EP 600 Combi

Press Furnace and Ceramic Furnace



Valid as of Software Version V4.0

Operating Instructions

CE

ivoclar vivadent®
technical

Dental Servis
Serdar Ayısıt
0555 274 05 51

KONFORMITÄTSERKLÄRUNG
DECLARATION OF CONFORMITY
CERTIFICAT DE CONFORMITÉ
DICHIARAZIONE DI CONFORMITÀ
DECLARACIÓN DE CONFORMIDAD
DECLARAÇÃO DE CONFORMIDADE

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CE

Produkt / Product / Produit / Prodotto / Producto / Produto

IPS Empress EP600

DE Hiermit erklären wir in alleiniger Verantwortung, dass das oben aufgeführte Produkt den erwähnten Normen entspricht.
Gemäss den Bestimmungen der EU-Richtlinie(n):

GB We herewith declare that the product listed above complies with the mentioned standards.
Following the provisions of Directive(s):

FR Par la présente, nous déclarons que le produit ci-dessus indiqué est conforme aux normes énoncées.
Conformément aux dispositions de la (des) Directive(s) CE:

IT Con la presente dichiariamo sotto la nostra responsabilità, che il prodotto sopra menzionato corrisponde alle norme citate.
Secondo le disposizioni della/e Direttiva/e CEE:

ES Por la presente declaramos que el producto arriba indicado cumple con las normas citadas.
Siguiendo las indicaciones de la Directiva:

PT Declaramos que o produto citado cumpre as normas mencionadas.
De acordo com as especificações da(s) Diretriz(es):

73/23/EWG 89/336/EWG	EN 50081-1	1992
	EN 50082-1	1997
	EN 61010-1	1990
	EN 61010-1/A1	1992
	EN 61010-1/A2	1995
	EN 61010-2-010	1992
	EN 61010-2-010/A1	1996
	EN 61326-1	1998

Schaan, 25.02.2003

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Bürs, 25.02.2003

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Rev. 1.3

{IPS Empress EP600 1.doc/25.02.03/obma}

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List of Parts

A = Furnace Base

1 Sagger tray BP1
2 Screws for sagger tray
3 Rubber foot
4 Air vents
5 On/Off switch
6 Power socket
7 Vacuum pump socket
8 External vacuum pump fuse
9 Heater fuse
10 Controls fuse
11 Rating plate
12 Vacuum hose connection
13 Vacuum hose
14 PC printer connection (RS-232)
15 Opening for the operating pin
16 Press drive socket
17 Heater plug socket
18 Thermocouple socket
19 Sealing surface
20 Fuse holder
21 Power cord
22 Plug for power cord
23 Plug-in for ground connection
24 Recess for ATK1
25 Support for tray

B = Furnace Head with Press Mechanism

50 Firing plate
51 Screws for furnace head connections cover
52 Press drive cover
53 Furnace head cover
54 Furnace head connections cover
55 Screws for press drive cover
56 Press plunger EP600 (red)
57 Terminal screw for press plunger
58 Cover for press electronics
59 Press electronics
60 Split taper socket for press plunger
61 Press drive cable
62 Thermocouple cable
63 Heater cable
64 Thermocouple plug
65 Press drive plug
66 Heater plug
67 Heater plug retention screw
68 Snap ring
69 Stone lining
70 Heating muffle
71 Sheathed thermocouple
72 Seal (O-ring)
73 Warnings
74 Recess for removal of firing plate (50)
75 Pegs for plug-on console
76 Leaf spring
77 Plug-on console
78 Grounding band
79 Socket for Pager 1
80 Operating pin
81 Motion rod

C = Control Unit

100 LC Display
101 Contrast key
102 HELP key
103 Foil
104 Function key 1
105 Function key 2
106 Function key 3
107 Function key 4
108 ESC key
109 ENTER key
110 START key
111 STOP key
112 Open furnace head key
113 Close furnace head key
114 Numerical keys (0-9)

D = Automatic Temperature Checking Set (ATK 1)

121 Ceramic base block
122 Melting sample
123 Contact pins

E = Investment Ring Cooling Grid (complete)

140 Investment ring cooling grid

F = Firing Tray

150 Firing tray

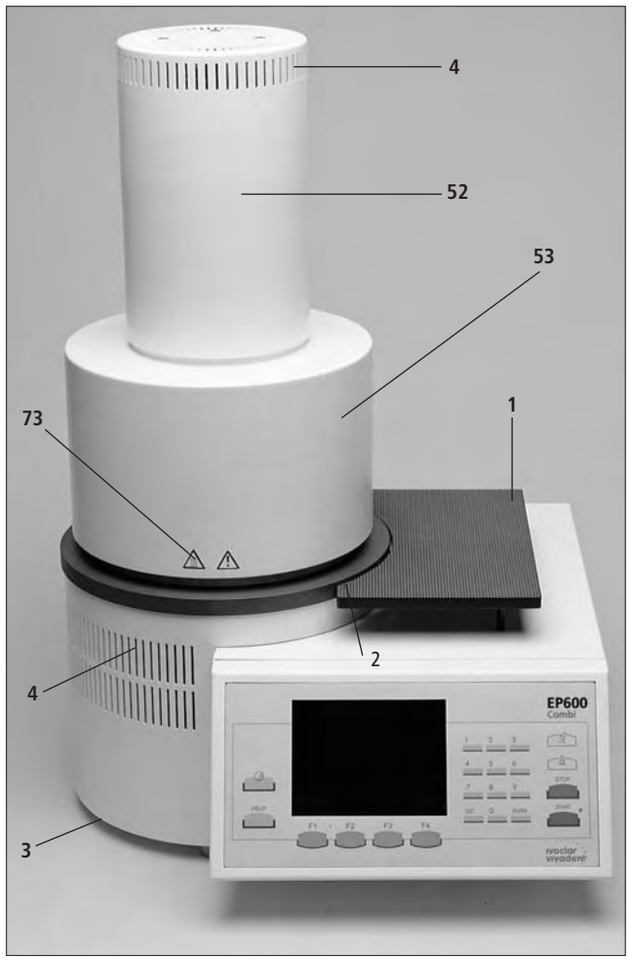
G = Card Reader

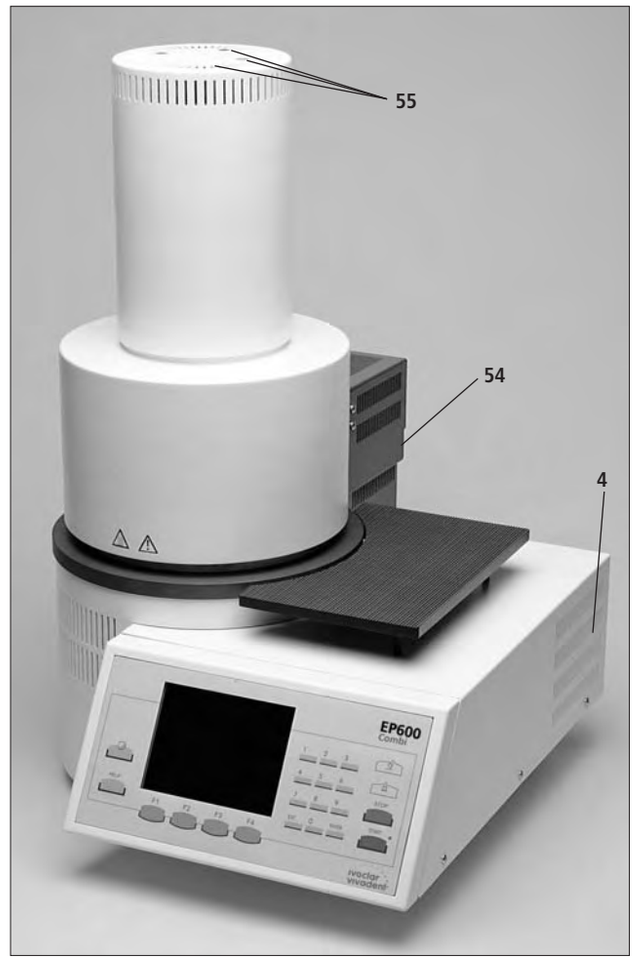
160 Card reader
161 RS232 plug
162 Power pack
163 Status indicator
164 Card slot
165 Adapter

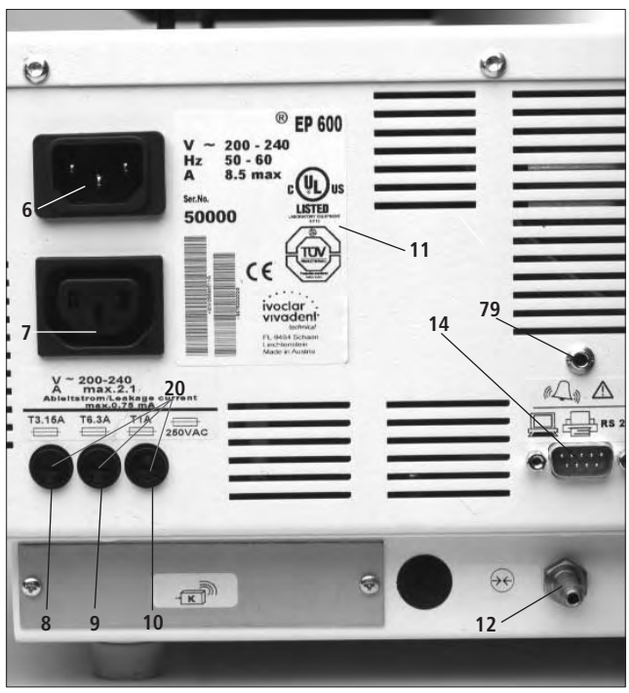
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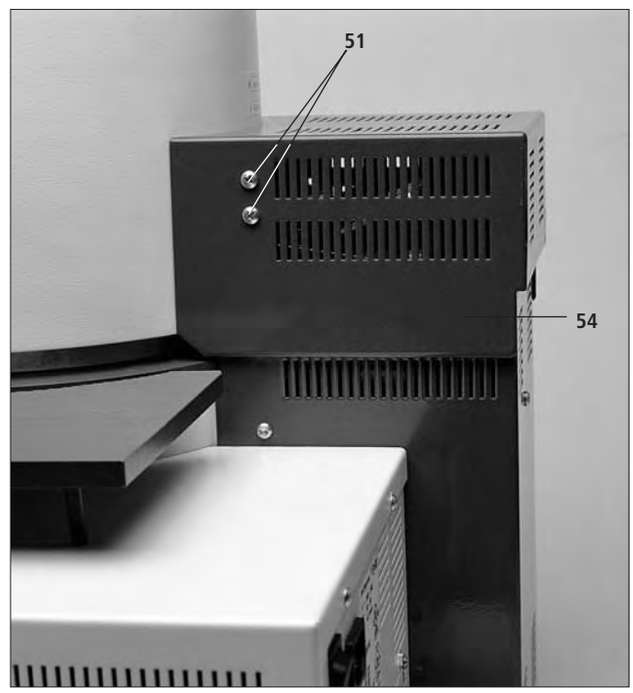
170 Program memory card

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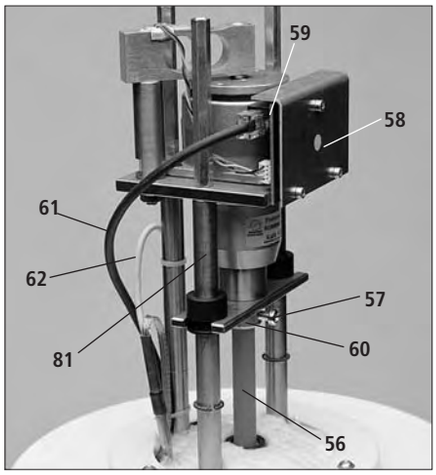


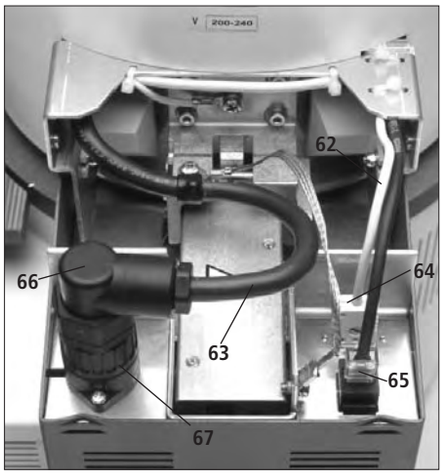


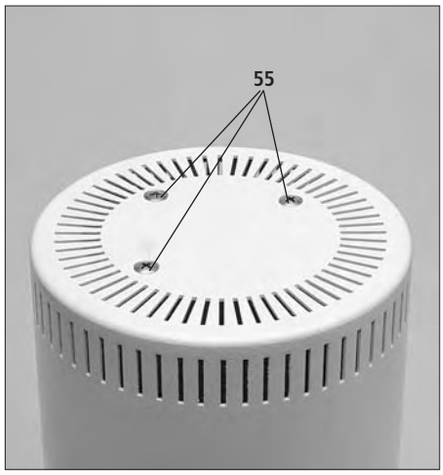


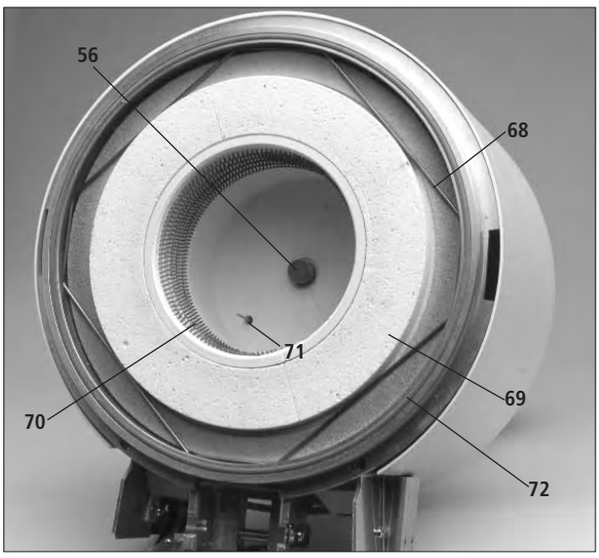


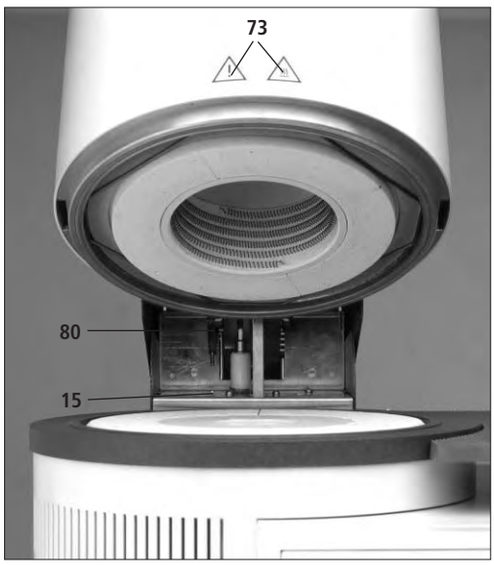
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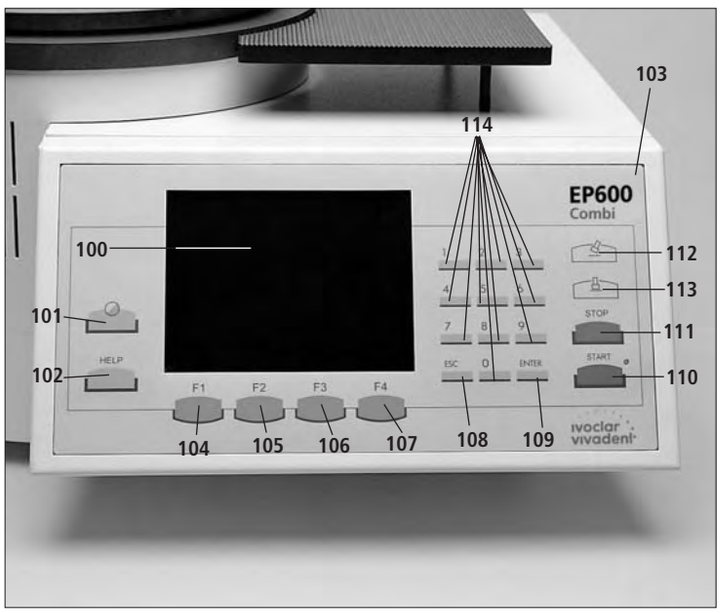




