UV lighting switches (On, Off).

\	1	T	-	W		0	6	0	:	0	0		V	i	s
1	0	0							O	n					

\	V	i	s	=	O	f	f		U	V	=	O	n		
1	0	0		1	0	0			O	n					

8. After the required time (required dose) is reached, the light on the rack is switched off, which is displayed on the display including the number of the rack and type of exposure, and a question whether to continue, i.e. start measurement of the subsequent dose, is displayed as well.
- In racks with photosensors, the e-X dose is increased according to the instantaneous exposure measured. Teroing of T-X and e-X, if any, must be performed individually.
- If there is any in-process dose in the moment of the program run starting (T-X time is not zero but has not reached the required value yet), such dose measurement is continued till the required T-W time is reached or the programme interrupted.
- If there is any dose terminated in the moment of the program run starting (T-X time has reached the required T-W value), T-X and e-X parameters are zeroed and new dose measurement is started.
- The previous two points are also applied in case of an automatic start after a power supply failure.
- Any rack lighting can be permanently switched on by setting the T-W time to 999:59 (displayed and printed as oo:oo); this can be applied for racks both with and without photosensors.
- Any rack lighting can be permanently switched off by setting the T-W time to zero. In racks with photosensors, both parameters must be zeroed to switch the lighting permanently, i.e. both the required time T-W and the required dose e-W.
- If both parameters, T-W and e-W, are non-zero on the rack with photosensors (but T-W has not been set to oo:oo), e-W parameter is decisive for the dose termination (T-W parameter has no influence on the dose measurement).

- If e-W parameter is zero on the rack with photosensors, but T-W time is not zero, the dose will be terminated in the moment when the measured time T-X reaches T-W value.
- The last protocol of each rack can be subsequently printed in the user mode of Service 60. In a not terminated dose, the paragraph "End of measurement" will not be printed.
- After language switching in Service 5, the same protocol can be printed in another language.
- To print a protocol, the printer must be switched on in the user service 04 (recording mode).
- In FC device, RH will also be printed on the protocol in addition to the temperature at the beginning and end of the dose.

Examples of protocol printouts:

Dose specified by e-X parameter

```
----------------------------------------------------------

PROTOCOL POLICE Vis-1 RACK PROTOCOL Vis-1
Zacatek mereni:          Measur.start:
 22-06-2009 11:52          22-06-2009 11:52
 T = 29.9°C               T = 29.9°C
Konec mereni:            Measur. end:
 22-06-2009 11:58         22-06-2009 11:58
 T = 29.9°C               T = 29.9°C
Pozadovana davka:        Required exposure:
 1.50 kLx                 1.50 kLx
Celkovy cas:             Total time:
 000:06                   000:06
Celkove osvetleni:       Total exposure:
 1.51 kLxh                1.51 kLxh

----------------------------------------------------------

Datum:                   Date:
22-06-2009 12:00         22-06-2009 11:59

JMENO:                   NAME:

Podpis:                  Signature:
```

Dose specified by T-X parameter

```
----------------------------------------------------------

PROTOCOL POLICE Vis-1 RACK PROTOCOL Vis-1
Zacatek mereni:          Measur.start:
 22-06-2009 11:17         22-06-2009 11:17
 T = 29.9°C               T = 29.9°C
Konec mereni:            Measur. end:
 22-06-2009 11:27         22-06-2009 11:27
 T = 29.9°C               T = 29.9°C
Pozadovany čas:          Required time:
 000:10                   000:10
Celkovy cas:             Total time:
 000:10                   000:10
Celkove osvetleni:       Total exposure:
 2.71 kLxh                2.71 kLxh

----------------------------------------------------------

Datum:                   Date:
22-06-2009 11:50         22-06-2009 11:51

JMENO:                   NAME:

Podpis:                  Signature:
```

4.4   PROGRAM P1

Constant temperature is required.

$$P1 = \diagup\overline{}$$

Device operates continuously at the set up temperature until switched off.

4.4.1   SET P1

Put cursor to the position Program with help of ◄► and switch to P1 with help of ▲. Set the temperature on the °C position within the 0 (-9,9) to 99,9 °C with the step 0,1 °C (100 % only is pre-set in PM models within the 5 to 70 °C). Move the cursor to the low display row and set

the fan speed at the position ⌀ from 10, 20... up to 100 % (the value of 100 % only is pre-set in PM models).

⚠ **ATTENTION!**
Do not reduce the fan speed if it is not necessarily needed. Reduced fan speed may cause reduced accuracy!

4.4.2 LCD READ OUT SHOWN
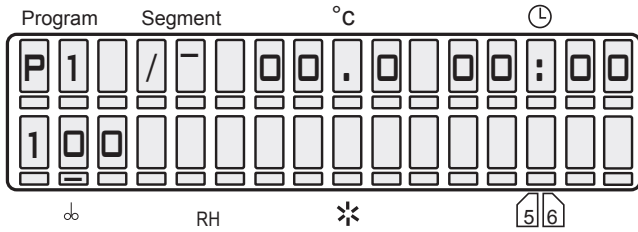
4.4.3 START P1

Press **START/STOP**, a sound will appear and the "windmill" in the first digit of LCD starts running clockwise.

See the following LCD read out:
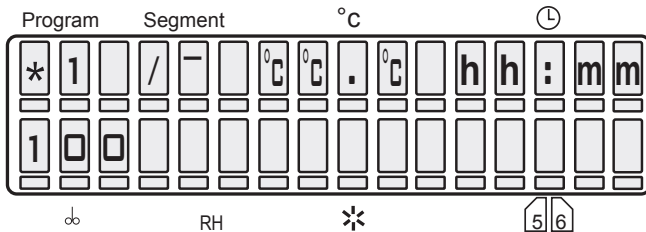
Digit 1 (windmill running) = program running
Digit 7 to 10 = actual temperature in °C.
Digit 12 to 16 = time from the start in hr:min.
As soon as the set values are reached, then run down time is shown.

4.4.4 INFORMATION ON THE SET PARAMETERS DURING THE DEVICE'S RUNNING

Press **X/W** and all information on the set parameters are shown at once. All possible parameters in all possible programs can be set including the one which is presently active, as long as the change is effective.

4.4.5 STOP P1

Press **START/STOP** again.

4.5 PROGRAM P2

SETUP-temperature is reached first, defined time will run down and when finished the heating resp. cooling is turned off.

P 2 = ⌐⌐⌐

The unit operates on the set temperature until defined run down time (max. 9999hr 59min) is over.

4.5.1 SET P2

With help of buttons ◄► put the cursor to the position Program and switch to the program P2. Set the temperature at the position °C. Move the cursor to the position ⊕ and set the run down time between 00hr:00min to 9999hr.

Set the ventilator rate at the position ⌀ tfrom 10, 20... up to 100 % (the value of 100 % only is preset in PM models).

⚠ **ATTENTION!**
Do not reduce the ventilator rate if not necessary. The reduced ventilator rate could influence the regulation of temperature and RH negatively!

4.5.2 LCD READ OUT SHOWN
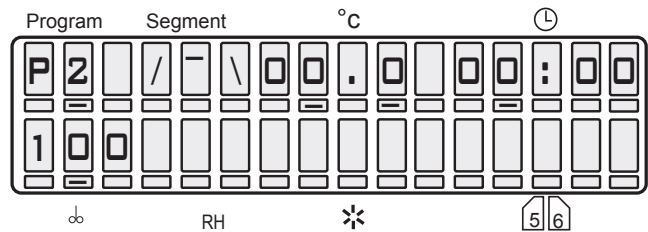
4.5.3 START P2

Press **START/STOP**, a sound will appear and the "windmill" in the first digit of LCD starts running.
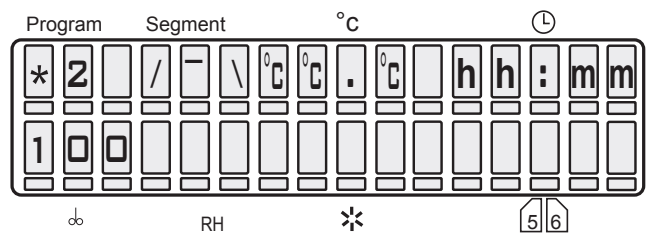
C°C°C = actual temperature
hh:mm = time to reach the set temperature, if the set-up is reached, the rest of the run down time is indicated.

4.5.4 INFORMATION ON THE SET PARAMETERS DURING THE DEVICE'S RUNNING

See paragraph 4.4.4.

4.5.5 STOP P2

Press **START/STOP.**

4.6 PROGRAM P3

The delayed start begins after the defined run down time has been reached.
[The function starts for example at the weekend. Thus your goods are ready on the first day of return to work.]

$$P\,3 = \_\diagup\overline{}$$

The device starts running after the delayed time has run down (max. 9999 hr) and the unit operates at the set temperature. The duration of the set temperature can be limited or unlimited in time.

4.6.1 SETTING THE PROGRAM P3

By means of ◄► set the cursor to the position Program and come over to the program P3.
By means of ◄► place the cursor in the graph to the segment 1, by which the segment is activated (eventually change the position of the cursor by means of ▲). Set the time of delayed start 00 min to 9999 hr 59 min in the fields ⌚.
By means of ◄► place the cursor in the graph and by means of ▲ switch over to the second

segment of the graph _/‾. Set the temperature in the fields °C. Place the cursor to the position

⌚ and set the time of operation between 00h:00min to 9999 hr or unlimited ∞ : ∞. (set the infinity in the following way: set 99 h, put the cursor to the nine in units and depress ▲).

Place the cursor to the position ⸭ and set the ventilator rate between 10 to 100 % (the value of 100 % only is pre-set in PM models).

⚠ **ATTENTION!**
Do not reduce the ventilator rate if not necessary. The reduced ventilator rate could influence the regulation of temperature and RH negatively!

