

# User's Manual for the Automated Denture Furnace for Metal Ceramics

## **DENTAMATIC 500 AT**

The furnace is designed for production of metal ceramic teeth as well as for other denture operations. This is a fully automated vacuum furnace with microprocessor control. It can store more than 400 programs, organized in folders.



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## I. SPECIFICATIONS

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### **Electrical:**

- Power supply – AC 220V/50÷60Hz or 110V/60Hz;
- Admissible variation of the supply voltage +10, – 5%;
- Maximum power consumption (without pump) – 1350 W;
- Average power consumption in operation – approx. 300 W;
- Pump power consumption – max 300 W;

### **Mechanical:**

- Overall dimensions 530mm/280mm/330mm;
- Weight – approx. 14 kg;
- Diameter of the working chamber – 92 mm;
- Height of the working chamber – 80 mm;

### **Operational:**

- Maximum temperature 1150°C (1200°C option);
- Maximum rate of temperature increase 200°C/min;
- Controllable Stand By mode (Idle) 100÷800°C;
- Operation in °C or °F;
- Electronic vacuum control;
- Operation in Bar, cmHg or InchHg;
- Number of programs - over 400;

### **Environmental:**

- Storage temperature: 1°C ÷ 50°C;
- Operation temperature: 10°C ÷ 50°C;
- Relative humidity: up to 80%;
- Altitude up to 2000m.;
- No need to run night program;
- Average life-expectancy of the muffle and the heater (quartz protected) – 10 years.

## II. INSTALLARION

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- Remove all packing material around the furnace;
- Position the furnace on horizontal area. Make sure it is at least 30cm. away from any combustible materials. Rear must be at least 20cm. away from wall;
- Connect vacuum pump hose to the vacuum port on the furnace;
- Connect vacuum pump power supply cable to the vacuum pump power connector on the furnace;
- Connect power supply cable to the power connector;
- Connect power supply cable to the power line;
- The furnace is ready for operation.



*Fuses replacement must be done only with fuses marked onto the furnace.*

### III. WORKING WITH THE FURNACE

#### 1. Control Panel.

The control of the furnace activity is done by a keyboard, LCD display and light indication (fig. 1).

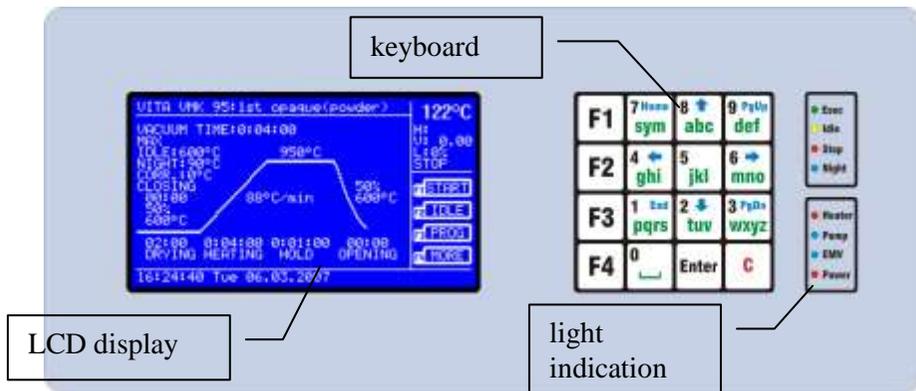


Fig. 0. Control panel

#### 2. Light Indication.

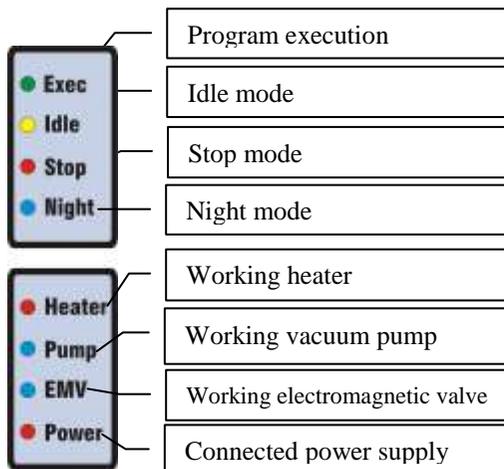


Fig. 2. Light Indication

### 3. Keyboard.

<b>F1</b>	7 Home sym	8 ↑ abc	9 PgUp def
<b>F2</b>	4 ← ghi	5 jkl	6 → mno
<b>F3</b>	1 End pqrs	2 ↓ tuv	3 PgDn wxyz
<b>F4</b>	0 └─┘	Enter	C

*Fig. 3. Keyboard*

The keypad consists of 16 buttons, most of which perform different functions, depending on the mode of the furnace. F1, F2, F3 and F4 are special buttons whose current function is displayed on the display. The 0,1,2,3,4,5,6,7,8 and 9 are used for entering information, menu navigation and elevator control. Enter is for confirmation and C is for refusal / erase.