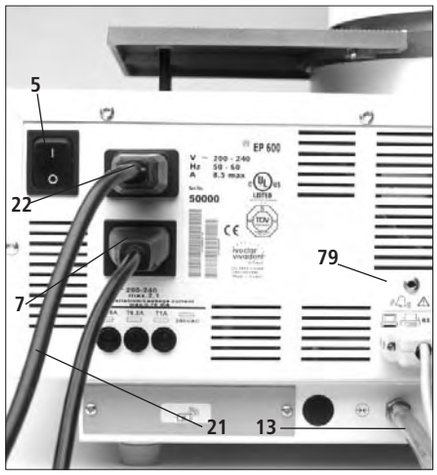




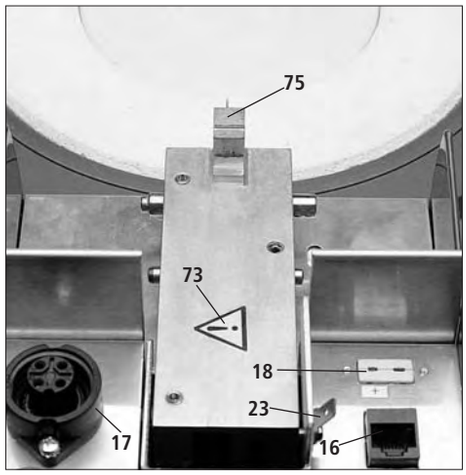


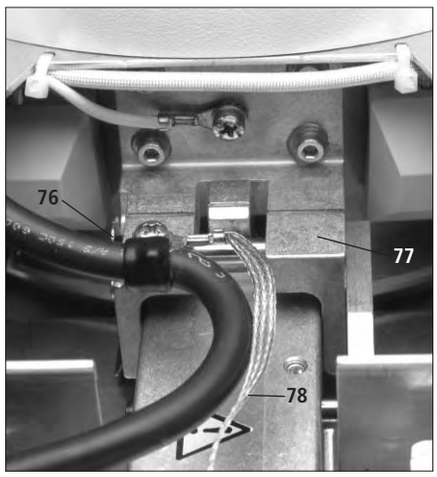


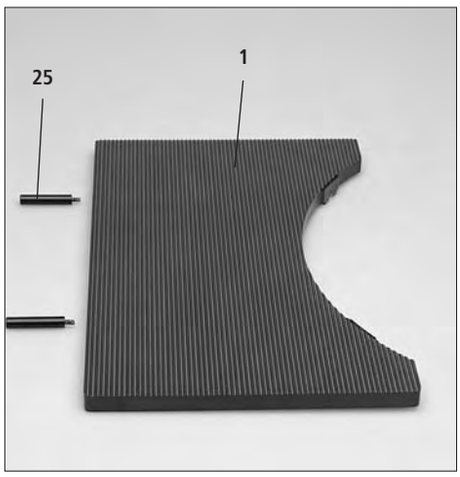
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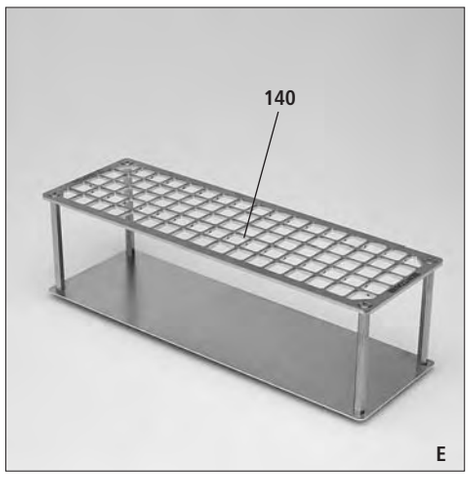


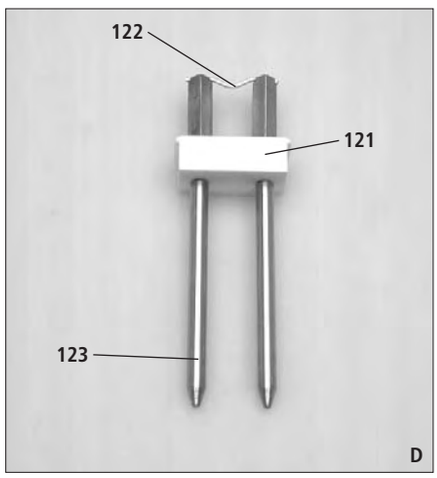


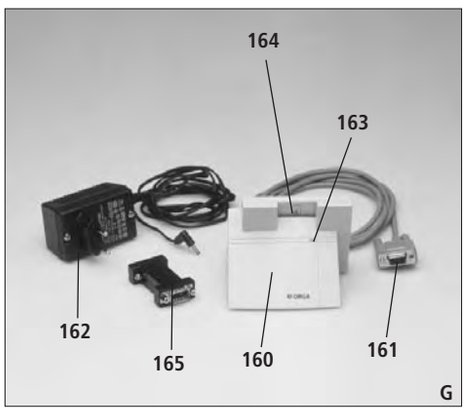


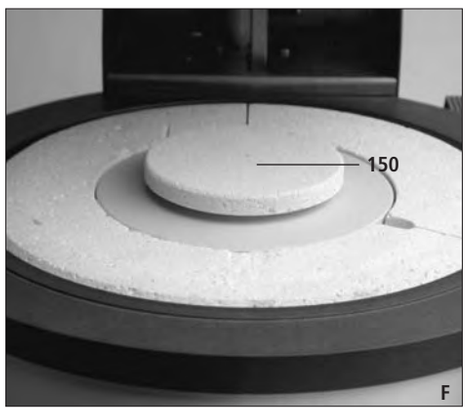


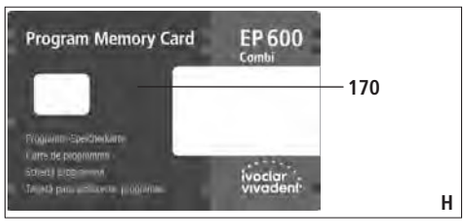












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1. Introduction / Signs and Symbols

1.1 Preface

Dear Customer,
Thank you for having purchased the EP600 Combi Press and Ceramic Furnace. This furnace with the intelligent press drive has been especially developed for the Ivoclar Vivadent all-ceramic systems (IPS e.max®, IPS Empress®). It is the latest of our technical high-quality products. Inappropriate use may damage the equipment and be harmful to personnel. Please observe the relevant safety instructions in Chapter 2.

The EP600 Combi is designed according to EN61010-1 and thus complies with the relevant EU regulations.

1.2 Signs and symbols

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

Risks and dangers
This symbol marks safety instructions that must be followed to prevent injury or death. Furthermore, damage to the furnace and/or laboratory may be avoided.

Important information
This symbol marks additional information for correct and economic use of the EP600 Combi.

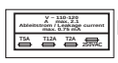

Contraindication

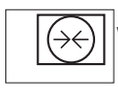

Burn hazard


Risk of crushing

Furnace


Printer


Fuses


Vacuum


K-Module
(Communication module)


Alternating current
(IEC 417)


Burn hazard
(IEC 417)


Risk of crushing


Outlet
(SELV, max. 24 VDC/A1)
PC printer connection

Display


FIRING Mode


PRESSING Mode


IPS e.max


IPS Empress Esthetic


IPS Empress Layering Technique


IPS Empress 2 Layering Technique


IPS Empress Cosmo


IPS Empress Staining Technique


Note


Technical malfunction


Operating error


Saving active; do not switch off the furnace


Timer active, programs cannot be started


Energy-saving mode active


Program memory card active


Data transfer from/to Program memory card active

1.3 Notes regarding the Operating Instructions

These Operating Instructions facilitate the correct, safe, and economic use of the EP600 Combi Press and Ceramic Furnace. They are divided into several, clearly structured chapters. This should enable you to locate specific topics quickly and easily.

You must read these Operating Instructions

To inform you about risks, dangers, important information, and contraindications, these Instructions contain corresponding signs/symbols to mark important paragraphs.

We recommend keeping the Instructions in a safe place near the furnace to have immediate access to the information if necessary.

Should you lose the Operating Instructions, extra copies can be ordered at a normal fee from your local Ivoclar Vivadent Service Center.

Furnace concerned:
EP600 Combi Press and Ceramic Furnace

Target group:
Dental technicians and technologists

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2. Safety First

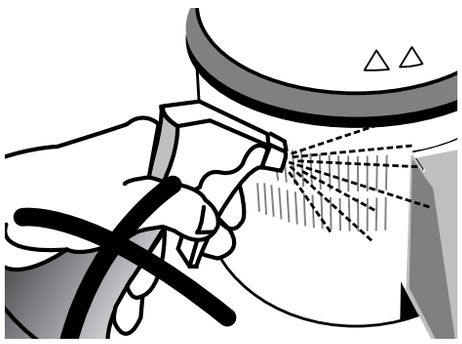
This chapter is especially important for individuals who work with the EP600 Combi or who have to carry out maintenance or repair work. This chapter must be read and the corresponding instructions followed!

2.1 Indications

The EP600 Combi has been designed for pressing IPS e.max and IPS Empress ingots and for firing dental ceramic materials and should be used for these purposes only. Uses other 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:

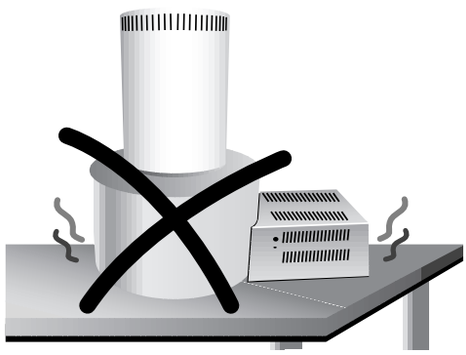
- The instructions, regulations, and notes in these Operating Instructions must be observed.
- The instructions, regulations, and notes in the vacuum pump Operating Instructions must be observed.
- The furnace must be operated under the indicated environmental and operating conditions (see Chapter 9)
- The EP600 Combi must be properly maintained.



2.1.1

Risks and dangers

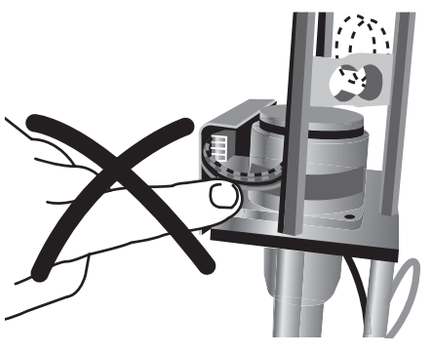
Make sure that no liquids or other foreign objects enter the furnace or the air vents, since this may result in an electrical shock.



2.1.2

Burn hazard

The furnace head should not be removed from the furnace and placed on a working surface or packaging material while it is still hot, as there is a burn hazard.

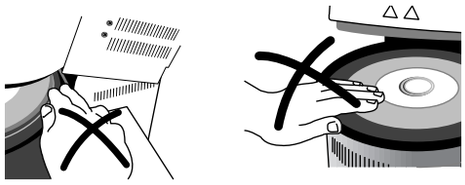


2.1.3

Risks and dangers

Never touch the electronic components, since a static discharge may damage them.

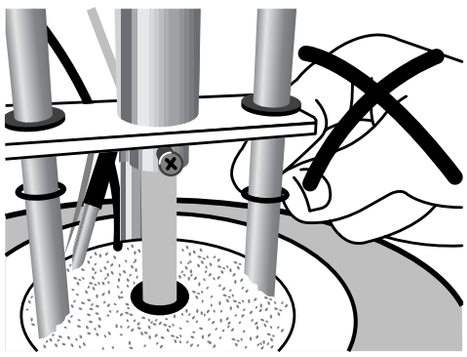
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2.1.4

Risk of crushing / burn hazard

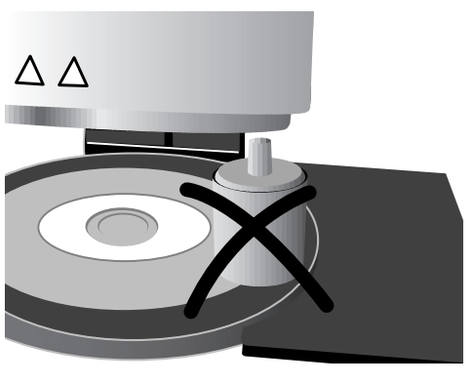
Never reach under the furnace head during operation. There is a risk of crushing and a burn hazard.



2.1.5

Risk of crushing

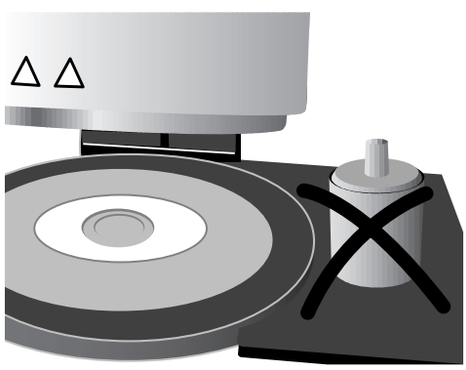
Never touch the press drive during operation. There is a risk of crushing.



2.1.6

Contraindication

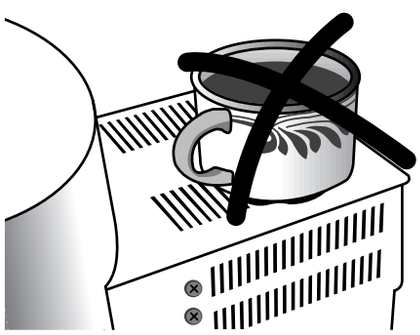
Investment rings or firing trays must not be placed in the area surrounding the firing table, since they may get stuck under the furnace head. Use the sagger tray for firing trays or the cooling grid for fired investment rings.



2.1.7

Contraindication

Fired investment rings must not be placed on the sagger tray to cool. Please use the cooling grid especially designed for that purpose.

