Operating Instructions



Programat®
P710 G2

Ceramic furnace

Valid from
software V7.0

Making People Smile

ivoclar

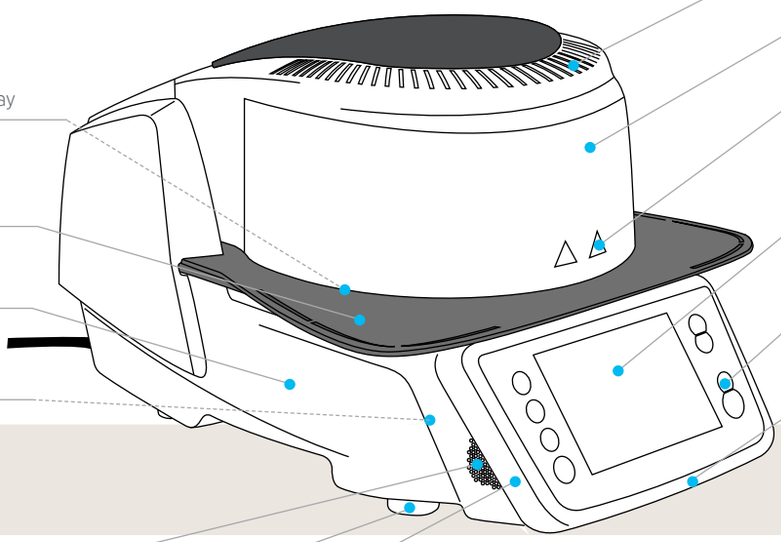
Dental Servis
Serdar Ayısıt
0555 274 05 51

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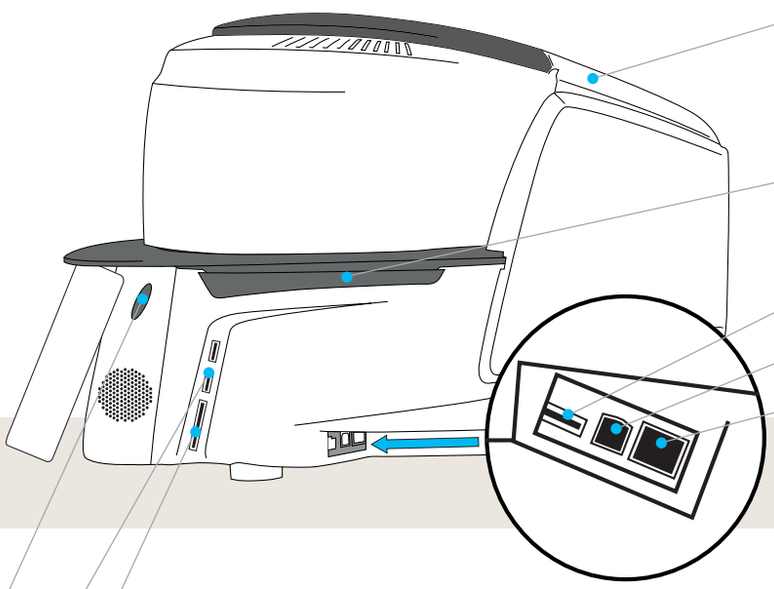
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List of Parts

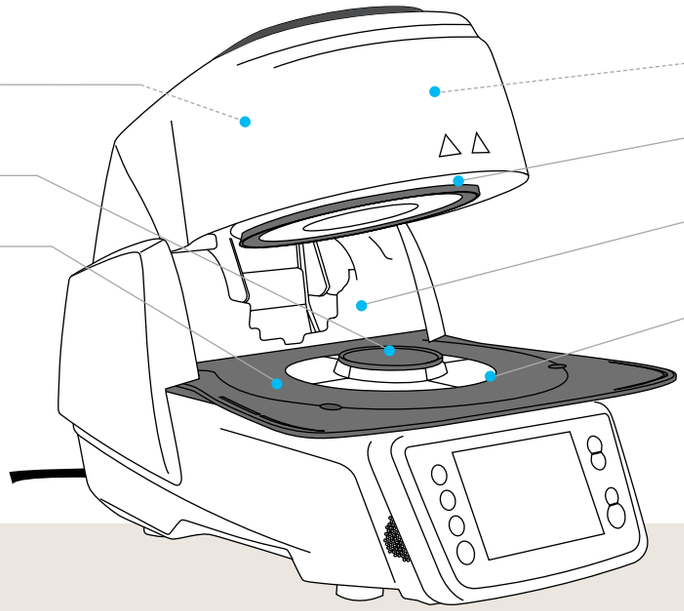


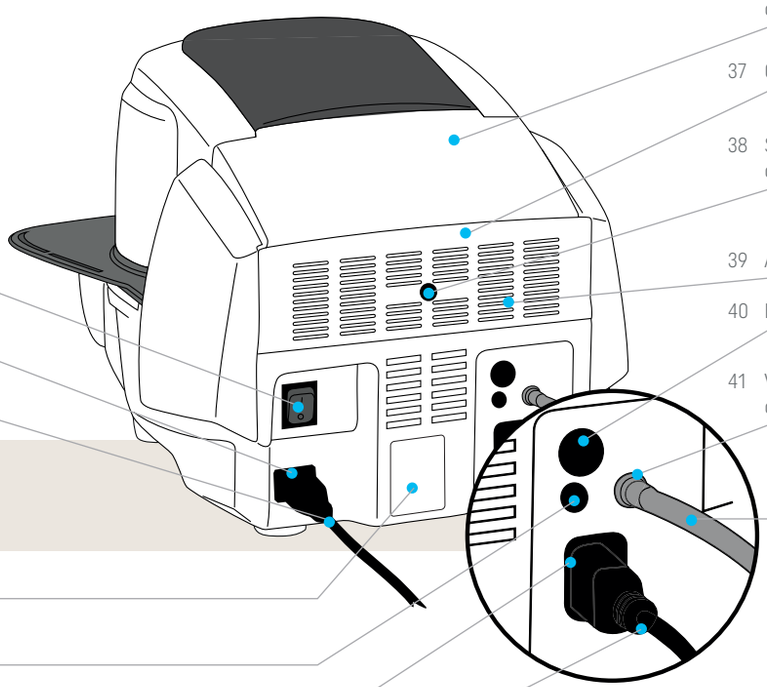
1 Screw for cooling tray
2 Cooling tray
3 Housing base
4 Audio ports (in/out)
5 Speaker
6 Furnace feet
7 Air furnace head
8 Furnace head housing
9 Warnings
10 Touch screen
11 Keypad
12a Optical Status Display (OSD)
12b Progress display



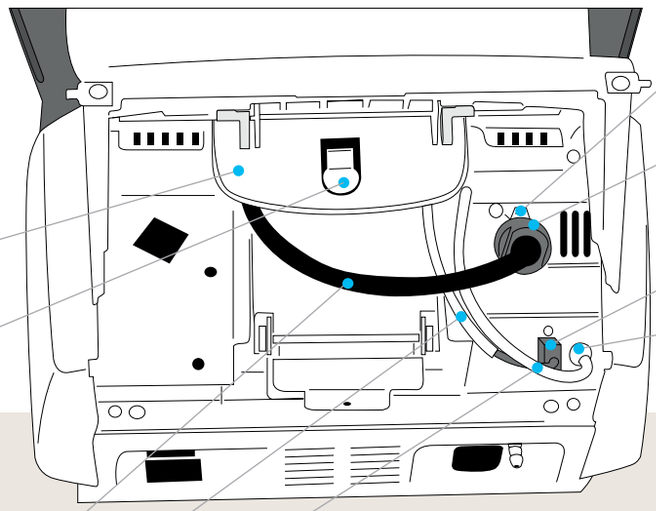
13 Operating unit fixature
14 USB connections
15 Card reader
16 Cover for head opening mechanism
17 Air vents (base)
18 USB connection
19 USB interface
20 Ethernet connection

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43 Furnace head mounting

44 Furnace head release

45 Heater cable

46 Thermocouple cable

47 Furnace head vacuum hose

48 Plug lock

49 Heater plug

50 Heater plug socket

51 Thermocouple plug

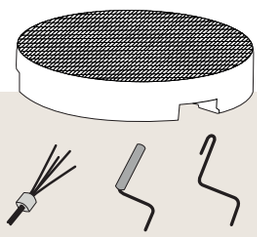
52 Thermocouple plug socket

53 Furnace head vacuum connection

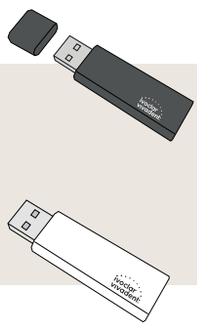
60 LAN download cable



61 Programat Firing Tray Kit 2



62 Programat USB stick



63 Automatic Temperature Checking Set 2 ATK 2 (test set)



64 Programat wireless LAN stick

65 Programat Bluetooth flash drive

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Introduction

Dear Customer

Thank you for having purchased the Programat P710 G2. It is a state-of-the art furnace for dental applications. The furnace has been designed according to the latest industry standards. Inappropriate use may damage the equipment and be harmful to personnel. Please observe the relevant safety instructions and read the Operating Instructions carefully.

Enjoy working with the P710 G2.

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1 Signs and Symbols

1.1 Signs and symbols contained in these Operating Instructions

The signs and symbols in these Operating Instructions facilitate the finding of important points and have the following meanings:

Symbol	Note
	Risks and dangers
	Important information
	Contraindication
	Burn hazard
	Risk of crushing
	The Operating Instructions must be read.

1.2 Notes regarding the Operating Instructions



Furnace concerned: Programat P710 G2
Target group: Dental technologists, dental professionals

These Operating Instructions facilitate the correct, safe and economical use of the furnace. Should you lose the Operating Instructions, extra copies can be ordered at a nominal fee from your local Ivoclar Service Centre or downloaded from **www.ivoclar.com**.

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1.3 Note on the different voltage versions

The furnace is available with different voltage versions:

- 110 – 120 V / 50 – 60 Hz
- 200 – 240 V / 50 – 60 Hz

In the Operating Instructions, the furnace is described in the 200-240 V voltage version. Please note that the voltage range shown on the images (e.g. rating plate) may differ depending on the voltage version of your furnace.

1.4 Notes on the images in the Operating Instructions

All images and illustrations in these Operating Instructions are used for exemplification and the details are not authoritative for the construction of the furnace. They are symbols, which may slightly differ from the original, e.g. due to simplification.

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2 Safety First

This chapter is especially important for individuals who work with the Programat P710 G2 or who have to carry out maintenance or repair work. This chapter must be read and the corresponding instructions followed!

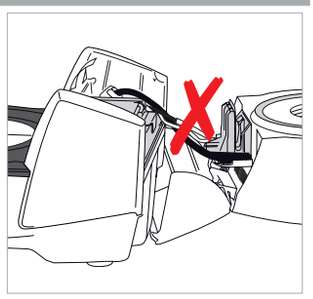
2.1 Indications

The Programat P710 G2 must only be used to fire dental ceramic materials and it should be used for this purpose only. Other uses than the ones stipulated, e.g. cooking of food, firing of other materials, etc., are contraindicated. The manufacturer does not assume any liability for damage resulting from misuse.
The user is solely responsible for any risk resulting from failure to observe these Instructions.

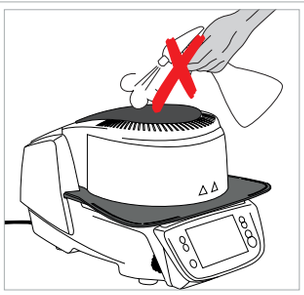
Further instructions to assure proper use of the furnace:
- The instructions, regulations, and notes in these Operating Instructions must be observed.
- The instructions, regulations, and notes in the material's Instructions for Use must be observed.
- The furnace must be operated under the indicated environmental and operating conditions (see Chapter 9.3).
- The Programat P710 G2 must be properly maintained.

Risks and dangers

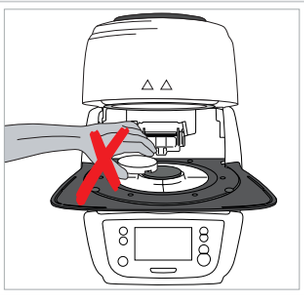
The furnace head must not be removed from the furnace base as long as the furnace head is connected by means of the cables.



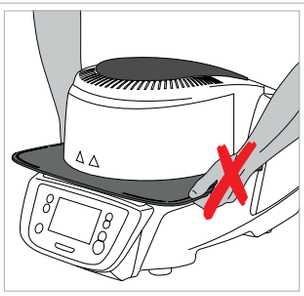
Make sure that no liquids or other foreign substances enter the furnace.



Burn hazard: Never place objects in the firing chamber by hand, since there is a burn hazard. Always use the tongs (accessories) supplied for this purpose. Never touch the hot surface of the furnace head, as there is a burn hazard.

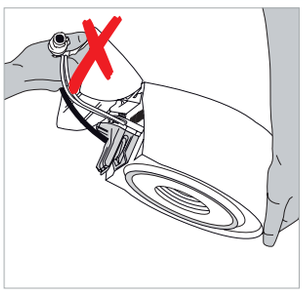


Do not carry the furnace by the cooling tray.



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Do not carry the furnace head by the cables, since the cables and connections may be damaged.



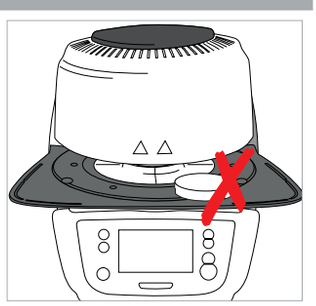
The furnace head has an electric drive and must be operated by means of the electronic controls. Never open the furnace head by hand, since the mechanism will be damaged.



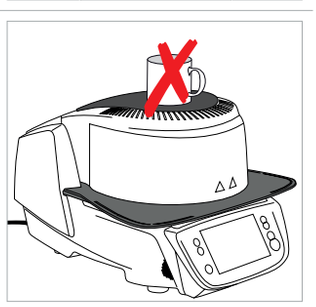
The furnace must not be operated if the quartz tube in the firing chamber or the insulation of the firing chamber is damaged. There is a risk of electric shock upon contact with the heating wire. Avoid damage of the insulation by contact with the investment tongs or firing tongs.

Contraindication

Firing trays must not be placed in the area surrounding the firing plate, since this will obstruct the closing of the furnace head.



Foreign objects must not be placed on the furnace head or the air vents. Make sure that no liquids or other foreign objects enter the air vents, since this may result in an electrical shock.

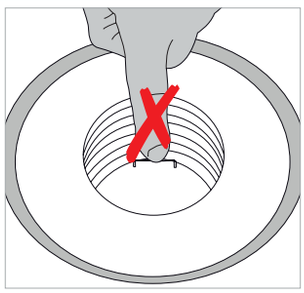


Never use the furnace without a firing table.

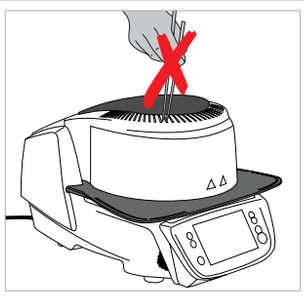


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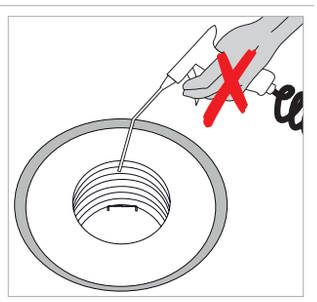
Do not touch the thermocouple and the quartz tube in the firing chamber. Avoid contact with the skin (grease contamination), as the parts may be prematurely damaged.



Do not insert any foreign objects into the air vents. There is a risk of electrical shock!



This product contains ceramic fibres and may release fibre dust. Do not use compressed air, or blow on the furnace thus distributing the dust in the environment and observe the additional notes on page 14.



Risk of crushing / burn hazard

Never reach under the furnace head with the hand or other parts of the body, since there is a risk of crushing and a burn hazard.



Never reach behind the rear cover with the hand or a finger in particular. There is a risk of crushing.



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2.2 Health and safety instructions

This furnace has been designed according to EN 61010-1 and has been shipped from the manufacturer in excellent condition as far as safety regulations are concerned. To maintain this condition and to ensure risk-free operation, the user must observe the notes and warnings contained in these Operating Instructions.

- The user must especially become familiar with the warnings and operating conditions to prevent injury to personnel or damage to materials. The manufacturer is not responsible for damage resulting from misuse or failure to observe the Operating Instructions. Warranty claims cannot be accepted in such cases.
- Before switching on the furnace, make sure that the voltage indicated on the rating plate complies with your local power supply.
- The mains socket must be equipped with a residual current operated device (RCD).
- The power plug acts as a circuit breaker and may only be connected with an easy-to-access power socket with protective contact.
- Use only the power cord originally supplied with the furnace. It must not be replaced by insufficiently rated ones.
- Place the furnace on a fire-proof table. Observe local regulations (e.g. distance to combustible substances or objects, etc.).
- Always keep the air vents at the rear of the furnace free from obstruction.
- Do not touch any parts that become hot during operation of the furnace. Burn hazard!
- When removing hot components from the firing chamber (e.g. firing table, firing tray), make sure to place them on a fire-proof surface.
- Clean the furnace only with a dry, soft cloth. Do not use any solvents! Disconnect power before cleaning and allow the furnace to cool down!
- The furnace must be cool before it is packed for transportation.
- Use original packaging for transportation purposes.
- Before calibration, maintenance, repair or change of parts, the power must be disconnected and the furnace has to be cool if it has to be opened.
- If calibration, maintenance or repair has to be carried out with the power connected and furnace open, only qualified personnel who are familiar with the risks and dangers may perform the procedures.
- After maintenance, the required safety tests (high voltage resistance, protective conductor, etc.) have to be carried out.
- Make sure that only fuses of the indicated type and rated current are used.
- If it is assumed that safe operation is no longer possible, the power must be disconnected to avoid accidental operation. Safe operation is no longer possible
  – if the furnace is visibly damaged.
  – if the furnace does not work.
  – if the furnace has been stored under unfavourable conditions over an extended period of time.
- Use only original spare parts.
- The temperature range for faultless operation is +5°C to + 40°C.
- If the furnace has been stored at very low temperatures or high atmospheric humidity, the head has to be opened and the furnace dried or left to adjust to room temperature for approx. 4 hours (do not connect the power yet).
- The furnace is tested for use at altitudes of up to 2000 m above sea level.
- The furnace may only be used indoors.
- Before leaving the factory, the furnace functions were tested for several hours. It is therefore possible that these tests have caused slight discolouration of the insulation. Nevertheless, your Programat P710 G2 is still a brand new furnace.

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Any disruption of the protective conductor either inside or outside the furnace or any loosening of the protective conductor may lead to danger for the user in case of malfunction. Deliberate interruptions are not tolerated.

Materials developing harmful gases must not be fired!

Warnings regarding the dismounting of the heating muffle
This product contains ceramic fibres and may release fibre dust. Fibre dust has proved to be carcinogenic in animal experiments. The heating muffle may only be dismounted by a qualified After Sales Service Centre.
Information regarding the Safety Data Sheet is also available from your After Sales Service Centre.

Disposal



The furnaces must not be disposed of in the normal domestic waste. Please correctly dispose of old furnaces according to the corresponding EU council directive. Information regarding disposal may also be found on the respective national Ivoclar homepage. The packaging may be discarded with the regular household refuse.

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3 Product Description

3.1 General aspects

The Programat P710 G2 is a modern ceramic furnace for dental applications. The firing chamber may be heated up to max. 1200 °C (2192 °F) by means of a heating element. Furthermore, the firing chamber has been designed in such a way that a vacuum may be created with a vacuum pump. Electronic components with the corresponding software monitor and control the firing programs. Additionally, the set and actual temperatures are continuously compared.

The Programat P710 G2 consists of the following components:
- Furnace base with electronic controls
- Furnace head with firing chamber
- Cooling tray
- Firing table
- Power cord and hose for vacuum pump

3.2 Hazardous areas and safety equipment

Description of the hazardous areas of the furnace:

Hazardous area	Type of risk
Firing chamber	Burn hazard
Opening/closing mechanism	Risk of crushing
Electrical components	Risk of electrical shock

Description of the safety equipment of the furnace:

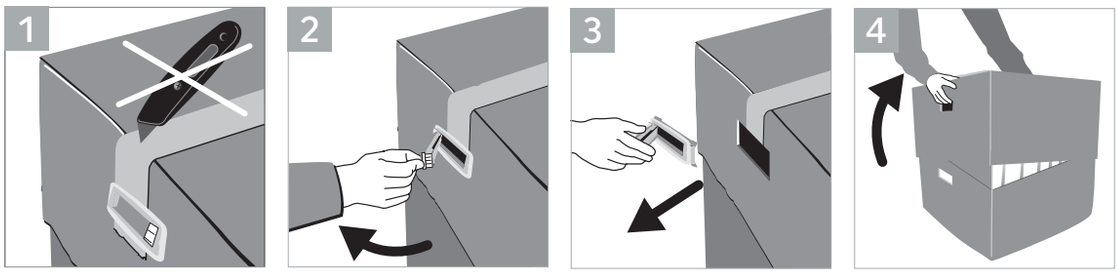
Safety equipment	Protective effect
Protective conductor	Protection from electrical shock
Electrical fuses	Protection from electrical shock
Furnace housing and end caps	Protection from electrical shock, burning and crushing

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4 Installation and Initial Start-Up

4.1 Unpacking and checking the contents

Remove the furnace components from their packaging and place them on a suitable table. Please observe the instructions on the outer packaging.



There are no special transportation grips on the furnace. Support the bottom of the furnace to carry it. Check the delivery for completeness (see delivery form in Chapter 9) and transportation damage. If parts are damaged or missing, contact your local Ivoclar Service Centre.

We recommend keeping the original packaging for future service and transportation purposes.

4.2 Selecting the location

Place the furnace on a flat table using the furnace feet. Make sure that the furnace is not placed in the immediate vicinity of heaters or other sources of heat. Make sure that air may properly circulate between the wall and the furnace. Also ensure that there is enough space between the furnace and the user, as the furnace releases heat during the opening of the furnace head.

The furnace should neither be placed nor operated in areas where there is an explosion hazard.

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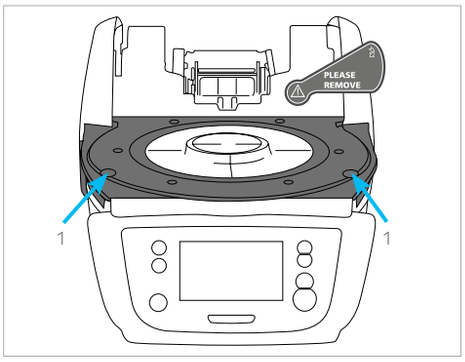
4.3 Assembly

Assembling the furnace is very easy and involves only few steps. Before you start assembling the furnace, make sure that the voltage indicated on the rating plate (32) complies with the local power supply. If this is not the case, the furnace must not be connected.

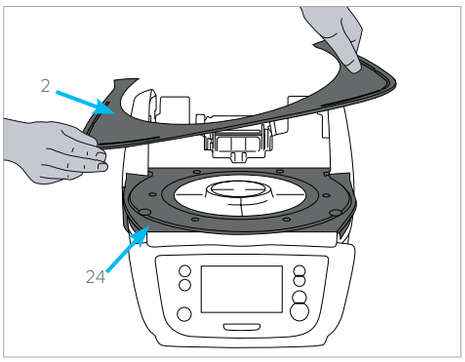
Step 1:

Assembling the cooling tray (2)

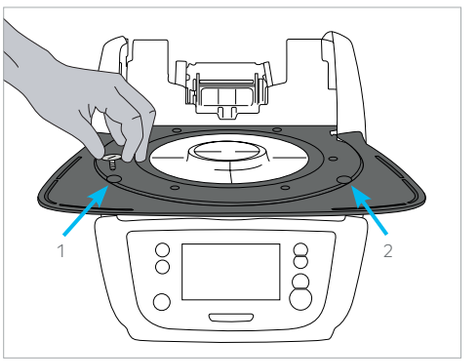
Remove the two fastening screws (1) for the cooling tray and the transport protection of the infrared camera.



