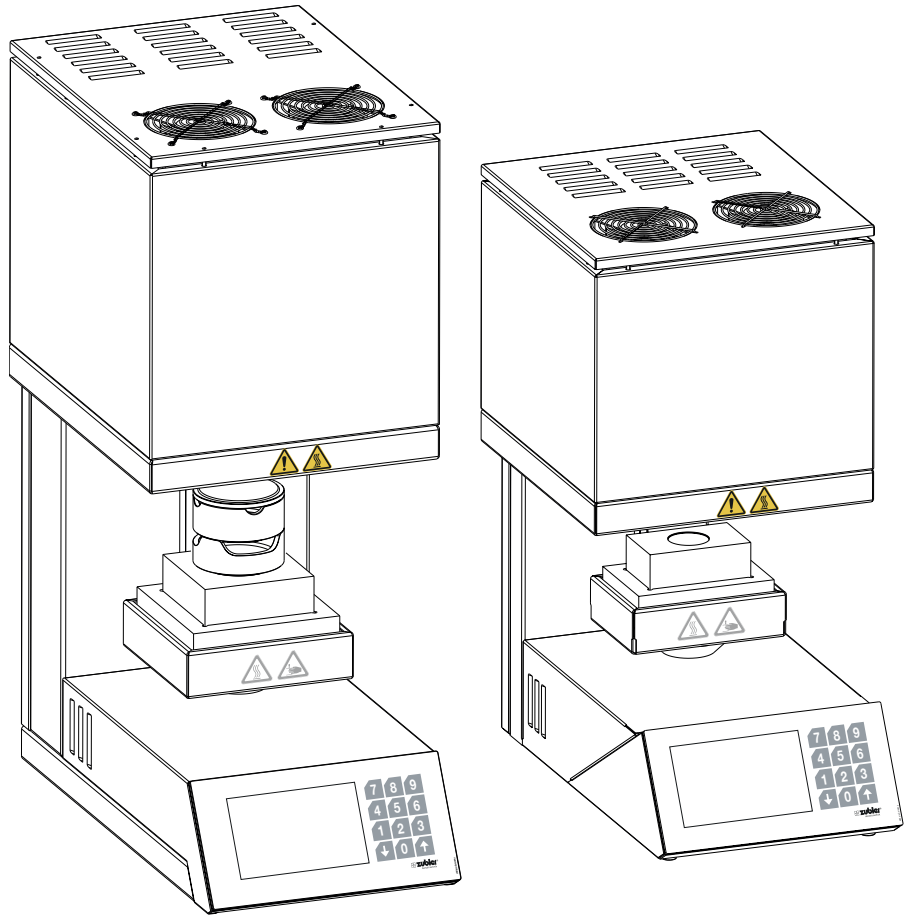


VARIO S 430

VARIO S 420



I. Signs and symbols used on the device and in the instructions



Safety goggles

Wear safety goggles for your own protection when working



Respiratory protection!

Wear an FFP3 respiratory protection mask for your own protection when working



Wear protective gloves

Wear protective gloves to prevent contact with hazardous substances when working.



Disconnect the mains plug before opening the appliance!

Disconnect the mains plug in the event of a malfunction or repair.



Only use the device indoors



Follow the instructions

Please always read the operating instructions before commissioning. They provide important information for the safety, use, and maintenance of the device. This protects you and prevents damage to the device.

To improve legibility, the use of male, female, and neutral (m/f/n) language forms is dispensed with. All references to people apply equally to all genders.

■ Lists

1 Numbered list



Risk of burns!

Housing parts may have an elevated temperature.



Crushing hazard!

Moving parts.



Warning of dangerous electrical voltage!

Parts are live.



Heavy weight

Only carry or unpack with two people.



Explosion protection

This product does not comply with the ATEX directive and may not be installed and operated in potentially explosive environments.



EX

Potential risk of explosion



Hazards and risks

This symbol indicates safety and hazard information which, if ignored, may result in injury to persons. In addition, the device and/or other property may be damaged.

Follow the operating instructions.



Attention, important note

Please pay particular attention to notes marked with this symbol.



Press button



Disposal

Information on disposal.



USB

USB-A 2.0 port/interface

Content

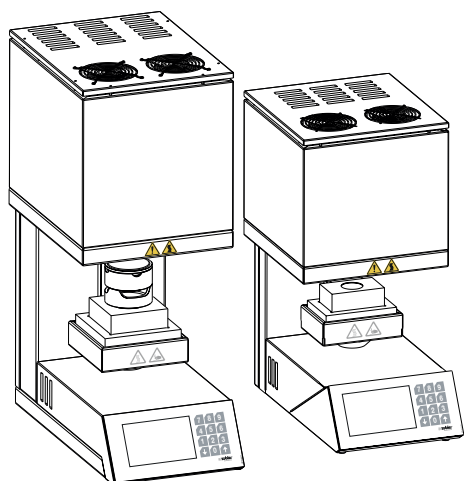
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1. Introduction

Dear Sir or Madam, we are delighted that you have chosen a Zubler sintering oven and wish you a pleasant working experience. The continuous development of our technology is based

on cooperation with experienced dental technicians. Our focus is to achieve the goal of building extremely high quality, flexible and future-proof dental ovens. Performance and economy are basic

requirements. To ensure trouble-free operation, you should read the operating instructions carefully.



1.1 Declaration of Conformity

We, Zubler Gerätebau GmbH
Buchbrunnenweg 26
89081 Ulm-Jungingen
www.zubler.de

declare that the product complies with the provisions of the following European directives:

2006/42/EC Machinery Directive
2014/35/EU Low Voltage Directive
2014/30/EU EMC Directive
2011/65/EU RoHS Directive

If the product is modified without our agreement, this declaration shall cease to be valid.

1.2 General Information

The correct processing of modern ceramic materials places increasing demands on dental technicians. We have taken this into account and combined state-of-the-art technology and future-oriented processes in our Zubler dental ceramic ovens. The software installed in the furnaces allows

you to conduct individual firings for all dental high-performance ceramics available on the market. The use of the highest quality materials increases the service life of the oven and gives you years of reproducible results at the highest level. Our aim is that you can use Zubler dental ovens to

produce top-quality ceramic dentures for years to come. We will inform you of any changes to the software or enhancements to the processing options. We are sure that you will have much success and pleasure with your sintering oven and congratulate you on your choice.

1.3 Intended Use

- The sintering furnaces were developed exclusively for sintering high-performance dental ceramics and are only intended for these applications.
- The user is liable for any damage resulting from other use.
- Any other use requires written approval from Zubler Gerätebau GmbH.
- The manufacturer's warranty conditions apply.
- Intended use also includes observing all the information in these operating instructions.
- Repairs may only be carried out by authorized service centers.
- Do not operate the oven under a sink. This could lead to premature failure of the top fans of the sintering furnaces.
- The oven table has an electric drive and may only be operated with the open and close button. Only open or close the oven table manually in exceptional cases, in consultation with our service partners or us.
- Only materials whose properties and melting temperatures are known may be used. The safety data sheets of the materials must be observed where necessary. The sintering furnaces are suitable for sintering technical ceramics for the production of ceramic dentures.
- The ceramic oven is designed for the manufacturing and production conditions in dental laboratories and for operation by trained personnel.
- This oven is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and/or knowledge.
- Only connect the mains plug to a socket with a protective conductor connection in perfect working order.
- The device is for indoor use only.
- When the combustion chamber heats up, the heating elements may make vibrating noises.
- Position the oven so that the plug is easily and quickly accessible.

1.4 Safety Instructions



- Only sufficiently qualified and authorized personnel may operate, maintain, and repair the machine. This personnel must be regularly instructed in all relevant issues of occupational safety and environmental protection and must be familiar with the entire operating instructions of the machine, in particular the safety instructions contained therein.
- Do not use the oven for:
 - Heating, melting, pressing, and drying of objects/materials that do not correspond to the intended use (dental ceramics)
 - Burning out of paints, adhesives, etc.
 - Preparing food or keeping it warm
 - Heating the laboratory/workplace
- To ensure operational safety, the electrical system of press and firing ovens must be checked at least every 4 years by a specialist to ensure it is in good working condition.
- Do not operate the control panel with wet or damp fingers.
- Please unpack the oven with care and have two people transport it. Always lift by the base, never by the oven chamber or table guide.
- Do not operate the control panel with hard and/or pointed objects.
- Never operate the oven without chamotte inserts in the lift cage.
- Do not put your hands between the oven table and the oven chamber during operation. There is a risk of crushing and burns.
- Never place hands or objects under the oven table during operation. The oven table must not be blocked during the opening process.
- The cooling slots and ventilation openings must not be covered, otherwise, there will be no natural air circulation and the appliance will become too hot.
- Do not allow liquids or objects to enter the device or the ventilation slots, as this could cause a short circuit.
- Position the oven on a stable and flat, non-flammable surface. A clearance of 30 cm must be maintained around and above the oven. Immediately adjacent walls surrounding the unit must be made of non-flammable material. The area should be well ventilated.
- In accordance with fire safety regulations, install an appropriate, recommended multi-purpose, dry foam fire extinguisher near the oven and ensure that your employees are familiar with its proper handling.
- Do not set up the sintering oven in the immediate vicinity of heat sources (e.g. preheating oven, other sintering oven).
- Never use highly flammable materials such as paper or brushes, as well as highly inflammable materials, such as monomers, insulating spray, die spacer, isopropanol, etc. near the sintering furnace.
- Make sure that the oven is professionally installed according to our instructions and that the selected electrical connection is properly grounded.
- For 220/240 V, use only the grounded device connection cable ICE C19 supplied.
- Connection conditions according to DIN EN IEC 61000-3-12: Rated current $I = 14 \text{ A}$, $R_{scE} = 250 \Omega$. If necessary, consult the electricity supply company.
- The device may only be connected to a separate socket outlet with a 16 A slow-blow fuse with ground contact and a 30 mA residual current circuit breaker.
- Usage of unauthorized or defective accessories can create an unintended risk. When setting up your system, make sure that you use approved accessories.
- The power cable of your sintering furnace should be routed away from walkways and passageways.
- During use, such as when opening the firing chamber, high radiant temperatures can occur.
- Do not touch the surface parts, the heating elements, or the inner surface of the oven. The hot surfaces can cause serious burns.
- Clean the device with a dry or slightly damp cloth only. Do not use solvents. Always disconnect the mains plug from the socket before carrying out this work.
- Before performing any recommended and authorized routine maintenance or service, switch the oven off and unplug it from the power source, to avoid risk of electric shock, injury, or death. Allow the oven to cool down to room temperature.
- Do not attempt to open, repair, or replace any part of your oven until you have read the manual and it expressly recommends repair or replacement. Any unauthorized attempt to repair, replace, or open any part of your oven poses a significant safety risk and will void your warranty. All service work, whether during or outside the warranty period, may only be carried out by authorized service personnel.
- Keep the original packaging materials for your VARIO oven. Please only use the original packaging for transporting your sintering furnace. Otherwise, improper transportation of your device will void the warranty.
- This product does not comply with the ATEX directive and may not be installed and operated in potentially explosive environments.

Release of Insulation Dust

- When handling insulating components, pay attention to hand, eye, respiratory, skin, and body protection.
- In case of skin contact, wash with plenty of soap and water.
- After contact with eyes, rinse gently with water for several minutes.
- Safety data sheets for insulation are available on request.

