



Instructions for use

Vacuum cabinets - line Standard

VACUCELL 22, 55, 111



Congratulations on obtaining a new temperature cabinet, Temperature sensitive, easy decomposable or oxidative materials, can be dried very tenderly in VACUCELL, vacuum drying ovens, where is the opportunity of extrusion of air by inert gas. Also complicated components with hardly accessible hollow spaces are drying quick and affectively in VACUCELL ovens.

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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EC - DECLARATION OF CONFORMITY

1 GENERAL INFORMATION

1.1 SCOPE OF VALIDITY

These instructions apply to the device series VUS-B2V and VUS-B2V-M.

1.2 PURPOSE

VACUCELL (VU) is an electrically heated and evacuated chamber which may be used after evacuation to heat the objects located in it. Evacuated objects are placed on the shelves in the chamber. The device works at temperature up to 200 °C.

The temperature course is controlled by a modern microprocessor (Fuzzy-logic) with digital display and PT 100 temperature sensor. This system ensures high precision of temperature regulation and reliability of the tempering process. The unit has been designed, produced and tested according to the appropriate European standards. It complies with the legislative requirements of LVD and EMC directives – see the attached declaration of conformity. It is made of high-quality materials, using the latest technology. Each piece goes through a careful output control.

1.3 USE

VACUCELL is designed to perform:

- vacuum drying of easy oxidable matters with possible displacement of oxygen by inert gas
- accelerated drying of form-simple and complicated parts
- drying of samples up to constant weight at adjustable temperature and selectable time mode.

The unit may be used primarily in the following branches:

- biology
- cosmetics
- pharmaceuticals
- food industry
- chemistry
- electric technology
- plastics processing
- engineering

The unit is designed to be used and handled by the persons familiar with dealing with the laboratory equipment and apparatuses.

2 IMPORTANT INSTRUCTIONS

2.1 UNPACKING, CHECKING, TRANSPORT AND HANDLING

After unpacking please check that the unit and the accessories are complete and undamaged). Possible damage must be immediately reported to the transporter. When handling - lifting the box, etc - the box must not be lifted using the hand rail or the door! Lift the box using the four hooks that you push into the openings in the side of longitudinal legs of the box.

Standard delivery consists of the cabinet and two shelves.

(order No.: V459046 - volume 22

V 459047 – volume 55

V 459048 – volume 111),

silicon hose 8 x 18 for connection chamber/
vacuum source (order No. 0662132)

2.2 BEFORE PUTTING INTO OPERATION

- **Before beginning the work with the unit please read the Instructions for use carefully!**
- Install the unit by plugging the power cord to the mains. However, make sure at first that the mains parameters correspond to the values specified on the unit type label and to the data shown in Chapter 5.1 - Electric Connection!



The unit is designed to work indoor within the ambient temperatures range of from 5 °C up to 40 °C, at maximum relative humidity of 80 %, up to the maximum altitude of 3 000 m.















Minimum distance of the unit from the rear and side walls is 100 mm.

- Do not place inflammable or explosive matters into the unit! In case of temperatures above 100 °C a yellowed stain of the inner chamber walls can occur. This stain is neither the material nor the unit's defect. After the first switching-on the heating bodies start to be burnt, which results in a characteristic smell; this smell disappears after several operating cycles.



Place the material to be warmed-up on the shelves only, not on the bottom of the unit.

-  No inflammable, explosive or toxic materials can be inserted to the unit! The same concerns also materials material giving off such a stuff!
-  The unit is not designed to warm-up liquids and it contains no liquids.
-  In case of any manipulation with the unit, other than its normal use, or if you do not use it for a longer period, disconnect it from electric mains by pulling the supply cord from the socket (position 2 –upper part panel)! When depressing the key **ON/OFF** the unit is set only in the stand-by mode, put it is not disconnected from electric mains!
-  **Any assembly or disassembly may be done only when disconnected from the mains! After switching the unit off with the key (key 11, fig. 3) the unit comes only to a stand-by mode, however, it is not disconnected from the mains!**
-  Maximum permissible load: see chapter **5 - Specifications of the unit.**
-  Goods are only to be put on trays into ovens, never directly on the bottom of the oven!
-  Do not put any object on the outer surfaces of the ovens.
-  Aparatus may not be used in the atmosphere with a possible danger of flammable or explosive anesthetics.
-  No dangerous goods are permitted. Ovens may not be used for heating of liquids.
- Protection of the thermal cabinet, its surrounding and the treated material against inadmissible temperature rise is ensured by a protection thermostat.
-  The maximum permissible temperature has been set to the maximum value in the factory
-  Carrying capacity of the floor during installation of the device must correspond to the weight of the unit itself taking the weight of the maximum charge into consideration (see chapter **5 - Parameters of the unit**).
-  If the device is used in another that specified way, the protection provided by the device could be impaired.

2.3 USEFUL SPACE

Useful space is illustrated in Fig.1, where $X(H)$ = 10% of the interior chamber depth, $X(\check{S})$ = 10% of the interior chamber width, $X(V)_1$ is the distance od the lowest shelve from the bottom of interior chamber, $X(V)_2$ is the distance of the top shelve from the top of the interior chamber. Within the space limited by said surfaces (according to the standard DIN 12 880 - illustrated by thick lines, thinner lines illustrate the interior walls of the chamber) temperature deviations stated in chapter **5 - Specifications of the unit** are maintained). It means, that over the last upper tray there are the limits from in chapter Specifications of the unit not obligatory.

