Operating Instructions



Programat®
EP 5010 G2

Press and ceramic furnace

Valid from
software V7.0

Making People Smile

ivoclar

Dental Servis
Serdar Ayısıt
0555 274 05 51

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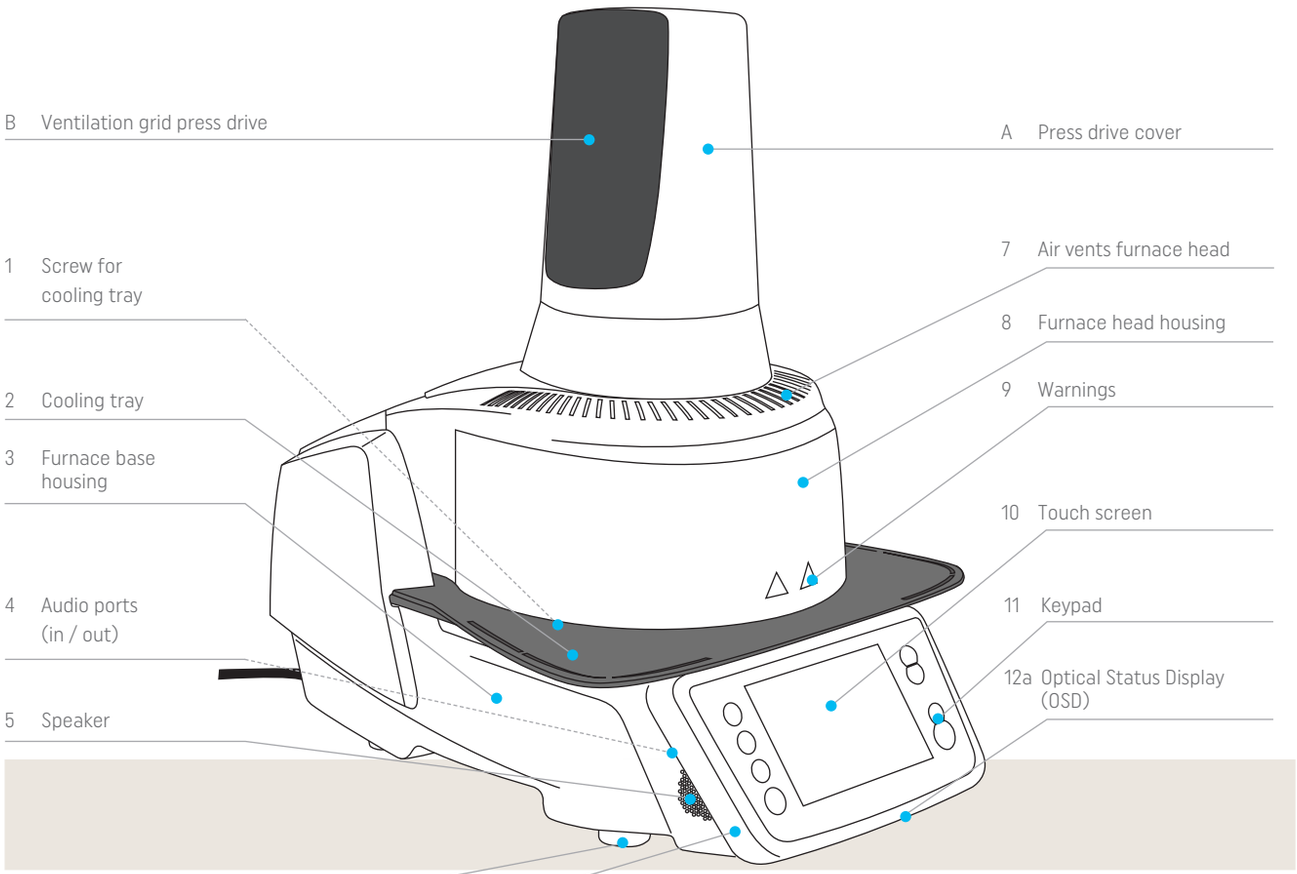
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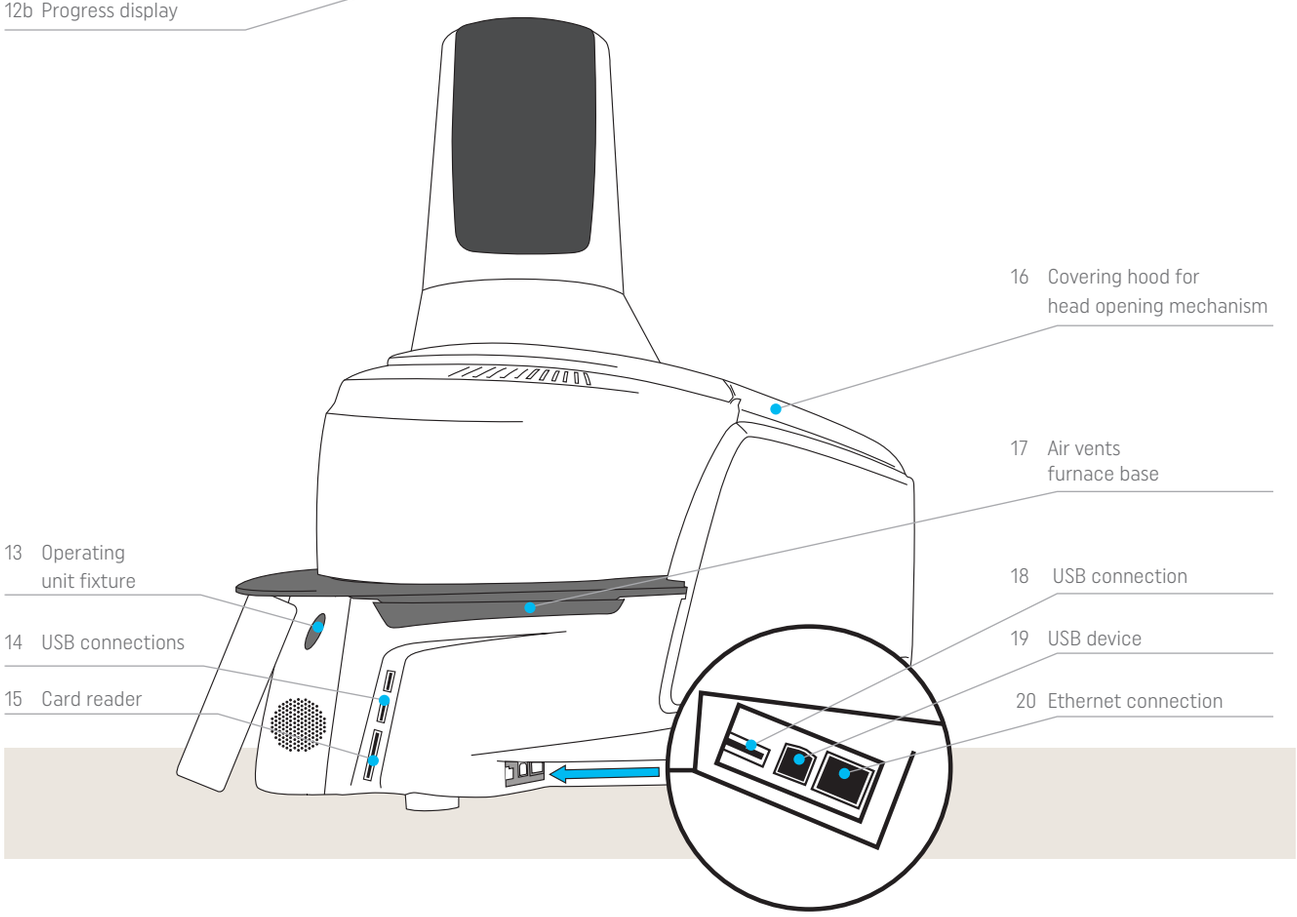
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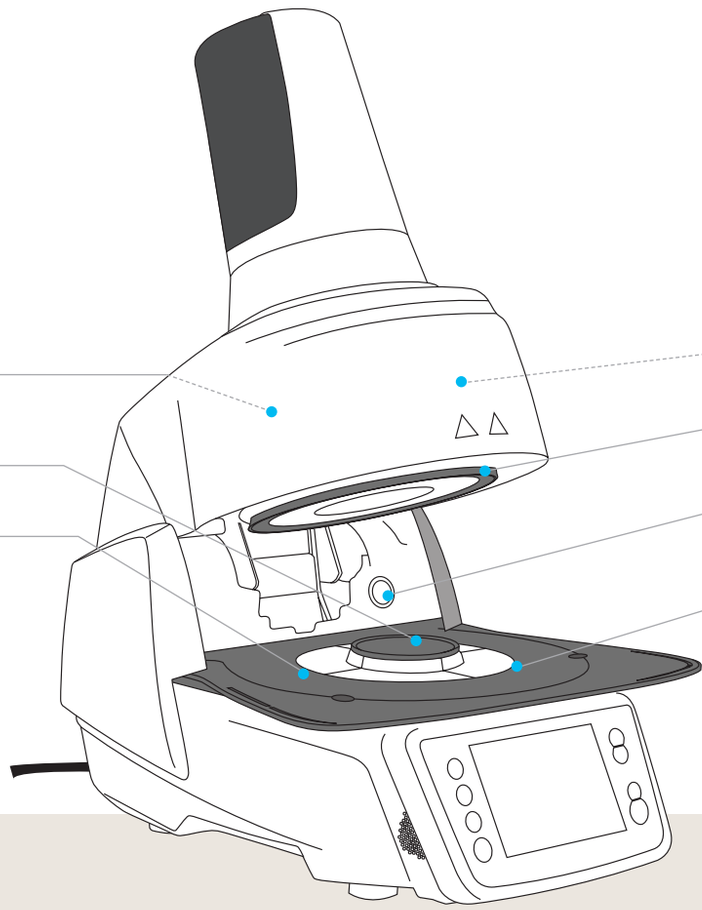
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List of parts

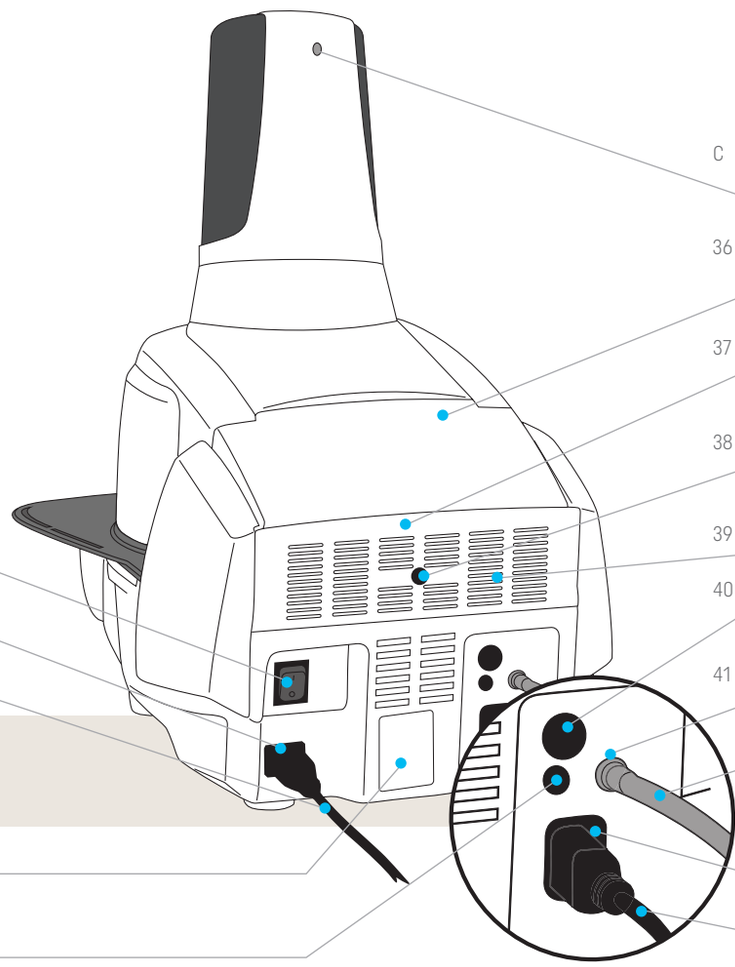




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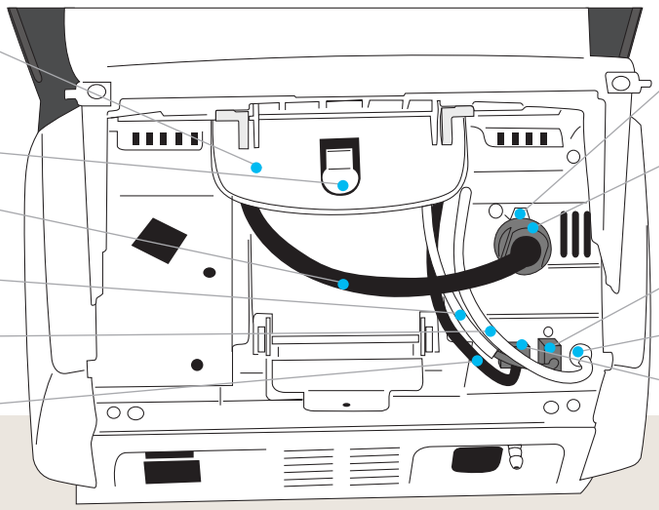


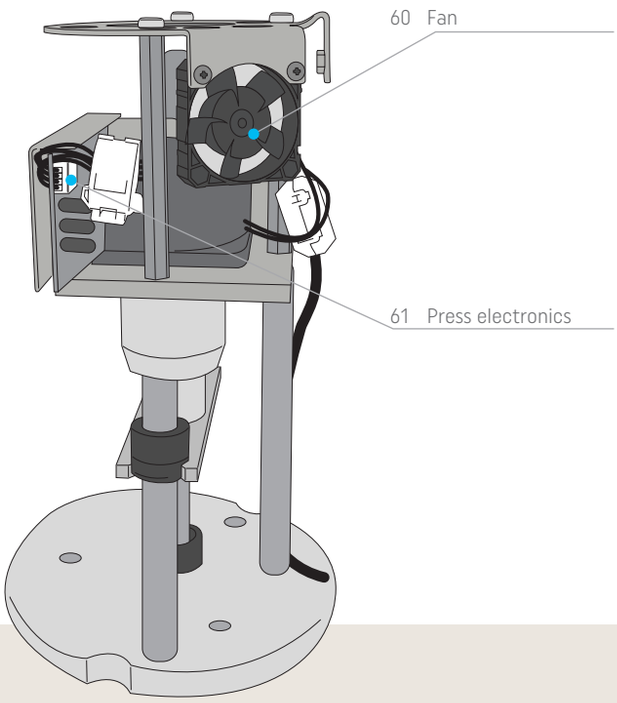
21 Insulation
22 Firing plate
23 Firing plate holder
24 Frame plate
25 QTK2 heating muffle
26 Sealing rims of furnace head
27 Infrared camera
28 Sealing surface

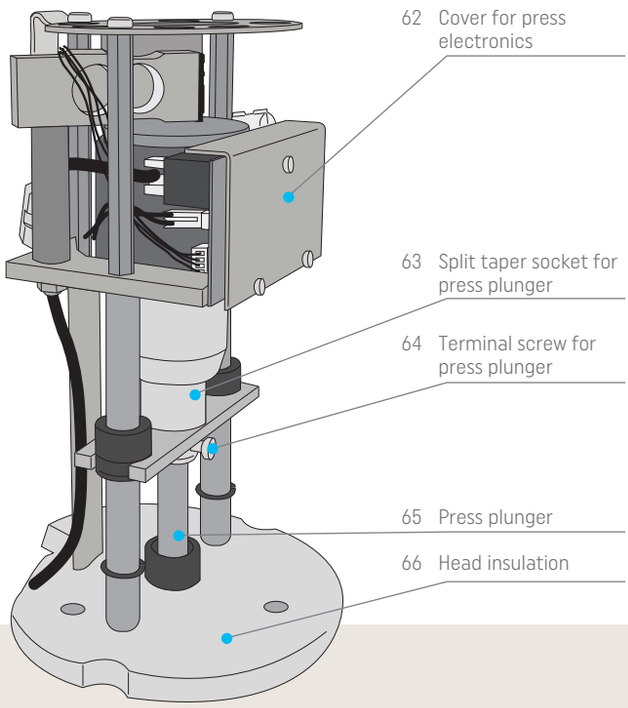


C Screw for press drive cover
29 On / Off switch
30 Power socket
31 Power cord
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34 Vacuum pump socket
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36 Covering hood for head opening mechanism
37 Connection cover
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40 Heating element fuse
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42 Vacuum hose

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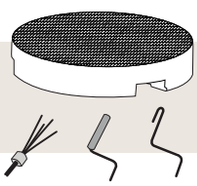




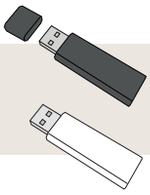
67 LAN download cable



68 Programat Firing Tray Kit 2



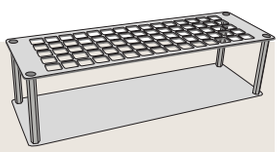
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71 Cooling grid



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Introduction

Dear Customer

Thank you for having purchased the Programat® EP 5010 G2. It is a state-of-the-art press and ceramic furnace for dental applications. The furnace has been designed according to the latest industry standards. Inappropriate use may result in certain risks. Please observe the relevant safety instructions and read these Operating Instructions carefully.

We hope that you will enjoy working with the Programat EP 5010 G2.

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1 Signs and Symbols

1.1 Signs and symbols used in these Operating Instructions

The signs and symbols used 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 EP 5010 G2
Target group: Dental technicians, dental professionals

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

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1.3 Notes on the different voltage versions

The furnace is available in 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 these 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 EP 5010 G2 or who have to carry out maintenance or repair work. This chapter must be read and the corresponding instructions followed!

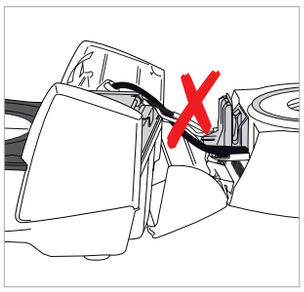
2.1 Indications

The Programat EP 5010 G2 must only be used to press and 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.

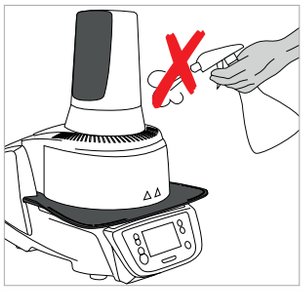
Further instructions to assure proper use of the furnace:
- The instructions, regulations and notes in these Operating Instructions must be observed.
- The instructions, regulations and notes in the material's Instructions for Use must be observed.
- The system must be operated under the indicated environmental and operating conditions (Chapter 9.3).
- The Programat EP 5010 G2 must be properly maintained.

Risks and dangers

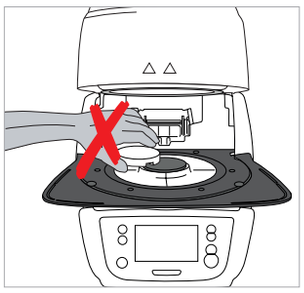
The furnace head should not be removed from the furnace base as long as the furnace head is connected by means of the heater cable.



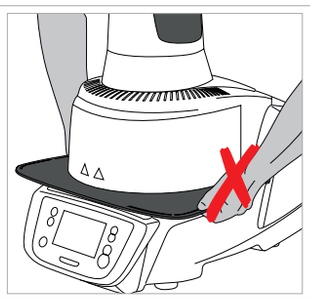
Make sure that no liquids or other foreign substances enter the furnace.



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.

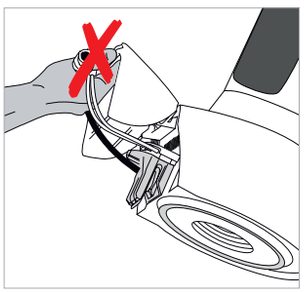


Do not carry the furnace by the cooling tray.

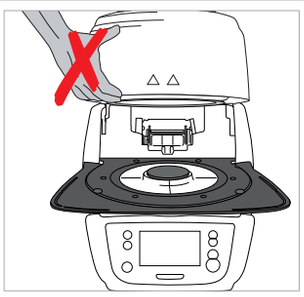


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The furnace head must not be carried by holding the cables, as there is a risk of damaging the cables and the corresponding connections.



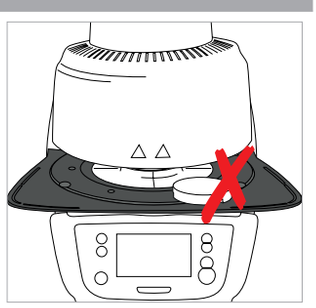
The furnace head has an electric drive and must be operated by means of the electronic controls. Never open the furnace head by hand, since the mechanism will be damaged.



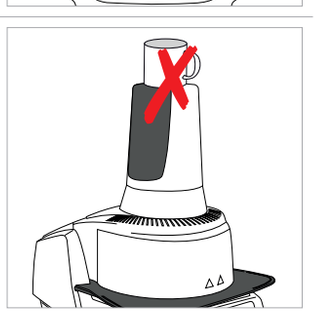
The furnace must not be operated if the quartz tube or the insulation in the firing chamber is damaged. There is a risk of electric shock upon contact with the heating wire. Avoid damage of the insulation by contact with the investment tongs or firing tongs.

Contraindications

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 electric shock.

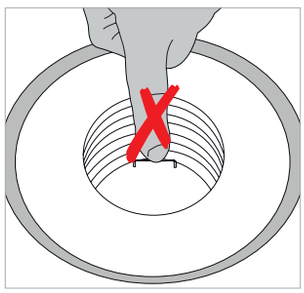


Never use the furnace without a firing plate.

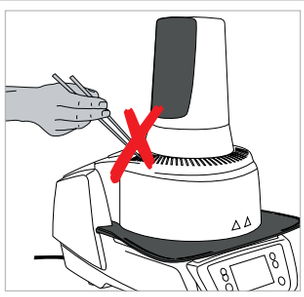


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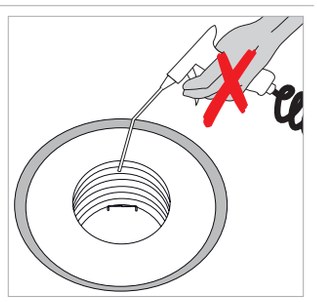
Do not touch the thermocouple or the quartz tube in the firing chamber. Avoid contact with the skin (grease contamination), as the parts will be prematurely damaged.



