VARIO 200
Ceramic Furnace

en

zubler

Operating instructions 01-2014 www.zubler.de

Dental Servis
Serdar Ayısıt
0555 274 05 51

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Thank you for choosing the Zubler VARIO 200 Ceramic Oven. We hope you are pleased with the improvements and new features. Be assurred, our technology comes from the requirments of experienced dental technicians and our desire to continually improve the performace of our products for our clients.We focus on the goal of building furnaces of the highest quality, flexibility and sustainability. Performance and efficiency are a basic requirement. Although easy operation is ensured, we encourage you toread the manual carefully.

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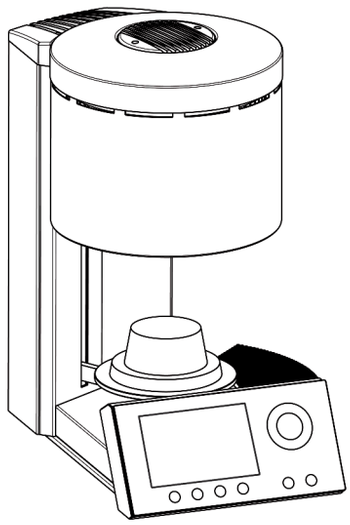
0 Introduction

0.1 Conformity Declaration



We, Zubler Gerätebau GmbH
Buchbrunnenweg 26
89081 Ulm-Jungingen

www.zubler.de

hereby declare, that the ceramic furnace product

VARIO 200

is in compliance with the protective requirements in accordance with the provisions of the following directives:

2006/42/EG Machines Directive

2006/95/EG Low-Voltage Directive

2004/108/EG EMV Directive.

In the event of any amendments being made to the product without our agreement, then this statement shall no longer be valid.

Kurt Zubler
Managing Director

0.2 General

The correct processing of modern dental ceramic materials is placing higher demands on dental technicians. We believe that the VARIO 200 furnaces meet these requirements by providing the latest technology for current and future ceramic processing.

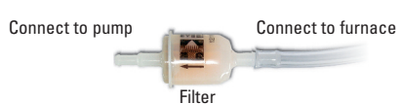
The software installed in the VARIO 200 series enables you to optimize firing management for all dental ceramics available on the market.

The use of materials of the highest quality increases the lifetime of the furnace, enabling you to reproduce optimal results over many years.

Our goal is to ensure that you will be able to produce top-quality ceramic prosthesis using our VARIO 200 furnaces for many years. We will therefore keep you informed of any changes to the software or extension of the processing possibilities.

We hope that the ceramic furnace provides you with great success and satisfaction. Thank you.

0.3 Setting up the furnace



- Put the furnace onto a stable and level surface.
- Place the vacuum pump near the furnace.
- Please make sure to retain the original cardboard boxes and other packaging materials. You will need to have them if returning the device for service.
- Attach the short transparent vacuum hose with its filter to the connector marked “VACUUM” at the back of the furnace.
- Attach the long transparent hose to the free end of the filter.
- Connect the vacuum pump and the furnace using the vacuum pump power cord.

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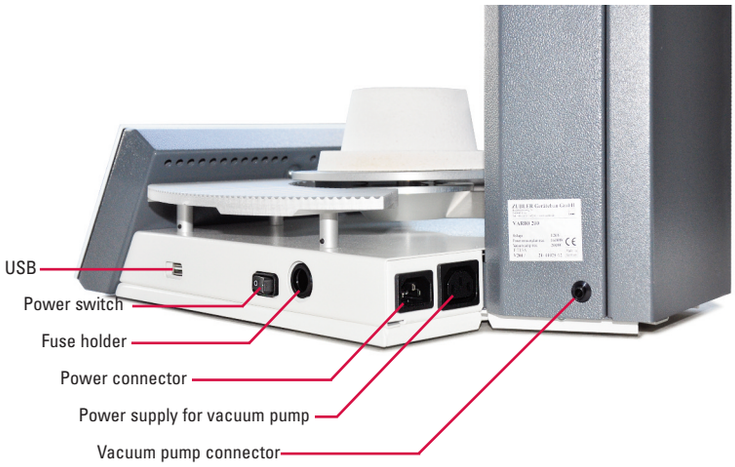
0 Introduction



Start of operation:

- Have the firing tray ready

Electrical connection:

- The ceramic furnace requires 120V/60Hz.

  1. Do not use any other power cable or extension cables

  2. Use fused circuit protection before the oven (e.g. multiway connector at the desk)
- The power switch should be in position "0".
- Connect the furnace to a grounded power outlet using the supplied power cord.
- Switch on the furnace.
- After a brief self test, the lift will automatically lower to its maximum open position.

Please immediately insert the firing tray.

0.4 Initial oven setup

After the furnace is switched on for the first time and the firing brick is inserted, run the setup program. You are prompted to set the following parameters

Main menu ⇒ Setup Oven ⇒ First setup program

1. Setting idle temperature
2. Setting night temperature
3. Setting language
4. Setting date and time
5. Setting the unit (° C or ° F)
6. Display functions
7. Activate preview mode: "Yes" or "No"
8. After that the furnace will automatically run a drying program to remove any residual humidity that might be in the oven after transport or storage (cycle time approx. 20min).
9. Subsequently, a vacuum test is performed during which the pump draws vacuum for 2 minutes. After which a leakage test starts (for another 2 minutes) to check the seals of the firing chamber.
10. Finally, there appears the prompt "Set Vacuum level." Confirm with "Yes" use the dialer or the plus-/minus buttons to enter your individual vacuum level. Always deduct 20mm from the value reached

(e.g: value reached 760mm - 20mm = 740mm individual vacuum value).