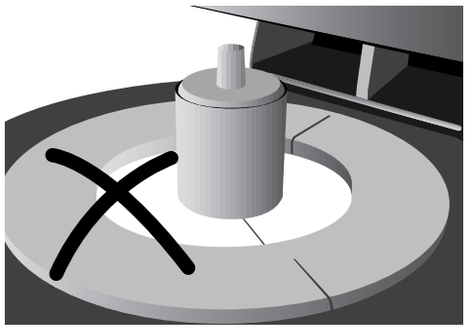


2.1.8

Contraindication

Do not place any objects on the furnace head. The opening process of the furnace head must not be obstructed.

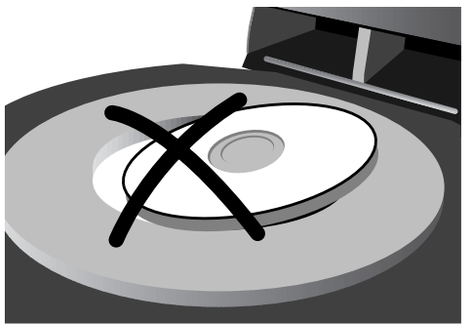
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2.1.9

Contraindication

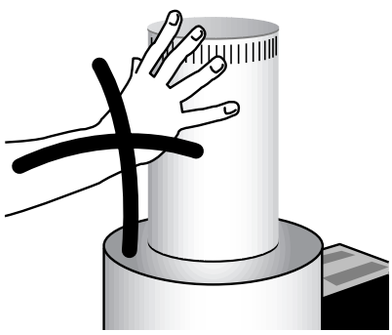
Press cycles must not be conducted without the firing plate (50) in place.



2.1.10

Contraindication

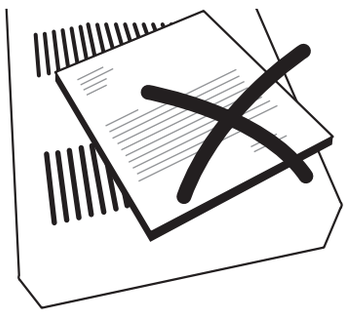
The firing plate (50) must be correctly positioned in the firing chamber.



2.1.11

Contraindication

The furnace head is equipped with an electronic drive and must be operated with the corresponding keys. Never open or close the furnace head manually.



2.1.12

Contraindication

The air vents must be kept free from obstruction and clean at all times. If this is not done, there is a risk of overheating the furnace.

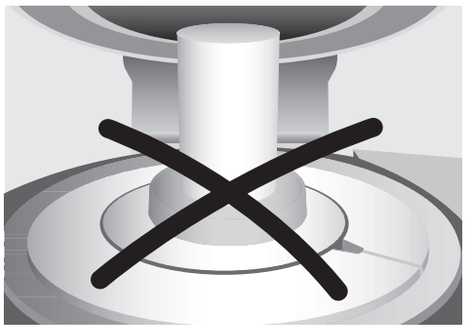


2.1.13

Contraindication

Do not bend the thermocouple (71). Do not touch the thermocouple with your fingers in order to prevent contamination (grease).

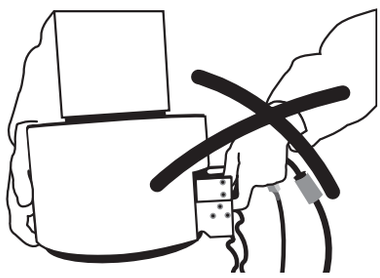
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2.1.14

Contraindication

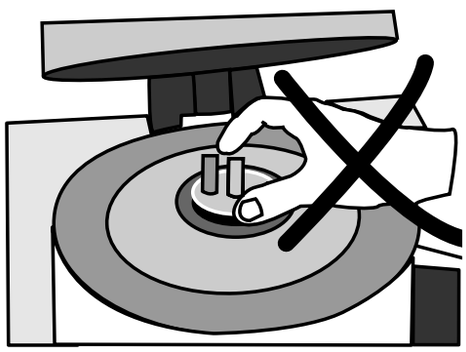
If the firing tray (150) is in place, press cycles must not be conducted.



2.1.15

Contraindication

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



2.1.16

Contraindication

Never place objects into the firing chamber with your bare hands. Always use the corresponding tongs of Ivoclar Vivadent supplied for that purpose.

Burn hazard

Do not touch the surfaces of the furnace head while it is hot. There is a burn hazard.

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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 safe operating condition. To maintain this condition and to ensure risk-free operation, the user must observe the notes and warnings in these Operating Instructions.

– Place furnace on a fire-proof table, observe local regulation (e.g. distance to combustible objects, etc.).

– Always keep the air vents at the rear of the furnace free from obstruction.

– Do not touch any parts that become hot during operation of the furnace.
There is a burn hazard.

– Clean furnace only with a dry or slightly damp cloth. Do not use any solvents. Disconnect power before cleaning.

– Use original packaging for transportation purposes.

– It is important that the user become familiar with the warnings and operating conditions to prevent injury to personnel or damage to materials. The manufacturer is not responsible for damage resulting from misuse or failure to observe the Operating Instructions. Warranty claims cannot be accepted in such cases.

– Before switching on the furnace, make sure that the voltage indicated on the rating plate complies with the local power supply.

– The mains socket must be equipped with a residual current operated device (FI)

– The power plug may only be inserted into sockets with protected contacts.

– Before calibration, maintenance, repair, or change of parts, the power must be disconnected if the furnace has to be opened.

– If calibration, maintenance, or repair has to be carried out with the power connected and furnace open, only qualified personnel, who are familiar with the risks and dangers, may perform the procedures.

– After maintenance, the required safety tests (high voltage resistance, protective conductor, etc.) must be carried out.

– Ensure that only fuses of the indicated type and current rating are used.

– If it is assumed that safe operation is no longer possible, the power must be disconnected to avoid accidental operation.
Safe operation is no longer possible if:
  – the furnace is visibly damaged
  – 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 (41 °F to 104 °F).

– If the furnace has been stored at very low temperature or high atmospheric humidity, the unit must be dried or left to adjust to the room temperature for approx. 1 hour prior to connecting power.

– The furnace is tested for use at altitudes of up to 4000 m (13,123 ft) above sea level.

– The furnace may only be used indoors.



Risks and dangers
Do not work with liquids near the furnace. Should a liquid accidentally enter the furnace, disconnect power and consult the Customer Service. Do not operate the furnace.



Risks and dangers
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 tolerated. Material developing harmful gases must not be fired.

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3. Product Description

3.1 Components

The EP600 Combi Press and Ceramic Furnace comprises the following components:

- Furnace base with electronic controls
- Furnace head with press drive
- Sagger tray
- Vacuum hose
- Vacuum pump with hose and power cord (accessories)

The electronic controls and the mechanical components for the opening mechanism are located in the furnace base. The heater is located in the muffle in the furnace head, where it is embedded in the stone lining segments. Operation and control of the furnace is done with state-of-the-art electronic components.

3.2 Hazardous areas and safety equipment

Description of the hazardous areas of the furnace:

Hazardous area	Type of risk
Press and firing chamber	Risk of burning
Opening/closing mechanism	Risk of crushing
Electronic components	Risk of electrical shock

Description of the safety equipment of the furnace:

Safety equipment	Protective effect
Protective conductor	Protection from electrical shock
Fuses	Protection from electrical shock and damage to the furnace
Interlock switch	Protection from electrical shock

Please also refer to Chapter 2.

3.3 Functional description

The press/firing chamber may be heated up to max. 1200 °C (2192 °F) by means of a heater. Furthermore, the chamber is designed so that a vacuum can be created with a vacuum pump. The press drive produces the pressure required for the press procedure. The press process is controlled by means of the electronic components and the corresponding software.

3.4 Accessories

- Refill Package ATK 1 "Melting Samples"
- Refill Package ATK 1 "Ceramic Base Blocks, Contact Pins"
- Vacuum pump

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4. Installation and Initial Start-Up

4.1 Unpacking and checking the contents

The new packaging provides the following advantages:

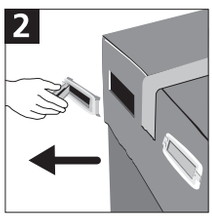
- Reusable packaging
- Closing mechanism with integrated transportation grips
- Ideal protection by Styrofoam inserts
- Easy handling / optimum unpacking
- The packaging may be used in several ways (modules)

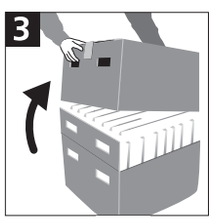
Check the delivery for completeness (see delivery form in Chapter 9) and transportation damage. If parts are damaged or missing, contact your local Ivoclar Vivadent Service Center.

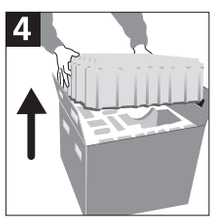
Remove the furnace components from their packaging and place the unit on a suitable table. Please observe the instructions on the outer packaging.

There are no special transportation grips on the furnace. Support the bottom of the furnace to carry it.



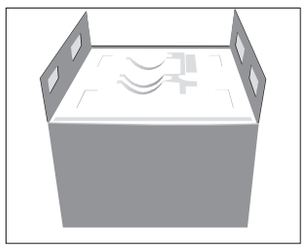


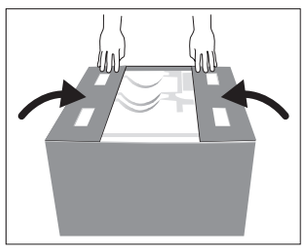


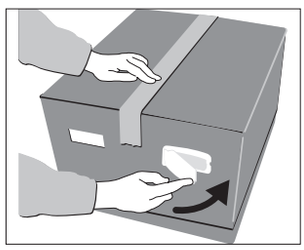


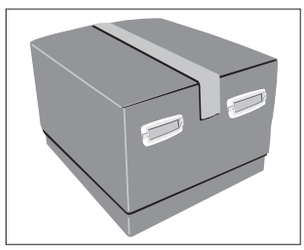
Packing and shipping of individual components
The packaging of the EP600 Combi permits simple and safe shipping of individual components. Simply use the two corresponding inserts. Fold the side flaps (2) and combine the two packaging parts by means of the transportation flaps.

The packaging may be discarded with the regular household refuse.









Important information
We recommend keeping the original packaging for future transportation purposes. The unit has been subjected to extensive checks by the manufacturer. It may therefore exhibit slight signs of testing (hairline cracks, slight discoloration).

4.2 Selecting the location

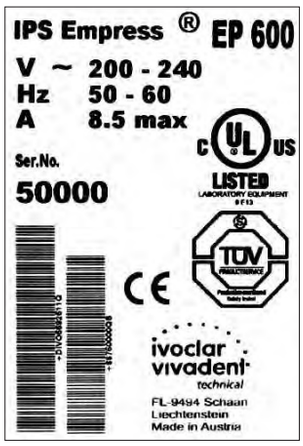
Place the furnace on a flat table using the rubber feet. Make sure that the furnace is not placed in the immediate vicinity of heaters or other sources of heat. Furthermore, protect the furnace from direct sunlight. Make sure that air may properly circulate between the wall and the furnace.

Also ensure that there is enough space between the furnace and the user, as the furnace releases heat during the opening of the furnace head.

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

4.3 Assembly and initial start-up

Make sure the voltage indicated on the rating plate complies with the local power supply. If this is not the case, the furnace must not be connected.



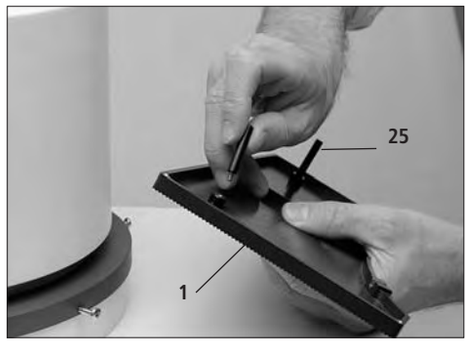
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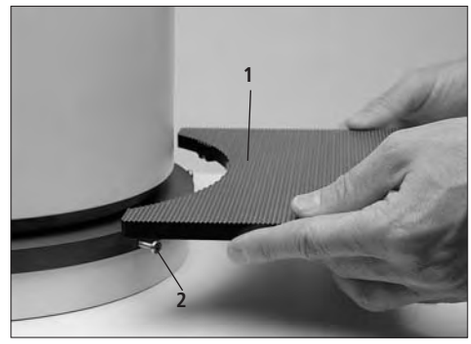
The furnace components are assembled as follows:

Step 1:

Assembling the tray and the firing plate

- Mount the supports for the sagger tray (25)
- The sagger tray (1) is slipped onto the screws (2). If desired, the screws may be tightened using a screwdriver.
- Remove the firing plate (50) from the protective paper and place it in the stone lining.
- Clean the sealing surface (19).







Step 2:

Assembling the furnace head

The furnace head is best assembled with the rear of the furnace base placed as shown in the corresponding figure. Lift the furnace head with both hands and slip the plug-on console (77) onto the corresponding pegs (75) in the furnace base until the leaf spring (76) audibly snaps into place.

Please make sure that no cable is caught between the furnace head and the furnace base and that the red marks are lined up.

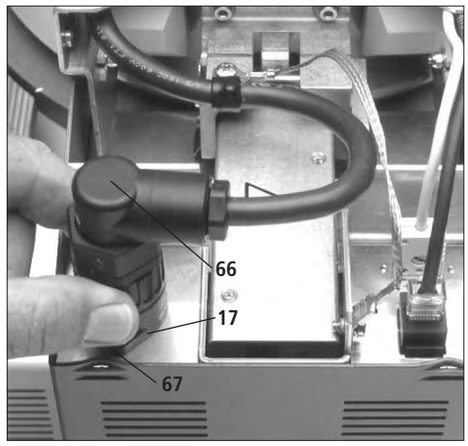


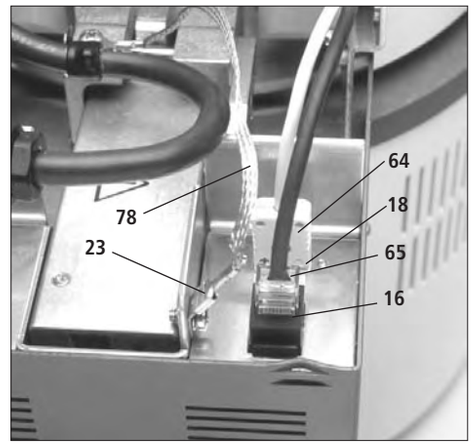


Step 3:

Mounting the connections

- Connect the cables of the furnace head with the furnace base.
- Insert the heater plug (66) into the heater socket (17) and secure it with the retention screw (67) with a right-hand turn.
- Insert the thermocouple plug (64) into the thermocouple socket (18).
- Make sure the polarity of the plug is correct (+ signs together).
- Insert the press drive plug (65) into the press drive sockets (16) until it audibly snaps into place.
- Mount the grounding band (78) of the furnace head onto the sip-on tongue of the furnace base (23).