4.6.2 LCD READ OUT SHOWN
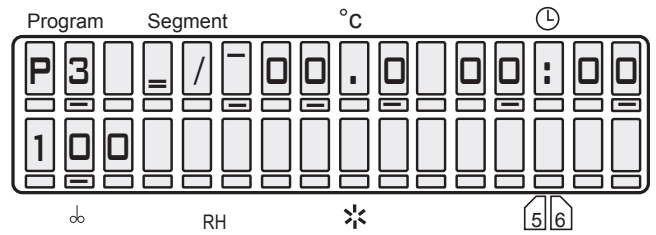
4.6.3 START P3

Press **START/STOP,** a sound will appear and the "windmill" in the first digit of LCD starts running clockwise. See the following LCD read out:

4.6.3.1 P3 AND SEGMENT 1 IN THE GRAPH ARE ACTIVE
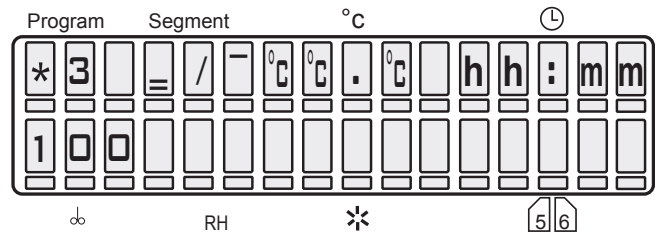
_/‾ = first segment

°C°C°C = actual temper ature
hh:mm = the programmed time, counting down towards zero.

4.6.3.2 P3 AND SEGMENT 2 IN THE GRAPH ARE ACTIVE, THE SEGMENT 1 IS OVER
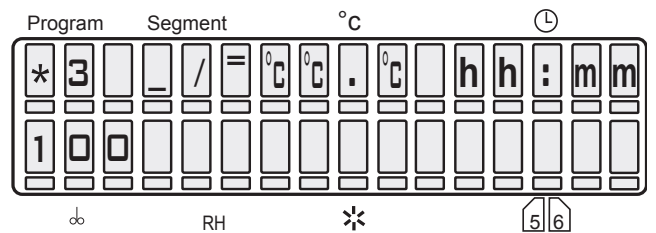
_/‾ = second segment

°C°C°C = actual temperature
hh:mm = time running from the start till the set temperature has been reached.

After the set temperature has been reached, the run down time is shown if the time of the procedure is unlimited. If the time is limited, the rest of the run down time is shown.

4.6.3.3 P3 AND THE THIRD SEGMENT IN THE GRAPH ARE ACTIVE

_/= = third segment
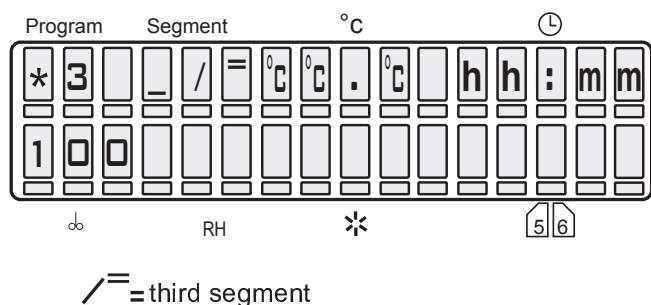
The preset temperature has been reached. If the procedure duration is unlimited, the time passed is displayed. If the procedure duration is limited, the time remaining till its end is displayed. After the programme ends, the temperature in the chamber and the text "End" are displayed. Both the programme end indication and the temperature in the chamber disappear after any panel key pressing.

4.6.4 INFORMATION ON THE SET PARAMETERS DURING THE DEVICE'S RUNNING

See paragraph 4.4.4.

4.6.5 STOP P3

Press **START/STOP**.

4.7 PROGRAM P4

With 2 temperature levels T1 and T2, with a controlled speed of the temperature change (ramps) and with cycling.
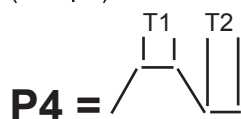
The program operates at 2 temperature levels T1 and T2, the time of operation at T1 is limited, the time of T2 can be limited or unlimited.

4.7.1 SET P4

Index: T0 = initial chamber temperature
T1 = temperature level 1
T2 = temperature level 2

Digit 11 on LCD, placed between temperature and dwell time values, shows the following information:

r = ramp value, can be set on digits 12 – 16 and corresponds with temperature change speed in °C/min
max. value is +3.20 °C/min, when T0 < T1, max. value is –1 °C/min, when T0 > T1
If r = 00.0, no ramp active!
(Variations of maximum ramp rates by different temperatures may appear due to physical limits of heating power.)

t = time available in position 🕐 (00hr:00min – 9999 hr), at T2 the dwell time can be unlimited

c = cycles shown in position 🕐, digits 12 – 13 on LCD (available only at T2, if the dwell time is unlimited).
Possible number of cycles is 01 to 99, eventually ∞ which is the next position after 99 (the cycles are possible on condition, that after the end of the interval on T2 the temperature drops below the value T0).

The value of cycle number is a global value that does not relate to individual segments, it relates to the complete programmed sequence. It can be displayed while displaying any segment on the display, however it does not concern only the displayed segment, but the whole sequence! The minimum number of cycles is 1. If only one cycle is selected, the programme runs as if it was started without cycles. The programme can be started by pressing **START/STOP**. Whichever segment is actually displayed, the programme will start from segment 1.

The program can be started by depressing **START/STOP**; no matter which segment is shown on the display, the program always runs from the segment 0 or 1, if the time of the zero segment is zero. For successful inserting of the cycling process into an already started process it is essential that at the moment of the start "cXX" is shown on the display, where XX is the number of intended runs of the whole sequence. E.g. number two means, that the sequence is carried out and then repeated completely, i.e. it runs twice around. If "cXX" is not shown on the display at the moment of the start and there is shown data on time or on the ramp of the actually displayed program instead, the whole sequence runs once and is not repeated, i.e. there are no cycles.

4.7.2 SET THE SEGMENT FOR T1

4.7.2.1 SET TEMPERATURE T1

Put cursor to the position Program and switch to P4. By pressing ◄►place the cursor on the graph and make sure that T1 (/‾_) is activated. If not, activate it with button ▲.
Change to the position °C - setting the temperature - and set the temperature between.

4.7.2.2 SET THE DWELL TIME OF T1

Move cursor to the digit 11 on LCD and ask for parameters by pressing ▲ Either „r" or „t" will appear (see above). Select „t". Move to the position ⏰ and set the dwell time between 00 hr:00 min and 9999 hr.

4.7.2.3 READ OUT OF T1 AND THE DWELL TIME
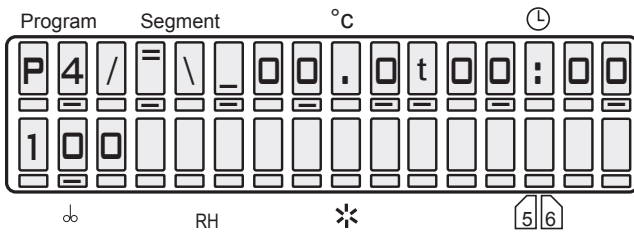
4.7.2.4 SET THE RAMP AT T1

Return the cursor to the digit 11 on LCD and by pressing ▲ select „r". Switch to the position ⏰ and set the required ramp (max. value +3.20 °C/min for T0 < T1). If the ramp is not needed, leave „r" on 0.00. In this case the temperature will be changed at maximum speed. The symbol ± appears automatically in accordance to T0 and T1 relation.

4.7.2.5 READ OUT OF T1 AND THE RAMP
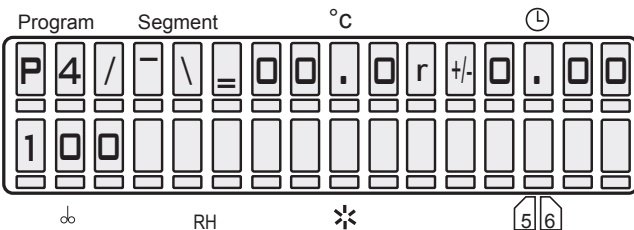
4.7.2.6 SET THE FAN SPEED AT THE TEMPERATURE T1

Put the cursor to the position ⌀ and change the fan speed between 10, 20...100 % (In case of volume 22 only 100 %).

⚠️ **ATTENTION!**
Do not reduce the fan speed if it is not necessarily needed. Reduced fan speed may cause reduced accuracy!

4.7.3 SET THE SEGMENT FOR T2

4.7.3.1 SET THE TEMPERATURE T2

Place the cursor on the graph and make sure that T2 (/‾_) is activated. If not, activate with help of ▲. Change to the position °C – setting of the temperature – and set the temperature.

4.7.3.2 SET THE DWELL TIME OF T2

Put the cursor on the digit 11 on LCD and ask for parameters by pressing ▲. Either „t" or „r" or „c" will appear. Select „t".

Enter the position ⏰ and set the delay time between 00hr:00min and 9999 hr 59 min, eventually ∞:∞.(set the infinity in the following way: set 9999 hr, put the cursor to the nine in units and depress▲).

4.7.3.3 READ OUT OF T2 AND THE DWELL TIME
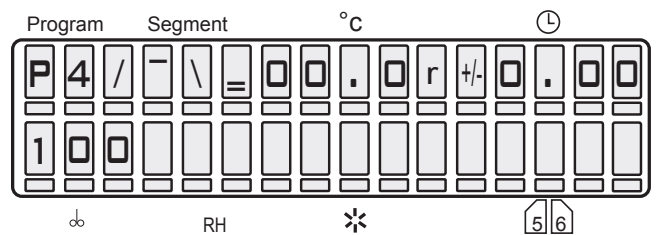
4.7.3.4 SET THE RAMP AT T2

Return the cursor to the digit 11 on LCD and by pressing button ▲ select „r". Switch to position ⏰ and set the required ramp (max. value +3.20 °C/min for T1 < T2). If the ramp is not needed, leave „r" on 0.00. In this case the temperature will be changed at maximum speed. The symbol ± appears automatically in accordance to T1 and T2 relation.

