Shenpaz
Dental Furnaces

FOCUS 4010



USER MANUAL

Focus 4010 porcelain firing furnace

Dental Servis
Serdar Ayısıt
0555 274 05 51

Warning

You have available one of the most precise dental furnaces equipped with a heating muffle made by the original manufacturer of this technology with an experience of more than 25 years in the dental laboratory industry.

IN ORDER TO PRESERVE THIS PRECISION AT ALL TIMES, PLEASE BE SURE TO ATTENTIVELY READ THE FOLLOWING INSTRUCTIONS PRIOR TO USING THE FURNACE!

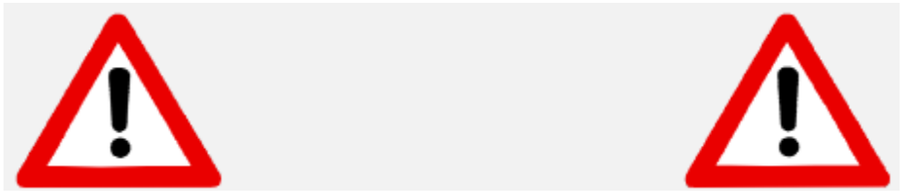
- Please keep your furnace in an ambient temperature for any storage .
- Prior to carrying out maintenance work on the furnace or in case of mechanical failure, firstly be sure to completely shutdown the device. To do so, switch the main switch (POWER) on the back of the furnace to OFF and pull the power-supply plug.
- Only qualified technicians and experts recommended by the furnace supplier should open the furnace.
- Do not attempt to open the furnaces without authorization since this will void the guarantee. For any necessary repair and maintenance work, consult your Shenpaz device servicing center.

- In case of a necessary replacement of fuses, proceed as follows:

1) Pull the power-supply plug.
2) Replace the fuse.
3) Be sure the correct safety fuse parameter is indicated on the spare fuse.

- Basically your furnace has a full recovery system on any power failure
- In case of a long external power failure and when it is needed to manually open the furnace proceed as follows:

1) Pull the power-supply plug.
2) Lower the support. To do so, insert the supplied crank into the hexagonal screw on.



ATTENTION!

When operating the furnace a Refractory support must always be on the lift tray!



ATTENTION!

Take out the furnace with the assistance of two persons. To do so, each person will take a side by holding the bottom of the furnace with one hand and the top side with the other hand.

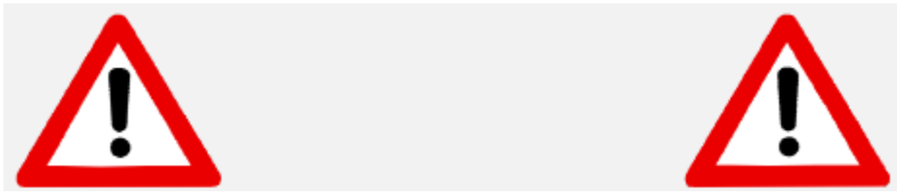
ATTENTION!

Do not pull out the furnace by its support in order to avoid damages.

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Warning

ATTENTION!



ATTENTION!

Mount on non-flammable surface material only !

Take out the furnace with the assistance of two persons. To do so, each person will take a side by holding the bottom of the furnace with one hand and the top side with the other hand.
Do not pull out the furnace by its support in order to avoid damages.

CAUTION: **PLEASE READ THE INSTRUCTIONS CAREFULLY BEFORE OPERATING THE FURNACE.**

When operating the furnace a Refractory support must always be on the lift tray!

- During use, the area around the furnace table is hot; approach and contact with the table should be only when the furnace is cold
- Dental work must only be placed on the furnace table.

  Avoid placing or resting objects on any area of the furnace except the rest table.
- In the event of an external power failure while the furnace is in operation:

  1) Disconnect the power supply cord from the electrical power outlet.

  2) Lower the table by inserting the crank supplied, into the hexagonal screw located at the back of the furnace.

Caution!
Risk of electric shock



Caution!
Hot surface!



Caution!
Risk or Danger
Refer to documenta



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1. Furnace Installation

1.1 Unpacking

1) Check the contents of the shipping carton, compare with the enclosed list.