2. Commissioning

2.1 Setting up the Device

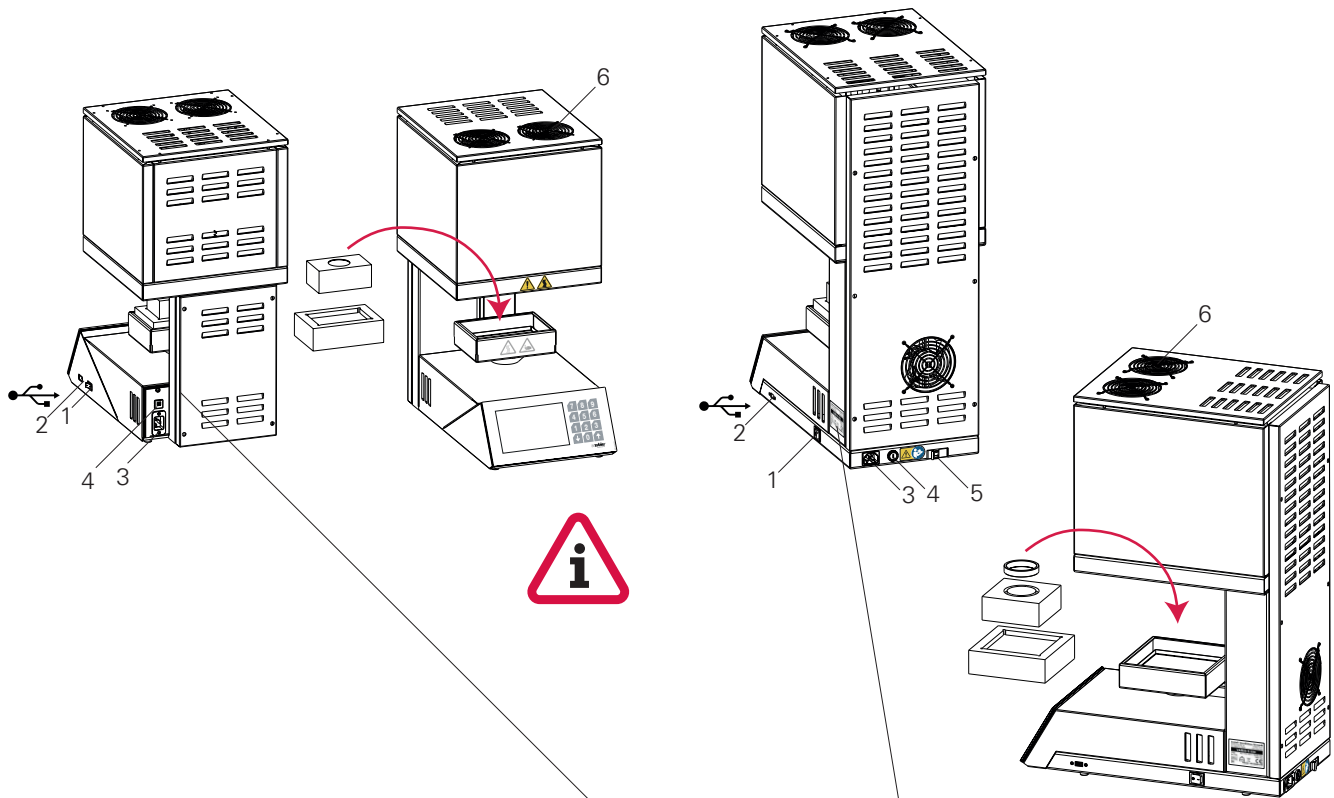
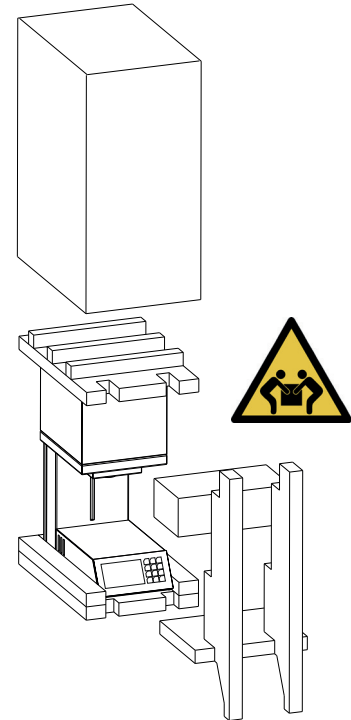
- Place the oven on a stable and level surface.
- Ensure that there is a clearance of approx. 30 cm around the device.
- Keep the original box and packaging material for warranty claims and servicing.
- Have the base and centering base (including centering ring for the VARIO S430) ready for the next step.
- Electricity supply: The sintering furnace requires AC 220-240 V 50/60 Hz.
- Do not use extension cords, outlet expansion strips or other devices on the same outlet as the oven.
- The main switch must be in the "0" position.
- Only connect the oven to the power supply using the supplied power cord.
- Switch on the oven at the main switch.

2.2 Initial Oven Setup

- After the first power-up, the display will show instructions for the first steps. The initial oven setup cycle then runs automatically. The oven is only ready for operation after it has been fully set up (3.3.8).

Initial oven setup steps:

- Setting the language
- Insert the base and centering base (including centering ring for the VARIO S430) into the lift cage (ensure parallel alignment)
- Brightness
- Volume
- For VARIO S430, check the automatic circuit breaker
- Set date/time
- Setting the units (°C/°F)
- USB: Load programs from USB
Do not load any programs
- Start burn-in program



1	Main switch
2	USB port
3	Mains connection
4	16 A slow-blow fuse "main fuse"
5	Automatic circuit breaker "Heating circuit" 16 A characteristic D
6	Cooling fan

Zubler Gerätebau GmbH
 Buchbrunnenweg 26 D-89081 Ulm
 Tel. +49(0)731-14520 www.zubler.de

VARIO S 430

Voltage AC 220-240 V 50/60 Hz
 Max. Power 1900 W

Made in Germany 52kg CE
 SN VS430 \ 09-00000-23

Zubler Gerätebau GmbH
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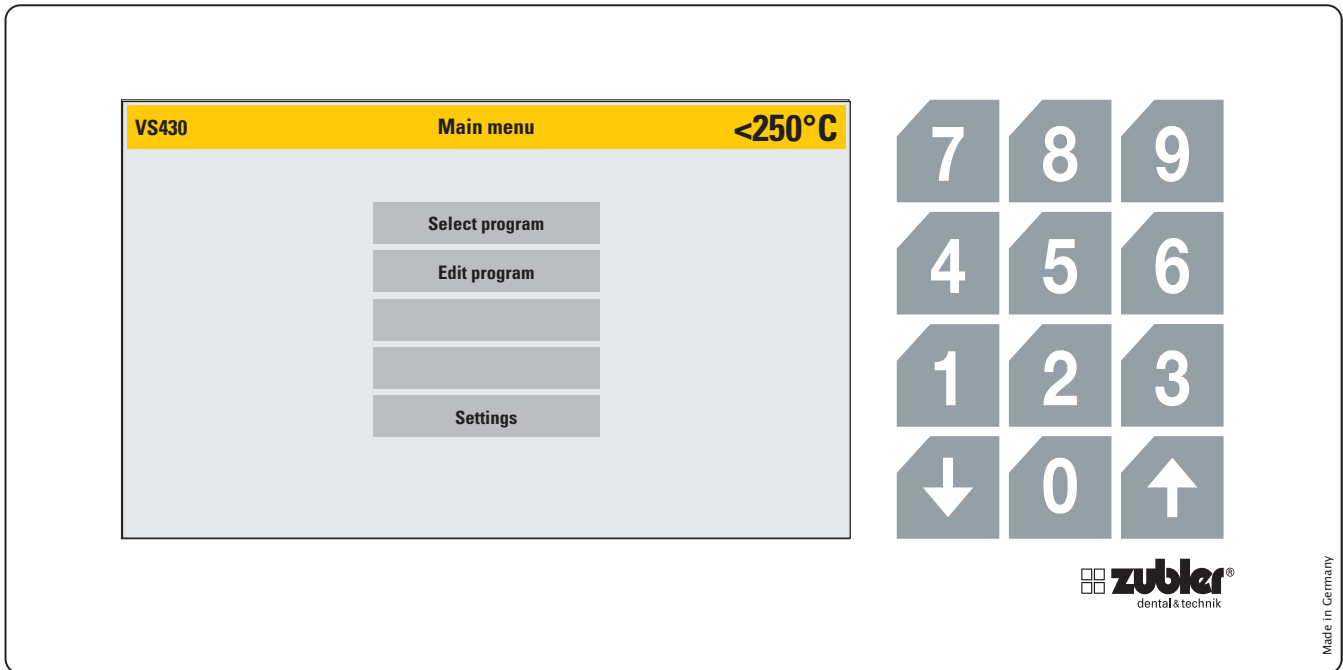
- Company Address
- Product name
- tech Technical details
- Symbols
- Serial number

Oven type/folder

Current menu area

Actual oven temperature

Number pad



2.3 Display

The sintering furnaces feature a full-touch display including an additional number pad. Select the required menu item by touching the desired item on the display.

The number pad is only active if numerical values can be entered.

This is used for intuitive menu navigation.

The "UP" and "DOWN" arrows are active when they can be used. In the closed lift position, only the down arrow is active; in the fully open lift position, only the up arrow is active.

2.4 Color Coding



Green: Confirmation of an entry, Forward/Next, Start



Entry required for start enable



Red: Cancel an action, error message, warning, back to menu



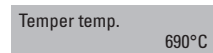
Yellow: Headline



Active control panel



Inactive control panel



Active parameter

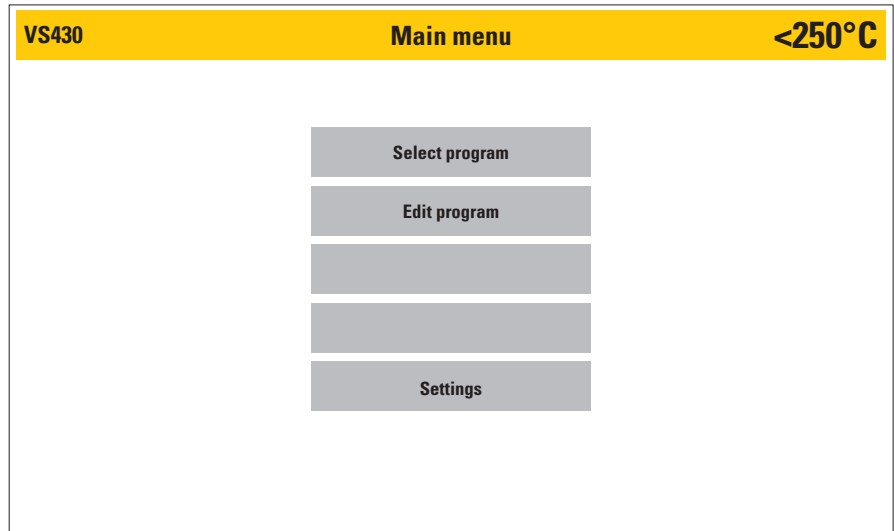


Inactive parameter

3. Operation

Selecting the menu parameters

Once you have switched on the oven, you will be taken to the main menu with 3 menu items. You can open the respective menu item by clicking on it directly (Fig. 08.1).

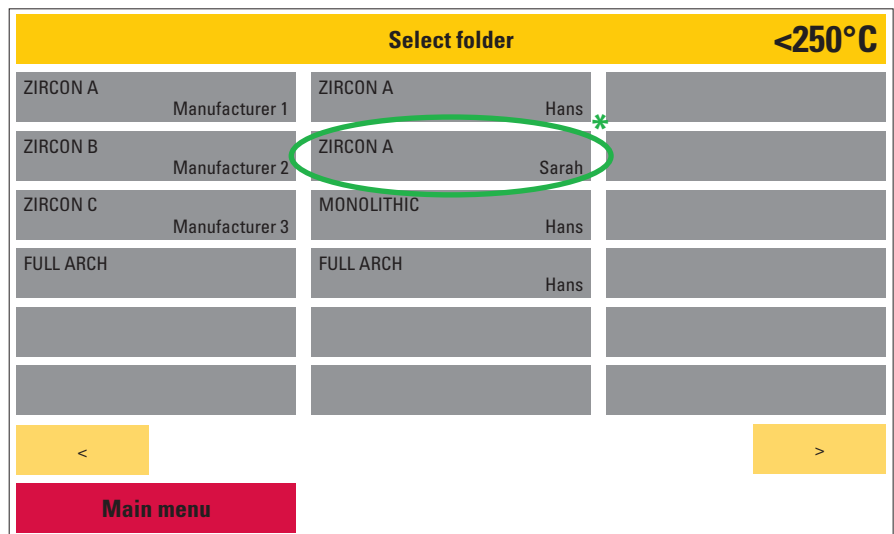


Display, status: Main menu

Fig. 08.1

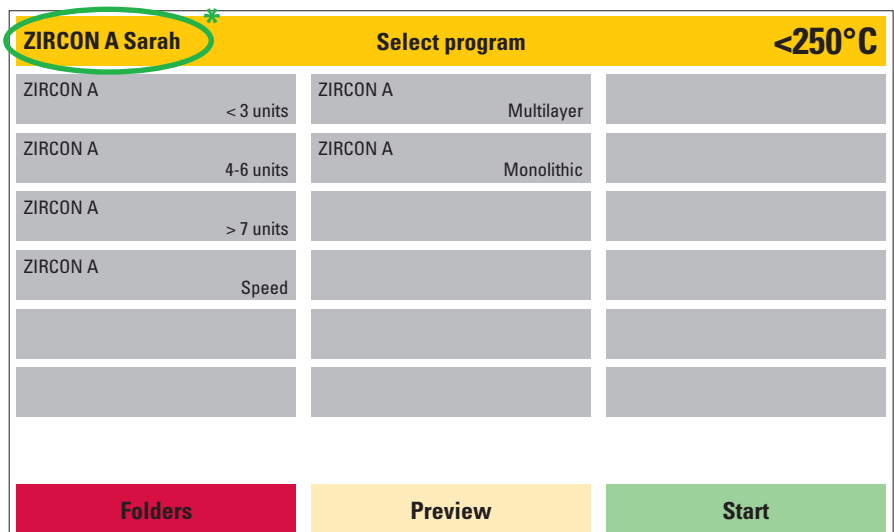
3.1 Program Selection

- The program menu is divided into folders, with twenty available program slots in each folder, which you may structure as you wish. There is a "superordinate folder area" that stands out visually from the "program level" due to its dark gray menu function field structure. The program level is displayed in lighter grey (Fig. 08.2). Clicking on a folder takes you to the program level (Fig. 08.3). The red **Main menu** button takes you back to the main menu.
- A program can be selected once in the selected folder (The folder name shown at the top left of the display). The program then has a dark background and can be started using the green Start button (Fig. 09.1). If the yellow **Preview** button (Fig. 09/1) is selected, all parameters can be viewed again. The parameters can be adjusted individually, as a one-off, for this running of the program sequence (see also point 3.1.1).