4.7.3.5 READ OUT OF T2 AND THE RAMP
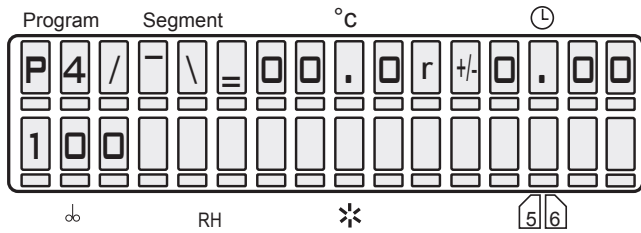
4.7.3.6 SET CYCLES FOR P4

Return the cursor to the digit 11 on LCD and with ▲ select „c". Switch to the position 🕐 set the number of cycles between 02 and 99 (eventually ∞). The number of cycles means, how many times will the cycle run, i.e. value 03 means, that at the end of the first cycle will be the whole process still twice repeated. Cycles will not be used in case „c" is not on LCD in the moment of start.

4.7.3.7 READ OUT OF CYCLES FOR P4
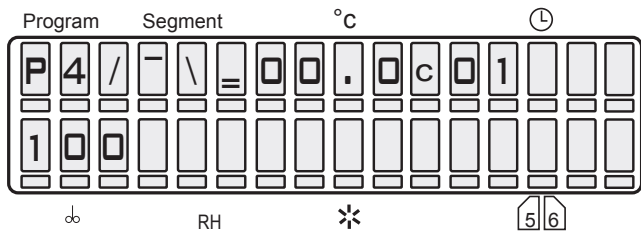
4.7.3.8 SET THE FAN SPEED AT T2

Put the cursor to the position ⚙ and change the fan speed between 10 to 100 % (the value of 100 % only is pre-set in PM models).

⚠ **ATTENTION!**
Do not reduce the fan speed if it is not necessarily needed. Reduced fan speed may cause reduced accuracy!

4.7.4 START P4

⚠ **ATTENTION!**
If cycling is required, „c" must be on LCD when starting the program.

Press **START/STOP**, a sound will appear and the "windmill" in the first digit of LCD starts running clockwise.

See the following LCD read out:
The graph shows the actual state of the program.
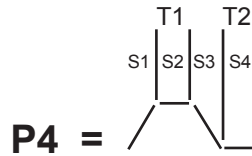
4.7.4.1 S1 IS ACTIVE, TEMPERATURE IS HEADING TOWARDS T1
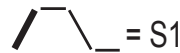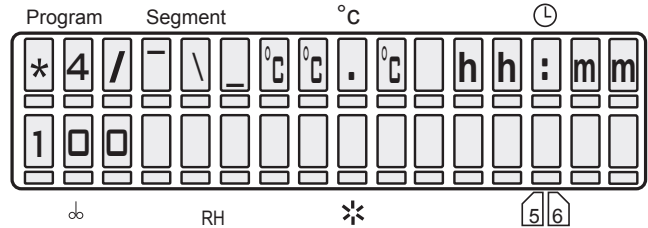
°C°C°C = actual temperature
hh:mm = time since start to reaching T1.

4.7.4.2 S2 IS ACTIVE, T1 HAS BEEN REACHED, DWELL TIME IS RUNNING
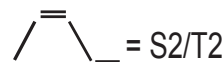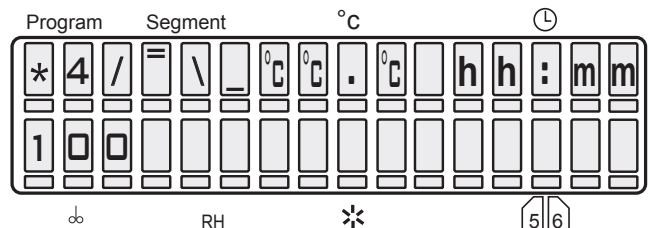
°C°C°C = actual temperature
hh:mm = dwell time at T1 running down towards zero.

4.7.4.3 S3 IS ACTIVE, TEMPERATURE IS HEADING TOWARDS T2
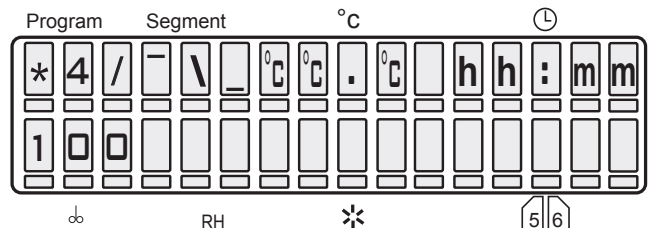
°C°C°C = actual temperature

hh:mm = time running since the end of T1 till it reaches T2.

4.7.4.4 S4 IS ACTIVE, T2 IS REACHED, DWELL TIME AT T2 IS RUNNING
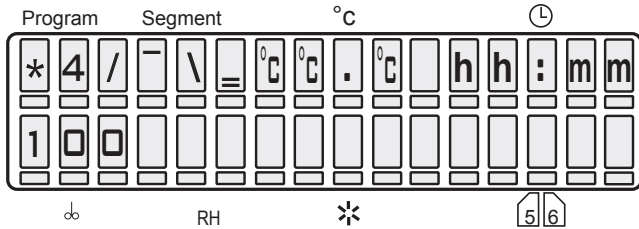
$$\diagup \diagdown_{=} = S4/T2$$

°C°C°C = actual temperature
hh:mm = in case the time of the procedure is unlimited the time of running is shown, in case of the limited time the rest of this time is shown.

4.7.5 INFORMATION ON THE SET PARAMETERS DURING THE DEVICE'S RUNNING

See paragraph 4.4.4.

4.7.6 STOP P4

Press **START/STOP**.

4.8 PROGRAMS P5

4.8.1 DESCRIPTION OF P5 AND ITS CONTROL
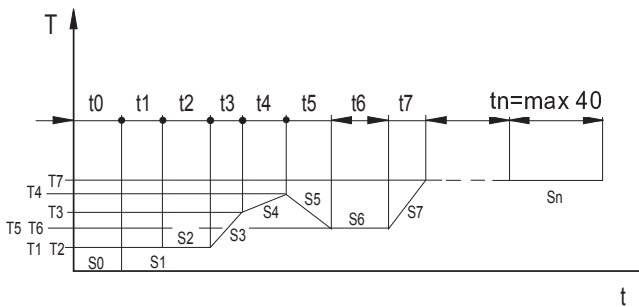
The program consists of 41 segments. Segment 0 is for the delayed start, it is defined only by the time t0. If t0 is 0, there is no delayed start. Segments 1 to 40 are of the same qualities, each of them is defined only by the end temperature, time or speed (ramp), fan rotation speed and depending on the type of the unit also by relative humidity and chamber light.

Each of the segments 1 to 40 can be set as the last and the infinite, that is after the end temperature T_i has been reached, and simultaneously after the time t_i is over either the program is finished or followed by another cycle. Each of the segments 1 to 40 can be set as the last and infinite, that is the program at this segment must be finished by **START/STOP** button.

If the cycle selection is active on LCD at the moment of the start, see fig. Display - state of the program selection - E: cXX, the program comes again to the start after the last segment is over and the whole program is repeated. The definite number of program cycles corresponds with the number behind the letter "c". The segment 0 can be counted into the cycle as well even when it is zero.

Range of parameters:

time	t0	0 h 0 min to 9999 hr
time	t1 to t40	0 h 0 min to 9999 hr or infinite
ramp	r1 to r40	0 to 3.2 °C/min for heating (in case of volume 22 0 to 1 °C/min for heating -2,5 to 0 °C/min for cooling) −1.0 to 0 °C/min for cooling
temperature	T1 to T40	0.0 (-9,9) to 99.9 °C
fan speed	V1 to V40	10 to 100 % with 10 % steps(the value of 100 % only is pre-set in PM models)
light	L1 to L40	ON/OFF (only for the type FC-W,)
number of cycles	C	2 to 99 (eventually ∞ - which is the next position after 99)

DISPLAY - STATE OF THE PROGRAM SELECTION

A: P5	name of the program
B: XX	number of the set segment
C: X	type of the set segment: x time of the zero segment is set to zero, segment will be skipped over > not the last, the end length - see E >I the last, the end length - see E ∞ the last, infinite length
D: XX . X	required temperature of the set segment (! the end temp.)

E: TXX : XX	The required length of the set segment, or
R ± X . XX	The ramp = the required speed of the set segment; or
tXX .XX	The calculated length of the set segment; ramp is default; or
cXX	the number of cycles of the whole program
F: XXX	the fan speed of the set segment
G: XX	disengaged
H: XXX	the light of the set segment
I: XX . XX	the month and day at the moment (impossible to be set in P5)

DISPLAY - RUNNING OF THE PROGRAM

A:*5	the rotating symbol and the program number
B: X	the number of the relevant segment
C: X	the type of the set segment: > not the last, >| the last, the end length - see E ∞ the last, infinite length
D: XX . X	the temperature in the chamber at the moment
E: XX : XX	the segment time at the moment - hours, minutes all segments - counting down from the set value towards zero, in case of an infinite length of the last segment counting up from zero in case the time is higher than 99 hr. 59 min >>: >> is indicated
F: XXX	the fan speed at the moment
G: XX	disengaged
H: XXX	the light at the moment

P5 programme continuation after the preset parameters change or after the programme interruption:

1) The programme runs, for example, in segment 5. You want to change the setting in the segment that has already passed (e.g. segment 4) or in a segment that will run (e.g. segment 6). Press **X/W**, change the setting according to your needs. Meanwhile, the programme continues running in segment 5. Wait for several seconds. The programme returns from the setting mode to the working segment 5 and continues working.

2) The programme runs, for example, in segment 5. You want to change the setting in the running segment 5. Press **X/W** and change the setting of segment 5 according to your needs. Wait for several seconds. The programme returns from the setting mode to the beginning of the working segment 5 and starts working.

3) The programme is running. Power supply is interrupted – either by the main device switch, or in the supply mains. After the power supply is restored, the device continues automatically from the same point as before interruption.

4) When switching off by **START/STOP** or **ON/OFF** and re-switching on, the programme will start running from the very beginning.

Fan run after the programme end:
The fan run can be set in Service 06. Immediate fan switch-off after the programme end has been preset in all models equipped with a fan.

4.8.2 EXAMPLE OF P5 SETTING

Requirement: Operation for 5 working days under temperature of 20 °C, RH = 50 %, light 100 %, 2 weekend days under temperature of 4°C, RH = 60 %, light off. This mode of operation is to be repeated cyclically with maximum possible final repetitions.