#### 4. Display.

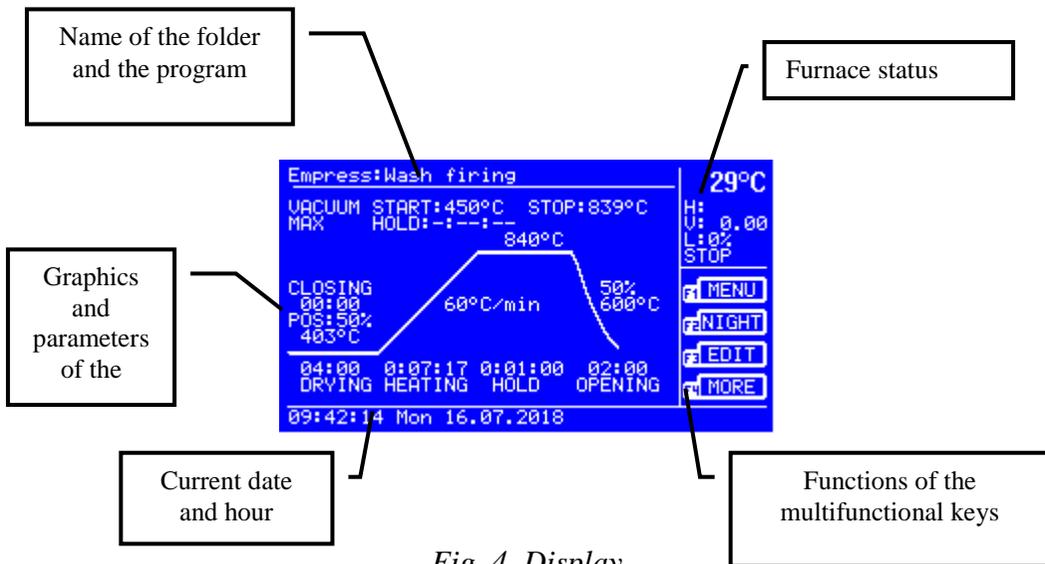


Fig. 4. Display

The name of the folder and the program appears in the top left corner of the display. The central part displays the graph of the program and its parameters. At the bottom, left corner is the current date and time.

In the top right corner is the furnace status (Fig. 5):

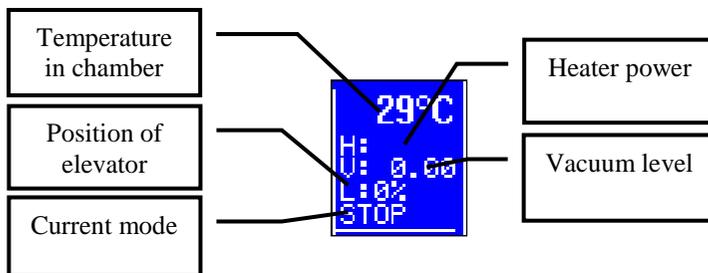


Fig. 5. Furnace status

When the heater is running, the "H" symbol flashes, and the "V" symbol flashes when the vacuum pump is running.

## IV. MODES OF OPERATION.

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At each switch-on, the furnace performs a temperature calibration (if more than 5 minutes has elapsed since the last one) and switches to the last mode it was in before it was switched off.

To switch between modes, use the function keys F1, F2, F3 and F4.

### 1. STOP.

When switching to **STOP** mode, the heater stops.

The elevator can be moved using the arrow keys, the up-arrow key, the down-arrow key and stop with the "5" key. With left-arrow and right-arrow, the program graphic can be scrolled if it does not fit on a single screen.

The meaning of the function keys is as follows:

<b>F1</b>	<b>START</b>	Starting the current program (FIRING).
<b>F2</b>	<b>IDLE</b>	Activating <b>IDLE</b> mode.
<b>F3</b>	<b>PROG</b>	Working with programs.
<b>F4</b>	<b>MORE</b>	Additional functions

The meaning of the additional functions is as follows:

<b>F1</b>	<b>MENU</b>	Settings and information (user menu).
<b>F2</b>	<b>NIGHT</b>	Activating <b>NIGHT</b> mode.
<b>F3</b>	<b>EDIT</b>	Editing the current program
<b>F4</b>	<b>MORE</b>	Exiting additional functions

## 2. IDLE.

When the IDLE mode is activated, the furnace performs a temperature calibration, the door closes and the selected **IDLE** or **LOW** temperature of the current program (according to the program settings) is maintained.

The elevator can be moved using the up-arrow key and the down-arrow key. With arrow-left and arrow-to-right, the program graphic can be scrolled if it does not fit on a single screen.

If the door opens, the furnace will keep the set temperature within one minute. If this minute expires before the door closes or the program starts, the furnace switches to **STOP** mode.

The meaning of the function keys is as follows:

F1	START	Starting the current program (FIRING).
F2	IDLE	Deactivating IDLE mode.
F3	PROG	Working with programs.
F4	MORE	Additional functions

When selecting additional features, the meaning of the keys is the same as in **B IV.1.STOP. STOP.**

## 3. NIGHT.

When switching to this mode, the door closes, the display turns off and the furnace maintains the set night temperature in the settings and information menu (see **VI. SETTINGS AND INFORMATION.**).