Place the cooling tray (2) on the frame plate (24). Make sure that the cooling tray is correctly positioned on the frame plate.



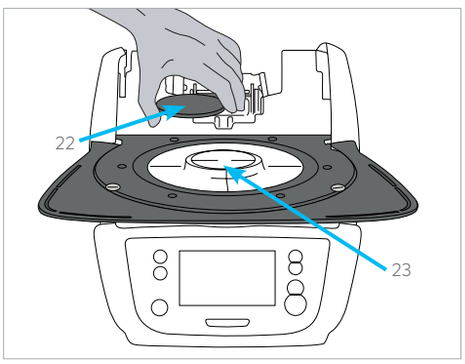
Secure the cooling tray (2) with the two fastening screws (1).



Step 2:

Mounting the firing plate

Place the firing plate (22) on the firing plate holder (23). If placed correctly, the bottom of the firing plate is automatically centered in the firing plate holder.

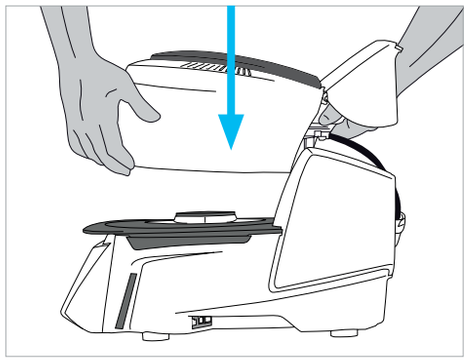


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Step 3:

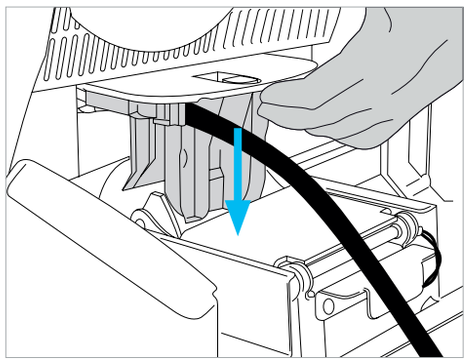
Mounting the furnace head

The complete furnace head is best mounted with the rear panel of the furnace pointing towards the user. Lift the furnace head with both hands (see picture) and carefully position it on the furnace head mounting.





Position the furnace head mounting as shown in the picture until the furnace head audibly snaps into place. Make sure that the firing plate or the insulation is not damaged by mounting the furnace head.

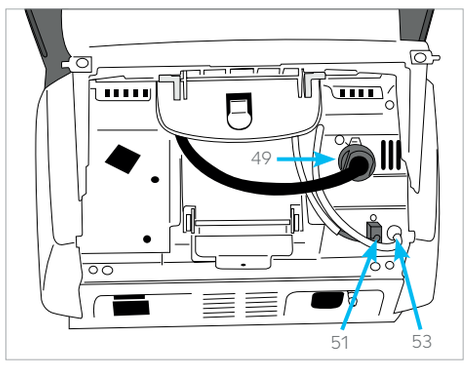


Step 4:

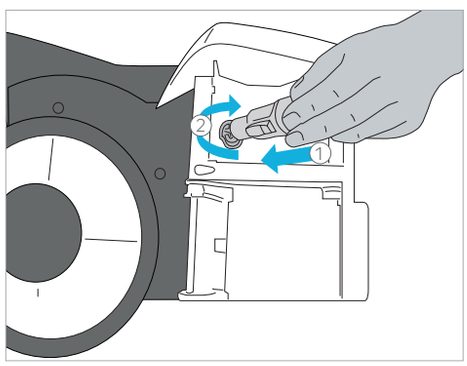
Connections

Connect the cables of the furnace head with the furnace base. Proceed as follows:

- Connect the vacuum hose (53)
- Insert the thermocouple plug (51) (make sure that the polarity of the plug is correct)
- Insert the heater plug (49)



1. Insert the heater plug in the intended socket.
2. Secure the heater plug by rotating it 45° until it snaps into place.

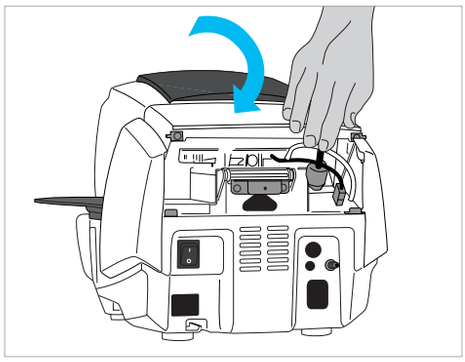


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Step 5:

Hinging on the hood

Once all cables are properly connected to the furnace base, the hood (36) can be hinged over the connections until it snaps into place.

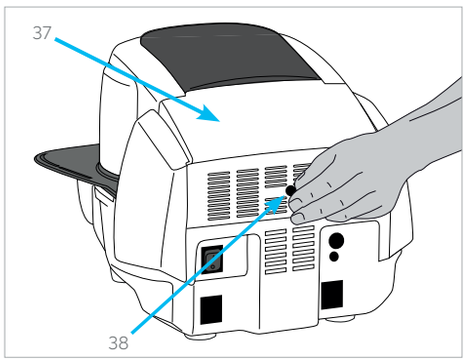


Step 6:

Mounting the connection cover

Mount the connection cover (37) and secure it with the fastening screw (38). When mounting the connection cover, make sure that the catch springs on the sides snap into place.

The furnace may only be operated with the hood and the connection cover mounted.



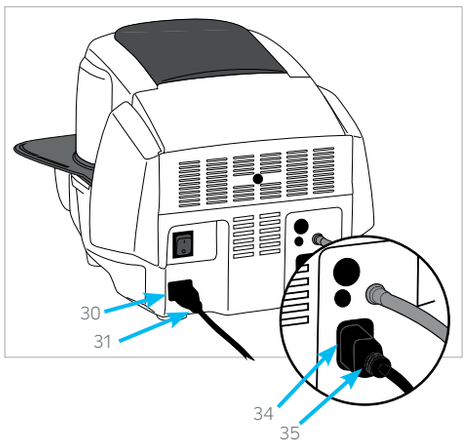
Step 7:

Establishing additional connections

Power connection

Please make sure that the voltage indicated on the rating plate complies with the local power supply. Subsequently, connect the power cord (31) with the power socket of the furnace (30).

The furnace may only be used with the supplied power cord!



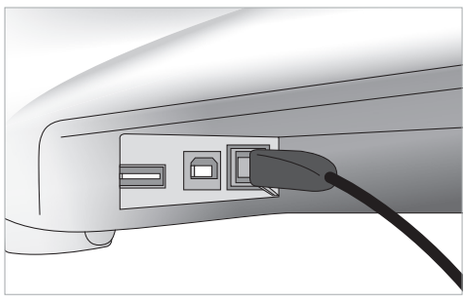
Vacuum pump connection

Connect the vacuum pump plug (35) with the vacuum pump socket (34). We recommend using a vacuum pump from Ivoclar, since these pumps are especially coordinated with the furnace. If other pumps are used, please observe and do not exceed the maximum power consumption.

Do not shorten the vacuum hose! The minimum length of the vacuum hose is 1.6 m.

Creating a LAN connection

In order to use the IoT function, you need a LAN connection to your web-enabled local PC network. Use the LAN network cable included in the delivery for this purpose. Connect one plug to the ethernet port (15) and the other one to the router (RJ45).

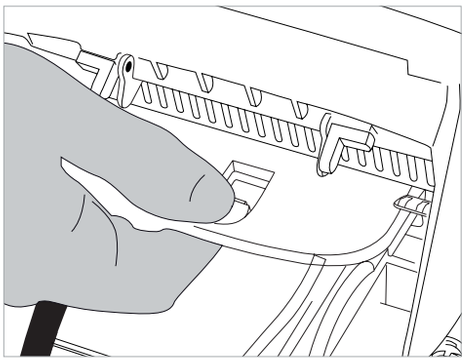


Creating a wireless LAN (WLAN) connection

As an alternative to a LAN connection, a wireless LAN connection can be set up. Please observe the instructions "Setting up a WLAN connection" under "Settings" in the respective Instructions for Use. The wireless LAN network needs to comply with the wireless LAN standard (IEEE 802.11n, b, g in the frequency band 2.4 GHz).

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4.4 Removing the furnace head

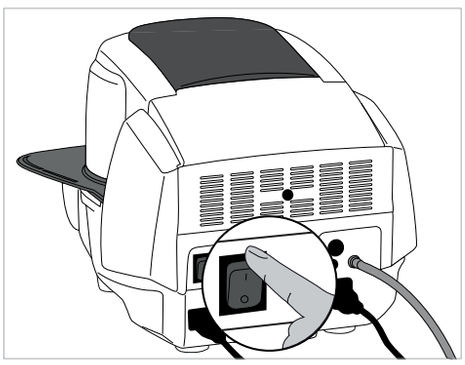


Before the hood and the connection cover are removed, the furnace has to be switched off and the power cord disconnected from the power socket.

1. Loosen and remove the knurled screw (38) of the connection cover (37).
2. Remove connection cover (37).
3. Open the hood (36).
4. Release the heater plug (49) and disconnect it with 45° anti-clockwise rotation.
5. Remove thermocouple plug (51).
6. Disconnect the vacuum hose (53).
7. Press the leaf spring (44) with a finger, lift off the furnace head at the same time and remove it.

Make sure the furnace head has completely cooled down before it is removed (fire hazard).

4.5 Initial start-up



1. Connect the power cord with the wall socket.
2. Put the On/Off switch (29) at the rear of the furnace on position I.

4.5.1 Start screen with QR code for video tutorials



The QR code on the splash screen can be scanned with a mobile device (e.g. a smartphone). This will take you directly to the Programat Video Tutorials homepage, where you can watch videos on different topics.

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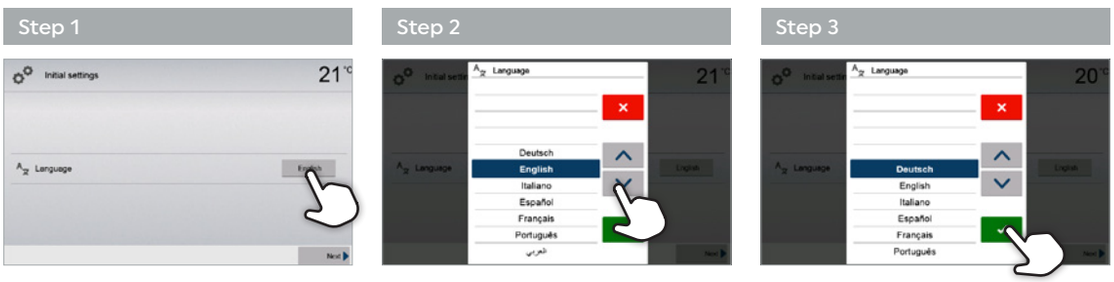
4.5.2 Basic settings upon initial start-up

Upon the initial start-up of the new furnace, a number of basic settings are required. These settings will be stored and will not appear anymore upon the following starting procedure.

Step 1:

Select the language.

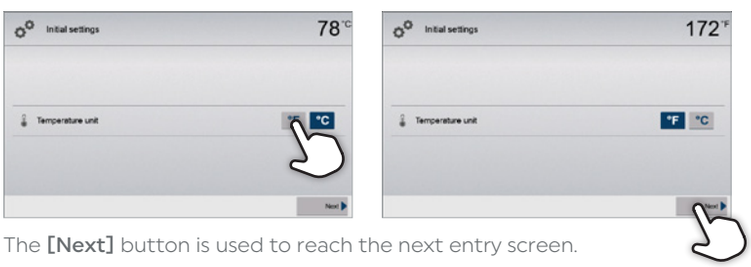
The first setting is the language selections. The touch buttons (display keys) can be operated by tapping the display.



Select the desired language using the **[Arrow up / down]** buttons. Confirm the entry with the green button. The **[Next]** button is used to reach the next entry screen.

Step 2:

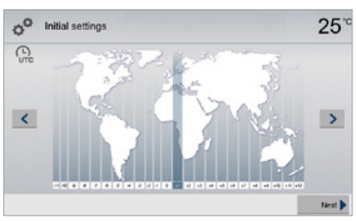
Select the desired temperature unit.



The **[Next]** button is used to reach the next entry screen.

Step 3:

Set the time zone (UTC).



The time zone can be changed by pressing the **[Left]** and **[Right]** buttons. Use the **[Next]** button to confirm the selection and reach the next entry screen.

Step 4:

Set the time (hours, minutes, seconds).



Confirm the entry with the green button. The **[Next]** button is used to reach the next entry screen.

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Step 5:

Select the date format.



Confirm the entry with the green button. The **[Next]** button is used to reach the next entry screen.

Step 6:

Set the date (day, month, year).

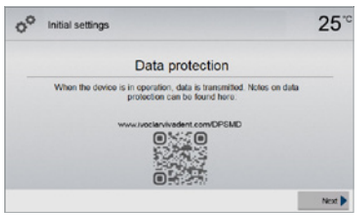


Confirm the entry with the green button. The **[Next]** button is used to reach the next entry screen.

Step 7:

Confirm the privacy policy

More information about the privacy policy can be found at http://www.ivoclar.com/digitalservices

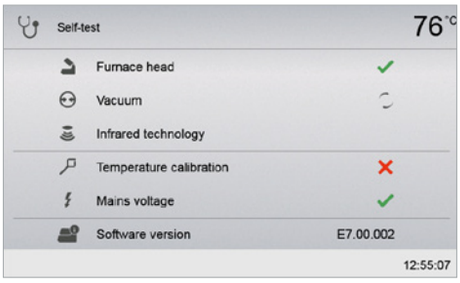


The **[Next]** button is used to reach the next entry screen.

The initial start-up and entry of the basic settings are now complete. The furnace will now automatically conduct a self-test.

4.5.3 Start screen and self-test

Immediately after switching on, the display briefly shows the start screen. Subsequently, the furnace conducts an automatic self-test. The performance of all furnace components is automatically checked.



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The following functions are checked:

Function		
Furnace head test		The furnace head test is in progress.
	✓	The furnace head test was successful.
	✗	The furnace head test failed. Please note the error message on the display.
Vacuum test		The vacuum test is in progress.
	✓	The vacuum test was successful.
	✗	The vacuum test failed. Please note the error message on the display.
IRT test		The IRT test is in progress.
	✓	The IRT test was successful.
	✗	The IRT test failed. Please note the error message on the display.

The following information is displayed:

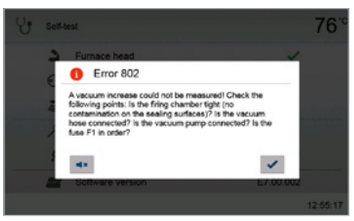
Information		
Temperature calibration	✓	Temperature calibration of the furnace is not required.
	✗	Some time has passed since the last calibration. Please conduct a calibration procedure.
Power supply	✓	The power supply voltage is in the acceptable range.
	✗	The power supply is outside the acceptable range.
Software version		The currently installed software version is displayed.

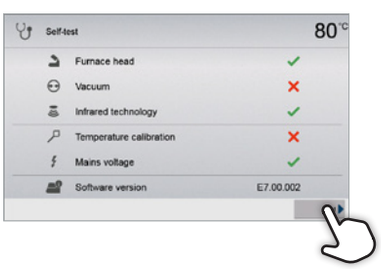
If the self-test has been successful, the furnace will automatically display the screen to select the desired operating mode (firing / pressing).

If the program recognizes a malfunction during the test, a corresponding error message with the corresponding rectification information appears on the display.

The acoustic signal and the error message can be acknowledged with the corresponding buttons.

Press the **[Next]** button to confirm the self-test.





Before the first firing, the firing chamber should be dehumidified using the dehumidification program (see Chapter 5.4 for details).

Please note that the furnace may require a certain acclimation time after having been set-up. Particularly if the furnace was exposed to considerable temperature changes (water condensation).

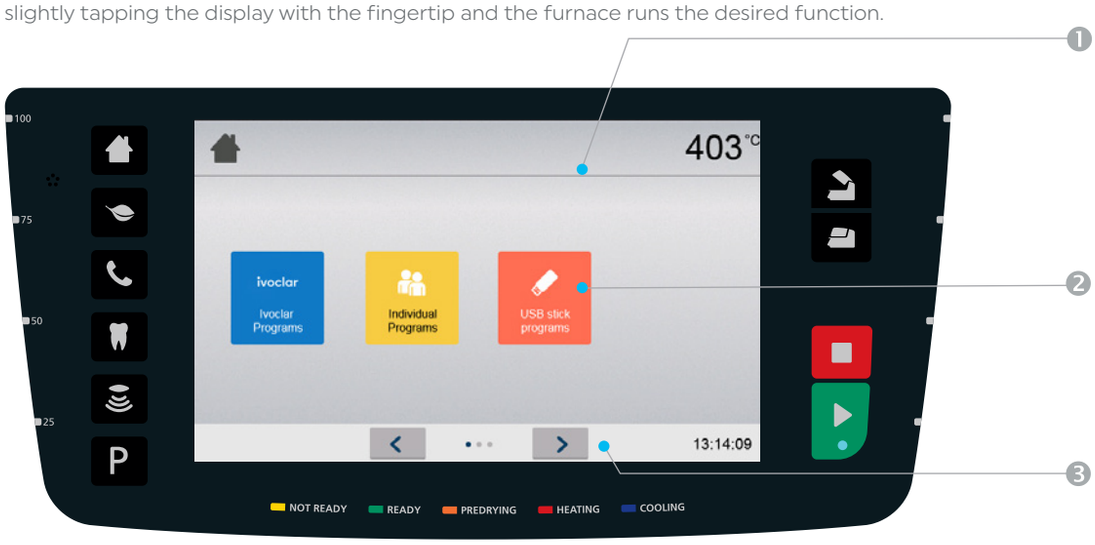
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5 Operation and Configuration

5.1 Introduction to the operation

5.1.1 Control unit

The Programat P710 G2 is equipped with a widescreen colour display. The furnace can be intuitively operated by means of the membrane-sealed keypad and the touch screen. The touch buttons can be actuated by slightly tapping the display with the fingertip and the furnace runs the desired function.



The user interface in the display is divided into three sections:

1. **Information bar** (e.g. indication of the current furnace temperature, the selected program, etc.)
2. **Main screen** (e.g. editing firing programs, changing the settings, etc.)
3. **Navigation bar** (e.g. scrolling, scrolling in higher levels, calling up favourite programs, etc.)

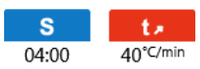
5.1.2 Explanation of key functions

Key	Function
	**Home** Switch to home screen (main menu)
	**Program key** Press once: Display of the currently selected program Press twice: Switch to the program selection via numbers
	**IRT key** With this key, the infrared image of the object can be displayed during the closing process.
	**Power-saving key** Power-saving function activated (only possible with the furnace head closed and the furnace on idle). The display shows the power-saving icon. Pressing any key ends the power-saving function.
	**Phone key** – If the furnace is not yet connected to a mobile phone, pressing this key results in the Bluetooth settings being displayed. – If the furnace is already connected to a mobile phone, pressing this key results in the mobile phone menu being displayed. – During an active phone call, this key can be used to fade the mobile phone screen in or out.
	**Digital Shade Assistent key** The Digital Shade Assistant (DSA) can be started and ended with this key.

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	**Open furnace head** **Quick cooling with the furnace head open:** If the furnace head is completely open and the Open furnace head key is pressed again, the quick cooling function is activated, e.g. the vacuum pump is switched on for 5 minutes. This function can be stopped at any time by pressing STOP, Close furnace head or START. This function can be activated any time when the furnace head is open.
	**Close furnace head**
	**STOP** A program in progress can be paused by pressing the STOP key and stopped by pressing STOP twice. Movement of the furnace head can be stopped at any time by pressing STOP. The acoustic signal can be confirmed by pressing the STOP key.
	**START (Start LED)** Starts the selected program. The green LED indicates that a program is active. If the program is paused (1x STOP), the Start LED flashes until renewed pressing of START results in the program being resumed.

5.1.3 Description of the most important touch buttons

Button	Function
	**Scroll left / Scroll right** With these buttons, for example, you can scroll to page 2 of the home screen.
	**Back with note** With this button, you can change to the "next higher" menu level. The button indicates to which screen you change, e.g. to the home screen.
	**Close** With this button, you can close sub-menus.
	**Confirm your entries** This button is used to confirm an entry. If the button appears pale green, no entry has been made yet or the value entered is not in the acceptable range.
	**Cancel entry** The entry can be cancelled with this button; changed values are not saved.
	**Program parameter button** Pressing these buttons allows you to change program parameters. A selection list or numeric pad for entering the values appears. The upper half of the button itself shows the parameter in question (e.g. closing time), while the lower half shows the entered value (e.g. 00:18).
	**On/Off button** This button is used to switch functions on or off.
	**Parameter button** Pressing these buttons results in a selection list or numeric pad for entering the values to appear.

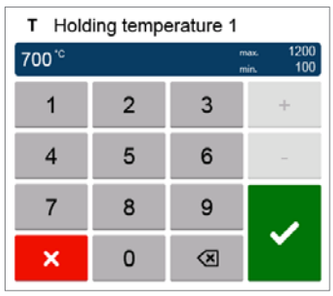
5.1.4 Description of the numeric pad and selection list

- Numeric pad

  The numeric pad enables the entering and changing of parameters, e.g. in firing programs or set-up menus. Additionally, the currently set value is indicated, as well as the minimum and maximum values.

  An entry must be confirmed with the green button. As soon as the entry has been confirmed, the numeric pad is closed. If the button appears pale green, the value entered is not within the acceptable range.

  The numeric pad can be closed with the red button, without any parameters being changed.



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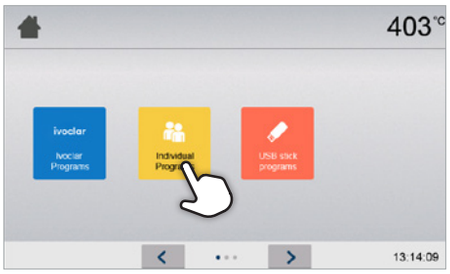
– **Selection list**
  In the selection list, the desired parameter can be selected by using the up/down arrows. An entry must be confirmed with the green button.
  After that, the selection list is closed.
  The selection list can be closed with the red button, without any parameters being changed.



5.1.5 Description of the home screen

After the furnace is switched on, the display shows the home screen. All functions of the Programat can be selected from this screen. With the HOME key, you can change to the home screen.

By pressing a selection button, you will reach the corresponding menu (e.g. firing programs, settings, calibration, etc.).



The next page of the home screen can be accessed with the arrow button, where additional functions are available.
The circles between the arrows indicate the number of pages.
The current page is marked with a light dot.



5.1.6 Description of the speaker sounds

– **Upon closing the furnace head below 100 °C**

There is a risk of crushing upon closing the furnace head. Upon closing below 100 °C, the user is alerted to the hazard by an acoustic signal.

– **After the self-test is completed**
  To inform the user that an automatic self-test has been successfully completed, a preset, non-changeable melody is played.

– **Furnace head open and temperature below 560°C**
  To inform the user that the temperature in the open furnace head has dropped below 560°C, the selected melody is played (5 seconds). In other words, the furnace head is basically cool enough for the next program start. The signal transmitter can only be ended with the STOP key.

– **Furnace head open and temperature below 360°C**
  To inform the user that the temperature in the open furnace head has dropped below 360°C, the selected melody is played. If the first playback (10 seconds) is not acknowledged with the STOP key, a second playback sounds after 5 minutes (for 5 minutes) to signal that the furnace head is cooling down. After that, no further signal is played. If one of the two playbacks is acknowledged with the STOP key, the signal transmitter is switched off and no further signals will be sounded.

– **For error messages**
  Error messages are acoustically supported with the "error melody" (endless beep). The signal transmitter may be switched off with the STOP key, while the error message still remains visible. If the error message is acknowledged with the corresponding button, the signal transmitter is also switched off.