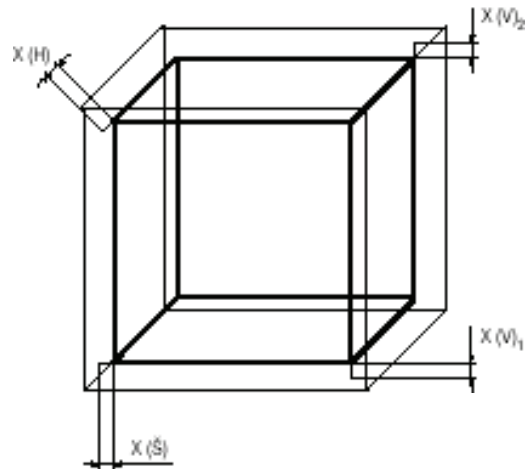


Fig. 1

2.4 WIRING AND OTHER CONDITIONS

Basic data for connection:	
Mains connection:	1x230V/50(60)Hz 1x110-125V/50(60)Hz;
(standard types are marked with bold face)	
Mains voltage fluctuation	±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:	
– 10 A	
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:	T 10 A
Ambient conditions:	
– ambient temperature: +5 °C to +40 °C	
– max.relative humidity: 80 % at 31 °C	
– maximal altitude: 3000 m	

3 DESCRIPTION OF THE UNIT

3.1 GENERAL VIEW

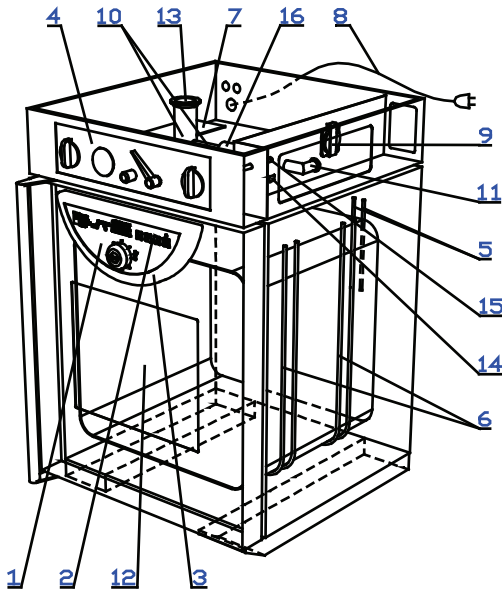


Fig. 2

- 1 - Panel of the regulator
- 2 - Control panel
- 3 - Control panel cover
- 4 - Panel of the superstructure
- 5 - PT 100 temperature sensor and safety Thermostatsensor
- 6 - Heating bodies
- 7 - Power part
- 8 - Power supply cord
- 9 - Built-in socket for the vacuum pump
- 10 - Vacuum fittings
- 11 - Inlet to connect the vacuum pump
- 12 - Heat resisting glass of the door
- 13 - Measuring feedthrough
- 14 - RS-232C connector
- 15 - Supply of inert gas to the needle valve
- 16 - Ball valve.

3.2 CONTROL PANEL IN THE DOOR OF THE BOX

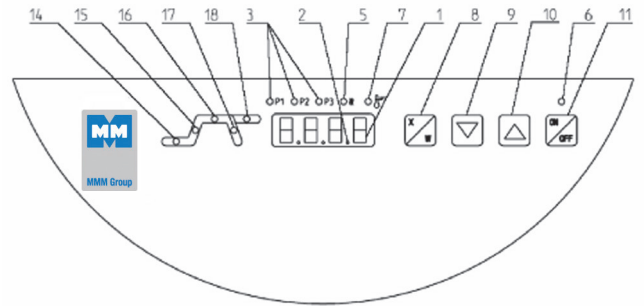


Fig. 3

- 1 - Display
- 2 - Decimal point - lights (the unit is connected to the mains - stand-by condition)
- 3 - Preselected programs indicator lamps - lights: program is active
- blinks: program will be active in 5 sec.
- 5 - Heating indicator lamp - lights: condition of temperature regulator - heating active
- 6 - Switching-on indicator lamp - lights after switching the unit on by the depression of ON/OFF
- 7 - Safety system indicator is flashing: The temperature exceeded the chosen limit set by the protective thermostat – the heating is switched off (see more in Chapter Safety System Functions and Setting)
- 8 - Setting-up mode activation button
- 9 - Setting the value downwards
- 10 - Setting the value upwards
- 11 - Switch (ON – switched on, OFF - stand by condition)
- 12 - Adjustable protecting thermostat - outer rotary ring
- 13 - Button (RESET) to set the protecting thermostat in operation again
- 14 - Indicator lamp: blinks - setting-up mode, lights - active part of the program is time-delayed switching-on
- 15 - Indicator lamp: blinks - setting-up mode, lights - active part of the program is heating upto set temperature
- 16 - Indicator lamp: blinks - setting-up mode, lights - active part of the program is time-delayed switching-off
- 17 - Indicator lamp: blinks - setting-up mode, lights - decrease of temperature after switching-off
- 18 - Indicator lamp: blinks - setting-up mode, lights - active part of the program is infinite stay on set-up temperature

Indicator lamps 14-18 blink - mode of number of cycles setting.

3.3 CONTROL PANEL IN THE SUPERSTRUCTURE

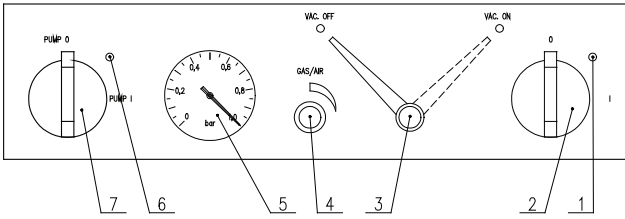
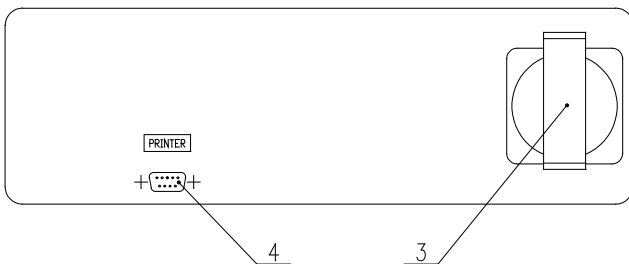


Fig. 4

- 1 - Mains main switch indicator
- 2 - Mains main switch
- 3 - Ball valve connecting the chamber and the vacuum pump, in position ON is valve open
- 4 - Needle valve to add inert gas or air
- 5 - Vacuumeter
- 6 - Indicator of the mains switch of built-in socket in the superstructure
- 7 - Mains switch of the built-in socket in the superstructure - for the vacuum pump.