Activate (wake) the display by pressing any key.

The meaning of the function keys is as follows:

- F1 STOP Deactivating **NIGHT** mode.
- F2 IDLE Activating **IDLE** mode.
- F3 PROG Working with programs.
- F4 MEHIO Settings and information (user menu).

#### 4. FIRING (Program execution).

Each time a program is started, the furnace performs an automatic temperature calibration.

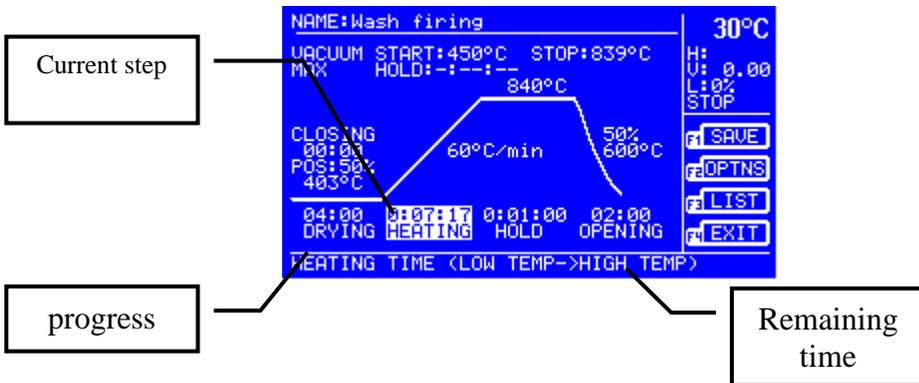


Fig. 6. Firing mode

The program can be interrupted with the F1 key.

The current step depicted on the screen is enlightened. In the lower right corner is the remaining time.

During program execution, it can be edited by pressing F3 (**EDIT**) button. The editing is done as described in V.6. 6. Grapgical editing of a program. Only parameters that refer to the current or next steps can be edited. Changes made during execution are not saved after the end of the program.

#### 4.1. The process of executing a program.

Program execution time is conventionally divided into nine steps (*Fig 7*):

- Drying (*DRYING*);
- Preheating (*PR.HEAT.*);
- Intermediate heating (*INTERM.HEAT.*);
- Interim retention (*INTERM.HOLD*);
- Heating (*HEATING.*);
- Hold (*HOLD.*);
- Cooling (*COOLING.*);
- Tempering (*TEMPER.*);
- Opening (*OPEN*).

Steps:

- Preheating (*PR.HEAT.*);
- Intermediate heating (*INTERM.HEATING.*);
- Interim retention (*INTERM.HOLD.*);
- Cooling (*COOLING.*);
- Tempering (*TEMPER.*);

are optional and by default are not active. Their activation is from the "**OPTIONS**" menu when editing a program.