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5.1.7 Optical status and progress display (OSD)

The Optical Status Display (OSD) (12) shows the most important statuses of the furnace. The following activities are indicated:

Shade	Activity
Yellow	The furnace is performing the self-test or is not ready for use, as the recommended temperature range for a program start has not yet been reached.
Yellow (flashing)	Information, note or error message
Green	The furnace is ready for use; the currently selected program can be started.
Orange	Program is closing the furnace head or is in predrying mode
Red	Program is heating up or is in holding time mode
Blue	Program is in long-term cooling or is opening the furnace head

Progress display:
During an active process, the progress of the program is also shown by the OSD. This is done by stage-to-stage lighting up of the lateral OSD (12b).

5.1.8 User code

For safety reasons, a user code is required for certain settings. The user code ex factory is as follows:

1234

The user code can be individually changed. See Chapter 5.4.1 Settings for details.

5.2 Firing programs and programming options

5.2.1 Program structure

The furnace offers several types of programs:

a. **Programs for Ivoclar materials**
b. **700 free, individually adjustable programs**
b. **700 free, individually adjustable programs on a USB stick**

The program types are subdivided into program groups. Each program group consists of 20 programs.

All programs are equivalent and therefore full-fledged programs. For each program, all the parameters can be adjusted.

a) Programs for Ivoclar materials (see enclosed Program Table)
When the furnace is delivered ex works, the Ivoclar programs already contain the recommended material parameter settings and are write-protected. Consequently, it is not possible to accidentally overwrite the programs.

However, the parameters can be changed and overwritten at any time, if required, if the programs are to be used for other purposes. Therefore, these programs are also available as individual programs.

In case of software updates, individually changed parameters in Ivoclar programs might be reset to the factory settings or changed!

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b) Free, individually adjustable programs
The programs are designed in such a way that they can be either used as conventional one-stage programs, as two-stage programs or, if required, as three-stage programs. The programs and program groups can be individually named.

In case of software updates, individually changed parameters in individual programs are NOT reset to the factory settings or changed!

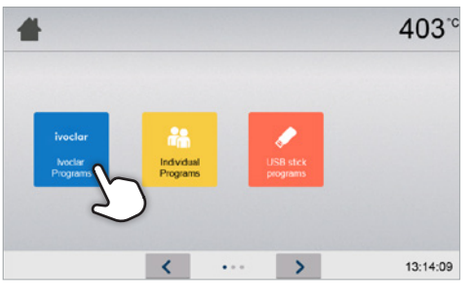
c) Free, individually adjustable programs on a USB stick
In a first step, a USB stick must be prepared as program memory (see Chapter 5.4). The programs are designed in such a way that the can be either used as conventional one-stage programs, as two-stage programs or, if required, as three-stage programs. The programs and program groups can be individually named.

In case of software updates, individually changed parameters in individual programs are NOT reset to the factory settings or changed!

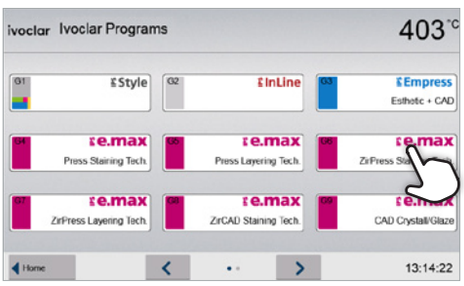
5.2.2 Program selection

The program selection requires only few steps:

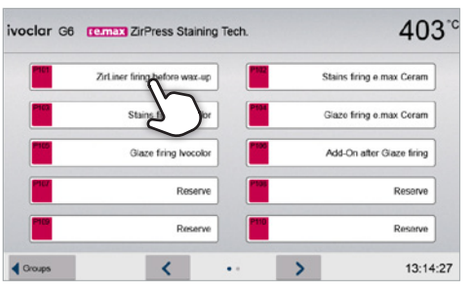
1. **Select program type.**



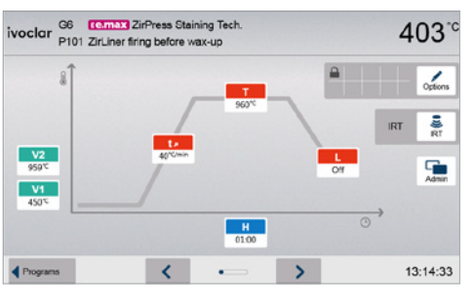
2. **Select program group**



3. **Select the program**



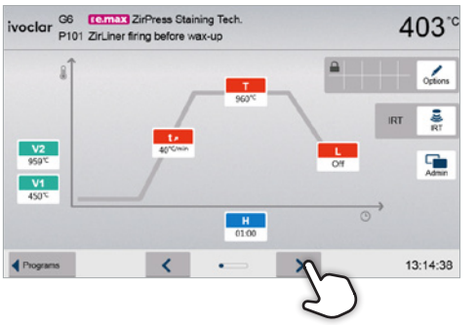
4. **Start program or edit program parameters**
The firing program can now be started or, as an alternative, the program parameters can be changed.



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Quick program selection
Pressing the P key switches to the program screen of the current program. When the program screen is shown, pressing the P key again switches to the quick program selection by means of number entry.

Browsing the programs
If a program has been selected, the neighbouring programs can be accessed by pressing the arrow buttons.



5.2.3 Program screen / Editing programs

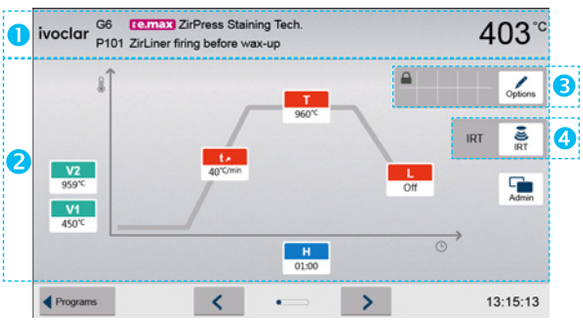
If a program has been selected, the program screen is displayed. The firing programs can be changed or edited in this screen.

For Ivoclar programs, the write-protection must be deactivated first, before any parameters can be changed.

The following information is displayed:

1. **Information line**
- Program designation
- Current furnace temperature

2. **Firing curve**
- Closing time, holding time
- Temperature increase, holding temperature, long-term cooling
- Vacuum on, vacuum off



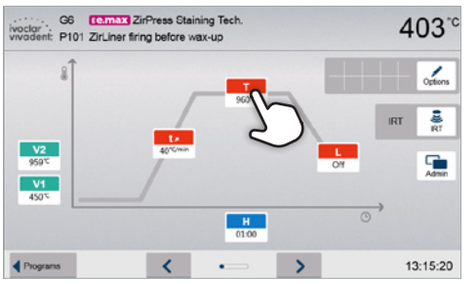
3. **Program options**
In addition to the parameters shown in the firing curve, several other options are available that can be activated by pressing the **[Options]** button. The icons in the grid show the activated options.

4. **IRT options**
There are different operating modes available for the Program infrared technology, which can be selected using the **[IRT]** button. The icon in the grid shows the activated IRT operating mode.

Editing parameters
Parameters are entered or edited in two steps.

Example: Setting the holding temperature

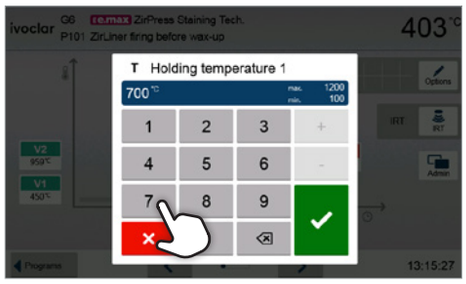
1. **Press the [T] button.**



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2. **Enter the desired holding temperature and confirm with the green button.**

The holding temperature has been successfully changed. All other parameters shown in the firing curve can be changed / edited in the same way.

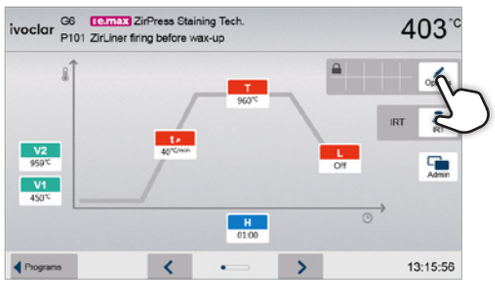


Changing program options

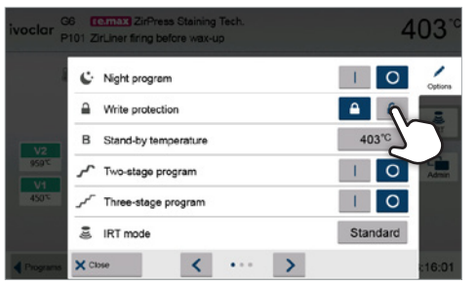
Pressing the **[Options]** button opens the menu for advanced program options:

Example 1: Deactivating the write-protection

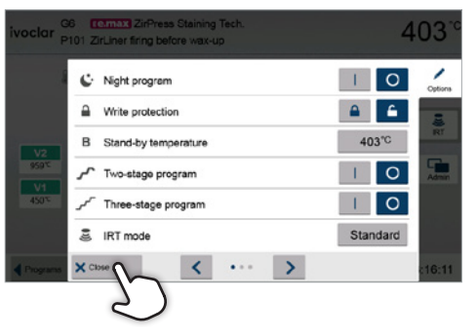
1. **Press the [Options] button.**



2. **Press the [Deactivate write-protection] button.**

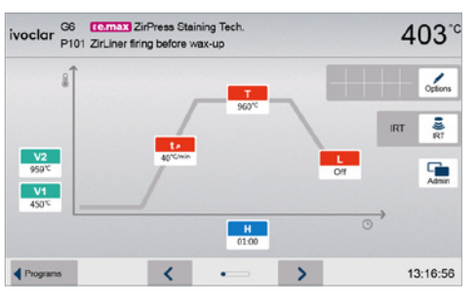


3. **Press the [Close] button to leave the Options menu.**



4. **The write-protection was successfully deactivated.**

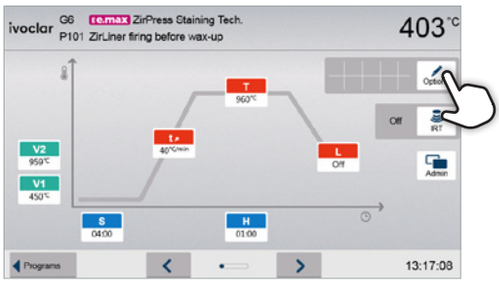
The lock symbol is no longer shown in the display next to the **[Options]** button.



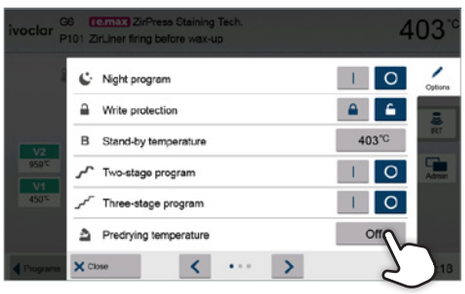
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Example 2: Changing the predrying temperature

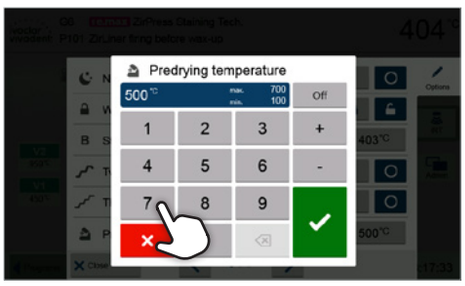
1. **Press the [Options] button.**



2. **Press the [Pre-drying temperature] button.**

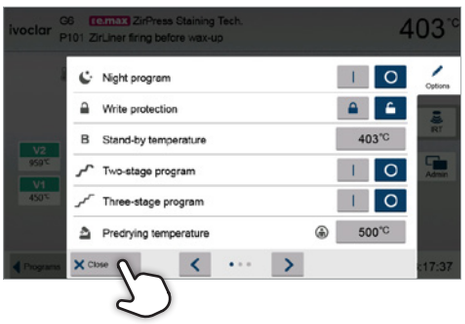


3. **Enter the desired predrying temperature and confirm with the green button.**



4. **The predrying temperature was successfully changed.**
Press the **[Close]** button to leave the Options menu.

The program screen now shows the symbol "pre-drying active" next to the **[Options]** button.

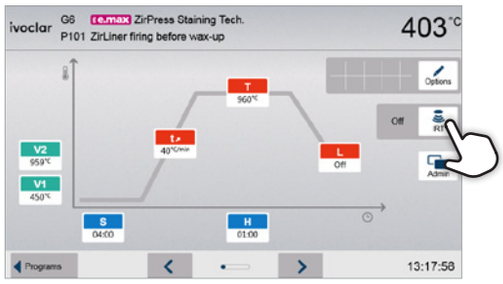


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Selecting the IRT operating mode

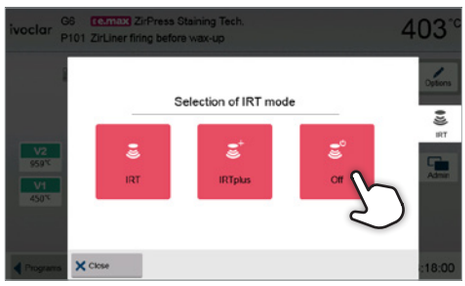
The menu to select the IRT operating mode is opened by pressing the **[IRT]** button.

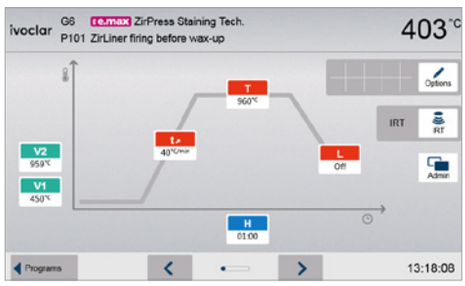
1. **Press the [IRT] button.**



2. **Select the desired IRT operating mode.**

The menu window is automatically closed once the desired operating mode has been selected. The program screen now shows the selected IRT operating mode next to the **[IRT]** button.



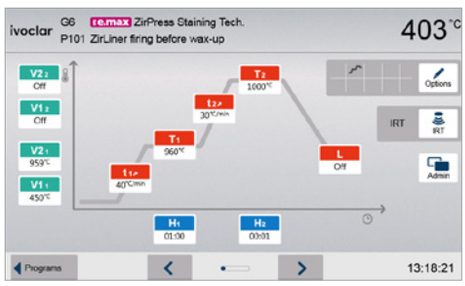


Two-stage programs

A two-stage program permits firing procedures on two temperature levels with different parameters (e.g. Holding time Stage 1, Holding time Stage 2) to be conducted.

The function "Two-stage program" can be selected in the Options menu.

The program screen now shows the symbol "Two-stage program" next to the **[Options]** button and the firing curve for the parameter entry is indicated in two stages.

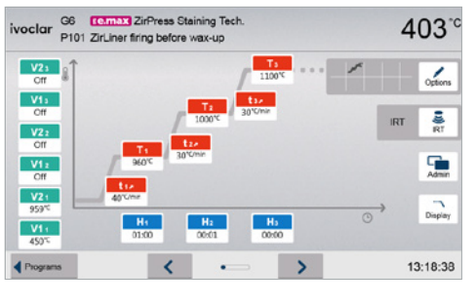


Three-stage programs

A three-stage program permits firing procedures on three temperature levels with different parameters (e.g. Holding time Stage 1, Holding time Stage 2, Holding time Stage 3) to be conducted.

The function "Three-stage program" can be selected in the Options menu.

The program screen now shows the symbol "Three-stage program" next to the **[Options]** button and the firing curve for the parameter entry is indicated in three stages.



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Two-stage cooling

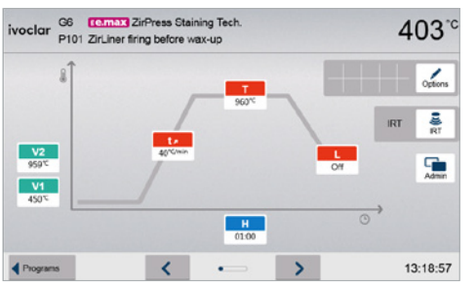
In addition to the three possible heating stages, up to two long-term cooling stages are available. For one- and two-stage programs, the configuration of the first long-term cooling results in the following cooling parameters to be shown:

- Cooling rate
- Long-term cooling holding time
- 2nd long-term cooling

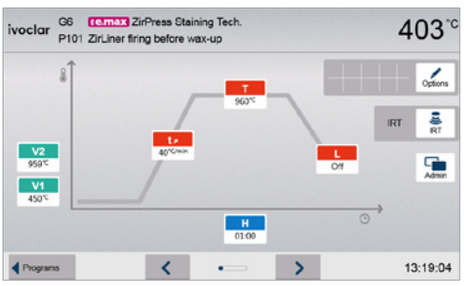
If the 2nd long-term cooling has been activated, switching back and forth between the parameters for the heating stages and the cooling stages is possible in the program screen. The screen now shows the symbol "two-stage cooling" next to the **[Options]** button.

Example: Toggling between heating stage and long-term cooling:

The program screen shows the parameters of the first temperature level (S, H1, etc.).

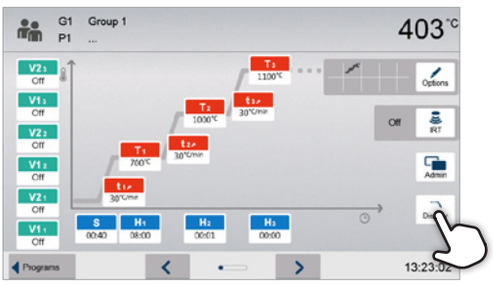


When the first long-term cooling stage is activated, the second long-term cooling state is displayed.



Once the parameters for the second long-term cooling state have been entered, the heating and cooling stages are divided into two different program screens.

You can toggle between the screens by pressing the **[Screen]** button.



After setting the temperature for long-term cooling Stage 2, the symbol for "two-stage cooling" is shown next to the **[Options]** button.

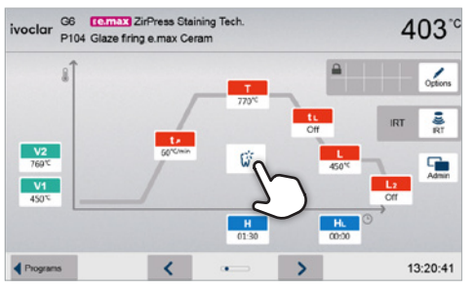
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Gloss function

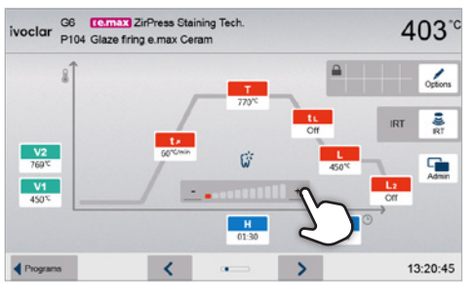
In addition to the usual program parameters, the Ivoclar Gloss programs feature a gloss function. This function can be activated by means of the **[Gloss Level]** button. After the function has been activated, the gloss of the restoration can be gradually increased (ten gloss levels). This prolongs the holding time of the corresponding firing step. The temperature remains unchanged by this setting. The gloss level is reset after every firing cycle or program change.

Proceed as follows to set the gloss level:

1. **Press the [Gloss Level] button**
   A gloss level chart opens. The red bar indicates the selected gloss level. If the red bar is on the far left (basic setting), no level has been selected and the gloss function is not yet active.



2. **Press the [Plus] button to increase the gloss of the restoration**



Automatic plausibility check of the parameters

The furnace is equipped with an automatic plausibility check function. The parameters are checked upon each program start. In case of contradictory parameter combinations, the program stops automatically and the respective note is shown.

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5.2.4 Adjustable parameters in the program screen

S	**S – Closing time** The closing time controls the duration of the furnace head closing process. *Value range: 00:18–30:00 (mm:ss)*
t ↗	**t – Temperature increase rate** (for two-stage programs: t_1) The temperature increase rate defines by how many degrees per minute the furnace heats up. *Value range °C: 10 – 140 °C/min; Value range °F: 18 – 252 °F/min*
T	**T – Holding temperature** (for two-stage programs: T_1) The holding temperature defines the temperature at which a firing process is conducted. *Value range °C: 100 – 1200 °C; Value range °F: 212 – 2192 °F*
H	**H – Holding time** (for two-stage programs: H_1) The holding time indicates how long an object is fired at the holding temperature. *Value range: 00:00 – 60:00 (mm:ss)*
V1	**Vacuum on** (for two-stage programs: $V1_1$) The parameter defines the temperature at which the vacuum is activated. *Value range °C: OFF or 1 – 1200 °C; Value range °F: 0 or 34 – 2192 °F*
V2	**Vacuum off** (for two-stage programs: $V2_1$) The parameter defines the temperature at which the vacuum is deactivated. • **Holding time without vacuum**: If V2 is set one degree lower than the holding temperature, the vacuum is ended before the holding time. • **Holding time with vacuum**: If V2 corresponds to the holding temperature, the vacuum is maintained during the entire holding time. • **Long-term cooling with vacuum**: If V2 is set one degree higher than the holding temperature, the vacuum is maintained during long-term cooling. *Value range °C: OFF or 1 – 1200 °C; Value range °F: 0 or 34 – 2192 °F*
L	**Long-term cooling** If long-term cooling is activated, the furnace cools to the set temperature (L) at the end of the holding time with the furnace head closed. *Value range °C: OFF or 50 – 1200 °C; Value range °F: 0 or 122 – 2192 °F*
t_L	**Cooling rate** Can only be set if long-term cooling "L" is activated. The cooling rate defines by how many degrees per minute the furnace cools down. *Value range °C: Off or 1 – 50 °C/min; Value range °F: Off or 2 – 90 °F*
t_2 ↗	**t2 – Temperature increase rate Stage 2** This parameter defines for the second temperature level by how many degrees per minute the furnace heats up. *Value range °C: 10 – 140 °C/min; Value range °F: 18 – 252 °F/min*
T_2	**T2 – Holding temperature Stage 2** The holding temperature for the second temperature level defines the temperature at which a firing process is conducted. *Value range °C: 100 – 1200 °C; Value range °F: 212 – 2192 °F*
H_2	**H2 – Holding time Stage 2** The holding time for the second temperature level indicates how long an object is fired at the holding temperature. *Value range: 00:00 – 60:00 (mm:ss)*
$V1_2$	**Vacuum on Stage 2** The parameter defines the temperature at which the vacuum for the second temperature level is activated. *Value range °C: Off or 1 – 1200 °C; Value range °F: 0 or 34 – 2192 °F*
$V2_2$	**Vacuum off Stage 2** The parameter defines the temperature at which the vacuum for the second temperature level is deactivated. If $V2_2$ corresponds to the holding temperature, the vacuum is maintained during the entire holding time. *Value range °C: Off or 1 – 1200 °C; Value range °F: 0 or 34 – 2192 °F*

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t 3	**T3 – Temperature increase rate Stage 3** This parameter defines for the third temperature level by how many degrees per minute the furnace heats up. *Value range °C: 10 – 140 °C/min; Value range °F: 18 – 252 °F/min*
T 3	**T3 – Holding temperature Stage 3** The holding temperature for the third temperature level defines the temperature at which a firing process is conducted. *Value range °C: 100 – 1200 °C; Value range °F: 212 – 2192 °F*
H 3	**H3 – Holding time Stage 3** The holding time for the third temperature level indicates how long an object is fired at the holding temperature. *Value range: 00:00 – 60:00 (mm:ss)*
V1 3	**Vacuum on Stage 3** The parameter defines the temperature at which the vacuum for the third temperature level is activated. *Value range °C: Off or 1 – 1200 °C; Value range °F: 0 or 34 – 2192 °F*
V2 3	**Vacuum off Stage 3** The parameter defines the temperature at which the vacuum for the third temperature level is deactivated. If $V2_3$ corresponds to the holding temperature, the vacuum is maintained during the entire holding time. *Value range °C: Off or 1 – 1200 °C; Value range °F: 0 or 34 – 2192 °F*
H L	**HL – Holding time long-term cooling** The holding time for the first cooling stage indicates how long an object is fired at the long-term cooling temperature. *Value range: 00:00 – 60:00 (mm:ss)*
L 2	**Long-term cooling** If long-term cooling Stage 2 is activated, the furnace cools to the set temperature (L2) at the end of the holding time with the furnace head closed. *Value range °C: Off or 50 – 1200 °C; Value range °F: 0 or 122 – 2192 °F*
t 2 L	**Cooling rate 2** This parameter defines by how many degrees per minute the temperature for the long-term cooling Stage 2 has to be decreased. *Value range °C: 1 – 50 °C/min; Value range °F: 2 – 90 °F/min*
H 2L	**H2L – Holding time long-term cooling** The holding time for the second cooling stage indicates how long an object is fired at the long-term cooling temperature Stage 2. *Value range: 00:00 – 60:00 (mm:ss)*

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5.2.5 Adjustable parameters in the Options menu

In addition to the parameters shown in the firing curve, several other options are available that can be activated by pressing the **[Options]** button (see Chapter 5.2.3). Active options are shown in the grid next to the **[Options]** button.