3.4 MAINS CONNECTION AND CONNECTOR

The mains connecting cord passes through the bush in the left part of the upper piece to the power board located in the upper piece. In the right part of the upper piece there is a RS232 C connector and a built-in socket for the vacuum pump. Both of them are accessible after lifting the cover off – see the figure below. In the right rear part of the upper piece there is an opening through which the pump hoses and hoses with inert gas are connected to the unit.



- 3 - mains socket (for the vacuum pump)
- 4 - RS-232C connector to connect the printer

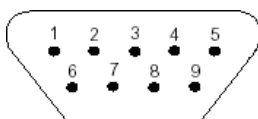


Fig. 6: Interface for protocol printer:

9 pin Canon connector on the case

Pin	Signal
2	RX
3	TX
5	GND
6	DTR

25 pin Canon connector in the printer

Pin	Signal
2	TXD
3	RXD
7	GND
20	DTR

Ovens connected by RS-232C connector must meet the regulations and be approved by the testing laboratory. The unit is designed to connect the CITIZEN printer type iDP 3110-24 RF-A which may be ordered to be delivered to the unit.

Interface parameters:

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

4 FUNCTION AND OPERATION

The unit can be set to several modes according to the required function; i.e. its cycle can be modified as described below in the text. Figure 7 shows the overall course of one cycle and its distribution to the individual phases.

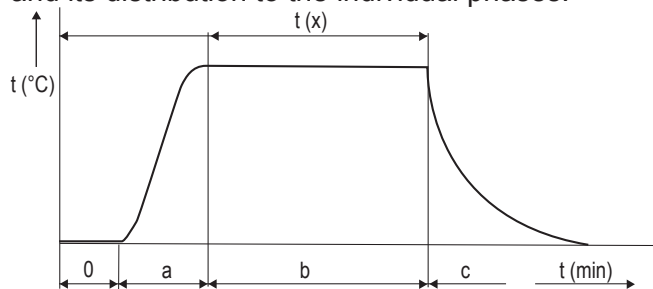


Fig.7

Phase Function

- 0 Time-delayed switching-on
- a Temperature rise
- b Time-delayed switching-off
- c Temperature decrease after switching-off

The functions of the respective indicator lights are described in chapter 3 - Description of the Unit, and 3.3 - Control Panel.

4.1 SWITCHING ON

1. Green indicator of the mains switch and green indicator in the right lower corner of the display (condition [**stand by**]) shine after connection to the mains and after switching on the mains switch on the panel of the superstructure.
2. Press the button **ON/OFF**. The indicator above the button, the indicator of one of the preset programmes, and the indicator of the initial active phase of the programme will switch on. If the preset temperature is higher than that in the chamber, the heating indicator is switched on as well - either permanently or intermittently (depending on whether the heating regulator is switched on or off).
3. The display shows the real data related to the active phase of the programme.
4. Mains switch to the left of the panel in the superstructure serves to switch on the mains socket of the pump (built-in in the shaft of the superstructure).

4.1 SWITCHING OFF

Press the button **ON/OFF**. The display turns off; the green indicator only in the right bottom part (**stand by**) is on.

The unit is disconnected from the mains by switching the power switch off. If the unit is to be repaired or shut down for a longer period, pull the plug of the mains cable from the socket – see also chapter 2.2 - **Before Putting into Operation**.

4.3 ADDITIONAL USER FUNCTIONS

Enter the user functions by concurrent pressing the buttons **X/W** + **▼**.

Using the buttons **▼▲**, you can browse the user functions and change the parameters of the individual functions. The changed values, except for changes of functions U6, U7, and U8, will automatically be stored in the memory. The given function parameters setting is entered and exited by pressing **X/W**. Exit the user functions mode by pressing **ON/OFF**

U1 – printer's printing period setting (Per.P) from 1 to 255 min, or the print period switch-off ("OFF") by means of buttons **▼▲**.

U2 – (CYcl) On or OFF – cycles permit or prohibition are set by means of **▼▲** (for all pre-sets at once); a cycle means a multiple programme repetition with a pre-set delayed switching off and on.

U3 – Prn or PC – data transfer via interface RS 232 either onto the printer (Prn) or, in case of using the program WarmComm, onto the computer (PC); set the sign Prn or PC by means of **▼▲**.

U4 – Not used.

U5 – Permission (Snd) or prohibition (**OFF**) of acoustic signalling after exposure termination (after the last cycle exposure in case of recycling). The acoustic signal consists of three subsequent tones (there is a short high beep between the eventual individual cycles). The original setting permits the acoustic signalling.

U6 – Safety system functioning as a protective thermostat
User safety upper temperature limit – setting of the maximum user-permitted exposure temperature (SFt.H). Change this value by means of **▼▲** and confirm by **ON/OFF** pressing. When setting this maximum value, the real temperature course, namely its potential overshoot during temperature rising, must be taken into account. If the pre-set maximum permitted temperature is lower than the required exposure temperature, the display shows the warning "SEt tEMP CroSSEd SAFEtY USEr LiMit", because the safety system would otherwise be activated during the cycle. The resolution and range of the setting correspond to the resolution and range of the required temperature. The highest temperature has been pre-set as default.

U8 – Safety system – setting of the maximum onset phase duration (SPt.f). After **▼▲** pressing, the actual maximum onset phase duration is displayed. It can then be changed by 1-hour steps within the range from 1 to 24 hours, or the time watching can be switched off, which is then displayed in form of "**OFF**". Confirm by **ON/OFF** pressing. Default setting: Time watching is switched off.