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



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

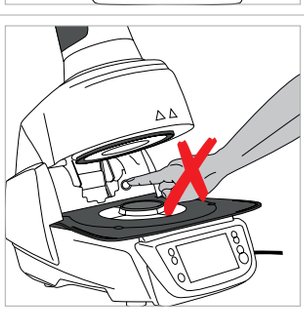


Risk of crushing / burn hazard

Never reach under the furnace head with the hand or other parts of the body. There is a risk of burning and crushing.



Never reach inside the rear cover with the hand or particularly with the fingers. 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.

- It is important that the user becomes 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 the furnace on, 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 (FI).
- The power plug acts as a circuit breaker and may only be connected with an easy-to-access power socket with protective contact.
- Only use the supplied original power cord. Do not use an inadequately measured replacement.
- 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. Burn hazard!
- When removing hot components from the firing chamber (e.g. firing plate, firing tray), make sure not to place them on a flammable surface!
- Clean the furnace only with a soft, dry cloth. Do not use solvents! Disconnect the power plug 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 the 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) must be carried out.
- Make sure that only fuses of the indicated type and rated current are used as replacements.
- 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;
  - the furnace does not work;
  - 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, it must be dried or left to adjust to the room temperature for approx. 4 hours prior to connecting power.
- The furnace is tested for use at altitudes of up to 2,000 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 EP 5010 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 a malfunction. Deliberate interruptions are not permissible.

Materials developing harmful gases must not be fired.

Warnings regarding the removal 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 Center. Information regarding the Safety Data Sheet is also available from your After Sales Service Center.

Disposal



The furnace must not be disposed with the common domestic waste. Please correctly dispose of old furnaces according to the corresponding EU council directive. Information regarding disposal can be found on the respective national Ivoclar website.

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3 Product Description

3.1 General

The Programat EP 5010 G2 is a state-of-the-art press and ceramic furnace for dental applications. The firing chamber may be heated up to max. 1200 °C by means of a heating element. The pressure for the press procedure is generated by a press drive. Furthermore, the firing chamber has been designed in such a way that a vacuum may be created with a vacuum pump. The firing / press programs are controlled with the corresponding electronic controls and software. Additionally, the set and actual temperatures are continuously compared.

The Programat EP 5010 G2 consists of the following components:
- furnace base with electronic controls
- furnace head with firing chamber and press drive
- cooling tray
- firing plate
- power cord and hose for vacuum pump.

3.2 Hazardous areas and safety equipment

Description of the risk areas of the furnace:

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

Description of the safety equipment of the furnace:

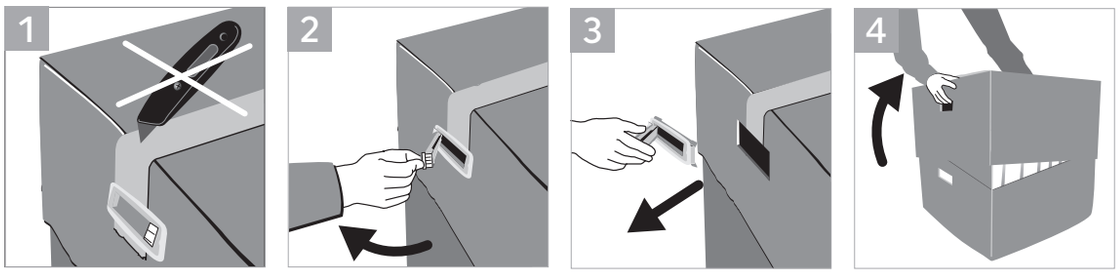
Safety equipment	Protective effect
Protective conductor	Protection from electric shock
Electric fuses	Protection from electric shock
Furnace housing and covers	Protection from electric shock, burning and crushing

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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 the unit 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 Center.

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 rubber 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 unit should neither be placed nor operated in areas where there is an explosion hazard.

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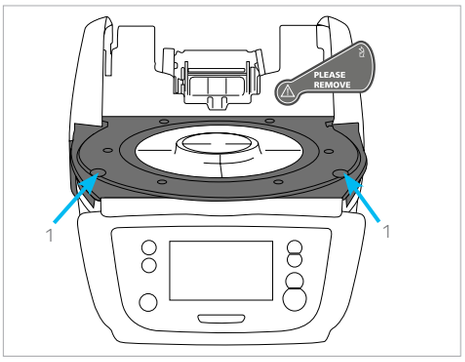
4.3 Assembly

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!

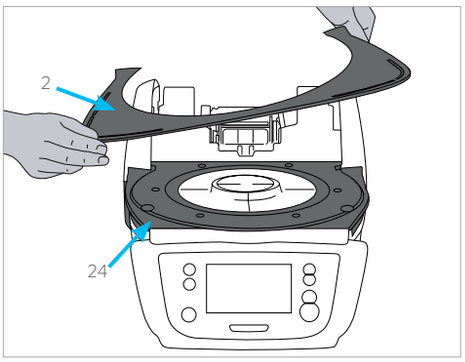
Step 1:

Mount the cooling tray (2).

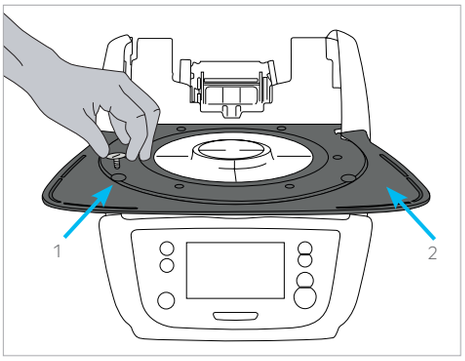
Remove the two screws for the cooling tray and the transport protection for the infrared camera.



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



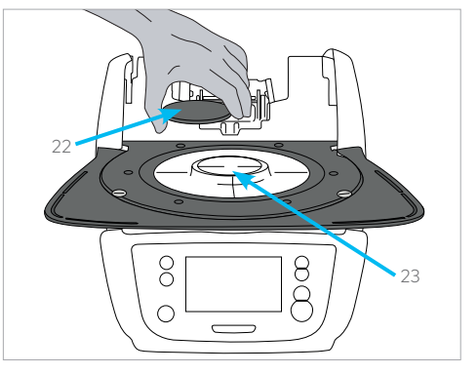
Secure the cooling tray with the two screws (1).



Step 2:

Place 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 centred in the firing plate holder.

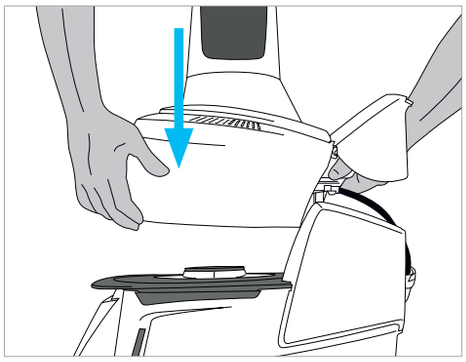


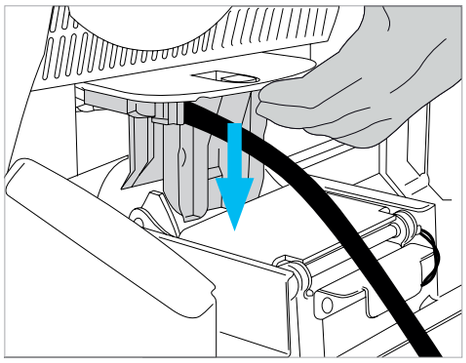
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Step 3:

Mount the furnace head.

The 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 and the insulation are not damaged by mounting the furnace head.

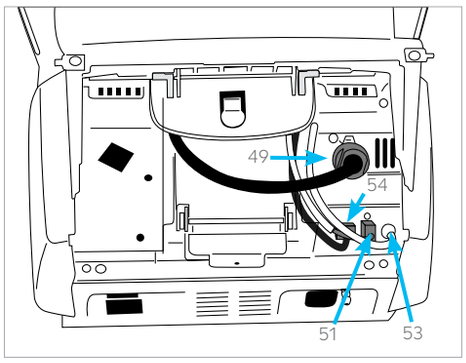
Step 4:

Connect the cables.

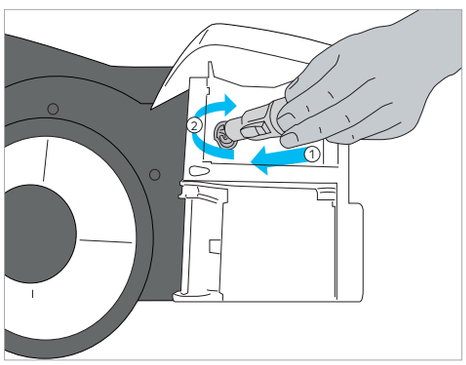
Connect the cables of the furnace head with the furnace base.

Proceed as follows:

- Connect the vacuum hose.
- Insert the thermocouple plug (make sure that the polarity of the plug is correct).
- Insert the press drive plug.
- Insert the heater plug.



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

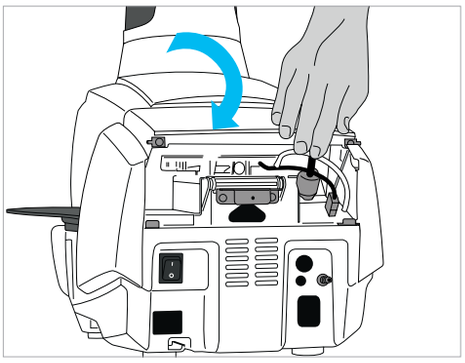


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Step 5:

Close the covering hood.

Once all cables are properly connected to the furnace base, close the covering hood over the connections.

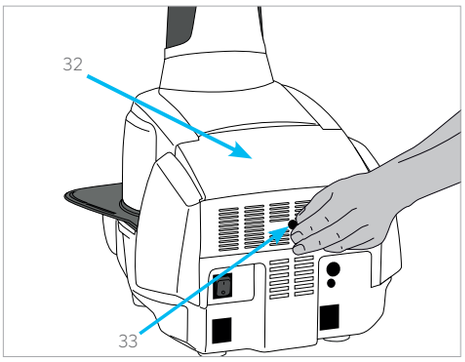


Step 6:

Mount the connection cover.

Mount the connection cover and secure it with the fastening screw. Make sure that the lateral catch springs snap into place when mounting the connection cover.

The furnace must only be operated with the covering hood closed and the connection cover mounted!



Step 7:

Establish additional connections.

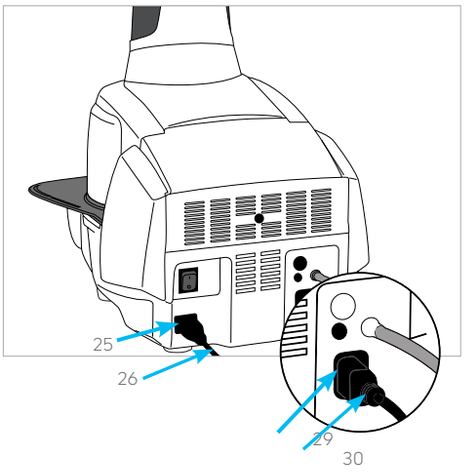
Connecting the power

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

The furnace must only be operated with the supplied power cord!

Connecting the vacuum pump

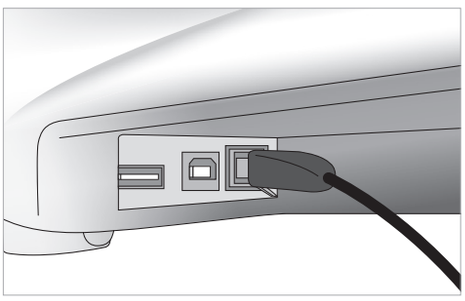
Connect the vacuum pump plug with the vacuum pump socket. We recommend using only a vacuum pump from Ivoclar (VP4 / VP5), since these pumps are especially coordinated with the press furnace. If other pumps are used, please observe and do not exceed the maximum power consumption.



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).



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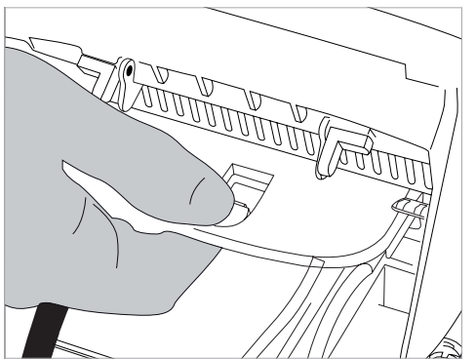
Creating a wireless LAN (WLAN) connection

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).

4.4 Removing the furnace head

Before the connection cover and the covering hood 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 of the connection cover.
2. Dismount the connection cover.
3. Open the covering hood.
4. Release the heater plug and disconnect it with a 45° anti-clockwise rotation.
5. Disconnect the press drive plug.
6. Disconnect the thermocouple plug.
7. Disconnect the vacuum hose.
8. Press the leaf spring with a finger, lift off the furnace head at the same time and remove it.

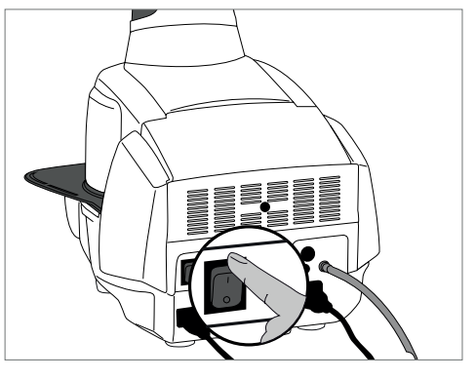




Make sure that the furnace head has completely cooled down before it is removed (fire hazard).

4.5 Initial start-up

1. Connect the power cord with the wall socket.
2. Switch the On / Off button at the rear of the furnace to 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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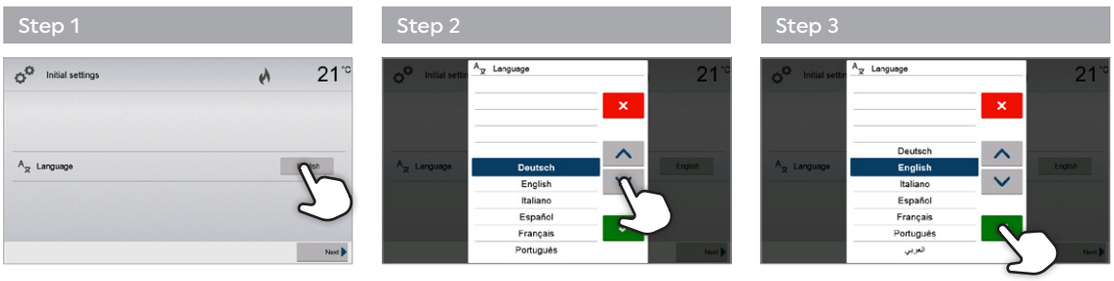
4.5.2 Basic settings upon initial start-up

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.

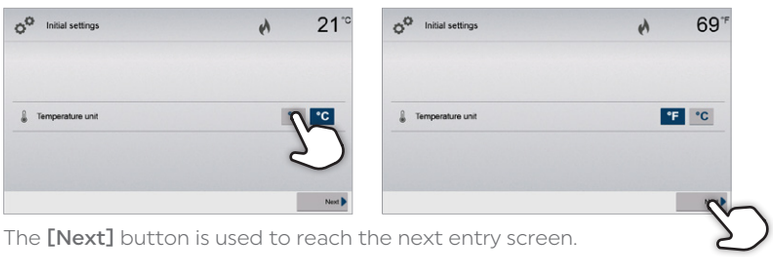
The first setting is the language selections. The touch buttons (display keys) can be operated by tapping the display.



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:

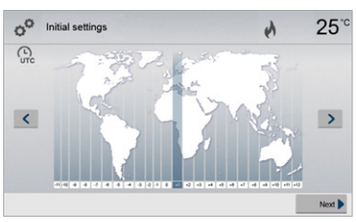
Select the desired temperature unit.



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

Step 3:

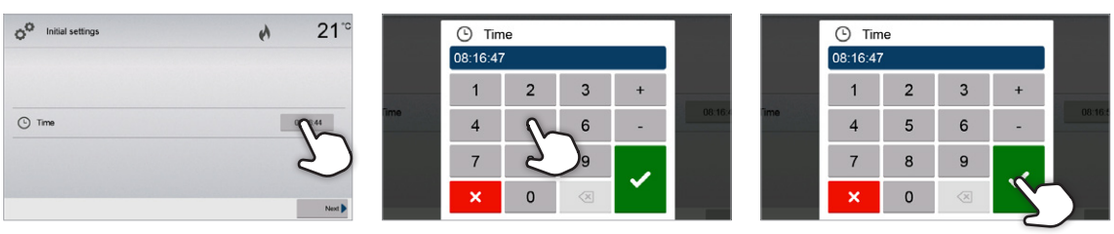
Set the time zone (UTC).



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).

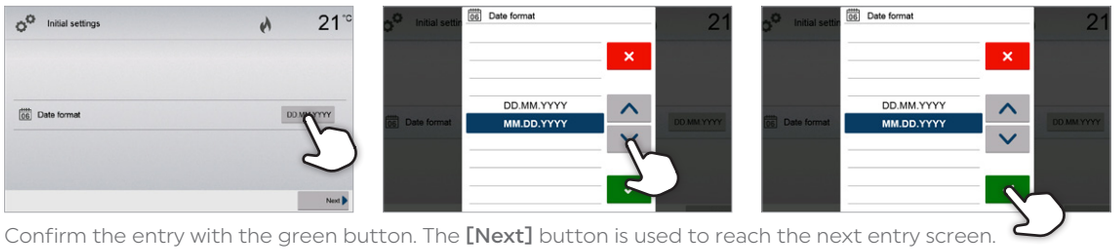


Confirm the entry with the green button. The **[Next]** button is used to reach the next entry screen.

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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).

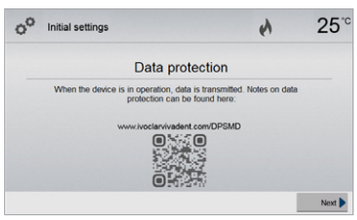


Confirm the entry with the green button. The **[Next]** button is used to reach the next entry screen.

Step 7:

Confirm the privacy policy

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

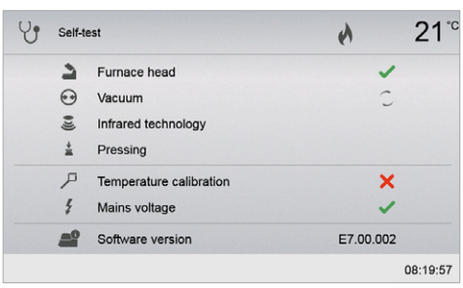


The **[Next]** button is used to reach the next entry screen.

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.

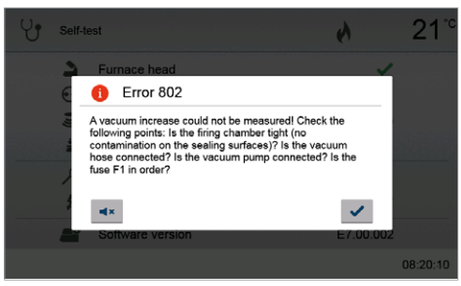
The following information is displayed:

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.

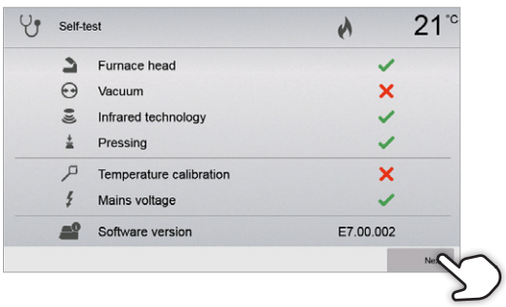
If the self-test has been successful, the furnace will automatically display the screen to select the desired operating mode (firing / pressing).

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).

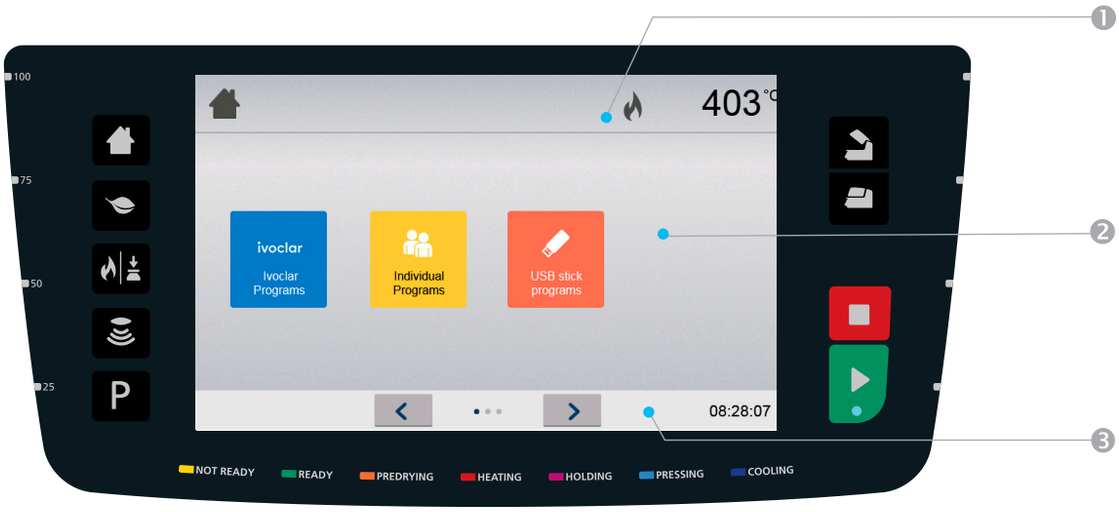
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5 Operation and Configuration

5.1 Introduction to the operation

5.1.1 Control unit

The Programat EP 5010 G2 is equipped with a wide-screen 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, selected program type, etc.)
2. **Main screen** (e.g. editing firing programs, changing the settings, etc.)
3. **Navigation bar** (e.g. scrolling, scrolling to higher levels, opening favourite programs, etc.)

