Programat® P300

Operating Instructions

CE

ivoclar vivadent ®

technical

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

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$C\epsilon$

Produkt / Product / Produit / Prodotto / Producto / Produto

Programat P300

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 93/68/EWG	EN 61010-1 EN 61010-2-010 EN 61326-1 EN 61326-1/A1 EN 61326-1/A2 EN 61000-3-2 EN 61000-3-3 EN 61000-3-3/A1	2001 2003 1997 1998 2001 2000 1995 2001

Bürs, 17.08.2005

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Rev. 0.0

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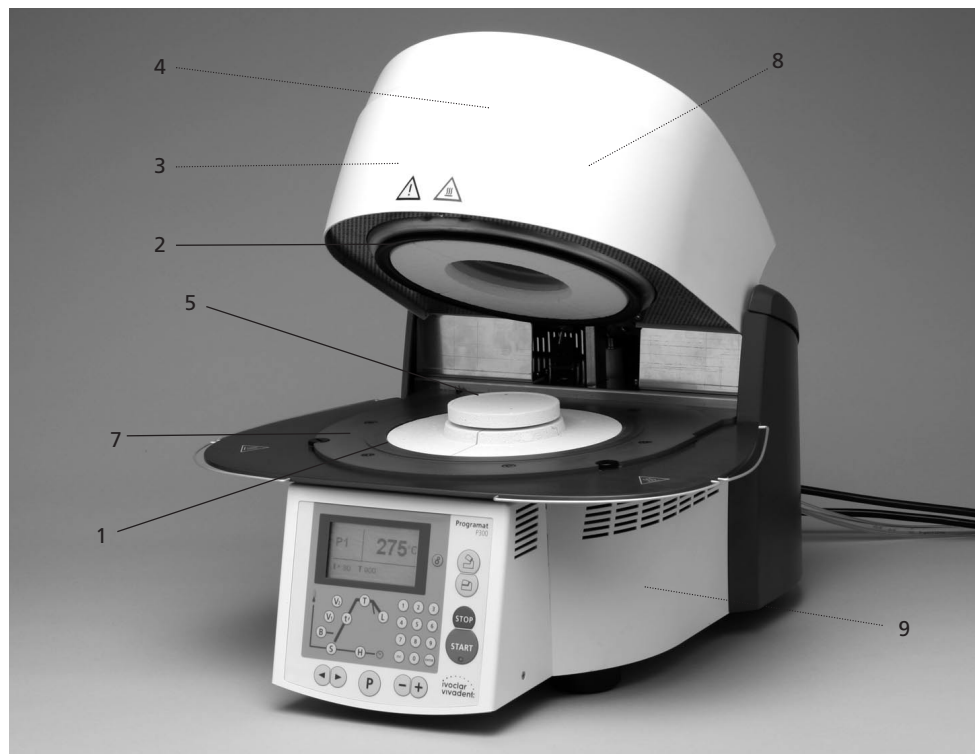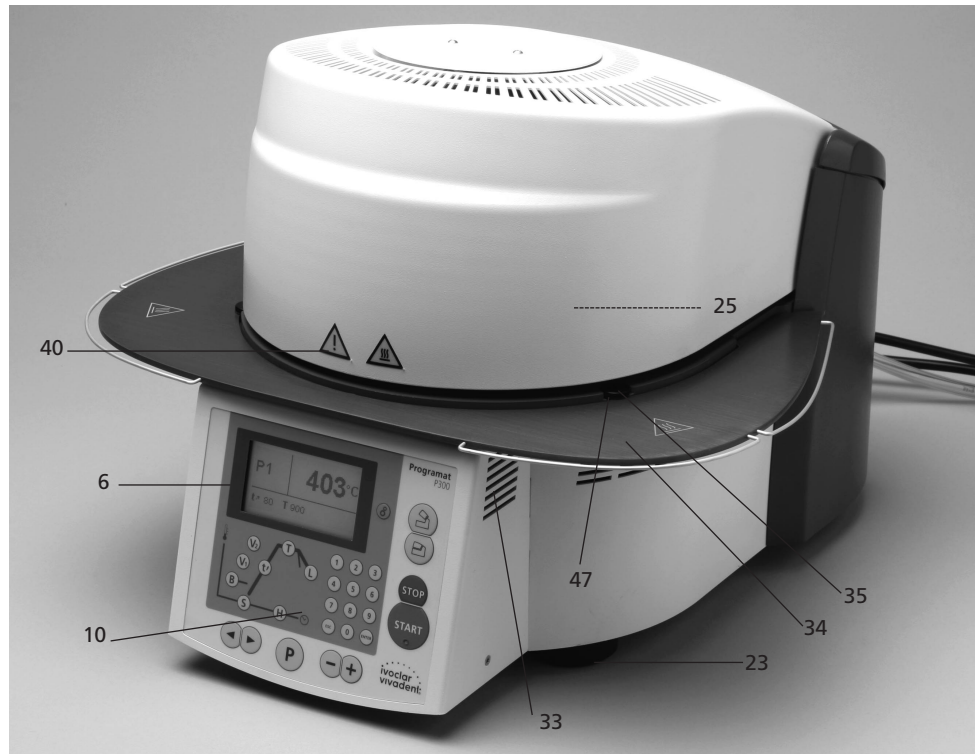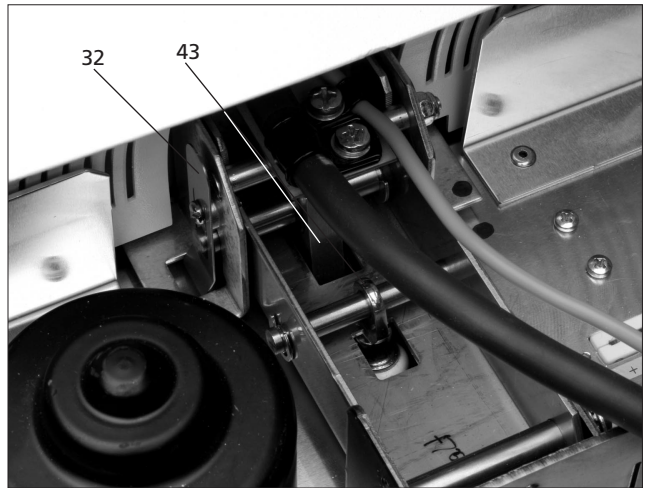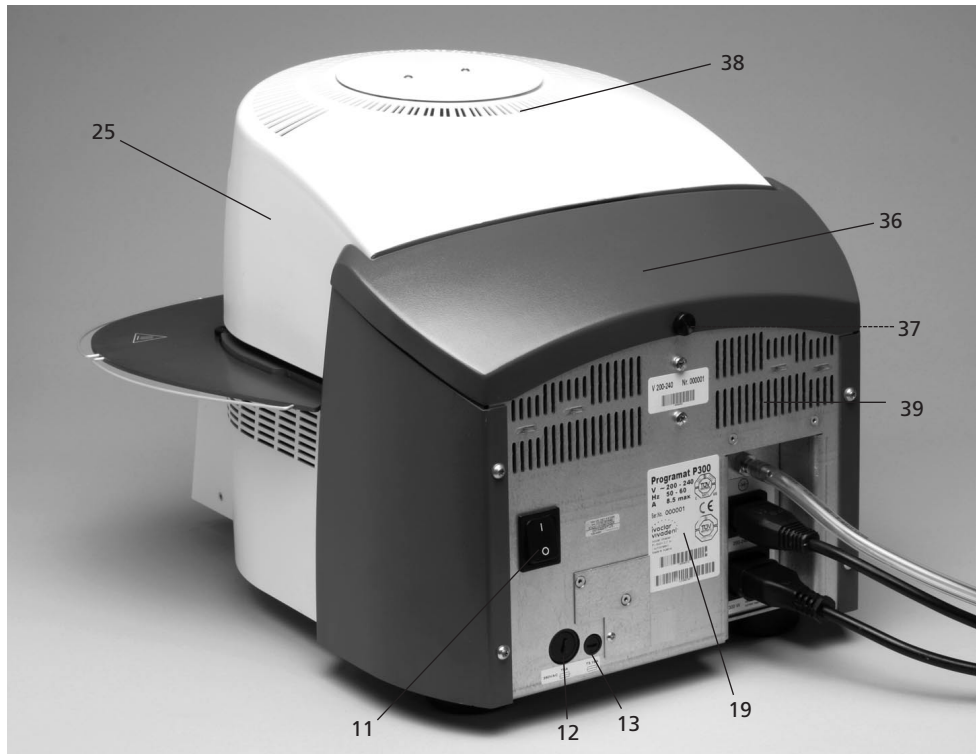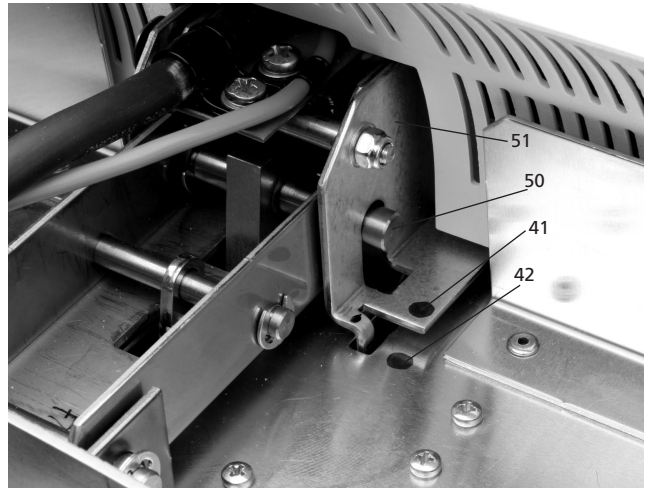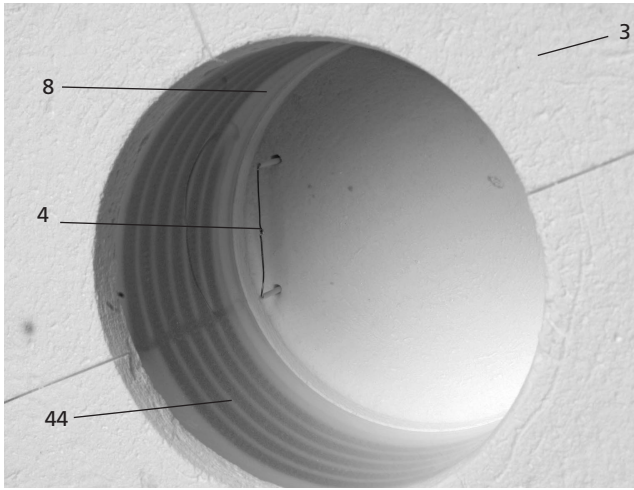
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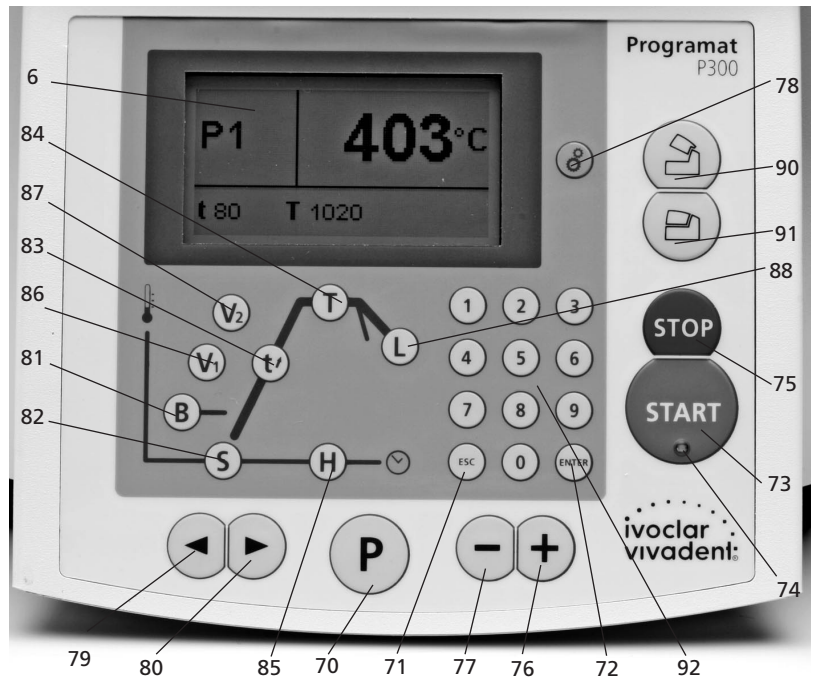
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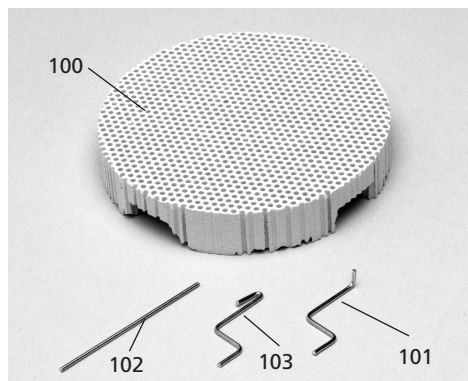
1. Introduction / Signs and Symbols