2) Take out the accessories and check the contents:

. Electrical Mains cord
. Firing table
. Tweezers
. Fuses
. Emergency wrench
. Vacuum hose
. User manual

Remove carefully the polyethylene foam.

3) Lift out the furnace carefully, and positioning it on its feet. **DO NOT** lift the furnace by the lift shaft.

4) Store the carton and the polyethylene foam for future use.

POINTS TO NOTE:

- When positioning the furnace on the working bench, please keep safe distances from the surrounding walls (approx. 20cm).
- Do not place the furnace near the open window or any source of direct airflow (like ventilator). This, in order to eliminate the possibility of wrong temperature reading when the firing table is in its lower position.
- Placing the furnace according to the above mentioned instruction will guarantee the proper temperature stabilizing, heating and cooling.

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1.2 Installation

1.3 Vacuum Pump Connection

1) Using the rubber vacuum tube and the band supplied:

1. Connect the nozzle of the vacuum pump to the rubber vacuum tube.
2. Connect the nozzle of the furnace to the other end of the rubber tube.
3. Check the band is well secured.

2) Plug the electrical power cord of the vacuum pump, into the electrical power outlet of the vacuum pump, located on the rear panel of the furnace.

3) Check the position of the pump so that the vacuum tube will have an undisturbed air flow.

1.4 Furnace Connection to Power Outlet

- Check and ensure that the main power switch at the rear of the furnace is turned off.
- Connect the electrical power cord into the furnace power inlet. Plug the electrical power cord into the wall power outlet.
- Switch the MAIN POWER switch ON (located on the rear panel). You will hear a single beep. The furnace is now in **Stand-by** mode. The word "ON" in the program field.
- Press the ON/OFF key on the front panel. The furnace is now in **Idle** mode.
- Press the [STOP/LIFT] key - the platform will descend automatically.
- **Place the ceramic table on the platform!!!**
- The furnace is now ready for the Initial Operation Procedure.

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2. General Description

2.1 Connections and Controls

FRONT PANEL:
The furnace controls are located on the front panel and are divided into 6 sections:

. Data keys
. Control keys
. Programming keys
. LCD color
. Temperature and Data Display
. Vacuum Display

REAR PANEL

The main switch and the furnace connections are located on the rear panel.

. Power switch
. Emergency wrench inlet
. Muffle fuse
. RS 232 /USB Inlet for Software uploading
. Power cord outlet
. Power muffle fuse
. Calibration inlet
. Vacuum pump inlet
. Vacuum pump fuse

2.2 Data Keys

Data keys are for the inserting, deleting, and changing of data.

The Data keys are:-

NUMBERS	– From numbers **0-9**.
ENTER	– Confirms the selection of a program or a parameter.
CLEAR	– Cancels the previous key selection.

2.3 Control Keys :

The 4 control keys are:-

ON/OFF	Turns the furnace on/off. – Switching to Idle mode.
STOP/LIFT	Raising and lowering the platform. Interrupting a firing cycle.
START	Starting a firing cycle.
HOLD	Temporarily "freezes" the firing cycle.

2.4 Programming keys:

PROG - (PROGRAM)	Sets the furnace into the mode for program selection.

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ARROWS keys	Closing and opening the table and toggle between the different parameters in the editing mode

2.5 Displays :

The " program Status" display shows the Status of the selected program. (start /Stop/ hold) left upper corner
The "program Time" screen displays either the selected program **remaining time** or 00:00 while not in cycle middle upper section

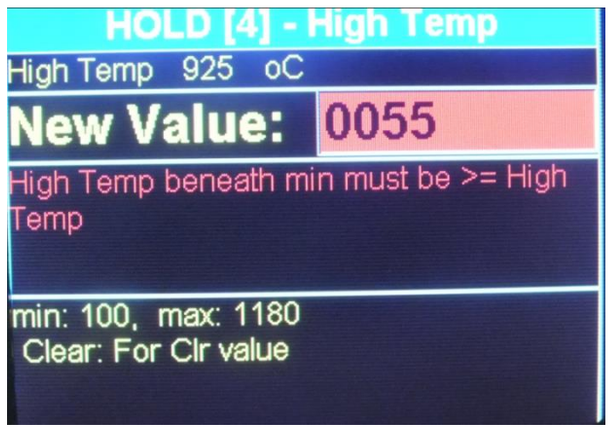
The "temperature and data" display screen displays the temperature during the Cycle, The symbol **°C** is displayed together with the temperature when degrees in Celsius are defined, and the symbol **°F** when the degrees are in Fahrenheit. Right upper section



"Vacuum" display is used when keying in the vacuum parameters of the cycle. During the cycle, the "vacuum" screen is displaying the actual vacuum level on the lower left corner. Lower left section

On the right lower side appear the running parameter in reel time

- While a selection is incorrect the field will be displayed in Red with Parameters Limits.