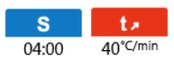
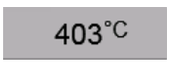
5.1.2 Explanation of the key functions

Key	Function
	HOME key Switch to home screen (main menu).
	PROGRAM key Press once: Display of the currently selected program. Press twice: Switch to the program selection via number entry.
	CHANGE OPERATING MODE key By pressing this key, you can switch between the firing and the press mode.
	IRT key With this key, the infrared image of the object can be displayed during the closing process.
	POWER SAVING key By pressing this key, the power-saving function is 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 automatically activated power-saving function.
	OPEN FURNACE HEAD key **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 the STOP, CLOSE FURNACE HEAD or START key. This function can be activated any time when the furnace head is open.
	CLOSE FURNACE HEAD key

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	**STOP key** 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. Acoustic signals can be confirmed by pressing the STOP key.
	**START key (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 Explanation of the most important touch buttons

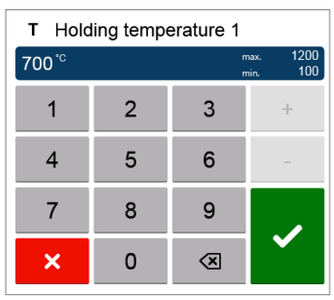
Button	Function
	**Scroll left / Scroll right** With these buttons, you can e.g. scroll to page 2 of the home screen.
	**Back with note** With this button, you can change to the "next higher" menu level. The button indicates to which screen you change, e.g. to the home screen.
	**Close** With this button, you can leave sub-menus.
	**Confirm entry** 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** This button is used to cancel an entry. Changed values are not saved.
	**Program parameters** 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.
	**Parameters** By pressing these buttons, a selection list or numeric pad for entering the values appears.

5.1.4 Explanation 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 setting menus. Additionally, the currently set value as well as the minimum and maximum values are indicated.

  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 is not in the acceptable range.

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



- **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.



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5.1.5 Selecting the operating mode

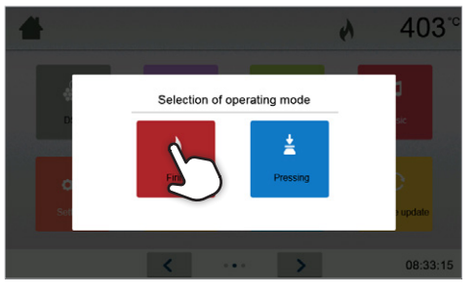
The furnace can be operated in two different modes:

- **Pressing:**
  Only press programs can be selected. The stand-by temperature of the furnace is set to 700 °C.
- **Firing:**
  Only firing programs can be selected. For Ivoclar programs, the stand-by temperature of the furnace is set to 403 °C.

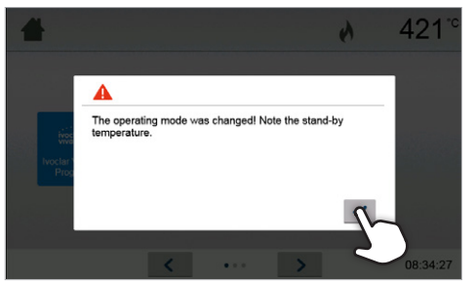
In order to switch between the press and the firing modes, you must press the CHANGE OPERATING MODE key to change the operating mode (Chapter 5.1.2).

Once the CHANGE OPERATING MODE key has been pressed, the operating mode can be selected.

1. Select the desired operating mode.



2. After the operating mode is selected, a note is displayed indicating the different stand-by temperatures of the respective operating modes.



Switching from "Firing" to "Pressing": Make sure that the furnace has heated up to 700 °C before starting the press program.

Switching from "Pressing" to "Firing": Make sure that the furnace has cooled down to 403 °C before starting the firing program.

In the information bar, the selected operating mode as well as the signal strength of the wireless LAN connection is displayed in addition to the temperature.

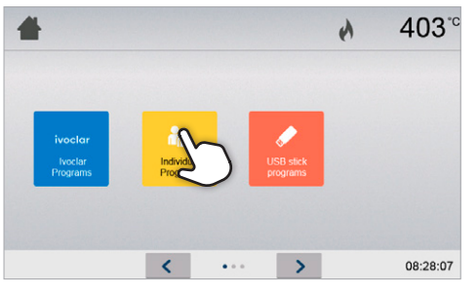
Icon	Meaning
	**Operating mode "Pressing"** If this icon is displayed in the information bar, the operating mode "Pressing" is active. In this operating mode, only press programs are available and the stand-by temperature is set to 700 °C.
	**Operating mode "Firing"** If this icon is displayed in the information bar, the operating mode "Firing" is active. In this operating mode, only firing programs are available and the stand-by temperature is set to 403 °C.
	**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.

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5.1.6 Explanation 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. You can switch back to the home screen with the HOME key.

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



By pressing the **[Arrow]** buttons, the next page of the home screen is accessed, where additional functions are available. The circles between the arrows indicate the number of pages. The current page is marked with a light dot.



5.1.7 Explanation of the speaker signals

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

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

- **Upon completion of the self-test**
  To inform the user that the automatic self-test has been successfully completed, a pre-set, not modifiable 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). Thus, the furnace head has sufficiently cooled down for the next program start. The acoustic signal can be stopped by pressing 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 acoustic signal can be confirmed by pressing 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.

- **For active press cycle**
  To inform the user that the press cycle has been started, a pre-set, not modifiable melody is played.

- **Upon completion of the press program**
  To inform the user that the press program has been completed, the selected melody is played continuously.

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5.1.8 Optical status and progress display (OSD)

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

Colour	Activity
Yellow	The furnace is performing a 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, notification 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).

5.1.9 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 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. **500 free, individually adjustable programs**
c. **500 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. All the parameters can be individually set in each program.

a) Programs for Ivoclar materials (see enclosed Program Table)

When the furnace is delivered ex factory, the Ivoclar programs already contain the recommended material parameter settings and are write-protected. Consequently, it is not possible to accidentally overwrite these programs.

If required, the parameters can be changed and overwritten at any time, 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) 500 free, individually adjustable programs
The programs are designed in such a way that they can be either used as conventional, one-stage programs or as two-stage programs, if required. The programs and program groups can be individually named.

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

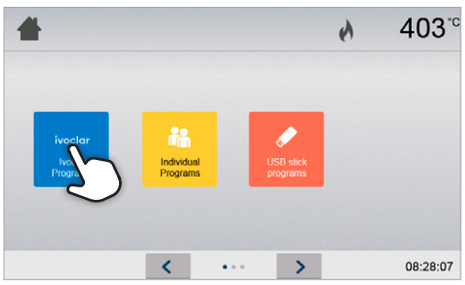
c) 500 free, individually adjustable programs on a USB stick
In a first step, a USB stick must be prepared as program memory (see Chapter 5.4). The programs are designed in such a way that they can be either used as conventional, one-stage programs or as two-stage programs, if required. The programs and program groups can be individually named.

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

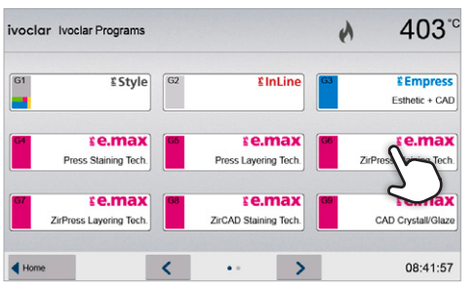
5.2.2 Program selection

The program selection requires only few steps:

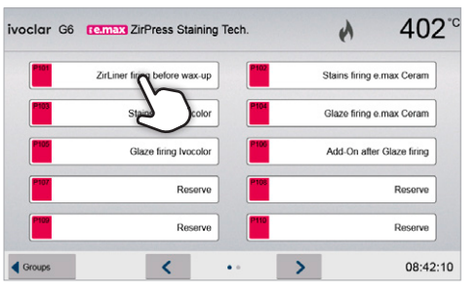
1. **Select the program type.**



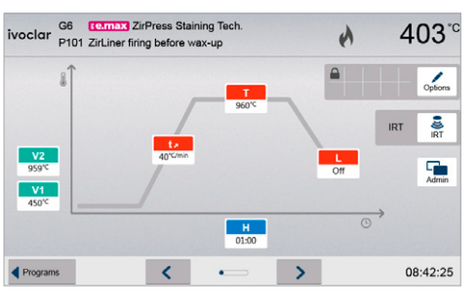
2. **Select the program group.**



3. **Select the program.**



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



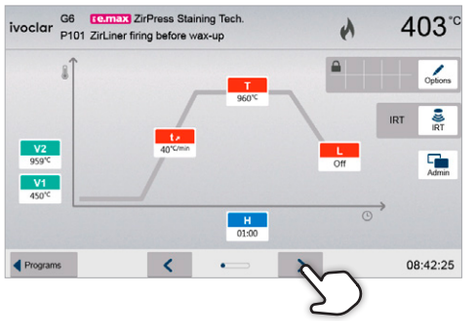
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Quick program selection

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.



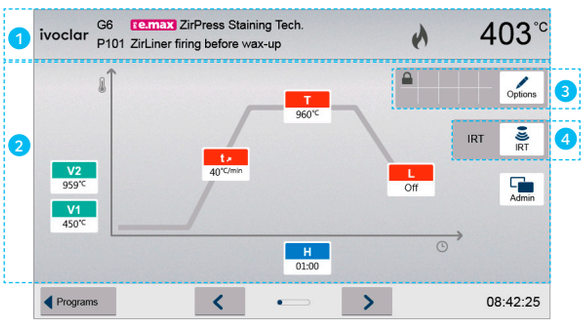
5.2.3 Program screen / Editing programs

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 bar**
   - Program designation
   - Current furnace temperature
2. **Firing curve**
   - Closing time, holding time
   - Temperature increase rate, 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**

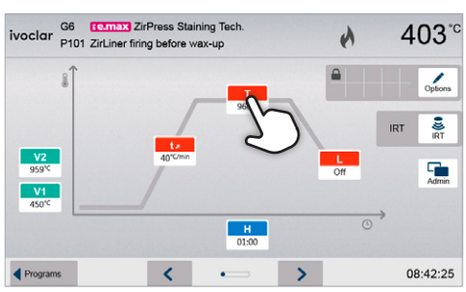
Different operating modes are available for the Programat Infrared Technology. These modes can be selected by pressing the **[IRT]** button. The icon in the grid shows the activated IRT operating mode.

Editing parameters

Parameters are entered or edited in two steps.

Example: Setting the holding temperature

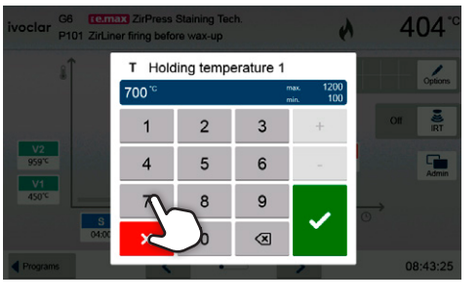
1. **Press the [T] button.**



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

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

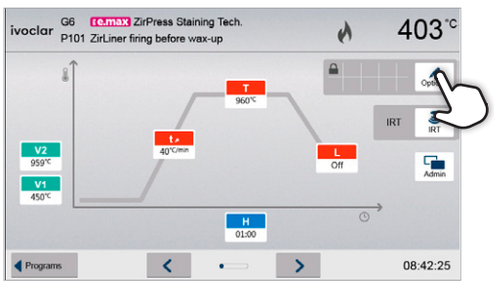


Changing program options

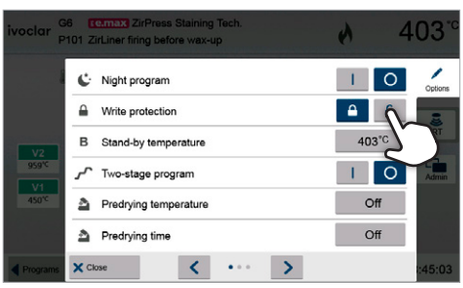
Pressing the **[Options]** button opens the menu for advanced program options.

Example 1: Deactivating the write-protection

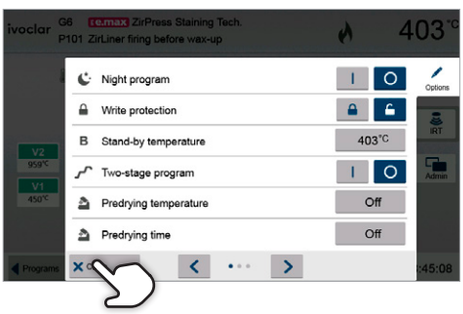
1. **Press the [Options] button.**



2. **Press the [Deactivate Write-Protection] button.**

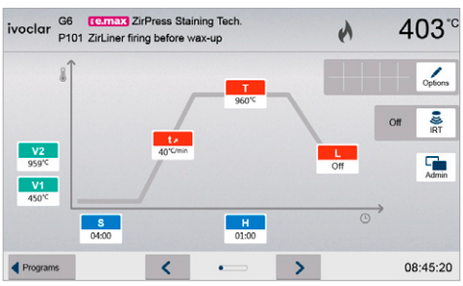


3. **Press the [Close] button to leave the Options menu.**



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

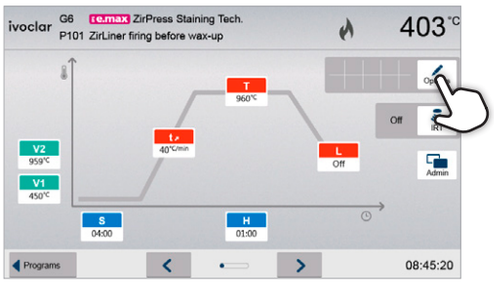
The lock symbol is no longer shown in the display next to the **[Options]** button.



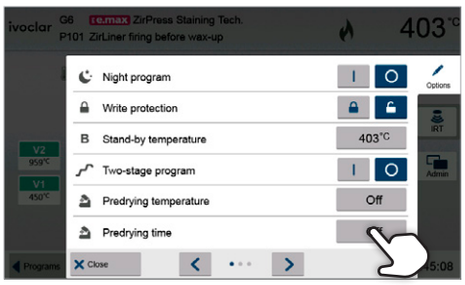
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Example 2: Changing the predrying temperature

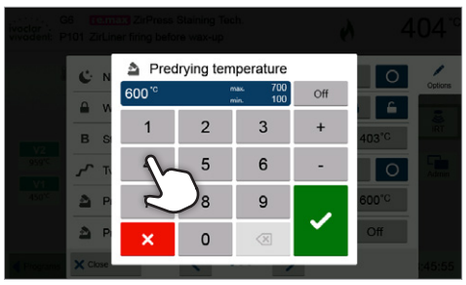
1. **Press the [Options] button.**



2. **Press the [Predrying Temperature] button.**

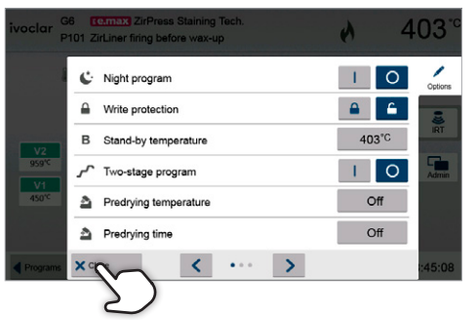


3. **Enter the desired predrying temperature and confirm by pressing the green button.**



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

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

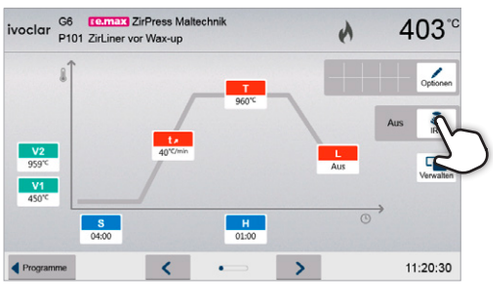


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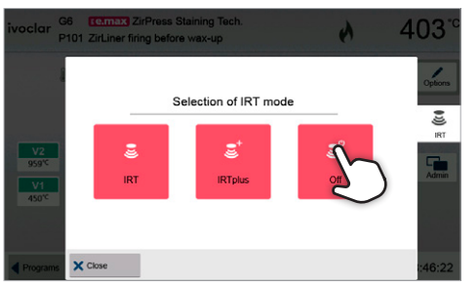
Selecting the IRT operating mode

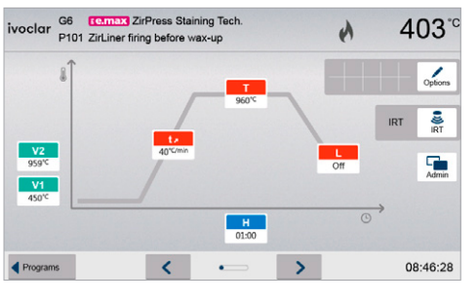
By pressing the **[IRT]** button, the menu for selecting the IRT operating mode is opened.

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



2. **Select the desired IRT operating mode.**
The menu is automatically closed once the desired operating mode has been selected. The selected IRT mode is displayed in the program display next to the **[IRT]** button.



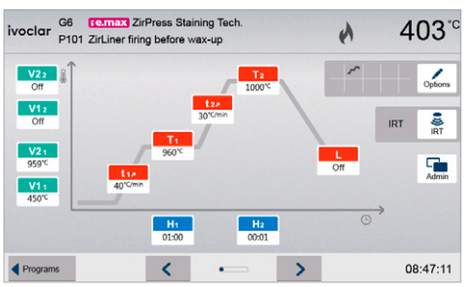


Two-stage programs

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



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 information is indicated.

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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: t1) 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: T1) 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: H1) 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: V11) 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: V21) 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. This parameter 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/min*
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** This 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** This 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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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 displayed as icons 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 options: 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 options: 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 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 program
If this function is activated, the selected program can be programmed on two temperature levels.

Setting options: 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.) with the Programat firing tray
- **Crystallization:** exclusively suitable for crystallization firing cycles (e.g. IPS e.max CAD crystallization) with the IPS e.max CAD Crystallization Tray
- **Fusion:** exclusively suitable for fusion firing cycles (e.g. IPS e.max CAD fusion / crystallization CAD-on) with the IPS e.max CAD Crystallization Tray

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

Setting options: Standard, crystallization, fusion



Predrying temperature Stage 1 (only available if Infrared Technology "OFF")
In a program with activated predrying in Stage 1, the desired "predrying temperature" is reached (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)

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	**Predrying temperature Stage 2** (only available if Infrared Technology "OFF") Predrying 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*
	**Predrying holding time Stage 2** (only available if Infrared Technology "OFF") This parameter defines the duration of the predrying process for Stage 2 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, the TSP function 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 options: On / Off*
	**Pre-vacuum** If a firing program with pre-vacuum is conducted, the vacuum pump is switched on at the end of the closing time (as soon as the furnace head is closed) and runs 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 is maintained until V2 is reached. V2 must be higher than the stand-by temperature B. *Setting options: 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 options: 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 options: On / Off*
	**Extraction system** If this function is activated, any vapours are extracted during the closing process by means of the vacuum pump, and fresh air is sucked in for a better firing and drying result. *Setting options: On / Off*
	**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.

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5.2.6 Adjustable parameters in the IRT menu

If the infrared technology is activated, the temperature is measured directly on the surface of the object during the predrying or closing process. The furnace regulates the closing and predrying process based on the data measured by the infrared camera.

Homogeneous drying and heating of the object is ensured by the heating of the heating muffle and the furnace head movements (furnace head opens and closes depending on the situation).

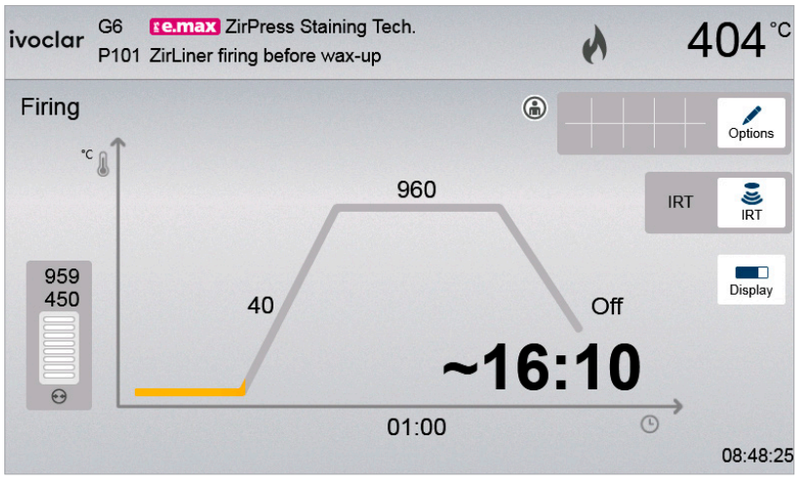
Different operating modes are available for the IRT function. These operating modes can be selected by pressing the **[IRT]** button:

	**IRT** The IRT operating mode is the preferred and recommended operating mode for standard veneer and all-ceramic firing processes. If the IRT operating mode is selected, the infrared camera controls the predrying and closing process in such a way that the processes are performed very quickly and efficiently. The time saving compared to conventional predrying and closing processes amounts up to 20%.
	**IRT Plus** If the IRT Plus operating mode is selected, the infrared camera controls the predrying and closing process with a reduced drying rate. As a result, predrying and closing takes longer. The IRT Plus operating mode is recommended for opaquer firing cycles and large restorations.
	**IRT Off** If the IRT Off operating mode is selected, the infrared camera is deactivated. Predrying and closing processes are performed as usual, e.g. by manually entering the closing time.

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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.

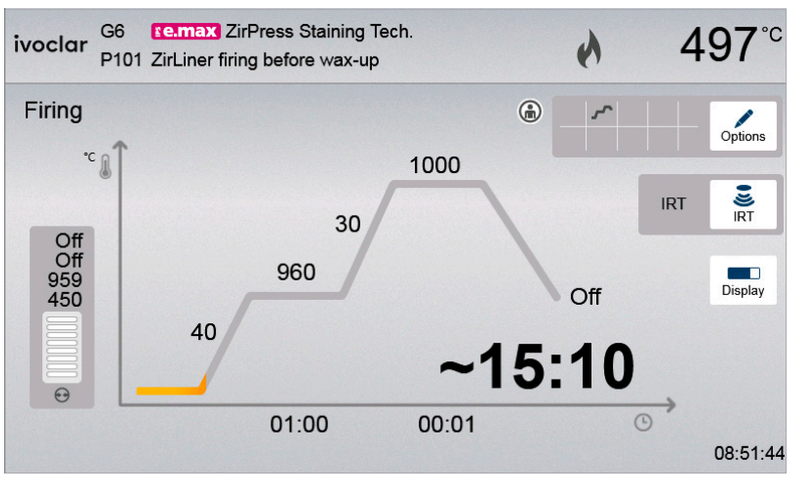


The following information is displayed:

- **Information bar**
  The program name and the current furnace temperature are shown in the information bar in the upper margin of the display.
- **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 displayed 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.