1.1 Preface

Dear Customer

Thank you for having purchased the Programat P300. It is a state-of-the-art furnace for dental applications.

The furnace has been designed according to the latest industry standards. Inappropriate use may damage the equipment and be harmful to personnel. Please observe the relevant safety instructions and read these Operating Instructions carefully.

Enjoy working with the P300.

1.2 Introduction

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

⚠ Risks and dangers

ℹ Important information

✋ Contraindication

♨ Burn hazard

⚠ Risk of crushing

1.3 Notes regarding the Operating Instructions

Furnace concerned:
Programat P300
Target group:
Dental technologists

These Operating Instructions facilitate the correct, safe, and economic use of the Programat P300 furnace.

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

This chapter is especially important for personnel who work with the Programat P300 or who have to carry out maintenance or repair work. This chapter must be read and the corresponding instructions followed.

2.1 Indications

The Programat P300 must only be used to fire dental ceramic materials and it should be used for this purpose only. Other uses than the ones stipulated, e.g. cooking of food, firing of other materials, etc. are contraindicated. The manufacturer does not assume any liability for damage resulting from misuse. The user is solely responsible for any risk resulting from failure to observe these Instructions.

Further instructions to assure proper use of the furnace:
– The instructions, regulations, and notes in these Operating Instructions must be observed.
– The instructions, regulations, and notes in the material's Instructions for Use must be observed.
– The furnace must be operated under the indicated environmental and operating conditions (Chapter 9).
– The Programat P300 must be properly maintained.

2.1.1

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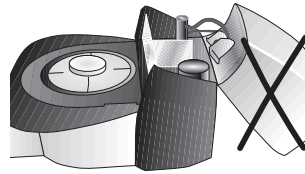
The furnace head should not be removed from the furnace base as long as the furnace head is connected by means of the heater cable.

2.1.2

⚠ **Risks and dangers**
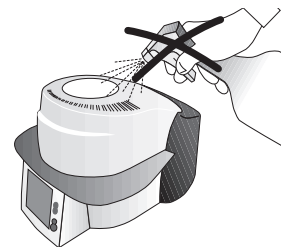
Make sure that no liquids or other foreign objects enter the furnace.

2.1.3

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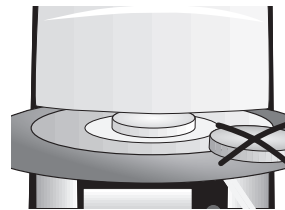
Firing trays must not be placed in the area surrounding the firing table, since this will obstruct the closing of the furnace head.

2.1.4

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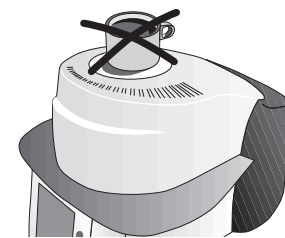
Foreign objects must not be placed on the furnace head or the air vents. Make sure that no liquids or other foreign objects enter the air vents, since this may result in an electrical shock.

2.1.5

⚠ **Risks and dangers**
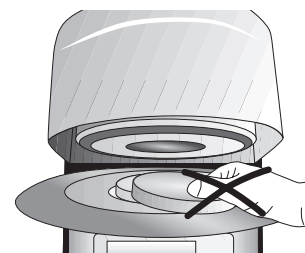
Never place objects in the firing chamber by hand, since there is a burn hazard. Always use the tongs (accessories) supplied for this purpose. Never touch the hot surface of the furnace head, as there is a burn hazard. Please also refer to the warnings on the furnace.

2.1.6

Risks and dangers
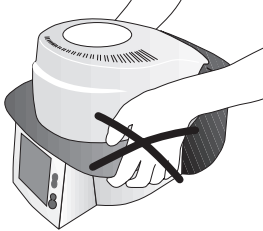
Do not carry the furnace head by the cooling tray.

2.1.7

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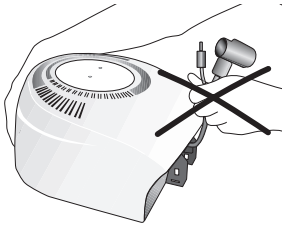
Do not carry the furnace head by the cables, since the cables and connections may be damaged.

2.1.8

Risks and dangers

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

2.1.9

Contraindication
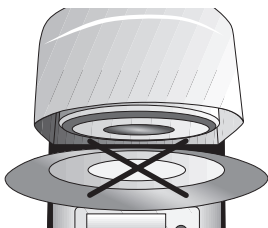
Never use the furnace without a firing table.