The following firing program options are available:



Night program
If this function is active, the furnace head remains open after the firing process, the heater is switched off and the green START LED flashes. No acoustic signals are sounded. Once the temperature drops below 100 °C, the furnace head closes, the heater remains switched off and the furnace cools down to room temperature.

Advantages of the night function:
After a power failure, the night program is always resumed. The program is resumed at the position at which the power failure occurred. After a longer power failure, the furnace head does not heat up to stand-by temperature and the object is protected at room temperature with the furnace head closed.

If the night program function is switched on, it is active only for the next program cycle.

Setting option: On/Off



Program write-protection
If the program write-protection is activated the program parameters and program options cannot be changed. This is to prevent accidental changes to the program.

Setting option: On/Off

B

Stand-by temperature
The stand-by temperature is the temperature to which the furnace heats up immediately after switching on. The temperature is maintained with the furnace head closed and when no firing process is active.

Programat furnaces are programmed to a stand-by temperature of 403 °C / 757 °F in the factory. The temperature can be individually set for each program.

Value range °C: 100 – 700 °C; Value range °F: 212 – 1292 °F



Two-stage programs
If this function is activated, the selected program can be programmed on two temperature levels.

Setting option: On/Off



Three-stage programs
If this function is activated, the selected program can be programmed on three temperature levels.

Setting option: On/Off



IRT mode (only available if Infrared Technology "ON")
If the IRT system is active, three different IRT modes can be selected.

- Standard: suitable for all conventional firing cycles (e.g. layering, opaquer, wash, gloss, glaze, characterization firing, etc.) using the Programat firing tray.
- Crystallization: exclusively suitable for crystallization firing cycles (e.g. IPS e.max CAD Crystallization) using the IPS e.max CAD Crystallization Tray.
- Fusion: exclusively suitable for fusion firing cycles (e.g. IPS e.max CAD Fusion/Crystallization CAD-on) using the IPS e.max CAD Crystallization Tray.

If IRT is activated, the option "Standard" is used as the default setting.

Setting option: Standard, crystallization, fusion

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Predrying temperature Stage 1 (only available if Infrared Technology "OFF")
In a program with activated predrying in Stage 1, the desired "predrying temperature" is set (heating or cooling) after the start with the furnace head open. Once this temperature is reached, predrying is conducted during the "predrying holding time". Once this time has elapsed, the furnace closes within the desired closing time.

The predrying temperature for Stage 1 can be set as follows:

Value range °C: Off or 100 – 700 °C; Value range °F: Off or 212 – 1292 °F



Predrying holding time Stage 1 (only available if Infrared Technology "OFF")
This parameter defines the duration of the predrying process for Stage 1 once the desired predrying temperature has been reached.

Value range Off or 00:00 – 60:00 (mm:ss)



Predrying temperature Stage 2 (only available if Infrared Technology "OFF")
Pre-drying for Stage 2 is only available if Stage 1 has also been activated. The parameters are set in the same way. At this stage, the furnace head is half open.

Value range °C: Off or 100 – 700 °C; Value range °F: Off or 212 – 1292 °F



Pre-drying holding time Stage 2 (only available if Infrared Technology "OFF")
This parameter defines the duration of the predrying process for Stage 1 once the desired predrying temperature has been reached.

Value range Off or 00:00 – 60:00 (mm:ss)

TSP

Thermo Shock Protection (TSP) (only available if Infrared Technology "OFF")
The TSP function protects the dental-lab work during the closing process. For this purpose, TSP gauges the temperature of the firing chamber in the furnace head upon the start of the firing program. If required, the closing path within the set closing time S is adjusted.

Setting option: On/Off



Pre-vacuum
If a firing program is conducted with pre-vacuum, the vacuum pump is switched on at the end of the closing time (as soon as the furnace head is closed) and run until the pre-vacuum time has elapsed.
The heating phase begins after the pre-vacuum time is over.

The value V1 is ignored upon the start of a program with individually activated pre-vacuum. The vacuum remains switched on until V2 is reached. V2 must be higher than the stand-by temperature B.

Setting option: Off or 01:00 – 05:00 (mm:ss)

Hv

Vacuum holding time
With this function, the vacuum share of the holding time can be individually set.

Example: H (holding time) = 02:00 (mm:ss). If a vacuum share of 50% is desired, the parameter "Vacuum holding time (Hv)" has to be set to 01:00 (mm:ss).

Setting option: Off or 00:01-60:00 (mm:ss)



Quick opening of the furnace head
If the option "quick opening of the furnace head" is activated, the furnace head opens at maximum speed at the end of the holding time.

Setting option: On/Off



Extraction system
If this function is activated, vapours are extracted by means of the vacuum pump during the closing process or fresh air is suctioned in for better burning and drying.

Setting option: On/Off

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	**Vacuum quality** The vacuum pump is switched off as soon as the set vacuum quality VG1, VG2 or VG3 in per cent: 25 / 50 / 75 / 100 has been reached. VG2 is only available if the second or third heating stage has been activated. VG3 is only available if the third heating stage has been activated. *Setting option: 25 / 50 / 75 / 100 percent*
	**Wireless LAN signal strength** If this icon appears in the information bar, the wireless LAN connection is active. Many thick black lines in the icon indicate a high signal strength.
	**IoT function** The IoT function can be activated and deactivated here. Moreover, the connectivity status is indicated. In addition, the time zone can be set in this section.

5.2.6 Adjustable parameters in the IRT menu

With the Infrared Technology active, the temperature measurement during the closing or predrying process is conducted directly on the surface of the object placed in the furnace. The furnace regulates the closing and predrying process on the basis of the measuring data provided by the infrared camera.

Gentle drying and heating of the object is achieved by heating the heating muffle and by the furnace head movement (furnace head opens and closes depending on the given situation).

There are different operating modes available for the IRT function, which can be selected using the **[IRT]** button.

	**IRT** IRT is the preferred and recommended operating mode for conventional veneering and all-ceramic firing cycles. If the operating mode "IRT" is selected, the infrared camera controls the predrying and closing processes in such a way that the processes are conducted as quickly and efficiently as possible. The time-savings compared to conventional predrying and closing processes are up to 20%.
	**IRT Plus** If the operating mode "IRT Plus" is selected, the infrared camera controls the predrying and closing processes with a reduced drying rate. The closing and predrying processes are thus prolonged. The operating mode IRT Plus is recommended for opaquer firing cycles and massive restorations.
	**IRT Off** If the operating mode "IRT Off" is selected, the infrared camera is deactivated. Closing and predrying processes are conducted in the conventional manner, e.g. by entering a closing time.
	IRT2 function after firing After the firing process, the IRT2 function measures the surface temperature of the fired objects while the furnace head is opening. The thermal image is shown on the screen and a notification on the display indicates when the objects have reached the ideal temperature to be removed from the furnace.

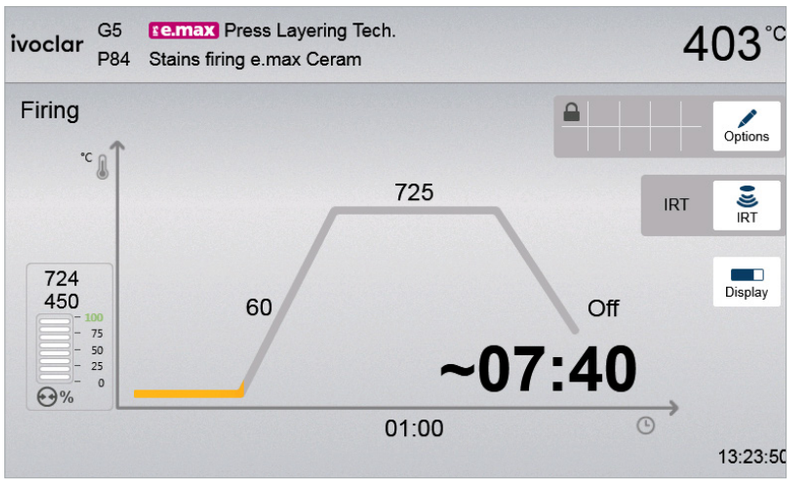


The IRT2 function is only available in combination with the IRT function. The IRT2 function can be switched on/off in the Settings menu.

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5.2.7 Starting and stopping programs / the operating indicator

Once the program is started by pressing START, the firing curve display appears.



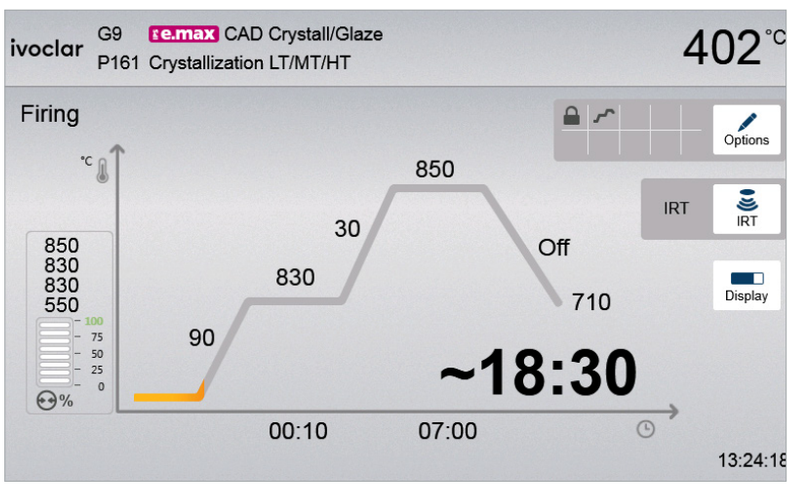
The following information is displayed:

- **Information bar**
  In the information bar in the upper margin of the display, program name and the current furnace temperature are indicated.
- **Main area**
  The vacuum is shown on the left side of the main screen. The progress of the program is shown in the form of a firing curve. The estimated remaining time is also displayed in 10-second intervals. If no vacuum is activated, the vacuum indicator and all the corresponding parameters are blank.

  The process status is shown in colour in the firing curve:
  – Orange: Program is closing the furnace head or is in predrying mode
  – Red: Program is heating up or is in holding time mode
  – Blue: Program is in long-term cooling or is opening the furnace head

  Active firing program options are shown in the grid next to the **[Options]** button.

  If a two-stage program is selected, the firing curve is shown in two stages.



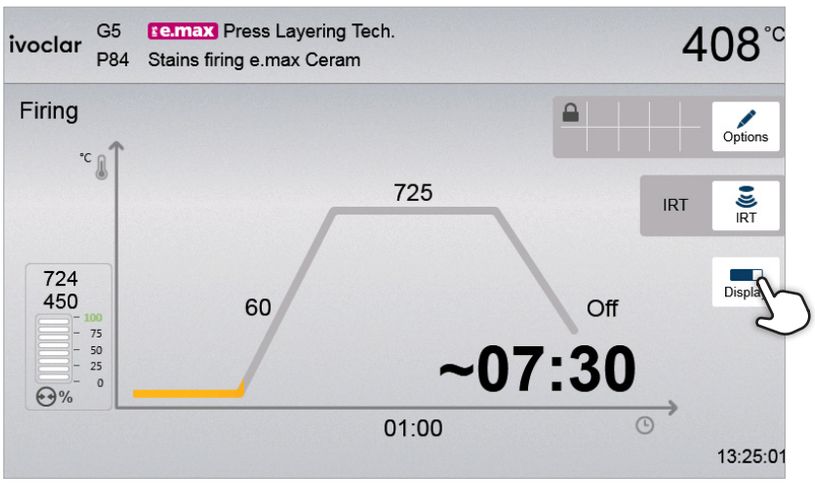
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Change operating indicator

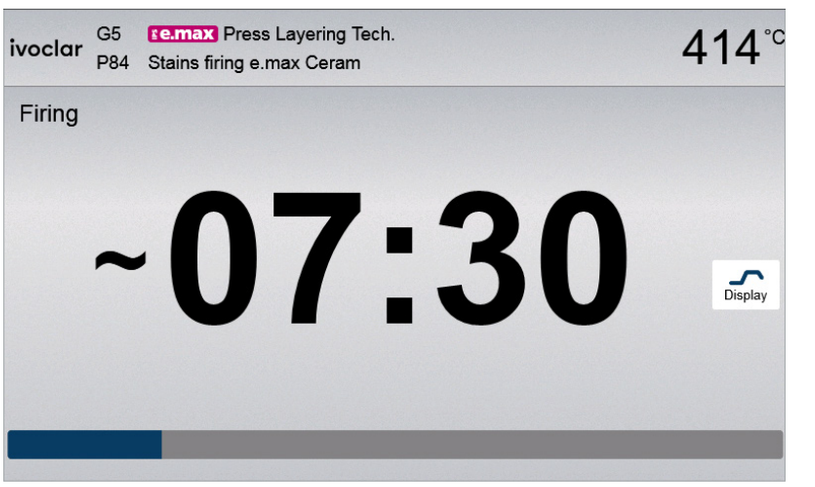
The active firing program can be displayed in two ways:

- Operating indicator "firing curve"
- Operating indicator "remaining time"

If the **[Display]** button is pressed during an active program, the operating indicator can be switched.



If the **[Display]** button is pressed while the firing curve is displayed, the remaining time will be shown. The remaining time indicator informs the user about the time that is left until the process is completed even from a distance. The remaining time is displayed in the centre of the screen in large characters.



The factory settings of the furnace are such that the firing curve is automatically displayed upon the start of a program.

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5.2.8 Pausing the active program

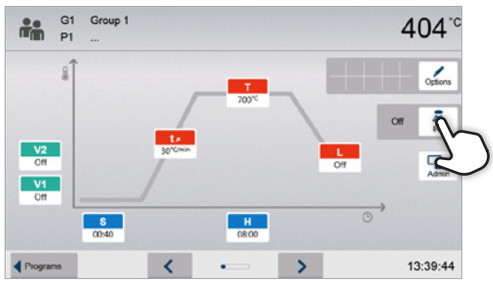
- Press STOP once to pause an active program (green LED flashes). Press the STOP key twice to completely stop the program or press START to continue.
- If the program is paused, the display shows a flashing "Pause" and the indicator changes back to the program screen.
- If a program is stopped prematurely, "Vacuum release" is displayed during the flooding of the firing chamber.

5.2.9 Changing the parameters while the program is running

Most of the parameters of the program, which have not yet been executed, can be changed while the program is paused. Change the parameters as described in Chapter 5.2.3.

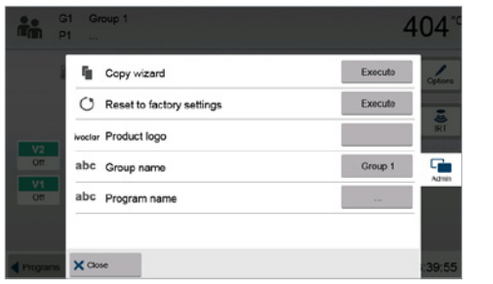
5.3 Managing programs

Press the button [Admin] in the program view to open the managing program menu.



The following functions are available:

- Copy programs
- Reset program to factory settings
- Select product logo
- Rename group name
- Rename program name



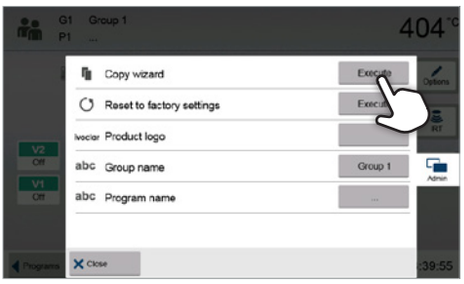
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5.3.1 Copying programs

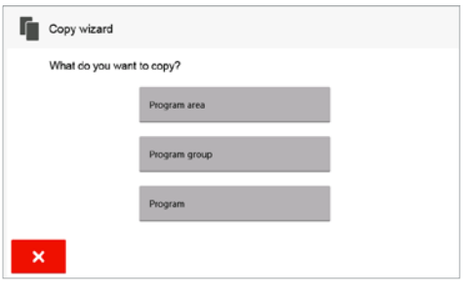
With the copy assistant, individual programs, program groups and program sectors can be copied. The source and target of the copy process can be selected in the copy assistant. Programs copied to a USB flash drive can only be opened with this furnace. PrograBase X10 offers the possibility to copy the programs to other furnaces.

Programs and program groups cannot be copied into the sector for Ivoclar programs. This sector is protected and reserved for original Ivoclar programs.

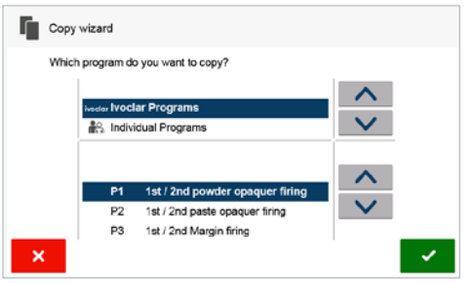
1. Press the corresponding [Execute] button in the Admin menu.



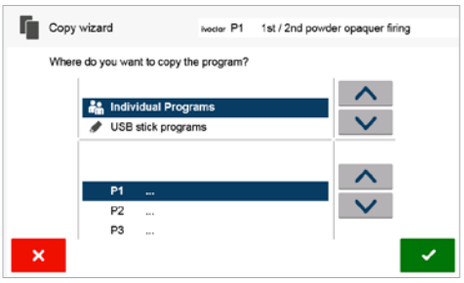
2. Select the items you want to copy.
(program sector, program group or an individual program)



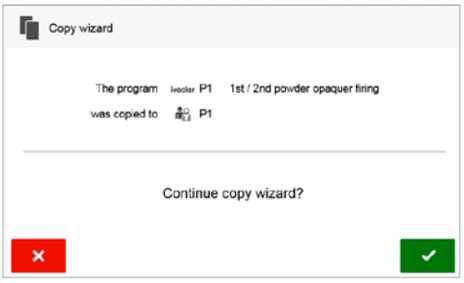
3. Make a selection depending on the desired copy content.
(program sector, program group or an individual program)



4. Select target.
The selection can be confirmed with the green button.
The red button is used to close the copy assistant.



5. The copy process can be continued with the green button. The red button is used to abort the copy process.

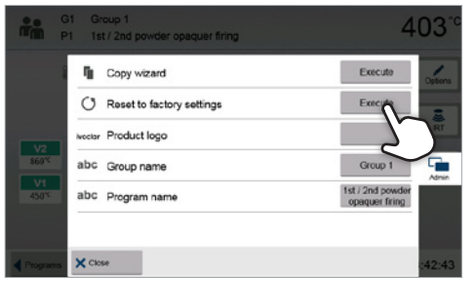


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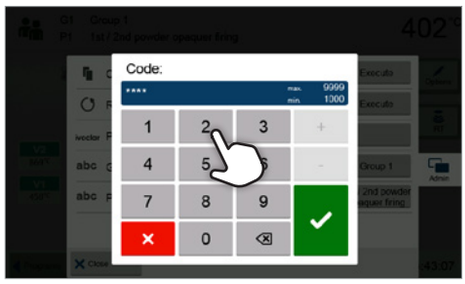
5.3.2 Resetting program to factory settings

This function is used to reset a changed program to factory settings.

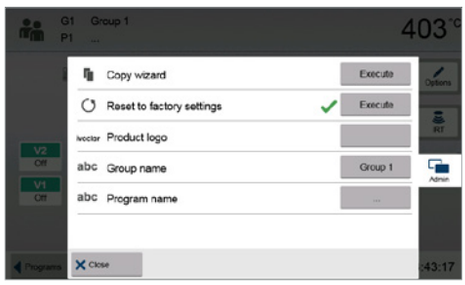
1. Press the corresponding [Execute] button in the Admin menu



2. Enter the user code to confirm that the program is reset to factory settings.



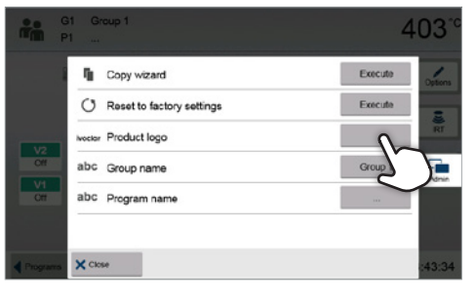
3. The program has successfully been reset to factory settings.



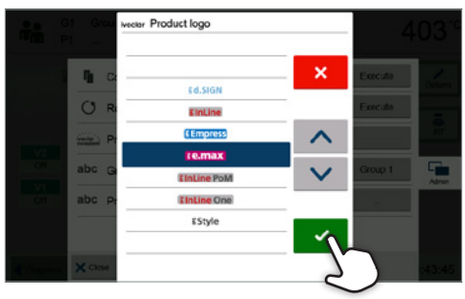
5.3.3 Selecting product brand

The product brand for the current group can be selected.

1. Press the corresponding button in the Admin menu.



2. Select the desired product logo. Confirm the entry with the green button.

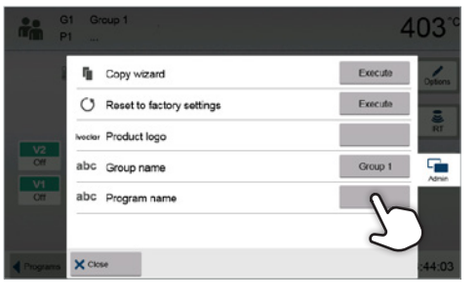


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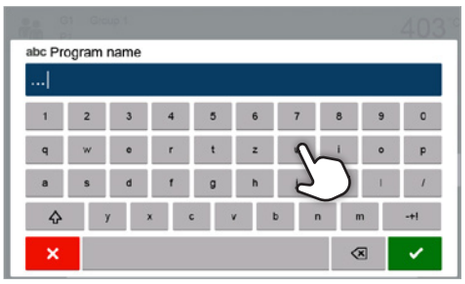
5.3.4 Renaming program, program group

The current program and current program group can be renamed (only possible for individual programs).

1. Press the corresponding button in the Admin menu and select whether the program or group name should be changed.



2. Enter the desired program or group name. Confirm the entry with the green button.



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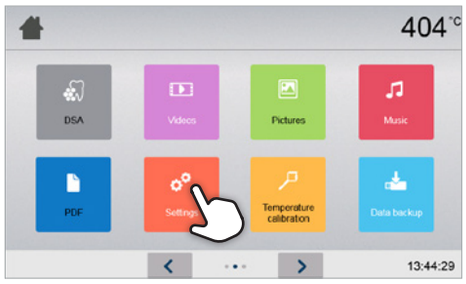
5.4 Advanced functions of the furnace / Software update

5.4.1 Settings

To reach the Settings menu, scroll to page 2 in the home screen and press the **[Settings]** touch button.

Example: Changing the brightness of the display

1. Open Settings
Scroll to page 2 in the home screen and press the **[Settings]** button.



2. Open display brightness
The **[Arrow]** buttons are used to scroll through the Settings menu. Press the button until the setting "Display brightness" appears in the display.

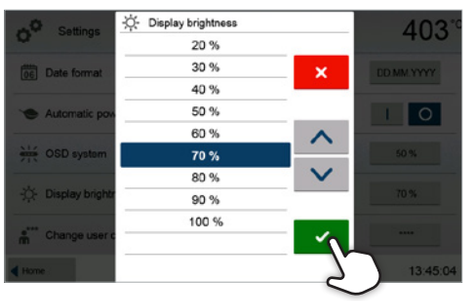


3. Changing the brightness of the display
Press the touch button in the line "Display brightness".



4. Select the desired display brightness
Confirm the entry with the green button or cancel the entry by pressing the red button.

The setting was changed.



To return to the home screen, press either the touch button [Home] in the navigation bar or the Home key on the membrane-sealed keypad.