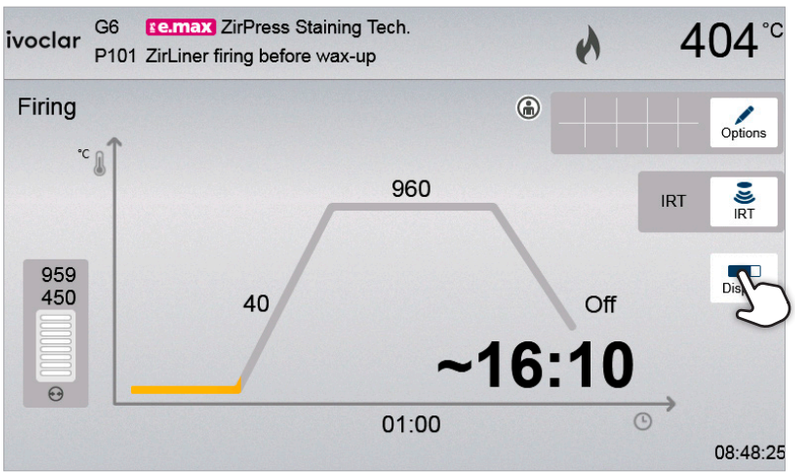
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Changing the operating indicator

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. The remaining time is displayed in the centre of the screen in large characters and is thus visible even from a distance.



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

5.2.8 Pausing the active program

- Press STOP once to pause a running program (green LED flashing). 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 shown in the display during the flooding of the firing chamber.

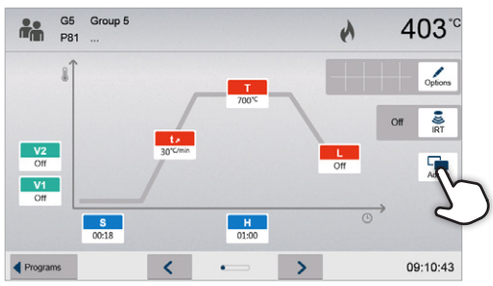
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5.2.9 Changing the parameters while the program is running

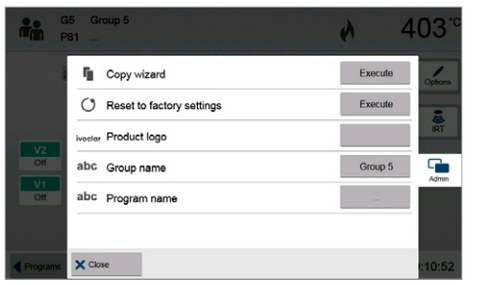
Most program parameters, which have not yet been executed, can be changed while the program is paused. Change the parameters as described in Chapter 5.2.3.

5.2.10 Managing programs

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



The following functions are available:
- copy program
- reset program to factory settings
- select product logo
- rename group
- rename program.

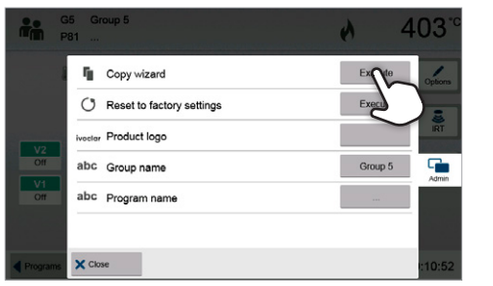


5.2.11 Copying programs

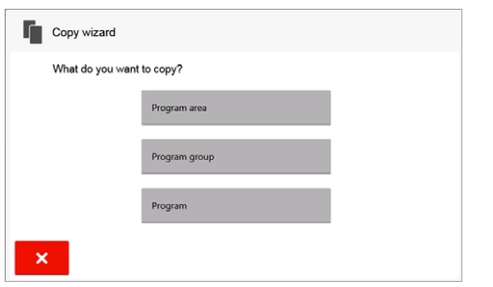
With the copy wizard, individual programs, program groups and program sectors can be copied. The source and target of the copy process can be selected in the copy assistant. Programs copied to a USB flash drive can only be opened with this furnace. PrograBase X10 offers the possibility to copy the programs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

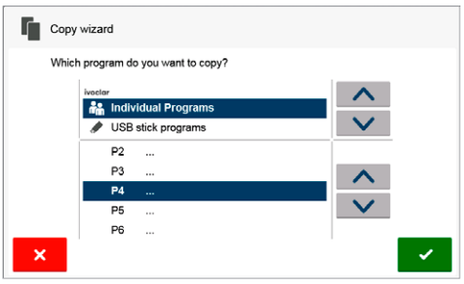


2. **Select the objects to be copied.**
(program sector, program group or individual program)

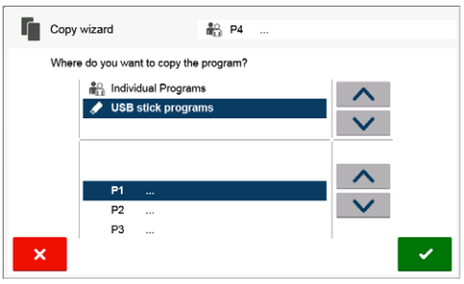


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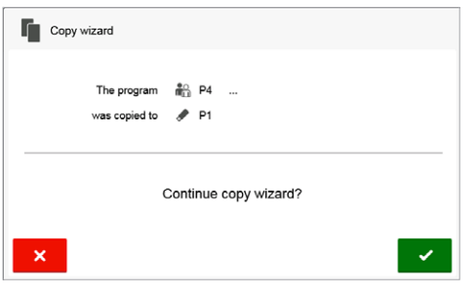
3. **Make a selection depending on the desired copy content.**
(program sector, program group, or individual program)



4. **Select a target.**
Confirm the selection with the green button or close the copy wizard with the red button.



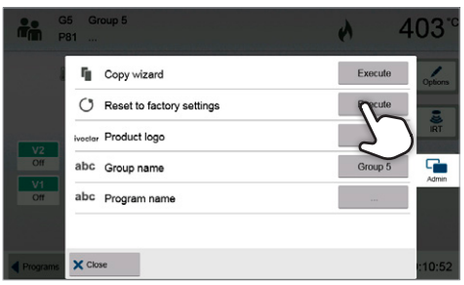
5. **The copy process can be continued with the green button. The red button is used to abort the copy process.**



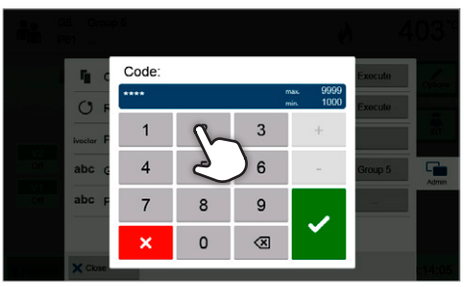
5.2.12 Resetting the program to factory settings

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

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

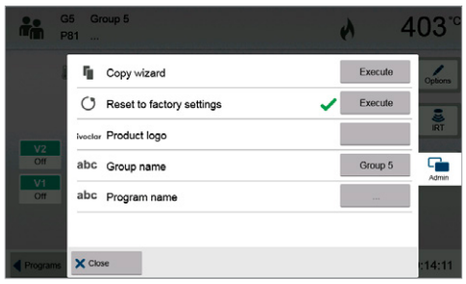


2. **Enter the user code to confirm that the program is to be reset to factory settings.**



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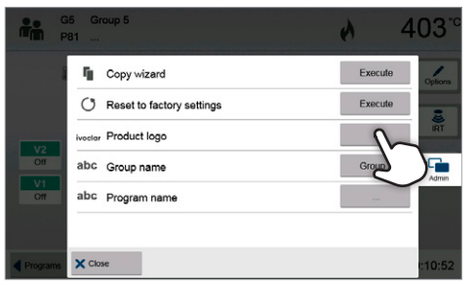
3. The program has been successfully reset to factory settings.



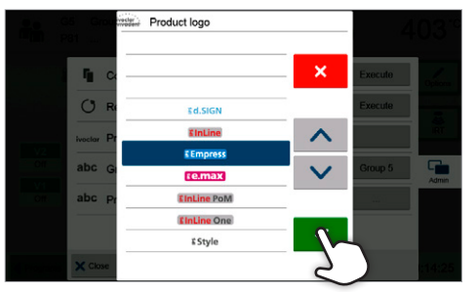
5.2.13 Selecting the product brand

The product brand for the current group can be selected.

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



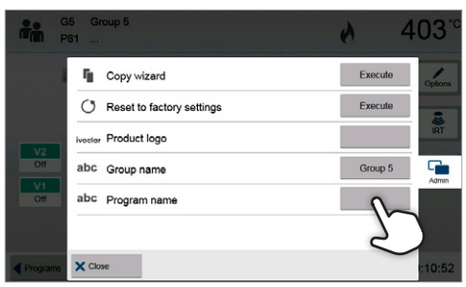
2. Select the desired product brand. Confirm the entry with the green button.



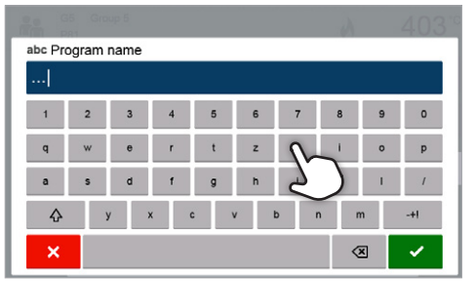
5.2.14 Renaming the program or program group

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 the group should be renamed.



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



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5.3 Press programs and programming options

The furnace offers different press program ranges:

a. Press programs for Ivoclar materials
b. FPF – Fully automatic press function for IPS e.max Press materials
c. 20 free, individually adjustable press programs.

a) Press programs for Ivoclar materials
When the furnace is delivered ex factory, the Ivoclar programs already contain the recommended material parameters. They cannot be deleted or overwritten. The parameters are not shown in the software.

b) FPF Fully automatic press function for IPS e.max Press materials
This function has been ideally coordinated with the IPS e.max Press materials. The ingot type is automatically recognized and the press process is started fully automatically.

c) Free, individually adjustable press programs
Individual press programs can be freely programmed and renamed.

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

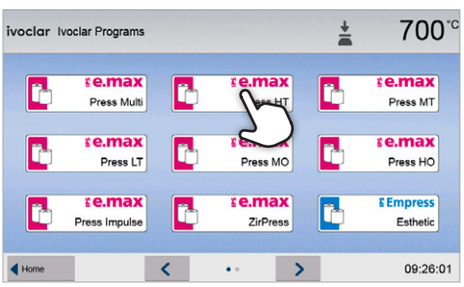
5.3.1 Program selection in the "Pressing" mode and with activated IRT investment ring analysis

The program selection requires only a few steps:

1. Select the program type.

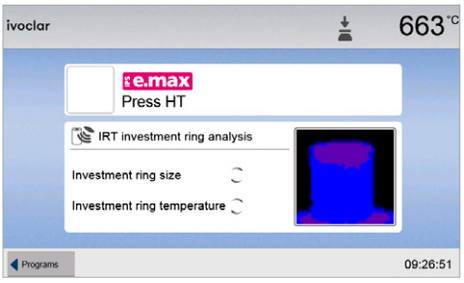


2. Select the program.



The automatic investment ring analysis is started as soon as the furnace head is opened.

The automatic investment ring selection can be skipped by pressing the **[Manual]** button. Continue with Chapter 5.3.2 item 3 for further operation.

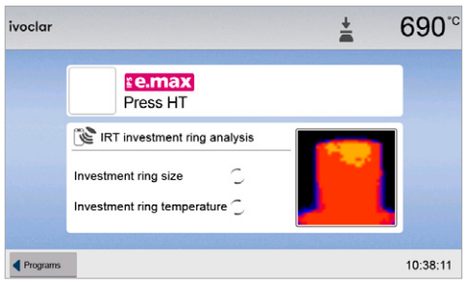


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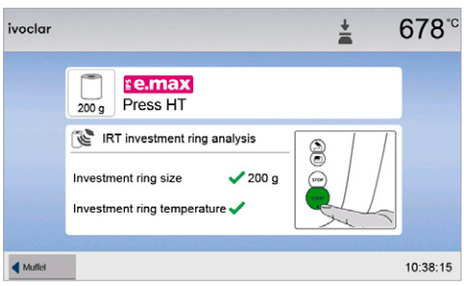
3. Load the furnace.
You can now load the firing chamber with the hot investment ring. The IRT investment ring analysis starts immediately after loading of the furnace:

- automatic identification of the investment ring size
- check of the investment ring preheating temperature.

For details regarding the IRT investment ring analysis see Chapter 5.4.



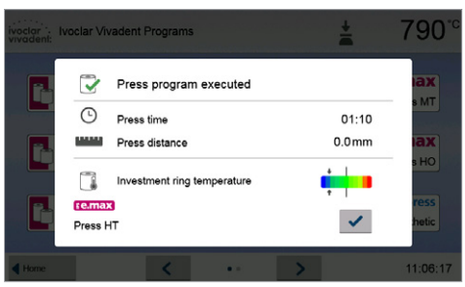
4. Start or edit the press program.
Now, the press program can be started. Individual press programs can be edited.



5. Results panel
The following information is displayed at the end of the press program:

- press time (mm:ss)
- press distance (mm)
- investment ring analysis (see Chapter 5.4.1 for details).

By pressing the **[Confirmation]** button, the results panel is closed and the program selection is displayed.



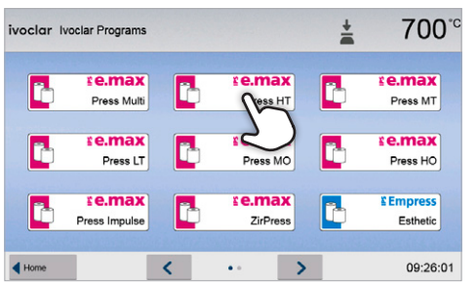
5.3.2 Program selection in the "Pressing" mode and with deactivated IRT investment ring analysis

The program selection requires only a few steps:

1. Select the program type.

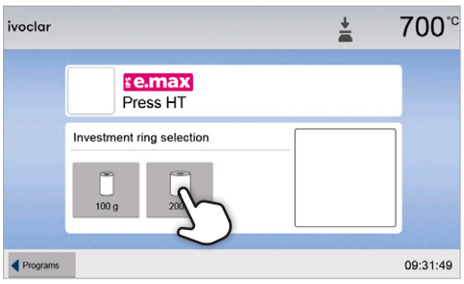


2. Select the program.



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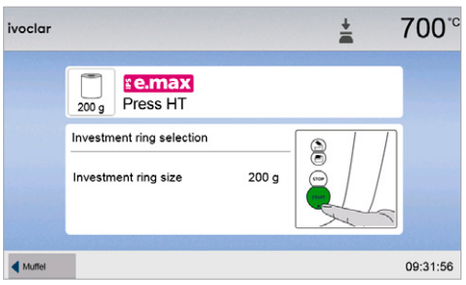
3. Select the investment ring size.
Depending on the program selected, different investment ring sizes can be chosen:
- 100-gram investment rings
- 200-gram investment rings
- 300-gram investment rings.



4. Start or edit the press program.
Now, the press program can be started.

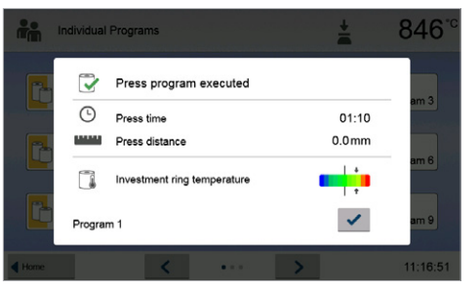
Ivoclar press programs cannot be changed or edited.

Individual press programs can be edited (see Chapter 5.3.4.).



5. Results panel
The following information is displayed at the end of the press program:
- press time (mm:ss)
- press distance (mm).

By pressing the **[Confirmation]** button, the results panel is closed and the program selection is displayed.



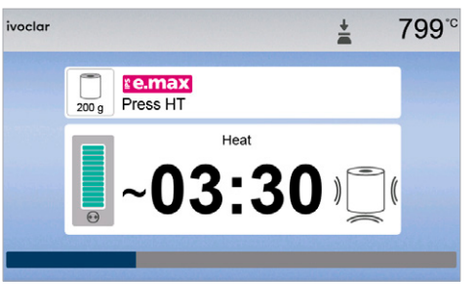
5.3.3 Starting and stopping press programs / the operating indicator

Once the press program has been started by pressing the Start key, the operating indicator is shown.

The following information is displayed:

Information bar:
The current furnace temperature and the program area are shown in the information bar in the upper margin of the display.

Main area:
The following information is displayed in the main area:
- selected program and investment ring size
- vacuum display
- remaining time and progress bar
- animation (preheating, holding, pressing).

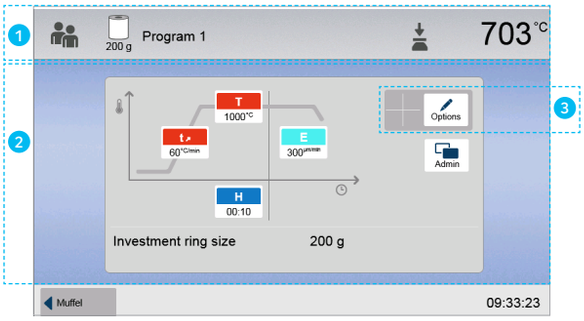


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5.3.4 Editing individual press programs

For the all-ceramic systems from Ivoclar (e.g. IPS e.max, IPS Empress Esthetic), only the original Ivoclar press programs must be used as they are especially coordinated with the respective materials.

After the individual press program was selected, the following information is displayed on the program screen:



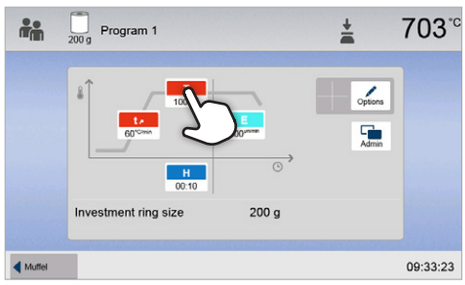
1. **Information bar:**
   - Program name, investment ring size
   - Current furnace temperature
2. **Firing curve:**
   - Holding time
   - Temperature increase rate, holding temperature
   - Stop speed
3. **Program options**

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.

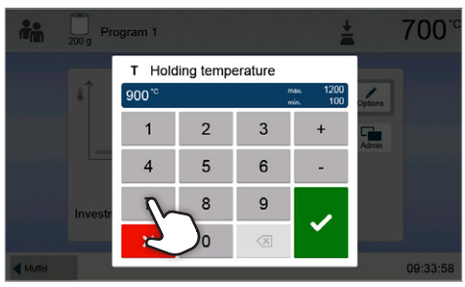
Editing parameters

Parameters are entered or edited in two steps. **Example: Setting the holding temperature**

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



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



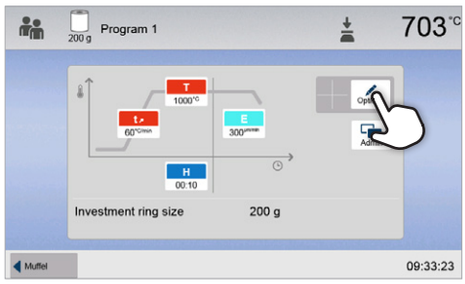
The holding temperature was successfully changed. All the other parameters shown in the firing curve can be changed / edited in the same way.

Changing the program options

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

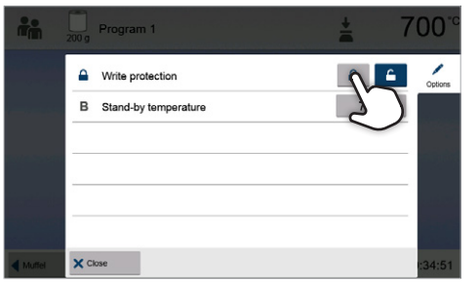
Example 1: Activating the write-protection

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

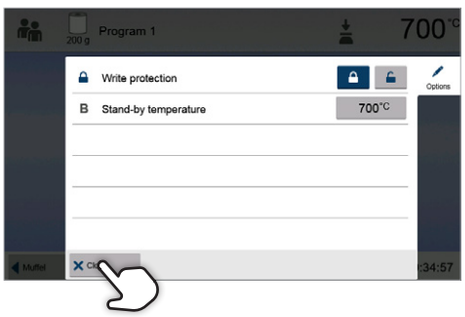


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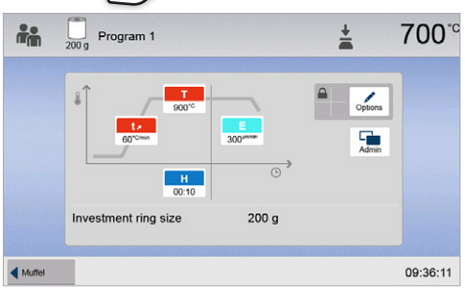
2. **Press the [Activate Write-Protection] button.**



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



4. **The write-protection was successfully activated.**
The lock symbol is shown next to the **[Options]** button in the display.



5.3.5 Adjustable parameters in the program screen

t	**t – Temperature increase rate** 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** The holding temperature defines the temperature at which the press process is started. *Value range °C: 100 – 1200 °C; Value range °F: 212 – 2192 °F*
H	**H – Holding time** The press process starts once the holding time ends. *Value range: 00:00 – 60:00 (mm:ss)*
E	**E – Stop speed** This parameter defines the end of the press process. For the layering technique, Ivoclar recommends a stop speed of 300 µm/min; for the staining technique a stop speed of 150 µm/min. – Higher values (stop speed of e.g. 300 µm/min) result in the press cycle being stopped sooner. – Lower values (stop speed of e.g. 100 µm/min) result in the press cycle being stopped later. Consequently, the press cycle is prolonged. *Value range: 0 – 10,000 (µm/min)*

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5.3.6 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. Active options are displayed as icons in the grid next to the **[Options]** button.