2.1.10

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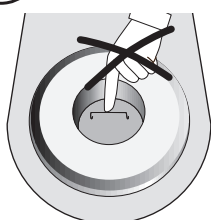
Do not touch the thermocouple and the quartz tube in the firing chamber. Avoid contact with the skin (grease contamination), as the parts will be prematurely damaged.

2.1.12

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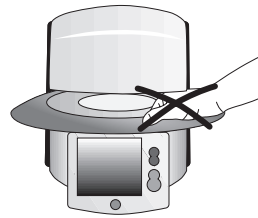
Never reach under the furnace head with the hand or other parts of the body during operation, since there is a risk of crushing and a burn hazard.

2.1.13

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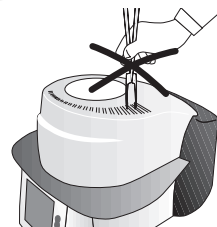
Do not insert any foreign objects into the air vents. There is a risk of electrical shock.

2.1.14

Contraindication
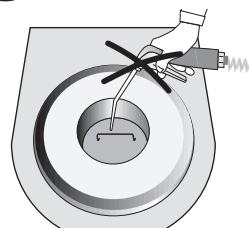
This product contains ceramic fibres and may release fibre dust. Do not use compressed air on the furnace thus distributing the dust in the environment and observe the additional notes on page 11.

2.1.15

Risks and dangers
The furnace must not be operated if the quartz tube in the firing chamber is damaged. There is a risk of electric shock upon contact with the heating wire.

2.2 Health and Safety Instructions

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

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

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

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

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

– Use original packaging for transportation purposes.

– The furnace must be cool before it is packed for transportation purposes.

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

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

– The power socket must be equipped with a residual current circuit breaker.

– The furnace must be plugged into a socket with protected contacts.

– Before calibration, maintenance, repair, or exchange of parts, the power must be dis-connected if the furnace is to be opened.

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

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

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

– If it is assumed that safe operation is no longer possible, the power must be disconnected to avoid accidental operation.
Safe operation is no longer possible if
  – the furnace is visibly damaged
  – 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 temperatures or high atmospheric humidity the head has to be opened and the unit dried or left to adjust to room temperature for approx. 1 hour (do not connect the power yet).

– The furnace has been tested for use at altitudes of up to 2000 m above sea level.

– The furnace may only be used indoors.

Any disruption of the protective conductor either inside or outside the furnace or any loosening of the protec-tive conductor connection may lead to danger for the user in case of malfunction. Delibe-rate interruptions are not tolerated. Materials developing harmful gases must not be fired.

**Warnings regarding the
dismounting of the heating muffle**

This product contains ceramic fibres and may release fibre dust.
Fibre dust has proved to be carcinogenic in animal experiments. The correspon-ding EU Safety Data Sheet must be observed.

The heat insulation of the firing chamber in the Programat P300 & P500 consists of ceramic fibres. After prolonged use of ceramic fibres at temperatures of over 900 °C (1652 °F), silicogenic substances (Cristobalite) may be produced. In certain cases, e.g. upon changing of the heating muffle, the possible resulting dust exposure may cause irritation of the skin, eyes, and respiratory organs. Therefore, proceed as follows when changing the heating muffle:

– Make sure the corresponding staff wears long-sleeved clothing, as well as headgear, goggles, and gloves.
– Place suction equipment at the source of the dust or, if not possible, provide the staff with FFP3 facemasks or similar items.
– Once the procedure has been completed, any dust possibly adhering to exposed skin must first be rinsed off with cold water. Only after that should soap and warm water be used.
– The corresponding work clothes should be washed separately.

Warning
The insulation on this product contains refractory ceramic fibres (RCF) which pose a possible cancer hazard, if agitated and inhaled. May be irritating to the skin, eyes or respiratory tract if insulation is cracked or corrupted.

California Proposition 65
Warning: "This product contains Refractory Ceramic Fibres, a substance known to the State of California to cause cancer."

Disposal:
The furnaces must not be disposed in the normal domestic waste. Please correctly dispose of old furnaces according to the corresponding EU council directive.

3. Product description

3.1 Components

The Programat P300 comprises the following components:
– Furnace base with electronic controls
– Furnace head with firing chamber
– Firing table
– Cooling tray
– Power cord and hose for vacuum pump
– Vacuum pump (accessory)

3.2 Hazardous areas and safety equipment

Description of the risk areas of the furnace:

Hazardous area	Art der Type of risk
Firing chamber	Risk of burning
Opening/closing mechanism	Risk of crushing
Electrical components	Risk of electrical shock

Description of the safety equipment of the furnace:

Safety equipment	Protective effect
Protective conductor	Protection from electrical shock
Electrical fuses	Protection from electrical shock

3.3 Functional description

The firing chamber may be heated up to max. 1200 °C (2192 °F) by means of a heating element. Furthermore, the firing chamber has been designed in such a way that a vacuum may be created with a vacuum pump. The firing process is controlled with the corresponding electronic controls and a software. Moreover, the set and actual temperatures are continuously compared.

3.4 Accessories
(not part of the delivery form)

– Temperature Checking Set 2
– Programat Accessories Set (large and small firing trays, firing tongs, Temperature Checking Set)
– Vacuum pump

4.1 Unpacking and checking the contents

The 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 it 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.
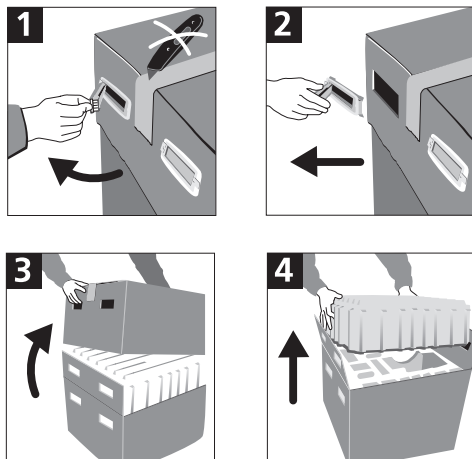
Packing and shipping of individual components:
The packaging of the P 300 permits simple and safe shipping of individual components. Simply use the two corresponding inserts. Fold the side flaps (2) and combine the two packaging parts by means of the transportation flaps. The packaging may be disposed with the regular household refuse.
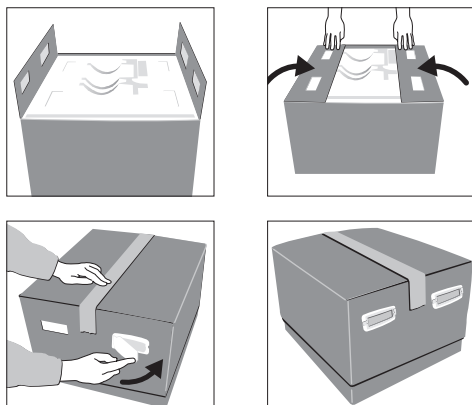
 We recommend keeping the original packaging for future service and transportation purposes.

4.2 Selecting the location

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

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

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

4.3 Assembly

Make sure the voltage indicated on the rating plate (19) complies with the local power supply. If this is not the case, the furnace must not be connected.
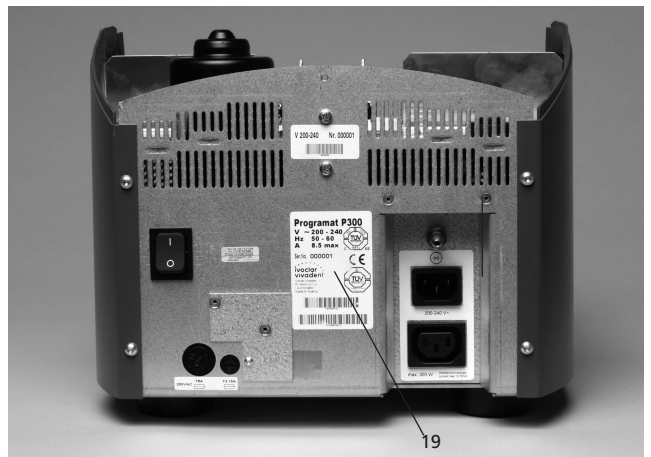
Step 1:
Assembling the cooling tray (34)
Remove both screws (35) including the silicone rest (47) for the cooling tray (34).

Place the cooling tray (34) on the frame plate (7). Make sure that the cooling tray (34) is correctly positioned on the frame plate (7).

Secure the cooling tray (34) with the two screws (35) including the silicone rest (47).

