Programat P95

Operating Instructions

Schulungsunterlage
Course material

CE

=IVOCLAR=

Contents

The Programat P95 is a fully automatic ceramic vacuum furnace with sophisticated microprocessor control. It was developed from the tried-and-tested Programat P90.

The temperature sensor has been greatly improved. The platinum tube now used provides optimum conduction and transfers the values to the microprocessor at a significantly higher speed.

In the area of software, practical experience has led to improvements which give the dental technician more individual options and more effective control over the ceramic material to be fired.

The Programat P95 is supplied in four module kits, each packed in polystyrene:

Supply packs

Pack 1:
Furnace head (K), cooling plate (A)

Pack 2:
Control unit (S)

Pack 3:
Furnace base (U), vacuum hose, spare fuses

Pack 4:
Accessories:
Set comprising tongs, firing trays K and G, temperature control set and program cards

In addition to the standard cream colour, Programat P95 is available in the following colours:

Colours	IVOCLAR colour name	RAL number and name
Standard colour	cream standard	RAL 1013 pearl white
Special colours	salmon pink	RAL 3014 old rose
	aquamarine	RAL 5014 pigeon blue
	turquoise	RAL 6027 light green
	grey	RAL 7035 light grey
	white	RAL 9016 traffic-sign white

Important points to be noted

- Avoid positioning the furnace and pump in the immediate vicinity of radiators or other sources of heat.

- Ensure that the air vents in the rear panel of the furnace are unrestricted at all times.

- Install the vacuum pump in a well-ventilated place. Ensure that the apertures (68a, b, c) in the frame plate (68) are free and that no foreign matter can fall into the furnace base.

- Avoid resting any objects on the frame plate (68); rest objects only on the cooling plate (A).

- Ensure that the sealing ring (35) in the furnace head and the sealing rim (69) of the furnace base are kept clean and undamaged.

- Be careful not to touch the hot parts of the furnace during operation.

- Do not damage the blade contacts (33).

- Clean only with a dry or slightly moist cloth. Do not use solvents.

- For forwarding, use original packaging.

Parts list

S-Control unit
1 0/1 switch with pilot lamp
2 Keypad
3 Display window
4 Front panel
5 Cover
6 Tab
7 Screws
8 Table
11 Battery
12 Printed-circuit board

A-Cooling plate

4
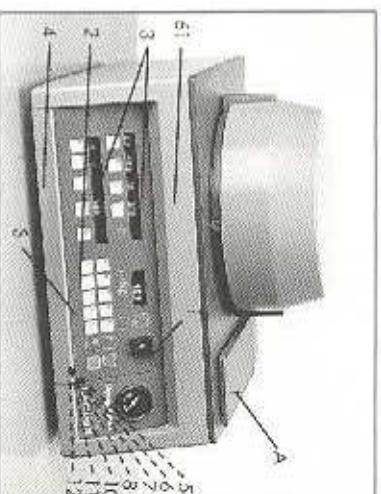
K-Furnace head

30	Dome
30a	Inside wall of hood
31	Mounting lug
31a	Holes
32	Switch pin
33	Blade contacts
34	Protective caps
35	Sealing ring
36	Spring clip
37	Ring
38	Insulation cord
38a	End
39	Stone lining segments
39a	Joints
40	Heating muffle
41a,b	End of wire
41a,b	Terminal
42a,b	Terminal screws
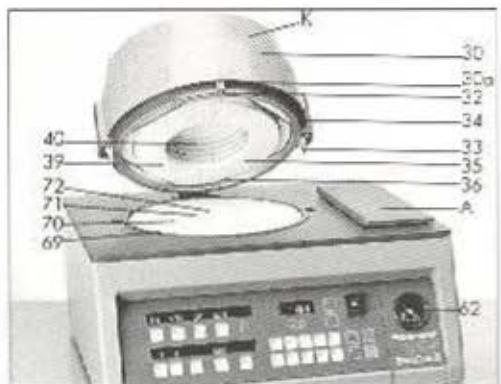
U-Furnace base

60	Casing
61	Front panel
61a	Guides
61b	Floor of base
61c	Locking bolt
61d	Pad
62	Vacuum gauge
63	Air vents
64	Mains lead
65	Pump power socket
66a	Pump fuse
66b	Mains fuse
66c	Heating circuit fuse
67	Vacuum hose connection
68	Frame plate
68a,b,c	Apertures in frame plate
69	Sealing rim
70	Stone lining insert
71	Sheathed thermocouple
72	Firing mount
73	Hinge pin
89	Pump plug
99	Vacuum hose
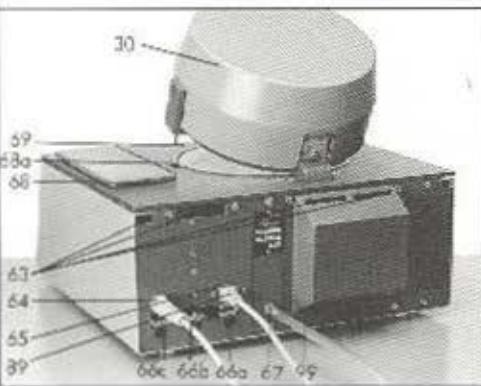
Pre-operating procedure

1. Unpacking

- Grip the individual parts through the recesses in the packaging and carefully remove from the packaging.
- Check for any damage in transit and clean off residues of polystyrene from the packaging.
- Check the ac voltages indicated on the plates on the back of the furnace head, on the furnace base and on the control unit comply with the local mains voltage.