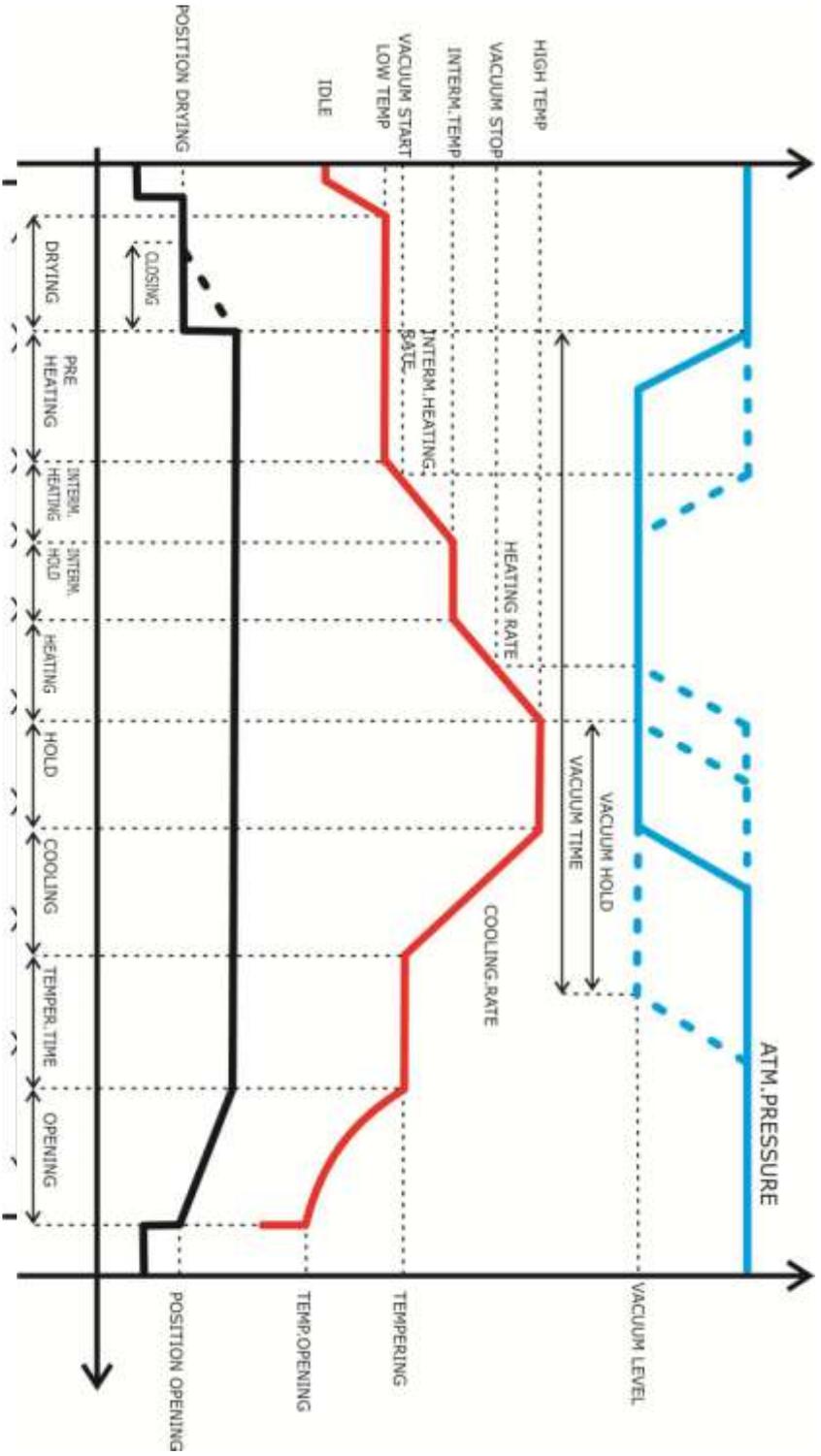


Fig 7. Program Steps

When the program is started, the lift occupies the position set for drying (**DRY POSITION**) and the temperature in the chamber starts rising until the initial temperature (**LOW TEMP**) is reached. From this point on, the drying time begins.

If a closing time (**CLOSE**) is set, the door closes slowly (in steps) during the last **CLOSING** minutes from the time of (**DRYING**).

If the drying time (**DRYING**) is set (00:00), the **DRYING POSITION** and **CLOSE** position is hidden.

If pre-heating time is set (**PR.HEATING**), the furnace continues to keep the **LOW TEMP** temperature until the time has elapsed **PR.HEATING** with a closed door.

Next is a process of raising the temperature. If intermediate heating (Intermediate = **YES**) is set in the program options, the firing will be done at two temperature levels. First, the temperature in the chamber will increase to **INTER.TEMP.** with speed of **SP.IN.HEATING** for a time of **IN.RETEN.**. Then the **IN.TEMP** will then be maintained in the chamber for **IN.RETEN.** time. After expiring of the **IN.RETEN.**, the temperature will continue to rise to **HIGH TEMP.** with a speed of **SP.HEATING** for a time of **HEATING**. Upon reaching the **HIGH TEMP** temperature, the retention time (**HOLD**) starts. For **HOLD** time in the chamber, a **HIGH TEMP** temperature is maintained.

If the intermediate heating is not activated (from the options menu), the temperature will increase from **LOW TEMP** to **HIGH TEMP** with speed **SP.HEATING** for a time of **HEATING**.

After the hold time (**HOLD**) has elapsed, if cooling (cooling = **YES**) is activated from the option menu, the cooling process starts. The temperature in the chamber will slowly drop at a rate (**SP.COOLING**) for a time of **COOLING** until temperature reaches **TEMPERING**. In the chamber, the reached temperature temperature is maintained for the set time **TEMPER.TIME**.

The final step in the program's implementation is opening. Before opening, the heater is switched off and, if the chamber is under vacuum, the vacuum is released.

For **OPENING** time the elevator door slowly reaches position **OPEN POSITION**. Then, if the **TEMP.OPEN** temperature is set, wait for the temperature in the chamber to drop to **TEMP.OPENING**, after that the door opens completely. The execution of the program ends. A message for a successful program is displayed.

#### 4.2. Vacuum Control.

The vacuum can be controlled by temperature and time or just in time. The choice is made from the program option menu when editing a program (*Fig.8*).



*Fig.8. Vacuum control*

If the value '**TEMP & TIME**' is selected for **VACUUM**, enter the vacuum start temperature (**VACUUM START**), the vacuum stop temperature (**VACUUM STOP**). If a value such as **HIGH TEMP** is set for **VACUUM STOP**, a parameter **VACUUM HOLD** is specified, which determines how long the vacuum is retained in the chamber after the start of the hold. **VACUUM HOLD** can not be greater than the total value of **HOLD + COOLING + TEMP.TIME**.