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The following settings can be changed in the Settings menu:

	**Temperature unit** You can choose between °C and °F. *Setting option: °C / °F*
	**Vacuum unit** You can choose between mbar and hPa. *Setting options: mbar / hpa*
	**Vacuum quality** Setting the final vacuum value. This value defines the negative pressure in the furnace head at which the furnace has reached a vacuum quality of 100%. *Setting option: 0 – 200 mbar*
	**Language** Select the desired operating language. *Setting options: German, English, Italian, French, Spanish, Portuguese, Swedish, Dutch, Turkish, Russian, Polish, Croatian, Trad. Chinese, Mandarin Chinese, Finnish, Norwegian, Slovenian, Czech, Slovakian, Hungarian, Indian (Hindi), Japanese, Korean, Taiwanese, Arabic, Iranian (Farsi)*
	**Volume** Select the desired volume of the acoustic signals. *Setting option: Off / 10 – 100 % in 10-% steps*
	**Melody** Select the desired melody for the acoustic signal. *Setting option: Melody 1 to 20*
	**Time** Setting the current time *Setting options: hh:mm:ss*
	**Date** Setting the current date *Setting options: according to the set date format*
	**Date format** Set the date format. *Setting options: dd:mm:yyyy; mm:dd:yyyy*
	**Time zone** Set the respective time zone. *Setting options: from 11 to +12 hours (revolving)*
	**Automatic power-saving mode** If the power-saving mode is activated and the furnace head closed, this function is automatically started after 30 minutes, if the furnace is on stand-by and no key is pressed during that time. The display shows the power-saving icon. Pressing any key ends the automatically activated power-saving function. *Setting option: On / Off*
	**Optical Status Display (OSD)** Here, the OSD can be switched on or off. *Setting option: Off / 10 – 100 % in 10-% steps*
	**Display brightness** Setting the display brightness *Setting option: 20 – 100 % in 10-% steps*

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User code
The user code can be individually changed.

It is recommended to make a note of the changed user code and keep it separately. If forgotten, the user code may only be reset with the help of Ivoclar After Sales Service.

Setting option: 1000 to 9999



Operating mode
Setting of the desired operating mode. See Chapter 5.4.8 Operating mode for details.

Setting option: Standard / Protected / Production



Furnace number
Here, you can enter any furnace number. If the operating mode "Production" is activated, the number will be prominently displayed in the screen.

Setting option: 1 to 99



Protocolling
If this function is activated, the program data are saved in a protocol entry after every firing procedure. The following protocol settings are available:

Inactive: Protocolling is not active

Printer: At the end of the program, the parameters used are logged and saved in the furnace. Additionally, the protocols are printed on a connected USB printer.

PC: At the end of the program, the parameters used are logged and saved in the furnace. If the furnace is connected to the PrograBase Software, the saved table entries are synchronized with the connected laptop/PC. Protocols can be edited, saved and printed by means of the PrograBase software.

Table: At the end of the program, the parameters used are logged and saved in the furnace. The data can be viewed via the Diagnosis menu.

Setting option: Inactive / Printer / PC / Table



Laboratory name
The laboratory name can be entered here. It is automatically added to the protocols.

Setting option: Laboratory name entry



Calibration interval
Setting for the notification as to when the next calibration should be conducted.

Setting option: 1 / 3 / 6 / 12 months



Set heating muffle firing hours to zero
If this function is executed, the heating muffle firing hours are set to "zero". This function can only be executed by entering the user code.

Setting option: Execute



Set vacuum pump hours to zero
If this function is executed, the vacuum pump hours are set to "zero". This function can only be executed by entering the user code.

Setting option: Execute



Reset to factory settings
If this function is executed, all programs and settings are reset to the status before the initial start-up. This function can only be executed by entering the user code.

Setting option: Execute



Preparing USB stick programs
If this function is executed, a USB stick is prepared as program memory.



Loading and individual start screen
This function is used to load an individual start screen from a USB stick. Once an individual start screen has been loaded, it will be shown for a few seconds when the furnace is switched on the next time.

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	**Loading individual tune** This function is used to load an individual tune. This melody is played as a speaker sound as described in Chapter 5.1.6.
	**Timer** With this menu item, the timer can be set. *Setting option: Off / Monday to Sunday on-time and off-time*
	**Setting up a WLAN connection** A WLAN connection can be set-up with this function. See Chapter 5.4.9 for details.
	**Voice output** Here, the voice output can be activated / deactivated. If the voice output is activated, a short voice message is played in the following situations: – Program start – Program interruption – Program abort – Program end – When the furnace head is open (< 360 °C) – If a program with illogical parameters is started. *Setting option: On / Off*
	**Setting up a Bluetooth connection** A Bluetooth connection with a mobile phone can be set up here. See Chapter 5.4.10 for details
	**Touch mode** Setting the sensitivity of the touch screen. Select "Special" in case of malfunctions when operating the touch screen. *Setting option: Normal / Special*
	**IRT2** After the firing process, the IRT2 function measures the surface temperature of the fired objects while the furnace head is opening. The thermal image is shown on the screen and a notification on the display indicates when the objects have reached the ideal temperature to be removed from the furnace. The IRT2 function is only availble in combination with the IRT function. *Setting option: On/Off*
	**Keypad tone** Here, the keypad tone can be activated. *Setting option: On / Off*
	**IoT function** The IoT function can be activated and deactivated here. Moreover, the connectivity status is indicated. In addition, the time zone can be set in this section.

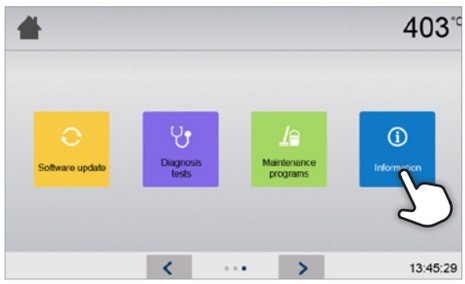
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5.4.2 Information

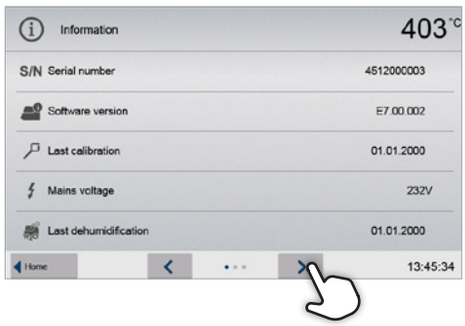
To reach the screen for the furnace information, scroll to page 3 in the home screen and press the **[Information]** touch button.

Example: Displaying information

1. Opening information
Scroll to page 3 in the home screen and press the **[Information]** button.



2. Reading the information
The information is displayed on several pages. The **[Arrow]** buttons are used to scroll to the next information page.



To return to the home screen, press either the touch button [Home] in the navigation bar or the Home key on the membrane-sealed keypad.

The following information can be read off:

S/N	**Serial number** Serial number of the furnace
	Software version Currently installed software version of the furnace. Software updates are available from *www.ivoclar.com/software-updates*.
	Last calibration Date of the last calibration
Volt	**Mains voltage** Currently measured mains voltage
H_2O	**Last dehumidification** Date of the last dehumidification of the furnace
h	**Operating hours** Number of operating hours
h	**Firing hours** Number of firing hours
h	**Vacuum hours** Number of operating hours of the vacuum pump
IP	**IP address** Indication of the IP address
IP	**WLAN IP address** Indication of the WLAN IP address
IP	**Internet connection** Indicates whether or not the furnace is connected to the internet.
IP	**MAC address** Indication of the MAC address
IP	**WLAN MAC address** Indication of the WLAN MAC address
	Video tutorials Display of the QR code to access the video tutorials

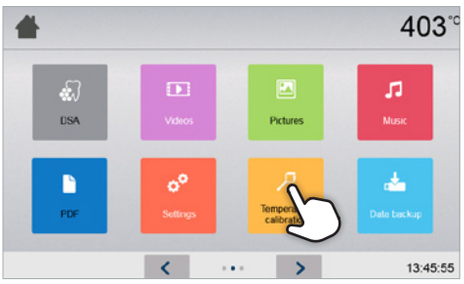
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5.4.3 Temperature calibration

The sheathed thermocouple and heating muffle of the furnace may be subject to changes which affect the furnace temperature, depending on the mode of operation and the frequency of use. Conduct the automatic temperature calibration at least every six months.

Temperature calibration requires only few steps:

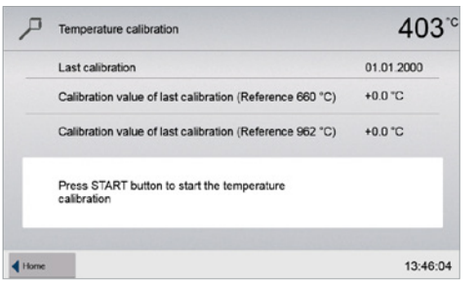
1. Open temperature calibration
Scroll to page 2 in the home screen and press the **[Temperature calibration]** button.



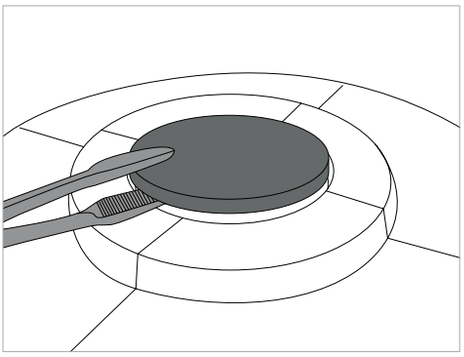
The furnace must have a stand-by temperature (403°C) before the calibration is started.

2. Start the calibration
The display shows the last calibration value and the date of the last calibration.

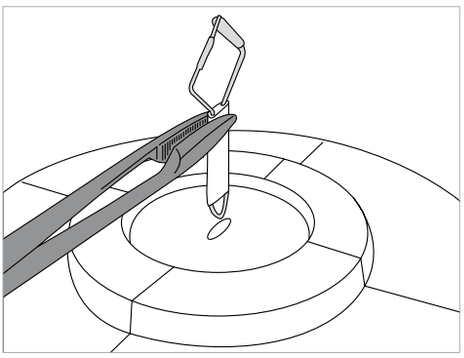
Press the START key on the membrane-sealed keypad to start the calibration. Follow the instructions on the display.



3. Remove the firing plate
Remove the firing plate from the furnace and place it on the cooling plate using the firing tongs.



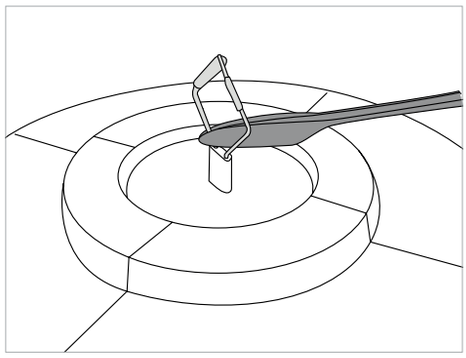
4. Insert the ATK2 sample
Carefully grip the upper part of the ATK 2 using the furnace tongs (Caution: fracture risk of the ceramic) and insert it into the holes designated for this purpose until it snaps into place.



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5. Press on sample

If necessary, use the furnace tongs to apply slight pressure to the centre of the calibration base until the calibration sample clicks into place. Observe the corresponding markings.



6. Start the calibration

Press START to start the calibration program. The progress of the calibration program is shown in the display.



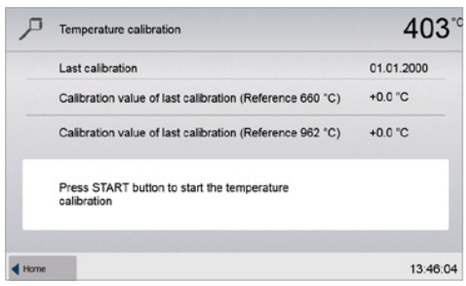
7. Complete the calibration

The result is displayed at the end of the calibration.

✔ Temperature calibration successful

✘ Temperature calibration failed

The calibration value is the difference between the measured current temperature and the desired set temperature.



At the end of the program, open the furnace head and carefully remove the ATK 2 using the furnace tongs and place it on the cooling tray to allow it to cool. Replace the firing plate using the furnace tongs.

To return to the home screen, press either the touch button [Home] in the navigation bar or the Home key on the membrane-sealed keypad.

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5.4.4 Data backup

With the data backup function, individual programs and settings can be backed-up on a USB flash drive. We recommend using this feature, e.g. before a software update or before sending in the furnace for maintenance purposes.

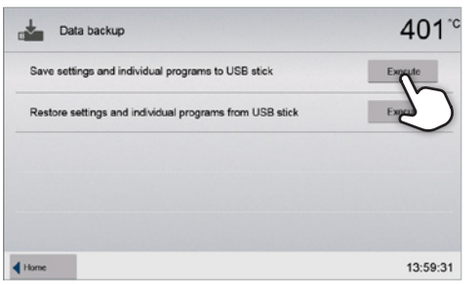
Moreover, furnace data saved on a USB flash drive can be restored on the furnace. However, restoring only works on the same furnace with the identical serial number.

Data backup or data recovery requires only few steps:

1. **Open data backup**
Scroll to page 3 in the home screen and press the **[Data backup]** button.



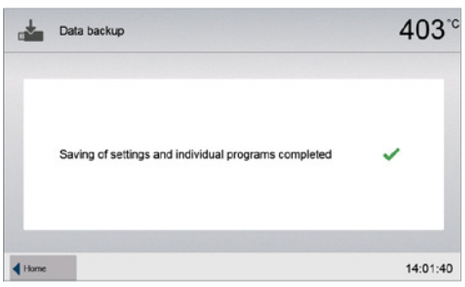
2. **Conduct the data backup**
Connect a USB stick to the furnace and press the **[Execute]** button.



3. **Complete the data backup**

✔ Data backup successful

✘ Data backup failed



To return to the home screen, press either the touch button [Home] in the navigation bar or the Home key on the membrane-sealed keypad.

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5.4.5 Software update

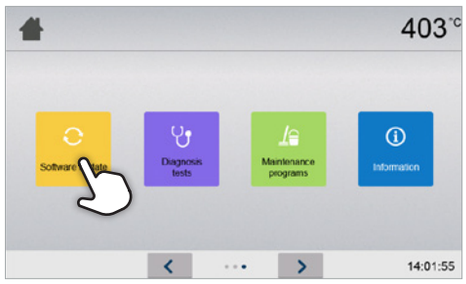
Software updates can be easily installed on the furnace by means of a USB stick. A USB stick, which contains a current software file (e.g. P710 G2_V1.10.iv) is required. The software version on the USB stick must be higher than the one installed on the furnace (see Selection – Information)

The free software updates for Programat furnaces are available from *www.ivoclar.com/software-updates*.

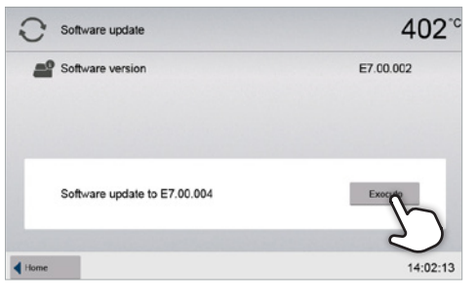
Back-up your data before performing a software update.

A software update requires only few steps:

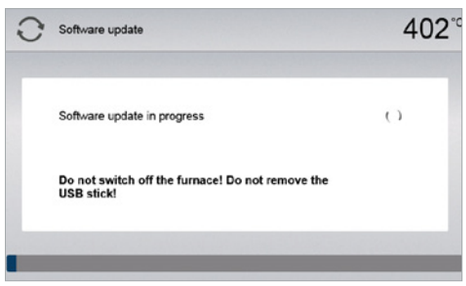
1. **Open Software update**
Scroll to page 4 in the home screen and press the **[Software update]** button.



2. **Conduct Software update**
If the USB stick with the software file is already connected, the furnace automatically searches for a valid software file.
If the USB stick has not yet been connected with the furnace, do so now.
Press the **[Execute]** button.



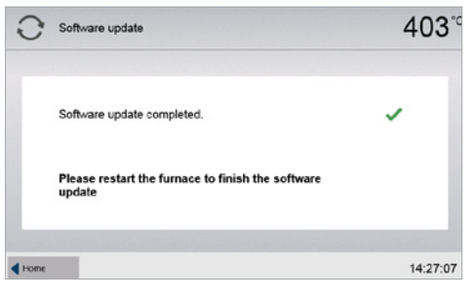
3. **The status bar shows the progress of the update**



4. **End Software update**
The following messages are displayed:

✓ **Software update successful**

✗ Software update failed



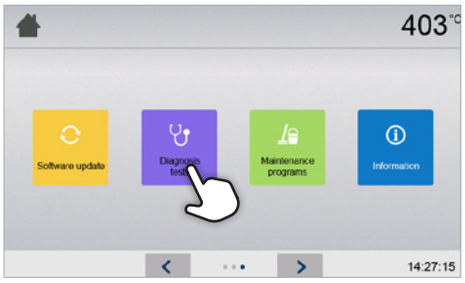
The furnace has to be switched off and on again by means of the mains switch at the rear of the furnace to complete the software update.

Important information
Please note that modified Ivoclar programs may be overwritten during a software update. Individual programs are not affected and will not be overwritten.

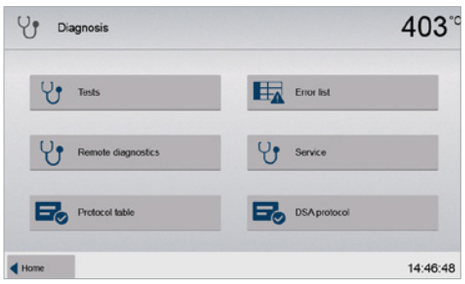
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5.4.6 Diagnosis

Scroll to page 3 in the home screen and press the **[Diagnosis]** button.



The following functions are available in the Diagnosis menu:
- Tests (e.g. vacuum test, heater test, etc.)
- Error list (saved error messages)
- Remote Diagnosis
- Protocol table
- Service

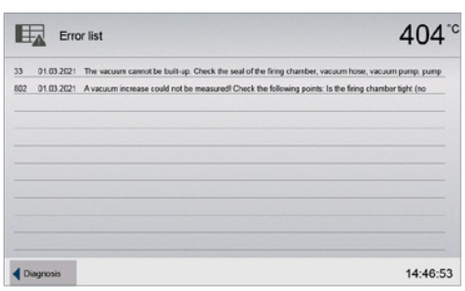


5.4.6.1 Tests (test programs)

- **Vacuum pump test program**
  With the vacuum pump test program, the vacuum performance and tightness of the furnace vacuum system can be automatically tested. For that purpose, the achieved (minimum) pressure in mbar is measured and indicated. If the pressure value is below 80 mbar (hPa), the vacuum performance of the system is adequate.
- **Heating muffle test**
  The quality of the heating muffle may be automatically checked by means of the heater test (duration: approximately 7 minutes). The heater test should only be conducted with the firing chamber empty, since an object in the chamber (e.g. firing tray) may influence the test result. Conduct the heater test immediately after switching on the furnace and before any actual firing procedures are conducted. If the furnace is too hot, an incorrect heating muffle quality will be indicated. If the heating element quality falls below 50%, replacing the heating element is recommended.
- **Keypad / touch test**
  Each time the keypad or the touch buttons are pressed, a short acoustic signal sounds to confirm their function.
- **Display test**
  Two different chequerboard patterns are alternately shown in the entire display. Every individual pixel can be visually checked.
- **OSD test**
  This test is used to check the LEDs of the Optical Status Display. For that purpose, the OSD alternately flashes in different colours.
- **IRT test**
  Fully automated test infrared camera function.

5.3.6.2 Error table

Every error message is saved in an error table after it occurred. The **[Arrow]** buttons are used to scroll through the list. The last 20 error messages are displayed.



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5.4.6.3 Remote Diagnosis

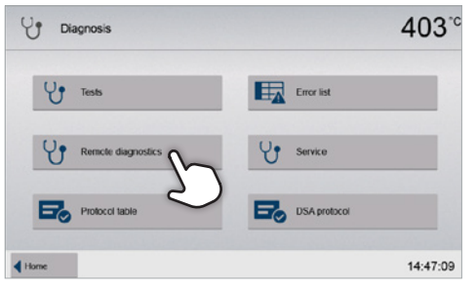
The remote diagnosis function helps you in case of a possible problem with your Programat furnace and facilitates the communication between users and the Ivoclar After Sales Service.

If the diagnosis function is executed, the furnace generates a diagnosis file, which is automatically saved on the USB stick. The file can be forwarded by e-mail or analyzed by means of PrograBase on a laptop/PC.

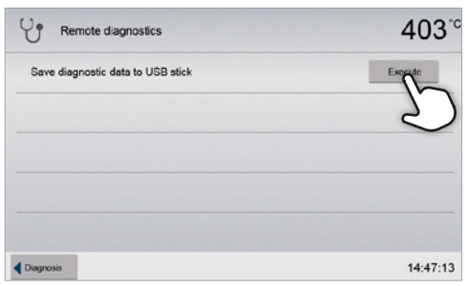
The diagnosis file provides furnace information (e.g. installed software version, set modes, etc.), operating data (e.g. operating hours, firing hours, etc.), calibration data (e.g. calibration values, date of the last calibration, etc.) test results and saved error messages.

Generating a diagnosis file:

1. **Open the diagnosis function**
Press the **[Remote Diagnosis]** button in the Diagnosis menu.



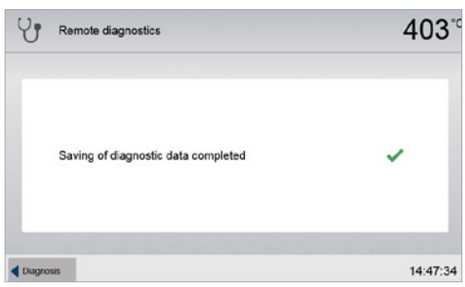
2. **Generate a diagnosis file**
Connect a USB stick with the furnace. Press the **[Execute]** button.



3. **Once the diagnosis file has been generated, one of the following messages is displayed:**

✔ Diagnosis successful

✘ Diagnosis failed



4. **Forward or analyze the diagnosis file**
Connect a USB stick with a laptop/PC. The file can only be analyzed by means of the PrograBase software or sent to any e-mail address.
If the furnace is connected with a laptop/PC via Ethernet, the file can also be directly opened, forwarded or analyzed by the PrograBase software.

5.4.6.4 Protocol table

If the protocolling function has been activated in the Settings menu (see Chapter 5.4.1), the last 20 firing protocols are saved in the protocol table. The saved protocols can be printed from this table, sent to a PC, or deleted.

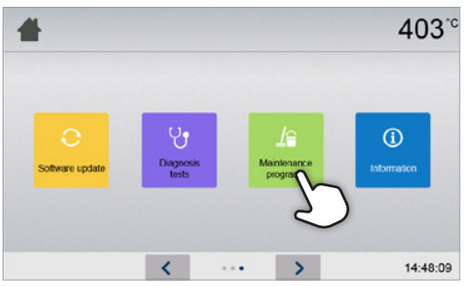
5.4.6.5 Service menu

This menu is code-protected and is only used by Ivoclar After Sales Service.

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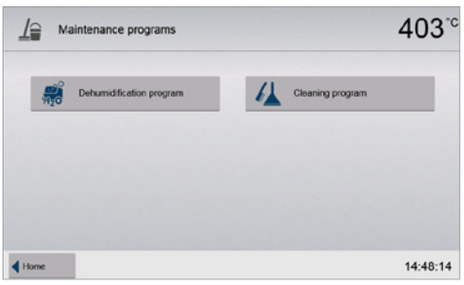
5.4.7 Maintenance programs

Scroll to page 3 in the home screen and press the **[Maintenance Programs]** button.