Setting in program P5

P	5		0	0	x	-	-	.	-		0	0	:	0	0
1	0	0				O	F	F							

P	5		0	1	>	2	0	.	0	T	0	0	:	0	0
1	0	0					O	N							

P	5		0	3	>	2	0	.	0	T	9	9	:	0	0
1	0	0					O	N							

P	5		0	4	>	0	4	.	0	T	0	0	:	0	0
1	0	0				O	F	F							

P	5		0	5	>|	0	4	.	0	T c	4 9	8 9	:	0	0
1	0	0				O	F	F							

Caution!
In time and temperature setting in programme 5, it is recommended to observe the following principles:
If you need to change the temperature in an already set chain of segments, pay attention to

whether the nature (rising or decreasing) and/or the subsequent or preceding ramps (marked "R" or "t") are in accord with the expected change.
If not, cancel the ramp and set it again only after the temperature setting.
The segment temperature shall be set at first and only then the ramp. If the ramp ("R" or "t") is decisive for the segment, then we should switch to time ("T" or "r")at first if we want to change the temperature.
When setting a chain of segments, we should proceed from the lower segment to the higher one.

4.9 PROGRAM P6

4.9.1 DESCRIPTION OF P6 AND ITS CONTROL
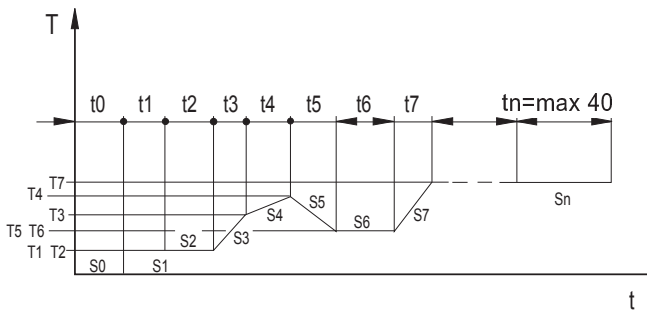
valid for products since 22.04.2009 with 41BB and newer memory).

P6 programme works with segments the duration of which is determined by real time and calendar date.
1. P6 programme consists of 40 segments and follows strictly the real time, i.e. follows the set programme independently of the time of start, power supply failures, restarts after an error, etc.
2. The segment 0 (so-called "delayed start") is compulsory and time and year is set in it; it can even be set to the past and means the "programme beginning". The segments 1 to 39 have equal properties; each of them is determined by the <u>final</u> temperature, time or speed (ramp), ventilator rotation speed, relative humidity (RH) and, according to the device model, by the exposure lighting of the chamber as well.
3. If cycling is switched on, the segment end times are shifted after the end of each cycle (forward one duration of the programme). The control of parameters during the device run (after **X/W** pressing), therefore, shows updated parameters.

4. The whole P6 programme (all segments at once) can be shifted by means of Service 64 by any time interval both to the future and past and there is no need to rewrite all segments before a new start of the programme.

4.9.2 PROGRAMME SETTING

Segment 0 is compulsory, i.e. it cannot be switched off. This condition is necessary for defining both the programme beginning and overall duration, which is necessary for cycling.

When setting the delayed start, year is set in the bottom line. The programme start thus can be set even to the past. Year is always displayed at the same place (7th position on the bottom line); the sequence month-day (DD-MM or MM-DD) is set in Service 3

| P | 6 | | 0 | 0 | > | 2 | 2 | . | 5 | | 0 | 9 | : | 0 | 0 |
| 1 | 0 | 0 | | | | 2 | 0 | 0 | 9 | | 1 | 8 | - | 0 | 2 |

or

| P | 6 | | 0 | 0 | > | 2 | 2 | . | 5 | | 0 | 9 | : | 0 | 0 |
| 1 | 0 | 0 | | | | 2 | 0 | 0 | 9 | | 0 | 2 | - | 1 | 8 |

In other segments, RH and/or lighting is set in the bottom line. Years will be calculated at the programme start, e.g.

| P | 6 | | 0 | 1 | > | 2 | 2 | . | 5 | | 0 | 9 | : | 0 | 0 |
| 1 | 0 | 0 | | O | F | F | | O | N | | 1 | 8 | - | 0 | 2 |

or

| P | 6 | | 0 | 1 | > | 2 | 2 | . | 5 | | 0 | 9 | : | 0 | 0 |
| 1 | 0 | 0 | | O | F | F | | O | N | | 0 | 2 | - | 1 | 8 |

Each of the segments 1 to 40 can be set as the last one, i.e. after the end temperature Ti is reached and, at the same time, time ti lapses, either the programme ends or the subsequent cycle follows.
Each of the segments 1 to 40 can be set as the last and indefinite one, i.e. the programme must be terminated at this segment by the **START/ STOP** button.
If there is an active selection of cycles on the display in the moment of the programme start, (see the Figure Display – programme selection – E: cXX), then – during the programme run – the device will shift to the beginning again after termination of the last segment and the whole programme is repeated. The overall number of

the whole cycle courses equals to the numerical value after the letter "c".

The cycles number value is related to the whole programmed sequence. It can be displayed in the presence of any segment but it does not relate to the displayed sequence only, but to the whole sequence!

The minimum number of cycles is 1. If only one cycle is selected, the programme will run as if it was started without cycles.

The programme can be started by the "Start" button. It will always be started from segment 1 (if the zero segment time is zero) regardless of the segment displayed. However, it is of key importance for successful inclusion of cycling in the activated process that the display must show "c XX" at the moment of the programmed sequence start, where XX is the number of intended courses of the whole sequence. For example, the number 2 means that the sequence will be carried out and then repeated once more.

If there is not "c XX" displayed at the moment of switching on by means of the **START/STOP** button, but time or ramp of the actually displayed segment are displayed, the whole sequence will run only once.

The time is not determined as a segment duration but it is determined by the hour, minute, day, and month of its end, i.e. by the real time. If the set time and date of the segment is lesser than the time and date of the previous segment, the segment will end no sooner than in the subsequent year. The actual time and date (including the year) must be set to the system (regulator) in the service mode. Rising to the set relative humidity starts after the set temperature is reached.

Range of parameters:

time	t1 to t40	each of segments up to a year
ramp	r1 to r40	0 to 3.2 °C/min for heating −1.0 to 0 °C/min for cooling
temperature	T1 to T40	0.0 to 99.9 °C
fan speed	V1 to V40	10 to 100 % with 10 % steps
relative humidity	RH1 to RH40	10 % to 90 % with 10 % steps
light	L1 to40	0 % (OFF) to 100 % (ON) with 1 % steps
number of cycles	C	2 to 99 (eventually ∞ - which is the next position after 99

DISPLEJ - STATE OF THE PROGRAM SELECTION

A: P6	name of the program
B: XX	number of the set segment
C: X	type of the set segment: x segment will be skipped over > not the last, the end length - see E, I >I the last, the end length - see E, I ∞ the last, infinite length
D: XX . X	the required temperature of the set segment (! the end temp.)
E: TXX : XX	Hour and minute of the end of the set segment; or
R ± X .XX	The ramp = the required speed of the set segment; or
r± X .XX	The calculated hour and minute of the end of the set segment; ramp is default; or
cXX	the number of cycles of the whole
F: XXX	the fan speed of the set segment
G: XX	disengaged
H: XXX	the light of the set segment
I: XX . XX	the month and day at the moment (impossible to be set in P5)

DISPLAY - RUNNING OF THE PROGRAM

A: ✳ 6	the rotating symbol and the program number
B: X	the number of the relevant segment
C: X	the type of the set segment: > not the last, >| the last, the end length - see E ∞ the last, infinite length
D: XX . X	the temperature in the chamber at the moment (°C)
E: XX : XX	the segment time at the moment - hours, minutes all segments - counting down from the maximum value towards zero, in case of an infinite length of the last segment counting up from zero in case the time is higher than 99 hr. 59 min >>:>> is indicated

F: XXX	the fan speed at the moment (%)
G: XX	disengaged (%)
H: XXX	the light at the moment (%)

⚠ **CAUTION!**

When setting the time and temperature parameters in the programs 6 it is suitable to follow the following principles:

If there is a need to change the temperature in an already set chain of segments, pay attention to whether the nature (rising or decreasing) and/or the subsequent or preceding ramps (marked "R" or "t") are in accord with the expected change. If not, cancel the ramp and set it again only after the temperature setting.

The segment temperature shall be set at first and only then the ramp. If the ramp ("R" or "t") is decisive for the segment, then we should switch to time ("T" or "r") at first if we want to change the temperature.

When setting a chain of segments, we should proceed from the lower segment to the higher one.

4.9.3 PROGRAMME START

After the programme starting (by the **START/STOP** button or order from WC3), years of other segment will be calculated and the test of the last segment time will be then performed.

Three situations may occur:
1. The actual time is lower than the zero segment time – waiting phase is started; the whole programme will run.
2. The actual time is higher than the zero segment time but lower than the last segment time – all segments that should be terminated at the given time will be skipped and that segment which corresponds to the actual one will be started. Duration of such segment will be adapted (shortened) so as to terminate at the set time ; LCD displays the time remaining to the segment end.
3. The actual time is higher than the zero segment time – warning audible signal (Operator Error) sounds and the programme does not start.

4.9.4 POWER SUPPLY FAILURE

After a power supply failure, the following situations may occur:
1. Programme without cycles; the actual time is lower than the last segment time. Those segments that should already be terminated will be skipped, duration of the actual segment will be adapted (shortened).
2. Programme without cycles; the actual time is higher than the last segment time. The programme will be terminated (all segments will be skipped because the programme "ended" during the power supply failure); LCD displays "End of P6".
3. Programme with cycles; the actual time is lower than the last segment time. See point 1 above. The programme will continue with a shortened "actual" segment; subsequent cycle runs normally.
4. Programme with cycles; the actual time is higher than the last segment time. The programme definition is shifted by the appropriate number of P6 programme durations so that the programme could continue.

The operation then is like in point 3 above.