U9 – Selection of the flexible sensor display (Yes/No).

U10 – Selection of the pressure sensor display (Yes/No).

U14 – Alarm – setting of the permitted lower deviation from the required exposure temperature (dlt.L). Set the deviation by means of in the range from -0.1 to

-99.9 °C, or the function can be switched off, which is displayed as "OFF". The alarm function has been switched off as a default.

U15 – Alarm – setting of the permitted upper deviation from the required exposure temperature (dlt.H). Set the deviation by means of in the range from +0.1 to 99.9 °C, or the function can be switched off, which is displayed as "OFF". The alarm function has been switched off as a default.

Exit any user function setting by **X/W** pressing.
Exit any user function selection by **ON/OFF** pressing.

4.4 SETTING THE REQUIRED VALUES OF TEMPERATURE, TIME-DELAYED SWITCHING-OFF, NUMBER OF CYCLES, AND TIME-DELAYED SWITCHING-ON

1. Set the preselection of the programme 1, 2, or 3 by means of ▼ or ▲. After pressing the button ▼ or ▲, the subsequent programme indicator starts flashing. This programme will become activated after about 7 seconds if no other button is pressed during that time. Transfer by means of ▼ or ▲ will stop the running cycle and start a new cycle with the pre-selected parameters. The setting cycle begins with the required temperature setting.
2. Press the button **X/W**. The indicators 15 and 16 (Fig. 3) start flashing. Using the buttons ▼ ▲, set the required temperature [°C] on the display. The least adjustable and displayable temperature interval is 1 °C. The segments indicators still flash.
3. Enter the phase of the time-delayed switching-off by pressing **X/W**. Using the buttons ▼ ▲, set the required value in hours and minutes (from 0 to 99 h 59 min) on the display. The indicators 16 and 17 (Fig. 3) will flash. The symbol "∞" means a time unlimited exposure. After 99 hours: 59 min, time is displayed in hours only and after 999 hours, it is displayed by ∞ symbol (infinity). When printing the record in the printer, time is shown in the hhh:mm format; after exceeding 999:59, the text „infini“ is printed.
4. By pressing the button **X/W**, enter the phase of the number of cycles setting and set the number of cycles from 1 to 255 by means of ▼ ▲ (more information about the

cycles – see Chapter 4.3). All indicators will flash during the setting. This function can only be used in setting of a specific value of the time-delayed switching-off. Select the possibility of the cycles setting by means of the user supporting function.

5. By pressing the button **X/W**, enter the phase of the time-delayed switching-on. Using the buttons ▼ ▲, set the required value in minutes from 0 to 99 hours 59 min. The indicator 14 (Fig. 3) flashes.
6. Double pressing of **ON/OFF** starts the programme (the programme start is signalled by an acoustic signal). In the phase of the time-delayed switching, the real temperature and time countdown flash on the display. After reaching the zero time, the heating switches on and the display shows the real temperature in the chamber.
After the required temperature is achieved
 - a) And the time-delayed switching-off is preset: The temperature in the chamber with the time countdown start flashing on the display;
 - b) And switching-off is unlimited: The temperature in the chamber with the rising time flash on the display.
 Continuously shining indicators inform about the actually active programme segment.
7. You can control the individual values setting during the programme run – after pressing **X/W**, the display shows the required value. The indicators flash. Before 5 second passes, press **X/W** again to enter the subsequent phase. In this way, you can check gradually all the settings. If you do not use any control element, the original programme will continue.
8. The already preset values can be changed in a similar way during the programme run, if:
 - a) You wait for about 5 seconds after the last value – time-delayed switching-on – setting. The programme with the changed values then continues from the point of interruption;
 - b) You start the programme after the value setting by double pressing the button **ON/OFF**. The programme with the new values will start running from the beginning.

4.5 LIST OF ERROR MESSAGES

When there is an error announced on the display, you can use the buttons ▼ and ▲ switch to display the textual error description and/or other error-related data recorded in the moment of the error occurrence. Press **X/W** to exit this display. Cancel the error message (by **X/W** pressing and holding for about 2 s) and then follow the instructions. If you do not succeed in the error removing, contact the service technician.

Er 11 – Wrong temperature sensor of the safety system

Contact the service centre.

Er13 – The temperature exceeds the user upper limit watched by the safety system.

Check the limit setting in the user mode U6: The limit may not be lower than the required temperature, taking also account of overshoot or fluctuation.

After you change the value, check by a repeated entry in the U6 mode whether the pre-set value has been saved. If not, check the correct setting procedure in the instructions for use.

Check also whether the device has not been overheated without the device fault, e.g. by the load ignition.

Er15 – The device threshold temperature watched by the safety system has been exceeded.

Check whether the device has not been overheated without the device fault, e.g. by the load ignition.

Er17 – The maximum phase time was exceeded

If there is any error during the temperature rise, compare the rise duration with the setting in the user mode 8 and/or assess the reasons for the long rise duration, or increase the maximum controlled period in mode U8.

Er23 – the temperature measured by the control system differs from the temperature measured by the safety system.

Check whether the error was not caused by strong temperature changes, e.g. by the door opening and air blowing.

Er24 - The safety relay did not pass the test

Contact the service centre.

Er 50 and Er 51 – Wrong regulatory sensor

Contact the service centre.

Er 52 and Er 53 – Errors of flexible sensors

Check the integrity of the flexible sensor.

SEt tEMP CroSSEd SAFEtY USEr LIMIT.

Warning message informing only that the pre-set temperature is either lower or higher, but

too close (up to 3 °C) to the user safety upper temperature checked by the safety system (U6), which probably will cause the safety system activation. Cancel the message by **X/W** pressing and change one of the two given values.