The following programs are available in the Maintenance Programs menu:

- Dehumidification program
- Cleaning program

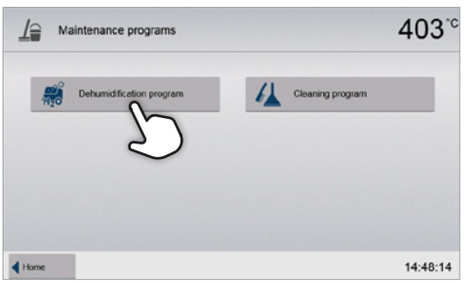


5.4.7.1 Dehumidification

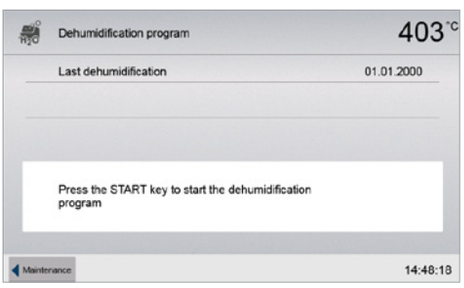
The condensation of water in the insulation of the firing chamber and the vacuum pump will result in a lower vacuum and thus in impaired firing results. For that reason, the furnace head should be kept closed when the furnace is switched off or the temperature is below 100°C, in order to prevent the absorption of humidity.

Conducting the dehumidification program:

1. **Open the dehumidification program**
Scroll to page 3 in the home screen and press the **[Maintenance Programs]** button. Press the **[Dehumidification Program]** button in the Maintenance Programs menu.



2. **Start the dehumidification program**
Press START to start the dehumidification program.



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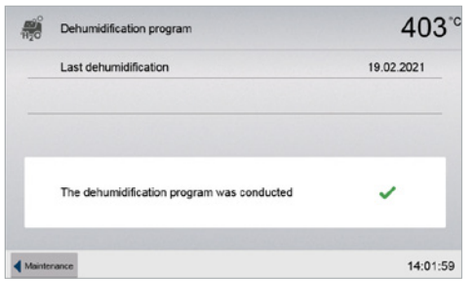
3. **The status bar shows the progress of the dehumidification program.**



4. **End the dehumidification program.**
The following messages are displayed:

✔ Dehumidification program successful

✘ Dehumidification program failed



When the dehumidification program is active, the furnace head is automatically opened and closed during the program. This supports the evaporation of condensed water. Do not interrupt this procedure.

5.4.7.2 Cleaning program

The cleaning program is used to "clean" the heating muffle (duration: approx. 17 min). After a cleaning program, it is recommended to calibrate the furnace. In case of problems with discolouration of the ceramic, we recommend replacing the firing table or the firing tray material.

To start the cleaning program, proceed as described in the section on the dehumidification program.

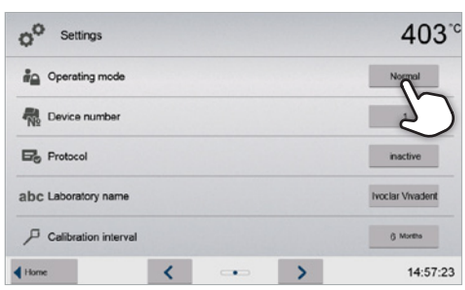
5.4.8 Operating mode

In the Settings menu, various operating modes can be selected. This increases the reliability of use and adjusts the furnace to the area of application. The following modes are available:

- **Standard**: All functions of the ceramic furnace are available in this mode.
- **Protected**: Only programs can be selected and started in this mode. Programs cannot be changed. Settings or special functions cannot be activated or changed. The safe mode can only be activated or deactivated by entering the user code.
- **Production**: In this mode, only one program can be accessed. Only the functions Open/Close furnace head and Start/Stop program are available. Only that program is available, which was loaded in the furnace at the time the production mode was activated. Help notes on the operation are shown in the display. The production mode can only be activated or deactivated by entering the user code.

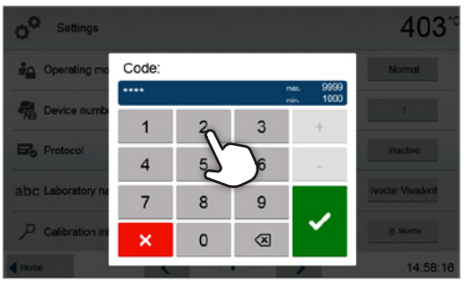
The selection of the operating mode requires only few steps:

1. **Changing the operating mode**
Open the Setting menu and press the button in the line "Operating Mode".

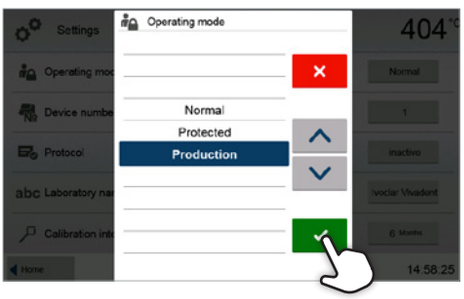


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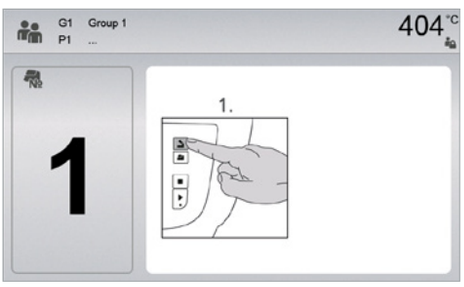
2. Entering the user code
Enter the user code and confirm the entry with the green button.



3. Selecting the operating mode
Select the desired operating mode and confirm the entry with the green button.



4. Program screen in the "Production" operating mode (example)



The operating modes "Protected" or "Production" can be changed by prolonged pressing of the home key (at least 3 seconds).

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5.4.9 Setting up a WLAN connection

A WLAN connection can be set up in the Settings menu. This function is only available if the Programat WLAN Stick has been connected with the furnace.

The set-up requires only a few steps:

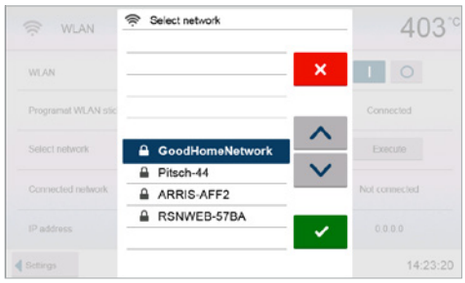
1. Switch on WLAN.



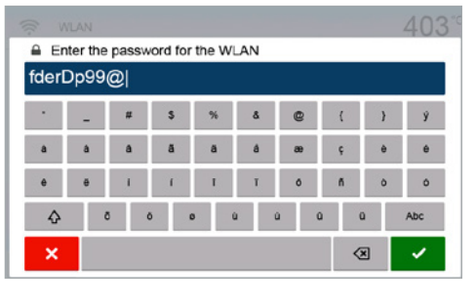
2. Press the button [Execute] to show available WLAN networks.



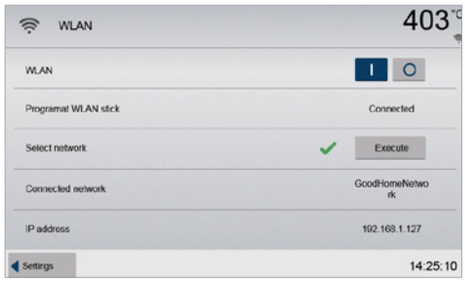
3. Select the desired network.



4. Enter the WLAN password and confirm with the green button or abort the entry with the red button.



5. The WLAN connection was successfully set up.



Only 2.4 GHz networks with the following security standards are supported:
– WEP 64-bit
– WEP 128-bit
– WPA-PSK TKIP
– WPA-PSK AES
– WPA2-PSK TKIP+AES
– WPA2-PSK AES

After the initial set-up of the WLAN connection, the furnace automatically connects with the network last used at every new start, provided the network is available.

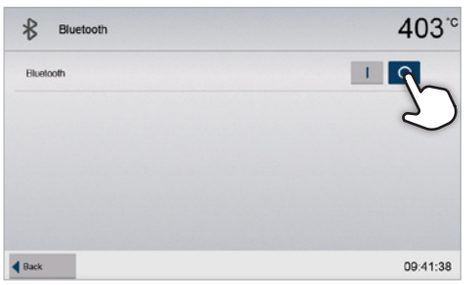
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5.4.10 Setting up a connection with a mobile phone

A connection with a mobile phone can be set-up in the Settings menu. This function is only available if the Programat Bluetooth stick has been connected with the furnace. The Bluethooth flash drive should only be inserted and removed while the furnace is switched off.

The set-up requires only a few steps:

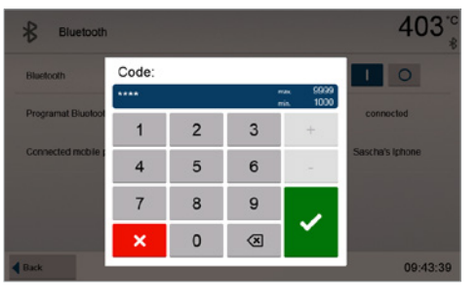
1. **Switch on Bluetooth.**



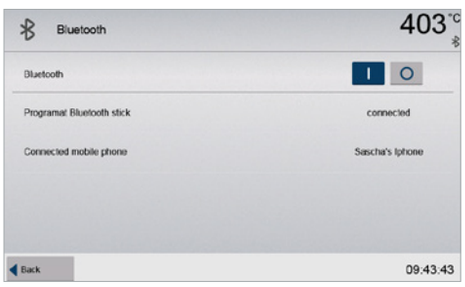
2. **Connect telephone with the Programat P710 G2.**
A Bluetooth connection is established with the operating controls of the mobile phone.

Please observe the notes in the Operating Instructions of the mobile phone used.

3. **Enter the password for the connection, if required, (default 0000) and confirm with the green button or abort the entry with the red button.**



4. **The connection has been successfully established.**



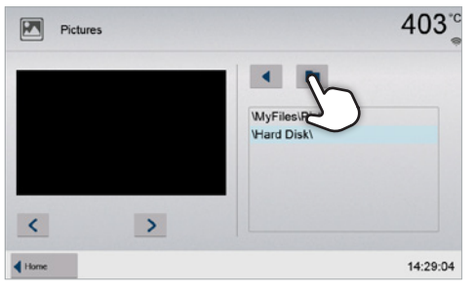
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5.5 Multimedia functions

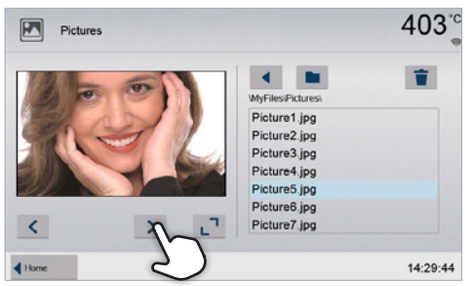
The Programat P710 G2 is equipped with multimedia functions such as photo display, MP3 and video player. The furnace is also equipped with an internal memory. Images can be saved in this memory with the help of the "PrograBase X10" computer software. In order to use all multimedia functions without PrograBase X10, an external memory (USB flash drive or SD memory card) containing the corresponding data must be connected.

5.5.1 Image display

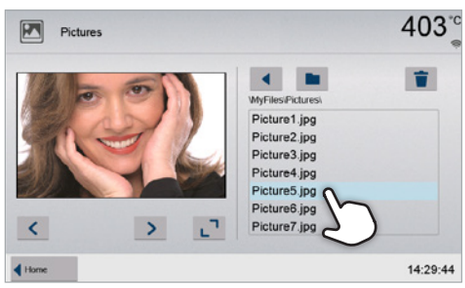
Scroll to page 2 in the home screen and press the **[Images]** button.



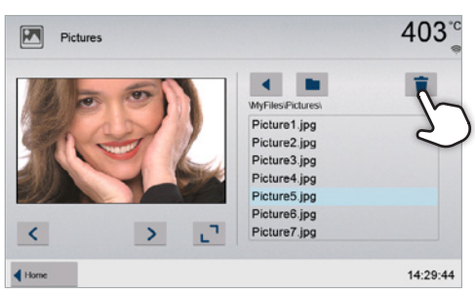
1. Select folder
The arrow keys are used to scroll through the folder.
The folder can be opened by clicking the **[Open]** button.



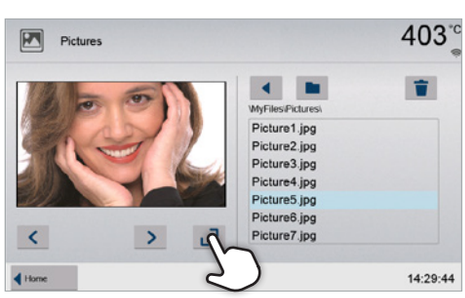
2. Scroll though available image files
The arrow keys are used to scroll through the available image files.



3. Select image
The desired image can be selected on the right side of the display. The left side of the display contains a preview.



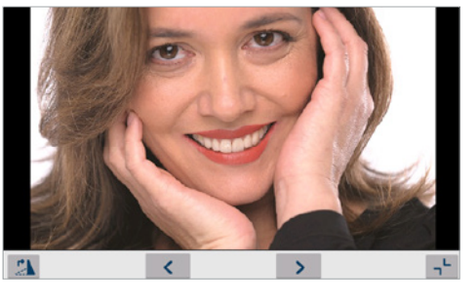
4. Delete image
The image file can be deleted by tapping the **[Recycling bin]** button.



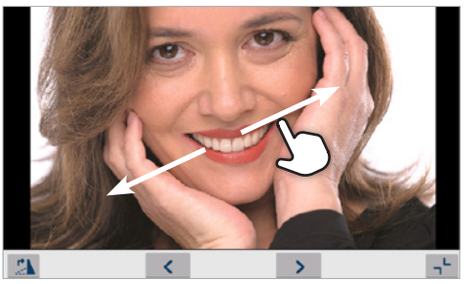
5. Switch to full screen view
The corresponding button is used to switch to the full screen view.

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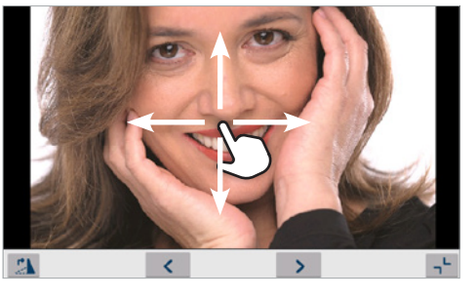
6. Full screen view
In the full screen view, you can scroll through the available image files. The image can be rotated by pressing the corresponding buttons and the full screen view can be ended.



7. Zooming image section
In the full screen view, the image can be enlarged or downsized. To activate the zoom function, press the touch screen for at least 1 second and move the finger towards the upper right (enlarge) or the lower left (downsize).



8. Moving the image
An enlarged image can be moved in all directions. For that purpose, press the touch screen with the finger and move the image in the desired direction.



To return to the home screen, press either the touch button [Home] in the navigation bar or the Home key on the membrane-sealed keypad.

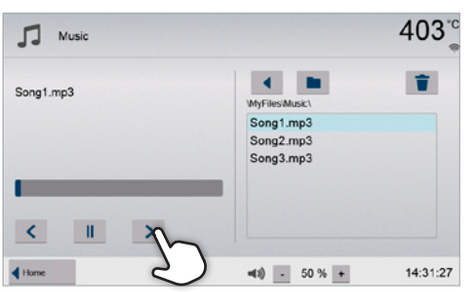
5.5.2 MP3 player

Scroll to page 2 in the home screen and press the **[Music]** button.

1. Select folder
The arrow keys are used to scroll through the folder.
The folder can be opened by clicking the **[Open]** button.

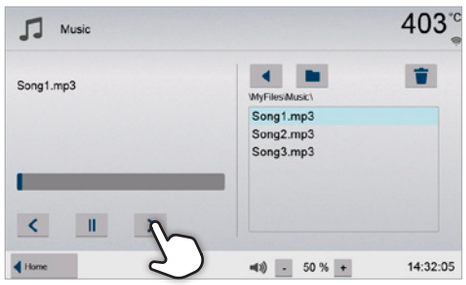


2. Selecting music file
The desired music file can be selected on the right side of the display.

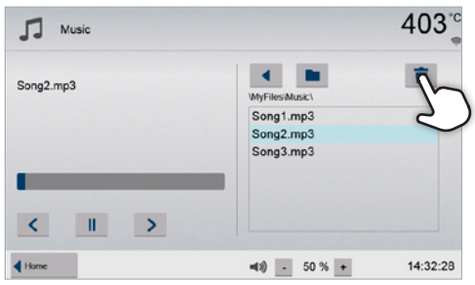


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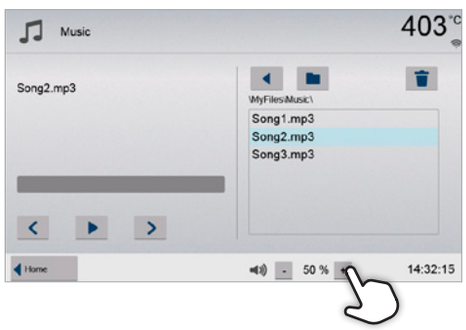
3. Playback elements
The corresponding buttons are used to change to the next or previous title, as well as to start or stop (or pause) the playback. At the end of a title, the next title is automatically played.



4. Deleting the music file
The music file can be deleted by tapping the **[Recycling bin]** button.



5. Adjusting the playback volume
The corresponding button is used to adjust the volume of the playback.

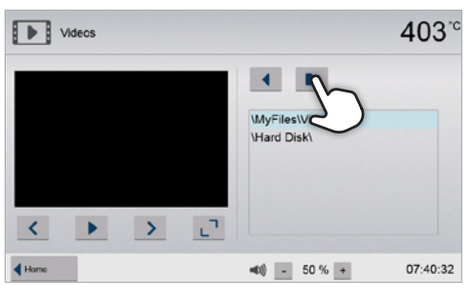


To return to the home screen, press either the touch button [Home] in the navigation bar or the Home key on the membrane-sealed keypad. This does not end the music playback. The playback can only be stopped by pressing the corresponding button in the media player (see Step 2).

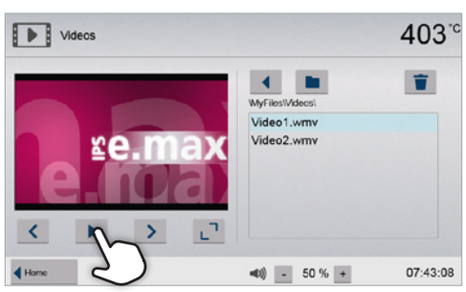
5.5.3 Video player

Scroll to page 2 in the home screen and press the **[Video]** button.

1. Selecting the folder
The arrow keys are used to scroll through the folder.
The folder can be opened by clicking the **[Open]** button.



2. Selecting the video
The desired video file can be selected on the right side of the display. The left side of the display contains a preview.

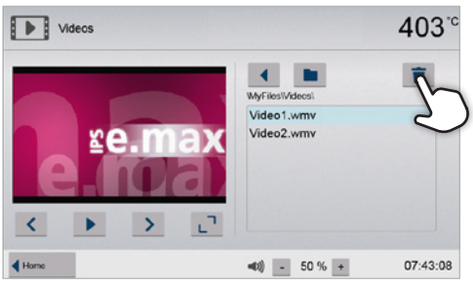


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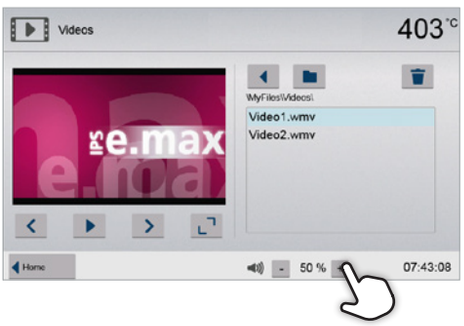
3. Playback elements
The corresponding buttons are used to change to the next or previous title, as well as to start or stop (or pause) the playback.At the end of a video, the next one is automatically played.



4. Deleting the video
The video can be deleted by tapping the **[Recycling bin]** button.



5. Adjusting the playback volume
The corresponding button is used to adjust the volume of the playback.



6. Switch to full screen view
The corresponding button is used to switch to the full screen view.



7. Full screen view
The corresponding buttons are used to end the full screen view and to adjust the volume.



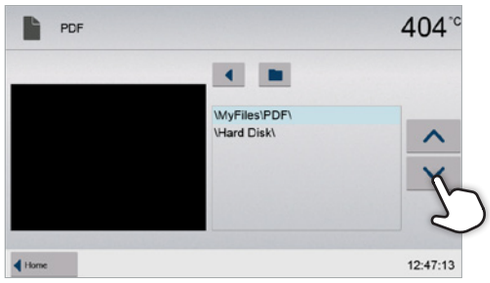
To return to the home screen, press either the touch button [Home] in the navigation bar or the Home key on the membrane-sealed keypad.

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5.5.4 PDF-viewer

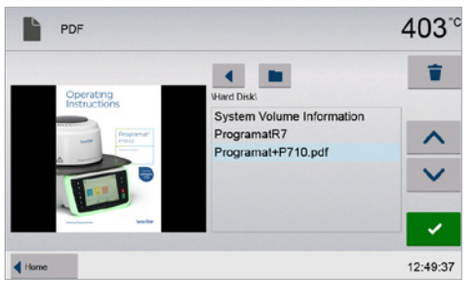
Scroll to the second page of the Home screen and press the **[PDF]** button.

1. Selecting the folder
The arrow keys are used to scroll through the folder.
The folder can be opened by clicking the **[Open]** button.

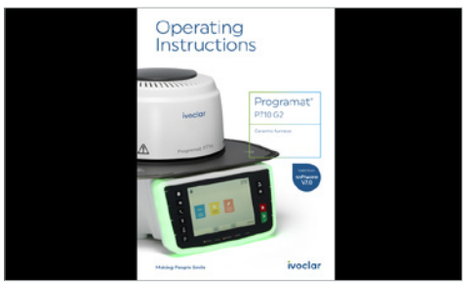


2. Select PDF
The desired PDF-file can be selected on the right section of the screen. The preview is shown in the left section.

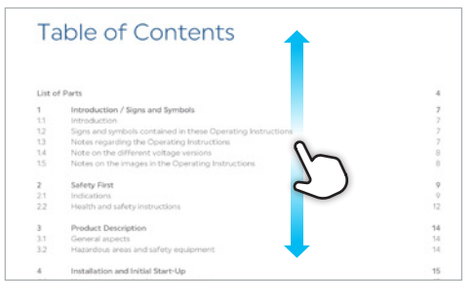
You can switch to the next or previous PDF-file by pressing the **[Arrow Up/Down]** buttons.



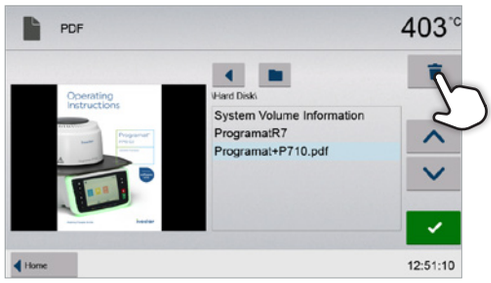
3. Show PDF
The green button can be pressed to show the PDF-file in full screen view.



4. PDF navigation
In the full screen view, you can scroll through the document by swiping the screen to the left or the right. Double-clicking the display results in the document being shown in large format. In this view, you can scroll within the page by swiping the screen up or down. You can leave this view with a renewed double-click. To leave the full screen view, press any key on the membrane-sealed keypad.



5. Deleting the PDF file
The PDF file can be deleted by pressing the **[Recycle Bin]** button.



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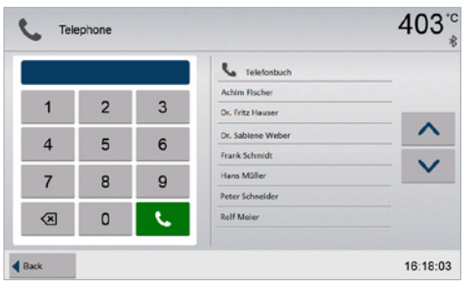
5.6 Phone function

The Programat P710 G2 features an integrated phone function. To use this function, a phone with an active SIM card must be connected with the furnace via Bluetooth.

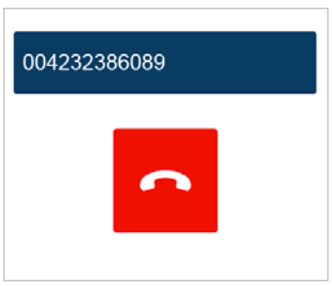
Press the phone key on the membrane-sealed keypad to start the phone function.

a. If the furnace is not yet connected to a mobile phone, pressing this key results in the Bluetooth settings menu being displayed. A connection with a mobile phone can be set-up here.
b. If the furnace is already connected with a mobile phone, pressing the phone key results in the phone screen being displayed.