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0.5 Use within specifications

- The VARIO 200 furnace series was exclusively designed for the firing of dental ceramics, and is intended only for those applications.
- the user shall be liable for damages resulting from any other use,
- At temperatures above 1075°C/1967°F, the working life of the heating muffle is reduced.
- In case of defect of the furnace, the stated warranty will apply provided that use conforms to the specifications within this manual.
- Repairs and maintenance may only be performed by our authorized Customer Care Center.
- Do not touch the screen with wet fingers.
- Please unpack the oven with caution. It should always be carried by two persons. Always lift the device at the bottom, never at the furnace chamber or table slide bar.
- Never use hard or sharp objects to operate the touch screen.
- The oven must always have a firing brick on the lift table.
- During operation, never place your hand between the lift table and the furnace chamber. There is a risk of pinching, crushing and a burn hazard.
- During operation never place your hand under the lift table and do not put any objects under the lift table.
- Do not block the lift table during the opening process.
- The air vents must be kept free from obstruction and clean at all times to allow proper air circulation. If this is not done, there is a risk of overheating the furnace.
- Make sure that no liquids or other foreign objects enter the furnace or the air vents, as this may result in an electrical shock.
- The lift of the furnace has an electrical lift drive and has to be operated using the “Open” and “Close” keys. Do not open or close the lift manually.

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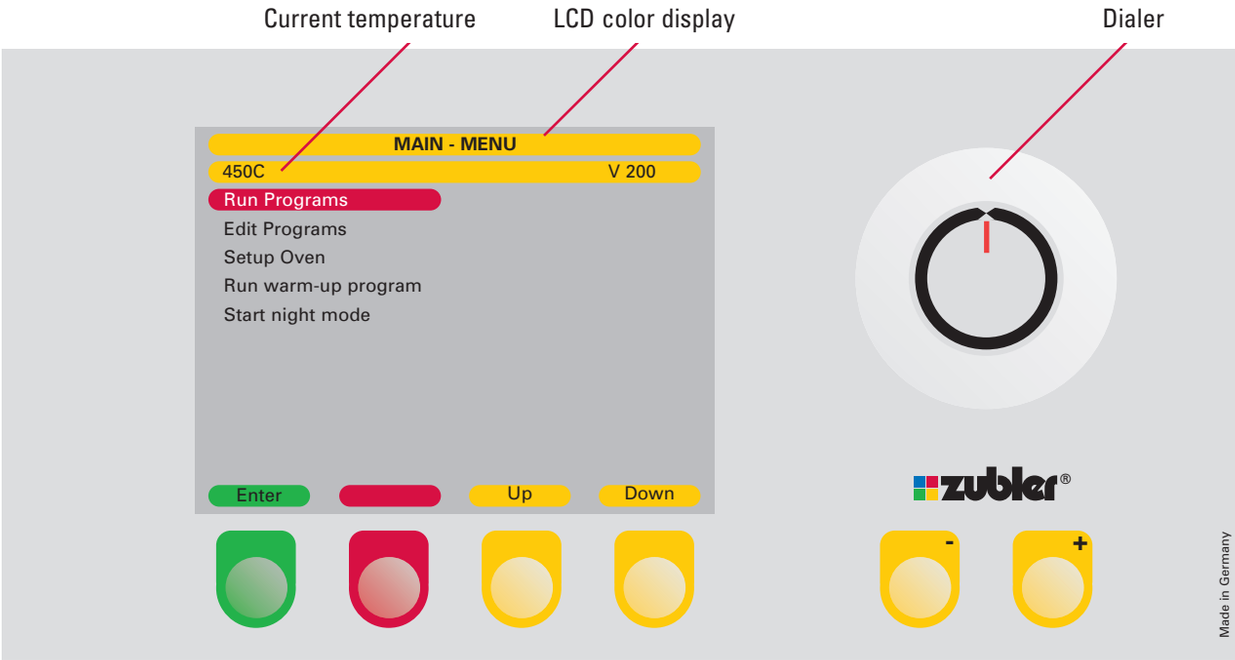
1 Operation

1.0 Display functions



Section for selecting parameters:
Confirm / Cancel – key
Lift movement Up / Down

Section for changing values
Rapid selection (circle dialer)
Step by step (yellow keys)

Selection of menu parameters

❶ Once you have switched on the oven, the Main Menu will appear and display the following five items:

1.1	Run programs
1.2	Edit programs
1.3	Setup oven
1.4	Run warm-up program
1.5	Start night mode

❷ Please select your desired menu item using the dialer or the +/- keys

❸ Confirm your selection with the green "Enter" key

Touch the green "Enter" key to confirm a selection or move forward through a menu. Touch the red "Esc" key to move backwards, escape or cancel a selection.

1.1 Run programs

- Select "Run Programs" from the Main Menu and confirm this selection with the green "Enter" key.
- The program group is displayed. The most recently activated program will be highlighted. 20 other program adresses will also be displayed.

  Each of the 500 programs (= 25 brands with 20 programs each) can be easily edited.
- Use the dialer or +/-keys to highlight the program you wish to run. Touch the green "Enter" key to activate the program.
- To switch to another program group, touch the red "Esc "key.
- To switch to a different program group touch the red "ESC" button. Use the yellow "Next" key, the + / -key or the dialer, select the desired program group.
- Confirm with the green "Enter" key. select the desired program With the +/ -key or the dialer..
- To start the program confirm with the green "Enter" key.
- "Set preview mode" (see - 1.3.10)