4.9.5 AUTOMATIC SHIFTING OF P6 PROGRAMME BEGINNING IN CYCLING

After each cycle is terminated, the programme definition is recalculated (all segments are shifted forward by one programme duration). When checking the parameters during the programme run by **X/W** pressing, the actual P6 setting is displayed. After the last cycle or programme without cycling ends, the parameters will not be shifted, i.e. the last parameters according to which the programme was running are always displayed after the programme end or interruption (with or without cycles).

4.9.6 MANUAL SHIFTING OF P6 PROGRAMME BEGINNING - USER SERVICE 64

Durations of all segments remain unchanged.

S	e	r	v	i	c	e		6	4				
S	h	i	f	t	i	n	g		p	r	o	g		P	6

After the programme is started (**START/STOP** – see), time and whole date of the zero segment are displayed.

S	e	r	v	i	c	e		6	4				
0	9	:	0	0		2	0	0	9	-	0	2	-	1	8

or

	S	e	r	v	i	c	e		6	4					
0	9	:	0	0		2	0	0	9	-	1	8	-	0	2

or

	S	e	r	v	i	c	e		6	4					
0	9	:	0	0		0	2	-	1	8	-	2	0	0	9

or

	S	e	r	v	i	c	e		6	4					
0	9	:	0	0		1	8	-	0	2	-	2	0	0	9

Any parameter can be changed (a year can be changed by one year forward or backward as compared to the actual year) and by **X/W** pressing, the programme will be shifted by the difference between the new and original segment time ("Done" is displayed).

	S	e	r	v	i	c	e		6	4					*
D	o	n	e												

The programme can be shifted both forward and backward. Time (hh:mm) is always displayed at the beginning of the line; date is displayed in a format chosen in the user service 3 (i.e. 4 possibilities of the sequence year-month-day). This differs from the segment 0 setting where the year is always at the first place.

4.9.7 EXAMPLES OF P6 PROGRAMME SETTING

Example 1: Day and night phase with equal temperature
Requirement: Constant temperature 22 °C, light ON from 9:00 AM till 5:00 PM, light OFF from 5:00 PM till 9:00 AM of the next day, indefinite number of cycles

Programme start on 18.02.2009 at 9:00 AM. At the programme start, the display must show the setting „c oo"(cycling activation).

P	6		0	0	>	-	-	.	-	T	0	9	:	0	0
1	0	0				2	0	0	9		0	2	:	1	8

P	6		0	1	>	2	2	.	0	T	0	9	:	0	0
1	0	0						O	N		0	2	:	1	8

P	6		0	2	>	2	2	.	0	T	1	7	:	0	0
1	0	0						O	N		0	2	:	1	8

P	6		0	3	>|	2	2	.	0	T c	0 9 / c 0 0	:	0 0
1	0	0						O	F	F	0 2	.	1 9

Example 2: Day and night phase with different temperatures.
Requirement: from 9:00 AM till 5.00 PM Temperature 25 °C, light ON 100 % from 9:00 AM till 5:00 PMof the next day; temperature 22 °C, humidity 70 % RH, light OFF indefinite number of cycles.

Programme start on 18.02.2009 at 9:00 AM. At the programme start, the display must show the setting „c oo"(cycling activation).

P	6		0	0	>	-	-	.	-		0	9	:	0	0
1	0	0				2	0	0	9		0	2	:	1	8

P	6		0	1	>	2	5	.	0		0	9	:	0	0
1	0	0					O	N			0	2	:	1	8

P	6		0	3	>	2	2	.	0		1	7	:	0	0
1	0	0					O	F	F		0	2	:	1	8

P	6		0	4	>|	2	2	.	0	c	0 9 / 0 0	:	0 0
1	0	0						O	F	F	0 2	.	1 9

- The programme can be started at any time between 9:00 AM on 18.2.2009 and 9:00 AM on 19.2.2009 without any adjustment of the programme definition.
- If the required programme is to be started after 9:00 AM on 19.2.2009, the date only is to be changed in Service 64 (the programme duration is 24 hours, i.e. all times will remain); the actual time should be taken into account. If the programme is to be started before 9:00 AM, the start should be set to the previous date; otherwise, the waiting segment begins (delayed start) and the cabinet will start to temper no sooner than at 9:00 AM. When starting after 9:00 AM, the date in Service 64 is simply set to the actual date.
- In case of a power supply failure, the programme will always continue in that time in which it would be if the programme run had not been interrupted, i.e. day and night phase with breaks at 9:00 AM and 5:00 PM will be ensured.

Example 3: Week cycle
Requirement: 5 working days per week – operation at the temperature 20 °C, light 100 %, 2 weekend days at the temperature 4 °C, light off; this course shall be repeated cyclically for 99 times.

Setting in P6 programme
Start on Monday 30.10 at 08:00 AM

P	6		0	0	>	-	-	.	-		0	8	:	0	0
1	0	0				2	0	0	9		1	0	:	3	0

Monday morning at 08:15 AM

P	6		0	1	>	2	0	.	0	T	0	8	:	1	5
1	0	0						O	N		1	0	.	3	0

Saturday morning at 08:00 AM

P	6		0	2	>	2	0	.	0	T	0	8	:	0	0
1	0	0						O	N		1	1	.	0	4

Saturday morning at 08:15 AM

P	6		0	3	>	0	4	.	0	T	0	8	:	1	5
1	0	0						O	F	F	1	1	.	0	4

Monday morning at 08:00 AM

P	6		0	4	>|	0	4	.	0	T	0	8	:	0	0
										c	9	9			
1	0	0						O	F	F	1	1	.	0	6

Note: The 15-minute delay between 8:00 AM and 8:15 AM was chosen on condition that it is sufficiently long enough for the transfer from one temperature to another If it is not the case, an experimentally ascertained delay must be set.

4.9.8   SUMMER/WINTER TIME

The regulator does not take account of the time changes. When the time is changed to the summer/winter time, the user must change the time manually in Service 3, or the time can be set in a remote way. The programme of the recording WarmComm 3-F SW synchronizes the regulator time with the time of a PC, if connected, with an installed recording SW (the set regulator time equals the PC time). Any time change during the programme run, however, does not influence its course because the durations of the segments are calculated only at the programme start (and in the examples above, the day and night phase will be changed at 6:00 PM and 10:00 AM).
To match the times fully, the programme must be restarted either by stopping and immediate starting, or by power supply failure simulation (by the power supply switch).

Service 64 – P6 programme start shifting
The whole P6 programme (all segments at once) can be shifted by any time interval both to the

future and past. The setting is described in the P6 programm.

4.10   MEASURED VARIABLES DISPLAYING DURING THE PROGRAMME RUN

In devices with a greater number of measured variables, all variables cannot be displayed at once. Their values may be displayed during the programme run consequently by pressing the ◄ or ► button. The given variable is displayed for several seconds. Its displaying can be extended by repeated ▲ pressing.
In devices with a greater number of measured variables, all variables cannot be displayed at once. Their values may be displayed during the programme run consequently by pressing the ◄ or ► button. The given variable is displayed for several seconds. Its displaying can be extended by repeated ▲ pressing.

Example: FRIOCELL with one flexible temperature sensor:
1. Cycle: xx/yy   where xx means the number of the just running cycle; yy is the overall number of the preset cycles
2. Temp_1 Regulatory sensor temperature [°C]
3. Humid RH [%]
4. Temp_2 Flexible sensor temperature [°C]
5. T_Sfty_Th Protective sensor temperature [°C] (if the control of the difference between the measured temperature and the regulatory sensor has been preset).

4.11   ERROR MESSAGES

Error messages are placed on LCD and have the following meaning:

Error 00	PT 1 (regulatory sensor) – not connected, broken, or short-circuited. Call the service.
Error 01	PT 2 (flexible sensor a) – not connected, broken, or short-circuited. Call the service.
Error 02	temperature is below the preset lower limit. See service 41 in the instructions for use.
Error 03	temperature is above the preset lower limit. See service 41 in the instructions for use.
Error 04	protective thermostat is activated; heating is disconnected. See service 07 in the instructions for use.

Error 05	protective thermostat setting. See service 07 in the instructions for use. The error can be caused by starting a programme whose temperature is out of the limits specified by the protective thermostat setting, or by a HW defect.
Error 10	controlling programme. Call the service.
Error 11	communication Call the service.
Error 12	PT 3 (flexible sensor b) – not connected, broken, or short-circuited Call the service
Error 19	– PT 4 (flexible sensor c) – not connected, broken, or short-circuited Call the service.
Error 20*)	door cannot be blocked See service 58 and chapter 10.15 in the Instructions for use.
Error 21*)	door cannot be unblocked See service 58 and chapter 10.15 in the Instructions for use.
Error 27	PT 5 (flexible sensor d) – not connected, broken, or short-circuited Call the service.
Error 28	great temperature difference between the regulatory sensor and protective thermostat Call the service.

*)......... This is a soft error
**)........ Error type may be set by the user.

* It is a soft error. The difference between the soft error and the hard one is, that after the soft error occurs and is reported the whole running process is not stopped, only the system is eliminated, whose element has been detected as defective. Other systems continue their controlled function – heating, cooling, ventilator, lighting.

If such an error occurs – the regulator (without interrupting the operation) informs – acoustically and optically by means of display – the operator. The acoustic signal is the same as in case of the hard error, the optical signal differs (from reporting the hard error) by flickering of the appropriate message on the display. In case of hard error it is shown permanently.

The soft error is used, because its cause can be removed by a simple correction and it is not necessary to interrupt the running process. E.g. the hose of the drain from the steam generator is rolled up improperly, which prevents the water to go out when turbidity is removed, on the other hand it is not necessary

to interrupt the running process by a hard error.

If a "soft" error occurs, you can proceed in following ways:
1) By depressing **X/W** only the acoustic signal is suppressed so that it does not disturb. The humidity generating elements are blocked, the unit does not regulate the humidity. Other functions are kept and controlled.
2) By depressing **START/STOP** -both the acoustic signal is suppressed -and the humidity generating elements are unblocked. During the "soft" error the button **START/STOP** has not the function of stopping the operation. After depressing **START/STOP**, if the soft error cause is eliminated, the unit can continue the operation inclusive the humidity. If another error occurs in future, it will be signalized only optically, not acoustically.
3) By disconnecting the unit from mains and connecting it again (e.g. with the main switch) during the operation the elements of the humidity automatics are initialized and the unit starts running automatically in the same way as in case of the fall-out loss of electrical energy and the operation continues from the point of interruption. In this case another eventual "soft" error will be signalized both acoustically and optically.