If the value '**TIME**' is selected for **VACUUM**, the **VACUUM TIME** parameter is set to indicate how long the chamber will be under vacuum from preheating or heating (if the pre-heating time is 0:00:00 or is not active) . The **VACUUM TIME** value can not be

greater than the total value of **PR.HEATING + INT.HEATING + IN.RETEN + HEATING + HOLD + COOLING + TEMP.TIME.**

The **VACUUM LEVEL** parameter determines the vacuum level in the chamber. This parameter takes values from -0.30 to -0.99bar or MAX. When selecting the MAX, the vacuum level is the maximum achievable for the vacuum pump used.

### 4.3. Argon.

When using argon (option Argon from menu program options), after shutting down the vacuum oven, the pump will be switched on to drain the atmospheric air, then the argon will enter the chamber through the atmospheric air nozzle.



*The use of argon for the treatment of materials (for example, titanium), which at high temperatures are in reaction with the atmospheric air, must require cooling. The cooling temperature should be selected sufficiently low and safe to avoid burning the material in contact with the ambient air after opening the furnace.*



*The maximum duration of a program is limited to 9:59:59.*

## V. WORKING WITH PROGRAMS

### 1. Folders.

The programs in the furnace are organized into folders. The furnace can store more than 400 programs, subject to the following restrictions:

- Max number of folders is 64;
- Max number of programs in a folder is 40.

To work with programs, choose “PROG” with F3 button from the main menu (*Fig. 9*).



*Fig. 9.Main*

A folder menu will appear on the screen (*Fig.10*).



*Fig.10.Folders*



Typically, a folder contains the programs of a specific ceramics, but this organization is not required.

You can use the keys on the keyboard to perform the following actions:

- arrows** - Moving the cursor
- Enter** - Opening a folder
- F1** NEW - Creating a new folder
- F2** EDIT - Editing the name of a folder
- F3** BACK - Going back to the main menu
- F4** MORE - Additional actions

## 2. Selectin/Editing a name.

Press F1 to create a new folder and edit the name of an existing folder with the F2 button..

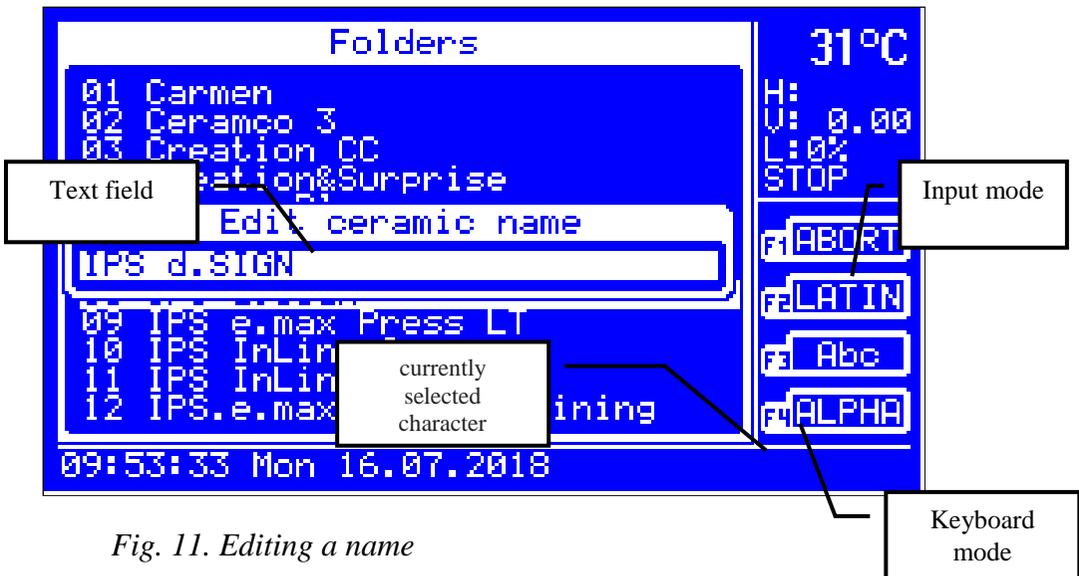


Fig. 11. Editing a name

The function of the keys for the text input mode is the following:

<b>F1</b>	ABORT	-	Decline changes
<b>F2</b>	LATIN/ CYR.	-	Switch between latin and cyrillic
<b>F3</b>	ABC/ Abc/ abc	-	Input mode (only main, only first, only small).
<b>F4</b>	ALPHA/ NUM/ NAV	-	Keyboard mode (entering letters and characters, entering numbers only, navigating mode - moving the cursor
<b>C</b>		-	Delete a mark before the cursor
<b>Enter</b>		-	Confirm the changes

With the F4 button you can change the keyboard mode.

In ALPHA mode, you can enter letters, numbers and characters (button 7 / Home / sym).

Different characters are entered by pressing the corresponding button repeatedly until the desired character is reached. The bottom right corner of the display shows the list of characters for that button.

The marks are erased with the **C** button.

With F3, the character entry mode can be changed.