Hi ALARM

Lo ALARM

Alarm activation announcement. See the chapter ALARM FUNCTION

Other error messages

Disconnect the device from the power supply and then reconnect it.

If the error repeats, contact the service centre.

Er 54 and Er 55 – Errors of pressure sensors

Check the pressure sensor integrity.

Contact the service centre.

4.5.3 NOT-DISPLAYED ERRORS

Red LED with the safety thermostat symbol is lighting, the control unit does not react. The safety system has disconnected the safety relay; there is no current supplied to the heaters.

Disconnect the device from the power supply and re-connect it.

The device does not display any information (dark display).

Check whether the device is connected to the power mains. If yes, try to disconnect and re-connect it.

The device does not react to any button.

Disconnect the device from the power supply and re-connect it.

The printer either does not print anything, or prints some nonsense. Check whether the device is switched to data sending to the printer (U3); check the print period (U1). Check whether the printer is connected to the power supply and switched to the transfer speed 9600 Bd.

The temperature overshoots the required temperature markedly during the exposure cycle and reaches it only after some time.

Check proper closing of the unit door.

The temperature exceeds markedly the required value during the exposure cycle and the device continues to be overheated.

Switch off the device.

The temperature reaches the required temperature during the exposure cycle only after a too long time. Check proper closing of the unit door. Check whether the power mains have required values specified in the Instructions for Use, chapter Power Mains Connection.

The temperature never reaches the required value during the exposure cycle. Check whether the power mains have required values specified in the Instructions for Use, chapter Power Mains Connection.

4.6 PROTOCOL PRINTING

DPT 6333 printer is recommended for the record printing on the printer. Other printers may also be used, e.g. CITIZEN, model iDP 3110-24 RF-A. Printing to a PC application (Printer Archiv) is allowed as well.

4.6.1 INSTALLATION AND SETTING OF THE PRINTER

DPT-6333-V24 does not require any microswitch setting by the user.

Setting the DIP microswitches of the printer CITIZEN iDP 3110:

all four pins are in the lower position OFF.

Setting the DIP microswitches of the printer CITIZEN CBM 910:

OFF / ON / OFF / ON / OFF / ON / ON / OFF
(from the left to the right).

CBM 910II: OFF / ON / OFF / OFF / OFF / OFF / ON / OFF.

After the setting is changed, the printer must be switched off and on either by the switch or by disconnection 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 RS232 shown on the case.)

Connect the printer to the device by means of a cable with serial connector (RS-232C). Connect one end of the cable to the printer socket (see Fig. 4) and the other one 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 the switch on the right side of the printer to be switched on. The indicators POWER and SEL light up. The printer is in the on-line mode. Paper is fed by pressing the LF button (in the on-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!

Follow the chapter User Support Functions to set the type of data from the COM output connector (user mode U3) and the required print interval (user mode U1).

By the printer interval setting you can determine the time intervals of actual chamber temperature

printing. The interval is shown in the record heading.

The printer interval can be set on the display in the range from
tmin = 1 min to tmax = 255 min
(i.e. 4 hours 15 min) in 1-minute increments.

4.6.2 PRINTING

1. The printer prints out the heading showing the device type, programme number, number of cycles, pre-set temperature, time of the start delay, and the required time interval.
2. Then the printer prints out the procedural data and titles of the procedural data columns (physical unit inclusive).
3. Below that, the values of the following procedural data are printed out:
 - Actual temperature in the chamber;
 - Time from the programme start.
4. Other printed data:
 - Start of individual phases;
 - Change of any required value;
 - Change of a user function influencing the cycle procedure (U1, U3, U4, U6, U8) m, including the new value printing;
 - Alarms activation/deactivation, including the description;
 - For IC,ICV: Activation or deactivation of the safety system warning, including the description;
 - Error state activation, including the description.
5. In case of power failure and subsequent power recovery, the printer prints out "--> Power recovery!" Counting of the printing time intervals starts from the moment of power recovery. A new heading is printed out after switching the device off and on by means of **ON/OFF**.

If there is a power failure of the printer only, or if the printer is switched off, the printer shows no message after the power recovery or the printer switch-on.

4.7 SAFETY SYSTEM FUNCTION AND SETTING

The safety system watches the exposure process controlled by the control circuit. It also performs the function of a safety thermostat and serves to protect the temperature box, its surroundings and the processed material against an inadmissible excess of the set temperature (it will e.g. prevent

the damaging or destruction of material samples in case of the temperature regulator damage, or unintended setting of a higher temperature than that tolerated by the sample in the unit chamber). Supervision is performed both under the normal operation and in a Stand By.

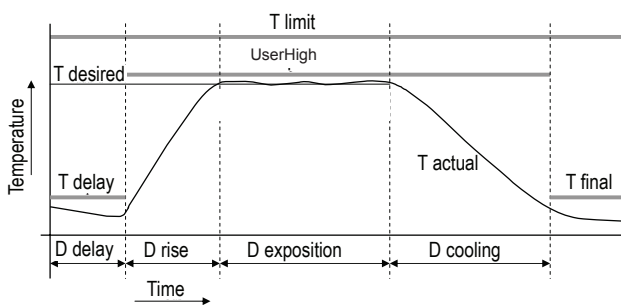
The safety system measures the temperature independently at the same place like the regulatory sensor and counts the time independently. If the set maximum temperature and period of time are exceeded, the safety relay switches off the heating, indicates the error state by its indicator flashing (red) and passes the information about the error to the controlling unit which then passes to the error regimen and indicates the error.

To cancel the error by the user, hold **X/W**. The controlling unit cancels the error state in the safety system circuit. The device passes to a break state in which parameters can be reset, or you can let the chamber cool. The device is put into operation by pressing **ON/OFF**.

4.7.1 CHANGE OF THE MAXIMUM VALUES

It is carried out in the user settings U6 and U8 – see the diagram of the safety system function and the user settings description. Minimum difference from the regulated temperature set should be $\pm 5\text{ }^{\circ}\text{C}$.