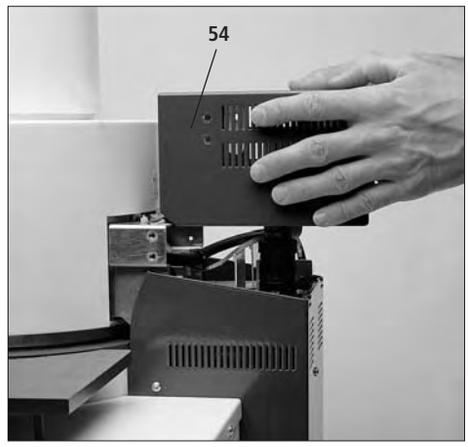




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Step 4:

Mounting the furnace head connections cover
Once the connections between the furnace head and the furnace base are established, assemble the furnace head connections cover (54) and secure it with the corresponding screws (51).

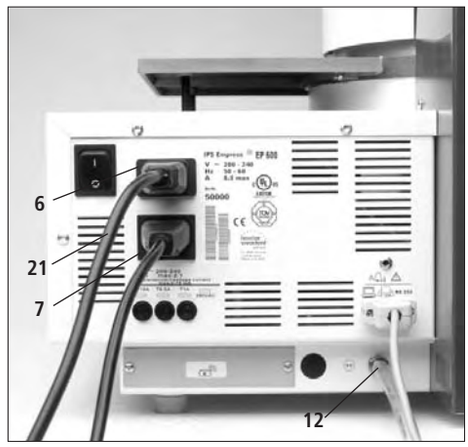


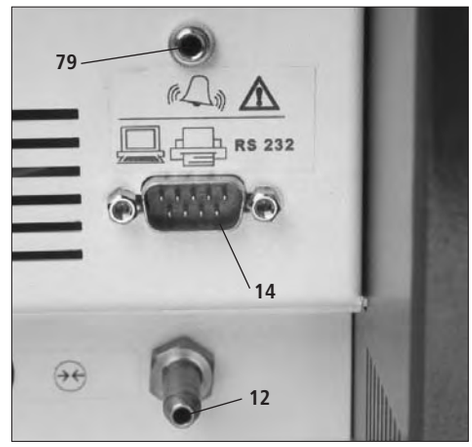
Step 5:

Establishing additional connections
Make sure the voltage indicated on the rating plate of the apparatus complies with the local power supply. If everything is in order, plug the power cord (21) into the power socket (6).

Vacuum pump
Insert the plug of the vacuum pump into the socket for the vacuum pump (7) and slide the vacuum hose onto the vacuum hose connection (12).

We recommend using the Ivoclar Vivadent VP3 Vacuum Pump with this furnace.
If another pump is used, the maximum power consumption and the maximum final vacuum of the corresponding pump have to be observed.





Step 6:

Setting-up the cooling grid for investment rings
The cooling grid for investment rings is supplied fully assembled. Please position the grid in a suitable place.

Please remember that the investment rings are very hot and that the grid should not be placed on combustible surfaces or in the vicinity of combustible objects and materials.



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Step 7:

Connecting the card reader
Connect the adapter (165) with the RS232 PC/Printer interface (14) and insert the plug (161) or the card reader (Type 'ECO 5000 KB1' from ORGA) into the adapter.

Important information
Please make sure that the voltage indicated on the rating plate complies with the local power supply. You may only use the apparatus if the voltage is compatible.

If the apparatus has been correctly connected and is ready for operation, the status indicator (163) lights up.

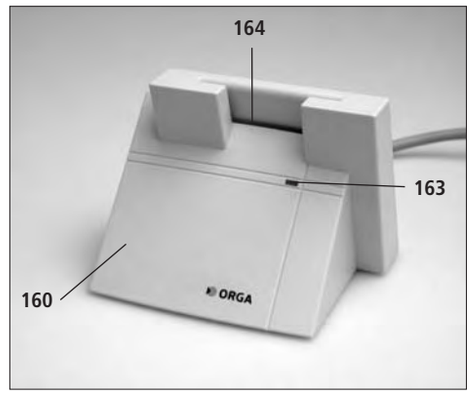
Program parameters may be stored on and read from a memory card using the card reader.

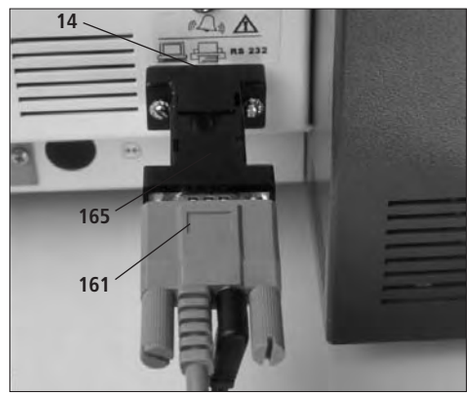
Firing programs stored on the memory card are used in the same way as the ones stored in the furnace. They may be accessed, edited, and run. Insert the program memory card into the card reader with the microchip facing downwards. The storage system is now ready for operation.

Chapter 5 (Program Manager) describes how to copy programs to and from the program memory card.

In order to activate the card reader, "Eco 5000" has to be set as output device in the menu "Miscellaneous – Configuration – Interface". See also Chapter 5.4.4

The RS232 interface (14) may also be used to connect a printer or a PC in order to save or print firing protocols.





Initial start-up
Connect the power cord (21) with the power supply. Put the On/Off switch (5) at the rear of the furnace on position "I". The language selection menu appears on the display. Select the language by means of the F4 key and confirm by pressing ENTER. Complete the selection procedure using the function key F1. After selecting the language, the display shows the EP600 logo. After that, the unit conducts a self-test to check the basic functions. The course of the self-test is indicated by means of a status bar. Once the self-test has been completed successfully, the preheating phase will start. This phase prepares the unit for optimum temperature control. The self-test and preheating phase together usually take 30 min.

To reduce the moisture in the press chamber (stone lining) the vacuum pump is switched on during the pre-heating phase, thus removing the moist air.

As of Software Version V3.0 the vacuum pump is kept on during the complete pre-heating phase.

Once the preheating phase has been completed, the unit is ready for operation.
The 'furnace selection' menu is displayed to select whether the furnace is used as a ceramic or press furnace. After that, the main menu appears on the display.

Important information
During the test of the press drive, noise from the press drive is audible (approx. 2 seconds). During the self-test, this sound is normal. If this is not the case, a technical malfunction has occurred. Please refer to Chapter 8.

The power plug may only be inserted into a grounded socket. The power cord must not come into contact with the hot furnace head and should be protected accordingly.

The EP600 Combi is equipped with a special electronic device that can bridge a power outage of approx. 10 seconds.

The EP600 Combi Press and Ceramic Furnace undergoes extensive checks prior to delivery. In the process, the unit is subjected to special test procedures. As a result, the firing chamber may exhibit slight signs of testing. These signs show that the unit has been tested. These checks are important for quality assurance.

Disassembling the furnace head
Note: Before the furnace head connections cover is removed, the furnace should be switched off and the power cord (21) unplugged.

Removing the furnace head connections cover
– Remove screws (51) of the furnace head connections cover.
– Remove the furnace head connections cover (54)

Removing the secured furnace head
– Before the furnace head is removed, the heater plug, thermocouple plug, press drive plug, and grounding band should be disconnected from the furnace base.
– Release leaf spring (76) and lift off furnace head using both hands.



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5. Operation and Standard Settings

5.1 Starting the furnace



5.1.1 Start-up

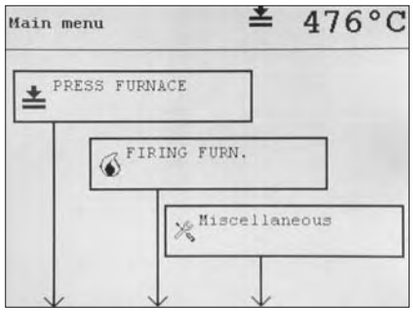
After the furnace has been switched on, the unit undergoes a self-test, and if necessary, a preheating cycle. The furnace selection menu is shown on the display.

To reduce the moisture in the press chamber (stone lining) the vacuum pump is switched on during the pre-heating phase, thus removing the moist air.

As of Software Version V3.0 the vacuum pump is kept on during the complete pre-heating phase.

5.1.2 Main menu

In this menu, you may select whether the EP600 Combi is used as a press furnace or a ceramic furnace. The 'Combi Furnace' software is required for the latter option. Additionally, the menu item "Miscellaneous" can be accessed from here. This menu automatically appears, once the preheating cycle has been completed.



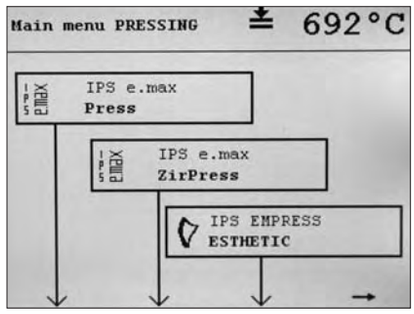
5.2 Introduction to the operation "Pressing"

The EP600 Combi is designed for use with the Ivoclar Vivadent all-ceramic systems IPS e.max and IPS Empress. Therefore, the corresponding parameters of the various programs have already been set in the factory. All you have to do is select the desired program for the corresponding material using the function keys F1 (104), F2 (105), F3 (106), or F4 (107). Next select whether you are using a large or small investment ring. After that, the display indicates the corresponding program cycle diagram. The program is started by pressing START. The firing of the press cycle selected is graphically displayed. The most important parameters are visible on the display (74) at all times.

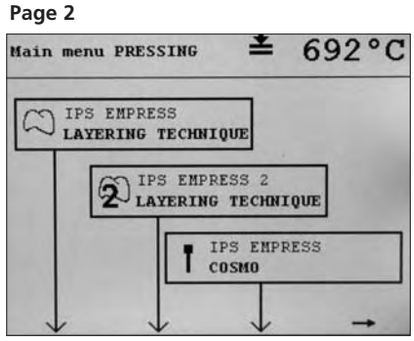
5.2.1 Main menu "Pressing"

This menu appears after selection of the menu item "Press furnace" in the main menu.

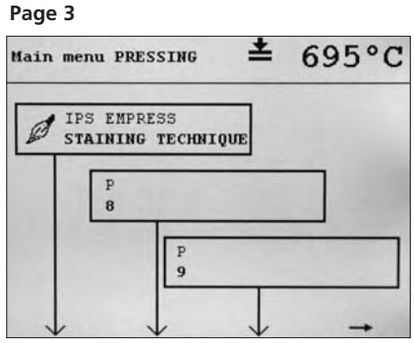
Page 1



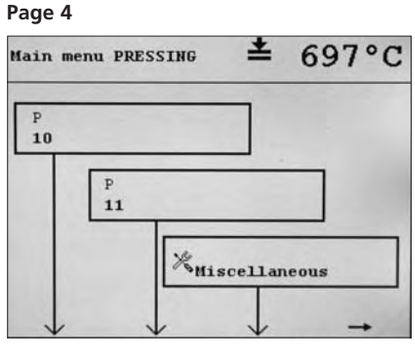
Page 2



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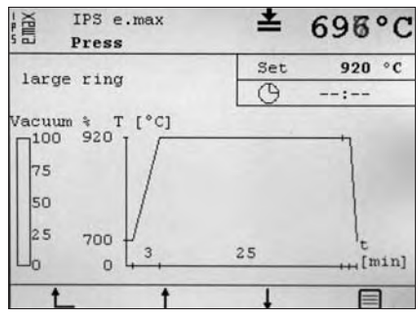


Now the press program is selected using the function keys. This menu always displays three programs, which may be selected by means of the function keys F1, F2, and F3. The menu comprises several pages. F4 is used to move forward.
On the last page, there is an option called "Main menu".

5.2.2 Menu "Investment ring selection"

This menu is used to indicate which investment ring (large, small) will be used.

5.2.3 Menu "Program"

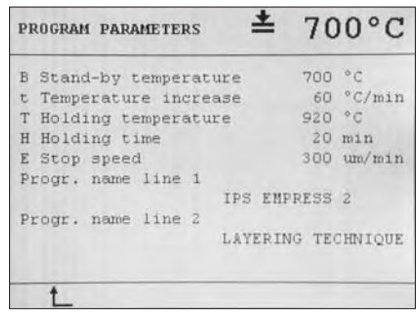


In this menu, a graphical representation of the currently selected program is displayed. The temperature curve indicates the set temperature values. The progress of the running program is shown by a bold line. The remaining time until the start of the actual press process is also indicated. As soon as the press process has commenced, the time passed since the beginning of the press process is indicated.

Furthermore, the display indicates the distance travelled by the press plunger in the selected unit of measure since the beginning of the press process, as well as the quality of the vacuum in percent. If no program is in progress, F2 and F3 can be used to change between the various programs.

With F4, the parameters of the currently selected program can be viewed (see menu "Program parameters").

5.2.4 Menu "Program parameters"



In this menu, the set parameters of the selected program are displayed or edited (for freely programmable programs).

Pressing F1 returns you to the menu "Program".

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Freely programmable press programs
Furthermore, the EP600 Combi is equipped with 4 freely programmable press programs (P8–P11). For these programs, values within the following ranges can be entered:

Parameter	MIN	MAX	Unit of measure
B Stand-by temperature	50	900	°C
t Temperature increase	1	140	°C/min.
T Holding temperature	50	1200	°C
H Holding time	0	109	min.
E Stop speed	0	1000	µm/min

Important information
For the layering technique, we recommend a stop speed of 300 mm/min, for the staining technique 150 mm/min.

– Higher values (stop speed of e.g. 300 mm/min) results in the press cycle being stopped sooner.
– Lower values (stop speed of e.g. 100 mm/min) results in the press cycle being stopped later. Consequently, the press cycle is prolonged.

Once the program is started by pressing START, the new program is displayed in the usual manner.

Please use only the original standard programs, which are especially coordinated with the corresponding materials for the Ivoclar Vivadent all-ceramic systems (IPS e.max, IPS Empress System).

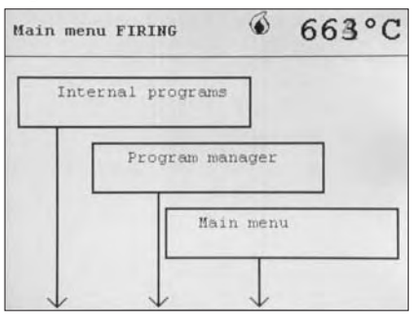
5.3 Introduction to the operation "Firing"

5.3.1 Main menu "Firing"

The main menu "Firing" always displays menu items, which may be selected by means of the function keys F1, F2, and F3. The menu comprises several pages. F4 is used to move forward.

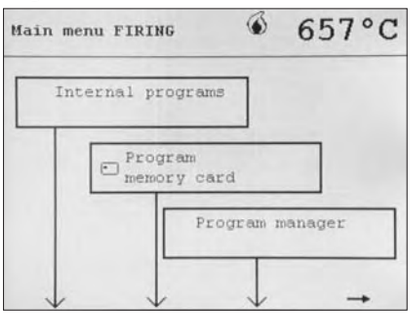
Menu without program memory card in place:

Page 1

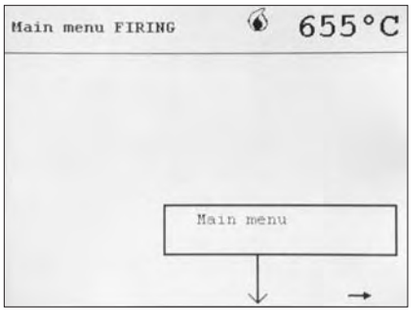


Menu with program memory card in place:

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Internal programs
With this menu item, you may access 50 individual firing programs that are stored in the furnace.