The following press program options are available:

🔒	**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 options: 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 or press process is activated. In the "Pressing" mode, Programat furnaces feature an automatic stand-by temperature of 700 °C as the factory setting. The temperature can be individually set for each program. *Value range °C: 100 – 700 °C; Value range °F: 212 – 1292 °F*

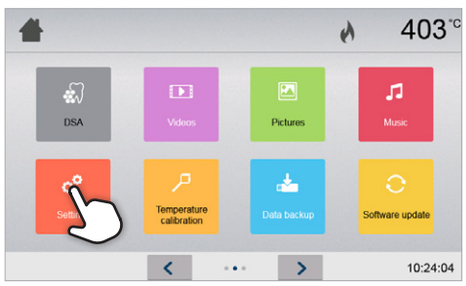
5.4 Advanced functions of the furnace / Software update

5.4.1 Settings

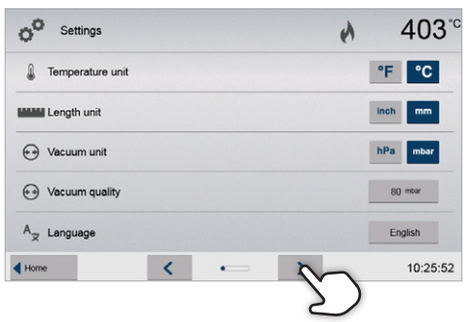
To reach the Settings menu, scroll to page 2 in the home screen and press the **[Settings]** button.

Example: Changing the brightness of the display

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

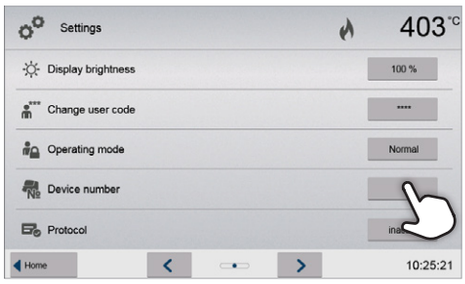


2. Open the display brightness setting.
The **[Arrow]** buttons are used to scroll through the Settings menu. Press the button until the setting "Display brightness" appears in the display.



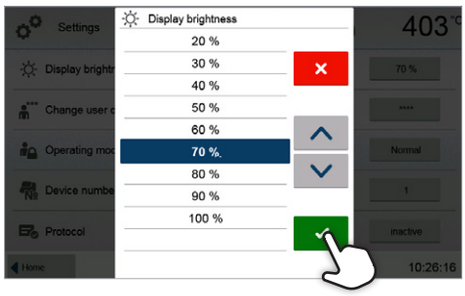
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3. Change the brightness of the display.
Press the touch button in the line "Display brightness".



4. Select the desired display brightness.
in percent and confirm the entry with the green button or cancel the entry with the red button.

The setting was changed.



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

The following parameters can be changed in the Settings menu:

	Temperature unit Choose between °C and °F. *Setting options: °C / °F*
	Vacuum unit Choose between mbar and hPa. *Setting options: mbar and hPa*
	Vacuum quality Set 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 options: 0 – 200 mbar*
	Language Select the desired operating language. *Setting options: German, English, Italian, French, Spanish, Portuguese, Swedish, Dutch, Turkish, Russian, Polish, Croatian, Traditional Chinese, Mandarin Chinese, Finnish, Norwegian, Slovenian, Czech, Slovakian, Hungarian, Hindi, Japanese, Korean, Arabic, Farsi*
	Volume Select the desired volume of the acoustic signals. *Setting options: Off / 10 – 100% in 10%-steps*
	Melody Select the desired melody for the acoustic signals. *Setting options: Melody 1 to 20*
	Time Set the current time. *Setting options: hh:mm:ss*
	Date Set the current date. *Setting options: according to the set date format*

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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, provided the furnace is in idle mode 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. The power-saving mode is not available in the press operating mode.

Setting options: On / Off

Optical Status Display (OSD)
The OSD can be switched on or off.

Setting options: Off / On

Display brightness
Set the display brightness.

Setting options: 20 – 100% in 10%-steps

User code
The user code can be individually changed.

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

Setting options: 1000 to 9999

Unit of length
Chose between millimetres and inch.

Setting options: mm / inch

Operating mode
Set the desired operating mode. See Chapter 5.4.8 Operating mode for details.

Setting options: Normal / Protected / Production

Furnace number
Enter the furnace number. The number will be prominently shown in the display when the operating mode "Production" is activated.

Setting options: 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 with the PrograBase software.
Table: At the end of the program, the parameters used are logged and saved in the furnace. The data can be requested from the Diagnosis menu (for more details see Chapter 5.4.6).

Setting options: Inactive / Printer / PC / Table

Laboratory name
Enter the name of the laboratory. The name is automatically added to the protocols.

Setting options: Laboratory name entry

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	**Calibration interval** Set the notification as to when the next calibration should be conducted. *Setting options: 1 / 3 / 6 / 12 months*
	**Reset 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 options: Execute*
	**Resetting 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 options: Execute*
	**Resetting 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 options: Execute*
	**Preparing USB stick programs** If this function is executed, a USB stick is prepared as program memory.
	**Loading an 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.
	**Loading an individual melody** This function is used to load an individual melody. This melody will be played as acoustic signal as described in Chapter 5.1.6.
	**Acoustic signal at the beginning of the press process** Switch the acoustic signal at the beginning of the press process on or off. *Setting options: On / Off*
	**Timer** With this menu item, the timer can be set. *Setting options: Off / Monday to Sunday on-time and off-time*
	**Setting up a wireless LAN (WLAN) connection** A WLAN connection can be set-up with this function. See Chapter 5.4.9 for details. *Setting options: Off / Monday to Sunday on-time and off-time*
	**Touch mode** Setting the sensitivity of the touch screen. Select "Special" in case of malfunctions when operating the touch screen. *Setting option: Normal / Special*
	**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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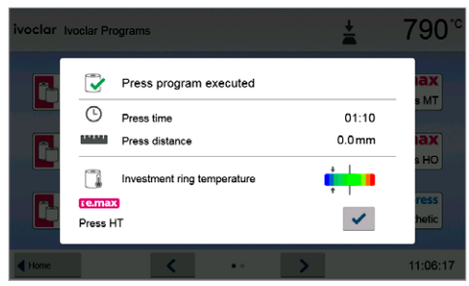
IRT investment ring analysis
The IRT investment ring analysis can be switched on or off.

Setting options: On / Off

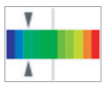
The IRT investment ring analysis includes the following functions:

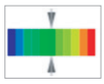
- **Automatic recognition of investment ring size**
  If a preheated investment ring is placed into the furnace, the program for the respective investment ring size is automatically selected. If the size cannot be defined by the infrared camera or if the size of the placed investment ring is not available in the selected program, the manual investment ring selection is automatically opened.
- **Check of the investment ring temperature**
  During the loading process, the IRT system automatically checks if the investment ring has been preheated according to the instructions. The following situations are possible:
  - **The investment ring has the correct temperature**: This is confirmed with a green check. The program can be started immediately.
  - **Investment ring is too hot**: After the program start, the note "Waiting for correct investment ring temperature" is displayed. The furnace waits automatically and the furnace head closes only once the investment ring has reached the optimum start temperature.
  - **Investment ring is too cold**: In this case, a note is displayed. The heating muffle was not sufficiently preheated or the transfer time from the preheating furnace to the press furnace was too long. There is a high risk for an incorrect pressing. Ivoclar recommends to sufficiently preheat the investment ring. After the note has been acknowledged, the press program may still be started.

At the end of the press program, the results panel is displayed. In the lower area, the temperature of the investment ring at the time of loading is displayed.



This feature allows the user to coordinate the preheating furnace with the press furnace:


The investment ring was slightly too cold at the time of loading. Increase the temperature of the preheating furnace or shorten the transfer time. Check the display again after the next press cycle.


The investment ring was optimally preheated at the time of loading. Preheating furnace, transfer time and press furnace are optimally coordinated with each other.


The investment ring was slightly too hot at the time of loading. Reduce the temperature of the preheating furnace. Check the display again after the next press cycle.

If the IRT investment ring analysis is activated, it is recommended to exclusively use original Ivoclar investment ring systems.

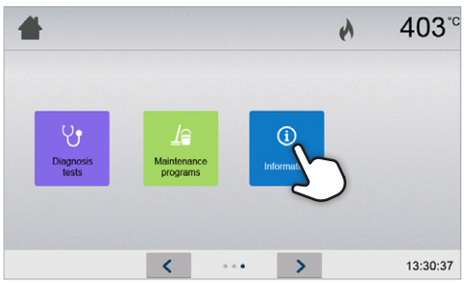
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5.4.2 Information

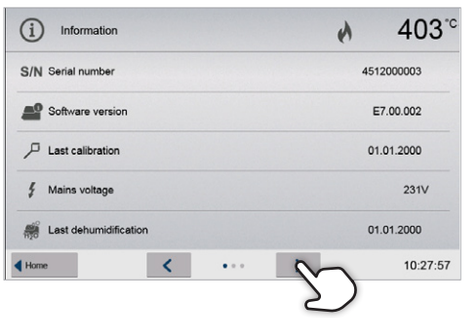
To reach the screen for the furnace information, scroll to page 3 in the home screen and press the **[Information]** touch button.

Example: Displaying information

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



2. **Read the information.**
The information is displayed on several pages. Use the **[Arrow]** buttons to scroll to the next information page.



To return to the home screen, press either the [Home] touch button 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** IP address indication
IP	**WLAN IP address** WLAN IP address indication
IP	**Internet connection** Indicates if 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

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	Press procedures Number of all press cycles
	Press cycles since last calibration Number of press cycles since the last calibration
	Video tutorials Display of the QR code to access the video tutorials

5.4.3 Temperature calibration

The 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 an automatic temperature calibration at least every six months.

Temperature calibration requires only few steps:

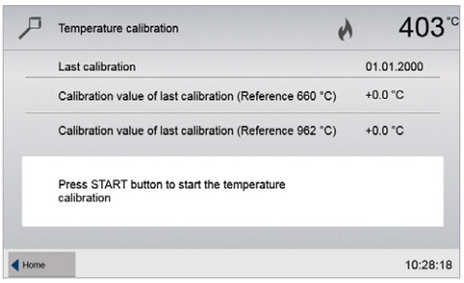
1. **Open the temperature calibration.**
Scroll to page 2 in the home screen and press the **[Temperature Calibration]** button.



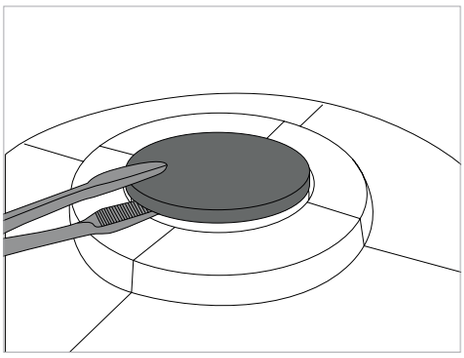
The furnace must be heated up and have reached its stand-by temperature (403 °C) before the calibration is started.

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

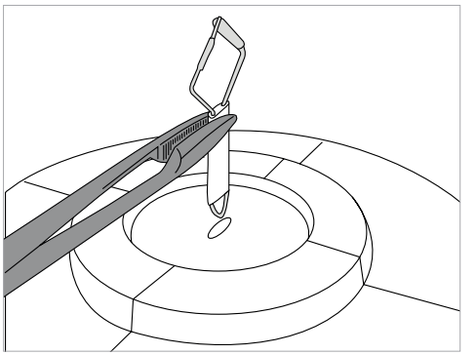
Press the START key on the membrane-sealed keypad to start the calibration. Follow the instructions on the display.



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

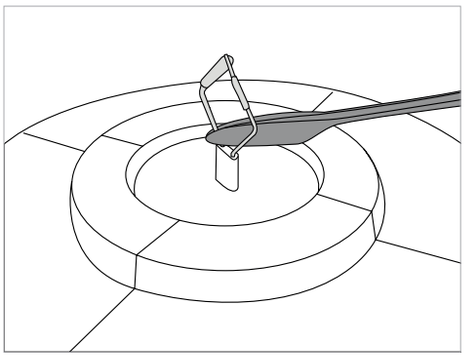


4. **Insert the ATK2 sample.**
Carefully grip the upper part of the ATK2 using the furnace tongs (Caution: fracture risk of the ceramic) and insert it into the holes designated for this purpose until it snaps into place.



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5. Press the sample into place.
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 the START key to start the calibration program. The progress of the calibration program is shown in the display.

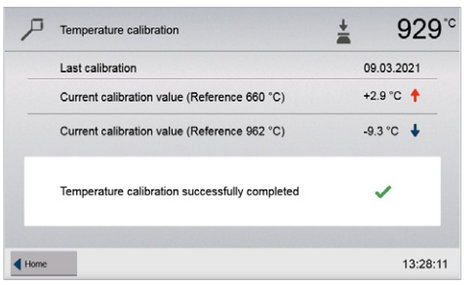


7. Complete the calibration.
The result is displayed at the end of the calibration.

✔ 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 ATK2 sample using the furnace tongs and place it on the cooling tray to allow it to cool. Reinsert the firing plate using the furnace tongs.

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

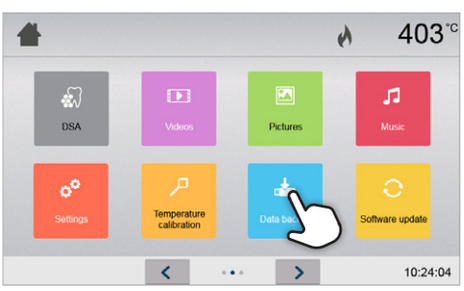
5.4.4 Data backup

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.

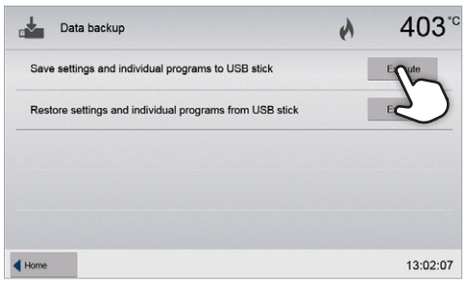
The data backup and data restoring procedures require only few steps:

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



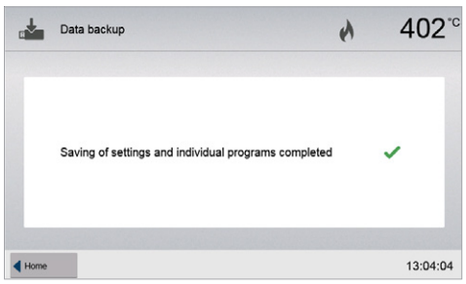
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2. **Conduct the data backup.**
Connect a USB stick to the furnace and press the **[Execute]** button.



3. **Complete the data backup.**

- Data backup successful
- Data backup failed



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

5.4.5 Software update

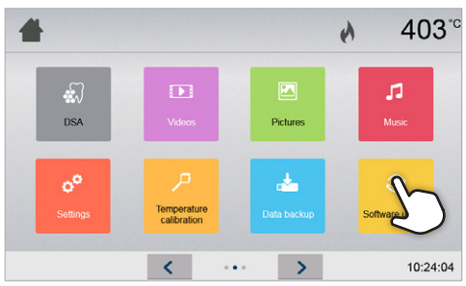
Software updates can be easily installed on the furnace by means of a USB stick. A USB stick which contains the current software file (e.g. EP 5010 G2_V1.10.iv) is required for the update. The software version on the USB stick must be higher than the one installed on the furnace (see Selection – Information).

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

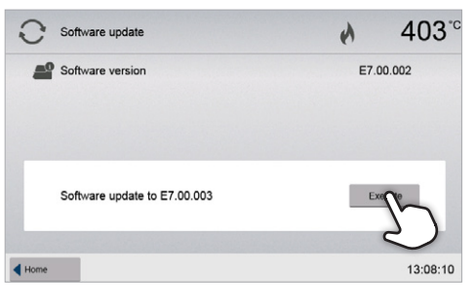
Back-up your data before performing a software update.

A software update requires only few steps:

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

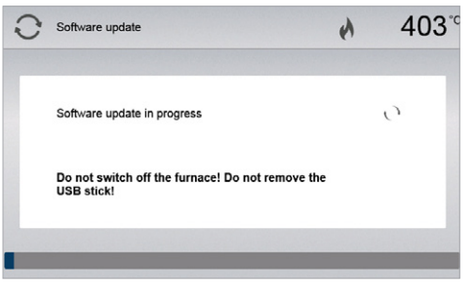


2. **Conduct the software update.**
If the USB stick with the software file is already connected, the furnace automatically searches for a valid software file. If the USB stick has not yet been connected with the furnace, do so now. Press the **[Execute]** button.



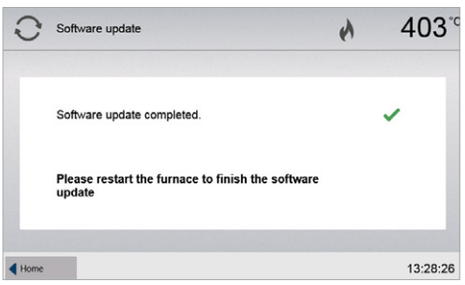
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3. The status bar shows the progress of the update.



4. Complete the software update.
The following message is displayed:

- ✔ Software update successful
- ✘ Software update failed

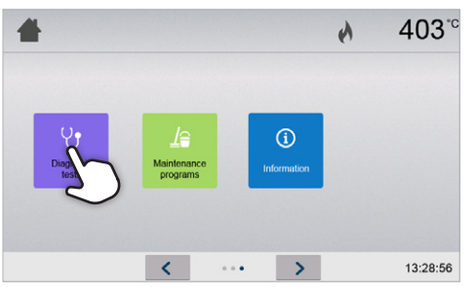


The furnace has to be switched off and on again by means of the mains switch at the rear of the furnace to complete the software update.

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.

5.4.6 Diagnosis

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



The following programs are available in the Diagnosis menu:
- tests (e.g. vacuum test, heater test, etc.)
- error table (saved error messages)
- remote diagnostics
- firing protocol table
- press protocol table
- service.



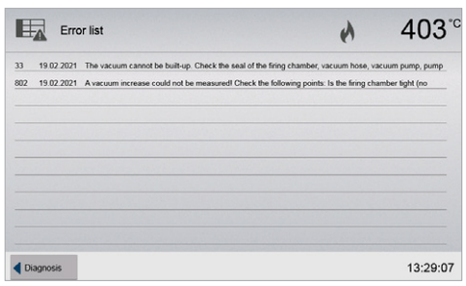
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5.4.6.1 Tests (test programs)

- **Vacuum test program**
  With the vacuum test program, the vacuum performance and tightness of the vacuum system of the furnace 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.
- **Heater test**
  The quality of the heating muffle can be automatically checked by means of the heater test (duration: approximately 7 minutes). The heating muffle test should only be conducted with the firing chamber empty, since any additional item in the firing chamber (e.g. firing tray) influences the result. Conduct the heater test immediately after switching the furnace on and before any actual firing procedures are conducted. If the furnace is too hot, an incorrect heating muffle quality will be indicated. If the quality of the heating element drops below 50 %, changing the heating element is strongly recommended.
- **Keypad / touch test**
  Each time the keypad or the touch buttons are pressed, a short acoustic signal sounds to confirm its function.
- **Display test**
  Two different chequerboard patterns are alternately shown in the entire display. Every individual pixel can be visually checked.
- **OSD test**
  The OSD test checks the LEDs of the Optical Status Display. During the test, the OSD lights up in different colours.
- **IRT test**
  This test automatically checks the functioning of the infrared camera.
- **Press drive test**
  This test automatically checks the functioning of the press drive.

5.4.6.2 Error table

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



5.4.6.3 Remote diagnostics

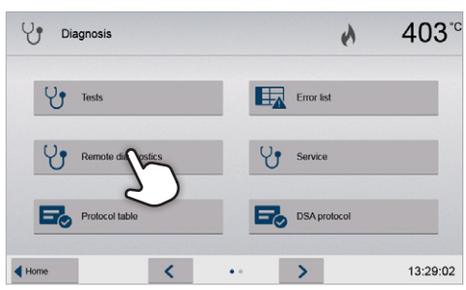
The remote diagnostics function helps you in case of a possible problem with your Programat furnace and facilitates the communication between users and the Ivoclar After Sales Service.

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

The diagnostic 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.

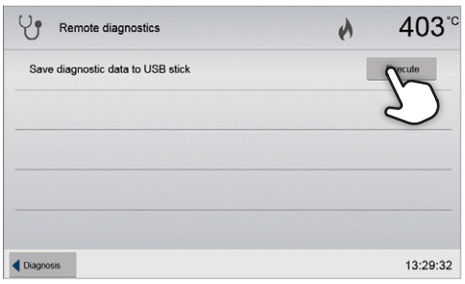
Generating a diagnostic file:

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



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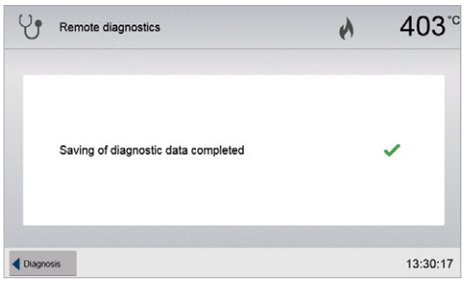
2. **Generate a diagnostic file.**
Connect a USB stick with the furnace. Then, press the **[Execute]** button.



3. **Once the diagnostic file has been generated, the following message is displayed:**

✔ Diagnostics successful

✘ Diagnostics failed



4. **Forward or analyze the diagnostic 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 Firing protocol table

If the protocol function is activated in the Settings menu (see Chapter 5.4.1 for details), the last 20 firing protocols will be saved in the firing protocol table. The saved firing protocols in this table can be printed, sent to a PC or deleted.

5.4.6.5 Press protocol table

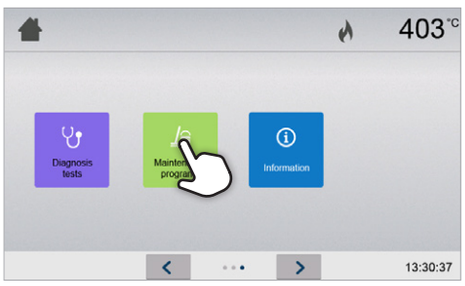
If the protocol function is activated in the Settings menu (see Chapter 5.4.1 for details), the last 20 press protocols will be saved in the press protocol table. The saved press protocols in this table can be printed, sent to a PC or deleted.