Display, status: Select program / folder overview

Fig. 08.2



Display, status: Select program / Select folder / Program overview

Fig. 08.3

ZIRCON A Sarah		Select program		<250°C
ZIRCON A	< 3 units	ZIRCON A	Multilayer	
ZIRCON A	4-6 units	ZIRCON A Monolithic		
ZIRCON A	> 7 units			
ZIRCON A	Speed			
Folders		Preview/Timer		Start

Display, status: Select program / Select folder / Program selected (ZIRCON A Monolithic)

Fig. 09.1

3.1.1 Preview/Timer Function

- In the preview, the parameters can be viewed and changed for the next program sequence only. This is not saved permanently in the program. Parameters can only be permanently changed and saved via **Edit program** in the main menu.
- Select the value of the parameter to be changed here and enter the new desired value using the now active number pad.
- This action activates the green **OK** button. Please confirm your entry by clicking on this button. The original parameter is called up again by pressing the active **Abort** button.
- If an invalid value is entered (outside the range), it is adjusted to the possible limit value and highlighted in yellow (Fig. 09.3).

VS430		Preview		<250°C	
		ZIRCON A	Monolithic	Sinter ↓	
Heat rate 1	50 °C/min	Final temp. 1	250 °C	Hold time 1	000 min
Heat rate 2	50 °C/min	Final temp. 2	1500°C	Hold time 2	060 min
Heat rate 3	50 °C/min	Final temp. 3	450 °C	Hold time 3	000 min
Heat rate 4	45°C/min	Final temp. 4	450 °C	Hold time 4	000 min
Heat rate 5	45°C/min	Final temp. 5	450 °C	Hold time 5	000 min
Ramps	3		50 °C/min	Opening temp.	250 °C
Abort		Timer			

Display, status: Select program / Select folder / Program selected / Preview / Final temp. 3 selected

Fig. 09.2

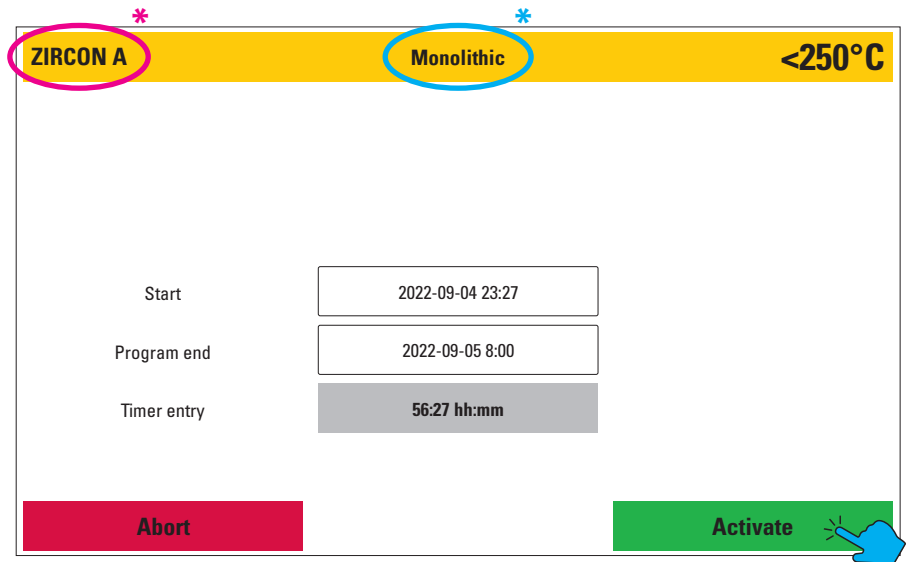
VS430		Preview		<250°C	
		ZIRCON A	Monolithic	Sinter ↓	
Heat rate 1	50 °C/min	Final temp. 1	250 °C	000 min	
	50 °C/min	Final temp. 2	1500°C	060 min	
Heat rate 3	50 °C/min	Final temp. 3	450 °C	000 min	
Heat rate 4	45°C/min	Final temp. 4	450 °C	000 min	
Heat rate 5	45°C/min	Final temp. 5	450 °C	000 min	
Ramps	3		50 °C/min	Opening temp.	250 °C
Abort		Delete		Start	

Display, status: Select program / Select folder / Program selected / Preview / Heat rate 1 adjusted over 50°C and confirmed

Fig. 9.3

Timer Function

- A program start delay can be programmed using the timer button. This can be set in hours from 1 to 99 hours. The oven will then display the date and time of the start and end of the program.
- To program a timer value, please activate the grey highlighted "Timer entry" input bar. You can use the now active number field to specify a start delay time value. The green **Activate** button activates the timer. The oven then indicates the start time and the expected end of the program by date and time. **Cancel** cancels this process and returns you back to the parameter entry. **Preview** takes you to the parameter view without canceling the timer function. (Fig. 10.1)

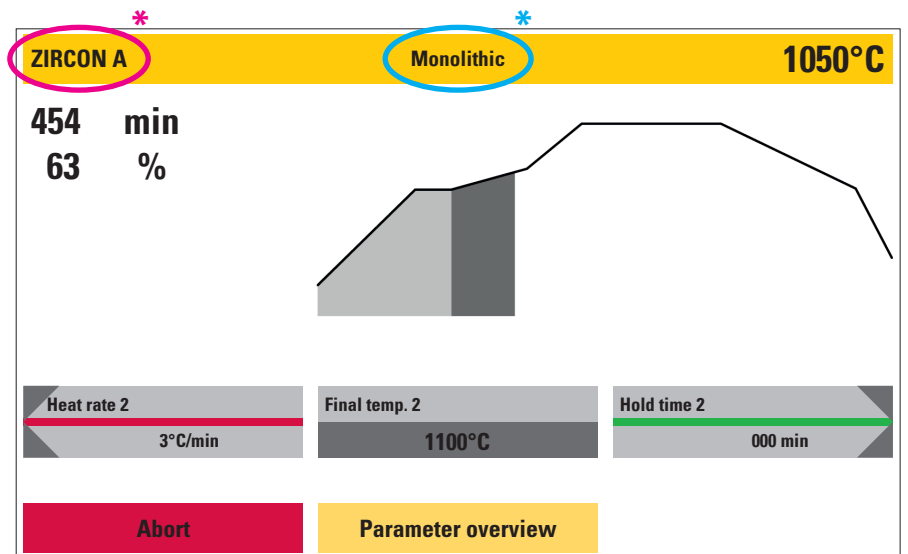


Display, status: Select program / Select folder / Program selected / Preview/Timer / Timer entry

Fig. 10.1

3.1.2 Start Program

- As soon as a program is started using the green **Start** button (Fig. 9.3), the program sequence is displayed once as a graph and as a parameter list. The currently active parameter is highlighted in a darker shade of gray in the program slider, while parameters that have already been processed recede into the background. In the graph, the active parameter is also highlighted in a darker shade of grey. This means that the program status can be seen at a glance, even when stood back from the device. The parameter slider provides more detailed information. As already described, the active parameter is highlighted in a darker shade of gray. If a subsequent parameter is activated, the parameter bar scrolls accordingly. Subsequent parameters can be checked by dragging the process bar to the corresponding positions with a "swiping motion" (Fig. 10.2)



Display, status: Select program / Select folder / Program selected and started / Program sequence

Fig. 10.2

3.1.3 Parameter Overview

- The **Parameter overview** button can be used to call up the **Preview** window again during a program sequence. This allows all parameters to be checked at a glance. Changes to parameters can no longer be made here.

ZIRCON A			Parameter overview			<250°C		
			ZIRCON A		Monolithic		Sinter ↓	
Heat rate 1	50 °C/min		Final temp. 1	250 °C		Hold time 1	000 min	
Heat rate 2	50 °C/min		Final temp. 2	1500°C		Hold time 2	060 min	
Heat rate 3	50 °C/min		Final temp. 3	450 °C		Hold time 3	000 min	
Heat rate 4	45°C/min		Final temp. 4	450 °C		Hold time 4	000 min	
Heat rate 5	45°C/min		Final temp. 5	450 °C		Hold time 5	000 min	
Ramps	3		Cooling rate	50 °C/min		Opening temp.	250 °C	
Abort						Graph		

Display, status: Select program / Select folder / Program selected / Start / Parameter overview Fig. 11.1

3.1.4 Abort Program

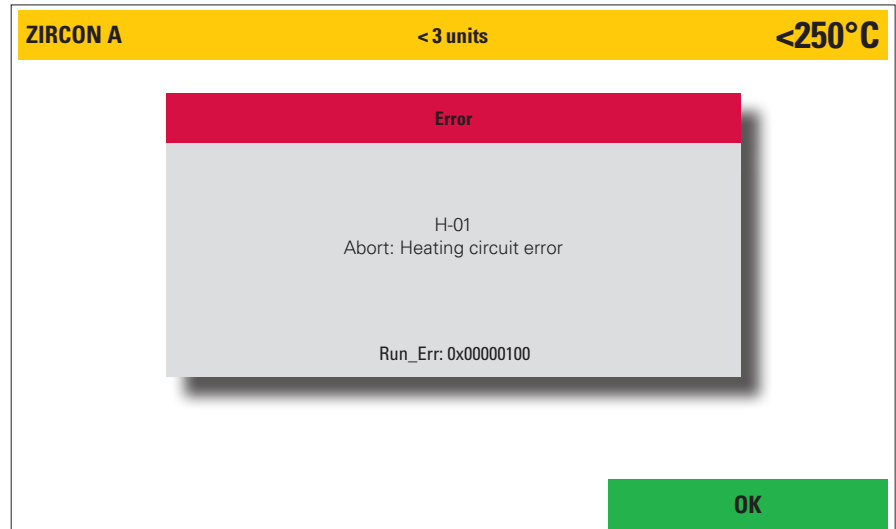
- If you want to end a program prematurely or abort it, this can be done by pressing the red **Abort** button. In this case, the program abort must be confirmed again by confirming the security prompt (Fig. 11.2).

ZIRCON A		Monolithic		900°C	
<div style="background-color: #e91e63; color: white; padding: 5px; text-align: center; margin-bottom: 10px;">Abort</div> <div style="background-color: #cccccc; padding: 20px; text-align: center; border: 1px solid #ccc;"> Should the program really be aborted? </div>					
No			Yes		

Display, status: Select program / Select folder / Program selected / Start / Abort Fig. 11.2

3.1.5 Malfunction during Program Sequence

- In the event of a malfunction, the oven interrupts the work process and displays a window with an error message in plain text and an error code (Fig. 12.1).
- This error message and thus the program abort must be confirmed with the green **OK** button.
- The last 5 error messages displayed can be viewed under:
-**Settings**
-**Current error messages.**

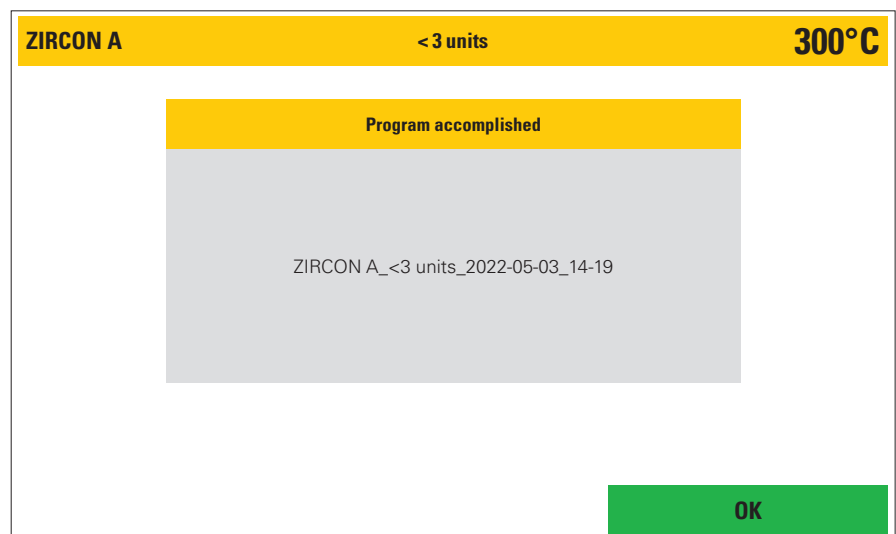


Display, status: Error message during a running sinter program

Fig. 12.1

3.1.6 Program Accomplished

- The end of the program is indicated by an acoustic signal and visually by a text window. The text window shows the name of the completed program, and the time and date of program completion (Fig. 12.2).
- A code is generated for documentation or quality assurance. This is composed of the date YYYY-MM-DD time (24 h system) and program name. The complete program data can be called up under **Settings - Data transfer - Export protocol data**. The last 50 program sequences are saved here. Older program sequences are overwritten. The protocol data should therefore be backed up at regular intervals.