Important:
The sheathed thermocouple must be set perpendicular and must not be either damaged or bent.

## 2. Assembling the furnace base and its sections

- Position the furnace base (1).
- Remove the firing mount (72) from the packaging material and introduce it into the stone lining insert (73).
- Clear the sealing rim (69).
- Mount the cooling plate (A) in the three indentations in the frame plate (68).

3. Mounting the furnace head

- Blow out the muffle (40) and the surfaces of the stone lining (39) at moderately low pressure or clean carefully with a soft brush.
  Do not touch the heating element!
- Clean the sealing ring (35) of the furnace head, the heating muffle and the surfaces of the stone lining segments (39).
  Do not touch the heating element of the heating muffle!
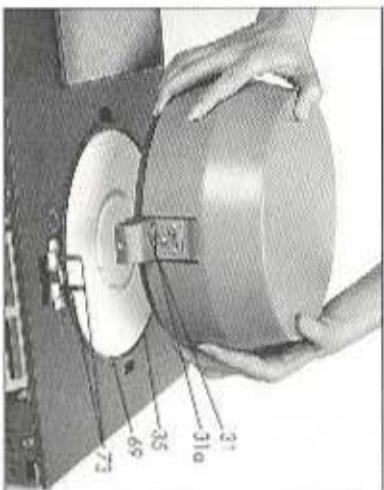
- Set the furnace arms (73) perpendicular to the furnace base

- Hold the furnace head and fit it through the apertures (31a) in the mounting lug (31) onto the hinge pins (73).
- Keeping the furnace head level, push down its a parallel direction and the sealing ring (35) rests evenly on the sealing rim (69) of the furnace base
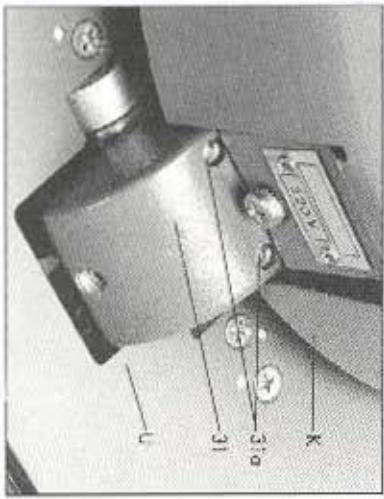
Connections

1. Vacuum pump

- Programat vacuum pump:
  Follow separate pump operating instructions.
- Pumps from other manufacturers:
  (for permitted specifications see page 32)

a) Have the Programat pump plug connected to the vacuum pump mains lead by a qualified electrician.

b) Position the pump and insert the pump plug into the socket (65).

c) Push the vacuum hose into the hose connection (67) of the furnace and the vacuum pump connection.

Important:

Before operating the furnace, connect the vacuum pump to the base of the furnace!

2. Furnace

Connect the mains lead (64) to the mains supply.

Switches, keypad and indicators

1. 0/I switch with green pilot lamp
When the 0/I switch has been pressed, the green pilot lamp is lit, the buzzer sounds and various data appear briefly on the displays. After about six seconds, the effective values are displayed. The closed furnace heats to stand-by temperature B.

2. Selection keys

Key	To select:
P	Program
B	Stand-by temperature
t↗	Temperature increase
I	Firing temperature
S	Closing time
H	Holding time
L	Long-term cooling
V₊	Vacuum on
V₋	Vacuum off

When a selection key is pressed, a dot is lit at the end of the relevant display. This indicates data input or that the value can be changed.

3. Stand-by temperature
The stand-by temperature can be freely programmed from 100-700°C (212-1292°F).

4. Holding time
Holding time is entered in tenths of a minute from 0.1 to 9.9 minutes.
Holding times of 10-30 minutes are entered in steps of one minute.
Example: holding time 1.3 - enter H1 H3 → display 1.3

Input values in seconds:
0.1 – 6 seconds
0.2 – 12 seconds
0.3 – 18 seconds
0.4 – 24 seconds
0.5 – 30 seconds etc.