1. A phone number can be directly entered on the left hand side of the screen. The number is dialled by pressing with the green [Call] button.



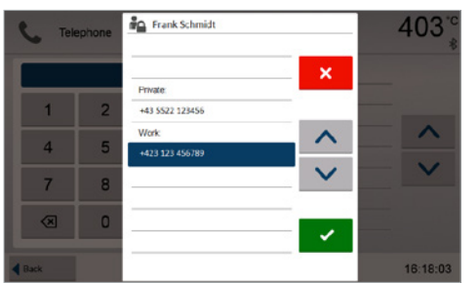
2. As soon as a connection has been established, the end-call screen appears. The call and/or connection can be cancelled with the red button.



3. If the mobile phone contains a contact list and the phone supports the "Call up contact list", the contact list of the mobile phone is shown on the right of the display.
The marked contact can be called with the green **[Call]** button (see 2).



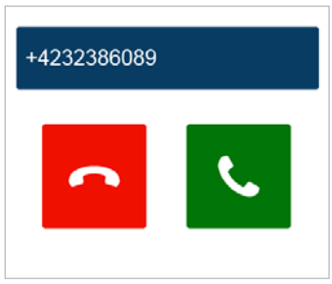
4. If several phone numbers are stored for a contact, a detailed view appears after the green **[Call]** button has been pressed and the desired phone number can be selected.
By pressing the **[Call]** button, the marked phone number is called. The detailed view can be left by pressing the **[Close]** button.



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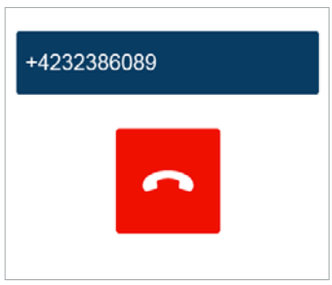
5. If the furnace is connected to a mobile phone and there is an incoming call, the call can be taken with the green button or rejected with the red button.

   If the caller is in the contact list and the mobile phone supports this function, the name of the caller appears at the top of the display. If not, the number of the caller is shown.



6. If the call is accepted, it can be ended by pressing the red button.

   The end-call screen can be left any time by pressing the phone key on the membrane-sealed keypad in order to continue working at the furnace. It is still possible to continue the phone call. To end an active phone call, you can switch back to the end-call screen using the phone key on the membrane-sealed keypad.



To ensure the best possible voice quality, the Bluetooth stick must be connected to one of the USB slots on the side of the furnace.

5.7 IoT feature and Monitoring app

Monitor your Programat devices from anywhere with the Ivoclar Monitoring app via real-time updates on your smartphone, tablet or desktop.
Detailed information about using and installing the app can be found at:
https://ivoclar.com/ivoclar-monitoring

To be able to use the Monitoring app, the IoT feature must be enabled in the settings menu.

The Ivoclar Monitoring app is currently available in selected countries only.
Detailed information regarding the availability in your country can be found at:
https://ivoclar.com/ivoclar-monitoring



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5.8 Digital Shade Assistant (DSA) function

The Programat P710 G2 is equipped with a function to determine the tooth shade based on three selected reference teeth.

The process of shade determination is divided into two parts:
- Determining the reference teeth and imaging involving the patient (clinical part)
- Evaluating the image data by means of the DSA function directly with the Programat P710 G2 in the laboratory.

These Operating Instructions describe the procedure in the laboratory. Instructions on determining the reference teeth and image taking are enclosed in the DSA Holder Kit and the DSA Starter Kit.

Using the Digital Shade Assistant function of the Programat P710 G2

Press the DSA key on the membrane-sealed keypad to start the Digital Shade Assistant function.

1. Selecting the image source

Store the image data of the patient either on an USB flash drive or an SD memory card and connect it with the furnace. As an alternative, images can be transmitted to the furnace by means of the PrograBase X10 computer software.

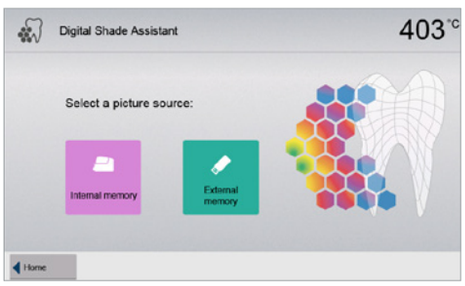
After the start of the DSA function, the following image sources are available:

Internal memory:

Images can be saved in the internal memory of the furnace with the help of the "PrograBase X10" computer software. For that purpose, connect the furnace with a laptop/PC, on which PrograBase X10 has been installed, via WLAN or LAN.

External memory:

USB data carriers (e.g. USB flash drive, external hard drive etc.) can be connected to the ceramic furnace. Additionally, the furnace is equipped with an integrated SD memory card reader.

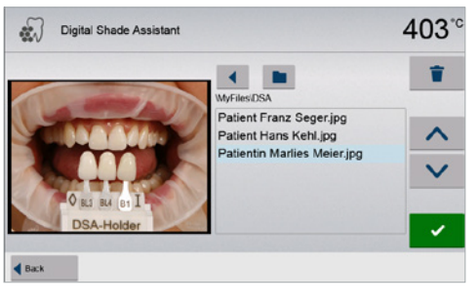


2. Selecting the image and starting the analysis

The desired jpg file can be selected on the right side of the display. The left side of the display contains a preview.

You can switch to the next or previous jpg file by pressing the **[Arrow Up/Down]** buttons.
The marked folder can be opened by clicking the **[Open]** button.
The folder can be left by clicking the **[Back]** button.
The image displayed can be deleted by clicking the **[Delete]** button.

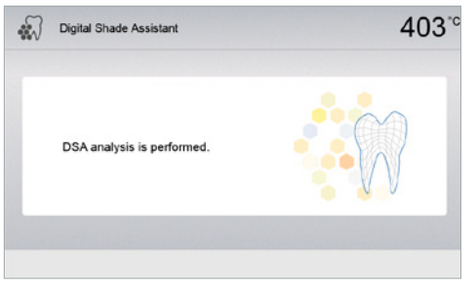
The analysis of the displayed image can be started by pressing the green button.



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3. Automatic analysis is conducted

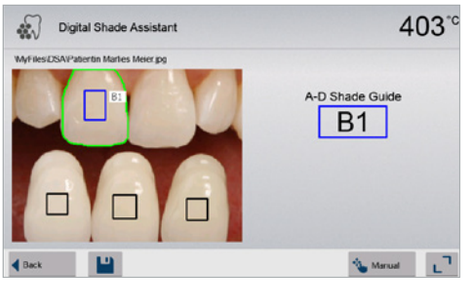
This screen is shown during the automatic analysis.



4. Result of the automatic analysis

The tooth to be analyzed (green frame) and the three shade guide teeth as well as their orientation (inicisal edge to cervical edge or incisal edge to incisal edge) are automatically recognized. The software compares the tooth to be analyzed with the reference teeth.

The result of the shade analysis is shown directly on the tooth to be analyzed as well as on the right side of the screen (shade B1 in this example).

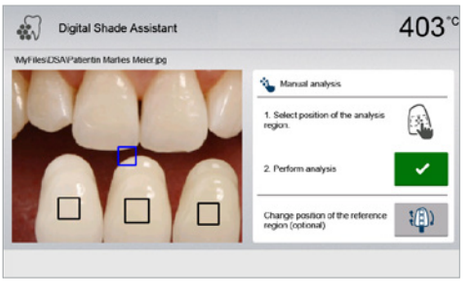


5. Conducting a manual analysis

The position of the manual analysis section can be selected by pressing the **[Manual]** button. The blue rectangle can be moved on the touch screen with a finger.

The manual analysis can be started by pressing the green button.

As an option, the position of the reference areas can be changed by pressing the **[Position]** button.



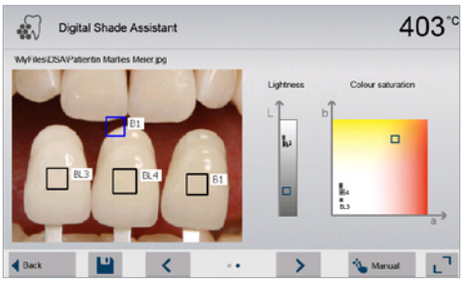
6. Result of the manual analysis

The manual analysis section is compared with the three shade guide teeth. The designation of the shade guide tooth that is most similar to the section to be manually analyzed, is shown as the result.

The right side of the screen shows the values of the analysis in a graphic diagram:
L –> Brightness
B, A –> Saturation
The blue square indicates the value for the tooth to be analyzed. Additionally, the values for the three reference teeth are indicated.

The manual analysis can be conducted any number of times.

You can toggle between the automatic result and the manual result with the arrow keys.



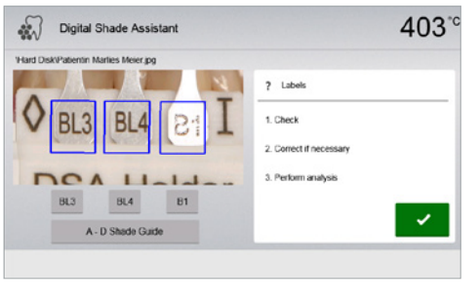
Please refer to the specialized literature for further information about the Lab colour space.

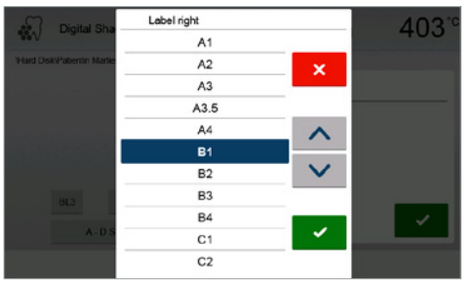
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7. Verifying the designations (correcting)

If the designations of the shade guide teeth cannot be clearly recognized, this screen is shown. The recognized designations are shown in the three buttons below the image. If necessary, this designation can be corrected by pressing the corresponding button.

Finally, the analysis can be conducted by pressing the green button.



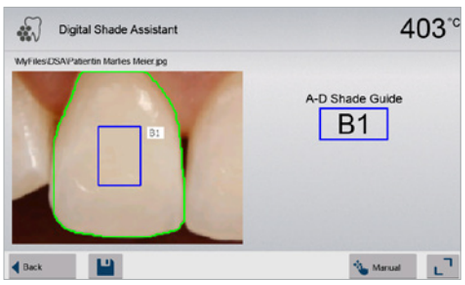


8. Moving an image section and zooming

The image section can be moved on the touch screen with a finger.



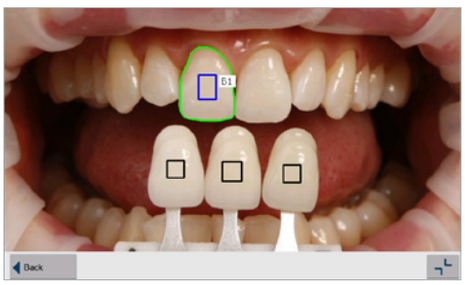
By double-clicking the touch screen, the image section can be enlarged and reduced again.



9. Full screen view

The **[full screen]** button is used to switch to the full screen view.

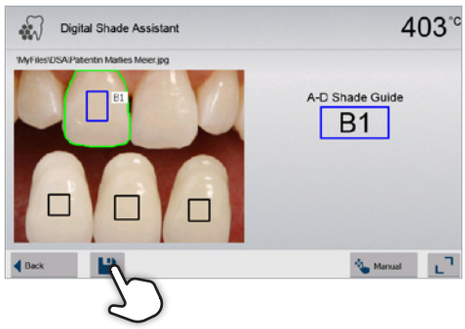
The corresponding button is used to end the full screen view.



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10. Log function

The current shade analysis can be saved as a log file by tapping the **[Disk]** button. The log file can be printed via the PrograBase X10 software or stored as a PDF file.



The DSA results greatly depend on the determination of the three reference teeth and optimum picture taking. The designation of the reference tooth that is most similar to the tooth to be analyzed is shown as the result. If the reference teeth are incorrectly determined or unfavourable pictures are taken, the DSA result will also be incorrect. Further development of the software not excluded.

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6 Practical Use

The operating procedure for the Programat P710 G2 will be explained with the help of two examples: one Ivoclar and one individual program.

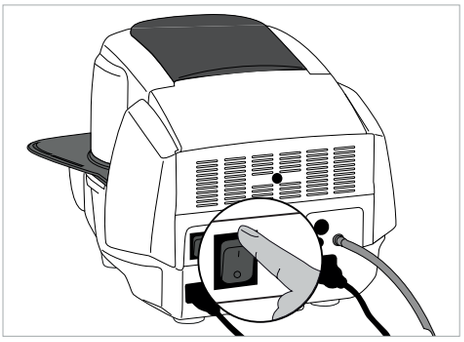
6.1 Firing with an Ivoclar program

Step 1:

Switching on

Switch on the furnace with the mains switch at the rear of the furnace. The furnace conducts an automatic self-test.

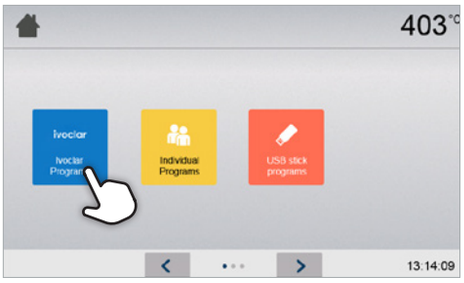
Wait until the furnace has reached the set stand-by temperature and/or the Optical Status Display (OSD) lights up green.



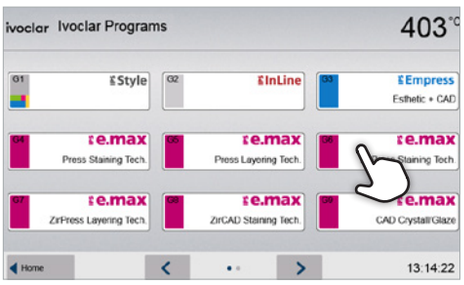
Step 2:

Select the program

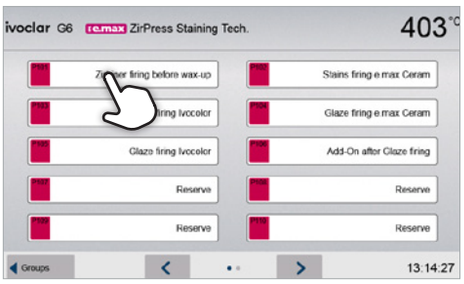
After the self-test, the display shows the home screen. Press the **[Ivoclar programs]** button.



Select the desired program group



Select the desired program

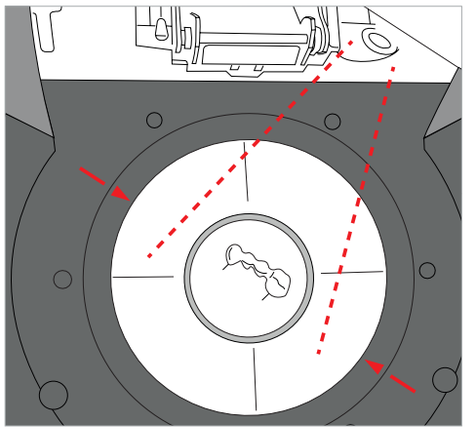


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Step 3:

Load the furnace

Open the furnace head with the OPEN FURNACE HEAD key and place the object on the firing tray in the furnace.

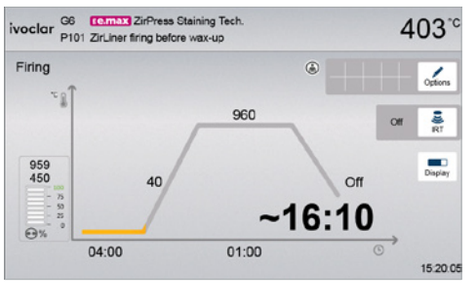


With the infrared technology active, position the objects in such a way that the infrared camera has a wide view of the objects. Use the markings on the frame plate (see Figure) for orientation purposes.

Step 4:

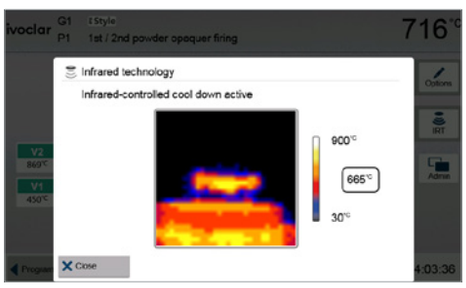
Starting the program

Press the START key to start the program. The LED lights up in green. You can observe the course of the program on the firing curve display.



The IRT key (see Chapter 5.1.2) is used to switch to the view of the infrared camera during the closing and predrying process. The corresponding key is pressed again to return to the firing curve display.

The furnace head opens automatically at the end of the program. If IRT was activated, the IRT2 function is started during cooling. The function measures the temperature of the fired objects and shows it on the right next to the IRT image.



Once the object has reached the ideal removal temperature, the display shows a corresponding notification and the cooling time elapsed.

As soon as the OSD lights up in green, the furnace is ready for the next program start.



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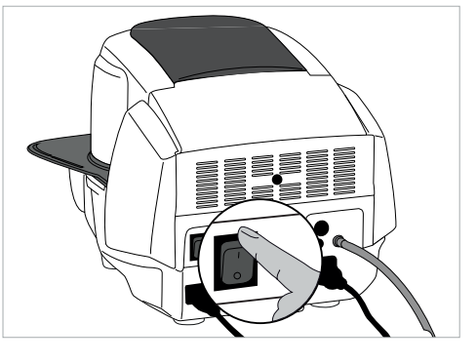
6.2 Firing with an individual program

Step 1:

Switching on

Switch on the furnace with the mains switch at the rear of the furnace. The furnace conducts an automatic self-test.

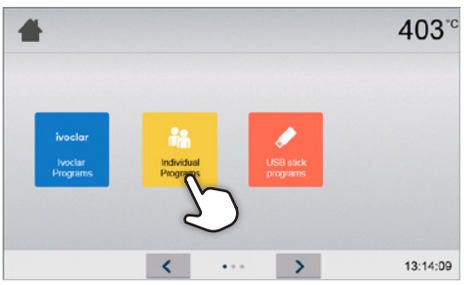
Wait until the furnace has reached the set stand-by temperature.



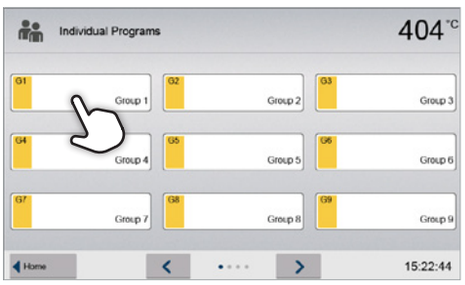
Step 2:

Select the program

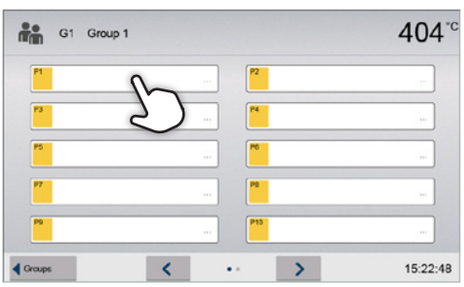
After the self-test, the display shows the home screen. Press the **[Individual programs]** button.



Select the desired program group



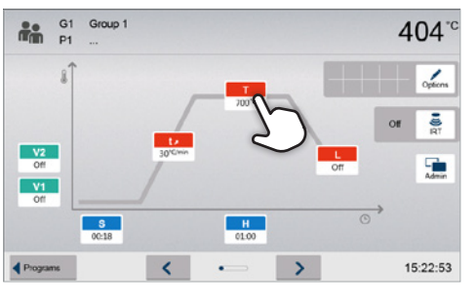
Select the desired program



Step 3:

Entering the parameters

Enter the individual parameters and create the desired firing program (See Chapter 5.2.3 for details).

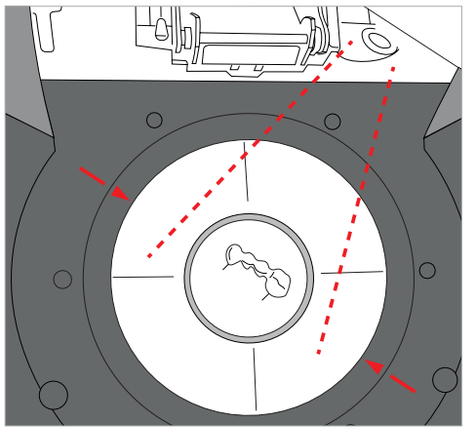


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Step 4:

Load the furnace

Open the furnace head with the OPEN FURNACE HEAD key and place the object on the firing tray in the furnace.

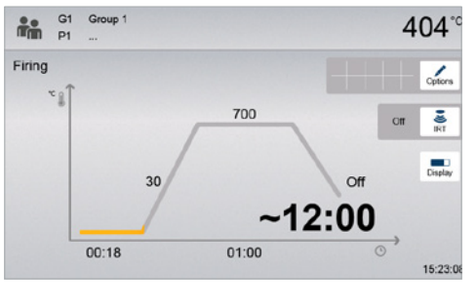


With the infrared technology active, position the objects in such a way that the infrared camera has a wide view of the objects. Use the markings on the frame plate (see Figure) for orientation purposes.

Step 5:

Starting the program

Press the START key to start the program. The LED lights up in green. You can observe the course of the program on the firing curve display.



The IRT key (see Chapter 5.1.2) is used to switch to the view of the infrared camera during the closing and predrying process. The corresponding key is pressed again to return to the firing curve display.

The furnace head opens automatically at the end of the program. If the Optical Status Display (OSD) lights up green, the furnace is ready for the next program start.

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6.3 Important notes on the use of the infrared technology

The following notes on the Infrared Technology have to be observed to obtain meaningful and correct measuring results from the infrared camera.

Note	
Loading the furnace	With the infrared technology active, position the objects in such a way that the infrared camera has a wide view of the objects. Use the markings on the frame plate (see Figure in Chapter 6.1) for orientation purposes. If possible, always place the objects on firing pins. **Do not load the firing chamber with an already heated object. In back-to-back firing cycles, the object must always be adequately cooled down.**
Active process	If a program has been started and the infrared camera is active, the objects must not be moved during the closing and predrying process. This results in faulty measurements and in the closing process being aborted.
Firing tray	Firing trays that are not coordinated with the furnace or fitted firing trays can change the temperature at the objects by +/– 20°C and more! Exclusively use the original Programat firing tray or the special firing trays indicated for the respective materials. If another firing tray is used, make sure that the height of the tray corresponds with that of the original firing tray. Higher trays result in faulty measurements of the infrared camera.
Unsuitable firing objects and materials	Basically, temperature measurement with the infrared camera cannot be conducted on metal structures. Therefore, the IRT function must not be used for oxidation firings of metal frameworks! Veneered metal frameworks with retentions or a holding pin have to be placed in such a way that the retentions or holding pin are not caught by the camera, as this may affect the correct temperature measurement. Unused firing pins or fan pins should be removed or placed outside the viewing range of the infrared camera. When firing very flat objects (e.g. veneers) directly on the honey-comb firing tray or firing pillow, as well as when platinum foil is used, the IRT function must not be used!
Several objects	If several and different objects are fired together, large and massive objects have to be preferentially shown to the camera, while small objects can be positioned behind the large objects. Wet objects should face the infrared camera. Touch-dried objects can be positioned behind freshly fabricated and wet objects. Adding additional objects after the start of the process may result in faulty measurements and the closing process being aborted.
Sources of interference	Heat sources within the viewing range of the furnace may interfere with the temperature measurement. In certain cases, this may result in unusually long processes. Sources of interference may include light bulbs, heaters, air conditioners or another furnace. Sources of interference in the viewing range of the infrared camera can be easily recognized if the corresponding view is activated. If the source of interference cannot be removed, the interference may be eliminated by slightly rotating the furnace. The view on the objects must not be obstructed at any time after the start of the program. This results in the closing process being aborted. If objects from a previous firing cycle are cooling on the cooling plate, they should be placed outside the viewing range of the infrared camera if possible.