If "soft" errors occur repeatedly, please inform your service organization.

4.12   PRINTING THE PROTOCOL

DPT 6333 printer is recommended for records printing. Other types can be used as well, such as CITIZEN, model iDP 3110-24 RF-A. Printing into a PC application (Printer Archiv) is allowed as well.
By setting the printer interval you give the time intervals of printing actual values of temperature in the chamber. Length of this interval is displayed in the head of the protocol.
Printer interval can be set - see paragraph Basic Setting, point Service 04.
1. Connect the printer to the device by means of a cable with a serial connector (RS-232C); use the printer socket (on the rear side of the extension piece/device). Then connect the other end of the cable to the connector in the rear part of the printer. Connect the printer to the electric power mains by means of an adapter. Some types require a switch on the right side of the printer to be switched on.

The POWER and SEL indicators light up. The printer is in the ON-LINE mode. Paper is fed by pressing the LF button (in the OFF-LINE mode only, i.e. after the SEL button pressing – the SEL indicator turns off. To renew the ON-LINE mode, the SEL button must be pressed – the SEL indicator lights up). The printer can print in the ON-LINE mode only!

2. Follow Service 04 – Printing Interval Setting and set the required interval either up or down.
   There is a head printed by the printer, the head comprises: type of unit, set temperature, eventually set ramp, number of cycles, ventilator rate, RH, light and the selected printing interval. Below the head following values are printed:
   time since the start of the program, real temperature in the chamber (below eventually temperature on the flexible sensor), RH.

A new head is printed if:
- the cooling incubator is started
- some parameter has been changed

3. You can stop the printing by setting the printing interval to Printer off.

4. In case of a mains fall-out and restoring the supply again there is → Mains fall-out printed. The printing intervals start to be counted since the moment of restoring the current supply.

5. In case of fall-out of the printer or switching the printer off there is no report printed after the switching on or restoring the supply.

DPT-6333-V24 does not require any microswitch setting by the user.
Setting the DIP microswitches of the printer CITIZEN iDP 3110: the second DIP microswitch from the left is in the upper position, the other three ones are in the lower position OFF.
Setting the DIP microswitches of the printer CITIZEN CBM 910: OFF / ON / OFF / ON / OFF / OFF / ON / OFF (from the left to the right).
Setting the DIP microswitches of the printer CITIZEN CBM910 II: OFF/ON/OFF/OFF/OFF/OFF/ON/OFF (from the left to the right).
After any change of setting, the printer must be switched off and on either by the switch, or by disconnecting from the power supply.
A different type of the printer must be adjusted with the help of the printer´s manual and the data on the interface RS232C shown on the case.

4.13 CHECKING THE FUNCTION OF THE SAFETY THERMOSTATS

According to the procedure described in Service 07 – Setting the safety thermostat, set the limit temperature 85 °C and confirm with the chip card SO. In P1 set the temperature 80 °C and start the program. After reaching the set temperature wait ca. 10 minutes, stop the program and enter the Service 07; in Service 07 set the limit temperature to 70 °C, confirm the setting with the chip card SO. The unit operates according to the description in Service 07 -Setting the safety thermostat: on the display "Safety thermost" etc.

4.14 ADDITIONAL FUNCTIONS

4.14.1 DOOR OPENING CONTROL

The door opening is signalled as follows:
If the alarm is switched off and the door is opened during the programme run, the display will show a flashing message "Door open". If the alarm is switched on, it sounds in addition to the displayed message.
The alarm can be cancelled temporarily by pressing any ◄ ▲ ► button. By the door closing, the alarm is renewed; i.e., the operator will be informed acoustically about any subsequent door opening again.
The fact of the door opening during the programme run is registered in the connected printer record or in the SW WarmComm record in the connected PC.

See also Service 62 – Alarm Setting.

4.14.2 KEYBOARD BLOCKING

The keyboard can be blocked (to prevent an incidental activation of some function) by concurrent pressing the **X/W** and ◄► buttons. Unblocking is performed in the same way.

5 MAINTENANCE

5.1 SEALING EXCHANGE AND DOOR SETTING

Take the whole sealing off, begin in the middle bottom part. Fix the new sealing on the edge of the chamber, begin in the middle bottom part.

Slam the sealing between the chamber and the outer cover. To check up the tighteness place a sheet of paper between the door and the chamber when closing the door. Pull it out slowly, you should feel a relatively strong resistance.

The door is adjustable at all four points:
– in the left upper part by means of bolts and nuts – sketch position 3
– in the left lower part by means of bolts and nuts – sketch position 4
– in the right upper part by means of screw with internal hexagon – sketch position 2
– in the right lower part after loosening the screw with internal hexagon adjusting in front- back direction of the door hinge is possible – sketch position 1.
In case of volume 22, only one adjustable screw is on the side of the door closure.

Adjust the door so that when closed the rubber sealing of the chamber would fit to the sheet of the floating door along the whole perimeter. To check it up place a sheet of paper between the sealing and the metal sheet of the floating door before it is closed, it is possible to take the paper out against a small resistance.
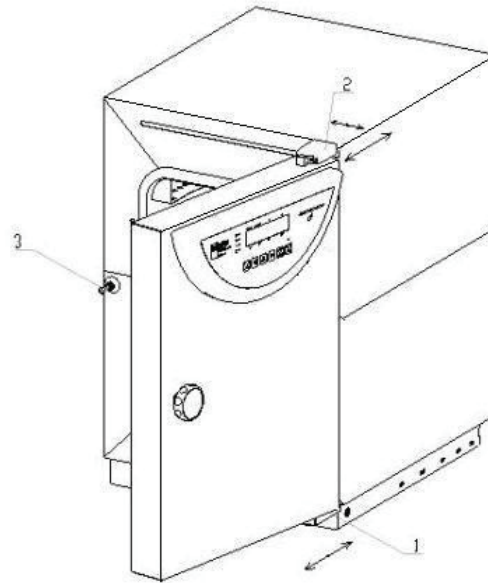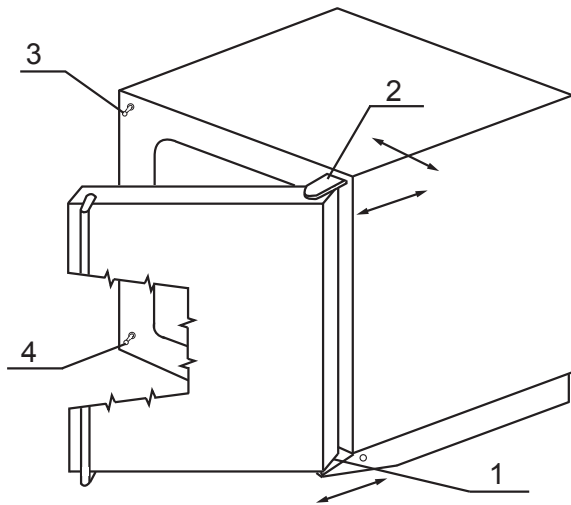
5.2 A CONTAINER COLLECTING THE CONDENSED WATER STEAM

During the operation in the cooling mode water steam condensed on the heat exchanger runs down on the inclined chamber bottom with a discharge tube. Under the tube there is a condensate dish without discharge slid in the guides on the outer side of the jacket bottom. During the operation of the cabinet follow its filling and after a filling-up pour the condensate out in the drain. In built-in-door light types there

is also a shaped sheet with a discharge to the condensed water steam container at the lower part of the door. In case of volume 22, no dish is available.

5.3 CLEANING THE COOLING INCUBATOR

Clean the incubator with a soft cloth. Use soap and water or customary detergent for the exterior. For the interior use acidfree detergent or disinfectant approved by the chief hygienist of the state. Clean the incubator only in ambient temperature. Take the sheets of the inner chamber out as following: top as first, then sheets on the sides, rear cover and bottom cover - see the photo.

VOLUME 22:
Unscrew the screws in the rear chamber part. By hitching up towards the door, remove the bottom and ceiling from the instrument. Then, it is possible to put out the back. In case of leakage of some contaminated stuff into the chamber the user is responsible for a proper decontamination of all contaminated surfaces with a suitable and approved disinfecting agent.
Before using another cleaning or decontamination method, with the exception of the by us recommended methods, the user should consult the producer, whether the considered method could not cause a damage to the device.

5.4   MELTING

During the operation with temperatures below 10 °C there occurs a gradual frosting of the condensate on the cooling exchanger. The melting is carried out by putting the cabinet out of operation untill the full defrosting of the cabinet is achieved. The defrosting can be checked visually after removing all sheets of the inner chamber. The melting can be accelerated by short heating the chamber on condition that the temperature rise in the chamber does not cause a damage to the treated material eventually placed in the chamber.
Defrosting can be accelerated by short chamber heating under the condition the temperature increase in the chamber does not damage the load, if there is any. Icing is not expected in PM models under the temperature of 5 °C and up.

The condensation on the ribs of Peltier module may emerge after long-term use of temperatures round about 5 °C. After the finishing of work in the mode round about 5 °C, we recommend to increase the temperature and, at the same time, to let the ventilator in the operation, whereby the ribs and chamber became dry.

5.5   INSPECTION OF ELECTRICAL COMPONENTS

The heat unit cabinets are intended to work in a basic/normal environment. The manufacturer recommends a one-year inspection period unless the local regulations require otherwise.

Inspection activities:
Check of the electrical equipment, especially the power supply, the terminal clamps and the protective clamp. Undamaged state of the conductors insulation (e.g. due to rubbing, burnout etc.) and firm connection of the conductors in the clamps. The resistance of the protective connection shall be < 0.1 Ohm; the resistance of the power supply shall not be taken into account.

If the cabinet is placed in another environment, the inspection must be performed in accordance with the local standards.

A service overhaul depends on an agreement between the customer and the service organization.