5.4.6.6 Service menu

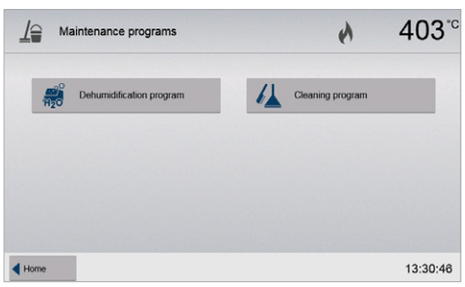
This menu is code-protected and is only accessible by the Ivoclar After Sales Service.

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.



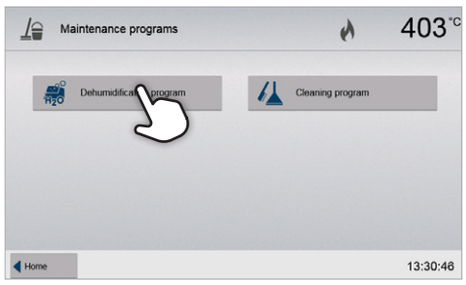
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5.4.7.1 Dehumidification program

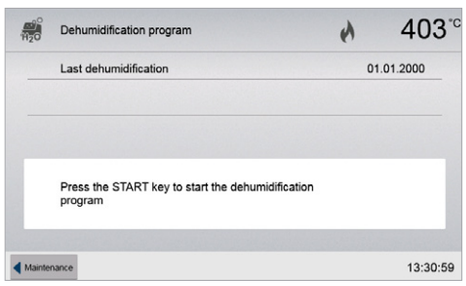
Condensation in the insulation of the firing chamber or the vacuum pump results in a poor vacuum and thus in poor firing results. For that reason, the furnace head should be kept closed when the furnace is switched off or is below 100 °C in order to prevent the absorption of humidity.

Conducting the dehumidification program:

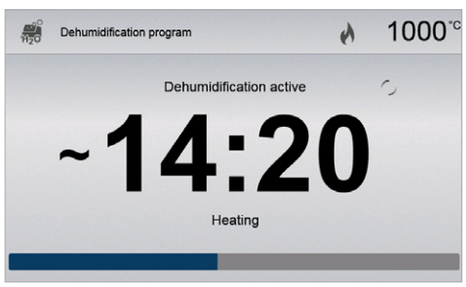
1. **Open the dehumidification program.**
Scroll to page 3 in the home screen and press the **[Maintenance Programs]** button. Press the **[Dehumidification Program]** button in the Maintenance Programs menu.



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



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

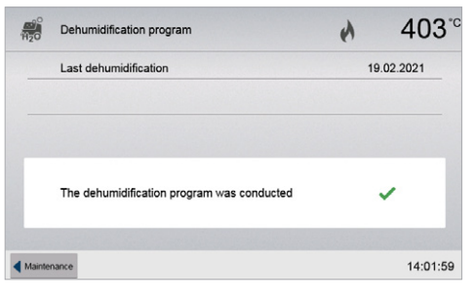


During an active dehumidification program, the furnace head is automatically opened and closed.

4. **Complete the dehumidification program.**
The following message is displayed:

✔ Dehumidification program successful

✘ Dehumidification program failed



During an active dehumidification program, the furnace head is automatically opened and closed. This supports the evaporation process of the condensed water. Do not interrupt this process.

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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 cleaning the firing plate or replacing the firing tray material.

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

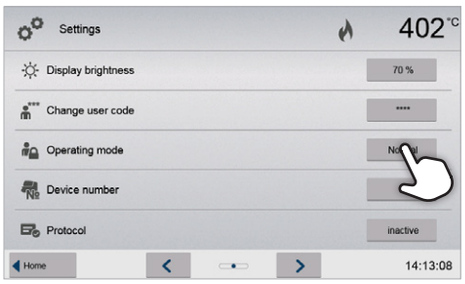
5.4.8 Operating mode

Various operating modes can be selected in the Settings menu. In this way, the user safety is enhanced and adjusted to the area of application. The following modes are available:

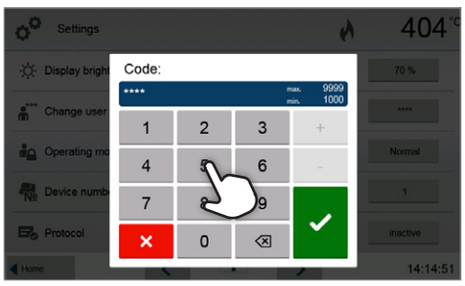
- **Normal**: All functions of the furnace are available in this mode.
- **Protected**: Programs can only be selected and started in this mode. Programs cannot be changed. Settings or special functions cannot be activated or changed. The protected mode can only be activated or deactivated by entering 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 selected. 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 a few steps:

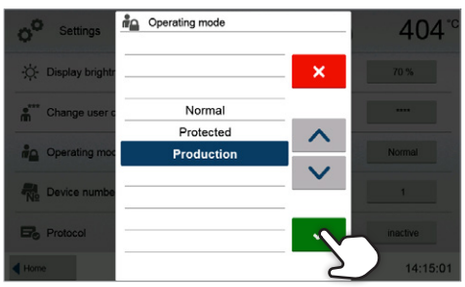
1. **Change the operating mode.**
Open the Settings menu and press the button in the line "Operating mode".



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

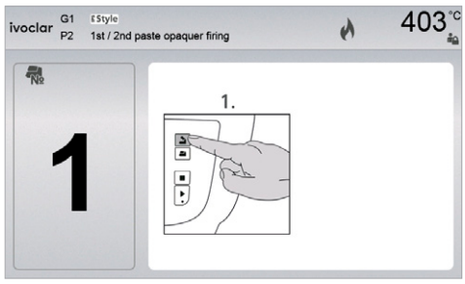


3. **Select the operating mode.**
Enter the desired operating mode and confirm the entry with the green button.



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



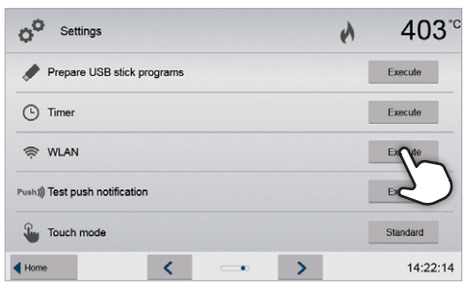
The "Protected" or "Production" modes can be quit by prolonged pressing of the HOME key (at least 3 seconds).

5.4.9 Setting up a WLAN connection

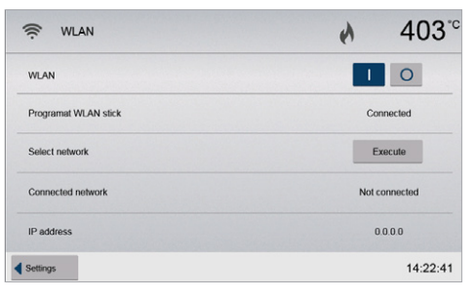
A WLAN connection can be set-up in this Settings menu. This function is only available if the Programat WLAN Stick has been connected with the furnace.

The set-up requires only a few steps:

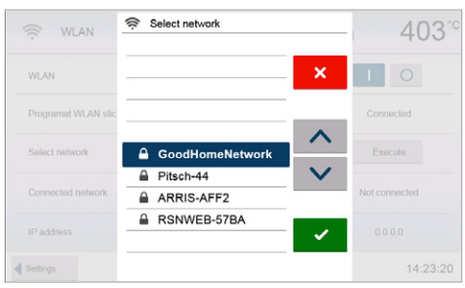
1. Switch WLAN on.



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

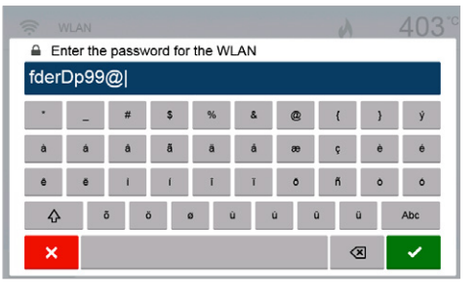


3. Select the desired network.

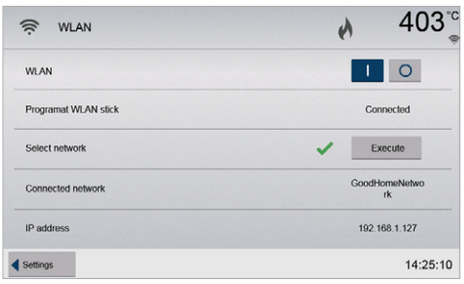


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4. Enter the WLAN password and confirm with the green button or abort the entry with the red button.



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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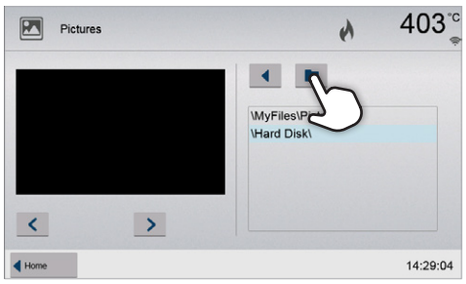
5.5 Multimedia functions

The Programat EP 5010 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.

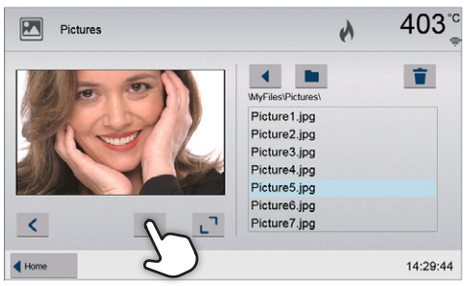
5.5.1 Image display

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

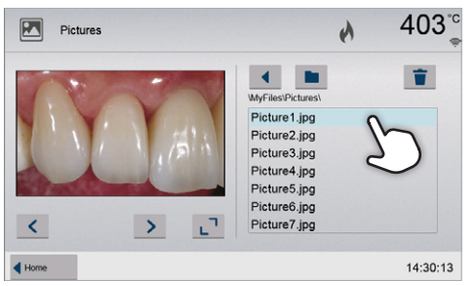
1. Select folder
The arrow keys are used to scroll through the folder. The folder can be opened by clicking the **[Open]** button.



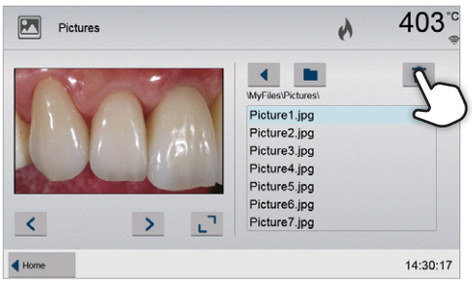
2. Scroll though available image files
The arrow keys are used to scroll through the available image files.



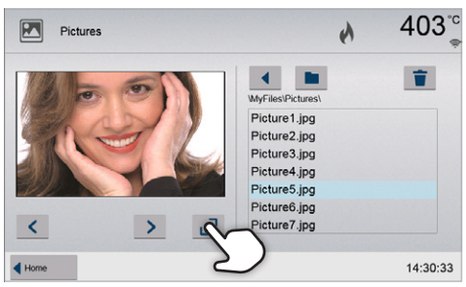
3. Select image
The desired image can be selected on the right side of the display. The left side of the display contains a preview.



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

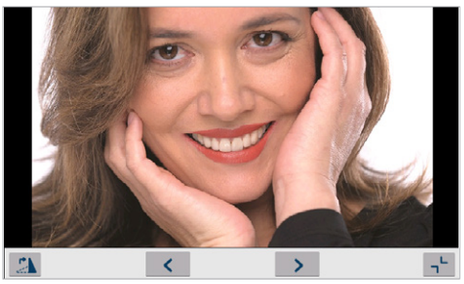


5. Switch to full screen view
The corresponding button is used to switch to the full screen view.

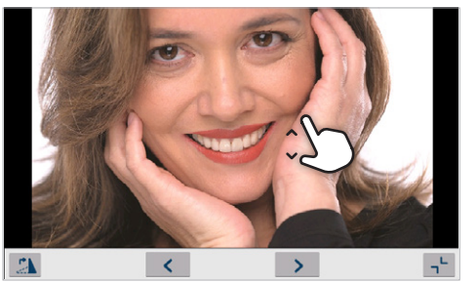


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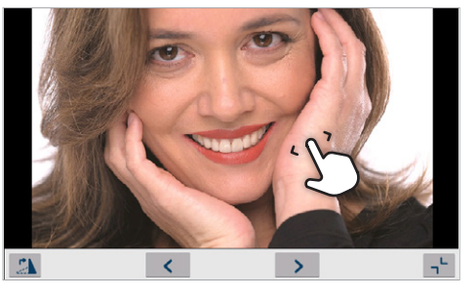
6. Full screen view
In the full screen view, you can scroll through the available image files. The image can be rotated by pressing the corresponding buttons and the full screen view can be ended.



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.

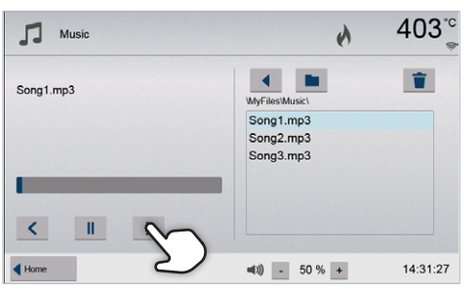
5.5.2 MP3 player

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.

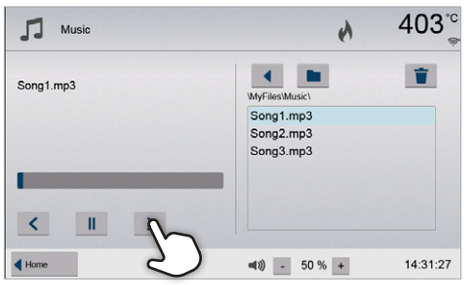


2. Selecting music file
The desired music file can be selected on the right side of the display.

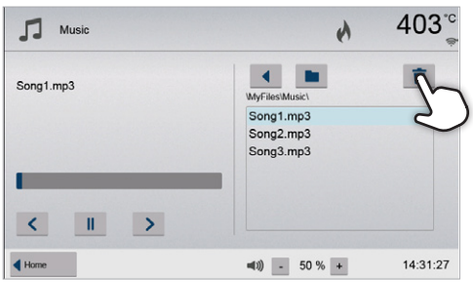


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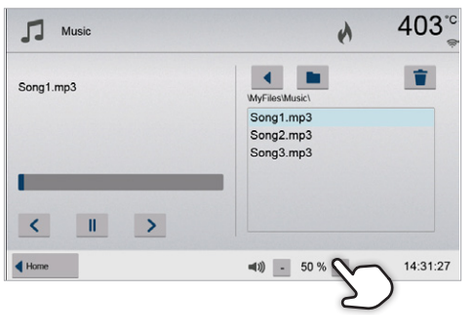
3. Playback elements
The corresponding buttons are used to change to the next or previous title, as well as to start or stop (or pause) the playback. At the end of a title, the next title is automatically played.



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.

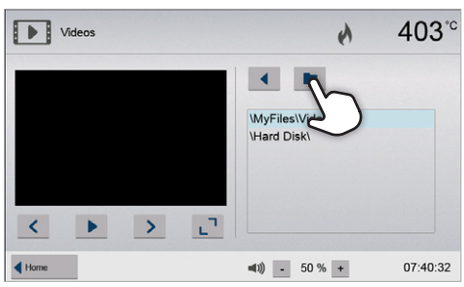


To return to the home screen, press either the touch button [Home] in the navigation bar or the HOME key on the membrane-sealed keypad. This does not end the music playback. The playback can only be stopped by pressing the corresponding button in the media player (see Step 2).

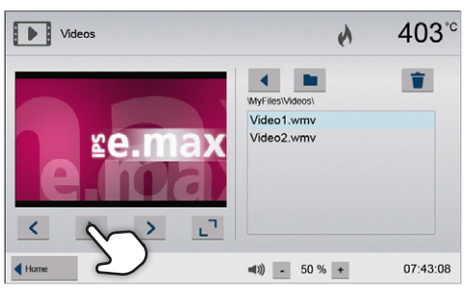
5.5.3 Video player

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.

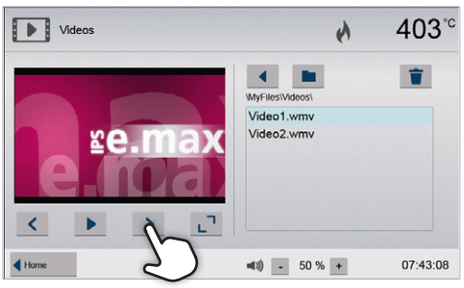


2. Selecting the video
The desired video file can be selected on the right side of the display. The left side of the display contains a preview.

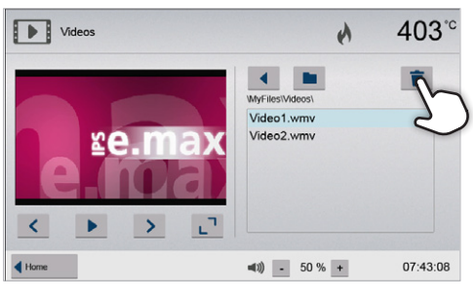


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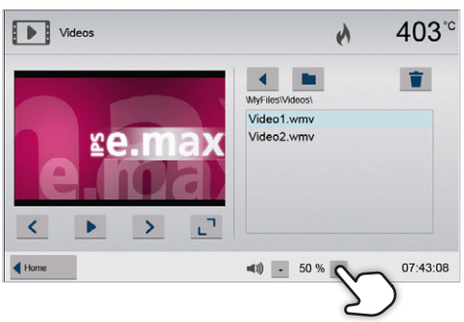
3. Playback elements
The corresponding buttons are used to change to the next or previous title, as well as to start or stop (or pause) the playback.At the end of a video, the next one is automatically played.



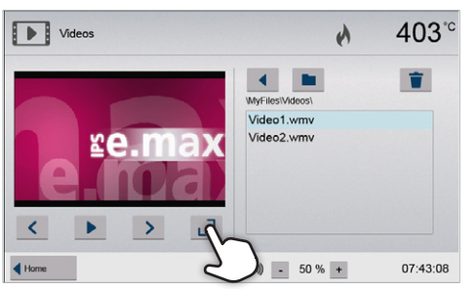
4. Deleting the video
The video can be deleted by tapping the **[Recycling bin]** button.



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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5.6 Digital Shade Assistant (DSA) function

The Programat EP 5010 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 EP 5010 G2 in the laboratory.

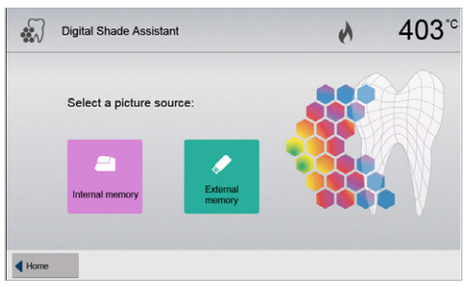
These Operating Instructions describe the procedure in the laboratory. Instructions on determining the reference teeth and image taking are enclosed in the DSA Holder Kit and the DSA Starter Kit.

Using the Digital Shade Assistant function of the Programat EP 5010 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:

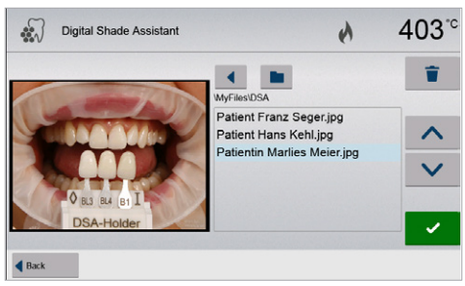
Images can be saved in the internal memory of the furnace with the help of the "PrograBase X10" computer software. For that purpose, connect the furnace with a laptop/PC, on which PrograBase X10 has been installed, via WLAN or LAN.

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.

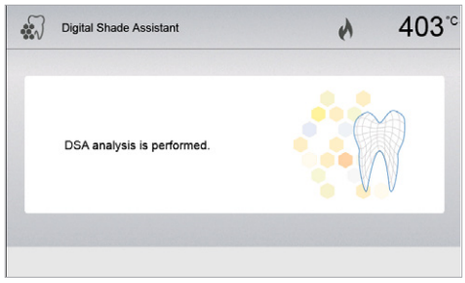


- You can switch to the next or previous jpg file by pressing the **[Arrow Up/Down]** buttons.
- The marked folder can be opened by clicking the **[Open]** button.
- The folder can be left by clicking the **[Back]** button.
- The image displayed can be deleted by clicking the **[Delete]** button.

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

3. Automatic analysis is conducted

This screen is shown during the automatic analysis.

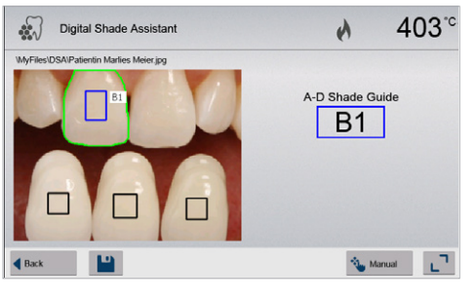


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4. Result of the automatic analysis

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).

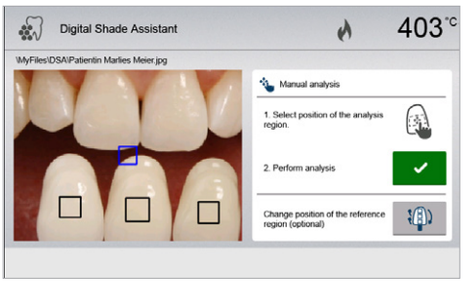


5. Conducting a manual analysis

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.

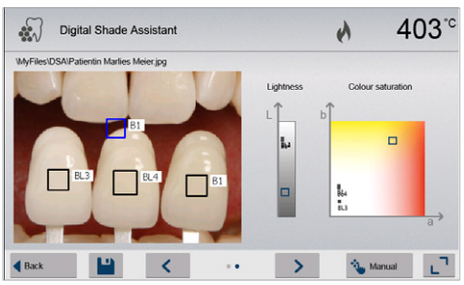
As an option, the position of the reference areas can be changed by pressing the **[Position]** button.



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.

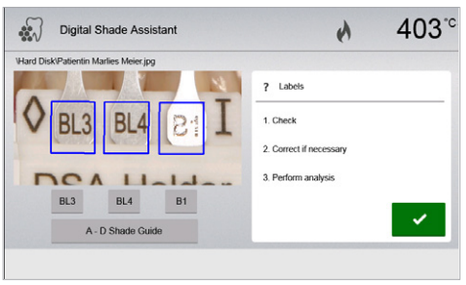
You can toggle between the automatic result and the manual result with the arrow keys.