Program memory card
This option also provides 50 individual programs. However, the programs are stored on the program memory card by means of the card reader. This option may only be selected if a program memory card is present in the card reader.

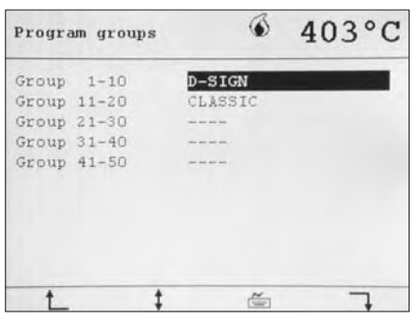
Program Manager
This menu item offers you various copying options. For example, programs from the furnace may be saved on the program memory card.

Main menu
This menu item allows you to return to the main menu.

5.3.2 Firing program groups

The program groups are used to organize the 50 firing programs in five groups each consisting of 10 programs. You may name the groups, e.g. according to the materials used (e.g. d.SIGN), according to the name of the technician (e.g. John Miller), or according to your own requirements. These program groups can be found in the internal memory or the program memory cards.

Use F1 to return to the next higher level.



Use F2 to select a program group. After that, F3 is pressed to reach the menu "Text input". The names of the groups can be freely defined. Twenty characters are available for that purpose (see "Text input").

Use F4 to open the program list of the current group.

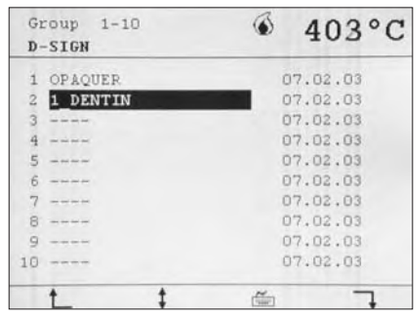
Text input



The characters are selected using F2 and F3. Use F4 to transfer the selected, highlighted character to the text field. A character can be deleted from the text field with F1. Additionally, the numerical keys 2, 4, 6, and 8 may be used to navigate the characters.

In order to leave the text input screen and to confirm the defined text, press ENTER. If you want to leave the text input screen without acknowledging the text, press ESC.

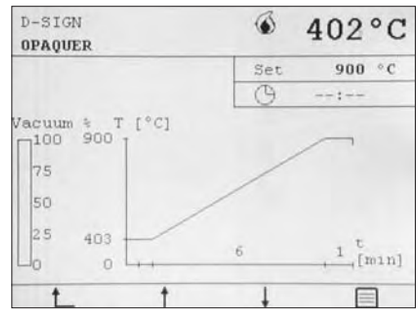
List of firing programs
The list of firing programs shows all the firing programs (10 programs) of a program group. The program group may be stored in the internal memory of the furnace or on a program memory card.



Use F2 to select the desired program. Once a program has been selected, F3 is used to access the text input screen. The names of the groups can be freely defined. Twenty characters are available for that purpose. Enter the desired text as described above. The date (e.g. 01.01.99) of the latest change or saving will be automatically allocated to the program. Use F1 to return to the menu "Firing program groups". Use F4 to access the firing curve display.

Once the firing curve display is visible, press START (110) to start the selected program.

Important information
If no vacuum is set, i.e. no values for V(A) or V(B), the vacuum bar is replaced by the text "No vacuum".



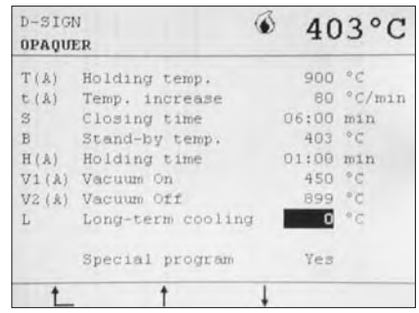
Use F1 to change to the list of firing programs.

Press F2 to return to the previous firing program or F3 to change to the next firing program.

Use F4 to return to page 1 of the program parameters menu.

Once the firing curve display is visible, press START (110) to start the selected program.

Program parameters, Page 1
The furnace is supplied by the factory with 50 free programs (empty parameters). The parameters of the firing program may be set on 2 menu pages.



The parameters for standard firing programs are listed on page 1, while page 2 contains the additional parameters necessary for special programs.

The header displays the name of the program group (e.g. d.SIGN), program number (1), program name (glaze firing), and the current temperature (403 °C).

Use F2 and F3 to change from one parameter to the next or the previous one.

F1 is used to change to the firing curve display. Once the firing curve display is visible, the selected program is started by pressing START.

The values are displayed in the form of a table and may be individually set by the user. The values entered have to be confirmed with ENTER.

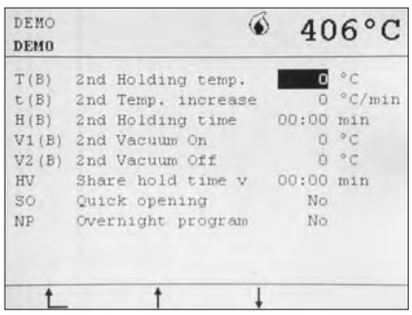
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Important note
Vacuum:
If the value 0 is entered for V1 and V2, no vacuum will be created.

Long-term cooling
Values between 50 and 1200 °C (122 and 2192 °F) may be entered. If 0 is entered, no long-term cooling will be conducted.

Special programs
If "No" has been selected in the "Special program" option, Page 2 of the program parameters cannot be accessed.
If "Yes" is selected (press F4, "yes" appears, confirm with ENTER), Page 2 is opened to set the special values.

Program parameters, Page 2



Use F2 and F3 to change from one parameter to the next or the previous one.

F1 is used to change to the firing curve display. Once the firing curve display is visible, the selected program is started by pressing START.

Additional information regarding the special programs

HV: Share of holding time with vacuum
With the parameter HV, the user selects if and when the vacuum is switched off during the holding time H.
- If V2 < T, the vacuum is switched off before the holding temperature is reached. In such cases, the parameter HV is irrelevant.
- If V2 >= T, the parameter HV is taken into consideration.
- If HV = 0, the vacuum is not switched off during the holding time.
- If HV > 0, the vacuum is switched off after period HV has passed since the beginning of the holding time, but at the end of the holding time H at the latest.

Use of HV for the first or second holding time
- For one-step programs, HV is used for the first holding time H(A).
- For two-step programs, HV is used for the second holding time H(B). For the first holding time, the following rule applies: If V2(A) ≥ T(A), the vacuum is on during the entire first holding time.

SO: Quick opening
If this option is switched off, the furnace head opens within one minute after the end of the program. If this option is switched on, the furnace head opens within 15 seconds after the end of the program.

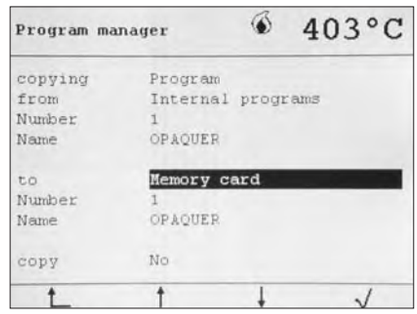
NP: Overnight program
This option corresponds to the one offered by the Programat P100 and Programat X1 furnaces. If this option is switched off, the furnace head opens after the end of a firing program. If this option is switched on, the procedure is as follows:
- The firing program is completed, the heater is switched off.
- The furnace head opens without the buzzer sounding.
- Once the furnace temperature drops below 150 °C (302 °F), the furnace head closes. The heater remains off.

Program course
Programs in progress can be stopped by pressing STOP. An interruption of the programs is not possible.

Empty programs
Upon delivery, all the internal firing program spaces are filled with 'empty' programs. An empty firing program does not have a name. Empty programs are treated like any other program. They can be selected, run, or edited:

Holding temperature	700 °C
Temperature increase	30 °C/min.
Closing time	18 seconds
Stand-by temperature	403 °C
Holding time	1 minute
Vacuum on / Vacuum off	both 0 (i.e. no vacuum)
Long-term cooling	none
Special program	no

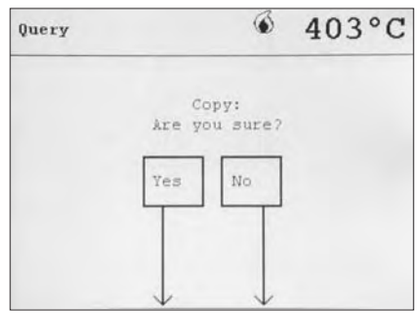
5.3.3 Main menu "Program manager"
This program permits copying of the firing programs to various storage media (EP600 program memory, or program memory card).



Example:
- Copy "Program" from "Internal programs" No. 23 to "Program" on "Memory card" No. 24

Duplicating programs: If the source and target media are identical, the program on this medium is duplicated.

Since copying always results in an existing program being overwritten (possibly an empty program), the following inquiry will be shown:



This inquiry should prevent the programs from being overwritten accidentally.

Important information:
Only firing programs can be copied.
Press programs cannot be copied.

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5.4 Introduction to the menu "Miscellaneous"

This menu is called up via the main menu. It permits the selection of a number of lower-level programs with which the furnace can be configured, calibrated, tested, etc.

5.4.1 Menu "Furnace information"

(Example)

Serial number of the furnace:	00001234
Article number of the furnace:	00006789
Number of press cycles:	789
Number of operating hours:	1245 h
Number of firing hours:	789 h
Operating hours of the vacuum pump:	367 h
Software date:	14.06.00
Version of the operating software:	V01.00
Version of the supply board software:	V01.00
Version of the press drive software:	V01.00

5.4.2 Menu "Calibration"

This menu provides an auto-calibration program. The temperature measuring circuit can only be calibrated with this program.

The data of the latest ten calibrations are stored in a table according to the date and time (see menu "Protocols").

5.4.3 Menu "Diagnostic programs"

In this menu, the user is provided with various diagnostic programs (see Chapter 7.4 "Diagnostic programs").

5.4.4 Menu "Interface"

With the help of this menu, the RS232 interface can be configured.

- **Baud rate**
  Defines the transmission rate.
- **Parity**
  Defines the number of bits transmitted per character.
- **Stop bits**
  Defines for which number of bits the line has to be idle before the next character is transmitted.
- **Output device**
  Selection of the type of device connected with the EP600 Combi.
- **Code page**
  Character set

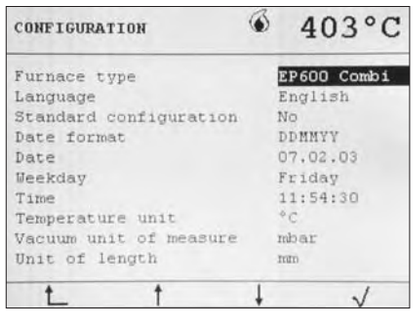
Parameters for the card reader

Baud rate	=	9600
Data bits	=	8
Parity	=	even
Stop bits	=	1
Output device	=	ECO5000
Code page	=	CP 437

5.4.5 Menu "Configuration"

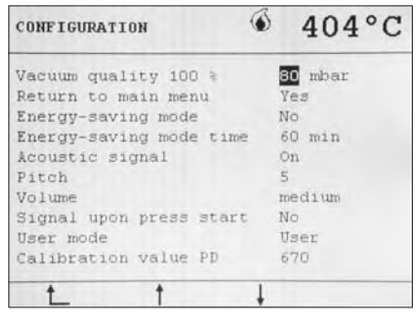
In this menu, the following functions of the furnace can be configured:

Page 1



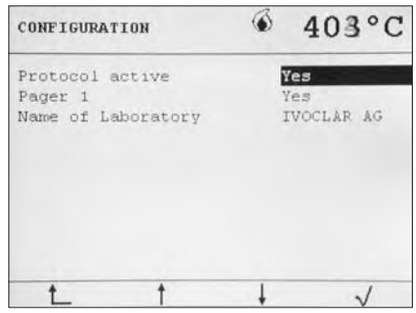
- **Furnace type**
  This option is used to select the desired furnace type: EP600 or EP600 Combi. To change the furnace type, a code is required, which has to be entered after the selection of the new furnace type.
- **Language**
  German, English, French, Italian, Spanish. Further languages possible at a later date.
- **Default settings**
  If this option is selected and confirmed with ENTER, all the subsequent menu items are set to the default settings.
- **Date format**
  With this menu item, the date format may be changed from the European to the American format and vice versa.
- **Date**
  With this menu item, the exact date can be set.
- **Day**
  With this menu item, the day can be set.
- **Time**
  With this menu item, the exact time can be set.
- **Temperature mode**
  With this option, the temperature may be changed from °C to °F and vice versa.
- **Vacuum unit of measure**
  With this option, the unit of measure for the vacuum (mbar, hPa) can be selected and/or changed.
- **Measure of length**
  With this menu item, the measure of length (mm, inch) can be selected and/or changed.

Page 2



- **Vacuum quality 100 %**
  This option indicates the absolute value (in mbar) for 100 % vacuum quality.
- **Return to "Main menu"**
  With this option, it may be determined whether the software returns to the "Main menu" once a program is completed or if the current menu is maintained.
- **Energy saving mode**
  If the energy saving mode is active, the heat is reduced after a time period defined by the user. In this way, the life cycle of the heating muffle is prolonged and energy is saved. By pressing the indicated function key, the mode may be deactivated.
- **Time of energy saving mode**
  Period of time after which the energy saving mode is activated if no program is in progress and no key has been touched.
- **Acoustic signal**
  On/Off
- **Pitch of the signal**
  Tune 1–9
- **Volume of the signal**
  Three stages: low, medium, loud
- **Signal at the beginning of the press process**
  Yes/No
- **User mode**
  This menu option is reserved for Service Centers.
- **Press drive calibration value**

Page 3



- **Protocols active**
  No / Yes / Direct

  No –> Press/Firing programs are not protocolled.

  Yes –> Press/Firing programs are protocolled (Press/Firing program protocol table). The protocols have to be transmitted manually from the corresponding protocol table)!

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Direct –>Press/Firing programs are protocolled (Press/ Firing program protocol table) and are shown or printed immediately on the serial interface RS232. Please note that therefore, a corresponding output device (printer or PC) has to be selected in the menu 'Interface'.

– **Pager 1**
  Yes/No
– **Laboratory name**
  Name which will appear in the header or footer of the various protocols.

5.4.6 Menu "Maintenance"

This menu provides the commands necessary during the maintenance of the furnace.

– Lower press plunger manually
– Lift press plunger manually

5.4.7 Menu "Enter new program"

The "Main menu pressing" also provides three individual programs (Program No. 5–7) in addition to the standard programs. If these programs are not shown in the menu, they are still concealed. They can be inserted using the following function:
To insert one of the programs (program No. 5–7), select this menu item (F4), type in the correct code, and confirm with ENTER.

Code	Program No.
14000	5
15000	6
16000	7

If the code was typed in correctly, the "Main menu pressing" displays the new program.