- In The Display mode all the status and parameters will appears in reel time.

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–



2.6 Sound Messages :

The tone sound is a useful indicator for key selection and operation procedures.

- A single tone sounds, when a key is pressed or when the furnace is in the "HOLD" mode.
- A double tone sounds when there is an incorrect key selection or choice of data.
- A five double-tone sounds at the end of a firing cycle.

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3. Initial Operation

Before running any firing cycles the furnace must undergo an initial drying procedure to remove any absorbed humidity that may have entered during transit.

The furnace firing procedure is a special drying cycle for the firing chamber, and it must be carried out before you start using your furnace.

The procedure is mentioned here before the operating instructions, to remind you to read the entire operations manual and then to run the initial firing procedure before working with any program.

We highly recommend you to use a dry pump that is able to reach 720 mmHg within 35-40 sec

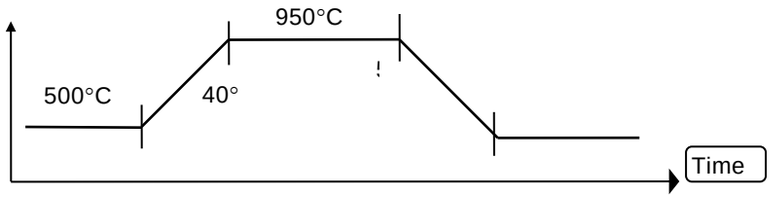
3.1 Initial Furnace firing for muffle drying

1) Connect the furnace as instructed previous sections.
2) Using the [STOP/LIFT]key move the platform to the lowest position.
3) Place the ceramic table on the furnace platform.
4) Use program No.1 (the BUILD-IN parameters listed below) :-

Table 3-1

START TEMP	500 °C
UP TIME	3 minutes (03:00)
DRY TIME	1 minutes (01:00)
HEAT RATE	40 °C /minute
HIGH TEMP	950 °C
TEMP DELAY	5 minutes (05:00)

5) Run program No.1
This program will dry the muffle from any absorbed humidity.
6) Repeat the above procedure 2 to 3 times.



REMEMBER:

Only after completing this procedure is the furnace ready for use.

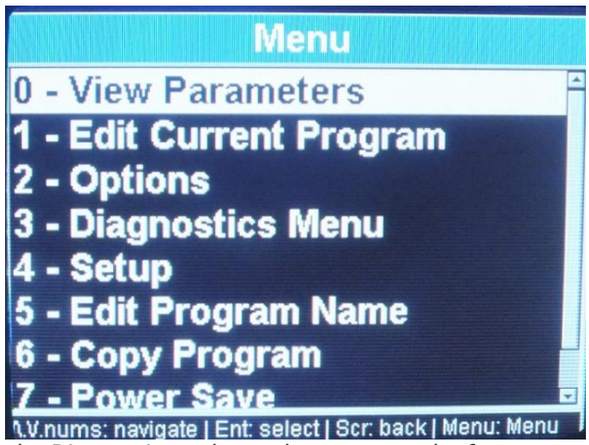
3.2 Power Switch :

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To start the furnace press the power switch located on the rear panel to the **ON** position, the furnace is now in the Stand -by Mode.

By pressing the ON/OFF button on the front panel, the furnace is turned on. This mode is called the Idle Mode. The temperature would rise and will maintain on 200ºC.

3.3 Set-Up possibilities:



In order to enter the Diagnostic mode you have to turn the furnace **on** from the front panel by pressing the ON/OFF key. Now the furnace is in the stand-by mode (the display is showing "Focus "Logo).