4.7.2 DIAGRAM OF THE SAFETY SYSTEM FUNCTION



T limiting – threshold temperature is the maximum operation temperature permitted by the manufacturer in all phases and watched by the safety system. Its value depends on the device type and cannot be changed.

T User High – safety user upper temperature limit is the maximum temperature permitted by the manufacturer for the phase of temperature rise, exposure and cooling, pre-set in U6 and watched by the safety system.

T delay – Maximum permitted temperature of the time-delayed switching-on phase. It sets itself at the beginning of the delay phase to the value of the actual temperature increased by $30\text{ }^{\circ}\text{C}$.

T final - maximum permitted temperature after termination of cooling. It reaches the $T_{exp\ max}$ temperature or $55\text{ }^{\circ}\text{C}$, whichever is lower.

D delay - time of the delayed switching may vary from the set time for $\pm 2\text{ min}$.

D rise - max. rise time according (Safety Time) to the setting in the user mode U8.

D exposition - exposition time may vary from the set time for $+3\text{ min} / - 0\text{ min}$.

D cooling - max. cooling time is set to 24 hours.

T limiting temperature setting has been fixed to $+230\text{ }^{\circ}\text{C}$. (Setting of the values before the product dispatch – maximum permitted exposure temperature is $+220\text{ }^{\circ}\text{C}$; minimum permitted exposure temperature is $+10\text{ }^{\circ}\text{C}$; maximum rise time is 6 hours.)

4.7.3 CHECKING THE SAFETY RELAY FUNCTION

The test is performed automatically in the phase of the temperature rise, without the cycle influencing, and after the period between tests elapsing (3,000 hours). The said time is counted in the exposure phase. After the device is connected to the power mains, the safety relay state is monitored as well. If the test result is not good, Err 24 is announced.

4.7.4 CONTROL OF THE CORRECT FUNCTION OF THE CHECK CIRCUIT

This control shall be carried out after stabilization of the required temperature (10 minutes at least). When changing the permitted temperatures in U6 and U7, do not forget to record each temperature change in the safety system by pressing the **ON/OFF** button before leaving the user mode.

Control of temperature exceeding:

- Activate the user service U6.
- Set the maximum permitted temperature to a value $5\text{ }^{\circ}\text{C}$ over the required temperature. The safety circuit must not react.
- Set the maximum permitted temperature to a value $5\text{ }^{\circ}\text{C}$ below the required temperature. The safety circuit must react. LED of the safety thermostat is switched on and Er13 error is displayed.

Low temperature control:

- Activate the user service U7.
- Set the minimum permitted temperature to a value $5\text{ }^{\circ}\text{C}$ below the required temperature. The safety circuit must not react.
- Set the minimum permitted temperature to a

value 5 °C over the required temperature. The safety circuit must react. LED of the safety thermostat is switched on and Er12 error is displayed.

4.8 CREATION OF VACUUM IN THE CHAMBER

Push the hose from the vacuum pump onto the end of the vacuum piping of the unit (Fig.2, position 11) which is accessible through the side cut-out in the superstructure. Connect the mains cord of the vacuum pump into the socket in the shaft of the superstructure and switch the pump on. Set the ball valve on the front panel of the superstructure into the position VAC ON. Value of vacuum begins to rise on the vacuumeter in the front panel after several tens of seconds (the needle valve and the door must be properly closed).

4.9 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 tightness place a sheet of paper between the door and the chamber when closing the door. Pull it out slowly, you should feel a stronger resistance.

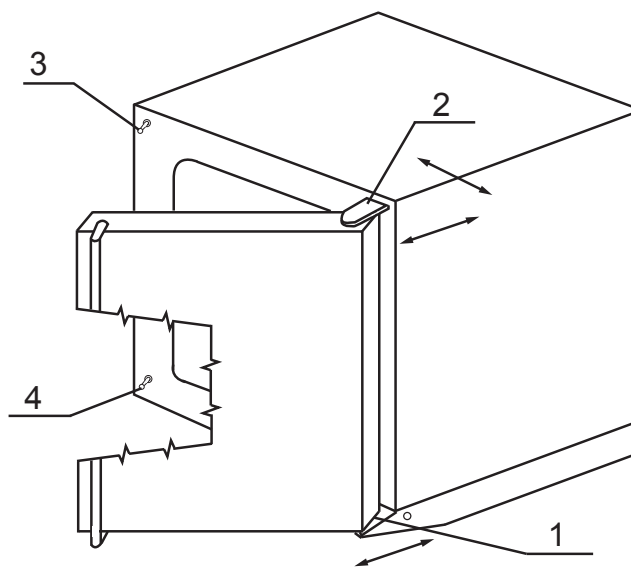
The door is adjustable at four points:

Pins of the lock 3, 4: on the left front part of the jacket – at the top and at the bottom: these pins can be loosened by means of the lock nut and they can be adjusted forwards/backwards by means of the thread.

Door hinge, lower 1: by loosening the screw M8 at the front on the right side of the foot it is possible to adjust the door forwards/backwards in the horizontal direction.

Door hinge, upper 2: after removing the cover of the extension part the screws M8 in the front right corner become accessible. After loosening these screws the position of the door can be adjusted.