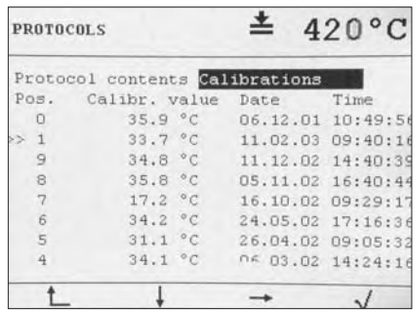
By therein entering the code, a concealed program will be released and an already released program will be concealed.

5.4.8 Menu "Request alarm table"

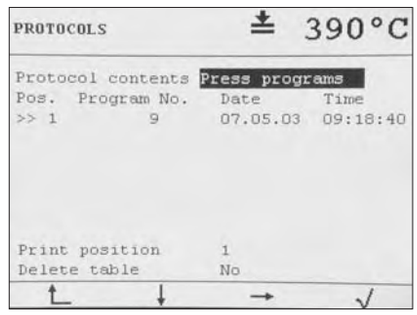
See Chapter 7.3.

5.4.9 Menu "Protocols"

After selecting this menu the table with the calibration data is shown.

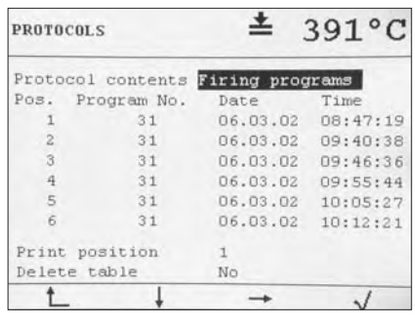


Key F4 can be used to switch to the press program protocol table (keys to be pressed: F4, ENTER).



In this table the protocols of the last 15 press programs are stored. These protocols can be transmitted manually from here to the PC or printer (this depends on the settings in the menu 'Interface').

Key F4 can be used to switch to the firing program protocol table (keys to be pressed: F4, ENTER).



In this table the protocols of the last 15 firing programs are stored. These protocols can be transmitted manually from here to the PC or printer (this depends on the settings in the menu 'Interface').

5.4.10 Menu "Timer"

In this menu, the timer may be programmed. With this feature, the furnace may be heated up to stand-by temperature or switched off at any given time.

In the interval between the switch-on and the switch-off times, the unit is kept at stand-by temperature.

To change the setting, select the corresponding switch-on/switch/off time with the cursor (F2/F3) and use the numeric keypad for selecting the desired time.
The timer can also be switched on or off with the key 'timer active-yes/no'.

The times are typically typed in via the numeric keypad. F3 is used to change the selected menu item. ESC is used to undo changes. ENTER is used to save the changes. The mains switch must not be switched off during this procedure.

When the timer is active, i.e. when the heater is switched off, the symbol is shown on the display. If a program has not been completely finished at the time when the furnace is scheduled to turn off, the program will nonetheless be completed before the heater is deactivated. While the timer is active, programs can only be started once the time settings have been adjusted accordingly.

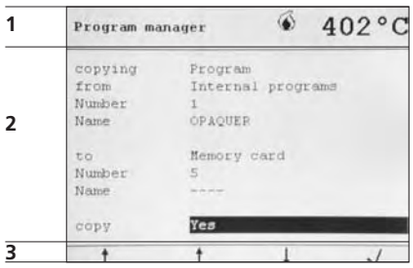
5.4.11 Menu "Status memory card"

In this menu, all the information regarding the status of the card reader and the memory card in the card reader can be accessed.

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5.5 Operating the menu / key functions

5.5.1 Navigation



1 Information line
This line always shows the most current temperature and operating mode. Additionally, useful program information is displayed.

2 Firing curve and dialog field
In this field, the dialogues and the various information are displayed. The different parameters may be changed here.

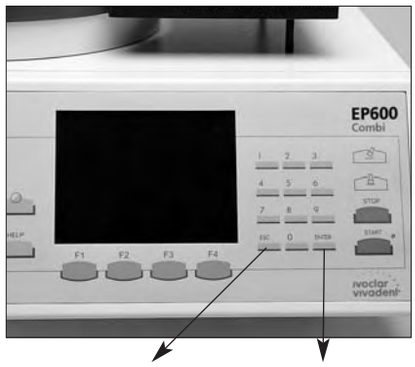
3 Function line

- Change of level
  1 level higher
- Selector up
  Selection within the same level
- Selector down
  Selection within the same level
- Change of level
  1 level lower
- Selection key
  Selection from various possibilities
  The selection must always be confirmed with ENTER.

The four function keys below the display are used to navigate through the various menus. The functions of the keys are represented by symbols. These symbols are shown for those keys, which have a certain function at the current stage in the program. For example, the symbol for the 'page down' key is only shown if the contents of the current screen take up more than one page.

5.5.2 Numeric keypad

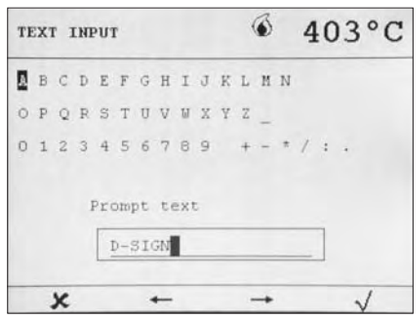
The numeric keypad is used to enter numbers. This keypad also contains the ESC and ENTER keys.



ESC: Discarding values

ENTER: Used to confirm entered numbers, for example, or the change of the temperature mode from °C to °F.

5.5.3 Text input



The input of text is enabled by a virtual keyboard shown on the display. F2 and F3 are used to select the characters. F4 transfers the selected, highlighted character to the text field. F1 can be used to delete a character from the text field. ENTER is used to leave the text field and confirm the text. If the user wants to quit this menu without confirming the text, ESC is used.

5.5.4 Numbering of the various menus

To facilitate support, each menu is given a number, which will become visible as soon as the help function of the menu in question is called up.

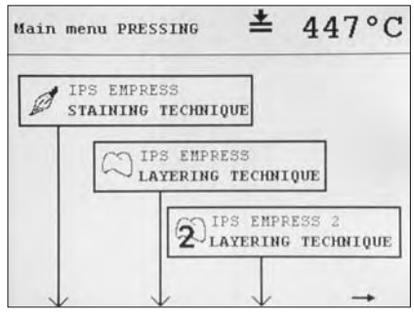
5.5.5 Display contrast

The display contrast can be regulated by means of key 101.

If the unit has been in operation for an extended period of time, the display contrast properties may change due to an increase in temperature.

5.6 Help function

Pressing HELP will display a help text for the current menu.

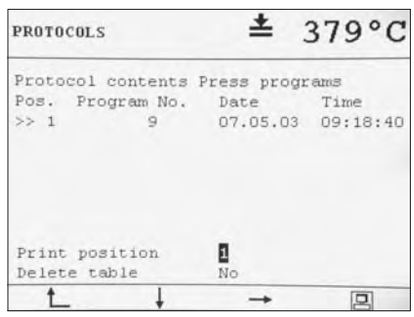


If the help text consists of several pages, the 'Up' (F2) and 'Down' (F3) symbols are shown. They indicate that these keys may be used to navigate between the individual pages. F1 is used to return to the last active menu.

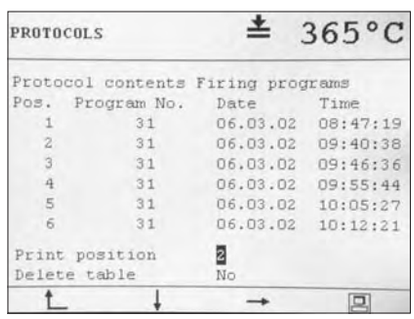
5.7 Protocolling / Output of protocols

From the press/firing program protocol charts the protocols saved there can be output. For that reason use key F2 to set the cursor on position 'Print'. Subsequently, enter the position number of the protocol to be printed with the numbers' block and confirm with the ENTER key. Using key F4 the selected protocol can be sent via the serial interface RS232 to the printer or PC (Prograsoft).

Example press program protocol table:



Example firing program protocol table:



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6. Practical Use

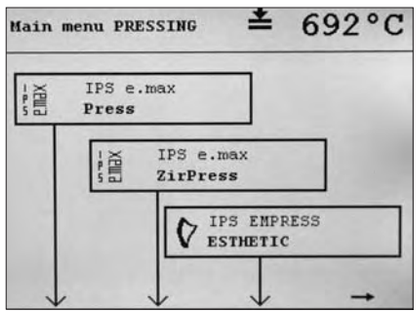
6.1 Switching on/off

Put the I/O switch at the rear of the furnace on position "I". The furnace is now switched on and the EP600 logo appears on the display. Subsequently, the unit conducts a self-test to check the basic functions. The course of the self-test is shown by means of a status bar. If the self-test does not reveal any errors or malfunctions, the preheating phase is started. The preheating phase prepares the furnace for optimum temperature control. The self-test and preheating phase together take 30 minutes. After the preheating cycle has been completed, the unit is ready for operation. The main menu appears.

Important information
If the temperature in the firing chamber is above 300 °C (572 °F) at the time when the furnace is switched on, only a self-test is conducted. The preheating phase is not started.

Important information
When changing from the press furnace mode to the ceramic furnace mode (or vice versa), please keep in mind that the corresponding stand-by temperature must be present. If the stand-by temperature does not correspond with the standard value (ceramic furnace: 403 °C (757 °F); press furnace 700 °C (1292 °F) the display will show a corresponding error message.

6.2 Standard press programs



1 Select the desired program and type of investment ring.

2 Open furnace head with the corresponding key (112).

3 Place preheated investment ring, ingot, and Alox plunger in the furnace.

4 Press START; the LED of the start key lights up (the process is automatically started).

5 Once the press cycle has been completed, the furnace head opens automatically and the buzzer sounds. Immediately remove the investment ring from the furnace. Place it on the cooling grid to cool. The program returns to the initial position only after pressing STOP. Until that point, the press time and press cycle is shown. Close the furnace by pressing 'Close furnace head'.

Important information
Please use the separate cooling grid and not the sagger tray of the furnace.

Important information for the IPS e.max and IPS Empress Systems
Various examinations have shown that the time taken to remove the investment ring from the preheating furnace and to place it in the press furnace significantly influences the press results.

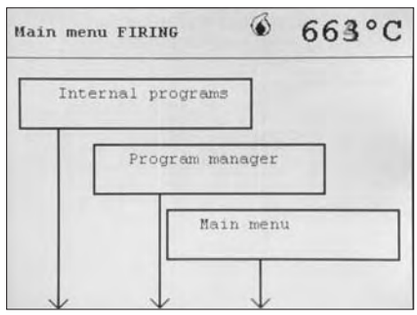
This process should not take more than 1 minute. If it takes longer, the investment ring will cool down too much and miscasts may result.

In addition, make sure to open the furnace head only immediately before placing the investment rings in the furnace to prevent the firing chamber (heater, stone lining, and in particular the firing plate) from cooling down too much.

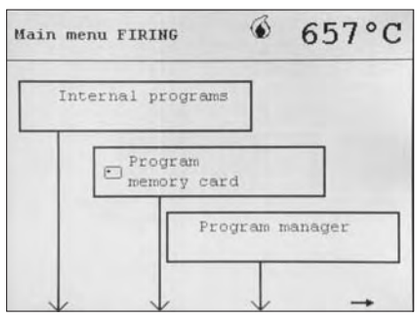
6.3 Firing programs

The firing programs are selected in the main menu "Firing".

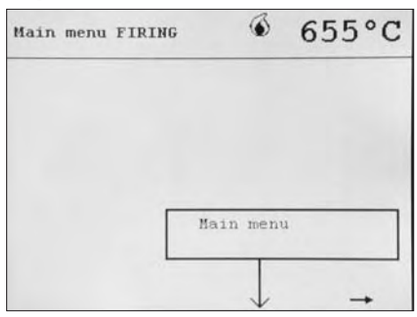
Without program memory card
Page 1



With program memory card
Page 1



Page 2



1 Select the desired program.
2 Adjust the program parameters, if necessary
3 Open furnace head and place the objects in the furnace.
4 Press START; the LED of the start key lights up. The program has now started.
5 After the completion of the program, the furnace head opens automatically and the buzzer sounds as soon as the fired object may be removed.

Important information
For further information about the firing programs (one-step, two-step programs), please refer to Chapter 10.4 and 10.5 on page 37–38.

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7. Maintenance, Cleaning, Diagnosis

This chapter describes the maintenance and cleaning procedures that may be performed by the users. All other tasks must be performed by qualified service personnel at a certified Ivoclar Vivadent 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. For that reason, the recommended times are only approximates.

Turn off the furnace and disconnect power before maintenance and cleaning, since there is a risk of electrical shock.

This apparatus has been developed for typical use in the dental laboratory.

If the product is used in a production facility, for industrial applications, or in continuous firing operation, premature ageing of certain spare parts have to be expected.

These spare parts are e.g.:
– Heating muffle
– Insulation material
– Lamps

These spare parts are not covered by the warranty.

Please also observe the shorter service and maintenance intervals.

What	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 stone lining inserts for large cracks or damage. If the stone linings are worn down, they must be replaced by a certified Ivoclar Vivadent Service Center. Slight hairline cracks on the stone lining surface do not have a negative influence.	Stone lining inserts	weekly
Check if the sealing rims of the furnace head and furnace base are clean and undamaged	Sealing rims of the furnace head and furnace base	weekly
Check the keypad for visible damage. If the keypad is damaged, it must be replaced by a certified Ivoclar Vivadent Service Center.	Keypad	weekly
Check furnace temperature (calibration).	Press chamber	Every 3–4 months, or after approx. 50 press cycles.

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.

Parts	Frequency	Cleaning material
Housing	if required	soft, dry cloth
Keypad	weekly, or if required	soft, dry cloth
Tray	if required	cleaning brush or vacuum cleaner
Stone lining inserts	daily	cleaning brush
Sealing rims of the furnace head and furnace base	daily	cleaning brush and a soft cloth

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7.3 Menu "Access alarm table"

In this menu, up to 20 of the last alarm messages are listed in a table. In case of inquiries, please provide the service technician with this information.

The enclosed error list contains further information.

7.4 Menu "Diagnostic programs"

– **Vacuum and system test**
The program checks the final value (in mbar) that the vacuum reaches after a defined period of time and how much time passes until 50 mbar are reached.

– **Muffle test**
By measuring the maximum power consumption of the heating muffle, the 'age' of the heating muffle is determined and presented by a bar diagram. If the muffle has a high power consumption (good, new), the bar is solid. At a certain stage, the user is informed that the heating muffle has to be replaced shortly.

– **Keypad test**
If the user conducts this test, all the keys are represented on the display by a matching symbol. Pressing the corresponding key results in the symbol of the display being inverted to change to non-inverted (depending on the actual condition.

F1 is not represented, since this key is used to quit the menu.

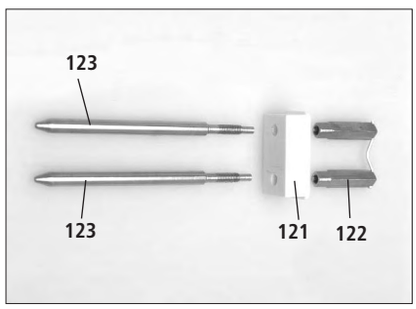
– **Display test**
The test merely presents a certain pattern (e.g. chessboard pattern: inverted / non-inverted) so that the user may check for defective pixels.