Display, status: Sinter program finished

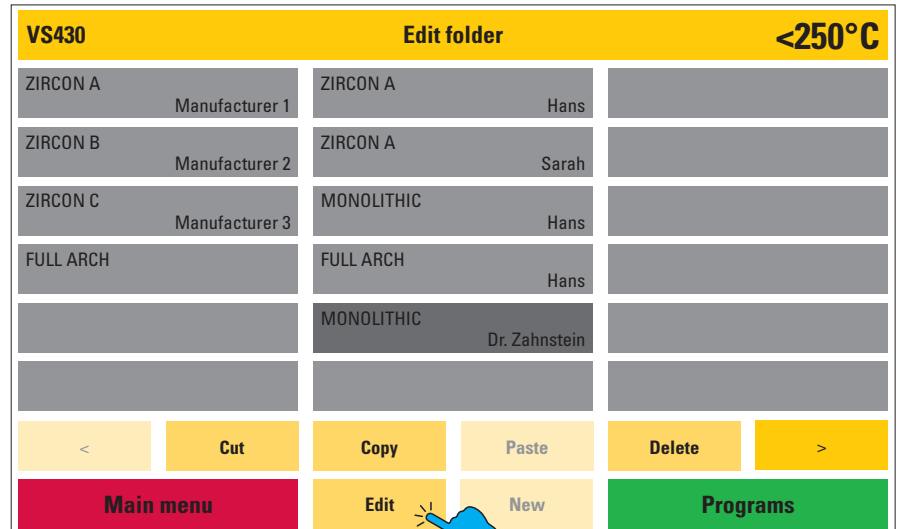
Fig. 12.2

3.1.7 Explanation of Terms

Ramps	The number of desired program sections can be set here. A program section (ramp) consists of: Heat rate, final temperature, hold time. 2- 6 such program sections are programmable. 5 ramps can be created for gradual heating and 1 ramp for cooling.
Heat rate 1- 5	Temperature increase in °C/min (°F/min) to reach the final temperature in the respective program section. VARIO S430: Heat rate 1 is limited to a maximum of 50°C/min, heat rates 2- 5 to 100°C/min. VARIO S420: 200°C/min up to a final temperature of 1000°C 100°C/min up to a final temperature of 1500°C 50°C/min up to a final temperature of 1650°C
Final temperature 1- 5	The respective target temperature of the individual program sections. Adjustable temperature range: 250°C- 1650°C.
Hold time 1- 5	Holding time of the respective program section at final temperature. VARIO S430: Maximum hold time to be set for an individual ramp: 300 minutes. Maximum hold times to be set distributed across all ramps: 420 minutes. VARIO S420: Maximum hold time to be set for an individual ramp: 60 minutes. Maximum hold times to be set distributed across all ramps: 120 minutes.
Cooling rate	Cooling in °C/min (°F/min) to reach opening temperature. VARIO S430: Adjustable cooling range 1- 50°C/min VARIO S420: Adjustable cooling range 1-100°C/min
Opening temperature	Indicates the temperature at which the oven opens. The setting range works is 250°C- 400°C. If desired, the limit of the maximum opening temperature to be set can be changed between 250°C- 1650°C. Please contact your service partner or Zubler Gerätebau GmbH.

3.2 Edit Folder/Program

- In the **Edit program** area folders or programs can be created, edited, copied, or deleted. A distinction is generally made between two “levels”: The “Folder level” and the “Program level”. For visual orientation, the “Folder level” is shown in a darker shade of grey, and the “Program level” in a lighter shade. These structures can be freely named by the customer. For example, the folder structure can be created based on material or technician (Fig. 14.1).
- If a folder function field is selected in **Edit program mode**, it is highlighted. Corresponding buttons are now active in the lower area of the display. If a free folder has been selected, it can now be named using the New button. If a folder containing a previously saved name or description is selected, the field and its contents can be copied, moved, edited, or deleted. The corresponding function buttons are highlighted as soon as the function is available (Fig. 14.1).
- If a function button has been selected, a green **Programs** and a red **Main menu** button become active. Pressing the **Programs** button takes you to the program level while pressing the **Main menu** button takes you back to the main menu (Fig. 14.1).

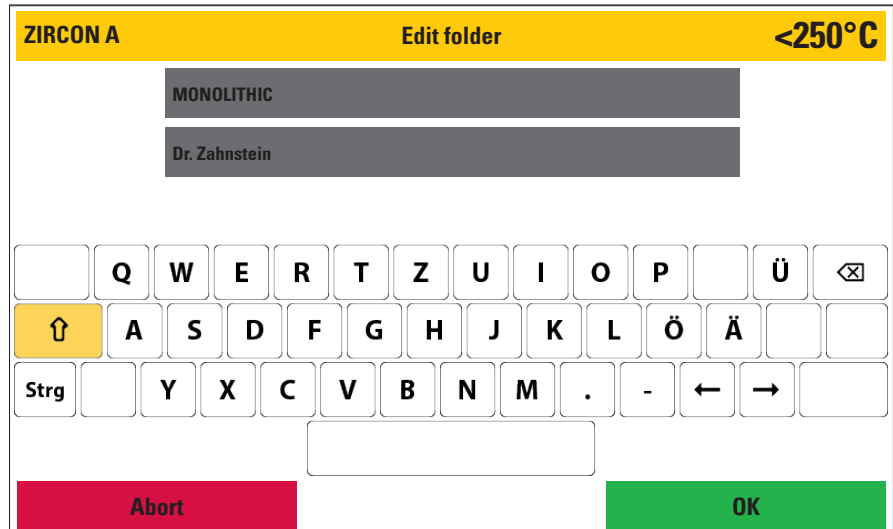


Display, status: Edit program / Folder selected

Fig. 14.1

■ **New**

The New button is activated as soon as an empty program or folder is selected. If the **New** button is pressed, the oven opens two lines of text and a keyboard field for entering any name desired. Up to 12 characters or letters can be used per text line. Letters can be displayed in both upper and lower case (Fig. 15.1).

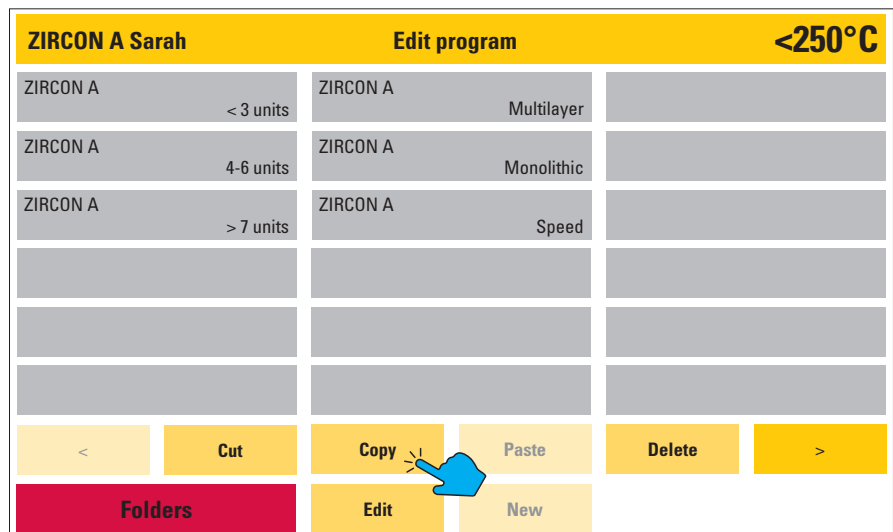


Display, status: Edit program / Free folder selected / New

Fig. 15.1

■ **Cut**

You can use the cut function to move individual programs or entire folders, including their contents. To do this, first select the desired program or folder. This field (program or folder function field) is now visually highlighted for checking purposes. Now select the desired **Cut** button. The oven now hides all other buttons except **Abort**. The destination folder or program location must now be selected (programs, can also be placed in different folders). Pressing the Paste button moves the folder or program and its contents to the desired position (Fig. 15.2).



Display, status: Edit program / Folder selected / Programs / Program selected

Fig. 15.2

■ **Copy**

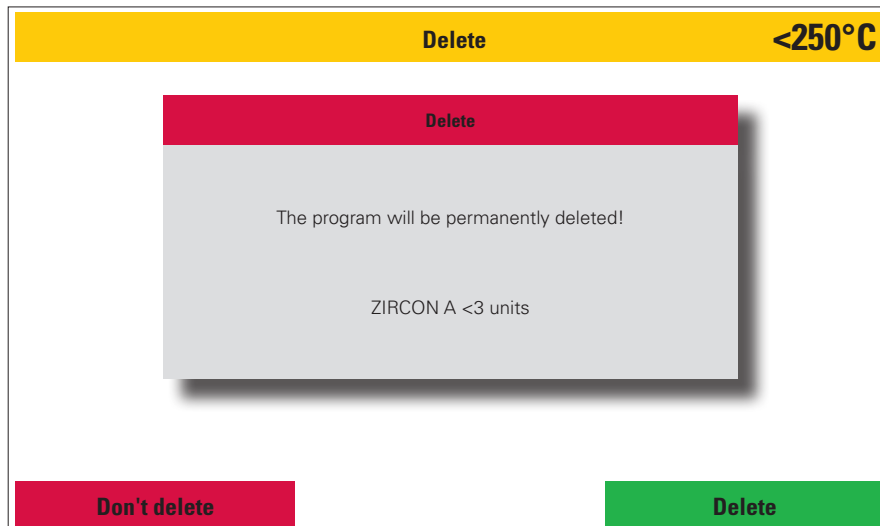
Here the folder/program is copied to the clipboard. The copied folder or program remains unchanged in the same position. The remaining procedure is the same as described under point 2 **Cut**.

■ **Paste**

The folder or program from the clipboard is pasted to the selected position. Only free (empty) program fields can be selected.

■ **Delete**

After pressing the Delete button, a confirmation prompt appears, which you must confirm with **Delete** or **Don't delete**



Display, status: Edit program / Folder selected / Programs / Program selected / Delete

Fig. 16.1

■ **Edit**

The name of existing folders or programs can be changed. The number pad is active. Parameters can also be changed and saved permanently for programs. If parameters are changed outside their limits, they are adjusted to their limit value after the OK field has been pressed and highlighted in yellow for clarity. (e.g. Heat rate 1 is limited to 50°C/min, so if a value of e.g. 60°C is entered, the maximum value of 50°C/min is set by the oven after OK has been pressed). These values are accepted and saved by pressing **Save**, and the initial values are called up again by pressing Abort (Fig. 16.2).

Edit program			<250°C
	ZIRCON A	Speed	Sinter ↓
Heat rate 1	50 °C/min	Final temp. 1	250 °C
			Hold time 1
			000 min
Heat rate 2	50 °C/min	Final temp. 2	1500°C
			Hold time 2
			060 min
Heat rate 3	50 °C/min	Final temp. 3	450 °C
			Hold time 3
			000 min
Heat rate 4	45°C/min	Final temp. 4	450 °C
			Hold time 4
			000 min
Heat rate 5	45°C/min	Final temp. 5	450 °C
			Hold time 5
			000 min
Ramps	3	50 °C/min	Opening temp.
			250 °C

Display, status: Edit program / Folder selected / Programs / Program selected / Edit

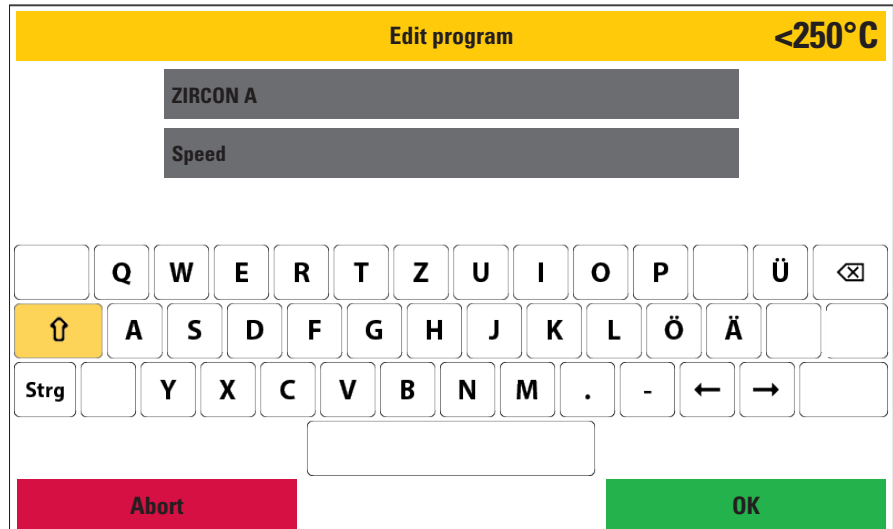
Fig. 16.2

■ **Forward/Back**

The **Forward** > and **Back** < buttons can be used to switch to the next page with further groups or programs. The buttons are only active if there is another page.

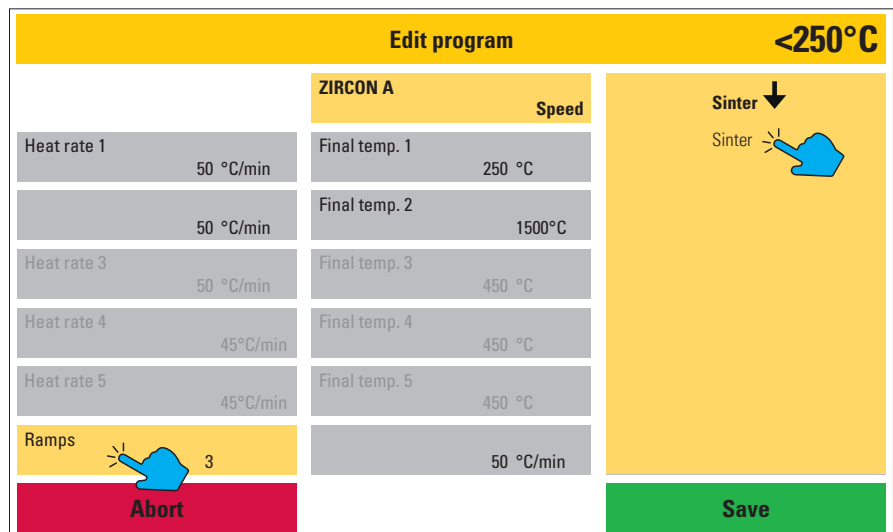
■ **Name programs/folders**

If a new program or folder needs to be created, a name must first be entered. Two text lines with a maximum of 12 characters or letters are available for this purpose.