- Press menu button:
  - By pressing the arrows you can browse through the options/Diagnostics/setup
  - By pressing number 2 you will be able to set your preference:
    By pressing the arrows you can navigate between the different options
    By pressing the enter button you will change your choice

PIC 1/1

3.4 Idle Mode :

Press the [ON/OFF] key located on the **front panel**, the furnace is now ready for Program selection.

POINTS TO NOTE

⇒ Idle mode is provided for use during long time intervals, when the furnace is not in operational use.

⇒ **It is very important that you keep the firing chamber closed to prevent moisture from entering the muffle.**

3.5 Programming mode:

Press the "PROGRAM" key **[PROG].**

Using the number keys enter any number from 0-249 or scroll with the arrows to the chosen program.

Press the "ENTER" key.

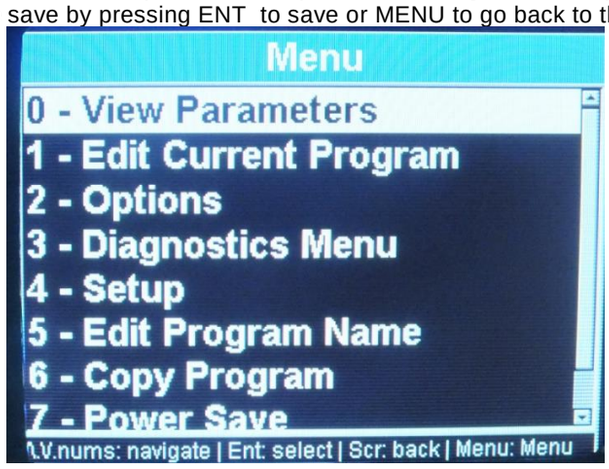
POINTS TO NOTE

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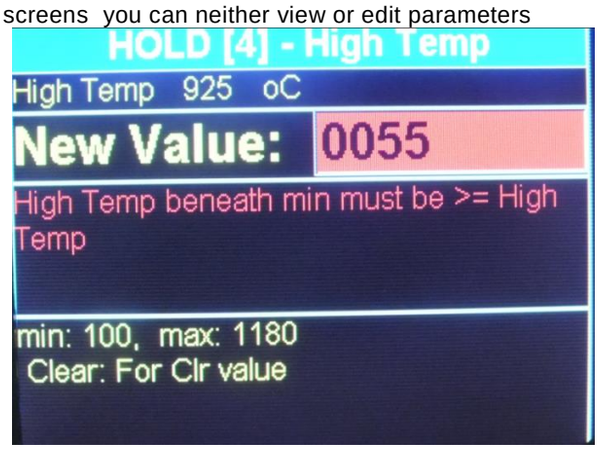
⇒ When editing is required press menu button and press option 1- edit program.
- by pressing the arrow you will change to the different parameters and to update the different value
⇒ If you want to change your program, press the "CLEAR" key and re-enter a different program number **(0-249)**.

3.6 View/Entering and Changing Parameter Data-Edit program

To view parameters of a program press the button Menu+ Enter
To edit parameter of a program Press the buttons Menu+ arrow down until reaching 1-edit current program + enter/ all the parameters will appears one after the other with the limit of the parameter. Continue to press on the up arrow to change the other parameters, the change will be save by pressing ENT to save or MENU to go back to the main screen.



PIC: From this screens you can neither view or edit parameters



By Pressing the Arrow key, you reach the desired parameter screen and you can read the value on the data display or modified it to the edition one.

Using the data keys, enter the parameter data you require (for the programs 2-249).

Using this method continue to toggle through your parameters, checking or entering data as required.

Press the "ENTER" key when finished to introduce or to change all the required parameters. To run the cycle go back to the main screen by pressing the menu button

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In case one or couple of the parameter fields are not in use, they should remain blank and there is no need to introduce the "0" level or any value in the blank field.

EXAMPLE 1

Entering a START TEMP of 400°C and HEAT RATE 55°C/min .

1. Press the Arrow key until the **[START TEMP]** field will appear
2. Press the keys **[4]**, **[0]**, **[0]**.
3. Press the Arrow UP key until the **HEAT RATE** display will be illuminated (do not enter values in the **UP TIME** and **DRY TIME** fields if not needed).
4. Press the keys **[5], [5] for the ramp.**
5. Press **ENTER** key.

EXAMPLE 2

Entering a UP TIME and DRY TIME of 3.5 minutes each.