"Abc" - the first letter entered is large, the next small ones;

"abc" - lower case input only;

"ABC" - upper case input only.

Only numbers are entered in **NUM** mode. In **NAV** mode, you can use the arrows to move the cursor to the desired position in the text field. The **Home** and **End** buttons move the cursor to the beginning or end of the text.

With **Enter**, the changes are confirmed and with **F1** button are aborted.

### 3. Additional actions with folders.

Pressing the **F4** button from the folder menu will show the additional folders actions:

<b>F1</b>	MOVE	-	Move a folder to a new location
<b>F2</b>	COPY	-	Copy a folder
<b>F3</b>	ERASE	-	Delete a folder
<b>F4</b>	MORE	-	Return to previous menu

Using the **F1** button, you can move a folder to a new position in the list (Fig. 13). After pressing it, the currently selected folder starts blinking. Use the arrows to move the folder to the desired position and confirm with the **F1** button. Movement can be canceled with the **F4** button.



Fig. 12. Moving a folder

You can copy a folder by pressing F2 (Fig. 13).



Fig. 13. Copying a folder

The name of the copy of the folder is then entered, as described in **V.2. Input / editing a name.**

Button **F3** deletes the currently selected folder along with its programs.

#### 4. Programs.

When you press the **Enter** button from the folder menu, the currently selected folder opens and the available programs menu (Fig. ).



Fig. 14. Programs

You can use the keys on the keyboard to perform the following actions:

- |               |      |                           |
|---------------|------|---------------------------|
| <b>arrows</b> | -    | Moving the cursor         |
| <b>Enter</b>  | -    | Selecting a program       |
| <b>F1</b>     | NEW  | - Creating a new program  |
| <b>F2</b>     | EDIT | - Editing a program       |
| <b>F3</b>     | BACK | - Back to the folder menu |
| <b>F4</b>     | MORE | - Additional actions      |

## 5. Input/editing a program.

Pressing F1 creates a new program, and an F2 button edits an existing program. A menu opens with program parameters listed in the following figure (Fig. ).

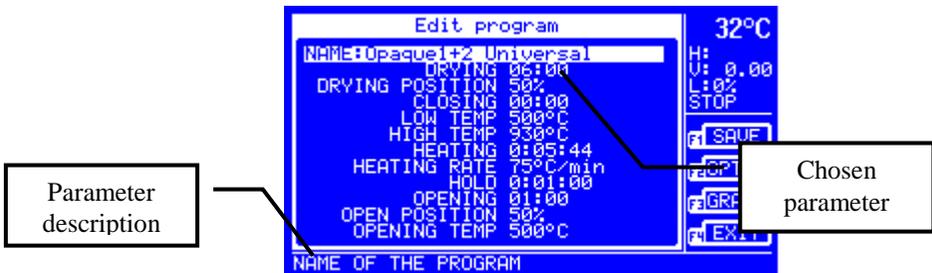


Fig. 15. Program editing

The actions of the buttons are as follows:

- |               |       |  |
|---------------|-------|--|
| <b>arrows</b> |       | - Moving the cursor                      |
| <b>Enter</b>  |       | - Edit the selected parameter            |
| <b>F1</b>     | SAVE  | - Save Changes to Memory                 |
| <b>F2</b>     | OPTNS | - Open a menu of options for the program |
| <b>F3</b>     | GRAPH | - Graphic editing of the program         |
| <b>F4</b>     | EXIT  | - Exit Edit Mode                         |

Editing a selected parameter is done by first selecting the arrows and then pressing **Enter**. The parameter value is highlighted and a cursor is displayed (*Fig. 16*).



*Fig. 16. Editing a parameter*

Entering the parameter value is done with the keys on the keyboard. Button **C** is used to delete the entered value, and the **F1** button can cancel the changes. Confirm the entered value with the **Enter** button.

Editing the **NAME** parameter is as described in **V. 2. Input / editing a name**.

When entering the **VACUUM LEVEL** parameter besides the value in the selected units of measurement, **FULL** or **MAX** can also be set using the **F3** and **F4** buttons (*Fig. 17*).



Fig. 17.Editing the vacuum level

At set value **FULL**- the pump with run continuously and at **MAX** – until the maximum vacuum for the vacuum pump is



*For the best results and storage of the vacuum pump resources, the recommended value of the **VACUUM LEVEL** parameter is **MAX**.*

reached.

## 6. Graphic editing of the program.

When you press the F3 (GRAPH) button in the program edit mode, it switches to graphical editing mode (Fig.18.).



Fig.18. Graphical editing of the program

To return to the previous mode, press the F3 (LIST) button again.

The parameters can be scrolled with the arrow buttons, and the editing is done again with the Enter button, in the same way as in V.5. Input/editing a program.

Graphic Editing Mode is the default mode when selecting a program scrolling (F3 - EDIT) from the main menu (screen). The edited program can be executed without having to be stored in the permanent memory. If desired, changes can be saved with the F1 (SAVE) button. Restoring the original program is done by reloading using the F3 (PROG) -> Folders menu -> Enter-> Programs menu-> Enter (program loading).