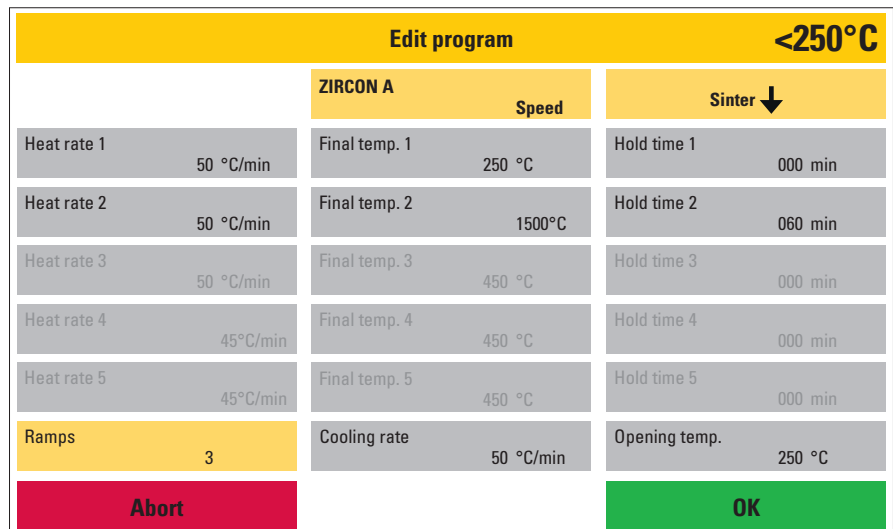
Display, status: Edit program / Folder selected / Programs / Free program slot selected / New Fig. 17.1

■ When programs are created (Fig. 17.1), the program type (Sinter) is selected in the second step. Number of program sections (ramps). Once the number of desired program sections has been selected, the oven starts the corresponding heating stages in the program screen.



Display, status: Edit program / Folder selected / Programs / New (after program name has been entered) Fig. 17.2

■ These parameters can now be programmed as desired. (Fig. 17.3). To do this, select the relevant parameter and enter the desired value using the now active number pad. A green **OK** button is now activated with which this value must be confirmed. Pressing the red **Abort** button calls up the initial value again. Once all parameters have been named accordingly, they can be saved with the green **Save** button.

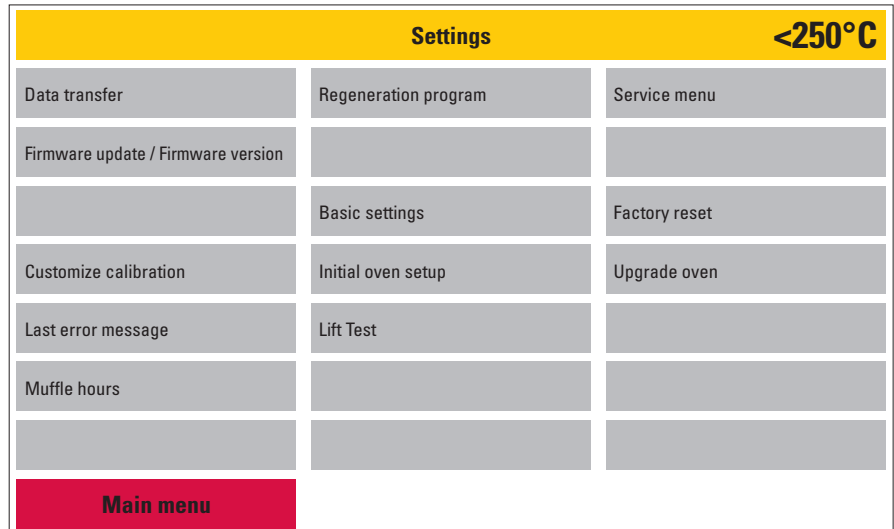


Display, status: Edit program / Folder selected / Programs / Free program slot selected / New (after program name has been entered) Fig. 17.3

3.3 Settings

Settings take you to the “Service level” of the menu. Various basic settings can be adjusted here, service programs can be carried out, and data can be transferred (software, program, and protocol data).

Pressing button the red **Main menu** takes you back to the main menu.



Display, status: Main menu / Settings

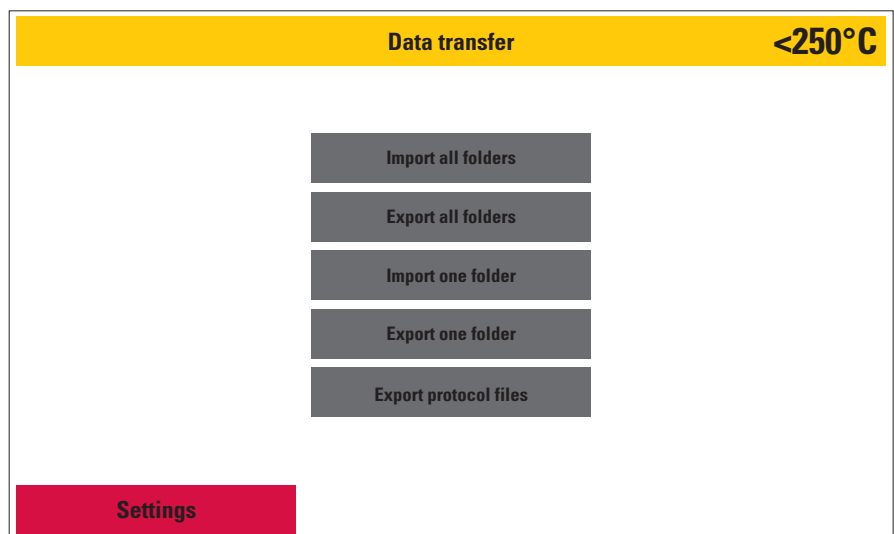
Fig. 18.1

3.3.1 Data Transfer

A USB data storage device is included in the scope of delivery of your Zubler sintering furnace. You can use this USB stick to transfer program data (from oven to USB or from USB to oven) or to save protocol data for quality assurance purposes. If the oven detects the USB stick, all active function fields are highlighted visually (Fig. 18.2).

If a third-party data storage device is used, problems may occur during data transfer. If a USB stick is not detected, all function fields remain inactive.

Pressing the red **Settings** button takes you back to the settings area.




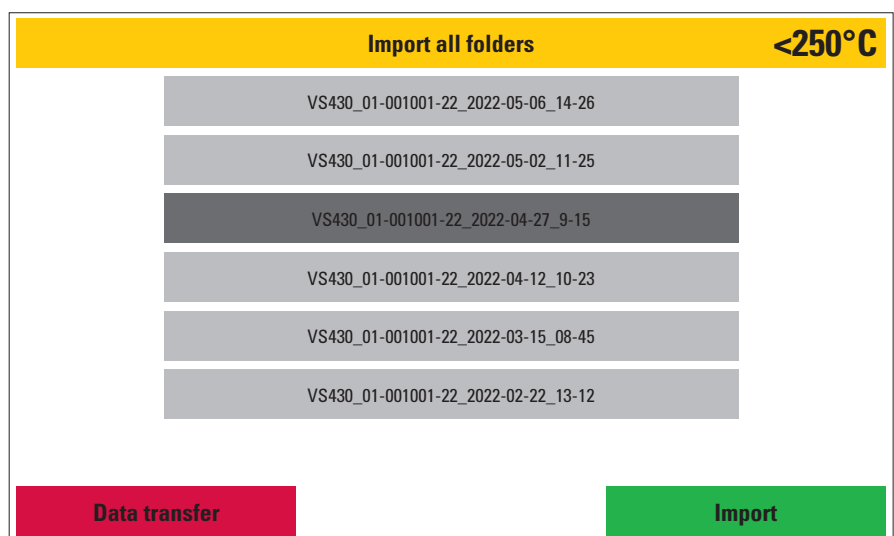
Display, status: Settings / Data transfer

Fig. 18.2

1 Import all folders

- If a corresponding folder already exists on the USB stick, this is detected by the oven, and the **Import all folders** function field is activated (dark grey background, Fig. 18.2).
- Selecting the button, displays a list of available program folders. Selecting the desired data record will activate the green **Import** button. Clicking on this button loads the desired data record.

 All folders and programs on the oven will be overwritten!

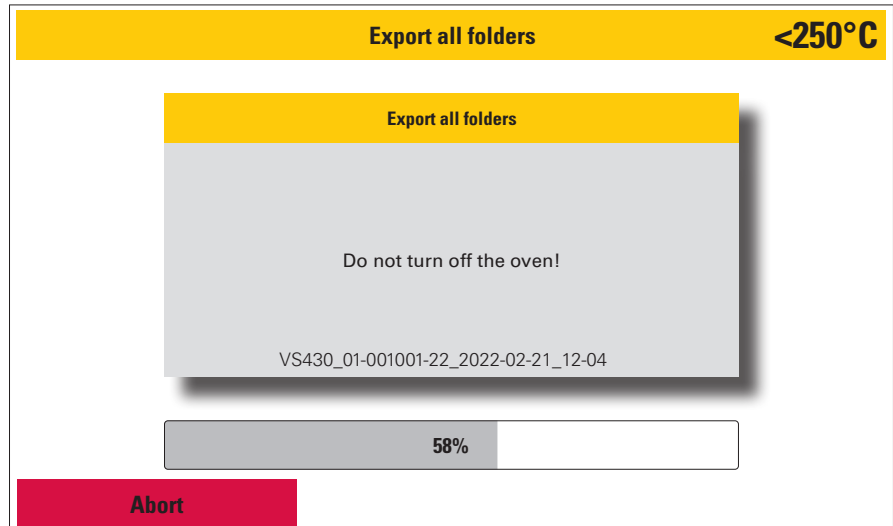


Display, status: Settings / Data transfer / Import all folders

Fig. 18.3

2 Export all folders

- When the Export all folders function button is selected, all program folders are saved from the oven to the USB memory and can be transferred to another oven.
- The oven creates the file name from the oven model name, oven serial number, date, and time (Fig. 19.1).



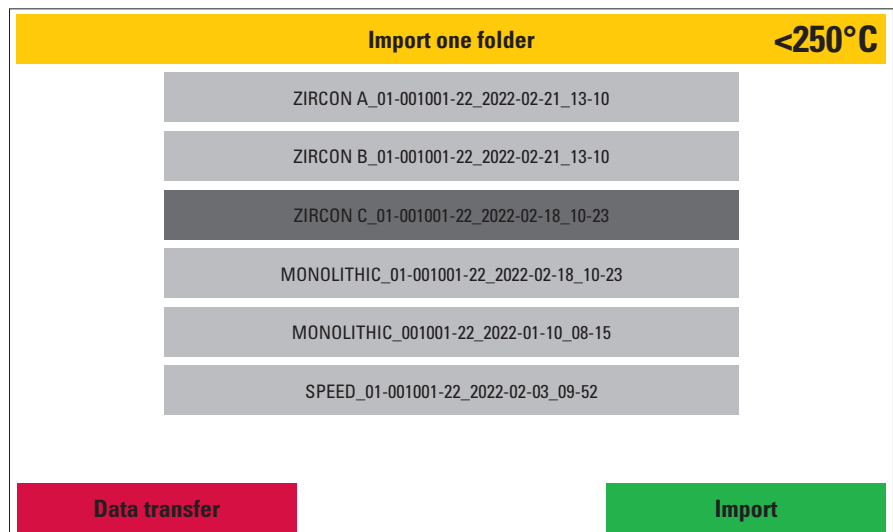
Display, status: Settings / Data transfer / Export all folders

Fig. 19.1

3 Import one folder

Individual program folders may be imported from the USB memory.

- To do this, select the desired folder and the folder menu will open. Please select a free folder slot here. This will be highlighted visually and the green Import button will be activated. To complete the process, please press this button.

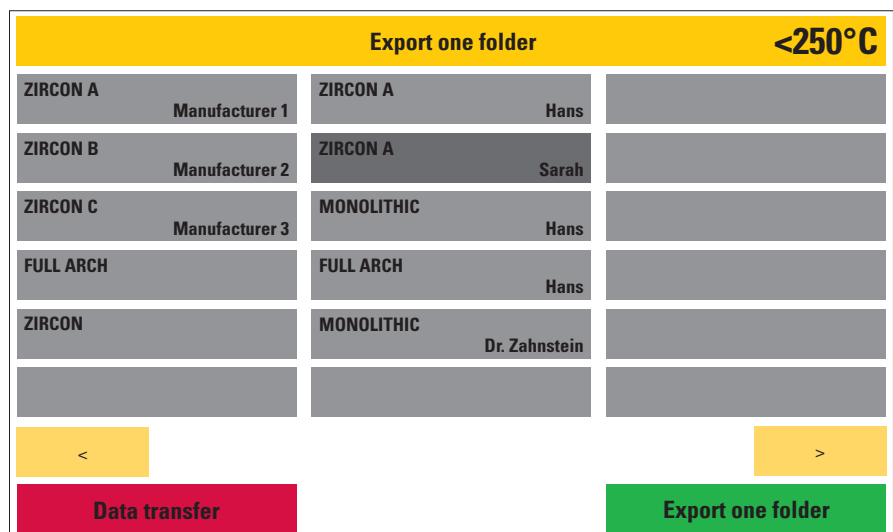


Display, status: Settings / Data transfer / Import one folder

Fig. 19.2

4 Export one folder

- Here a single folder can be backed up from the oven to the USB memory.
- If **Export one folder** is selected, the oven opens the folder menu. As soon as the folder to be saved is selected, the green **Export one folder** function field is activated. Please click on this to save the folder and its contents.
- The oven creates a folder file which it names using the folder name to be backed up, the oven serial number, the date, and the time.