1. Press the arrow key until the **[UP TIME]** field will appear
2. Press the keys [**3]**, **[3], [0].**
3. Press the up key.
4. Press the keys **[3}, [3], [0].**
5. Press the key **[ENTER]** or Arrow key again.

EXAMPLE 3

Entering a "VACUUM ON" TEMP of 420°C, "VACUUM OFF" TEMP 820°C and "VACUUM LEVEL" of 720mmHg.

1. Press the up key until the Field "V on" will be displayed on the "VACUUM" field.
2. Press the keys **[4], [2], [0].** For vacuum start
3. Press the up key until the field " vacuum off" will be displayed on the "V.off" display. For the end of the vacuum
4. Press the keys **[8], [2], [0].**
5. The vacuum Level can be set here or by preset the Level in the option screen, if the Level is chosen this possibility will not appear, if the fields in the option is empty, you will be able to set the vacuum level

   if the field is enable than
6. Press the keys **[7], [2], [0].**
7. Press the key [ENTER] or arrow key again.

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3.7 Description of the parameters, and their limitations.

As a useful guide, we have listed for you in **Table below**, the parameters, their functions and their limits. The comments will draw your attention to other relevant details.

Parameter	START. TEMP
Function	The starting temperature of the program. When it is reached the cycle will begin.
Limits	100°C to 450°C
Comments	One of the parameters, which have to be included in order for a program to run.
Parameter	UP TIME
Function	The time required to raise the platform from lowest position until the muffle is closed.
Limits	0 to 30:00 Min
Comments	During UP TIME the platform rises in four progressive stages.
Parameter	DRY TIME
Function	The final stage of the UP TIME during which the muffle is closed and the temperature does not rise for the defined duration.
Limits	0 to 30 minutes.
Comments	Vacuum pump will start pumping out the air before the DRY TIME countdown begins. If DRY TIME without vacuum required , VACUUM START temperature value should be 5°C higher than START TEMP.
Parameter	HEAT RATE
Function	The rate in °C or °F at which the temperature rises from START TEMP to HIGH TEMP and from HIGH TEMP to FINAL TEMP.
Limits	10 °C to 100 °C
Comments	One of the parameters which have to be included in order for a program to run..
Parameter	HIGH TEMP
Function	The temperature to be reached at the end of the HEAT RATE or **intermediate** temperature when the value of the FINAL TEMP is **higher**
Limits	100°C to 1100°C in normal 100°C to 1180°C in HT
Comments	Must not be less than “VACUUM OFF” temperature. (When a vacuum is included in the program). One of the parameters which have to be included in order for a program to run.

Parameter	TEMP DELAY
Function	The duration of time that the furnace will remain at the HIGH TEMP before the firing chamber is opened or before the temperature will continue it’s rise to FINAL TEMP (if defined) .
Limits	0 to 30 minutes (specified in minutes and seconds). 0 to 4:30 H in the HT Programs
Comments	**Intermediate** delay when FINAL TEMP is **higher** than HIGH TEMP.
Parameter	FINAL TEMP

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Function	An additional heating or cooling mode. May be lower or higher than HIGH TEMP. If higher - heating will be reactivated. If lower - chamber will be opened slightly to enable quick cooling to the FINAL TEMP value. Then the platform will close the muffle and the temperature will stabilize on FINAL DELAY temperature.
Comments	Optional parameter. In case not in use should remained blank
Limits	100°C to 1100°C in normal 100°C to 1180°C in HT
Parameter	FINAL DELAY
Function	The time duration the furnace will remain at FINAL TEMP before opening the chamber.
Limits	0 to 30 minutes. 0 to 4:30 H in the HT Programs
Comments	To use only when FINAL TEMP parameter is programmed.
Parameter	COOL TIME
Function	The time required to lower the platform. The platform descends in three progressive stages. Starting from when the firing chamber is closed to the lowest position.
Limits	0 to 30 minutes.
Parameter	VAC. START **[S]**
Function	The temperature at which the vacuum starts
Limits	Any value within the selected temperature range of the program (°C) or (°F).
Comments	If equal to START TEMP than vacuum will start before DRY TIME begins.
Parameter	VAC. END **[E]**
Function	The temperature at which the vacuum to be released
Limits	Any value within the selected temperature range of the program (°C) or (°F).
Comments	Must be lower or equal to the HIGH TEMP or FINAL TEMP (in case FINAL TEMP defined **higher** than HIGH TEMP).
Function	VACUUM LEVEL [L]
Function	The level at which the vacuum is held during the cycle.
Limits	From 100 mmHg to 750 mmHg In case constant vacuum pump activation required – the VACUUM LEVEL set should be – 760mmHg.
Comments	Must always be set when using a vacuum firing.
Parameter	VAC. DELAY **[DEL]**
Function	Duration of the time for maintaining vacuum at HIGH TEMP or FINAL TEMP (if FINAL DELAY defined).
Limits	0 to 30 minutes. 0 to 4:30 H in the HT Programs