6 TECHNICAL DATA

6.1 CHAMBERS

FRIOCELL (FC) M								
Technical data Inner dimensions Chamber, stainless steel	volume	cca l	22	55	111	222	404	707
	width	cca mm	224	400	540	540	540	940
	depth	cca mm	307	370	370	520	520	520
	height	cca mm	296	350	530	760	1410	1410
Trays, stainless steel *)	racks standard equipment Min. distance between trays	max. No pcs. included cm	4 2 60	4 2 70	7 2 70	10 2 70	19 2 70	19 2 70
Maximal load	screens steel sheet racks in total	kg/screen kg/rack kg/case	10 10 25	20 20 50	20 20 50	30 30 70	30 30 100	50 20 130
Number of doors	outer and inner door	No	1/1	1/1	1/1	1/1	1/1	2/2
External dimensions (including door and handle)	width depth height	cca mm cca mm cca mm	406 592 605N	620 640 820N	760 640 1100K	760 790 1330K	1010 790 1920K	1460 790 1920K
Mass	net brut	cca kg cca kg	33 38	80 99	101 131	135 156	233 261	273 305
Electricity	max. power **) mains 50/60 Hz Protective system	W V	130 100-240 IP 20	1130 230 IP 20	1130 230 IP 20	1130 230 IP 20	2250 230 IP 20	2500 230 IP 20
Technical data								
Working temperature***)	from 0.0 °C to °C	°C	5-70	99	99,9	99,9	99,9	99,9
Temperature accuracy	at 10 °C accuracy in space at 37 °C accuracy in time	cca (±) °C cca (±) °C	<0,3 <0,3 <0,1	<0,5 <0,5 <0,2	<0,5 <0,5 <0,2	<0,5 <0,5 <0,3	<1 <1 <0,3	<1 <1 <0,4
Heating/up time to	to 37 °C from the ambient temperature	min	<10	23	24	25	26	27
Cooling/down time	from 22 °C to 10 °C	min	<31	<14	<21	<21	<21	<21
Recovery time after 1 min. door open	at 37 °C and at 50 °C	min	4	4	4	4	4	4
Heat emission	at 37 °C	cca W	50	62	70	97	123	148
Noise level of the complete FC		dB	53	46	46	50	56	58

Note:

All technical data are related to 22 °C of ambient temperature and ± 10 % voltage swing. The volume 22 cools ca. 20 °C under the ambient temperature (it uses the Peltier effect.) Peltiér´s module serves for cooling and heating.

* Approx. 50 % of the tray area can be filled in a way a uniform air circulation is enabled inside the chamber.

**) Compressor + condenser + electromagnetic valves + ventilator (s).

***) When using probes for measuring of photo values, the upper operation temperature is limited to 75°C. The maximal adjustable temperature for protective thermostat is 80 °C.

6.2   SHELVES WITH EXPOSURE LIGHTING

The device FC B2V M		FC 111	FC 222	FC 404	FC 707
Width x depth x height of the shelf	mm	539 x 350 x 90	539 x 500 x 123	539 x 500 x 123	939 x 512 x 93
Number of fluorescent tubes	pc/1 shelf	5	8	8	12
Max. number of shelves in the chamber	pc	2	2	3	3
Overall input power	W/1 shelf	75	120	120	180
Fluorescent tube length/ diameter	mm	450 / 26	450 / 26	450 / 26	450 / 26
Applicable VIS source (fluorescent tube): range// colour temperature		400 - 700 nm// 2700 / 3000 / 4000 / 6000 °K			
Applicable UV source (fluorescent tube): range//maximum		300 - 400 nm // maximum 350 nm			
VIS exposure parameters					
Tube type (power input)	W/pc	Luxline Plus-colour temperature 4000°K // 15 W			
Lighting In the middle of the shelf below the source, in the distance of 10 cm from the light source	kLux±10%	16,5	18	18	20
UV exposure parameters					
Tube type (power input)	W/pc	Black light blue BLB // 15W			
Lighting : In the middle of the shelf below the source, in the distance of 10 cm from the light source	mW/cm^2 ±10%	5	5	5	5
Working temperature range (°C) **The shelves are switched on.**					
1 shelf 2 shelves 3 shelves	°C °C °C	0 - 99,9 15 - 99,9 ---	0 - 99,9 15 - 99,9 ---	0 - 99,9 --- 8 - 99,9//	0 - 99,9 --- 8 - 99,9//
Working temperature range (°C) **The shelves are switched off.**					
0 – 99,9// 10 - 90					
Level of protection	°C	IP65	IP65	IP65	IP65
Number of connectors	pc/1 exposure shelf)	2	2	2	4

All data apply to an empty chamber (without samples on the screens) and the ambient temperature of 20 - 22 °C; 100 % of the fan revolutions; supply voltage 230 V ± 10 %.
The actual quantities of the photometric quantities during the experiment must be measured by an independent measuring device.

7 WARRANTY, SERVICE

The guarantee period is marked on the certificate of warranty.

The warranty refers to manufacturing defects or material defects on condition that:
- the product has been installed and used in accordance with the Instructions for use,
- the cause of the defect was not a insufficient maintenance, unqualified intervention in the device or damage through external impacts.

The warranty does not relate to natural wear of material and to consumer material, such as e.g. door sealing, materials for recording devices, accumulators etc. If a defect occurs, draw claims to a warranty repair directly at the nearest MMM service center. Please mention the device name and type, its serial number and how the defect appears (error message, printer record).Provided the warranty conditions are fulfilled there follows, according to the consideration of the service center, the cost-free repair or replacement of the defective part.

If the prescribed maintenance is complied with, the device life exceeds 10 years. At the same time, this is the period for which the manufacturer bears objective responsibility within the meaning of EU Directive no. 85/374/EEC for any potential damage caused by the device operation. If you decide to continue using the device after the said period expiration, ask the manufacturer or an authorized service for an expertise whether or not the device can still be used regarding its wear and tear, technical condition and service availability.

8 TRANSPORT AND STORAGE

Device will be prepared for transport by a competent person (who also disconnects the device from the mains). Device must be transported and stored in original wrapping. If you send the device back (for reparation or change in case of reclamation), use the original wrapping. Otherwise you overtake the responsibility for event. damaging during the transport and the producer will reclaim compensation for event.

additional reparations. Device can be stored in the ambient temperatures of 0 °C to 40 °C.

9 HOW TO ELIMINATE WRAPPINGS AND A UNIT OUT OFF SERVICE

Pallet – in a refuse incinerating plant
Cardboard –waste for recycling
Unit out off service:

For the European Union Member Countries:
If the user stops to use the labelled product, and the product will become useless for him

then the product must not be disposed in municipal waste and is subjected to the regime in compliance with the national rules on liquidation of electrical and electronic equipment, corresponding to WEEE (Waste Electric and Electronic Equipment) Directive in version force (in the Czech Republic it is Waste Law No. 185/2001 Code of Law in version in force). Please, ask for detailed information about correct liquidation of electrical and electronic equipment by your seller or supplier.

For countries outside of European Union:
The symbol given above is valid only in European Union countries. Please, ask for detailed information about correct liquidation of electrical and electronic equipment by authorities in your country or by your seller of electrical equipment.

10 OPTIONAL EQUIPMENT

10.1 INNER LIGHTING

Inner space is illuminated with thermo-resistant bulbs - their switch is placed on the door. It is not recommended for the volume 22.

10.2 BUSHINGS OF DIAMETER 25, 50, 100 MM

The bushings are normally placed cca in the middle of the side (right or left) wall of the

chamber. The bushes are metallic, closed with a special plastic plug from the outer side, which enables passing through of wires etc. from the outer space to the chamber.
(For the volume 22 only the bushings 25 and 50 mm.)

Recommendation: the used unit should be provided with a bushing with corresponding dimensions, if user wishes to measure temperature or RH (with CLC) inside the chamber by means of sensors, that are connected with an independent measuring device by means of wires; the user pulls the wires through the bushing.

10.3 LOCKABLE DOOR

The lock is placed on the upper part of door's surface near the closing mechanism.

10.4 LEFT DOOR

This is the symmetric mirror version of the right door. The cabinet of 404 liter is not delivered in this version.

10.5 INDEPENDENT SENSOR PT100

Independent flexible sensor is used for measuring of material temperature directly in the chamber. The date of temperature on this sensor (PT2) is displayed on LCD in the position of time date, while these two data are altering.

The corresponding printed protocol has two lines, first line - beginning with digit 1 - shows the temperature on the sensor of regulator (PT1), second line beginning with digit 2 shows the temperature on the sensor PT2. If there is a contact failure between PT2 and the regulator, the display reports error 01.

10.6 SUPPORTIVE SW FOR PC

10.6.1 RECORDING SW - WARMCOMM - FOR PC UNDER WINDOWS

The program WarmComm is designed to record the temperature course in the ovens/incubators. Data obtained during the regulation are displayed in a diagram (with time on the horizontal axis and measured data on the vertical axis).

The program enables to follow the regulation on-line, to store the regulation course to a file on a disc and to view the already stored files, to send e-mails in case of not receiving data from the cabinet and to send reports of excessive values being reached within the specified time interval.
The instructions for the programme use are supplied with the installation programme. Hardware requirements: Common PC with an operational software Windows 2000, XP and higher. One free port RS 232 (COM) is required for each connected device. The maximum length of the connecting cable is 15 m.

10.6.2 RECORDING PRINTING SW - PRINTER ARCHIVE - FOR PC UNDER WINDOWS

The Printer Archive programme serves for text recording from the device print outlet. It serves as a direct substitution of a physical printer. The data are recorded to a file on a PC disc and the programme offers more possibilities of the recorded data handling including archiving or printing on a table PC printer. Hardware requirements: Common PC with an operational software Windows 95 and higher. One free port RS 232 (COM) is required for each connected device. The maximum length of the connecting cable is 15 m. For more detailed information about HW, ask the seller.

10.7 POTENTIAL - FREE CONTACT FOR ALARM REPORTS

It's outlet is placed in the connector in the rear foot, a voltage up to 24 V/ 1 A can be connected to it.

10.8 THE INNER SWITCHED SOCKET

It is not recommended for the volume 22. The socket is placed inside the chamber on the side wall. Details of the switching control see par. Basic setting of the units FRIOCELL – Service 06, connection and other details are given in the following diagram and text.