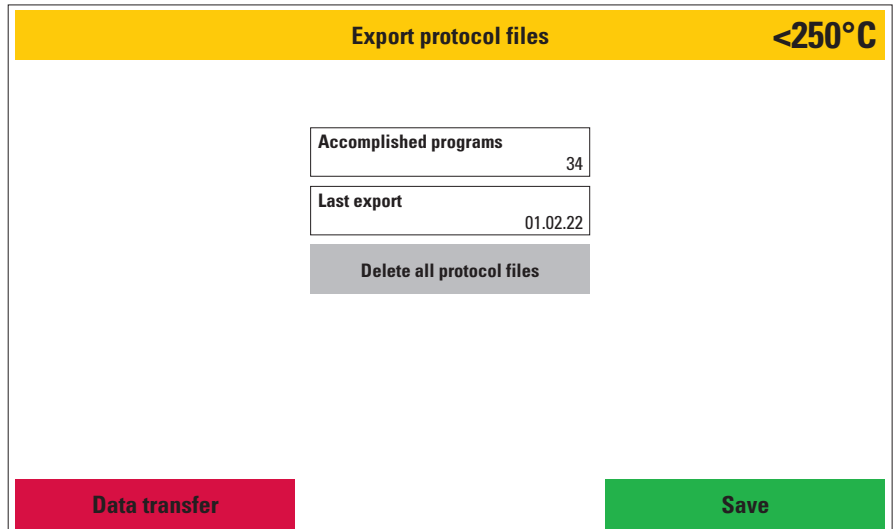


Display, status: Settings / Data transfer / Export one folder

Fig. 19.3

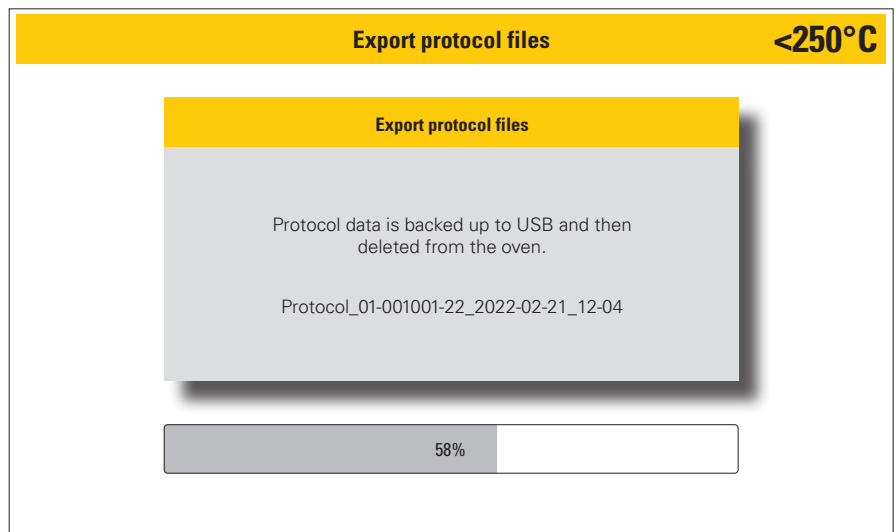
5 Protocol files

- The last 50 program sequences and results can be downloaded as a .csv file for documentation and quality assurance purposes.
- After 50 program sequences have been saved, the oven overwrites the previous protocol data, starting with the oldest, for subsequent work processes.
- Protocol data that is exported is deleted from the oven memory in the process.
- The oven generates a file name, which is composed of the date YYYY-MM-DD time (24 h system) and program name. (Fig. 20.2).
- The **Delete all protocol files** button can be used to delete all protocol files without backing them up. (Fig. 20.1)



Display, status: Settings / Data transfer / Export protocol files

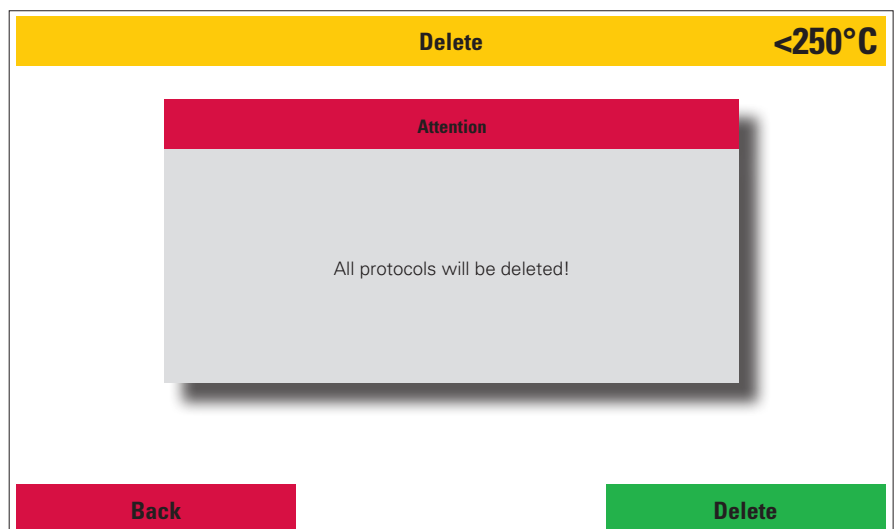
Fig. 20.1



Display, status: Settings / Data transfer / Export protocol files / Save

Fig. 20.2

- If **Delete all protocol files** has been selected, the green **Delete** button is activated. If this button is pressed, a confirmation prompt appears, which must be confirmed again using the **Delete** button (Fig. 20.3).



Display, status: Settings / Data transfer / Export protocol files / Delete all protocol files / Delete

Fig. 20.3

3.3.2 Firmware Update/Firmware Version

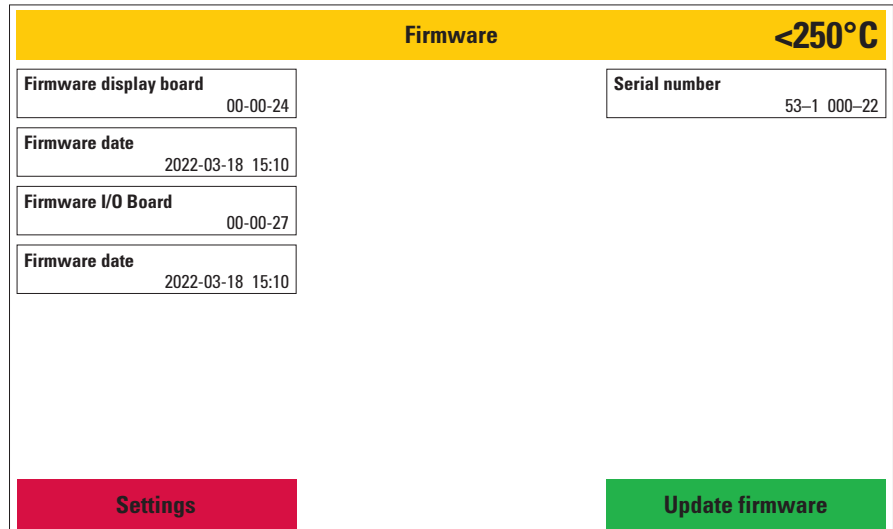
■ Firmware version and firmware update.

Firmware shows the current firmware versions of the different components.

A firmware update can be installed on the oven from the USB memory.

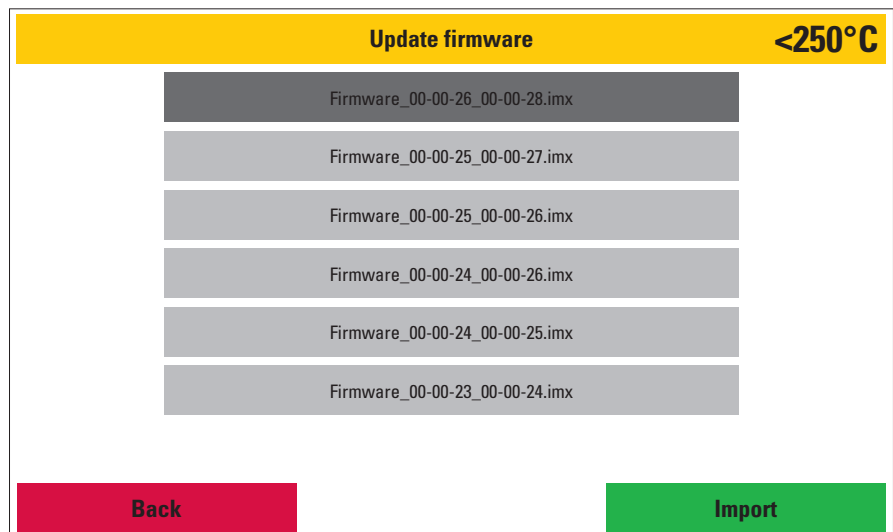
If the USB stick and the firmware stored on it are detected by the oven, the green **Update firmware** button is activated. If this button is pressed, the oven displays a list of all firmware versions saved on the USB stick (Fig. 21.2).

- If a version is now selected, the green **Import** button is activated. Please press this button to start the update



Display, status: Settings / Firmware update / Firmware version

Fig. 21.1



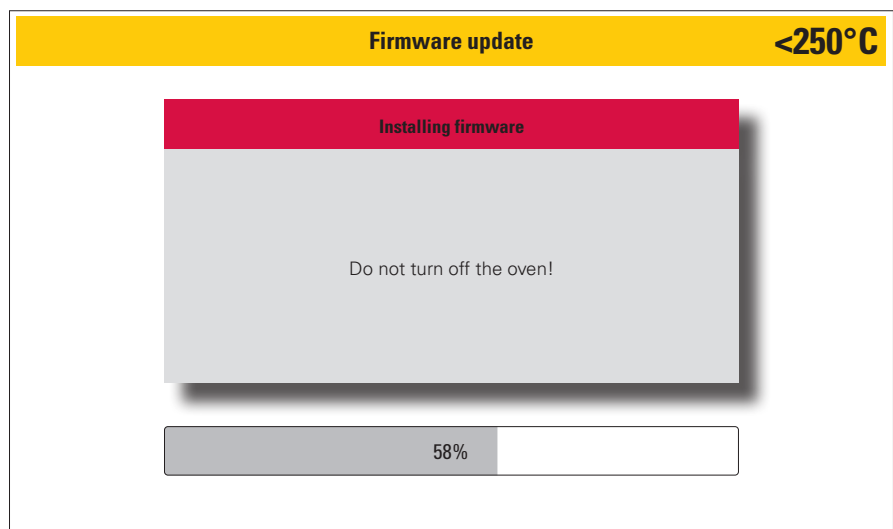
Display, status: Settings / Firmware update / Firmware version / Update firmware / Firmware selected

Fig. 21.2



Warning: The oven must not be switched off or disconnected from the power supply during the firmware update. This would result in the complete loss of the firmware on your oven.

Restoration can only be carried out by the manufacturer!



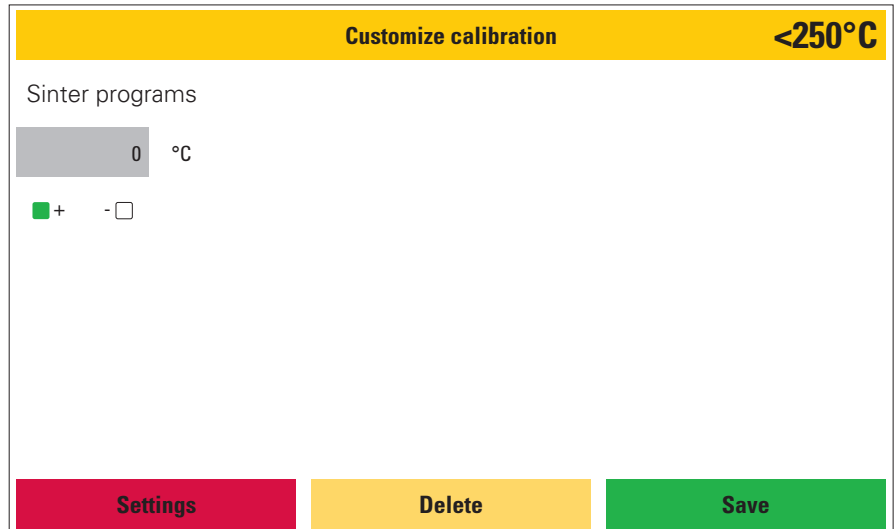
Display, status: Settings / Firmware update / Firmware version / Update firmware / Select firmware / Import

Fig. 21.3

3.3.3 Customize Calibration

With customized calibration, the basic temperature calibration of the oven can be readjusted. A value can be entered using the number pad. If (+) is activated, the temperature in the program is increased by the entered value. If (-) is activated, the temperature in the program is lowered by the entered value. When the field to be changed is selected, the stored value can be removed by pressing the **Delete** button. The value is saved using the **Save** button (Fig. 22.1).