## 7. Additional actions with programs.

Pressing the F4 (MORE) button in the program menu will show the additional program actions:

<b>F1</b>	<b>MOVE</b>	-	Move a program to a new location
<b>F2</b>	<b>COPY</b>	-	Copy a program
<b>F3</b>	<b>ERASE</b>	-	Delete a program
<b>F4</b>	<b>MORE</b>	-	Return to previous menu

Using the F1 (**MOVE**) button, you can move the program to a new position in the list by moving the folders described in **V.3.Additional actions with folders.**

To copy a program, press **F2 (COPY)**. Instead, the function of the **F2** button is activated (PASTE) and the F3 - ABORT button (*Fig.19.*).



Fig. 19. Copying a program

Press the **F4 (MORE)** button, then the **F3** button (**BACK**) - returns to the folder menu.

Open the desired folder to copy the program and re-select the additional actions using the **F4 (MORE)** button. Press the **F2** button to copy the program. The action is fulfilled. Cancel the copy by pressing the **F3** button (**ABORT**).

When copying, the program is placed in the last position in the list. If desired, it can be moved to a new position with the **F1** button (**MOVE**).

Button **F3** deletes the currently selected program.

## 8. Program options.

In program edit mode, when you press the **F2 (OPTNS)** button, an option menu appears on the edited program (Fig.20.).



Fig. 20. Program options

With the arrows, a desired option is selected, and the Enter button can change its setting.

The description of the options is as follows:

- **Idle temp.** – when selecting **YES**, an additional parameter **IDLE** is triggered, which can be set to the desired temperature on the floor. If the value is **NOT**, the first temperature (**LOW TEMP**)
  - **Pre heat** - when selecting **YES**, an additional **PARAMETER** parameter is opened to set the **LOW TEMP** hold time, when the door is closed, after the drying has been shut off and before the start of the heating (see **IV.4.1. Program execution and Fig.7. Program steps**).
  - **Interm.heat** – when selecting **YES**, additional parameters **INTERM.HEAT**, **INTERM.HEAT.RATE.**, **INTERM.HOLD** и **INTERM.TEMP** are unlocked, which sets the time for intermediate heating, intermediate heating rate and intermediate retention of the **TEMPERATURE** (see **IV.4.1.Program execution Figure 7. Program steps**).
  - **Cooling** – When selecting **YES**, additional **TEMPERATURE**, **COOLING**, **COOLING RATE**, and **TEMPERING TIME** parameters are triggered by setting the tempering temperature, cooling rate and time (see **IV.4.1. Program, and Fig.7. Program steps**).
- Аргон** – when choosing **YES**, the use of argon is triggered (see **IV.4.3 Argon**);
- **Correction** – when selecting **YES**, the **OPTION** parameter can be unlocked by which the temperature of the particular program can be adjusted;
  - **Vacuum** – choice for a way to adjust the vacuum (see **IV.4.2.Vacuum control**)

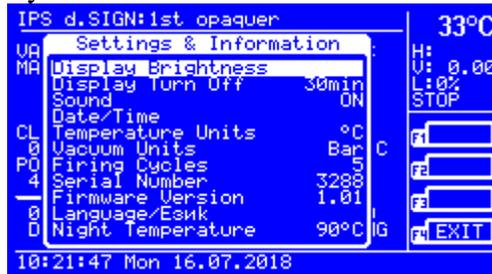
## 9. Table of program parameters.

Param.	Description	Range
<i>NAME</i>	Program name	
<i>IDLE</i>	Idle temperature of the program	50-800°C (122 -1472°F)
<i>DRYING</i>	Time of drying	00:00-99:59 minutes
<i>POS DRYING</i>	Position of elevator, in time of drying	0-100%
<i>CLOSING</i>	Време за затваряне на асансьора по време на сушене.	00:00- <i>DRYING</i> minutes
<i>LOW TEMP</i>	Low (initial) temperature. This parameter can not have a lower value than <i>IDLE</i> . Its maximum value is 800°C (1472°F).	<b>IDLE</b> ÷ 800°C (1472°F)
<i>INTERM.TEMP</i>	Intermediate temperature. If set, the program will have two temperature levels.	<b>LOW TEMP</b> ÷ <b>HIGH TEMP</b>
<i>HIGH TEMP</i>	End temperature	<b>HIGH TEMP</b> / <b>INTERM.TEMP</b> ÷ 1150°C (2102 °F)
<i>PRE HEAT</i>	Preheating	0:00:00-9:59:59 hours
<i>INTERM.HEAT</i>	Time for intermediate heating (from <b>LOW TEMP</b> to <b>INTERM.TEMP</b> ).	0:00:00-9:59:59 hours
<i>INTERM.HEAT.RATE</i>	Temperature increase of the temperature during the intermediate heating.	0-200°C/min 0-360°F/min
<i>INTERM.HOLD</i>	Intermediate temperature retention time.	0:00:00-9:59:59 hours
<i>HEATING</i>	Heating time from <b>LOW TEMP</b> to <b>HIGH TEMP</b> or from <b>TEMP</b> to <b>HIGH TEMP</b> , depending on whether Intermediate heating is selected.	0:00:00-9:59:59 hours
<i>HEATING.RATE</i>	Temperature rise rate. This parameter is directly related to the heating time.	0-200°C/min 0-360°F/min