Step 2:
Placing the firing plate (5)
Place the firing plate (5) on the firing plate holder (48).
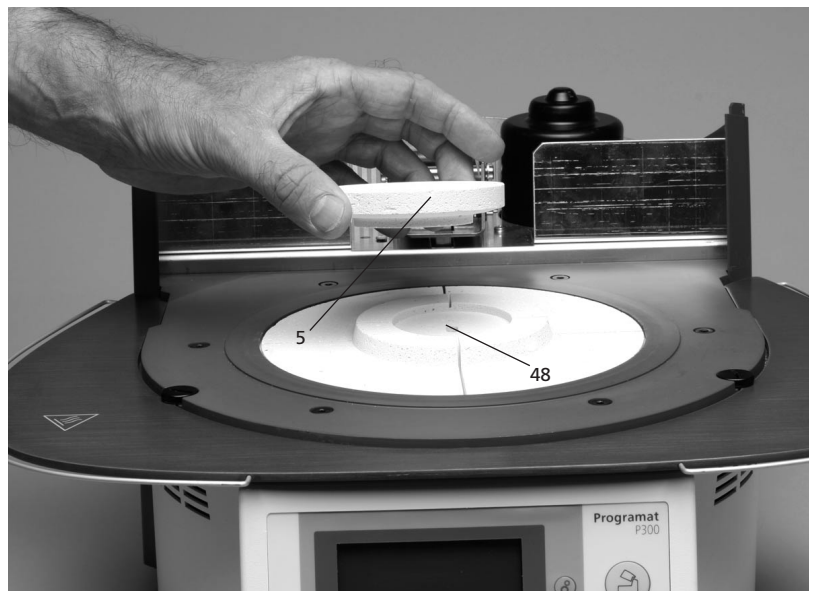
Step 3:
Mounting the furnace head
The complete furnace head is best mounted with the rear panel of the furnace pointing towards the user. Lift the furnace head with both hands (see picture) and carefully position it on the furnace head mounting (43).

Ensure that the furnace head mounting mark (41) is aligned with the furnace base mounting mark (42).

| **i** | Make sure that the firing plate (5) is not damaged by mounting the furnace head. |

Step 4:
Connections
Connect the cables of the furnace head with the furnace base. Proceed as follows:

– Insert the thermocouple plug (26) (make sure that the polarity of the plug is correct)
– Insert the heater plug (28)

Secure the heater plug (28) with the plug fuse (27) by turning it until the heater plug (28) has been secured.

27
28

Step 5:
Mounting the hood (36)
Once all cables are properly connected to the furnace base, the hood (36) can be mounted.

Subsequently, secure the hood with the knurled screw (37).

⚠ The furnace may only be operated with the hood mounted.

36

37
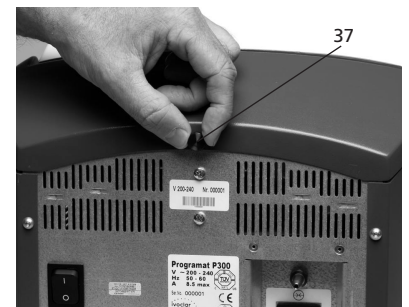
Step 6:
Establishing additional connections

Power connection
Please make sure that the voltage indicated on the rating plate complies with the local power supply. Connect the power cord (16) with the power socket (17) of the furnace.

Vacuum pump connection
Connect the vacuum pump plug with the vacuum pump socket (18).

We recommend using only the VP3 easy or VP3 vacuum pumps from Ivoclar Vivadent, since these pumps are especially coordinated with the furnace. If other pumps are used, please observe and do not exceed the maximum power consumption.

Programat P300
V ~ 200 - 240
Hz 50 - 60
A 8.5 max
Ser.No. 000001

ivoclar
vivadent

21
46
17
16
18

200-240 V~
max. 300 W

19

12   15   13

4.4 Removing the furnace head

Before the hood (36) is removed, the furnace has to be switched off and the power cord (16) disconnected from the power socket (17).

1. Loosen and remove the knurled screw (37) of the hood (36)
2. Remove the hood (36)
3. Disconnect the thermocouple plug (26)
4. Disconnect the heater plug (28)
5. Press the leaf spring (32) with a finger, lift off the furnace head at the same time and remove it

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

4.5 Initial start-up

1. Connect the power cord (16) with the wall socket.
2. Put the On/Off switch (11) at the rear of the furnace on position "I".

The furnace will now automatically conduct a self-test. The performance of all furnace components is automatically checked. The display shows the following indications during the self-test:
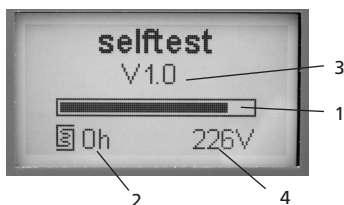
1 Status bar
2 Firing hours
3 SW version
4 Current supply voltage

If any component is defective, the corresponding error number (ER xxx) will be indicated in the display. If all components work properly, the display shows the stand-by mode.

Stand-by mode
The stand-by mode is indicated after the self-test. The furnace is set to the last used program.
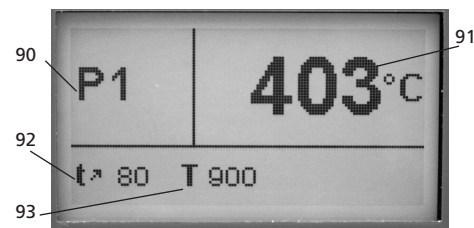
90 Program number
91 Current temperature
92 Temperature increase
93 Holding temperature

5. Operation and configuration

5.1 Introduction to the operation

The Programat P300 is equipped with a graphical display (A) with backlighting. Moreover, the keypad features a parameter firing curve (B) with the parameter keys (C), where the parameters can be selected. By means of the enter keys and the command keys (D), the furnace may be programmed and controlled.
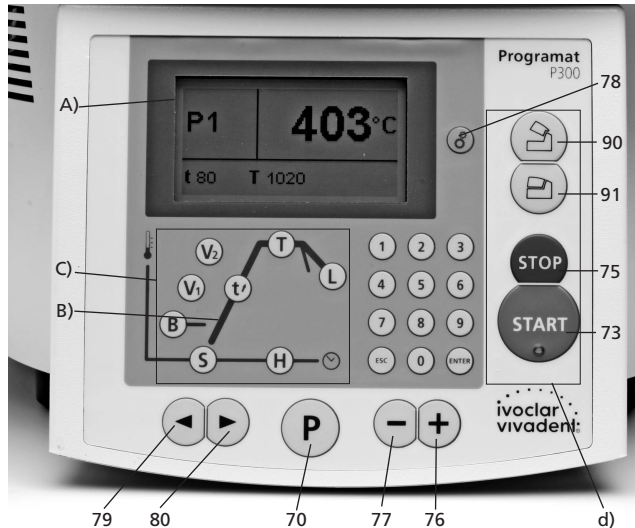

5.2 Explanation of key functions

– **T** = Holding temperature (84)
  Indicates the holding temperature (actual firing temperature).

– **H** = Holding time (85)
  Indicates the holding time (actual firing time).

– **S** = Closing time (82)
  Indicates the closing time of the furnace head (pre-drying time).

– **B** = Stand-by temperature (81)
  Indicates the stand-by temperature.

– **t↗** = Temperature increase (83)
  Indicates the temperature increase per minute for heating up.

– **V1** Vacuum on temperature (86)
  Indicates the temperature level at which the vacuum is switched on.

– **V2** Vacuum off temperature (87)
  Indicates the temperature level at which the vacuum is switched off.

  If this temperature equals the holding temperature T, the vacuum is maintained during the entire holding time.

  Specific case: If the temperature V2 is exactly 1 °C (or 1 °F) higher than the holding temperature T during activated long-term cooling, the vacuum is maintained during the entire long-term cooling (e.g. recommended for the cleaning program).

– **L** = Long-term cooling temperature (88)
  Indicates the temperature level at which the furnace head starts to open after the end of the holding time and free or controlled (tL) cooling.

– **tL** = Controlled cooling temperature gradient (°C or °F / min)

– "Cogwheel" key
  Configuration and information (78)
  After pressing the settings key (2 cogwheels), a selection (information / settings) is displayed. Subsequently, the left key can be used to navigate through the information menu. The right key can be used to navigate between the settings and auxiliary programs.

– **Cursor keys (79, 80)**
  The current cursor position is indicated by means of a fix (non-blinking) frame around the value.

– **Enter keys (76, 77, 92)**
  The values can be entered by using the + / – keys or the numeric keys.

  Each value entered by means of the + or – key will be immediately accepted (as long as the value ranges are observed) without separately confirming the entered value (pressing the key once will adjust the value by + or – 1). An active entry by means of the numeric keys will blink until the value has been confirmed or the process aborted.

  Each entry via the numeric keys can be confirmed with the Enter key. However, the Program key, the START key or the parameter keys can be used to confirm an entry by means of the numeric keys. Therefore, a program can be edited considerably faster (less keystrokes required).

  If an invalid entry is made (outside the current value range), the invalid entry continues to blink after confirmation.
  As an error message (Entry error: entry outside the value range) an exclamation mark will blink in the bottom line until a new value is entered and the entry is either confirmed or the process aborted with the ESC key. If the process is aborted with ESC, the old valid value will reappear. Please refer to the respective parameter details for the value range.