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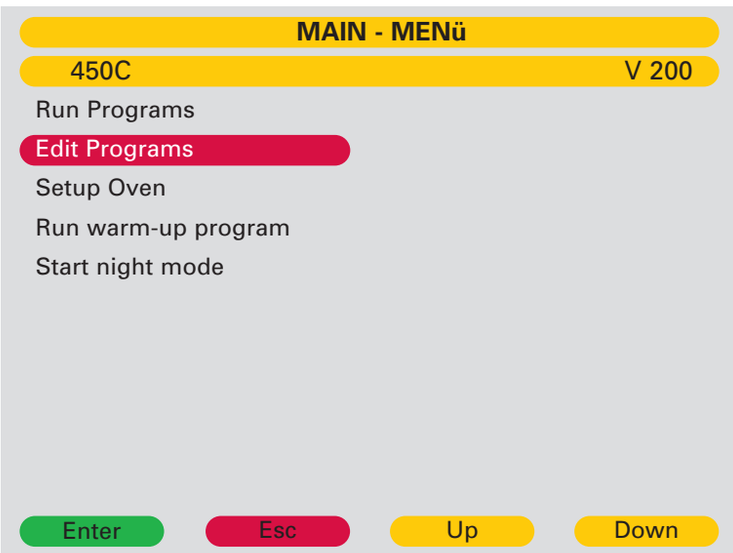
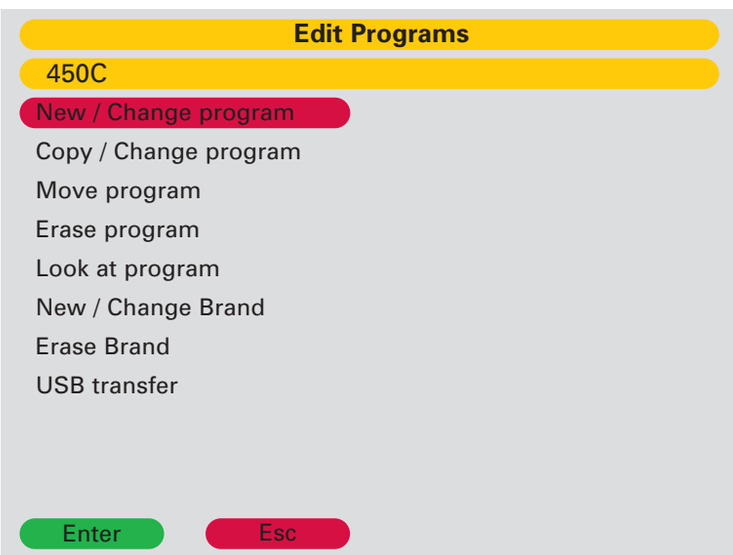
Temporary overwriting of a program during operation

- Touch the yellow "Edit Prog" key. There appears in the display a red bar with the first modifiable parameter.
- Use the dialer or +/-button to adjust the parameter.
- Confirm with the green "Enter" key. Repeat the last two steps until you do not see the green "Enter" key on the display anymore.
- For details, see point 2.5 Technical Explanation

1.2 Edit programs





1.2.1 New/Change program

- With the + / -button or the dialer, select the following points and confirm with the green "Enter" key:

1. "Edit Programs"
2. "New/ change program"
3. Program group (index)
4. Program space

- The letter or number to be changed is highlighted in gray.
- With the + / -key or the dialer select the desired letter or number
- Use the yellow "Left" or "Right" key to move the cursor one position to the left or right.
- Confirm by pressing the green "Enter" key. This will advance you to the program editing screen.
- Use the + / -key or the dialer to select the desired program type and confirm with the green "Enter" key.
- The firing parameters can be changed using the + /-key or the dialer.
- Use the green "Enter" key to move to the next parameter.
- The yellow "Back" button will return you to the previous line.
- The yellow key "Last Line" will take you to 'save' yes / no.
- Select to save the program by selecting "Yes" or "No" with the dialer or +/- keys. Confirm the selection by touching the green "Enter" button.

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1 Operation

Program typs - 1: Professional Program

Individual firing management with 16 programmable parameters for processing all dental ceramic materials perfectly.

003-PULSE MC CERAMAY

450C Edit " 063-PULSE MC DENTIN 1 "

Program type	Professional	-Temper	No
-Start temp	450C		
-Pre dry	Yes	-Open temp	820C
-Pre dry time	3:00	-Opening time	1:00
-Closing time	3:00	-Vacuum	Yes
-Soak temp	450C	-Release vacuum	Heat up
-Soak time	0:30	-Vacuum End	820C
-Heat rate	55C		
-Final temp	820C		
-Hold time	1:00		

Enter Esc

We recommend the Professional Program for all firing tasks. Perfect pre-drying and uniform heating ensure excellent firing results.

Start temperature Temperature in the firing chamber at which the program starts.

Pre-dry Selecting "YES" activates the special pre-drying program.

Pre-dry time Enter a time. In this section, the lift identifies a predefined position for the entire time, depending on the heat radiated by the firing chamber. The object can thus be pre-dried at a constant temperature.

Closing time Time in which the lift moves in 10 increments into the firing chamber.

Soak temperature At this temperature the object remains in the closed firing chamber in order to achieve an even temperature distribution. Soak temperature = Vacuum start

Soak time States the retention period of the object in the firing chamber before evacuation and the temperature increase.

Heat rate Temperature increase per minute

Final temperature Temperature at which the ceramic is sintered.

Hold time Period for which the ceramic is maintained at the final temperature.

Temper Selecting "YES" activates the special tempering program.

Temper temperature Temperature at which the ceramic is tempered, i.e. subjected to precise thermal treatment at a constant temperature.

Temper time States the duration of the thermal treatment in the firing chamber when closed.

Open temperature Temperature at which the device opens the firing chamber.

Opening time Decent time of the lift from the chamber to the fully open position.

Vacuum Selecting "YES" activates the vacuum parameter (firing under vacuum).

Vacuum release (⇒=Selection)

During the heating up stage ⇒ "Release Vacuum Heat up"

During the hold time at final temperature ⇒ „Release Vacuum Hold time"

During the cooling stage ⇒ „Release Vacuum Cooling"

Vacuum end Displays the temperature or time at which the vacuum is released.

Edit done? Saving or cancel the program by selecting „Yes" or „No".

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Program types - 2: Standard Program

A standard firing management in accordance with the guidelines for the dental ceramics available on the market.