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7 Maintenance, Cleaning, Diagnosis

This chapter describes the user maintenance and cleaning procedures for the Programat P710 G2. Only those tasks are listed that may be performed by dental professionals. All other tasks must be performed by qualified service personnel at a certified Ivoclar Service Centre.

7.1 Monitoring and maintenance

The time for these maintenance procedures depends on the frequency of use and the working habits of the users. For that reason, the recommended times are only approximations.

Hazardous area	Part	When
Check all plug-in connections for correct fit.	Various external connections	weekly
Check if the furnace head opens smoothly and without excessive noise.	Furnace head opening mechanism	monthly
Check if the thermocouple is straight and in the right place	Thermocouple	weekly
Check the insulation for cracks and damages. If the insulation is worn down it has to be replaced by a certified Ivoclar After Sales Service Centre. Fine hairline cracks on the surface of the insulation are harmless and do not adversely affect the function of the furnace.	Insulation	monthly
Check if the sealing rims of the furnace head and furnace base are clean and undamaged.	Sealing rims of the furnace head and the furnace base	weekly
Check the membrane-sealed keypad for visible damage. If the membrane-sealed keypad is damaged, it has to be replaced by a certified Ivoclar After Sales Service Centre.	Membrane-sealed keypad	weekly
Conduct temperature check: Use the temperature checking set to check and adjust the temperature in the furnace.	Firing chamber	every six months
Check the quartz glass cylinder to make sure the quartz glass is not defective.	Firing chamber	daily
Check if there is condensate in the vacuum hose or firing chamber.	Vacuum hose, Firing chamber	monthly

This furnace has been developed for typical use in dental laboratories. If the product is used in a production enterprise, for industrial application and for continuous use, premature ageing of the expendable parts has to be expected. The expendable parts are, e.g. the heating muffle, furnace head seal or the insulation material.

Expandable parts are not covered by the warranty. Please also observe the shorter service and maintenance intervals.

In general, the furnace head should not be replaced since the components (furnace head and furnace base) have been coordinated with each other. However, if the furnace head must be replaced for maintenance reasons, subsequent temperature calibration is required.

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7.2 Cleaning

The furnace may only be cleaned when it is cool, since there is a burn hazard. Do not use any cleaning solutions. Disconnect power before cleaning.

The following parts have to be cleaned from time to time:

Item	Frequency	Cleaning material
Furnace housing and furnace head	If required	Soft, dry cloth
Membrane-sealed keypad and display	If required	Programat cleaning cloth
Cooling tray	Daily	Cleaning brush*
Insulation	Daily	Cleaning brush*
Sealing rim of the furnace head and the sealing surface	Daily	Cleaning brush and a soft cloth
Firing table	If required	Cleaning brush or sandblasting unit (with glass beads)
Infrared camera	If required	Programat cleaning cloth

*Never clean with compressed air!

7.3 Service note

When the service note appears for the first time, the furnace has already more than 1500 firing hours. If the service note is acknowledged, is will reappear every 1000 firing hours.

Ivoclar recommends to conduct a heater test after a certain number of firing hours and have the heating muffle examined by Ivoclar After Sales Service if necessary.

7.4 Stand-by

We recommend keeping the furnace head closed, especially if the temperature drops below 150°C. If the furnace head is open, there is a risk that the insulation absorbs humidity and condensation water develops during firing. This negatively affects the vacuum performance and, consequently, the firing results.

7.5 Power-saving mode

If the furnace is not used for longer periods of time, Ivoclar recommends to activate the power-saving mode. With the power-saving mode activated, individual components are switched off and the furnace temperature is reduced to 100°C.

7.5.1 Automatic power-saving mode

The automatic power-saving mode can be activated in the Settings menu.

If the power-saving mode is activated and the furnace head closed, this function is automatically started after 30 minutes, if the furnace is on stand-by and no key is pressed during that time. The display shows the power-saving icon. Pressing any key ends the automatically activated power-saving function.

7.5.2 Power-saving key

The power-saving mode can be manually activated by pressing the POWER-SAVING key. This is only possible with the furnace head closed and the furnace on stand-by. The display shows the power-saving icon. Pressing any key ends the power-saving function.

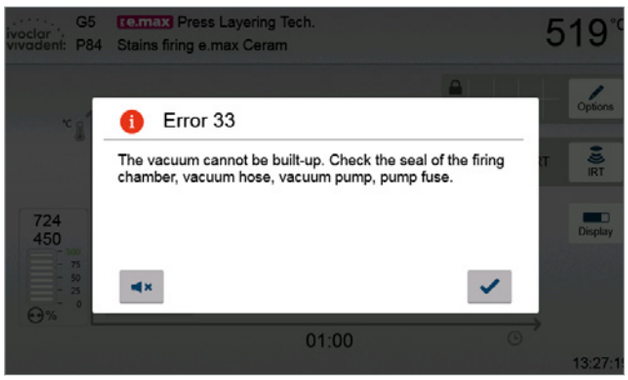
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8 What If ...

This chapter will help you to recognize malfunctions and take appropriate measures or, if possible and acceptable, to perform some simple repairs.

8.1 Error messages

During operation, the furnace continuously monitors all the functions. If an error is detected, the respective error message is displayed.



The acoustic signal and the error message can be acknowledged with the corresponding buttons.

The following error messages may be displayed. If there are any questions, please contact the Ivoclar After Sales Service.

Error / Hint No.	Work can continue after the error	Error	Text Error Message
2	yes	T < B	Enter an acceptable value for T.
7	yes	V13 < T2	Enter a lower value for T2 or a higher value for V13.
8	yes	L > T	Enter an acceptable value for long-term cooling L.
9	yes	V2x <= V1x	Enter an acceptable value for the vacuum-on temperature V1x or the vacuum-off temperature V2x.
10	yes	V2x > Tx + 1°C	Change either the vacuum values or the holding temperature T.
11	yes	Incorrect values for V1x, V2x	Enter plausible values for V1x, V2x.
12	yes	L2>L1	Enter a lower value for L2 or a higher value for L1.
13 *,**	yes	Current temperature after start > Tx + 80°C	Caution: Excess temperature! Program aborted; furnace head opens to cool down the furnace.
14 *	yes	Temperature in the firing chamber > 410 °C at the start of the calibration program, i.e. too high.	Temperature too high for calibration. Furnace is cooling down! Try restarting the program later.
15	yes	T3<T2	Enter a lower value for T2 or a higher value for T3.
16	yes	T2 < T1	Enter a lower value for T1 or a higher value for T2.
17	yes	Power failure > 10 s during a firing program in progress	A program in progress was interrupted for more than 10 s. The program cannot be continued.
18	yes	T1 > V12	Enter a lower value for T1 or a higher value for V12.
19	yes	V2 < B	Prevacuum activated! V2 must be higher than B.
20 **	no	Error in the heating system	Check the heater fuse. If the fuse is O.K., contact your local Ivoclar Service Centre.
23		Heating muffle very old	The heating muffle is very old. It is recommended to replace it by a new one. After this error message has been confirmed, a program may still be started.
24		Heating muffle defective	The heating muffle is in such poor condition that it has to be replaced immediately.
26		Temperature > B + 160°C at start firing program	Firing chamber is too hot for the start of a firing program.

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27 **,***	no	Furnace head cannot be initialized	The furnace head cannot be brought to the end position. It might be blocked by external mechanical influences! If this is not the case, contact your local Ivoclar Service Centre.
28 **		The furnace head does not reach the target position	Furnace head does not open/close correctly. The furnace head is obstructed or has been moved by hand. Operate the furnace head only with the keys intended for that purpose.
32 **	no	The vacuum is not released	The vaccum cannot be released. The vacuum valve might be stuck or dirty. Contact a Service Technician.
33		Necessary vacuum (xxxmbar) is not reached within 1 min	The vacuum cannot be built-up. Check the seal of the firing chamber, vacuum hose, vacuum pump, pump fuse.
106		Timer active – device is in standby	The program cannot be started, because the unit was put into stand-by mode by the timer (heating turned off). Deactivate the timer or extend the time frame to be able to execute programs.
109		Incorrect value for HV or V2	Enter plausible values for HV or V2.
110		HV > H (H2)	Enter a lower value for HV or a higher value for H (H2).
111		Max. number firing protocols reached	The maximum number of firing program protocol entries has been reached. A repeated protocol will delete / overwrite existing entries.
150		Memory error	Internal memory error. Please restart the device.
531	yes	Error while trying to store firing data	An error occurred while logging firing program data. The storage medium may be full.
702		Brief power failure during a program in progress	A program in progress was interrupted by a short power outage. The program is being continued.
800		Final vacuum value not reached	The set vacuum end value could not be achieved. Check the vacuum pump.
801		Vacuum drop	An unacceptable vacuum drop has occurred.
802		The vacuum does not increase (self-test)	A vacuum increase could not be measured! Check the following points: Is the firing chamber tight (no contamination on the sealing surfaces)? Is the vacuum hose connected? Is the vacuum pump connected? Is the fuse F1 in order?
803		The vacuum system is not tight	The tightness of the vacuum system is not given. Check the sealing surfaces for possible contamination.
1302 **		ATK2-calibration: preheat 962°C	Error during calibration. Sample might be incorrectly inserted. Try again with a new sample and make sure the sample shows the correct contact.
1501	yes	Hint -> working hours	The heating muffle has ****working hours. Please perform a heating test (diagnosis) and follow the instructions on the display and in the Operating Instructions.
1510		Temperature > VT at the start of a firing program	The temperature of the firing chamber is higher than the predrying temperature. To continue the programm nevertheless, press the Start button.
1522		SW-update:	An error occurred during the software update. Do NOT switch off the furnace. Try again. If the error reoccurs, try an update via the USB interface.
1541		Error during copying a file	An error occurred while copying the file. Possible causes: File too large, invalid data type
1800	yes	USB stick	No USB memory stick available.
1815	yes	USB stick	There is no USB stick available or the stick is not prepared as an external program memory. The USB stick can be prepared in the settings menu.
1820	yes	USB stick	The USB memory stick is already prepared for programs.
1825	yes	USB stick	Please unplug all USB devices and then just plug in the USB memory stick to be prepared.
1830	yes	USB stick	Not enough free memory.
1835	yes	Media playback	Playback of the file is not possible.
1900	yes	Data backup – recover	The new software contains setting options which were not yet available at the time of the data backup. Only the existing settings of the data backup were restored.
1901	yes	Data backup – recover	The new software contains program parameters which were not yet available at the time of the data backup. Only the existing program parameters of the data backup were restored.

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1902	yes	Data backup – recover	The new software includes program groups which were not yet available at the time of the data backup. Only the existing program groups of the data backup were restored.
1911	yes	Data backup – recover	The new software includes program parameters which were not yet available at the time of the data backup. Please check the individual program groups. The individual programs are no longer valid.
1912	yes	Data backup – recover	The new software includes program groups which were not yet available at the time of the data backup. Please check the individual program groups. The individual program groups are no longer valid.
1920	yes	Data backup – recover	The data backup could not be performed. Please install a newer software version.
2010	yes	DSA	The tooth region was not determined.
2020	yes	DSA	The 3 shade guide teeth were not found.
2030	yes	DSA	The contour of the tooth was not determined.
2041	yes	DSA	The analysis region and the references differ significantly.
2042	yes	DSA	The analysis region is invalid. Select an analysis region on a tooth surface.
2100	yes	DSA	Unexpected error (# ****)
2754	yes	Error self-test	An error occurred while checking the infrared camera. Please switch the furnace off and on again. If the error persists, please contact your Service Center.
2755	yes	Error self-test	An error occurred while checking the infrared camera. Please switch the furnace off and on again. If the error persists, please contact your Service Center.
2756	yes	Error self-test	An error occurred while checking the infrared camera. Please switch the furnace off and on again. If the error persists, please contact your Service Center.
2757	yes	Error self-test	An error occurred while checking the infrared camera. Please switch the furnace off and on again. If the error persists, please contact your Service Center.
2758	yes	Error self-test	An error occurred while checking the infrared camera. Please switch the furnace off and on again. If the error persists, please contact your Service Center.
2759	yes	Error self-test	An error occurred while checking the infrared camera. Please switch the furnace off and on again. If the error persists, please contact your Service Center.
2760 **	yes	Error IRT	Check the orientation and positioning of the objects. The objects are possibly too small or are placed in an unfavourable position on the firing tray. Check if the protective foil has been removed from the sensor or if the sensor has been contaminated. Check if a correct firing tray is used. The height of the firing tray must correspond with the height of the firing trays recommended for the respective materials by Ivoclar.
2761 **	yes	Error IRT	Check the orientation and positioning of the objects. The objects are possibly too small or are placed in an unfavourable position on the firing tray. The object was not sufficiently dried in the specified time. Please repeat the procedure after the object has cooled down.
2762 **	yes	Error IRT	An error occurred while trying to identify the object. Check if interfering heat sources are in the visual range of the infrared camera. Sources of interference are for example: other furnaces, air conditioning systems, heaters, light bulbs, Bunsen burners, etc. Do not move the objects after the start of a program.

* Furnace head opens if this error occurs!
** A program in progress is aborted
*** Error cannot be acknowledged; programs cannot be started.

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8.2. Additional error messages

Please contact the Ivoclar After Sales Service Centre, if one of the following error numbers is being displayed:

25, 29, 43, 44, 45, 46, 47, 48, 56
103, 107, 108, 143, 144, 145, 146, 147, 148
700, 701, 703, 704, 707, 1010, 1011, 1012, 1013
1014, 1015, 1016, 1017, 1018, 1019, 1024, 1025, 1026
1028, 1143, 1144, 1145, 1146, 1147, 1148, 1207, 1300
1301, 1303, 1304, 1305, 1401, 1402, 1500, 1750, 1751
1752, 1753, 2001, 2002, 2750, 2751, 2752, 2753, 2763, 2770

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8.3 Technical malfunctions

These malfunctions may occur without an error message being displayed:

Error	Double-Check	Action
Vacuum is not or only slowly released	Is the vacuum released within approx. 30 seconds?	Wait until the vacuum has been released and remove object. Switch the furnace on and off again. *
Indication on display incomplete	Activate the display test program. *	*
Display not illuminated	Is the furnace properly connected according to the Operating Instructions and switched on?	Correctly connect the furnace and switch it on.
Signal transmitter does not sound.	Is the signal transmitter switched off (Volume = 0)?	Adjust volume.
Furnace head does not open	Was the furnace head opened manually?	Open the furnace head only by using the corresponding keys. Switch furnace off and on again.
	Has the vacuum already been released?	Is the program still running? Wait until the program is completed. Switch the furnace on and off again. *
Vacuum pump does not start working	Is the vacuum pump fuse defective?	Check fuse and replace if necessary.
	Was the maximum power consumption exceeded?	Use only the vacuum pump recommended by Ivoclar.
	Is the vacuum pump correctly connected?	Correctly connect the vacuum pump to the furnace base.
Final vacuum is not reached	Is the vacuum hose OK?	Check vacuum hose and hose connection (from the furnace to the pump and from the furnace head to the furnace base).
	Is the pump output OK?	Start the vacuum test program.
	Humidity/condensation in the vacuum hose?	Start dehumidification program.
Incorrect of illogical temperature indication	Is the thermocouple bent or fractured?	Contact your local Ivoclar After Sales Service Centre.
	Is the thermocouple correctly connected?	Correctly connect thermocouple.
	Is the thermocouple plug defective?	*
Cracks in the insulation	Are the cracks small and insignificant (hairline cracks)?	Small cracks in the muffle do not negatively affect the performance of the furnace.
	Are the cracks large or have parts of the insulation broken off?	*
Cracks in the quartz glass / heating element	Are there cracks in the quartz glass or is the quartz glass sheathing of the heating wire broken?	Switch off the furnace. *
Firing result does not meet the expectations	Are the firing parameters correct?	Set the firing parameters in accordance with the instructions by the material manufacturer
	Has a suitable firing tray been used?	Use the original Programat firing tray or the special firing tray recommended for the respective material.
	Was the furnace calibrated?	Conduct a furnace calibration.
	Is the thermocouple bent or damaged?	*
No wireless LAN icon in the information bar.	Has the furnace been connected to the Internet?	Connect the furnace to the Internet via wireless LAN.
The IoT function of the furnace does not work.	Has the IoT function of the furnace been activated?	Activate the IoT function in the settings. More information can be found at www.ivoclar.com/digitalservices

*If there are any questions, please contact the Ivoclar After Sales Service.

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8.4 Repairs

Repairs may only be carried out by a certified Ivoclar Service Centre. Please refer to the addresses on the last page of these Operating Instructions.

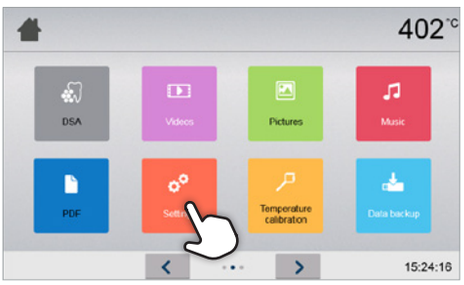
If repairs during the warranty period are not carried out by a certified Ivoclar Service Centre, the warranty will expire immediately. Please also refer to the corresponding warranty regulations.

8.5 Reset to factory settings

If the furnace has to be reset to its original condition, the factory settings can be loaded. In this process, all programs, melodies and volume adjustments are irrevocably reset to the factory settings.

For this purpose, proceed as follows:

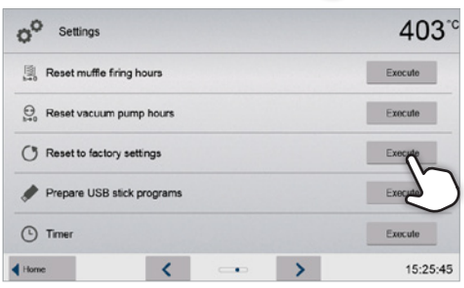
1. **Open Settings**
Scroll to page 2 in the home screen and press the **[Settings]** button.



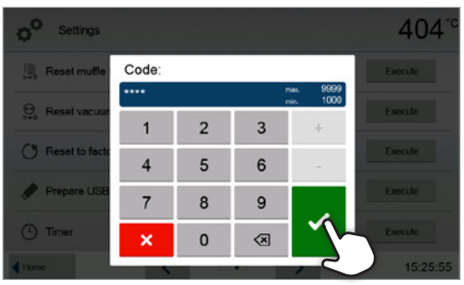
2. **Open "Reset to factory settings"**
The **[Arrow]** button is used to scroll through the Settings menu. Press the button until the setting "Reset to factory settings" appears in the display.



3. **Reset to factory settings**
Press the touch button **[Execute]** in "Reset to factory settings".



4. **Entering the user code**
Enter the user code (1234) and confirm the entry with the green button or cancel the entry with the red button.

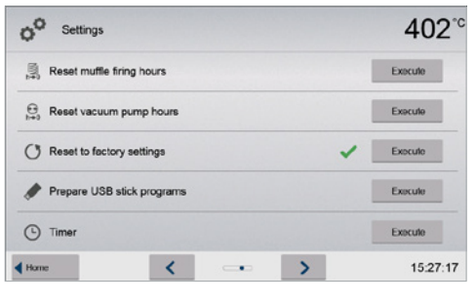


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5. Complete resetting to factory settings
The following messages are displayed:

✔ Reset to factory settings successful

✘ Reset to factory settings failed



To return to the home screen, press either the touch button [Home] in the navigation bar or the Home key on the membrane-sealed keypad.

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9 Product Specifications

9.1 Delivery form

- Programat P710 G2
- Power cord
- Vacuum hose
- Programat Firing Tray Set 2
- Automatic Temperature Checking Set ATK 2 (test set)
- LAN download cable
- Programat WLAN Kit
- Programat Bluetooth Kit
- DSA Holder Kit
- var. accessories

Recommended accessories:
- Temperature Checking Set ATK 2
- Vacuum pump VP5, VP3 easy

9.2 Technical data

Power supply	110 – 120 V / 50 – 60 Hz 200 – 240 V / 50 – 60 Hz
Overvoltage category	II
Contamination level	2
Acceptable voltage fluctuations	± 10 %
Max. power consumption	14 A at 100 V 12 A at 110 – 120 V 8 A at 200 – 240 V
Acceptable data for pumps of other manufacturers: Max. output Final vacuum	 250 W /max. leakage current 0.75 mA < 50 mbar Only tested pumps should be used.
Electrical fuses	110 – 120 V: 125 V / T15A (heating circuit) 125 V / T5A (vacuum pump)
	200 – 240 V: 250 V / T8A (heating circuit) 250 V / T3.15A (vacuum pump)
Dimensions of electrical fuses	110 – 120 V: Diameter 6.3 x 32 mm 200 – 240 V: Diameter 5 x 20 mm
Dimensions of the closed furnace	Depth: 495 mm Width: 320 mm / 395 mm (with cooling tray) Height: 320 mm
Usable size of the firing chamber	Diameter: 90 mm Height: 80 mm
Max. firing temperature	1200 °C (2192 °F)
Weight	18.7 kg

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Safety notes
The furnace complies with the following standards:
IEC 61010-1:2010
IEC 61010-1:2010/AMD1:2016
EN 61010-1:2010/A1:2019
UL 61010-1:2012/R:2019-07
CAN/CSA-C22.2 No. 61010-1:2012/A1:2018-11

EN 61010-2-010:2020
IEC 61010-2-010:2019
UL 61010-2-010:2019
CAN/CSA-C22.2 No. 61010-2-010:2019

Radio protection / electromagnetic compatibility EMC tested

9.3 Acceptable operating conditions

Acceptable ambient temperature range	+5°C to +40°C
Acceptable humidity range	80% maximum relative humidity for temperatures up to 31°C, gradually decreasing to 50% relative humidity at 40 °C; condensation excluded.
Acceptable ambient pressure	The furnace is tested for use at altitudes of up to 2000 m above sea level.

9.4 Acceptable transportation and storage conditions

Acceptable temperature range	–20 °C to +65°C
Acceptable humidity range	Max. 80% relative humidity
Acceptable ambient pressure	500 mbar to 1060 mbar

Use only the original packaging together with the corresponding foam material for shipping purposes.

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10 Appendix

10.1 Program table

A program table (°C / °F) is enclosed to these Operating Instructions. If not, please contact your local Ivoclar Service Centre.

Important information
The current program table is also available at: www.ivoclar.com/downloadcenter

The program tables can be downloaded from the internet as PDF files. Please make sure that your program table complies with the software version you use, as the table is coordinated with the respective software version.

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Declaration of conformity

Declaration of conformity

CE

Manufacturer Address	Ivoclar Vivadent AG Bendererstrasse 2 LI - 9494 Schaan Liechtenstein
Product	**Programat P710 / G2**
Type of material	**Dental Laboratory Equipment**
Classification	**Technical Device**

We herewith declare under our exclusive responsibility that the above mentioned products meet the provisions of the following EC Council Directives and its implementation in national law. All supporting documentation is retained on the premises of the manufacturer and, where applicable, the notified body.

Directives	2014/35/EU	Low voltage
	2014/30/EU	Electromagnetic compatibility
	2011/65/EU	Restriction of hazardous substances
Standards	EN 61010-1:2010 EN 61010-2-010:2020	
	EN 61326-1:2013 (Group 1, Class B) EN 61000-3-2:2014 EN 61000-3-3:2013	
	EN 63000:2018	
Notified Body Address	not applicable	
Place, Valid from	Schaan, 04.02.2021	
Valid until	03.02.2026	

Signature		
Name	Markus Heinz	Dipl. Ing. Gottfried Rohner
Positon	CPO Production & Logistics	Director Equipment Development
Date	04.02.2021	04.02.2021

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CE

Manufacturer
Ivoclar Vivadent AG
9494 Schaan/Liechtenstein
www.ivoclar.com

Version: 2
Date information prepared: 2024-04
Valid from software V7.0

The apparatus has been developed solely for use in dentistry. Start-up and operation should be carried out strictly according to the Operating Instructions. Liability cannot be accepted for damages resulting from misuse or failure to observe the Instructions. The user is solely responsible for testing the apparatus for its suitability for any purpose not explicitly stated in the Instructions. Descriptions and data constitute no warranty of attributes and are not binding.

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