Offset range: -50°C to +50°C



Display, status: Settings / Customize calibration

Fig. 22.1

3.3.4 Last Error Message

The last five error messages displayed by the oven can be called up again here. These are retained until the oven displays another error message. The oldest error message is overwritten.

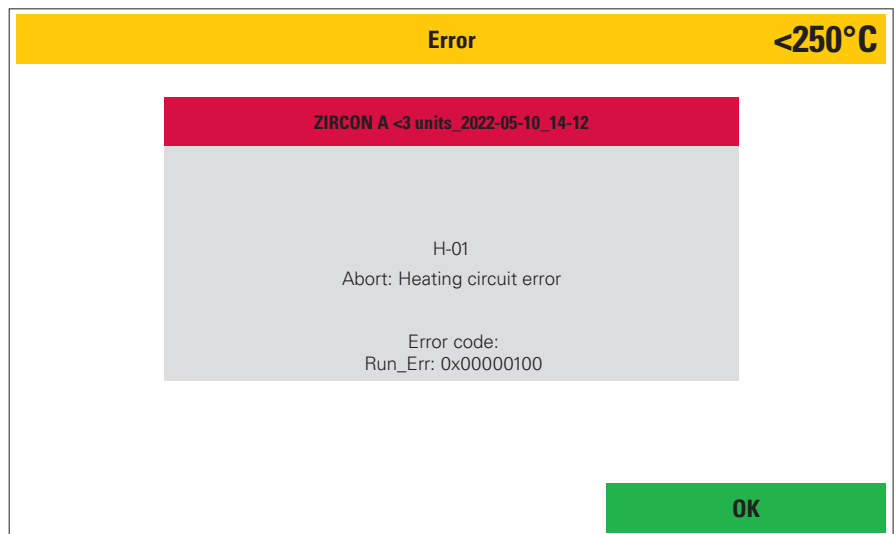
3.3.5 Muffle Hours

The operating hours in the individual temperature ranges can be viewed here. The information refers to the time spent in the respective temperature range in hours (Fig. 22.3).

3.3.6 Regeneration Program

This program is used to regenerate the heating elements of the sintering furnace. We recommend using this program only when necessary. The MoSi₂ heating elements installed in the sintering furnace have a protective oxide on the surface, which has a grey glossy appearance. This surface can be damaged during sintering, which is visible in the form of white or black dots on the elements or progressive matting. These defects can be regenerated. To do this, place both sintering dishes without contents (no zirconium, no sintering granulate or sintering beads) on the lift table and start the regeneration program.

This program also serves as a "depressurization heat treatment" after the replacement of heating elements.



Display, status: Settings / Last error message

Fig. 22.2

The screenshot shows a yellow header bar with the text 'Muffle hours' and '<250°C'. Below the header is a table with three columns and seven rows. The last row of the table is 'Total hours' with a value of 294. Below the table is a red 'Settings' button.

Below 299°C	35	800°C - 899°C	16	1400°C - 1499°C	32
400°C - 499°C	16	900°C - 999°C	28	1500°C - 1599°C	28
500°C - 599°C	16	1000°C - 1099°C	18	1600°C - 1699°C	3
500°C - 599°C	16	1100°C - 1199°C	18	Above 1700°C	0
600°C - 699°C	16	1200°C - 1299°C	18	Total hours	294
700°C - 799°C	16	1300°C - 1399°C	18		

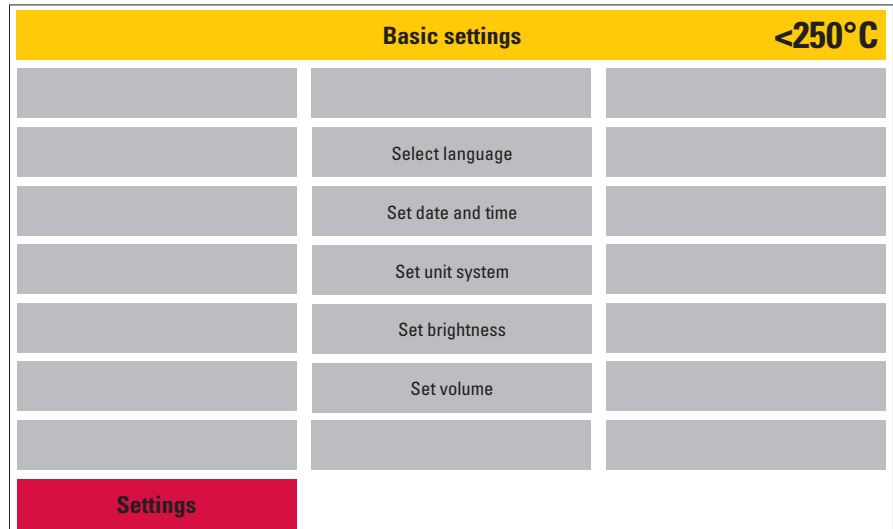
Display, status: Settings / Muffle hours

Fig. 22.3

3.3.7 Basic Settings

In this area, specific display settings can be made.

These include:

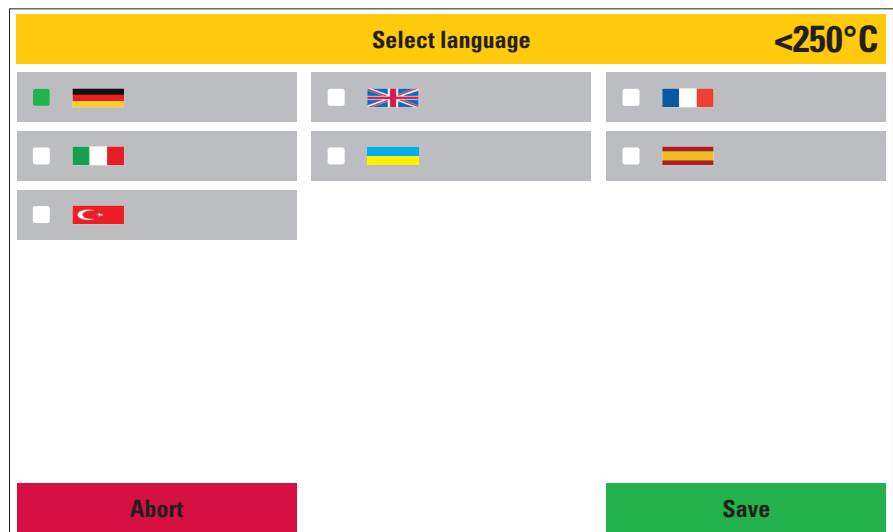


Display, status: Settings / Basic settings

Fig. 23.1

1 Select language

Selection of the menu language. To do this, select the desired language and confirm with the green **Save** button, or cancel the process using the red **Abort** button.



Display, status: Settings / Basic settings / Select language

Fig. 23.2

2 Set date and time

The date and time can be set here. Select with the arrow buttons, activate the green **Save** button to save. Return to the Basic settings menu using the red **Abort** button.

3 Set unit system

Choose between metric (°C) and imperial (°F). Select the desired system and confirm with the green **Save** button, or leave the area without making changes by using the red **Abort** button.

4 Set brightness

Adjust the display brightness using the slider. 4 test color fields are used for orientation. To confirm the selection, press the green **Save** button or return to the Basic settings menu without making any changes using the red **Abort** button (Fig. 24.1).

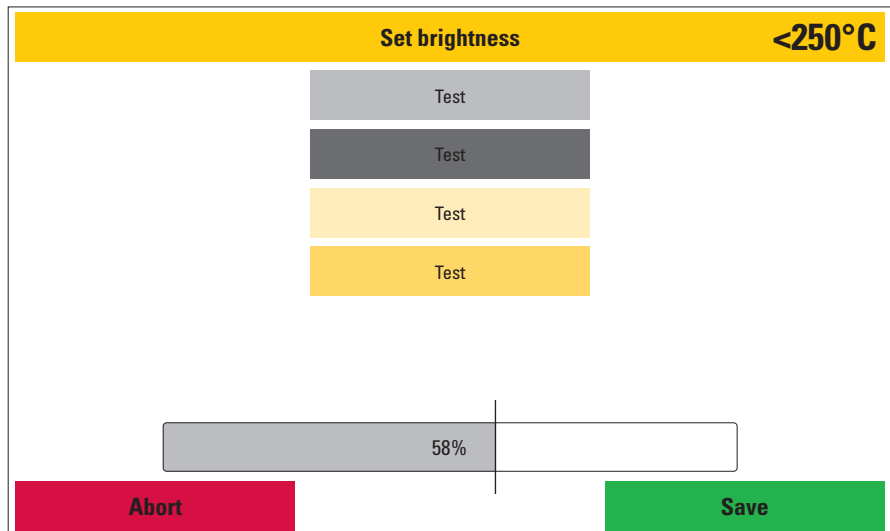


Fig. 24.1

5 Volume settings

In this area, warning and action tones can be activated or deactivated and their volume can be adjusted. As with setting the display brightness, a slider is available for this purpose. The volume for the each section can be checked by pressing the action buttons marked with a speaker. To confirm the selection, press the green **Save** button to exit the menu without making any changes, press the red **Abort** button (Fig. 24.2).

- **Start:** Tone sequence
- **Button:** Click
- **Program done:** Three-tone chime with repetition
- **Error / Abort:** Dissonant tone

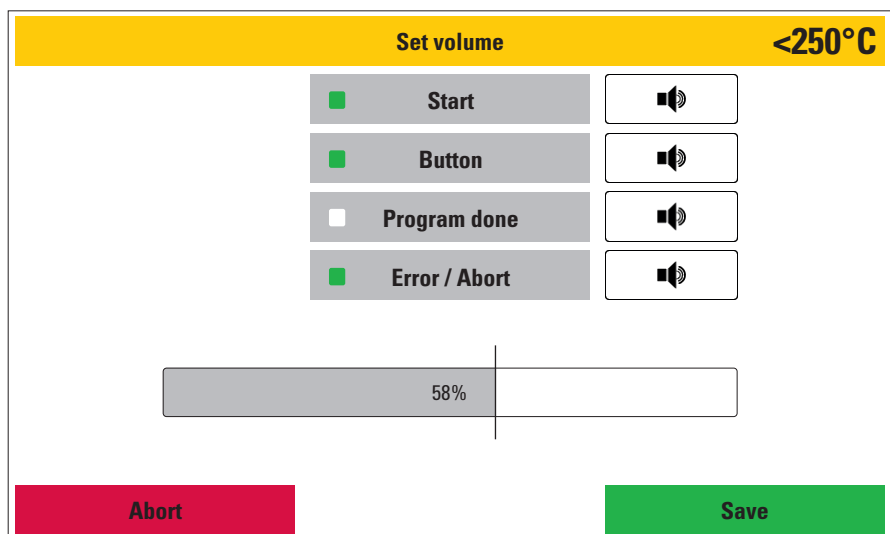


Fig. 24.2

3.3.8 Initial Oven Setup

You will be guided through all the parameters that must be configured when first commissioning the device. In addition, the oven will ask you to connect the power cable and check the automatic circuit breaker. The function fields marked in green must be confirmed.

When the device is first commissioned, this process must be run through in order to access the main menu.

3.3.9 Lift Test

The function of the limit switches of the lift system can be checked during the lift test. Three values are displayed:

Top limit switch: When the lift is fully closed, this position is described as **On**. If the lift opens, the indication changes to **Off**.

Lower limit switch: When the lift is fully open, this position is described as **On**. If the lift is closed, the indication changes to **Off**.

Lift position: This is described by a number. When the lift is completely closed, the number **100** is displayed and when the lift is completely open, the number **0** is displayed. Corresponding intermediate values are displayed on closing (Fig. 25.1).

Model	Lift test	<250°C
Top limit switch	Off	
Lower limit switch	On	
Lift position	0	
Back		

Display, status: Settings / Lift test

Fig. 25.1

3.3.10 Service Menu

Password-protected service area for customer support.

A password for this menu item can be created in the Service menu and requested if necessary. To access this area, please contact your service partner or Zubler Gerätebau GmbH.

3.3.11 Restore Factory Settings

All settings are reset to the factory default settings here.

This area can be protected by assigning a password.

The factory reset cannot be undone



All programs on the oven will be deleted.

3.3.12 Upgrade Oven

If you wish to switch to a different oven version after purchasing the device (if the device's hardware allows this), this can be achieved via software activation.

To do this, you can display a basic code in this menu and send the code and your serial number to your dealer or to Zubler Gerätebau GmbH. You will then receive an activation code which you can enter in this menu area. Press the green **OK** button to confirm this code and the oven will then switch to the desired device version.



The activation code is date-sensitive and can only be used for one day.