– **START key (73)**
  The program is started by pressing this key.

– **STOP key (75)**
  Pressing this key once (program paused)
  Pressing this key twice (program will be interrupted and vacuum flooded).

– **Open furnace head key (90)**
  The furnace head is opened (not possible during a program in progress).

– **Close furnace head key (91)**
  The furnace head is closed (not possible during a program in progress).

– **P = Program and parameter key (70) with double function**
  – Indicates the program number
  – In addition, it is possible to switch from the stand-by mode (or firing curve display) to the parameter list.

5.3 Program structure

The furnace offers three types of programs:

a. Standard programs for Ivoclar Vivadent materials
b. Free programs
c. Auxiliary programs

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

a) Standard programs for Ivoclar Vivadent materials (see chapter 10.1)
– IPS d.SIGN
– IPS InLine
– IPS Empress Esthetic
– IPS e.max Ceram
– Various Add-On materials

b) Free programs
– Free, individually adjustable programs

ℹ️ When the furnace is delivered ex works, the standard programs already contain the recommended material parameter settings.

However, the parameters can be changed and overwritten at any time, if required, if the programs are to be used for other purposes. Therefore, the 50 programs are also available as free programs.

The programs are designed in such a way that they can be either used as conventional, one-stage programs or as two-stage programs, if required. The mode can be changed via the symbol (one- or two-stage program) by using the + or – key.

c. Auxiliary programs
Various test programs are available. Please refer to chapter 5.5 Settings / configuration and information.

5.4 Adjustable parameters and possible value ranges

| Symbol	Parameter	Value range	Value range
P	Program number P	1–100	
B	Stand-by temperature	100–700 °C	212–1292 °F
S	Closing time (min : sec)	00:18–30:00	
t↗	Temperature increase rate	30–140 °C/min	54–252 °F/min
T	Holding temperature	100–1200 °C	212–2192 °F
H	Holding time (min : sec)	00.01–60:00	
V1	Vacuum on	0 or 1–1200 °C	0 or 34–2192 °F
V2	Vacuum off	0 or 1–1200 °C	0 or 34–2192 °F
t↗	Temperature increase rate		
t2↗	Second stage	30–140 °C/min	54–252 °F/min
T	Holding temperature		
	Second stage	100–1200 °C	212–2192 °F
H	Holding time		
	Second stage (min : sec)	00.01–60:00	
V1 (V1 2)	Vacuum on		
	Second stage	0 or 1–1200 °C	0 or 34–2192 °F
V2 (V2 2)	Vacuum off		
	Second stage	0 or 1–1200 °C	0 or 34–2192 °F
L	Long-term cooling	0 or 50–1200 °C	0 or 122–2192 °F
tL	Cooling temperature rate	0 or 1–50 **)	0 or 32–90

**) The maximum value of the cooling temperature rate is adjusted to the set holding temperature T and long-term cooling L (e.g. with T 1180, L 1000 -> max. t↗ 100 °C possible, but with T 850 L 700 -> max. t↗ 50 °C)

Automatic plausibility check
The furnace is equipped with an automatic plausibility check function. The parameters (e.g. T 960 but L 1000) are checked upon each program start. In case of contradictory parameter combinations, the program stops automatically and the respective error number is indicated.

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5.5 Settings / configuration and information

By pressing the "Settings" key (78), the following menu is displayed:

Information   Settings
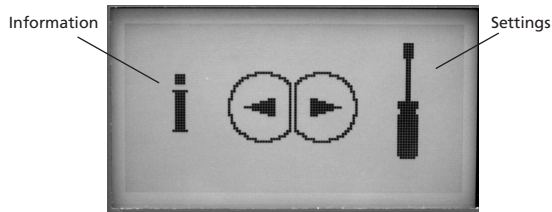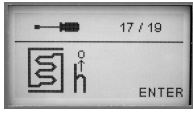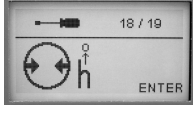

The left key (<) can be used to navigate through the information menu. The right key (>) is used to navigate through the settings and auxiliary programs. These displays can be aborted by pressing the Program key or ESC key.

5.5.1 Settings / Configuration

Settings	Display	Short description
Contrast	1 / 19 16 0 - 31	The contrast can be set by means of the + or – keys
Temperature mode	2 / 19 °C °C - °F	The + and – keys can be used to switch from °C to °F
User calibration value	3 / 19 ENTER	This program is suitable to conduct the temperature calibration by means of the Temperature Checking Set Type 2. The furnace head opens automatically if the Enter key is pressed. Place the test into the firing chamber and start the program by means of the START key.
Volume	4 / 19 2 0 - 5	The desired volume can be set by means of the + or – keys
Beeper tune	5 / 19 3 1 - 5	The tune can be set by means of the + or – keys
Time	6 / 19 09:50:12	The time can be entered by using the numeric keys
Date	7 / 19 14.09.2005	The date can be selected by using the numeric keys

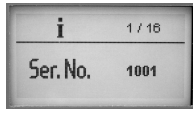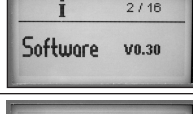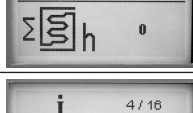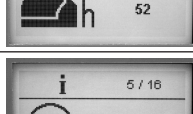| Settings	Display	Short description
Write protection	Code 8 / 19 on off - on	The + and – keys can be used to switch on the write protection. The function applies to all programs and cannot be individually set. Only after entry of the user code.
"Ivoclar Vivadent optimized temperature control function"	9 / 19 STD ENTER	Only after entry of the STD code.
Pre-drying	10 / 19 on off - on	The + and – keys can be used to switch on the pre-drying function. The function applies to all programs and cannot be individually set.
Vacuum test program	11 / 19 ? ENTER	Allows to check the vacuum quality of the system
Heating muffle test program	12 / 19 ? ENTER	Allows to check the heating muffle. The result is shown in graphical form after the end of the program
Key test	13 / 19 ? ENTER	Allows to check the keypad
Cleaning program	14 / 19 ENTER	The program is used to clean the heating muffle and the insulation materials by a heat process.
Dehumidification program	15 / 19 H₂0 ENTER	Permits the dehumidification of the furnace
Selection of factory settings	16 / 19 ENTER	With this setting, all values and parameters can be reset to the factory settings. **Attention**: All individual programs which have been created and saved will be deleted with this function.
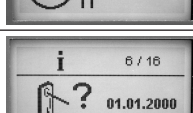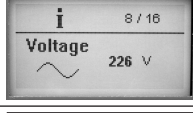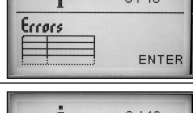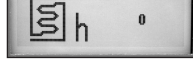
Settings	Display	Short description
Reset firing hours	17 / 19 ENTER	The firing hour count can be reset to 0. Only after entry of the user code.
Reset vacuum pump hours	18 / 19 ENTER	The operating hour count of the vacuum pump can be reset to 0. Only after entry of the user code.

Important information
The user code (6725) is required for some settings.

5.5.2 Information

Settings	Display	Short description
Serial number	i 1 / 16 Ser. No. 1001	Serial number of the furnace
Software version	i 2 / 16 Software V0.30	
Furnace head firing hours	i 10 / 16 Σ h 0	
Operating hours furnace	i 4 / 16 h 52	
Operating hours vacuum pump	i 5 / 16 h 0	
Latest start of calibration program	i 6 / 16 ? 01.01.2000	
Calibration value	i 7 / 16 2	
Supply voltage	i 8 / 16 Voltage 226 V	Shows the current supply voltage
Error table	i 9 / 16 Errors ENTER	
Total firing hours	i 3 / 16 h 0	

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5.6 Symbols in the display

Symbol name	Meaning	Symbol
"One-stage program"	Indicates that a conventional, one-stage program is used	
"Two-stage program"	Indicates that a specific, two-stage program is used. The bold line indicates the values for the **first** stage	
"Two-stage program"	Indicates that a specific, two-stage program is used. The bold line indicates the values for the **second** stage	
"Standard opening of the furnace head" (can be switched with the + / – key)	Indicates that the furnace head is opened at normal speed after firing.	
"Quick opening of the furnace head" (can be switched with the + / – key)	Indicates that the furnace head is quickly opened after firing.	
Pre-drying	Indicates that the option "Pre-drying" has been activated	

5.7 Explanation of beeper tunes

Beeper description	Explanation
Beeper lasting for approx. 2 seconds with unchangeable "SELF-TEST signal" to indicate the completion of the self-test.	SELF-TEST has been completed
Beeper lasting for approx. 10 seconds with the beeper signal set by the user.	Restart signal. The firing process has been completed and the furnace head is open. Moreover, the furnace temperature has fallen below 550 °C.
Beeper lasting for approx. 10 seconds with the beeper signal set by the user.	Close-furnace-head signal. The firing procedure is completed und the furnace head is open. Furthermore, the furnace temperature has dropped below 320 °C / 680 °F.
If the STOP key is not pressed during this time, the beeper sounds again after 5 minutes for a period of 5 minutes. Subsequently, there will be no further acoustic signal. If the STOP key is not pressed during beeping (10 s or 5 min), the beeper is immediately switched off. There will be no further acoustic signal.	The firing object can now be removed and cooled on the cooling plate.
Beeper with unchangeable "error tune". Only if the STOP key is pressed is the beeper switched off.	Error messages are supported by the error tune *
A short beeper signal will sound every time a key is pressed (approx. 0.5 seconds ON) basically at the volume set by the user. If the volume is set to OFF, then the signal sounds at a medium volume.	Keypad test active

* The beeper can only be interrupted by means of the STOP key.