POINTS TO NOTE

⇒ When programming data into a parameter, check that the data is correct and that it correlates with the other parameters.

⇒ Remember that parameters have limits, if you enter data above or below these limits the data will not be entered.

⇒ In the event of an error, the warning tone will sound by pressing START and the firing cycle will not start. The erroneous parameter will blink indicating the source of the problem. This parameter isn't logical or it is out of the permitted limits.

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4. The Firing Cycle

4.1 Starting the Firing Cycle

1) Check that the platform is in the lowest position. This can be done by pressing the **arrow** key.

. The firing cycle will not start until the platform is completely lowered.

2) Select a program.

3) Press the [START] key.

4) The firing cycle will automatically start when the firing chamber temperature reaches the temperature selected for the START TEMP. The relevant function will appear on the screen after 30 second (this value can be modified in the option). Showing the actual status of the cycle , with all the relevant value.

5) When the firing cycle has finished and the platform is in the lowest position the five double tone sound will be heard and the graph will be turned off.

4.2 By pressing the arrow up you can modified the position of the table within a cycle or close the table at any working stage of the furnace .



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4.3 Canceling a Cycle

Should you wish to cancel the program in the middle of a firing cycle, press the **[STOP/LIFT]** key. The platform is lowered and the furnace remains in the selected program mode.

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5. Supplementary Features

5.1 Countdown Time to the End of the Cycle

You can see the **Time** left to the end of the cycle in the middle high section of the screen, while sending the program but also in the screen mode

5.2 The Hold Key

The HOLD/RELEASE function is available only during a cycle. The **[HOLD]** key when pressed will temporarily "freeze" the firing cycle. The temperature is held (in case the HOLD key was pressed during the Heating) and the platform stops moving (in case the HOLD key was pressed during the UP TIME).

When HOLD key is pressed ,the color of "Cycle" change to orange. During the HOLD stage a single-tone single beep is heard repeatedly to remind the user that the furnace is still in the HOLD stage. To release the furnace from the HOLD stage, press HOLD. The indications of the HOLD stage will disappear and the furnace will return to normal operation.

During this "freezing stage", you can manually control and extend the drying time, cooling time, and glazing time, When you decide that the time has been sufficiently extended, Press the **[HOLD]** key, this will release the furnace from the "HOLD" stage, and the furnace will return to the firing cycle.

This function provides the user with the flexibility to have an elective and full control over the work being in cycle. It enables the control of drying, heating and the cooling stages.



5.3 5.3 Changing Parameters during Cycle

In order to change parameters during cycle, perform the following steps:

Using the HOLD/RELEASE function, during a cycle, enables to change the value of the parameters that haven't been performed yet. These changes are temporary and do not effect on the pre-programmed data in the cycle. In order to change the parameters during cycle the following steps are required:

Press "HOLD" key –Press Menu+ Edit current program.
Scroll through the parameters, by using the arrows keys, until you reach the parameter (s) that are required to be changed (only the changeable parameter will appear in an editing Blank field). Enter the new value and press ENTER. While you are not able to perform

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change on the parameter the word "NO EDIT" will appear on the active field.



Press HOLD, to release
from the HOLD stage and the furnace will resume the cycle.

The furnace will execute the cycle according the new parameters. After termination of the cycle the parameters will return to their original values.