Connection wiring beetween plug and built-in equipment
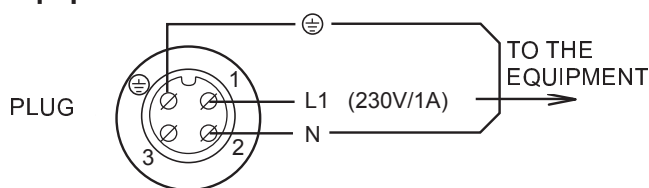
Warning:

The plug must be connected only by a person with a sufficient qualification.

When the plug is plugged in and out of the socket, or when manipulated with the inner equipment, FRIOCELL must be switched off (the mains switch in the position -„0").

The socket-plug contact must be tightened in order to prevent disfunctioning of the protective system.

After disconnecting the socket-plug contact fit carefully the protection covers on the socket and the plug so that impurities and humidity would not get inside.

10.9 EXPOSURE LIGHTING A) IN THE DOOR, B) ON THE SHELVES

Not available for volumes 22 and 55 litres.

a) Fluorescent exposure lighting is placed in the door. Its intensity can be controlled from 0 % to 100 % by 10 %. Details can be found in the chapter Basic Setting, point lighting Setting – Door Lighting Model.

b) Shelves with fluorescent exposure lighting are placed in the chamber. Its intensity can be controlled from 0 % to 100 % by 10 %. Details can be found in the chapter Basic Setting, point Setting the Lighting – Shelves Lighting Model.

10.10 MEASUREMENT OF UV AND VIS EXPOSURE LIGHTING PHOTOQUANTITIES IN THE CHAMBER

Photo sensors are placed inside of the chamber and they measure lighting of UV and VIS light, their values being displayed. The conditions for their use (operation temperature) – see the chapter Technical parameters.

10.11 TEMPERATURE RANGE FROM - 9.9 °C

This option is not available in PM models; it is neither available in other model sizes in combination with the exposure lighting in the door in both ON and OFF state, and in the shelves in the ON state.

10.12 PROTECTION OF THE PROGRAMME SETTING BY A CHIP CARD

The parameters of the selected programme may only be changed after an SO card inserting. The programmes may be selected arbitrarily but their parameters may not be changed (temperature, time, ...). If the card is not inserted, the programmes are marked with lower-case letters on the display (p1 to p6); after the chip card is inserted, they are displayed in capital letters (P1 to P6).

10.13 AUTOMATIC DEFROSTING

PM models do not have this function.

The frost shall thaw automatically on the cooling coil depending on the actual cooling capacity. The automatic defrosting finction can be used effectively under the temperature above 0 °C only. If the automatic defrosting is switched on, the temperature is increased regularly for a short time. The automatic defrosting can be switched off/on – see the Chapter "SERVICE 53 – SETTING OF AUTOMATIC DEFROSTING".

10.14 SIGNALLING OF THE DOOR OPENING

Door opening during the programme run is signalled both on the display and audibly. The acoustic signalling which is started when the door is opened can be suppressed temporarily by pressing the ◄, ► or ▲ button. After the door is closed and re-opened, the acoustic signal is switched on again,

10.15 DOOR BLOCKING

In this design, an electrically controlled mechanism can be used which prevents an unintentional door opening. The mechanism stays in its position even after the unit is switched off.

SERVICE 58 enables you selecting between two methods of blocking:

1. Manual: The door is blocked/unblocked by pressing the buttons ◄ and► for 2 seconds. If you try to block an open door, you are warned of a mistake by a longer beep. Door blocking is indicated on the display by a flashing sign "#".

2. Automatic: The door is blocked automatically after lapse of certain set time. The period of time can be set within the range from 2 to 9 seconds. The door is unblocked by pressing the buttons ◄ and ► for 2 seconds. The door can be blocked only if a programme has been started. When you unblock the door, you have a certain set period of time to open the door. If you do not open it, the door will be blocked again after lapse of the set period of time (2 to 9 seconds). Door blocking is indicated on the display by a flashing sign "#".

ATTENTION!
Blocked door may not be opened forcibly. The blocking system can be damaged mechanically. If there is a need of an emergency door opening (e.g. in case of power failure), follow the Emergency Door Opening.

**Emergency door opening**

(use it only in case of failure or power failure)

1. To insert a thin object (screwdriver, rod etc.) through the air hole of the door (in the bottom door surface) under the angle of ca 45 ° in the distance of ca 90 mm from the door edge.
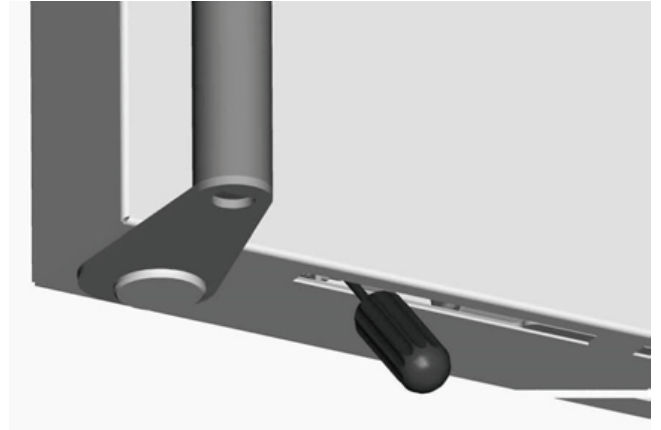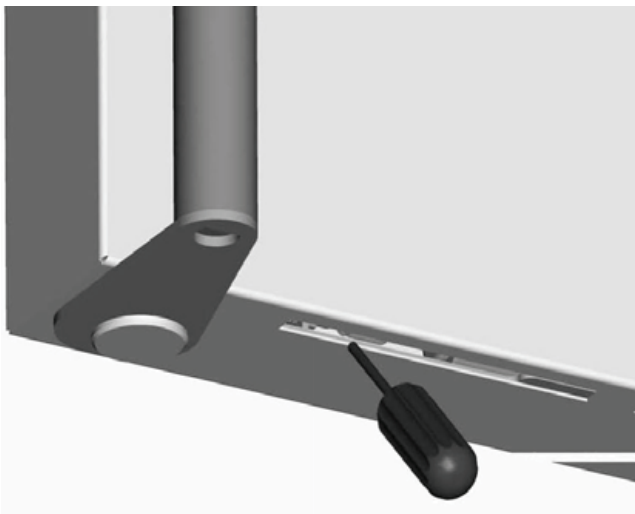
2. To push in the arrow direction and thus to push away the blocking rod (10 -15 mm is enough). In case of standard model – of the right door in the arrow direction, in case of the non-standard model – of the left door – it would be reversely (always in the direction from handle to the door hinges).
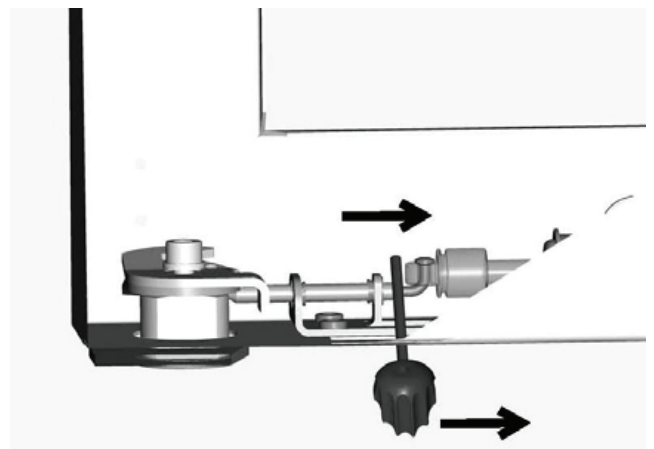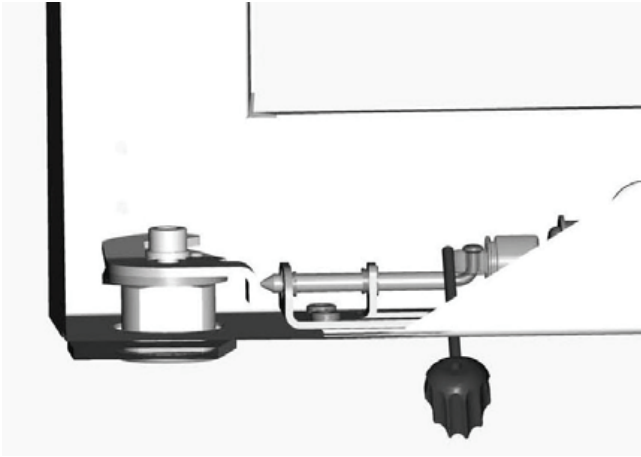
3. To open the door by means of the door handle
   If it would be not possible to move away the
   blocking rod of the door – see above, then
   it would be necessary to unscrew the whole
   blocking mechanism underneath
   (4x M4 screws) and to push it away as a
   whole. After such intervention, the service
   work is necessary (backward blocking
   mechanism assembly).

EC-DECLARATION OF CONFORMITY

CE

MMM Group

Date 2012-10-01	European Directive 2006/95/EC, 2004/108/EC

Manufacturer

MMM Medcenter Einrichtungen GmbH, Semmelweisstrasse 6, D-82152 Planegg / München

declare on our own responsibility that product

cooling incubator:	electrically heated incubator intended for heating and cooling of laboratory materials in the temperature range 0 °C up to 99,9 °C (type FCP-B2V: +5 °C up to 70 °C)		
trade name:	**FRIOCELL**		
type:	**FC-B2V**	**FC-B2V-M**	**FCP-B2V**
model:	**FC 55, 111, 222, 404, 707**	**FC 55, 111, 222, 404, 707**	**FC 22**

meets all the provisions of the Directives no. 2006/95/EC, 2004/108/EC, which apply to him.

This declaration is valid for all of the above products, that are marketed after the date of issue and is valid until changes in the facts contained therein.

Standards applied:

EN 61010-1:2001	Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements
EN 61010-2-010:2003	Safety requirements for electrical equipment for measurement, control and laboratory use - Part 2-010: Particular requirements for laboratory equipment for the heating of material
EN 61326-1:2006	Electrical equipment for measurement, control and laboratory use - EMC requirements Part 1: General requirements

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