4. Data

4.1 Technical Data

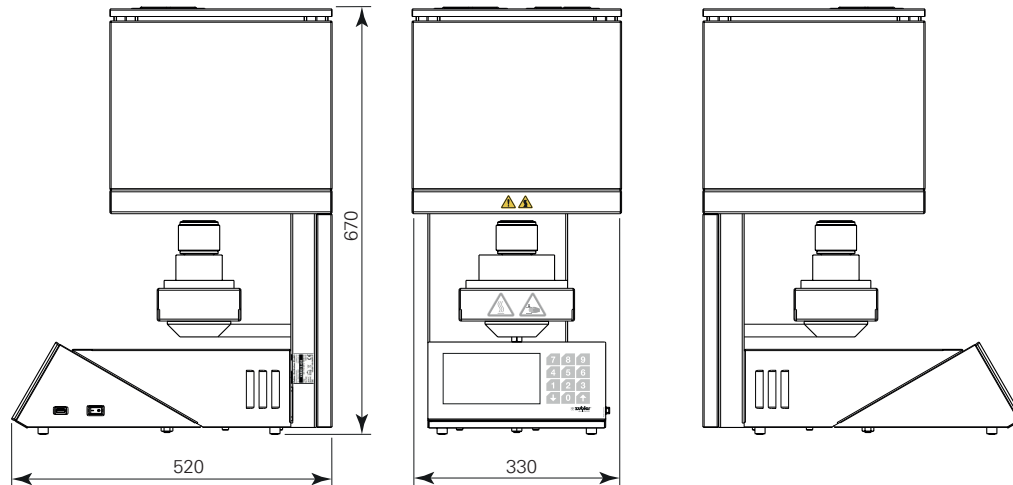


Fig. 26.1

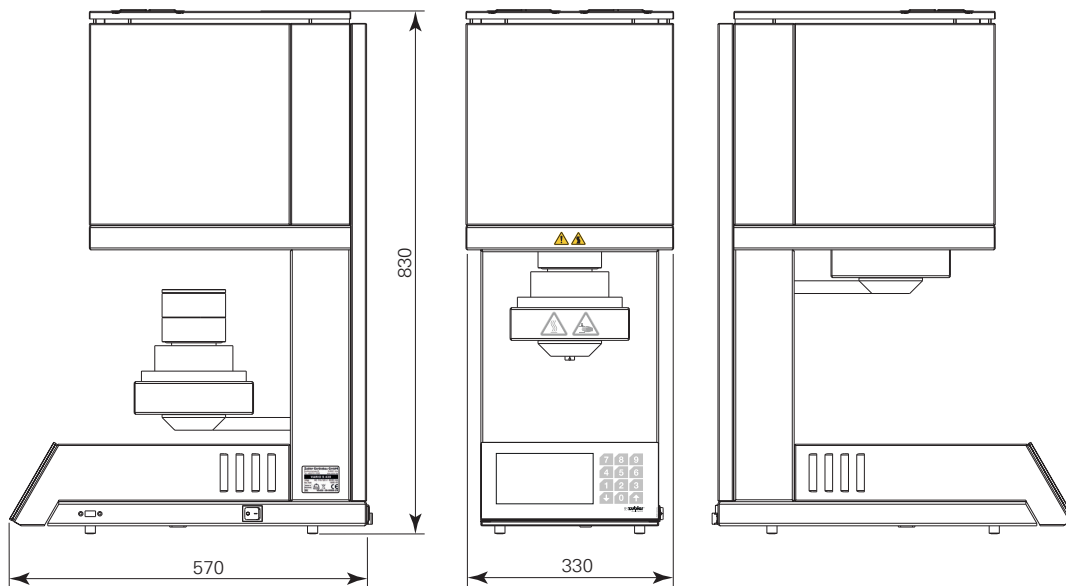


Fig. 26.2

VARIO S 420 (Fig. 26.1)

VARIO S 430 (Fig. 26.2)

Width:	330 mm	330 mm
Height:	670 mm	830 mm
Depth:	520 mm	570 mm
Weight:	46 kg	52 kg
Heat rate	1°C/min- 200°C/min	1°C/min- 100°C/min
Usable sintering space	115 cm ³	725 cm ³
Voltage:	100-120 V AC, 50-60 Hz 220-240 V AC, 50-60 Hz	220-240 V AC, 50-60 Hz
Power consumption:	1600 W	1900 W
Temperature	250°C to 1650°C	
Color display	152 x 92 mm	
Touch	230 x 92 mm	
Programs	500	
Number of heating/cooling stages	5+1	
IP protection class	IP20	
Pollution degree	2	

Permissible ambient conditions for safe operation

For indoor use only at	10°C to 40°C
Altitude up to	2000 m
Operating relative humidity	Linearly decreasing to 50% at 40°C 80% to 31°C

Environmental conditions for storage and transport

Permissible transport and storage temperature:	-25°C to 55°C
Rel. humidity during transport:	80%



4.2 Scope of Delivery

	VARIO S 420	VARIO S 430
1x Power cable	●	●
1x Sintering dish pliers	●	●
1x "Standard" sintering dish	-	●
1x "Speed" sintering dish	-	●
1x Sintering lid	-	●
2x Sintering plate	●	-
1x Sintering ring	●	-
1x Base	VS420	VS430
1x Centering base	VS420	VS430
1x Centering ring	-	●
40 g sintering beads	●	●
40 g sintering granulate	●	●
1x 16 amp slow-blow fuse	-	●
1x USB stick with operating software, program data record, operating instructions	●	●
1x Quick Start Guide	●	●

4.3 Accessories/Spare Parts

Power cable	012/00309
Sintering dish pliers "VS430" and "420"	898/4138
Long tweezers	898/106
Sintering dish set (1x "Speed" sintering dish, 1x "Standard" sintering dish, 1x sintering lid)	896/0418
"Speed" sintering dish, single (V S430)	896/04201
"Standard" sintering dish, single (V S430)	896/0420
Sintering lid (V S430)	896/0421
Base (V S430)	896/0407
Centering base (V S430)	896/0408
Centering ring (V S430)	896/0406
Base (V S420)	896/
Centering base (V S420)	896/
Sintering beads, 40 g	896/0409
Sintering beads, 200 g	896/0410
Sintering granulate, 40 g	896/0423
Sintering granulate, 200 g	896/0424
USB stick	896/0234
16 amp slow-blow fuse (V S430)	028/0129

5. Status Messages

Error code	Cause	Remedy
Oven cannot be switched on, main switch does not light up.	<ul style="list-style-type: none"> • Plug connection without contact or room protection switched off. • VS430: 16 amp fuse blown (V S430) • VS420 automatic circuit breaker has tripped. 	<ul style="list-style-type: none"> • Check plug connection • Check the circuit breaker of the area in which the oven is located • Try to operate oven in another phase • VS430: Check T 16 A fuse and replace if necessary. • Use only the replacement fuse supplied or a fuse of the same type • Check VS420 16 A automatic circuit breaker and switch on again if necessary.  
L-01 Abort: Fan error	<ul style="list-style-type: none"> • One or more fans have failed 	<ul style="list-style-type: none"> • Check which fan is not working (there are two fans above the firing chamber, one fan on the rear wall, and one fan behind the oven display) and contact your service partner
H-01 Abort: Heating circuit error	<ul style="list-style-type: none"> • The oven does not heat up or the oven cannot register a temperature rise. 	<ul style="list-style-type: none"> • Please check the position of the automatic circuit breaker on the rear wall of the oven. This should be set to ON. • Check the firing chamber to make sure that all heating elements are intact.
H-02 Abort: Maximum temperature exceeded	<ul style="list-style-type: none"> • The thermocouple has failed • Oven heats up beyond temperature control limit 	<ul style="list-style-type: none"> • Switch off the oven and contact your service partner

6. Maintenance

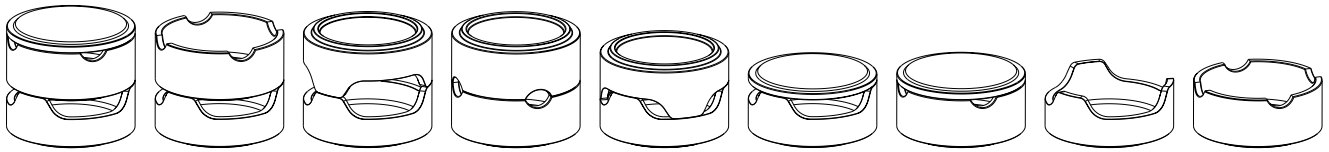
6.1 Regeneration of Heating Elements

See point 3.3.6

6.2 Regular Safety Inspections

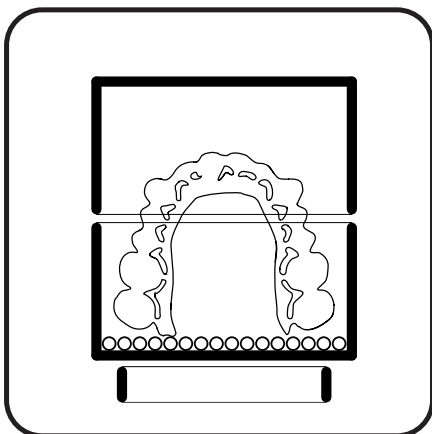
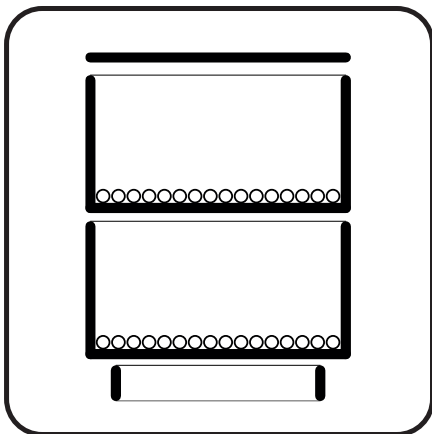
According to country requirements with leakage current test.

7. Sintering dishes application (V S430)



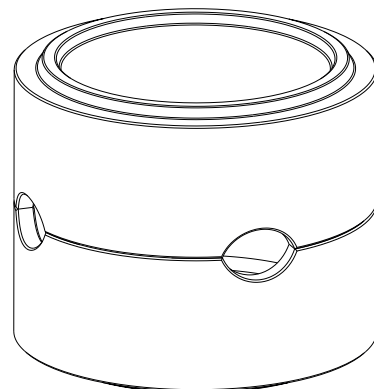
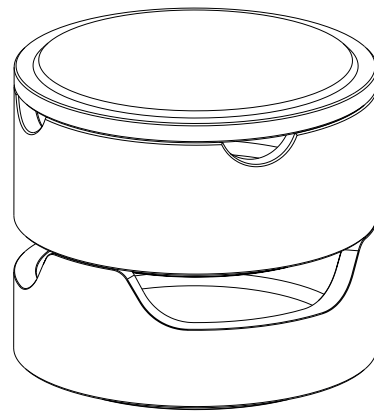
Procedure

Heat rate



Multifunction tray

<50°C/min



8. Warranty

If used correctly, Zubler grants a 12-month warranty on all parts of the device.

Exceptions to this are: Base, centering base, centering ring, sintering dishes including lids, cracks or breaks in the firing chamber insulation, heating elements broken off due to collision.

Zubler guarantees professional repairs with original spare parts. A warranty period of 6 months is granted for every repair carried out by a specialist retailer or by Zubler, provided that all maintenance work required for the unrestricted function of the device has been commissioned.

Warranty claims cannot be asserted for:

- Improper use
- Use outside the specified operating conditions
- Non-compliance with operating and connection regulations
- Non-identifiable regular cleaning, maintenance, and annually prescribed effectiveness test
- Repairs not carried out by a specialist retailer or by Zubler
- Use of spare parts from other manufacturers

9. Disposal Instructions



Disposal of Insulating Materials (e.g. base and centering base)

All materials must be disposed of in accordance with country-specific regulations.

Disposal of the Device

The device must be disposed of by a specialist company. The specialist company must be informed of any residues in the device that are hazardous to health.

Disposal Information for EU Countries

To preserve and protect the environment, prevent pollution, and improve the recycling of raw materials, the European Commission has issued a directive under which electrical and electronic equipment is taken back by the manufacturer for proper disposal or recycling.

Devices marked with this symbol must therefore not be disposed of with unsorted municipal waste within the European Union.

Please check with your local authorities for proper disposal.

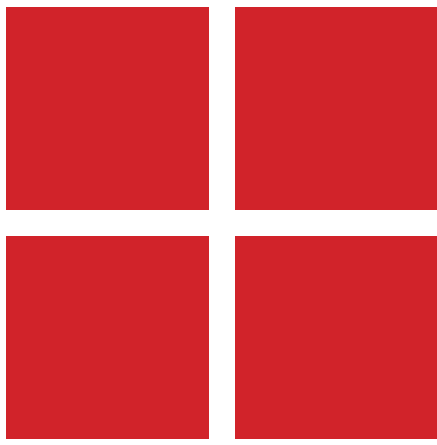
Special Information for Customers in Germany

Zubler electrical devices are devices for commercial use. These devices may not be handed in to municipal collection points for electrical appliances, but will be taken back directly by Zubler. Please contact your sales partner for current return options.

Protecting Personal Data

We would like to point out to all end users of electrical and refrigerated appliances that you are responsible for deleting personal data on the old appliances to be disposed of.

Further information is available at www.zubler.de



Subject to technical modification. 43.2024.de