003-PULSE MC CERAMAY

450C Edit " 063-PULSE MC DENTIN 1 "

Program type	Standard	-Vacuum Star	450C
-Start temp	450C	-Vacuum End	820C
-Pre dry	Yes		
-Pre dry time	3:00		
-Closing time	3:00		
-Heat rate	55C		
-Final temp	820C		
-Hold time	1:00		
-Opening time	1:00		
-Vacuum	Yes		

Enter Esc

Start temperature Temperature in the firing chamber at which the program starts.

Pre-dry Selecting "YES" activates the special pre-drying program.

Pre-dry time Enter a time. In this section, the lift identifies a predefined position for the entire time, depending on the heat radiated by the firing chamber. The object can thus be pre-dried at a constant temperature.

Closing time Time in which the lift moves in 10 increments into the firing chamber.

Heat rate Temperature increase per minute in order to reach the final temperature.

Final temperature Temperature at which the ceramic is sintered.

Hold time Period for which the ceramic is maintained at the final temperature.

Opening time Decent time of the lift from the chamber to the fully open position.

Vacuum Selecting "YES" activates the vacuum parameter (firing under vacuum).

Vacuum start Temperature at which the vacuum pump begins to evacuate the firing chamber.

Vacuum end Temperature at which the vacuum release occurs.

Edit done? Saving of the program.

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Program types - 3: Special Program This firing program is recommended for processing ceramic materials, which require two holding times under vacuum and/or two different heat rates (specially for crystallization programs for IPS e.max e.max®CAD)

010- CERAMAY

450C Edit " 140 CRISTALLISATION "

Program type	Special	-Heat rate 2	45C
-Start temp	450C	-Final temp 2	920C
-Pre dry	Yes	-Hold time 2	0:25
-Pre dry time	2:00	-Open temp	920C
-Closing time	4:00	-Opening time	1:00
-Soak temp	450C	-Vacuum	Yes
-Soak time	0:30	-Release vacuum	Heat up
-Heat rate 1	50C	-Vacuum End	820C
-Final temp 1	900C		
-Hold time 1	1:00		

Enter Esc

Start temperature Temperature in the firing chamber at which the program starts.

Pre-dry Selecting "YES" activates the special pre-drying program.

Pre-dry time Enter a time. In this section, the lift identifies a predefined position for the entire time, depending on the heat radiated by the firing chamber. The object can thus be pre-dried at a constant temperature.

Closing time Time in which the lift moves in 10 increments into the firing chamber.

Soak temperature At this temperature, the object remains in the closed firing chamber in order to achieve an even temperature distribution.

Soak time States the retention period of the object in the firing chamber before evacuation and the temperature increase.

Heat rate 1 Temperature increase per minute in order to reach the final temperature 1.

Final temperature 1 Temperature 1 at which the ceramic is sintered.

Hold time 1 Period for which the ceramic is maintained at the final temperature 1.

Heat rate 2 Temperature increase per minute in order to reach the final temperature 2.

Final temperature 2 Temperature 2 at which the ceramic is sintered.

Hold time 2 Period for which the ceramic is maintained at the final temperature 2.

Open temperature Temperature at which the device opens the firing chamber.

Opening time Decent time of the lift from the chamber to the fully open position.

Vacuum Selecting "YES" activates the vacuum parameter (firing under vacuum).

Vacuum release (⇒=Selection)

During the heating up stage

⇒ "Release Vacuum Heat up"

During the hold time at final temperature

⇒ "Release Vacuum Hold time"

During the cooling stage

⇒ "Release Vacuum Cooling"

Vacuum end Display shows temperature at which the vacuum is released.

Edit done? Saving of the program.

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Program types - 4: TTC Prof.: This firing program is recommended for processing ceramic materials on zirconia frameworks. Use your regular firing schedule wilth the addition of the TTC cooldown stage for optimal results.
(The VARIO 200Zr has only this function.)

010- CERAMAY

450C Edit " 025 - DC 9.2 DENTIN 1 "

Program type	TTC Prof	-TTC	Yes
-Start temp	450C	-Cool rate	35C
-Pre try	Ja	-Open temp	450C
-Pre try time	3:00	-Open time	0:30
-Closing time	3:00	-Vacuum	Yes
-Soak temp	450	-Vacuum end	785C
-Soak time	1:30	-Edit done ?	Yes
-Heat rate	35C		
-Final temp	785C		
-Hold time	1:00		

Enter Esc

Start temperature Temperature in the firing chamber at which the program starts.

Pre-dry Selecting "YES" activates the special pre-drying program.

Pre-dry time Enter a time. In this section, the lift identifies a predefined position for the entire time, depending on the heat radiated by the firing chamber. The object can thus be pre-dried at a constant temperature.

Closing time Time in which the lift moves in 10 increments into the firing chamber.

Soak temp At this temperature the object remains in the closed firing chamber in order to achieve an even temperature distribution.
Soak temperature = Vacuum start

Soak time States the retention period of the object in the firing chamber before evacuation and the temperature increase.

Heat rate Temperature increase per minute

Final temp Temperature at which the ceramic is sintered.

Hold time Period for which the ceramic is maintained at the final temperature.

TTC Selecting "YES" activates the special cooling program.

Cool rate is a linear, active-controlled cooling with a temperature gradient per minute.

Recommendation: Heat rate = Cool rate

Open temp Temperature at which the device opens the firing chamber. With the TTC Professional program the open temperature must be smaller like the final temperature.

Recommendation: Open temp. = Start temp.

Opening time Decent time of the lift from the chamber to the fully open position.

Vacuum Selecting "YES" activates the vacuum parameter (firing under vacuum).

Vacuum end Displays the temperature or time at which the vacuum is released.

Edit done? Saving or cancel the program by selecting „Yes" or „No".

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1.2.2 Copy/Change program

- Select the program to be copied using the + / - keys or the dialer and confirm with the green "Enter" key.
- You now return to the brand page.
- Select the brand and confirm by pressing the green "Enter" key.
- Select the place to which the program is to be copied using the +/- keys or the dialer. Fix the program to its new position by pressing the green “Enter” key.