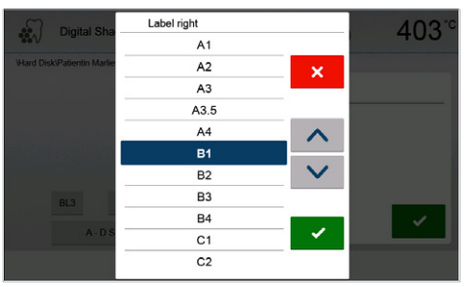
Please refer to the specialized literature for further information about the Lab colour space.

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.





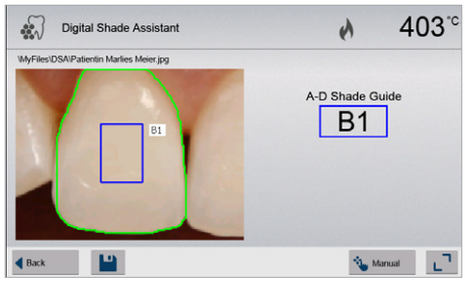
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8. Moving an image section and zooming

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



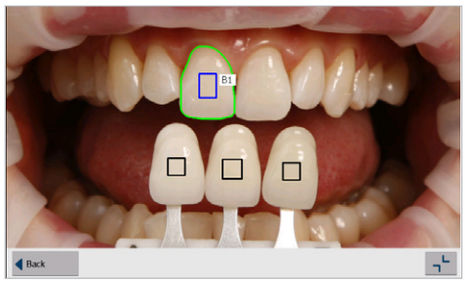
By double-clicking the touch screen, the image section can be enlarged and reduced again.



9. Full screen view

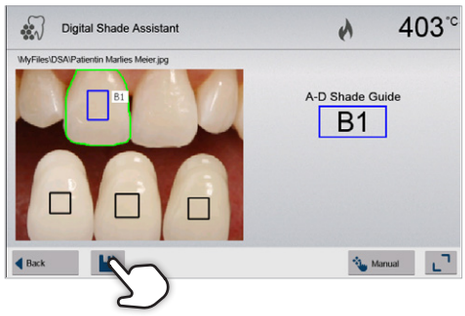
The **[full screen]** button is used to switch to the full screen view.

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



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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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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6 Practical Use

The operating procedure for the Programat EP 5010 G2 will be explained with the help of two examples: one Ivoclar and one individual program.

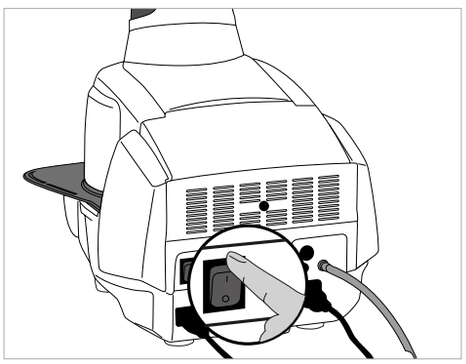
6.1 Firing procedure with an Ivoclar program

Step 1:

Switch the furnace on.

Switch the furnace on using the mains switch at the back of the furnace. Subsequently, the furnace conducts an automatic self-test.

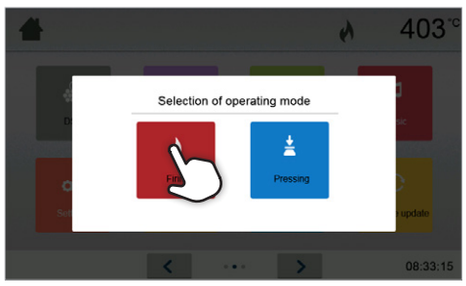
Wait until the furnace has reached the set stand-by temperature and/or the Optical Status Display (OSD) lights up in green.



Step 2:

Select the operating mode.

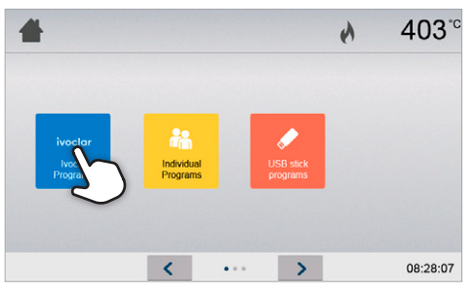
After the self-test has been completed, the selection of the operating modes is displayed. Select the operating mode "Firing".



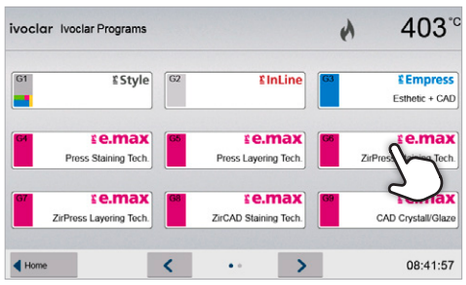
Step 3:

Select the program.

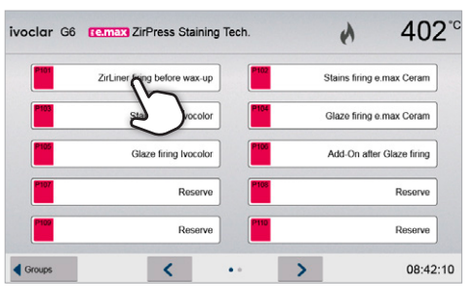
Press the **[Ivoclar Programs]** button.



Select the desired program group.



Select the desired program.

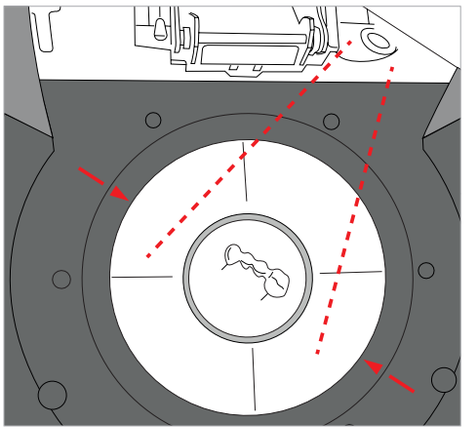


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Step 4:

Load the furnace.

Now, open the furnace head using the OPEN FURNACE HEAD key and position the firing tray with the object in the furnace.

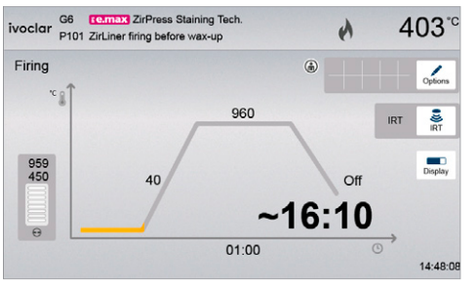


With the Infrared Technology active, position the objects in such a way that the infrared camera has a wide view of the objects. Use the markings on the frame plate (see Figure) for orientation purposes.

Step 5:

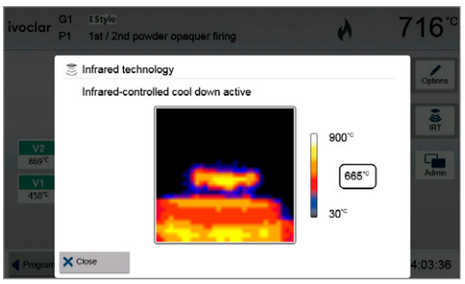
Start the program.

Activate the program by pressing the START key. The LED lights up in green. The process is indicated in 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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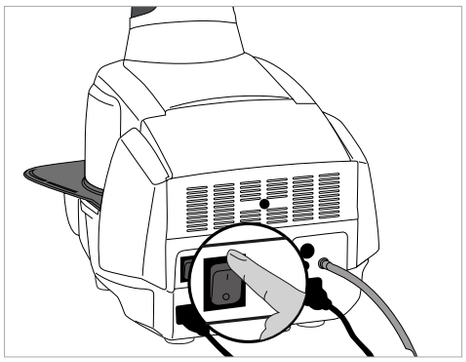
6.2 Firing procedure with an individual program

Step 1:

Switch the furnace on.

Switch the furnace on using the mains switch at the back of the furnace. Subsequently, the furnace conducts an automatic self-test.

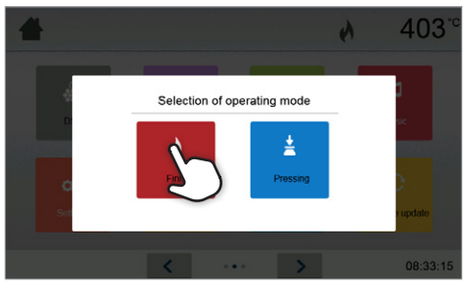
Wait until the furnace has reached the pre-set stand-by temperature.



Step 2:

Select the operating mode.

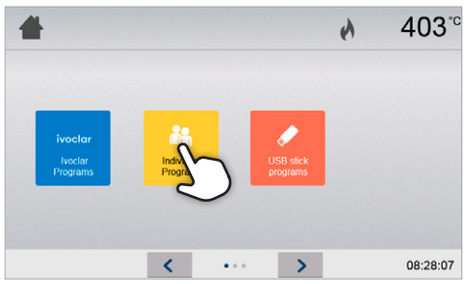
After the self-test has been completed, the selection of the operating modes is displayed. Select the operating mode "Firing".



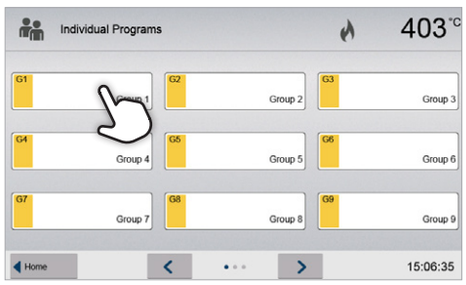
Step 3:

Select the program.

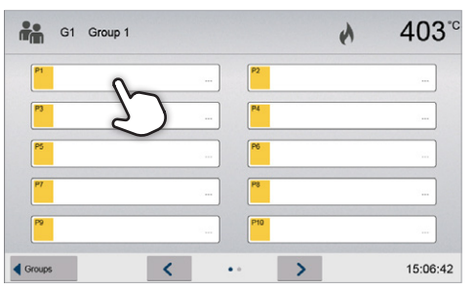
Press the **[Individual Programs]** button.



Select the desired program group.



Select the desired program.

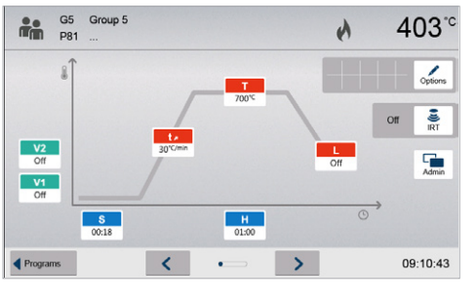


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Step 4:

Enter the parameters.

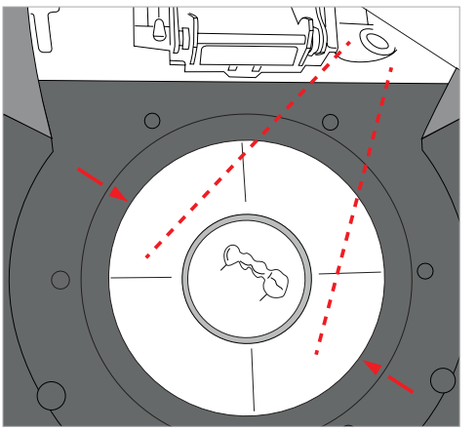
Enter your individual parameters and create the desired firing program (see Chapter 5.2.3 for details).



Step 5:

Load the furnace.

Now, open the furnace head using the OPEN FURNACE HEAD key and position the firing tray with the object in the furnace.

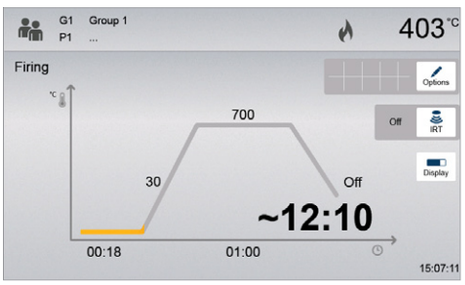


With the Infrared Technology active, position the objects in such a way that the infrared camera has a wide view of the objects. Use the markings on the frame plate (see Figure) for orientation purposes.

Step 6:

Start the program.

Activate the program by pressing the START key. The LED lights up in green. The process is indicated in 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.

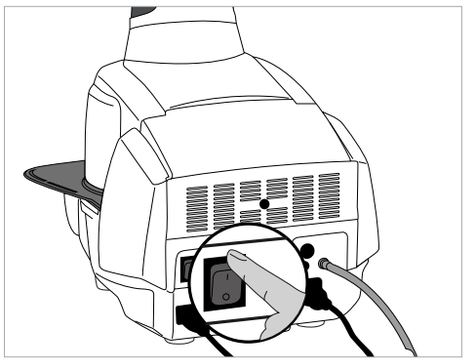
The furnace head opens automatically at the end of the program. When the Optical Status Display lights up in green, the furnace is ready for the next program start.

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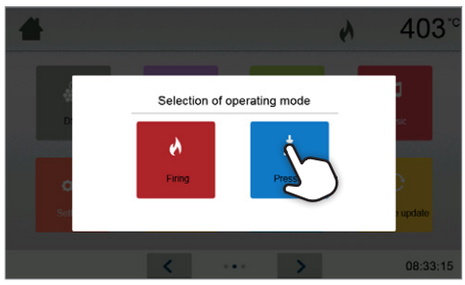
6.3 Press procedure with an Ivoclar press program

Step 1:
Switch the furnace on.
Switch the furnace on using the mains switch at the back of the furnace. Subsequently, the furnace conducts an automatic self-test.

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



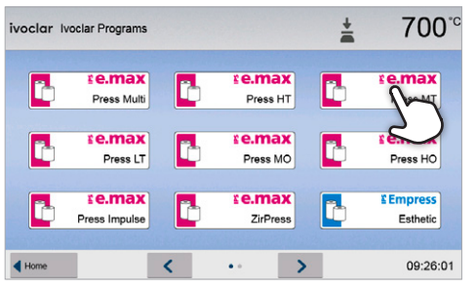
Step 2:
Select the operating mode.
After the self-test has been completed, the selection of the operating modes is displayed. Select the operating mode "Pressing".



Step 3:
Select the program.
Press the **[Ivoclar Programs]** button.

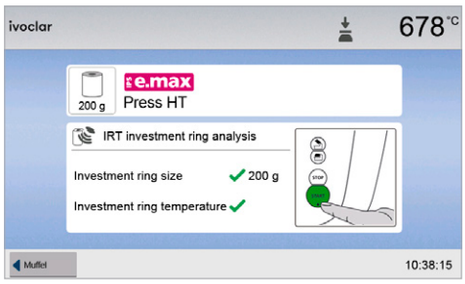


Select the desired program.



Step 4:
Select the investment ring size and load the furnace.

- **IRT investment ring analysis active:**
  Load the furnace with the preheated investment ring. The display shows the next steps and the result of the investment ring analysis.
- **IRT investment ring analysis inactive:**
  Select the desired investment ring size and then load the furnace with the preheated investment ring. Depending on the program selected, up to three different investment ring sizes can be chosen (100 g / 200 g / 300 g). Not all programs can be run with all the investment ring sizes. Please also refer to the Instructions for Use of the respective material.

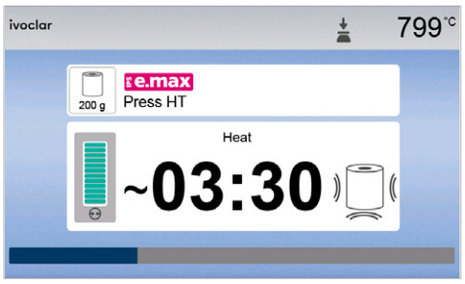


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Step 5:

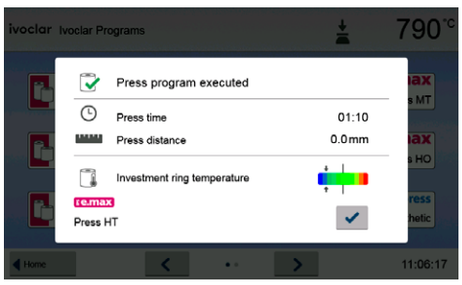
Start the program.

Activate the program by pressing the START key. The LED lights up in green. The progress of the program is shown in the display.



The furnace head opens automatically at the end of the program. The results panel displays the press time, press distance and the investment ring temperature, if the IRT investment ring analysis is activated, at the time of the loading.

After confirmation of the results panel and as soon as the Optical Status Display lights up in green, the furnace is ready for the next program start.



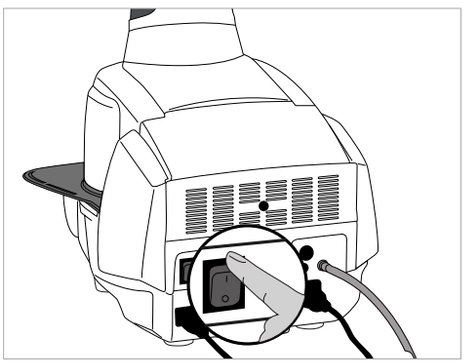
6.4 Press procedure by means of FPF – fully automatic press function

Step 1:

Switch the furnace on.

Switch the furnace on using the mains switch at the back of the furnace. Subsequently, the furnace conducts an automatic self-test.

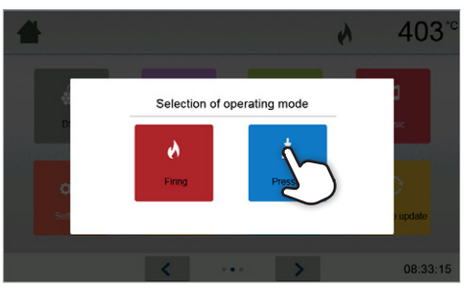
Wait until the furnace has reached the pre-set stand-by temperature.



Step 2:

Select the operating mode.

After the self-test has been completed, the selection of the operating modes is displayed. Select the operating mode "Pressing".



Step 3:

Select the program

Press the **[Fully Automatic Press Function]**.



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Step 4:

Load the furnace and start the program

Load the furnace with the preheated investment ring.
Now press the START button and the program will be started.
The LED lights up in green.

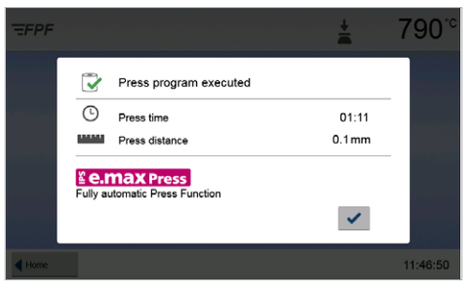


The progress of the program in shown in the display.



The furnace head opens automatically at the end of the program. Press time and press distance are indicated in the results panel.

After acknowledging the results panel and as soon as the OSD lights up in green, the furnace is ready for the next program start.



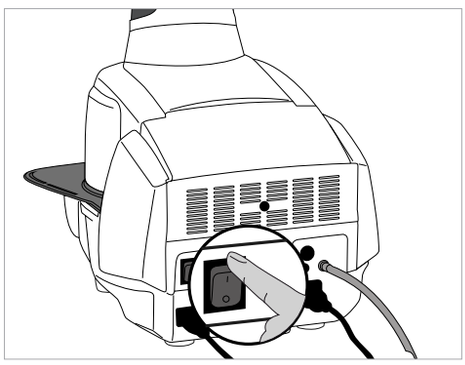
6.5 Press procedure using an individual press program

Step 1:

Switch the furnace on.

Switch the furnace on using the mains switch at the back of the furnace. Subsequently, the furnace conducts an automatic self-test.

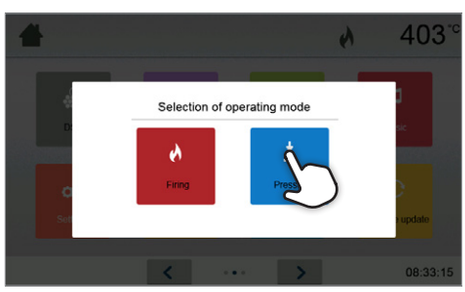
Wait until the furnace has reached the pre-set stand-by temperature.



Step 2:

Select the operating mode.

After the self-test has been completed, the selection of the operating modes is displayed. Select the operating mode "Pressing".



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Step 3:

Select the program.
Press the **[Individual Programs]** button.



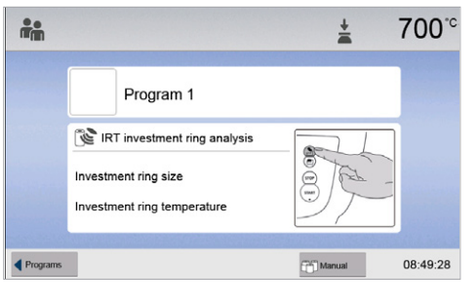
Select the desired program.



Step 4:

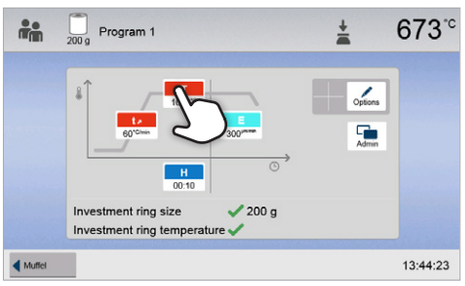
Select the investment ring size and load the furnace.

- **IRT investment ring analysis active:**
  Load the furnace with the preheated investment ring. The display shows the next steps and the result of the investment ring analysis.
- **IRT investment ring analysis inactive:**
  Select the desired investment ring size and then load the furnace with the preheated investment ring.
  Three different investment ring sizes are available for the individual press programs: 100 g, 200 g, 300 g.



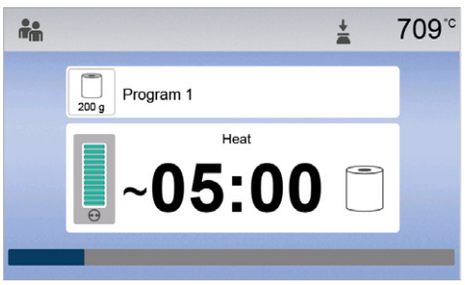
Step 5:

Edit the program.
Now enter your individual parameters and create the desired press program. By pressing the **[Program]** button, the program screen is closed again.