5.4 Night-mode

There are two ways to enter Night-mode:-

EITHER During a cycle, press the **[ON/OFF]** (Front panel) key. On completion of the firing cycle the furnace will **automatically** enter Night mode.
The automatic night-mode is indicated by the name Night-Mode in the bottom of the screen.
The night mode waits until the firing chamber temperature drops to 100°C. During this time the chamber remains open and the table is resting at it lowest position. After the temperature reaches 100°C the platform will close and maintains the furnace at the constant temperature of 100°C.
To cancel automatic night - mode press **ON/OFF** key .

OR If the furnace is not in cycle : Enter the pre-programmed cycle **[PROG], [0], [ENTER], arrow up can close door before reaching 100 degrees .**

The lift will close the muffle, and the temperature will drop to 100°C.To cancel night-mode press the **[STOP/LIFT]** key to lower the table and enter the required program number.

5.5 The STOP/LIFT Key

The **[STOP/LIFT]** key serves for cycle canceling.

A short press of the **[STOP/LIFT]** key, will lower the platform

If you wish to cancel a program in the middle of a firing cycle, press the **[STOP/LIFT]** key. The platform is lowered and the furnace remains in the selected program mode

5.6 Manual Pre-Heating/Drying

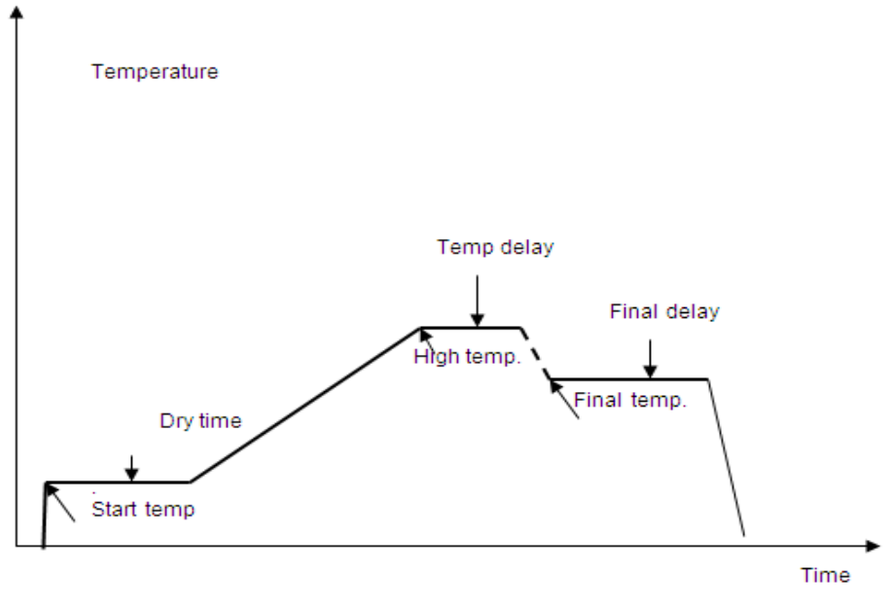
User can manually raise the platforms to any height in order to heat up an object or in case additional pre-heating is required. In order to perform it, you should choose the program number (PROG# - ENT), with START TEMP you will need to receive the optimal preheating.

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- Press the UP arrow continuously and the platform will start to rise. Move the platform by pressing the UP arrow until the required distance between the object and the opening of the muffle is achieved.

- In order to lower the platform - use the DOWN arrow continuously.

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5.7 Using the “Final temp” feature.

To enable the 13 parameters first go to the option screen and chose the 13 parameter option- Menu- Options-Enter+ go to program parameters 11 while the 11 is high light press ENT again.
Now when editing the program When the FINAL TEMP parameter will be lower than HIGH TEMP , then FINAL TEMP and FINAL DELAY parameters can act like TEMPERN effect i.e. temperature will drop down to FINAL TEMP and will remain at that temperature for the defined FINAL DELAY period.

POINTS TO NOTE

⇒ When programming data into a parameter, check that the data is correct and that it correlates with the other parameters.

⇒ Remember that parameters have limits, if you enter data above or below these limits the data will not be entered.

⇒ In the event of an error, the warning tone will sound by pressing START and the firing cycle will not start. The erroneous parameter will blink indicating the source of the problem. This parameter isn’t logical or it is out of the permitted limits.

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6. Calibration

CALIBRATION ADJUSTMENT

The furnace you received is precisely pre-calibrated at the factory. But in order to enable even more flexibility, the CALIBRATION ADJUSTMENT feature has been introduces. It enables you to adjust the muffles temperature to the level needed without performing additional calibration (in case the discrepancy is small).