The operating procedure for the Programat P300 will be explained with the help of two examples: one standard and one individual program.

6.1 Switching on/off

Put ON/OFF switch (11) on position "I". The furnace conducts an automatic self-test, which will be indicated in the beginning. Subsequently, a status bar shows that the self-test is being conducted. Make sure that the furnace is not manipulated during this time.

6.1.1 Stand-by mode
After successful completion of the self-test, the Stand-by mode is shown in the display.
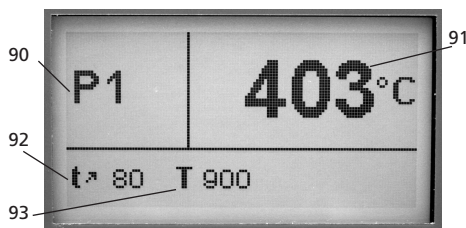
The cursor indicates the menu item which is currently active. The cursor can be moved with the cursor arrow keys.

If the cursor is positioned in the program display, the desired program can be selected by using the + and – keys. The desired program can also be selected by means of the numeric keys.

6.1.2 List of parameters
One-stage program
The list of parameters is accessed by pressing the Program key (70). The list shows all the parameters.

One-stage program

Two-stage program
If a two-stage program is used, the parameters are displayed for the first and the second stage in a separate screen. The P key is used to switch back and forth between the two screens. Please note the appropriate symbol (first or second stage).

Two-stage program
stage 1 is shown   stage 2 is shown

If the cursor is positioned on the "one-stage symbol" and the symbol is switched to the "two-stage symbol" by pressing the + or – key, the program has been set to "two-stage".

If the cursor is set on the "two-stage symbol" and the symbol is switched to the "one-stage symbol" by pressing the + or – key, the program has been set to "one-stage".

Starting a program is possible at any time, even if the input screen for the second stage is still being displayed.

Special variant: Conducting a one-stage program, in which only part of the holding time is fired with a vacuum (requirement: holding temperature 1 = holding temperature 2).

6.1.3 Description of the firing curve display
If the program is started with the START key, the firing curve display with the vacuum status is shown.
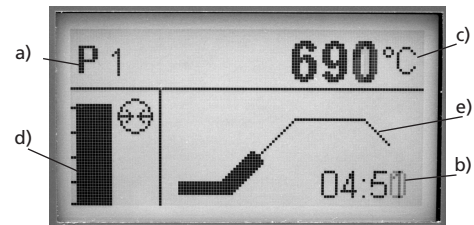
The following information is always displayed:
a) Program number
b) Remaining time
c) Current temperature
d) Status of vacuum
e) Status bar

If a two-stage program is selected, two stages are shown.
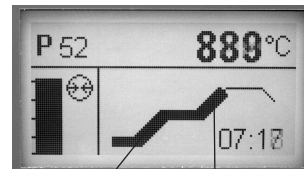
a) stage 1   b) stage 2

6.2 Firing using a standard program
Step 1:
Select the desired program (1 to 50) according to the firing table (Chapter 10).

Step 2:
Open the furnace head with the "Open furnace head" key (90) and place the object on the firing tray in the furnace.

Step 3:
Press the START key (73) to start the program. The process is indicated in the firing curve display.

6.3 Firing using an individual program

Step 1:
Select a free program.

Step 2:
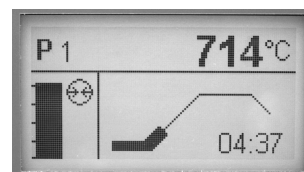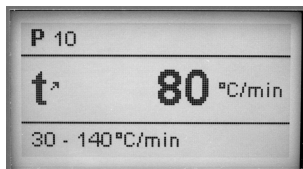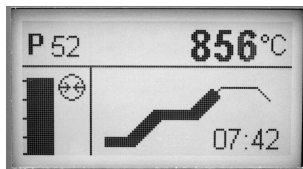Press the desired parameter (e.g. temperature increase). The input mask appears. In the lower field, you will find information about the acceptable temperature range (min. and max.). This will facilitate the entry and prevents input errors.
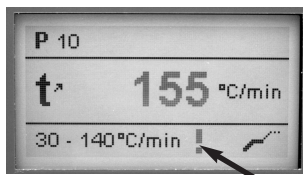

Step 3:
Press the START key (73) to start the program. The process is indicated in the firing curve display.

6.4 Further possibilities and special features of the furnace

6.4.1 Illogical values or incorrect entry:
If an illogical value is entered by means of the numeric keys (outside the current value range), the invalid entry still blinks after confirmation.

As error message (entry error: entry outside the value range), an exclamation mark blinks in the bottom line until the next value is entered and successfully confirmed or the process is aborted with ESC. The old, valid value reappears. Please refer to the parameter details for the value range.

6.4.2 Program write protection
If all programs are write-protected, a closed lock ⌧ appears in the stand-by mode, parameter list, and detailed parameter screen.

6.4.3 Stopping the running program
Press the STOP key once to pause a running program. The green LED in the START key blinks. Press the STOP key twice to completely stop the program or press START to continue.

6.4.4 Changing the parameters while the program is running
All parameters of the program, which have not yet been executed, can be changed while the program is stopped (green LED blinks).

6.4.5 Quick opening of the furnace head
By switching the symbol "standard opening of the furnace head" for the currently loaded program, the user may activate a "quick opening of the furnace head" at the end of the program.

7. Maintenance, Cleaning, and Diagnosis

This chapter describes the user maintenance and cleaning procedures for the Programat P300. All the 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 approximations.

i This furnace has been developed for typical use in dental laboratories. If the product is used in a production enterprise, for industrial applications, and for continuous use, premature ageing of the expendable parts has to be expected.

The expendable parts are as follows:
– Heating muffle
– Insulation material

Expendable 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	Var. external connections	weekly
Check if the furnace head opens smoothly and without excessive noise.	Opening mechanism	monthly
Check if the thermocouple is straight and in the right place.	Thermocouple (4)	weekly
Check the insulation for cracks and damages. If the insulation is worn down it has to be replaced by a certified Ivoclar Vivadent Service Center. Fine hairline cracks on the surface of the insulation are harmless and do not influence the function of the furnace in a negative fashion.	Insulation (3)	monthly
Check if the sealing rims of the furnace head and the furnace base are clean and undamaged.	Sealing rims of the furnace head (2) and the furnace base (1)	weekly
Check the keypad for visible damage. If the keypad is damaged, it has to be replaced by a certified Ivoclar Vivadent Service Center.	Keypad (10)	weekly
Check temperature. Use the temperature checking set to check and adjust the temperature in the furnace.	Firing chamber	twice a year
Check the quartz glass cylinder to make sure the quartz glass is not defective.	Firing chamber	daily

i If the furnace head is replaced, the furnace must be calibrated.

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.

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

Item	Frequency:	Cleaning material:
Housing (9) and furnace head (25)	if required	soft, dry cloth
Keypad (10)	weekly	soft, dry cloth
Cooling tray (34)	daily	cleaning brush *
Insulation (3)	daily	cleaning brush *
Sealing rim of the furnace head (2) and sealing surface (1)	daily	cleaning brush and a soft cloth

*Never clean with compressed air!

7.3 Test programs

Press the 'cog-wheel' key (Settings/Information)

– *Vacuum pump test program:*
  With this program, the vacuum performance of the furnace vacuum system can be automatically tested. For that purpose, the achieved (minimum) pressure in mbar is measured and indicated. If the pressure value is below 80 mbar, the vacuum performance of the system is adequate.

– *Keypad test program*

– *Heating muffle test program*

– *Dehumidification test program*

– *Cleaning program*

7.4 Stand-by

We recommend keeping the furnace head closed, especially if the temperature drops below 150 °C (302 °F).

7.5 Dehumidification program

The condensation of water in the insulation of the firing chamber and the vacuum pump will result in a lower vacuum and thus to impaired firing results. For that reason, the furnace head should be kept closed when the furnace is switched off, in order to prevent the absorption of humidity. Start the dehumidification program if required (humidity in the insulation).