Note: If a program is copied or moved to an occupied position, the existing program will be replaced.

- You may now change the name and program parameters, as described (see 1.2)
- Press the red "ESC" key to return to the input mode.

1.2.3 Move program

- Select the program to be moved using the + / - keys or the dialer and press the green "Enter" key.
- You now return to the brand page.
- Select the brand to which the program is to be moved using the + / -keys or the dialer and press the green “Enter” key.
- Select the place to which the program is to be moved using the + / -keys or the dialer and press the green “Enter” key.
- Note: if programs are not moved or copied to an empty position, the existing program will be replaced.
- Press the red "ESC" key to return to the input mode

1.2.4 Erase program

- Within a program group, select the program to be deleted by using the dialer or the + / -keys, and confirm by pressing the green "Enter" key.
- The program is displayed with all its parameters together with the question: “Delete program”?
- Confirm the deletion by pressing the “Yes” key.
- Now press the red "Esc" key to return to the input mode.

1.2.5 Look at program

- Within a program group (brand) select a program using the dialer or the + / -keys and confirm by pressing the green "Enter"key.
- The individual parameters are shown on the display, but cannot be changed.
- Press the "OK" key to return to the “Look at” mode.

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1.2.6 New/change brand

For clear arrangement and better handling, you have 25 programmable program groups (“Brands”) available (indexed from 0 to 24) with 20 program positions each.

- In the “Edit programs” mode, select “New/ Change Brand” using the dialer or + / -keys and confirm by pressing the green “Enter” key.
- The Brand page will appear on the display with the first 20 freely programmable program groups displayed.. Use the yellow "Next" button to display the remaining five program groups.
- Use the + / -keys or the dialer to select the program group to be programmed and confirm by pressing the green “Enter” key.
- The letter/figure to be changed is highlighted in grey.
- Use the + / -keys or the dialer to select the desired letter or number.
- Pressing the yellow "Left" or "Right" buttons moves the cursor one position to the left or right.
- Confirm by pressing the green "Enter" key to exit the "Brand page New /Change” mode or (by pressing the red “Esc”button?) you return to the “Edit Programs” screen.

1.2.7 Erase brand

- Use the dialer or the + / -keys to select the brand name to be erased and confirm by pressing the green “Enter” key.
- Then a security query appears which you can confirm by pressing the green “Enter” key or cancel by pressing the red “Esc” key.

1.2.8 USB - transfer

For loading or storing programs on the USB, you need a USB flash drive with USB Microsoft protocol and a folder named, "VARIO".

- In the “Edit Programs” Menu select USB-Transfer using the + / -keys or the dialer and confirm with the green “Enter” key.

“Send Progs to USB”

- Select „Send Progs to USB” using the + / -keys or the dialer and confirm by pressing the green "Enter" key.
- Use the + / -keys or the dialer to select the desired letter or number
- Use the yellow "left" or "right" buttons to move the cursor one position to the left or right.
- Touch the green "Enter" key, to store the programs on the USB flash drive. When the transfer is complete the display will return to the “Edit Programs” menu.

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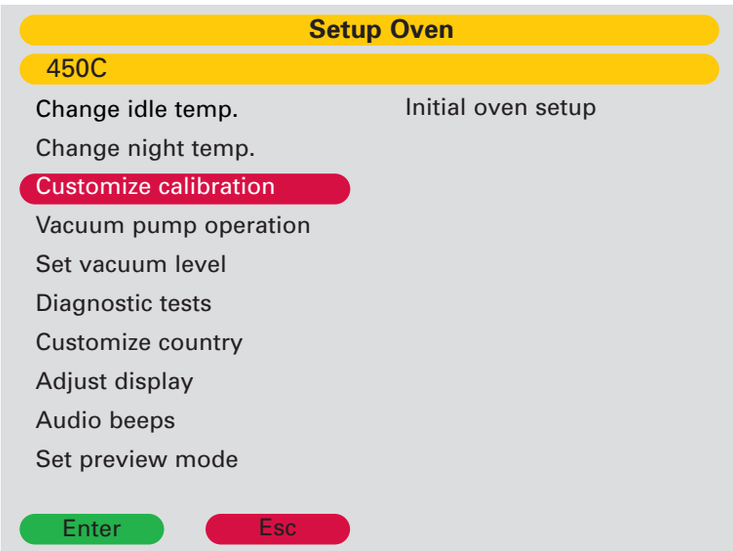
“Load Programs from USB ”

- Select “Load Programs from USB” using the + / -keys or the dialer and confirm by pressing the green "Enter" key.
- Select the program file you want to load from the USB, using the + / -keys or the dialer and confirm by pressing the green "Enter" key. When the transfer is complete the display will return to the “Edit Programs” menu.

1.3 Setup Oven



Users can enter their individual requirments here. With the +/-keys select in the main menu “Setup Oven” and confirm by pressing the green “Enter”-key.

1.3.1 Change idle temperature

This is the temperature reached by the furnace following the conclusion of a firing program.

This temperature should be based on the lowest starting temperature for the individual firing cycles.

1.3.2 Change night temperature

This value displays the temperature maintained by the furnace during night mode (see section 1.5)

1.3.3 Customize calibration

This allows the user to adjust the calibration within certain temperature ranges. This feature changes all the final temperatures of programs in the respective temperature range below/above 800°C). 1472°F

1.3.4 Vacuum pump

This section determines whether the pump is maintained in continuous operation, or is switched off when the required vacuum level has been reached.

It is recommended to run the vacuum pump in the "cyclical" mode in order to increase its life.

1.3.5 Vacuum level

In this section, you can set the vacuum level for the programs. (Run a vacuum test to check for the allowable vaccum level ???) (see 1.3.6 diagnostic tests, point 5 service tests).