– **Press drive test**
Automatic check of the press drive. Possible malfunctions are pointed out.

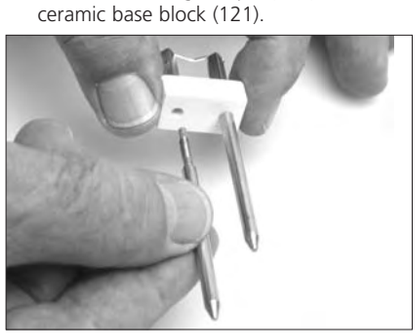
7.5 Temperature calibration

The accuracy of the thermocouple changes during use. In order for it to function optimally, it needs to be recalibrated on a regular basis. The automatic furnace calibration set (Automatic Temperature Checking Set 1) has been especially developed for this purpose. We recommend that you check your furnace with the Automatic Temperature Checking Set 1 after approximately 50 press cycles or after 3 to 4 months of use. The corresponding message will be displayed. Calibration should be conducted while the furnace is at operating temperature (stand-by temperature). It takes approx. 2 hours. For that reason, we recommend that you calibrate the furnace overnight in order to save time.

Important information
The automatic request for calibration after 50 press cycles is only displayed in the "Press furnace" mode. If the furnace is in the "Ceramic furnace" mode, the message will not appear after 50 firing cycles. However, we recommend conducting a calibration after approx. 3-4 months if the furnace is in frequent use.



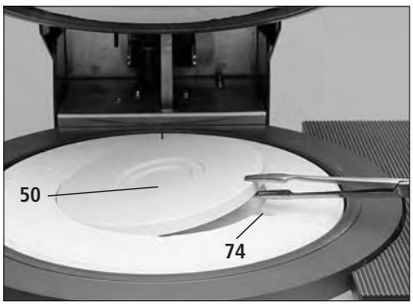
1. Insert the melting sample (122) in the ceramic base block (121).



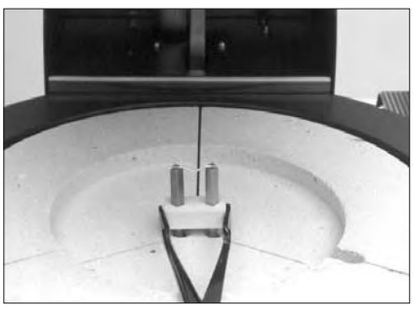
2. Screw the sample (122) to the contact pins (123).

Important
Do not use tongs. Tighten until barely fingertight.

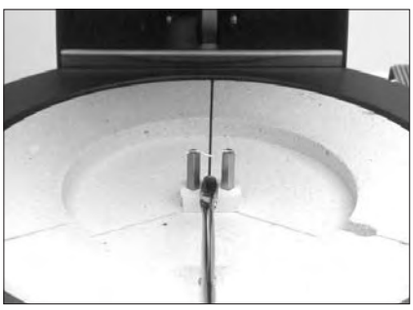
3. Go to "Miscellaneous" and select calibration program. Now the furnace head opens.
4. Remove the firing plate (50) from the furnace with the firing tongs and place it on the sagger tray.



5. Use tongs to insert the completed test assembly into the recesses for the ATK 1 (124).



6. Place the tongs at the center of the test assembly and press lightly until it perceptibly clicks into place.



7. Start the calibration program.
8. At the end of the program, remove the test assembly from the furnace using the tongs and allow it to cool.

Contraindication
Under no circumstances should you pull on the test sample. The ceramic base will break as a consequence.

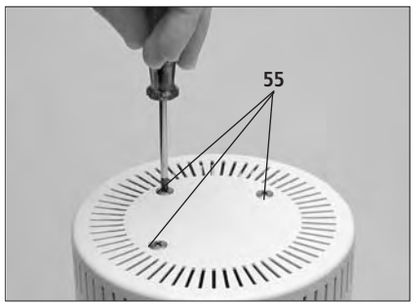
9. Replace the firing plate (50) and select a firing program. The furnace head will close automatically.
10. Once the sample assembly has cooled, take it apart.
11. Use new melting samples for the next calibration procedure and begin with step 1.

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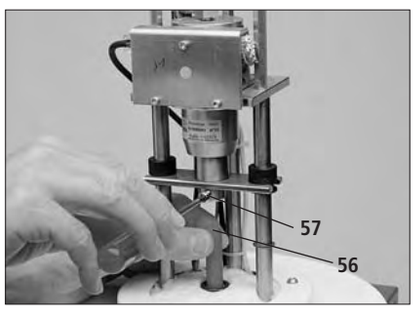
7.6 Changing the press plunger

In order to facilitate the changing of the press plunger, we recommend lowering the press plunger manually by using the corresponding option in the menu "Maintenance".

1. Remove the screws (55) and the press drive cover (52) while the furnace head is closed.



2. Loosen the terminal screw (57) for the press plunger with approx. half a turn.
3. Open the furnace head with the corresponding key (112). Once the furnace head is completely open, switch off the furnace, disconnect the power, and allow the furnace to cool to room temperature.

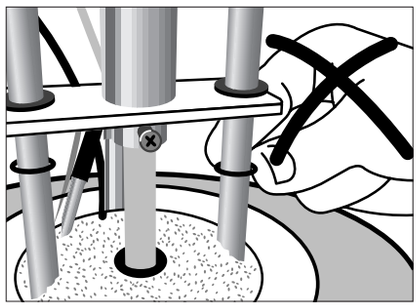


4. Move the press plunger (56) into the firing chamber by pushing it with one hand and pulling it with the other while rotating it slightly.

Contraindication
Take care not to buckle the thermocouple located in the upper part of the firing chamber.

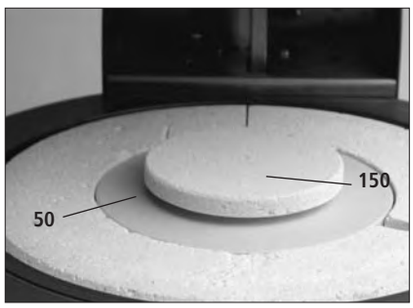
5. Insert the new press plunger (56) with the red mark into the guide bush with the phasing (inclination) first. Push the plunger into its split taper socket (6) by rotating it slightly. Tighten the screw (57).
6. Reconnect power and switch on the furnace with the I/O switch.

Never reach into the press drive during operation. There is a risk of crushing.



Wait until the furnace head closes automatically. Remount the press drive cover (52) and tighten the corresponding screws.

7.7 Changing the firing tray



If you use the EP600 Combi as a ceramic furnace, place the firing tray (150) in the firing plate (50) prior to starting the firing cycle.

Important information
For the firing cycles, always use the firing tray (150) in order to ensure optimum temperature conditions within the furnace.

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8. What If...

This chapter will help you to recognize malfunctions and take the appropriate measures or, if possible, to perform minor repairs.

8.1 Error messages and notifications (alarm)

Alarm notifications are directly displayed and can be classified as follows:



8.1.1 Technical errors
(The furnace has noticed a technical defect.)

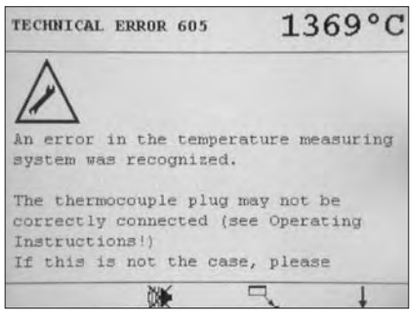


8.1.2 Operating errors
(The user has tried to make an incorrect entry.)



8.1.3 Notifications
Helpful information.

8.1.1 Technical errors



In case of a technical malfunction, a corresponding message is displayed and an alarm signal sounds. The alarm signal can be switched off by pressing F2.

As long as the malfunction is active, the "Minimize" symbol (F3) is indicated, otherwise the "Acknowledge" symbol (F1) is shown.

Depending on which symbol is shown, the error message has to be minimized to a symbol by pressing F3 (see "Minimized error messages") or acknowledged with F1 after it has been read.

Minimized error messages
If an error message is minimized, a corresponding symbol  will appear next to the temperature indicator.

If the error is still active after two minutes, the alarm window will appear again and the corresponding signal will sound.

8.1.2 Operating errors

In case of an operating error (incorrect data entry, etc.) an operating error message is displayed, which has to be acknowledged with F1.

8.1.3 Notifications

In special cases, notifications are displayed, which will provide you with important information. The notifications also have to be acknowledged with F1.

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8.2 Technical malfunctions

These malfunctions may occur without an error message being displayed:

Description	Double-Check	Action
Vacuum is not or only slowly released	Is the vacuum released within approx. 30 seconds?	Wait until the vacuum has been released and remove object. Switch the furnace off and on again. If it is still not working, contact your local Ivoclar Vivadent Service Center.
Microswitch of the furnace head opening mechanism does not engage	Is the opening for the operating pin (item 15 in parts list) obstructed?	Remove dirt (foreign objects) from the opening.
The calibration sample assembly cannot be properly inserted	Is the recess obstructed by a foreign object?	Clean the recess with a vacuum cleaner. The EP600 should be cold for that purpose.
Loud noises in the press drive	Is the press plunger (56) dirty or damaged?	Clean press plunger or replace it, if necessary
	Are the motion rods (81) of the press mechanism dirty?	Clean motion rods with a dry cloth. Do not apply grease.
Display incomplete		Run the display test program and contact your local Ivoclar Vivadent Service Center, if necessary.
Text on the display is difficult to read	Is the contrast set correctly?	Press "Contrast" key (101) until the contrast is ideal.
Display is not illuminated	Is the fuse (10) for the electronic controls OK?	Check fuse and replace it, if necessary.
Buzzer does not sound	Is the buzzer switched off (tune 0)?	Select tune (1–9)
Furnace head does not open	Is the fuse (10) OK?	Check fuse and replace it, if necessary.
	Was the furnace head opened manually?	Use only the corresponding key to open the furnace head. Switch furnace off and on again.
	Has the vacuum been released?	Is the program still running? Wait until the program is completed. Switch furnace off and on again. If it still does not work, contact your local Ivoclar Vivadent Service Center.
Press plunger fractured in the area of the terminal screw	Was the terminal screw of the press plunger (57) screwed too tightly?	Replace defective press plunger.
Press plunger slips out of its holder	Is the press plunger correctly secured?	Tighten the terminal screw of the press plunger (57).
Press plunger is too long	Was the press plunger of the EP500 with a length of 200 mm accidentally used?	Use the red press plunger designed for the EP600 Combi (175 mm).
Vacuum pump does not start working	Is the fuse for the vacuum pump (8) defective?	Check fuse and replace it, if necessary.
	Was the max. power consumption (2.2 A) surpassed?	Use only the vacuum pump recommended by Ivoclar Vivadent.
	Is the vacuum pump plug correctly inserted?	Correctly connect the vacuum pump plug with the furnace base.

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Description	Double-Check	Action
Final vacuum is not reached	Is the vacuum hose OK?	Check vacuum hose (13) and hose connection.
	Was the absolute value for the vacuum set incorrectly or not in accordance with the pump capacity?	Set a lower absolute value in the menu "Configuration" (Chapter 5.4.5)
	Is the furnace airtight?	Clean sealing surfaces.
	Is the press plunger OK, and in place?	Make sure that the press plunger is mounted and not fractured.
	Is the pump capacity accurate?	Run vacuum test program.
Wrong or illogical temperature indication	Is the thermocouple (71) buckled or fractured?	Contact your local Ivoclar Vivadent Service Center.
	Is the plug for the thermocouple correctly inserted?	Insert the plug correctly.
	Is the plug for the thermocouple defective?	Contact your local Ivoclar Vivadent Service Center.
Cracks in the heating muffle	Are the cracks small and neglectable (hairline cracks)?	Small cracks in the muffle are normal and do not negatively influence the performance of the furnace.
	Are the cracks very large or are parts of the muffle broken off?	Contact your local Ivoclar Vivadent Service Center.

List of Errors
These Operating Instructions also contain a list of errors that may be displayed by the corresponding EP600 Combi software.

Use only fuses and original spare parts from Ivoclar Vivadent with the corresponding test labels.

The contrast (brightness) of the display may slightly change after long periods of operation.

8.3 Repair

Repairs may only be carried out by a certified Ivoclar Vivadent Service Center. Please refer to the addresses listed on page 40. If repairs during the warranty period are not carried out by a certified Ivoclar Vivadent Service Center, the warranty will expire immediately.
Please also read the safety instructions in Chapter 2.

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9. Product Specification

This chapter contains all the relevant product specifications.

9.1 Delivery form

EP600 Combi
- EP600 Combi incl. software
- Sagger tray
- Automatic Temperature Checking Set 1 (complete)
- Investment ring cooling grid
- Power cord
- Vacuum hose
- Firing tray
- ECO-5000 card reader incl. power pack
- 3 program memory cards
- Operating Instructions
- Firing plate (slit)

Accessories
- Refill package ATK1 "Melting Samples"
- Refill package ATK 1 " Ceramic Base Block"
- VP3 Vacuum Pump
- Program memory cards
- Download cable

Colours
Standard colour:
Traffic white (RAL 9016)

Special colours:
- Salmon (RAL 3014)
- Aquamarine (RAL 5014)
- Turquoise (RAL 6027)

9.2 Technical data

Power supply:	200–240 Volt, 50–60 Hz 110–120 Volt, 50–60 Hz Installation category II
Max. power consumption:	12 A at 110–120 VAC 8,5 A at 200–240 VAC
Vacuum quality:	100% 40–120 mbar
Acceptable data for pumps of other manufacturers:	Max. power consumption: 2,1 A Final vacuum: < 50 mbar Use only tested pumps!
Electrical fuses:	200–240V: T 6,3 A (heating circuit) T 1 A (controls) T3,15 A (vacuum pump) 110–120V: T 12 A (heating circuit) T 2 A (controls) T5 A (vacuum pump)
Fuse dimensions:	200–240V = diameter 5 x 20 mm 110–120V = diameter 6,3 x 32 mm
Dimensions:	w x d x h: 445 x 520 x 650 mm
Usable size of the press chamber:	diameter 50 mm, height 85 mm
Usable size of the firing chamber:	diameter 80 mm, height 50 mm
Max. press and firing temperature:	1200 °C
Weights:	Furnace head: 7,6 kg Furnace base: 17,0 kg Tray: 0,4 kg Press furnace, complete: 25,0 kg Extra muffle: 0,3 kg
Safety information:	IEC 1010-1, EN 61010-2-020, Part 1 ULC and cUL standards
Radio protection, electromagnetic compatibility:	EMC tested

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9.3 Acceptable operating conditions

– **Acceptable temperature range:**
+5 °C to +40 °C
(+41 °F to +104 °F)

– **Acceptable humidity range**
Maximum relative humidity 80 % for temperatures up to 31 °C (87.8 °F), gradually decreasing to 50 % relative humidity at 40 °C (104 °F). Condensation excluded.

– **Acceptable ambient pressure**
The furnace is tested for use at altitudes of up to 4000 m (13,123 ft) above sea level. Atmospheric pressure 500 mbar – 1060 mbar.



Important information
If condensation water or ice is formed after unpacking, we recommend allowing the furnace to dry at room temperature for at least 24 hours.



Do not connect power cord. Even if the furnace seems to be dry on the outside, humidity may still be present inside.