7.5 Calibration

Furnace calibration (Silver Test)

The sheathed thermocouple may be subject to changes with affect the furnace temperature, depending on the mode of operation. Check furnace temperature with the 'Silver Test' at least once a year and adjust if necessary. For that purpose, the furnace features a special calibration program.
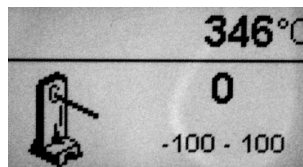
Procedure:
a) The Furnace must be at operating temperature (switched on for at least 60 minutes) and have a stand-by temperature of 403 °C (757 °F).

b) Press ⬡ and ▶ keys to enter the Options menu.

   Then press ◀ key until the Display shows this screen:
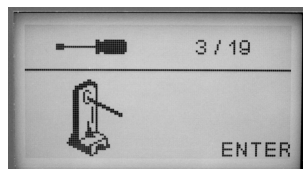
   To select the calibration program press the ENTER-key. The following is displayed:

c) Insert silver wire into the Ivoclar Vivadent sample holder.

d) Place the sample holder with the silver strip in the centre of the firing plate (6).

e) Press START (if error message Error 14 appears, the furnace temperature is still too high fort he 'Silver Test' (>410 °C/770 °F)). The furnace closes automatically at the correct temperature and the program starts.

If the silver wire has started to melt (and has a 'pitted' appearance) at the end of the program, the furnace temperature is correctly calibrated (Figure B) If not, recalibration is necessary.

Recalibration
A change in temperature of "+/-" 100 °C (180 °F) is possible in the Programat P300. Select calibration program to activate the calibration keys + and −. The program must not be started for this purpose. The latest calibration value is indicated on the Display.

– If the silver wire has not started to melt after the Silver Test, recalibrate using the +key (Figure A)
– If the silver wire has melted down to a ball after the Silver Test, recalibrate using the –key (Figure C).

Every time a calibration key is pressed, the set temperature changes by 1 °C (1.8 °F) Experience has shown that a recalibration of 5 °C (9 °F) is appropriate, which means pressing the relevant key five times.

While the calibration keys are in use, the calibration value in °C (°F) is shown in the Display. Entering the calibration value does not have to be confirmed with ENTER. We recommend that you do not recalibrate the furnace immediately before it reached the holding temperature or during the holding time of the Silver Test program. Repeat the Silver Test until the silver wire starts to melt correctly (Figure B).
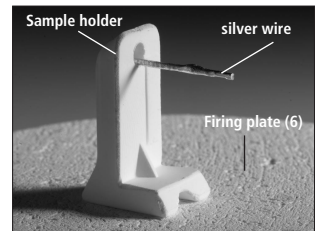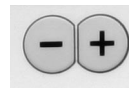

Fig. A   Temperature too low
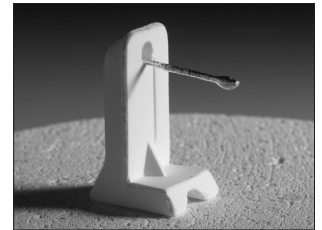
Fig. B   Temperature just right

Fig. C   Temperature too high

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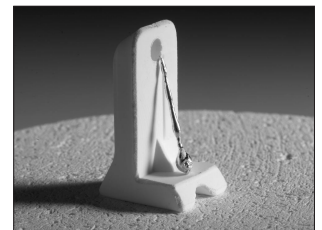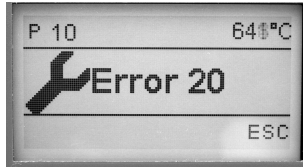
8.1 Error messages

The furnace continuously checks all functions during operation. If an error is detected, the respective error message is displayed.

In case of an error, the heater switches off for safety reasons.

The following error messages may be displayed:

Index	Category	Error	ERR No.	Conti-nuation possible	Error Message Text
1	Entry	T < B	2		Enter a logical value for T
2	Entry	L > T	8		Enter a logical value for long-term cooling L
3	Entry	V2x <= V1x	9		Enter a logical value for the vacuum-on temperature Vx1 or the vacuum-off temperature Vx2
4	Entry	V2x > Tx + 1°C	10		Change either the vacuum values or the holding time T
5	Entry	Incorrect values for V1x, V2x	11		Enter a logical value for V1x, V2x
6	System	Current temperature after Start > Tx + 50 °C	13 *, **		Excess temperature! Program aborted, furnace head opens to allow the furnace to cool down.
7	System	Temperature in the firing chamber > 410 °C at the start of the calibration program, i.e. too high	14 *		Temperature too high for calibration; the furnace cools down! Start the program again later!
8	Entry	T2 < T1	16		Enter a lower value for T1 or a higher value for T2.
9	System	Power failure > 10 s during a firing program in progress	17		A firing program in progress was interrupted for more than 10 s. The program cannot be continued!
10	Entry	T1 > V12	18		Enter a lower value for T1 or a higher value for V12
11	Entry	vV set, but V2 is missing or invalid	19		Pre-vacuum activated! V2 must be higher than B.
12	System	Error in the heating system	20 **	no	Check the heater fuse. If the fuse is O.K., contact your local Ivoclar Vivadent Service Center.
13	System	Heating muffle very old	23		The heating muffle is very old. It is recommended to replace it. After the error message has been acknowledged, a firing program may still be started.
14	System	Heating muffle defective	24		The condition of the muffle is so poor that is has to be replaced immediately.
15	System	Temperature in the furnace base is higher than 65 °C	25		The furnace base is too hot! Make sure that the air vents of the furnace are clean and unobstructed. Maximum temperature 65 °C
16	Entry	T is > B + 200 °C at the start of a firing program	26		Firing chamber too hot to start a firing program.
17	System	Furnace head cannot be initialized	27 **, ***		The furnace head cannot be moved to the final position. It might be blocked by an external mechanical source! If this is not the case, please contact your local Ivoclar Vivadent Service Center!
18	System	The furnace head does not reach the target position	28 **		The furnace head does not open/close correctly. The furnace head was manually moved or is obstructed. The furnace head must only be moved using the keys intended for this purpose!
19	System	Temperature > 1225°C (SW) or > 1300°C (HW) (8) EXCESS TEMPERATURE	29 *, **, ***	no	Excess temperature! The temperature in the furnace head by far exceeds the acceptable temperature range (maximum temperature 1200 °C).
20	System	The vacuum is not released	32 **	nein	The vacuum cannot be released. The vacuum valve might be dirty or stuck. Please contact your service technicians.
21	System	Necessary vacuum (xxxmbar) is not reached within 1 min.	33		The vacuum cannot be established. Check the seal of the firing chamber, vacuum hose, vacuum pump, pump fuse.
22	System	Write error in the firing program memory	43		Error while saving firing program data to the internal memory.
23	System	Read error in the firing program memory	44		Error while reading firing program data from the internal memory.