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 SPECIFICATIONS OF THE UNIT

VACUCELL (VU)						
Technical data Interior of stainless steel material DIN 1.4571(AISI316TI)	volume	cca ltrs	22	55	111	
	width	cca mm	340	400	540	
	depths	cca mm	260	320	410	
	height	cca mm	300	430	480	
Shelves	Shelves wiring Standard equipment	number max.	5	8	9	
		Pieces suppl	2	2	2	
Shelves distance	height	mm	40	40	40	
Usefull dim.of shelf	width × depths	mm	280x236	340x296	480x380	
Max.permissible load of the shelves	one shelf totally per unit	kg	20	25	25	
		kg	35	45	65	
External dimensions (including door and handle)	width	cca mm	560	620	760	
	depths	cca mm	490	550	640	
	height	cca mm	700	830	880	
Package dimensions (three layers carton)	width	cca mm	740	830	830	
	depths	cca mm	615	635	730	
	height (incl.palette)	cca mm	915	1010	1070	
Weight	nett	cca kg	65	98	130	
	brutt	cca kg	76	110,5	144,5	
Electric parameters – mains 50/60 Hz	max. input **) input in stand by mode current For the nominal voltage***) current For the nominal voltage***)	kW	0,8	1,2	1,8	
		W	5	5	5	
		A	3,5	5,2	7,8	
		V	230	230	230	
		A	7	10,5	15,7	
		V	115	115	115	
Temperature data Working temp (regulation start)	from 5 °C over ambient temp to °C		200	200	200	
Temp. deviations acc.to DIN 12 880 Teil 2 from working temp -Al shelvs pressure 5 – 10 mbar) **)	at 100 °C	accuracy	to (±) °C	2	2	3
	at 200 °C	in space	to (±) °C	<5 0,4	<6 0,4	<7 0,4
Temp. deviations acc.to DIN 12 880 Teil 2 from working temp-ss shelvs pressure 5 – 10 mbar) **)i	at 100 °C	accuracy	to (±) °C	10	10	11
	at 200 °C	in space	to (±) °C	8 0,5	23 1,0	* 1,0
Time of rise onto 98 % voltage 230 V – (Al shelvs pressure 5-10 mbar)	onto temp. 100 °C	min	60	65	110	
	onto temp. 200 °C	min	80	85	130	
Time of rise onto 98 % voltage 230 V - (ssteel shelvs, press 5-10 mbar)	onto temp. 100 °C	min	130	140	170	
	onto temp. 200 °C	min	170	180	220	
Heat radiation	at 100 °C	W	150	260	370	
	at 200 °C	W	130	520	750	
Vacuum connection	vacuum connection	DN mm	16	16	16	
	measuring feedthrough	DN mm	40	40	40	
	needle valve for inert gas or air	Ø mm	8	8	8	
	chamber untightness	mbar.l.s ⁻¹	≤ 5.10 ⁻³	≤ 5.10 ⁻³	≤ 5.10 ⁻³	

Note: All technical data are related to 22 °C ambient temperature and ± 10 % voltage swing (if not specified otherwise). For other parameters see section **5.1 – Electric connections**

*) Not measured

**) Under the vacuum conditions, the heat is transferred to the items on the shelves by conduction through the shelves. Therefore, the given temperature deviations apply to the temperatures on the shelves surface. There must be a perfect heat-conducting contact between the temperature sensors and the shelf surface. The items placed on the shelves must also be in a perfect contact with the shelves; the goods temperature depends mainly on their physical properties and their contact with the shelf.

***) The mains voltage is shown on the unit type label.

6 CLEANING

Cleaning is to be performed only after cooling the unit down and after disconnection of the mains cord from the mains. Internal walls of the chamber and the surface of the unit is to be cleaned with water and detergent or suitable chemical means, it is necessary to use rags that are not rough and do not release fibres. Abrasive cleaning means are not recommended, they could cause scratching of the metal sheets.

In case of contamination of the oven either outside or inside by dangerous material the user is responsible to carry out a proper decontamination of all contaminated surfaces with a suitable and approved disinfecting agent.

Before using of any method of cleaning or decontamination different from our recommendations we recommend to verify at the producer the compatibility of the procedure.

The outer door jacket around the regulator panel must be cleaned in a way avoiding the cleaning agent leaking under the regulator panel.

7 MAINTENANCE

No special maintenance of the unit is required. Contact the service centres if any breakdown appears.

Overhaul of the electrical components:

Heating technique cabinets are intended for use in a basic/normal environment. The manufacturer recommends 1-year overhaul periods unless the local regulations specify otherwise.

Overhaul activities:

Inspection of the wiring, especially of the leads, connecting terminals and the safety terminal. The integrity of the leads insulation (defects caused e.g. by rubbing or burning through etc.) and firm connection of the leads in the terminals must be checked. The safety connection resistance is <0.1 Ohm; the lead resistance is not taken into account. Leakage current is measured. If the cabinet is to be placed in another environment, the overhaul must be carried out in accordance with the local regulations. Any service inspection must be agreed between the customer and a service organization.

8 WARRANTY CONDITIONS AND SERVICE; GUARANTEED LIFETIME

MMM guarantees faultless delivery and function within the frame of contract rules and warranty time. Fixed sale and delivery conditions of MMM are valid.

MMM assumes no responsibility for the faults or other losses originated due to normal wear, chemical or physical influences, natural disasters, extreme loading, incorrect operation or improper or inadequate use, especially when not observing the appended Instructions for use, in case of incorrect installation, in case of damages originated due to the effect of foreign bodies, as well as in case of faulty or improper maintenance or repair. In the case of sending back to the producer (to repair or exchange at claim), use the original package. In the other case you accept the responsibility for eventual damage during transport and the producer will exact from you a compensation of necessary coherent repairs. For a correct connection to the mains observe the technical data and Instructions for use.

Important notice:

MMM (producer) is responsible for safety and technical properties of the unit only in case, when the repairs and modifications of the unit are performed by herself or by the organization specifically authorized by her, and when the parts will be during the repair substituted by the spare parts admitted by the producer and spare parts satisfying the quality standard of MMM.

MMM recommends the user of the unit to ask the one who carried out the repair for the certificate on the kind and extent of work, if need be with the data concerning the change of nominal data or work extent, date of performance, name of the company and signature.