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1.3.6 Diagnostic tests

❶ Run pre-heat/dry program

This program is run prior to the first operation of the furnace or when the furnace has been stored or turned off for long durations.(see 0.5 Set-up oven)

Note: The lift remains in a slightly open position, so any existing residual moisture can easily escape.

❷ Run purge program

Use this high temperature program to remove contaminates and impurities.

Never use ANY purging additives such as carbon (graphite pellets) for cleaning the firing chamber!

❸ About version

Displays the software version currently installed.

❹ Update software

Requires the entry of a password.

(We will provide the password and instructions with software updates.)

❺ Service tests

Vacuum test: determines the available vacuum for your location and performs a leakage test.

Factory tests: for use by service center.

1.3.7 Customize country

This section sets the language as well as the date, time and units (metric/imperial).

1.3.8 Adjust display

The brightness of the display is set using this function (recommended value 95).

1.3.9 Audio Beeps

Software switch to allow beep or not

1.3.10 Set preview mode

This function displays the parameters of the selected program before starting it.

1.3.11 Initial oven setup

see 0.5

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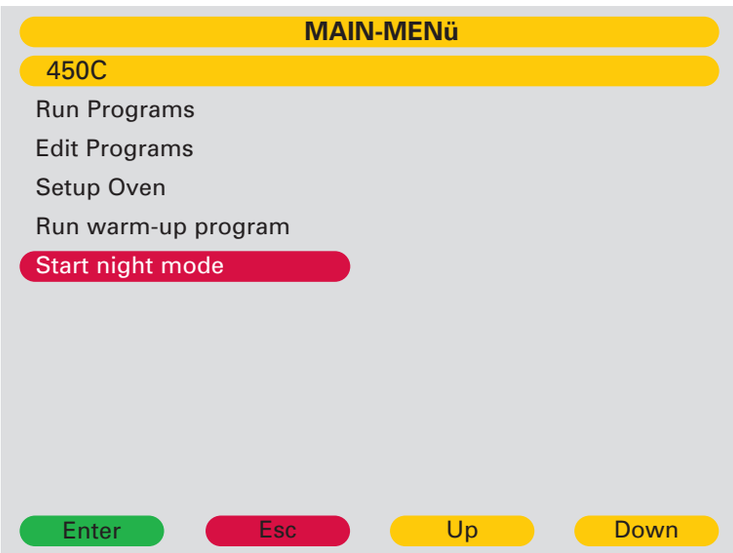
1.4 Run Warm-up program

Before starting work in the morning, always activate the “warm-up”-program to ensure homogeneous, uniform heating.

1.5 Start night mode



Instead of switching the furnace off, use night mode to prevent moisture and contamination from entering the firing chamber while the furnace is not in use.

The “night mode” program is started by pressing the green “Enter” key. If you start the “night mode” program and the oven is open, the oven cools down to the programmed temperature and closes automatically. The program is ended by pressing “abort”.

1.5.1 Stand-by temperature

To save energy and prevent impujriteis or condensation inside the furnace, we advise you to keep the firing chamber closed when it is not being used.

Should you be prevented from closing the furnace yourself, stand-by is automatically activated 30 minutes after a program has finished and the oven is not closed.

If the oven is closed after the last firing, the idle temperature is kept for 4 hours. After 4 hours the oven automatically starts the “stand-by” mode.

- First you hear an acoustic signal
- The temperature in the firing chamber is lowered to the 100°C stand-by temperature.
- Once stand-by temperature has been reached, the lift closes and remains in a closed position.
- After touching one of the pads, the oven goes back to idle temperature.
- The stand-by temperature is a fixed temperature and cannot be changed.

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2 Service

2.1 Fuse

The VARIO 200 ceramic furnace requires the following fuse:

Voltage	240V	230V	120V	100V
Fuse	10A slow blow	10A slow blow	15A slow blow	15A slow blow

2.2 Filter element for vacuum pump

The filter element prevents dissolved particles and/or condensation from clogging the vacuum pump.

We recommend you replace this filter element at least every 3 years.

2.3 Run purge program

From the main menu, select the following options using the + /-keys or the dialer and confirm by pressing the green "Enter" key:

1. "Setup Oven"
2. "Diagnostic tests"
3. "Run purge program"

Use this high temperature program to remove contaminates and impurities.

Never use ANY purging additives such as carbon (graphite pellets) for cleaning the firing chamber!

2.4 Spare parts

Filter for vacuum pump	556 / 072
Firing tray VARIO 200	898 / 105
Long tweezers	898 / 106

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The operator using the furnace must close the lift after completing a firing program

After closing the lift, the unit will remain at the programmed idle temperature for four hours. If the unit is not used, it will automatically go into the "stand-by" mode.

If, at the end of the program, the chamber is not manually closed, the device will automatically cool down to the safety temperature of 400°C, independent of the idle temperature selected. Once this temperature has been reached, the device will remain in this state for 30 minutes.

At the end of this time, the device will enter stand-by mode and close automatically after the defined stand-by temperature of 100°C has been reached.

Duplicate program names are not allowed.

Overwriting a program during operation

(see 1.1 Run Programs)

1. Should you find that you have to temporarily change one or more parameters while a program is running, you can do this by pressing the yellow "Edit Prog." key below the display.

2. In general, you can only change parameters that have not already been started when you press the yellow "Edit Prog." key.