Index	Category	Error	ERR No.	Continuation possible	Error Message Text
24	System	Checksum error in the firing program memory	45		Invalid checksum of the memory for firing program data - the firing program data are written to the internal memory using the original values.
25	System	Write error in the firing group memory	46		Error while writing firing group data to the internal memory.
26	System	Read error in the firing group memory	47		Error while reading the firing group data from the internal memory.
27	System	Checksum error in the firing group memory	48		Invalid checksum of the memory for firing group data - the firing group data are written to the internal memory using the original values.
28	System	OT1 <> OT2 plausibility check: OT1 = OT2 +/- 10°C	54 **,***	nein	Error in the temperature measuring circuit! Contact your local Ivoclar Vivadent Service Center.
29	System	Temperature in the furnace base is lower than 1 °C	56		Temperature in the furnace base is lower than 1 °C. Bring the furnace base to a higher operating temperature.
30	System	Program start blocked	103		Starting a program is not possible due to a technical malfunction.
31	System	Incorrect time settings (date / time)	107		The clock settings are incorrect. Please set a correct date and a correct time!
33	Entry	HV > H (H2)	110		Enter a lower value for HV or a higher value for H (H2)
35	Entry	"Share of the holding time with vacuum" is activated, but Vx2 does not correspond to Tx or Tx+1	120		Activate the vacuum during the holding time Tx or deactivate HV..
36	System	Supply voltage outside the acceptable range	700		The supply voltage is outside the acceptable range. Check the supply voltage.
37	System	Start-up aborted due to an error	701 ***		The self-test of the furnace was interrupted by an error. It is not possible to work with the furnace! Switch the furnace off and on again, once the error has been rectified.
38	System	Brief power failure during a firing program in progress	702		A firing program in progress was interrupted by a brief power failure. The program is continued!
39	System	Power failure during a firing program from the memory stick in progress – memory stick no longer present.	703		A firing program in progress (started from the USB memory stick) was interrupted by a power failure. The program could not be continued, since the USB memory stick is no longer present!
40	System	Prolonged power failure during an onvernight program in progress	704		An overnight program (firing program) in progress was interrupted by a prolonged power failure. The overnight program is continued!
41	System	Reading and processing supply voltage	705 **,***	no	Error during measuring the supply voltage. Contact your local Ivoclar Vivadent Service Center.
42	System	Reading the power frequency	706		Error during measuring the supply voltage. Contact your local Ivoclar Vivadent Service Center.
43	System	Incorrect supply voltage	707		The furnace is operated with the incorrect supply voltage. Make sure that the furnace is operated with the supply voltage indicated on the rating plate.
44	System	Final vacuum value not reached	800		The required final vacuum value cannot be reached. Check the vacuum pump.
45	System	Vacuum drop	801		An unacceptable vacuum drop has occurred.
46	System	The vacuum does not increase (self-test)	802		No vacuum increase could be measured. Check the following points: Is the firing chamber tight (no contamination on the sealing surfaces)? Is the vacuum hose connected? Is the vacuum pump connected? Is the fuse F1 o.k.?
47	System	Temp. EXTERNAL T-SENSOR excess temperature (> 1225°C)	1010		Temperature channel EXTERNAL T-sensor excess temperature
48	System	Write error in the furnace configuration data memory	1011		Error while saving furnace configuration data to the internal memory.
49	System	Read error in the furnace configuration data memory	1012		Error while reading the furnace configuration data from the internal memory.
50	System	Checksum error in the furnace configuration data memory	1013		Invalid checksum of the memory - furnace configuration data are written into the internal memory using the original values.
51	System	Write error in the furnace operational data memory	1014		Error while saving the furnace operational data to the internal memory.
52	System	Read error in the furnace operational data memory	1015		Error while reading the furnace operational data from the internal memory.
53	System	Checksum error in the furnace operational data memory	1016		Invalid checksum of the memory – furnace operational data are written into the internal memory using the original values.

Index	Category	Error	ERR No.	Conti-nuation possible	Error Message Text
57	System	Technical error of the furnace head	1024 **,***	no	Error while reading the stop switch for the furnace head.
58	System	Technical error of the furnace head	1025 **, ***	no	Read/write CPLD
59	System	Technical error of the vacuum driver	1026	no	Error in the vacuum driver
60	System	Technical error in the SBS driver	1028		Error while reading/writing the SRAM.
67	System	Reading, calculating the ambient temperature	1202 **,***	no	Error while measuring the ambient temperature
68	System	Reading, calculating the furnace temperature	1203 **,***	no	Error while measuring the furnace temperature
69	System	Reading, calculating the furnace control temperature	1204 **,***	no	Error while measuring the furnace control temperature
70	System	Reading, caluclating the resistance value	1205		Error while measuring the resistance value for the ATK2 calibration.
71	System	Reading, calculating, EXTERNAL T-sensor	1206		Error while measuring the temperature for the EXTERNAL T-sensor.
72	System	Temperature regulator	1207 **, ***	no	Error in the temperature regulator.
80	System	Access Board Descriptor: Writing the version number	1400		Error while writing the new version number to the BoardDescriptor (E2Prom).
81	System	Access Board Descriptor: Writing the serial number	1401		Error while writing the new serial number to the BoardDescriptor (E2Prom).
82	System	Access Board Descriptor: Reading the serial number	1402		Error while reading the serial number from the BoardDescriptor (E2Prom).
83	System	Loading of the drivers failed	1500 ***		Failure during loading the necessary drivers. The furnace is not ready. Contact your Ivoclar Vivadent Service Center.

Behaviour of the furnace in case of error
*   Furnace head opens when this error occurs.
**   A program in progress is stopped.
*** The error cannot be acknowledged; the programs cannot be started.

8.2 Technical malfunctions

These malfunctions may occur without an error message being displayed:

Description	Double-check	Action
Vacuum is not released or only very slowly.	Is the vacuum released within approximately 30 seconds?	Wait until the vacuum is released, remove object. Switch the furnace on and off again. If it still does not work properly, contact your local Ivoclar Vivadent Service Center.
Indication on display incomplete.		Activate the display test program and, if necessary, contact your local Ivoclar Vivadent Service Center
Writing in the display is very hard to read.	Is the contrast properly set?	Adjust contrast.
Display not illuminated	Is the furnace properly connected according to the Operating Instructions and switched on?	Correctly connect the furnace and switch it on.
Buzzer does not sound.	Is the buzzer switched off (Tune 0)?	Select tune 1–5.
Furnace head does not open.	Was the furnace head moved manually?	Open the furnace head only by using the corresponding keys. Switch the furnace on and off again.
	Has the vacuum already been released?	Is the program still running? Wait until the program is complete. Switch furnace off and on again. If it still does not work properly, contact your local Ivoclar Vivadent Service Center.
Vacuum pump does not start working.	Is the vacuum pump fuse defective?	Check fuse and replace if necessary.
	Was the maximum power consumption exceeded?	Use only the vacuum pump recommended by Ivoclar Vivadent.
	Is the vacuum pump plug correctly connected?	Correctly connect the vacuum pump to the furnace base.
Final vacuum is not reached.	Is the vacuum hose OK?	Check vacuum hose and hose connection.
	Is the pump output OK?	Start the vacuum test program.
	Humidity/condensation in the vacuum hose?	Start dehumidification program.
Incorrect or illogical temperature indication.	Is the thermocouple bent or fractured?	Contact your local Ivoclar Vivadent Service Center.
	Is the thermocouple correctly connected?	Correctly connect thermocouple.
	Is the thermocouple plug defective?	Contact your local Ivoclar Vivadent Service Center.
Hairline cracks in the heating muffle	Are the cracks very small and insignificant (hairline cracks)?	Small cracks in the muffle are normal and do not negatively influence the function of the furnace.
	Are the cracks large or have parts of the heating muffle broken off?	Contact your local Ivoclar Vivadent Service Center.
Cracks in the insulation.	Are the cracks very small and insignificant (hairline cracks)?	Small cracks in the insulation do not negatively influence the furnace.
	Are the cracks large or have parts of the insulation broken off?	Contact your local Ivoclar Vivadent Service Center.
Cracks in the quartz glass / heating element	Are there cracks in the quartz glass or is the quartz glass sheathing the heating wire broken?	Switch off the furnace and contact your local Ivoclar Vivadent Service Center

8.3 Repair

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

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

9. Product Specifications

9.1 Delivery form

– Programat P300
– Power cord
– Vacuum hose
– Calibration Test Pack
– Operating Instructions
– Programat Firing Tray Kit

9.1.2 Recommended accessories
– Programat Accessories Set
– Temperature Checking Set 2
– Vacuum Pump VP3 / VP3 easy

9.2 Technical data

Power supply	110–120 V / 50–60 Hz
	200–240 V / 50–60 Hz
Overvoltage category II	
Contamination level 2	
Tolerated voltage fluctuations	+/- 10%
Max. power consumption	12 A at 110–120 V
	8.5 A at 200–240 V

Acceptable data for vacuum pump of other manufacturers

Max. output:	250 W / max. leakage current 0.75 mA
Final vacuum:	< 50 mbar
	Use only tested pumps
Electrical fuses:	110–120 V:
	250 V / T 15 A (heating circuit)
	250 V / T 5 A (vacuum pump)
	200–240 V:
	250 V / T 8 A (heating circuit)
	250 V / T 3.15 A (vacuum pump)
Dimensions of electrical fuses	110–120 V:
	Diameter 6.3 x 32 mm
	200–240 V:
	Diameter 5 x 20 mm
Dimensions of the closed furnace	
Depth: 368 mm / width: 303 mm / 398 mm (with Cooling tray)	
	Height: 320 mm
Usable size of the firing chamber	Diameter 80 mm
	Height 48 mm
Max. firing temperature	1200 °C (2192 °F)
Weight	Furnace base: 12.3 kg
	Furnace head: 4.5 kg

Safety information
The P300 complies with the following guidelines:
– IEC 1010-1/EN 61010, Part 1
– UL and cUL standards

Radio protection / electromagnetic compatibility   EMC tested

9.3 Acceptable operating conditions

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

Acceptable humidity range:
80 % maximum relative humidity 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 2000 m above sea
level.

9.4 Acceptable transportation and storage conditions

Acceptable temperature range	-20 to +65 °C (-4 °F to +149 °F)
Acceptable humidity range	Max. 80 % relative humidity
Acceptable ambient pressure	500 mbar to 1060 mbar

Use only original packaging of the Programat P300 together with the
respective foam material for shipping purposes.

10. Appendix

10.1 Program table

Two program tables (°C / °F) are enclosed to these Operating Instructions. If not, please contact your local Service Center.

Important information
The current program table is also available at:
www.ivoclarvivadent.com

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

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