9 TRANSPORT AND STORAGE

The unit is being prepared for transport by an authorized person (who dismantles the connections). The unit shall be transported in its original package. If you send the device back

(for instance to repair or in case of reclamation), use the original package. Otherwise you take responsibility for possible damaging during the transport and producer will claim the costs for appropriate repairing of you. The device shall be stored in the range of temperatures from 0 °C to 40 °C.

10 THE WAY OF LIQUIDATION OF PACKAGE AND DISCARDED UNIT

Palette – Disposal at an incineration plant

Cardboard – Recyclable waste


Unit which was put out of operation

– The unit should be liquidated by a company authorized to dispose the waste. Such company shall provide for liquidation in accordance with the environmental regulations. The nit does not contain any components dangerous to the living environment.

For the European Union member states:

A product which the user stops to use and which becomes useless for the user and which is




labelled  with shall be shut down by the user and the user shall inform:

- The manufacturer (in the Czech Republic);
- The seller (in other EU countries).

The given product cannot be disposed of within the municipal waste. It is subject to a scheme corresponding to the national regulations relating liquidation of electric and electronic devices, complying with WEEE (Waste Electric and Electronic Equipment Directive) as amended. The seller (in the Czech Republic: the manufacturer) shall provide for the required activities complying with the local valid waste regulations (in the Czech Republic: the Waste Act no. 185/2001 Sb. as amended) and with the purchase contract.

Other than European Union countries:



 The above given symbol applies only to the European Union member countries.

To liquidate the electric and electronic devices correctly, ask your authorities or the device seller for detailed information.

11 OPTIONS

11.1 SUPPORTIVE SW FOR PC

11.1.1 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.

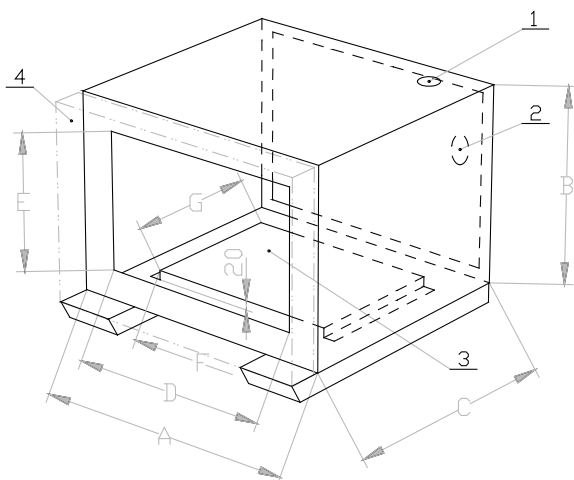
Hardware requirements: Common PC with an operational software Windows 2000, XP and higher. One free port RS 232 (COM) is required for each connected device. The maximum length of the connecting cable is 15 m.

11.1.2 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.

11.2 BOX „VACUSTATION“

For instance membrane vacuum pumps MZ2C (suction power cca 1.7 m³/h, achievable vacuum cca 9 mbar) and MD4C (suction power cca 3 m³/h, achievable vacuum cca 2 mbar) are recommended. Details see below.



	VU 22	VU 55	VU 111
A	560	620	760
B	600	600	600
C	360	420	510
D	450	510	650
E	490	490	490
F	310	400	400
G	334	394	394

Size [mm]

- 1 – through hole for the hose connecting the chamber with the vacuum pump
- 2 – through hole for the vacuum pump mains cord
- 3 – metal sheet with holes for fixing the vacuum pump (e.g. MZ2C or MD4C)
- 4 – door of the base box Vacustation (with window) – contour with dot and dash line.

11.3 CHEMICALLY RESISTANT VACUUM PUMP

For instance membrane vacuum pumps MZ2C (suction power cca 1.7 m³/h, achievable vacuum cca 9 mbar) and MD4C (suction power cca 3 m³/h, achievable vacuum cca 2 mbar) are recommended.

11.4 SEPARATOR AND EMISSION CONDENSER

The separator of the gas/steam exhausted from the chamber is placed between the chamber and the pump (the separating has a favourable influence on the power of the vacuum pump), emission condenser with water cooler is placed

on the pump outlet and reduces the amount of emissions of the exhausted gas/steam in the outer space. Both parts are made of glass and are fixed on the pump.

11.5 INDEPENDENT PT100 SENSOR

This is another additional sensor, freely movable in the chamber. Temperature inside the chamber or in the material can be measured by means of it. The sensor leads are brought to a vacuum-tight connector placed in a bush of 40-mm diameter. The flexible sensor is mostly used for the material temperature measurement directly in the chamber.

This sensor is measured and calibrated in the same way as the regulating sensor and its value is also set off. It is shown on the display (according to the setting in the user mode) in regular intervals alternating with the regulating sensor temperature display. It differs from the regulating sensor by an apostrophe on the highest digit. The exposure start (according to the setting in the user mode) is also enabled after reaching the preset temperature on this sensor with a tolerance of – 0.25 °C. However, the original condition must be met, i.e. the preset temperature on the regulating sensor must be reached with a tolerance of – 0.05 °C.

Good heat-conducting contact between the sensor and the measured material must also be ensured, especially under the vacuum conditions.

11.6 INDEPENDENT PRESSURE SENSOR

It is another additional sensor by means of which pressure inside the chamber can be measured.

This sensor is measured and calibrated. It is shown on the display (according to the setting in the user mode) in regular intervals alternating with the temperature display. It differs from the temperature by an apostrophe on the highest digit.



EC-DECLARATION OF CONFORMITY



Date 2012-06-09	European Directive 2006/95/EC, 2004/108/EC
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Manufacturer

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

declare on our own responsibility that product

drying oven:	electrically heated laboratory oven intended for material heating in the temperature range up to 200 °C with possible evacuation of the chamber or possible usage of inert gas in the chamber.
trade name:	VACUCELL
type:	VUS-B2V, VUK-B2V
model:	22, 55, 111

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

Ing. Milan **Krajcar**
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in medical and laboratory
engineering

Manufactured in the EU



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