<b>HOLD</b>	End temperature hold time ( <b>HIGH TEMP</b> ).	0:00:00-9:59:59 hours
<b>TEMPERING</b>	Tempering temperature	50°C(122 °F) ÷ <b>HIGH TEMP</b>
<b>COOLING</b>	Cooling time(from <b>HIGH TEMP</b> to <b>TEMPERING</b> )	0:00:00-9:59:59 hours
<b>COOLING.RATE</b>	Cooling rate	0-200°C/min 0-392°F/min
<b>TEMPERING TIME</b>	Holding the temperature tempering	0:00:00-9:59:59 hours
<b>OPENING</b>	Time for opening	00:00-99:59 minutes
<b>POS OPENING</b>	Positioning of opening	0-100%
<b>TEMP.OPENING</b>	Temperature of opening	50°C ÷ <b>HIGH TEMP</b>
<b>VACUUM STOP</b>	Temperature of starting the vacuum	<b>LOW TEMP</b> ÷ <b>HIGH TEMP</b>
<b>VACUUM START</b>	Temperature of stopping the vacuum	<b>VACUUM START</b> ÷ <b>HIGH TEMP</b>
<b>VACUUM HOLD</b>	Vacuum retention. If the <b>VACUUM STOP</b> value is equal to <b>HIGH TEMP</b> , it may be set how long to hold the vacuum until the furnace is opened.	0:00:00-9:59:59 hours
<b>VACUUM TIME</b>	Vacuum time. Sets the time for the vacuum to start from the beginning of the pre-heating step to the opening (including cooling).	0:00:00-9:59:59 hours
<b>VACUUM LEVEL</b>	Vacuum level. When selecting the <b>MAX</b> , the vacuum level is the maximum achievable for the vacuum pump used. <b>FULL</b> - constant operation of the pump.	0.0 до -0.99 Bar, <b>MAX</b> , <b>FULL</b>
<b>CORRECTION</b>	Temperature correction for the specific program.	-25÷0÷25°C

## VI. SETTINGS AND INFORMATION

In the Settings and Information menu, you can enter by selecting "MORE" and then "MENU" from the main screen using the multifunction keys.



*Fig. 21. Settings and information*

The menu options are as follows:

- Display Brightness** - Setting the display brightness
- Display Turn off** - Time to turn off the display in minutes (0 – without turn off).
- Sound** - Sound on/off.
- Date/Time** - Setting the date and hour.
- Temperature Units** - Choose temperature dimension °C/°F.
- Vacuum Units** - Vacuum dimension Bar/cm Hg/Inch Hg
- Firing Cycles** - Furnace cycle counter
- Serial Number** - Furnace serial number
- Firmware Version** - Furnace firmware version.
- Language/Езык** - Language settings
- Night Temperature** - Setting the night temperature

Exit the menu by pressing **F4** ("EXIT").

## VII. DISPLAYED MESSAGES AND CAUSES

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### **LIFT IS OVERLOADED!**

Appears when the elevator is overloaded, ie. the motor current reaches a very high value. It is possible to get in case of a mechanical problem (dirt, tightened strap).

### **LIFT POSITION SENSOR FAIL!**

Appears when the lift is set to move, and does not change in position. Possible cause - defective position sensor.

### **LIFT MICRO SWITCHES FAIL!**

Appears when one or both of the elevator's micro keys are damaged.

### **THERMO-COUPLE FAIL!**

Appears when the temperature sensor (thermo-couple) fails. Probable Cause - Interrupted thermo-couple.

### **TEMPERATURE IS OVER CRITICAL!**

Appears when the maximum allowed furnace temperature is exceeded. In this case, the heater is switched off completely via the safety relay. Possible cause - damaged switching element of the heater (triac).

### **LOW VACUUM!**

Appears if within 2 minutes the set vacuum level is not reached or the vacuum is below -0.80Bar.

### **VACUUM PROBLEM**

It occurs if the vacuum level drops very quickly after the vacuum pump is switched off.

### **LOWER PRESSURE!**

Appears when attempting to open the camera while the pressure in it is too low (under vacuum).

**The duration of the program should be less than 10 hours.**  
The duration of a program is limited to 9:59:59. Please correct the times in the program.

**PROGRAM COMPLETED**

The execution of the program is completed.

**PROGRAM IS TERMINATED!**

The execution of the program is terminated.

**AC POWER LOSS OCCURED.**

A power outage occurred during program execution.

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**Have a successful work with  
DENTAMATIC 500AT!**

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