3. The changes you have made are temporary and apply only to the current firing cycle.

4. Editing can be carried out only once during the firing cycle.

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3 Data

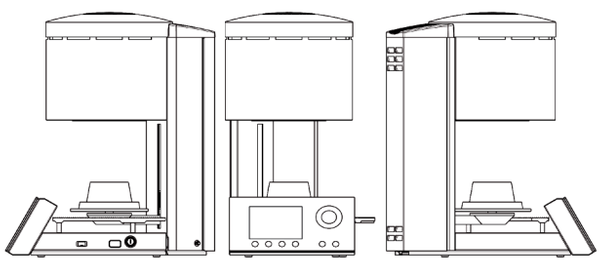
3.1 technical Data

Technical Data:		VARIO 200		Vakuumpumpe P3
Width x depth	320mm x 460mm	12,6 x 18,1 inch	320mmx186mm	12,6 x 7,3 inch
Height	540mm	21,3 inch	275mm	10,8 inch
Weight	23kg	50,7 lbs	12kg	26,4 lbs
Voltage	230V/50Hz	or 120V/60Hz	230V/50Hz or 120V/60Hz	
Current	without pump 1250VA			450VA
Performance Data:				Vacuum max. 975mbar
Idle temperature:	20°C - 700°C	68°F - 1292°F		-
Temperature:	20°C - 1200°C	68°F - 2192°F		-
Color display	120mm x 90mm	4,7 x 3,5 inch		-
		320 x 240 dots		-
Programs		500		-

Environmental conditions

Ambient temperature	18°C to 30°C
	64°F to 86°F

3.2 Included



1x Power cord
1x USB stick*
1x Firing tray
1x Long tweezers
1x Inline filter for vacuum hose
1x Vacuum hose
1x Connecting cord cold instrument plug for P3 vacuum pump
1x Spare fuses
1x castallated beam (ceramic)*
1x Warranty card
1x Operating instructions

Accessories: P3 vacuum pump

* only VARIO 200ZR

4 Safety warnings!

Never put any potentially flammable materials such as paper, brushes or similar things, as well as easily flammable substances like alcohol, insulation sprays or die spacers close to the furnace.

- Use this furnace only for its intended purpose as described in this Owner's Manual and carefully remove all packing materials and tape during installation.
- The furnace may only be used indoors.
- Materials developing harmful gases must not be processed in this furnace.
- This furnace must be plugged into the proper grounded circuit. If you have questions regarding the proper circuit, contact a licensed electrician.
- Any disruption of the protective conductor, either inside or outside the furnace, or any loosening of the protective conductor connection may lead to danger for the user in case of a malfunction.
- After any extended period without use as well as high humidity or low temperature, it may not be possible to generate a sufficient vacuum initially. This is normal.

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4 Safety warnings!

- Leave at least 8" – 12" of free space around and above the unit. Adjacent structures surrounding the unit should be non-flammable and the area should be well-ventilated.
- Follow fire department guidelines, always store a multi-purpose dry chemical fire extinguisher in your laboratory in proximity to the furnace and ensure that your employees have been properly trained in its use.
- Never wear loose fitting or hanging garments while using this furnace. Be careful when reaching for items stored around the furnace. Flammable material could ge ignited if brought into contact with any of the unit's hot surfaces and may cause severe burns to the user.
- Do not set the furnace or vacuum pump next to uninsulated heat sources (e.g. other furnaces or ovens).
- Soldering in this furnace will considerable reduce the life of the thermocouple and muffle and will void the warranty.
- Be sure that the furnace is properly installed per our instructions and that the selected electrical outlet is properly grounded.
- For 230/240 V use the grounded Powerf cable H05W-F3G1, 0 and a standard IEC Socket and Schuko plug.
- For 100/120V you use the grounded Mains cable and a standard IEC SJT3xAWG14 Socket and Schuko plug. (Name?)
- The electrical service provided must be a dedicated line of the proper size according to local electrical codes. Consult a qualified electrician to ensure that your amperage is sufficient to prevent burdening of any existing circuit.
- Do not use an extension cord with the furnace. Check with your utility provider for electrical codes, which apply in your area.
- In case of under voltage, the temperature increase may be delayed.
- Hoses and connections should be checked periodically for fit, wear and damage and replaced or tightened, as needed.
- All cords and hoses should be located away from walkways and aisles.
- During certain operations, such as high-temperature soak or when the chamber is opened after firing, high temperature convection currents are created.
- Do not touch the surface of the heating chamber, the heating elements or the interior surface of the heating chamber. These surfaces may cause severe burns.
- Always keep the chamber closed with the lift in the up position between processes or when the unit is not in use.
- If the furnace is under vacuum in the "Off" state for an extended period of time, the O-ring of the lift plate may adhere slightly.
- Clean the furnace with a dry or slightly damp cloth. Do not use any solvents. Always disconnect power before cleaning.
- When heating the firing chamber, there may be vibration noises from the heating elements, this is normal.
- In case of faults or damages that prevent safe operation, the equipment should not be used, until the problem is resolved or repaired.
- Turn off the furnace, disconnect the power cord and wait for the furnace to cool to room temperature before performing any recommended and authorized routine maintenance or service, due to the risk of electrical shock, personal injury or death.
- Do not attempt to repair, replace or open any part of your furnace, unless you have read the manual and the repair or replacement is specifically recommended therein. Any unauthorized attempt to repair, replace or open any part of your furnace could present a safety hazard and void your warranty. All other servicing, either in-warranty or out-of-warranty, should be referred to our Customer Care Center.
- In case of a service, use only original spare parts.
- Unauthorized changes or modifications to hardware or software can create severe safety hazards, as well as terminate your warranty.
- Children and untrained visitors should never be left alone or unattended in the area where a furnace is in use. They should never be allowed to climb or stand on any surface, where the furnace is situated and being operated from. Items of interest to children should not be stored in and around the furnace. Children climbing on and around the surface where furnace operates could be seriously injured.
- Do not discard the original packaging materials and shipping carton of your VARIO furnace.
- When transporting the furnace, use the original packaging, otherwise you could negate some of your rights under the warranty for failure to transport and/or return your unit in the original packaging.

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Muffle Dust Exposure

This furnace contains respirable refractory ceramic fibers (RCF) and crystalline silica in its thermal muffle insulation. These materials may be in the form of fiber blanket or felt, vacuum formed board or shapes, mineral wool slab or loose fill fiber.