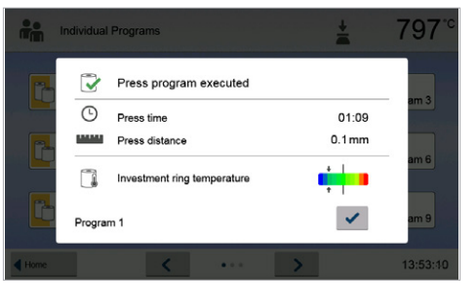
Step 6:

Start the program.
Activate the program by pressing the START key. The LED lights up in green. The progress of the program is shown in the display.



The furnace head opens automatically at the end of the program. The results panel displays the press time, press distance and the investment ring temperature, if the IRT investment ring analysis is activated, at the time of the loading.

After confirmation of the results panel and as soon as the Optical Status Display lights up in green, the furnace is ready for the next program start.



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6.6 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 in the "Firing" operating mode	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 Chapter 6.1) for orientation purposes. If possible, always place the objects on firing pins. **Do not load the firing chamber with already warmed up objects. In back-to-back firing cycles, the object must always have 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! Ivoclar recommends using only the original Programat firing tray or the special firing trays stipulated 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, a 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 a metal margin or a holding pin have to be placed in such a way that the metal margin or the holding pin is not caught by the infrared 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 infrared 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 tray, they should be placed outside the viewing range of the infrared camera if possible.

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7 Maintenance, Cleaning and Diagnosis

This chapter describes the user maintenance and cleaning procedures for the Programat EP 5010 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 Center.

7.1 Monitoring and maintenance

The time for these maintenance procedures depends on the frequency of use and the working habits of the users. Therefore, the recommended times are only approximate values.

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 Service Center. Fine hairline cracks on the surface of the insulation are harmless and do not influence the function of the furnace in a negative fashion.	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 base	Weekly
Check the keypad for visible damage. If the keypad is damaged, it has to be replaced by a certified Ivoclar Service Center.	Membrane-sealed keypad	Weekly
Check the temperature: Use the temperature checking set to check and adjust the temperature in the furnace.	Firing chamber	Twice a year
Check the quartz glass cylinder to make sure that 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 applications and for continuous use, premature ageing of the expendable parts has to be expected. The expendable parts are, e.g. the heating muffle, the furnace head sealing rim 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 the power before cleaning.

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

What	When	Cleaning material
Furnace housing and furnace head	If required	Soft, dry cloth
Membrane-sealed keypad and display	If required	With a Programat cleaning cloth
Cooling tray	Daily	Cleaning brush*
Insulation	Daily	Cleaning brush*
Sealing rims of the furnace head and the sealing surface	Daily	Cleaning brush and a soft cloth
Firing plate	If required	Cleaning brush or sandblasting unit (with glass beads)
Infrared camera	If required	With a 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 1,500 firing hours. If the service note is acknowledged, it will reappear every 1,000 firing hours.

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

7.4 Stand-by

We recommend keeping the furnace head closed, particularly 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 in idle mode 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 automatically activated power-saving function.

The power-saving mode is not available in the press operating mode.

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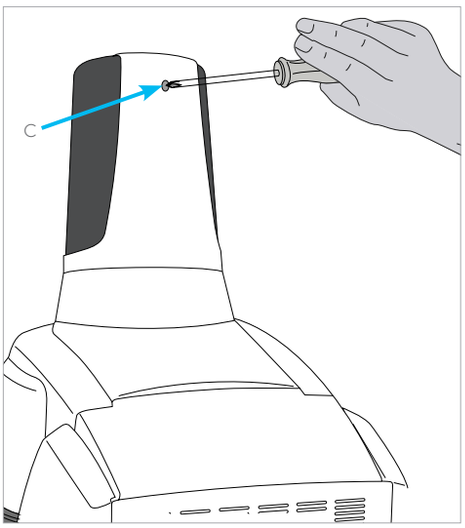
7.6 Replacing the press plunger

The press plunger may be replaced if required. In order to facilitate replacing the press plunger, the following procedure must be followed:

Step 1:

Remove the attachment screw.

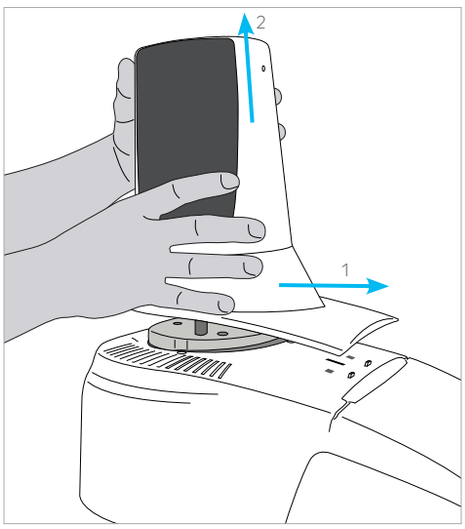
Remove the screw (C) while the furnace head is closed.



Step 2:

Remove the press drive cover.

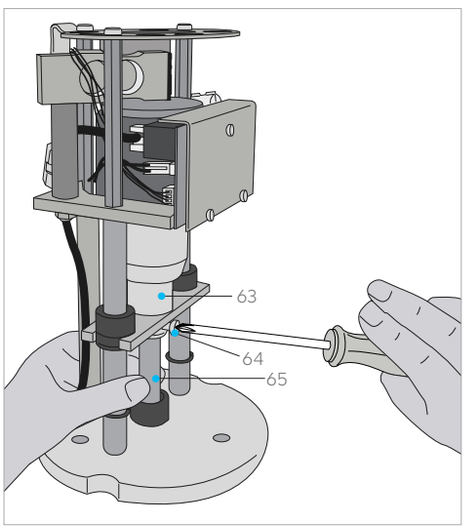
First firmly push the cover to the back (arrow 1) and then remove it by lifting it (arrow 2).



Step 3:

Loosen the press plunger.

Unscrew the clamping screw of the press plunger (64) by turning it approx. one half turn.



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Step 4:

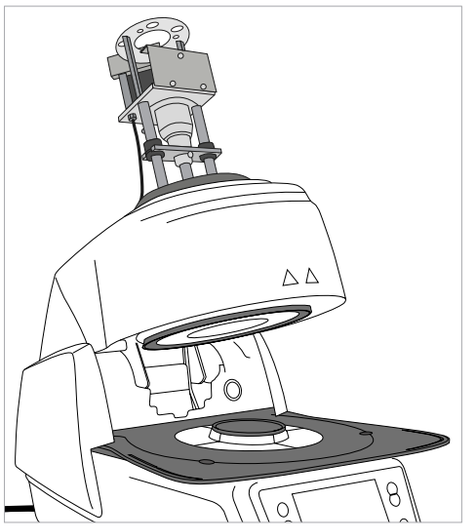
Open the furnace head with the OPEN FURNACE HEAD key. Once the furnace head is wide open, switch the furnace off, **disconnect the power plug**, and allow the furnace to cool to room temperature.

Step 5:

Pull the press plunger (65) with slightly rotating movements from the split taper socket (63) with one hand and pull down the press plunger with the other hand.



Contraindication:
Do not touch the thermocouple when replacing the press plunger.

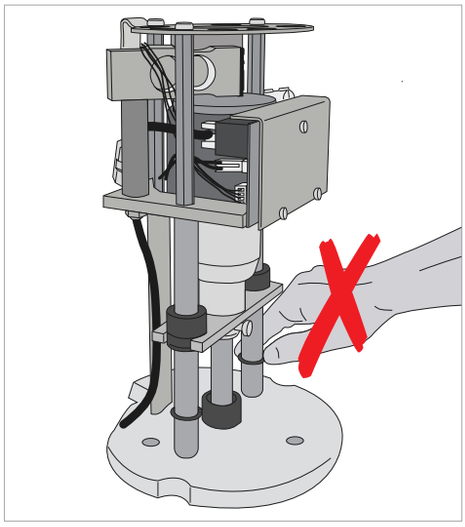


Step 6:

Push the white press plunger (65) with the taper ahead into the guide bush. Push the press plunger with slightly rotating movements into its split taper socket (63) and fasten the screw (64).



Note:
The furnace must only be operated with the press drive cover mounted!





Contraindication:
Never touch the press drive during operation. There is a risk of burning and crushing.

Step 7:

Place the press drive cover (A) and fasten it with the screw (C).

Step 8:

Connect the power and switch the furnace on.

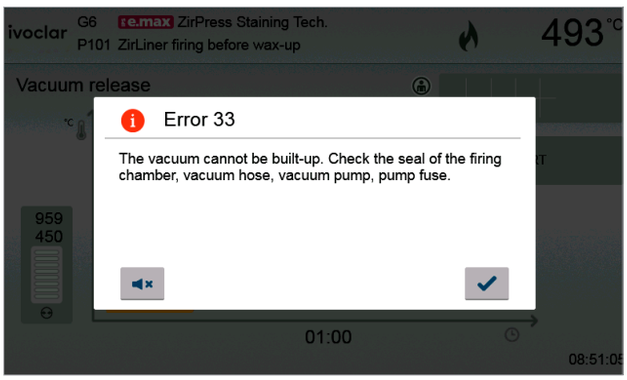
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8 What If ...

This chapter will help you to recognize malfunctions and take appropriate measures.

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	Error message text
2		T < B	Enter a logical value for T.
8		L > T	Enter a logical value for the long-term cooling L.
9		V2x < = V1x	Enter a logical value for the vacuum-on temperature V1x or the vacuum-off temperature V2x.
10		V2x > Tx + 1 °C	Change either the vacuum values or the holding temperature T.
11		Incorrect values for V1x, V2x	Enter a logical value for V1x, V2x.
13 *,**		Current temperature after start > Tx + 80 °C	Excess temperature! Program aborted.
14 *		Temperature in the firing chamber > 410 °C at the start of the calibration program; too high for calibration program	Temperature too high for calibration; furnace cools down. Try restarting the program later.
16		T2 < T1	Enter a lower value for T1 or a higher value for T2.
17		Power failure > 10 s during a program in progress	A program in progress was interrupted for more than 10 s by a power failure. The program cannot be continued!
18		T1 > V12	Enter a lower value for T1 or a higher value for V12.
19	Yes	V2 < B	Pre-vacuum activated! V2 value must be higher than B.
20 **	No	Error in the heating system	Check the heater fuse. If fuse is O.K., contact your local Ivoclar Service Center.
23		Heating muffle very old	The heating muffle is worn down. It is recommended to replace it with a new one. After the error message has been acknowledged, a firing program may still be started.
24		Heating muffle defective	The muffle is so worn down that it must be replaced immediately.
26		T is > B + 160 °C at the start of a firing program	The firing chamber is too hot to start a firing program.
27 **,***	No	The furnace head cannot be initialized.	The furnace head cannot be moved to the final position. It might be blocked by an external mechanical source! If this is not the case, please contact your local Service Center!

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28 **		The furnace head does not reach the target position.	The furnace head does not open / close correctly. The furnace head was manually moved or is obstructed. The furnace head must only be operated using the keys intended for this purpose!
32 **	No	Vacuum is not released.	The vacuum cannot be released. The vacuum valve might be dirty or stuck. Contact your Service Center.
33		Required vacuum (xxx mbar) is not reached within 1 min.	The vacuum cannot be built-up. Check the seal of the firing chamber, vacuum hose, vacuum pump and pump fuse.
106		Timer active – device is in stand-by	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.
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. An additional protocol will delete / overwrite existing entries.
150		Memory error	Internal memory error. Re-start the furnace.
513	No	Error press drive initialization	Press drive is not initialized. Please switch the furnace off and on again.
520	Yes	Error investment ring crack	CDS Crack Detection System has been activated. The program has been aborted and the press plunger has been moved backwards. CDS could probably save your restorations from investment ring cracks. Please check your press results before you continue your work process.
521	Yes	Error investment ring crack	CDS Crack Detection System has been activated. The program has been aborted and the press plunger has been moved backwards. CDS could probably save your restorations from investment ring cracks. Please check your press results before you continue your work process.
522	Yes	Error investment ring crack	CDS Crack Detection System has been activated. The program has been aborted and the press plunger has been moved backwards. CDS could probably save your restorations from investment ring cracks. Please check your press results before you continue your work process.
525	Yes	T < B	Enter a logical value for T.
530	Yes	Error while logging press data	An error occurred while logging press program data. The storage medium might be full.
531	Yes	Error while logging firing data	An error occurred while logging firing program data. The storage medium might be full.
540	Yes	The temperature of the investment ring is too low.	The investment ring is too cold. The investment ring must be sufficiently heated up!
550	Yes	Size of investment ring not recognized	The investment ring size was not recognized. The investment ring might have an unknown format or a hot object in the background disturbs the IRT investment ring analysis.
560	Yes	Investment ring size not available	The investment ring size is not available in this program.
702		Brief power failure during a program in progress	A program in progress was interrupted by a brief power failure. The program is continued!
800		Final vacuum is not reached	The required final vacuum value cannot be reached. Check the vacuum pump.
801		Vacuum drop	An unacceptable vacuum drop has occurred.
802		The vacuum does not increase (self-test).	No vacuum increase could 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 OK?
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: Pre-heating to 962 °C	Error during calibration. Sample may not be correctly inserted. Try again with a new sample and make sure that the sample makes ample contact.
1501	Yes	Note -> firing hours	The heating muffle has been in use for **** firing hours. Please perform a heating test (diagnosis) and follow the notes in the Operating Instructions.
1510		T is > VT at the start of a firing program	The temperature in the firing chamber is higher than the predrying temperature. Press START to continue the program despite the error message.

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1522		SW update: Error during update	An error has occurred during the software update. Do NOT switch the furnace off and try again. If the error reoccurs, try conducting the update via the USB interface.
1541		Error while copying a file	An error occurred while copying a file. Possible causes: file too large, invalid file format, etc.
1550	Yes	Change of operating mode	The operating mode has been changed! Please observe the stand-by temperature.
1800	Yes	USB stick	No USB memory stick is 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 plug in only the USB memory stick to be prepared.
1830	Yes	USB stick	Not enough free memory.
1835	Yes	Media playback	Playback of the selected file is not possible. The data rate might be too high.
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.
1902	Yes	Data backup – recover	The new software contains 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.
1903	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.
1911	Yes	Data backup – recover	The new software contains program parameters which were not yet available at the time of the data backup. Please check the individual programs. The individual programs are no longer valid.
1912	Yes	Data backup – recover	The new software contains 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.
1913	Yes	Data backup – recover	The new software contains program parameters which were not yet available at the time of the data backup. Please check the individual programs. The individual programs are no longer valid.
1920	Yes	Data backup – recover	The data backup could not be performed. Please install a newer software version.
1921	Yes	Data backup – recover	The data backup could not be performed. Please install a newer software version.
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.

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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!

8.2 Additional error messages

If one of the following error numbers appear, contact your local Ivoclar Service After Sales Service immediately:

25, 29, 43, 44, 45, 46, 47, 48, 56
103, 107, 108, 109, 143, 144, 145, 146, 147
148, 500, 504, 505, 514, 526, 527, 529, 700
701, 703, 704, 707, 1010, 1011, 1012, 1013, 1014
1015, 1016, 1017, 1018, 1019, 1024, 1025, 1026, 1028
1143, 1144, 145, 1146, 1147, 1148, 1207, 1300, 1301
1303, 1304, 1305, 1401, 1402, 1500, 1750, 1751, 1752
1753, 2750, 2751, 2752, 2753, 2770

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8.3 Technical malfunctions

These malfunctions may occur without an error message being displayed:

Error	Double-check	Measure
Vacuum is not or only slowly released.	Is the vacuum released within approx. 30 seconds?	Wait until the vacuum is released, remove the object. Switch furnace off and on again*.
Display incomplete	Activate the display test program; *	*
Display is not illuminated	Has the furnace been correctly connected and switched on according to the Operating Instructions?	Correctly connect and switch on the furnace.
Beeper does not sound.	Is the beeper switched off (volume = 0)?	Set the 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 been released?	Is the program still running? Wait until the program is complete. Switch furnace off and on again*.
Vacuum pump does not start working	Is the fuse for the vacuum pump defective?	Check fuse and replace it, if necessary.
	Was the max. power consumption at the connector surpassed?	Use only the vacuum pump recommended by Ivoclar.
	Is the vacuum pump plug correctly inserted?	Correctly connect the vacuum pump to the furnace base.
Final vacuum is not reached	Is the vacuum hose OK?	Check the vacuum hose and the hose connection (from the furnace to the pump and from the furnace head to the furnace base).
	Is the pump capacity accurate?	Start the vacuum test program.
	Is humidity / condensation in the vacuum hose?	Start the dehumidification program.
Wrong or illogical temperature indication	Is the thermocouple buckled or fractured?	Contact the Ivoclar Service Center.
	Is the plug for the thermocouple correctly inserted?	Correctly connect thermocouple.
	Is the thermocouple plug defective?	*
Cracks in the insulation	Are the cracks small and neglectable (hairline cracks)?	Small cracks in the insulation do not negatively influence the performance of the furnace.
	Are the cracks very large or are parts broken off?	*
Cracks in the quartz glass / heating element	Are there cracks in the quartz glass or is the quartz glass sheathing the heating wire broken?	Switch off the furnace*
The firing result does not meet the expectations	Are the firing parameters correct?	Set the firing parameters according to the instructions of the material manufacturer.
	Has the correct firing tray been used?	Use the original Programat firing tray or the special firing tray recommended for the respective material.
	Has the furnace been calibrated?	Perform a temperature calibration.
	Is the thermocouple damaged or buckled?	*
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 Repair

Repairs may only be carried out by a certified Ivoclar Service Center.

If repairs during the warranty period are not carried out by a certified Ivoclar Service Center, the warranty will expire immediately. Please refer to the warranty regulations for more details.

8.5 Resetting to factory settings

The furnace can be reset to the original settings, by resetting to factory settings. In this process, all programs, melodies and volume adjustments are irrevocably reset to the factory settings.

For that purpose, proceed as follows:

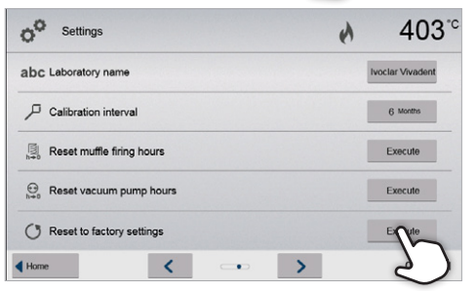
1. **Open the Settings menu.**
Scroll to page 2 in the home screen and press the **[Settings]** button.



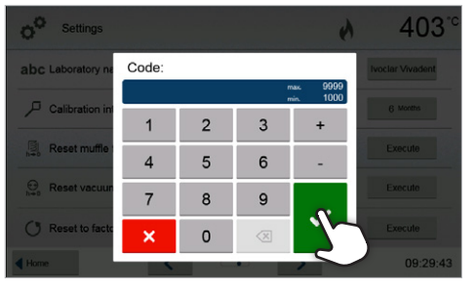
2. **Open the setting "Reset to factory settings".**
The **[Arrow]** button is used to scroll through the Settings menu. Press the button until the setting "Reset to factory settings" appears in the display.



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



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

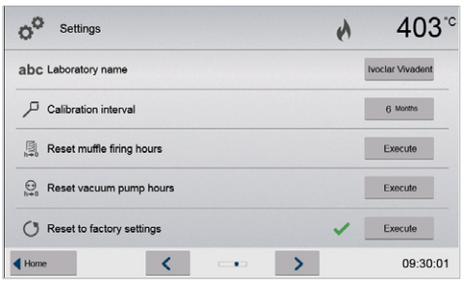


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5. Complete the "Reset to factory settings".
The following message is displayed:

✔ Reset to factory settings successful

✘ Reset to factory settings failed



To return to the home screen, press either the [Home] touch button 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 EP 5010 G2
- Power cord
- Vacuum hose
- Programat Firing Tray Kit 2
- Automatic Temperature Checking Set ATK2 (test set)
- LAN download cable
- Cooling grid
- Programat WLAN Kit
- DSA Holder Kit
- Various accessories

Recommended accessories

- Automatic Temperature Checking Set (ATK2)
- Vacuum pump VP5

9.2 Technical data

Power supply	110 – 120 V / 50 – 60 Hz 200 – 240 V / 50 – 60 Hz
Overvoltage category	II
Pollution degree	2
Tolerated voltage fluctuations	± 10%
Max. power consumption	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.
Values of electric 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 electric 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: 550 mm
Usable size of the firing chamber	Diameter: 90 mm Height: 80 mm
Max. firing temperature	1200 °C
Weight	20.5 kg

Safety notes

The furnace complies with the following guidelines:
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

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9.3 Acceptable operating conditions

Acceptable ambient temperature	+5 °C to +40 °C
Acceptable humidity range	Max. relative humidity 80% 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 2,000 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 Firing program table

A program table (°C / °F) is enclosed in these Operating Instructions. Should this not be the case, please contact the Ivoclar Service Center.

Important information
The current program tables are also available at: www.ivoclar.com/downloadcenter

The program tables can be downloaded from the Internet as PDF files. Please note, that the version of the firing program table should correspond to the software version which is used on your furnace.

10.2 Press program table

Material	Investment ring size		
	100 g	200 g	300 g
IPS e.max Press Multi		•	
IPS e.max Press HT	•	•	
IPS e.max Press MT	•	•	
IPS e.max Press LT	•	•	
IPS e.max Press MO	•	•	
IPS e.max Press HO	•	•	
IPS e.max Press Impulse	•	•	
IPS e.max ZirPress	•	•	•
IPS Empress Esthetic	•	•	
IPS Inline Press-on-Metal	•	•	•

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Declaration of conformity

Declaration of conformity

CE

Manufacturer Address	Ivoclar Vivadent AG Bendererstrasse 2 LI - 9494 Schaan Liechtenstein
Product	**Programat EP5010 / 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 2014/30/EU 2011/65/EU	Low voltage Electromagnetic compatibility 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: 8
Date of issue: 2024-04
Valid from software V7.0

This device has been developed solely for use in dentistry. Start up and operation should be carried strictly according to the Operating Instructions. Liability cannot be accepted for damage resulting from misuse or failure to observe the Operating Instructions. The user is solely responsible for testing the apparatus for its suitability for any purpose not explicitly stated in the Instructions.

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