Use only the original power cord for operation.

9.4 Acceptable transportation and storage conditions

– **Acceptable temperature range**
-20 °C to +50 °C
(-4 °F to +122 °F)

– **Acceptable humidity range**
Max. relative humidity 80 %

– **Acceptable ambient pressure**
500 mbar – 1060 mbar

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

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10. Miscellaneous

10.1 Press table

Program	Description	Investment ring size
1	IPS e.max Press	large
	IPS e.max Press	small
2	IPS e.max ZirPress	large
	IPS e.max ZirPress	small
3	IPS Empress Esthetic	large
	IPS Empress Esthetic	small
4	IPS Empress Layering Technique	large
	IPS Empress Layering Technique	small
5	IPS Empress 2 Layering Technique	large
	IPS Empress 2 Layering Technique	small
6	IPS Empress Cosmo	large
	IPS Empress Cosmo	small
7	IPS Empress Staining Technique	large
	IPS Empress Staining Technique	small
8	Reserve	large
	Reserve	small
9	Reserve	large
	Reserve	small
10	Reserve	large
	Reserve	small
11	Reserve	large
	Reserve	small

The program numbers for the reserve programs (8–11) are indicated on the new furnaces which are delivered ex works as of Software Version V.4.0.

If the Software Version V.4.0 has not been installed ex works and the furnace has been upgraded with an update version, the program numbers 6 and 7 will be occupied with standard programs. The parameters existing in the programs 6 and 7 will not be maintained.

The program parameters are set in the factory. The parameters used may differ, but they are based on the latest standard of technology of the Research & Development Department of Ivoclar Vivadent, Schaan.

For each of the listed programs, either the option "small" or "large" investment ring must be selected.

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EP 600 Combi

Freely Programmable Programs P 1 to P 50

Values in °C

P No.	Program		T(A) Holding temp. [°C]	t ↗(A) Temp. increase [°C]	S Closing time [min.]	B Stand-by - temp. [°C]	H(A) Holding time [min.]	V1(A) Vacuum on [°C]	V2(A) Vacuum off [°C]	L Long-term cooling [°C]
1-50	Value ranges for freely programmable programs		100-1200	30-140 4)	0:18-10:00	100-700	0:01-40:00	1-1200	1-1200	50-1200
1-50	Values preset by Ivoclar Vivadent		700	30	0:18	403	1:00	0	0	0
							0 = w/o H	0 = w/o V_1	0 = w/o V_2	0 = w/o L
Special programs			T(B)	t ↗(B)			H(B)	V1(B)	V2(B)	HV 2)
1-50	2 stages, feely programmable		100-1200	30-140			0:01-40:00	1-1200	1-1200	0:01-40:00
1-50	Values preset by Ivoclar Vivadent		0	0			0	0	0	0

Overnight program and 2) share of holding time with vacuum can be set for all 50 programs.

Legend:

w.v. - with vacuum

w/o.v. – without vacuum

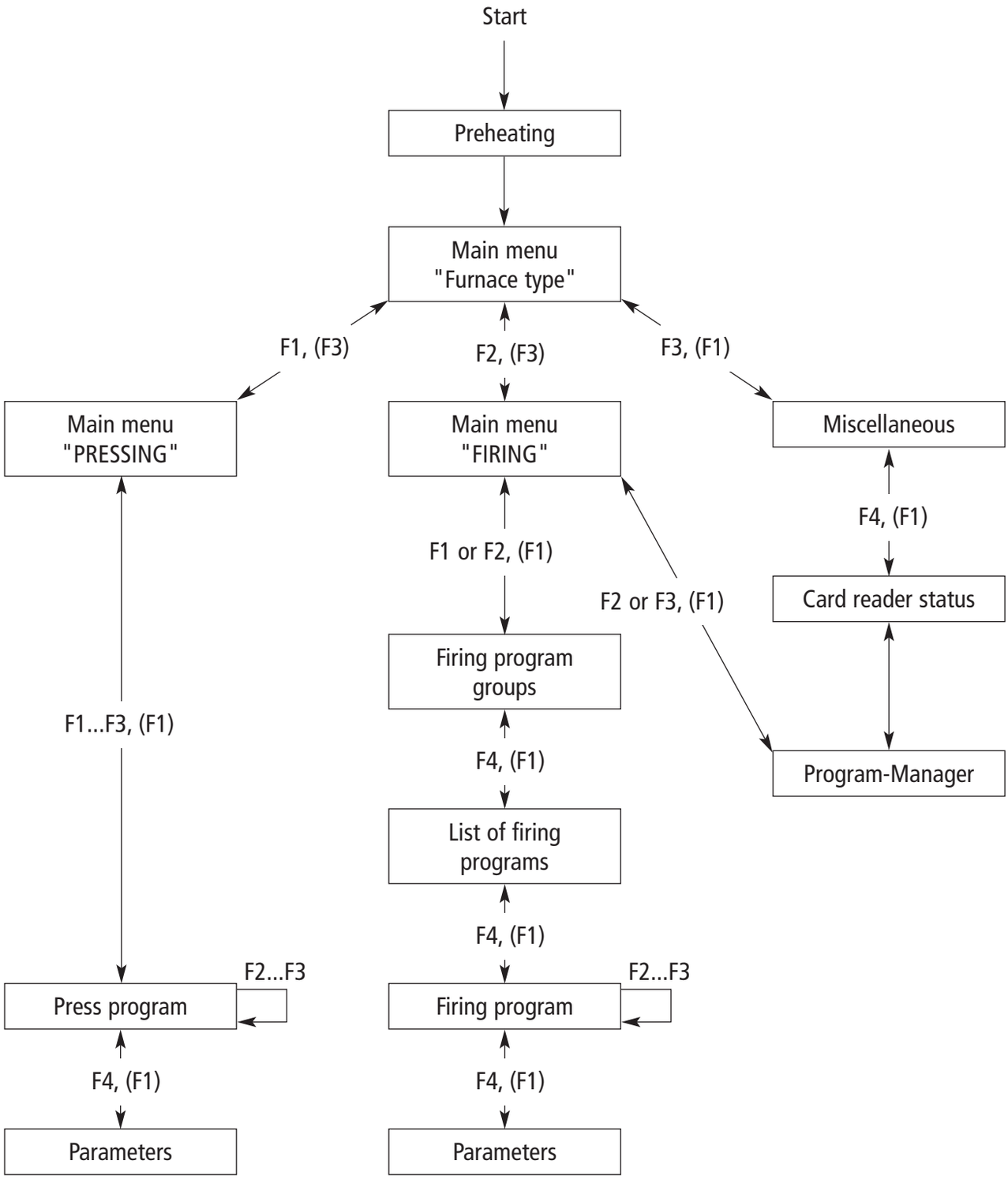
Buzzer sounds with the furnace head open below 370 °C – opening from stand-by temperature
Buzzer sounds with the furnace head open below 550 °C – opening as part of the program sequence
Quick opening = no (1 min.)
Quick opening = yes (30 s.)

L = 0 = no -> means without long-term cooling

2) A certain share "HV" of the individually set holding time "H" is conducted with vacuum, the rest is conducted without vacuum.
3) Overnight program: Furnace head opening in 1 min., without buzzer, furnace head closes after opening if T <= 80 °C. Furnace stops heating up.
4) These values are related to the possible set values. The actually achieved values however may differ and depend on various factors (e.g. starting temperature, heating of the firing chamber, vacuum yes/no, condition of the heating muffle, local power supply, type of object holder, object size).

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10.3 Menu structure of the EP600 Combi



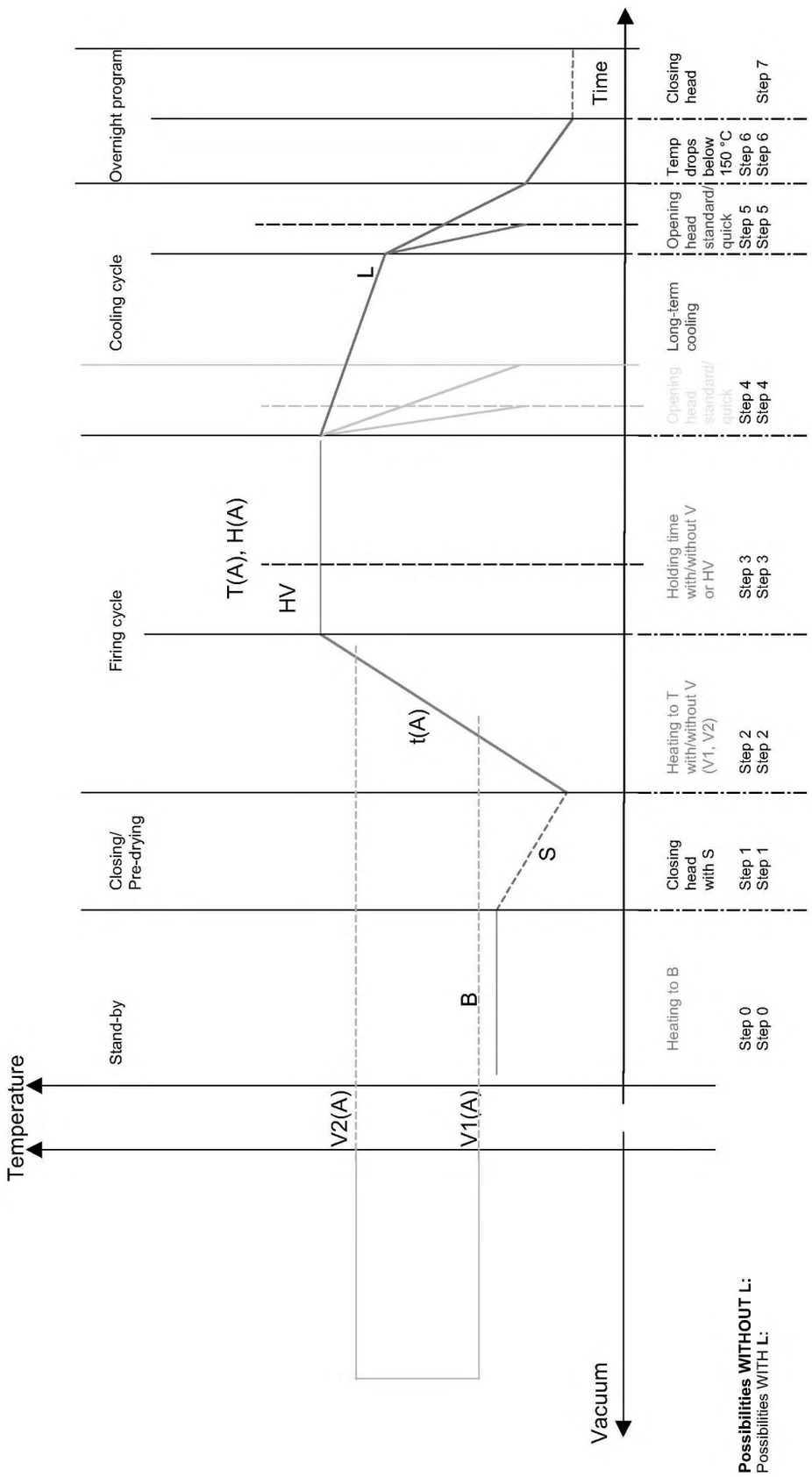
Description:

F3, (F1)

F1... skip into the next menu below with F1
(F3)... skip back with F3

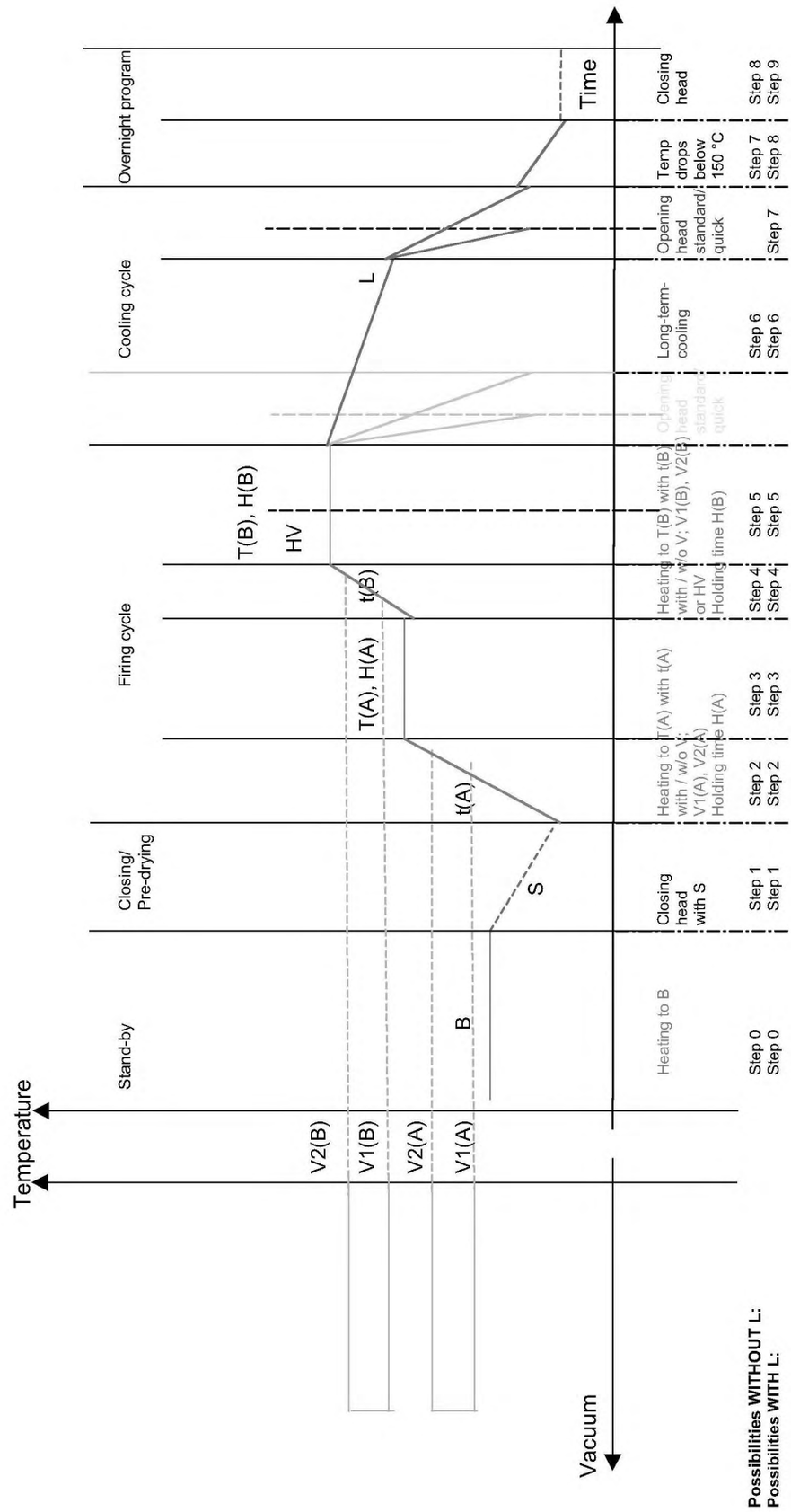
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10.4 1-step firing program



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10.5 2-step firing program



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