- Normal use of the furnace does not result in any significant level of air-borne dust from these materials. However, when it becomes necessary to replace the muffle, the person doing this maintenance and repair work may be exposed to much higher levels.
- Given conflicting evidence of any long term health hazards, we must recommend that safety precautions are taken whenever the materials are handled by authorized repair personnel.
- Exposure to dust from fiber which has been used at high temperatures may cause respiratory disease. When handling fiber always use an OSHA or NIOSH approved and HEPA filtered respirator, eye protection, gloves and long sleeved clothing.
- Avoid breaking up waste material. Dispose of fiber waste in sealed containers.
- After handling, rinse exposed skin with water before washing gently with soap (not detergent). Wash work clothing separately.
- Because this product and many similar products on the market today contain crystalline silica and ceramic fibers, it is necessary under the statutes of California Proposition 65 that the following statement be included:
- "This product contains substances known to the State of California to cause cancer. Material Safety Data Sheets for RCF materials supplied upon request".

Signs and Symbols

Risks and dangers

This symbol marks safety instructions that must be followed to prevent injury or death

Caution Hot Surface
Burn hazard

Risks of crushing/ pinching

Conflict

Risk of electric shock

Attention:

It is critical that the user completely reads the operating manual prior to start up!

It contains important information on safety, operation and maintenance that is designed to protect you and prevent damage to the instrument.

5 Service

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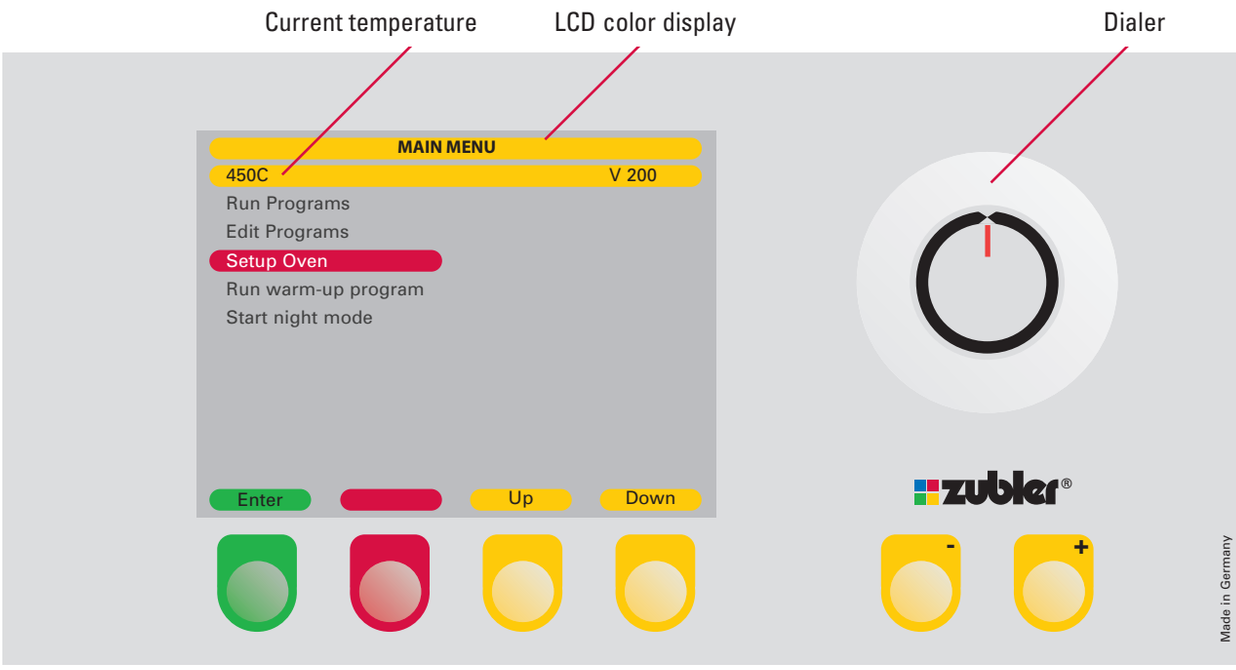

Section for selecting parameters:
Confirm / Cancel – key

Section for changing values
Rapid selection (circle dialer)
Step by step (yellow keys)

CUSTOMIZE CALIBRATION

Setup Oven

450C

Change idle temp. Initial oven setup
Change night temp.
Customize calibration
Vacuum pump operation
Set vacuum level
Diagnostic tests
Customize country
Adjust display
Audio beeps
Set preview mode

Enter Esc

Users can offset their calibration for ceramic programs with final temperature above and/or below 800C all at once without adjusting programs individually effecting the actual calibration curve of the machine. This allows more precise offset modification of temperatures with the use of individually preferred temperature measurement methodology.

From the "MAIN MENU" Select "SETUP OVEN" and press the "ENTER" button.

From the "SETUP OVEN" menu, select "CUSTOMIZE CALIBRATION" and press the "ENTER" button.

This will take you to the "CUSTOMIZE CALIBRATION" screen where individual offsets can be entered for all programs with final temperatures above and below 800C individually (High and low fusing).

Customize Calibration

450C

Porcelain under	800 C
Temp difference	0C
Final temp	Lower
Porcelain over	800 C
Temp difference	0C
Final temp	Lower

Change these values?

Enter Esc

To change the values:

On the "CUSTOMIZE CALIBRATION" screen, when "CHANGE THESE VALUES?" is displayed, press the green "Enter" button and the first "Temp Difference" will be highlighted (indicating it is ready for adjustment).

Using the dialer or +/- buttons, indicate the number of degrease you wish to change the temperature, then press the green "Enter" button to proceed to the next step.

Use the dialer or +/- buttons to indicate whether to make the temperature "higher" or "lower" by the number of degrease you just entered, then press the green "Enter" button to proceed to the next stage.

repeat the previous two step

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