NOTE:

The new furnace, when it comes from the manufacturer, is properly calibrated and checked.

In order to perform the calibration adjustment please perform the following:

- Press Menu
- Then press Options
- Press arrow down until you reach the + of the " Temp calibration" parameter high light
- *Press "ENTER" key to modified "+" to "-".*
- Press arrow down to enter to the data field .In the DATA field enter the numeric value
- Press "menu": or "ent " to validate your change
- The change will affect the firing parameters in all programs.

The change will be stored in the memory and all the firing temperature will be higher or lower accordingly.

In order to return to the basic, factory made calibration perform the following:

Enter to the calibration adjustment mode again and cancel the stored value
Calibration will be restore

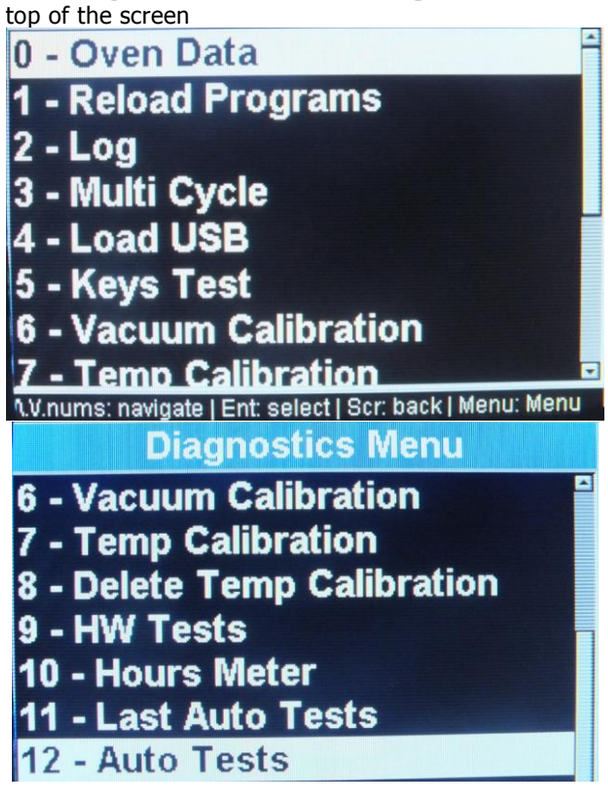
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7. Options mode

The Options mode:

Provides the user with very valuable and convenient means of testing the equipment. It is designed in order to assist the end-user to verify, and hence to define exactly, the probable cause of a malfunction. Thus, when a malfunction is suspected, the user can verify whether the various subsystems of the furnace function properly.
It is recommended that, whenever a problem occurs, an appropriate diagnosis will be performed prior to a request for assistance.
Access to the Diagnostics Mode is achieved by pressing "menu" button and then arrow down until reaching "diagnostic Menu" when the furnace is in the Standby

After you will enter the diagnostic mode the word "**diagnostic menu**" would be displayed on the top of the screen



By pressing each one of the menu you will activate the sub menu, all the explanation appear in the screen to activate the request menu.

- Note we highly recommended you to exchange your muffle after 3500 Working hours above 500 degrees- your furnace have a counter that show you all the information" hours meter"

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8. Build – in Programs

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Start temp				
Up time				
Dry time				
Heat rate				
High temp				
Temp delay				
Final temp				
Final delay				
Cool time				
Vacuum start				
Vacuum end				
Vacuum delay				
Vacuum level				

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A. Technical Specifications

• Measurements	23x24x57 cm (9.4' x 9.4' x22.5')
• Weight	13.5kg (29.7Pd)
• Muffle Chamber	Ø 95x65 mm (3.7'x2.7')
• Firing Table	Ø 90 mm (3.5')
• Main Input	110-120 V ac 50-60 Hz 200-240 V ac 50-60 Hz
• Max consumptions	110 V - 15A 230 V - 8A
• Temperature range	100° C to 1100° C
• Vacum level in	mmHg/mBar

Thank you for choosing the Focus 4010 ceramic furnace for your laboratory needs. For any questions or additional support, please contact us and we will look forward to assisting you.

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