Second holding time

Some ceramic compounds have to be processed with a second holding time during heating. Programs P70-P75 with an automatically set second holding time (see pages 12 and 31) have been provided for this purpose. **Holding time 50% with vacuum and 50% without vacuum.**

In program P76, the holding time is automatically divided:
50% = first half with vacuum, 50% = 2nd half without vacuum.

5. Data input keys

0 to 9: for the input of program number and desired values. For possible desired values, see pages 12 and 31.

6. Control keys

↑ : to open furnace
↓ : to close furnace

The control keys ↑ (open furnace) and ↓ (close furnace) cannot be operated while a program is running. If this is desired, however, first press the STOP key and then the control keys.

STOP: Press once to:
- stop a program which is running
- stop furnace head movement
- stop heating
- stop the buzzer

Press twice to:
- stop the vacuum

START: Press the green key to start a program.

7. Calibration keys

– and – calibration of furnace temperature (for instructions see page 18).

8. Indicators in the long displays

The displays show:
- Program number as selected with key P.
- Desired value as selected with the relevant key (no data displayed for L, V_1, V_2 if data input = 0; 0.0 is displayed at H).
- Duration of program sequence is shown on the clock display once a program has been started. (Approximate time in minutes shown after the flashing dot. If L is pre-set below 500 °C [932 °F], only the dot flashes).

Important:

Flashing of a data indicator signals an error in input (for explanation see page 19).

9. Indicators in the small display

- Furnace temperature (effective T value)
- ▼ = program running
- Flashing = error indication (for explanation, see pages 19 to 22).

10. Vacuum indicator

- Indicator at end of scale = no vacuum
- Indicator in green sector = operating vacuum

11. Buzzer

The buzzer sounds to signal
- close the open furnace
- position or remove object on firing mount
- end of program

Time sequence: 10 seconds buzzing - approx. 5 minutes pause - approx. 5 minutes buzzing. The acoustic signal can be changed using program P91. For description see page 13.

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Explanation of terms

P = **Program**

B = **Stand-by temperature**
This is the temperature to which the furnace heats after it has been closed and switched on, but no program has been started.

t? = **Temperature increase per minute**
Increase in furnace temperature after the furnace has been closed and a program started.

T = **Firing temperature**
The furnace temperature held constant once the desired temperature increase t has taken place.

= **Duration of program** in minutes with countdown.

S = **Closing time (minutes)**
Furnace closing time once the program has been started.

H = **Holding time (minutes)**
The period during which the furnace temperature is kept constant.

L = **Long-term cooling**
The furnace only opens when the temperature has fallen to the pre-set L value.

v_1 = **Vacuum on**
Development of vacuum (pump starts).

v_2 = **Vacuum off**
Release of vacuum (pump stops).
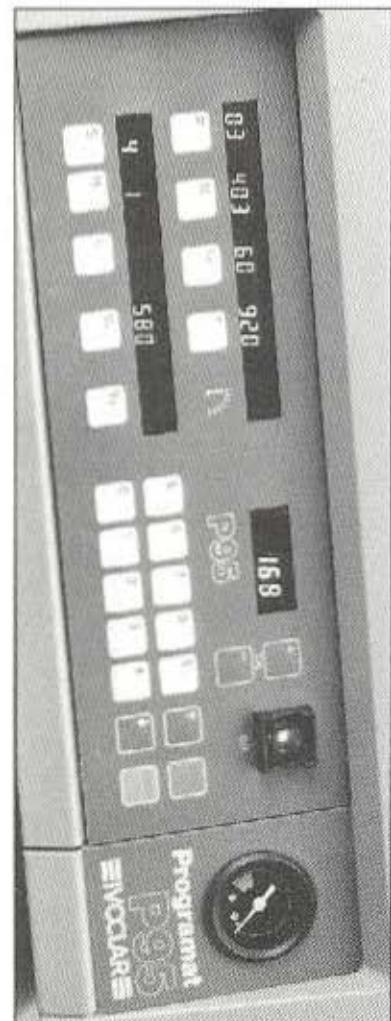
Trial run

1. Switch on
Press 0/1 switch and wait until the furnace reaches the stand-by temperature B

2. Check operating mode
Set for operation in Celsius or Fahrenheit mode (for procedure, see page 14).

3. Enter trial program
First press program selection key, e.g. P09.

4. Open furnace
Press key ↑ (furnace opens).

Pro-gram	°C mode	°F mode
B	400 (°C)	762 (°F)
ϑ	140 (°C / min.)	252 (°F / min.)
T	730 (°C)	1346 (°F)
S	04 (min.)	04 (min.)
H	09 (min.)	09 (min.)
L	690 (°C)	1274 (°F)
V₁	510 (°C)	950 (°F)
V₂	700 (°C)	1292 (°F)

5. Run program
Press START after the buzzer sounds.
The clock indicator shows the duration of the program sequence at any given time.
The programs runs automatically (see diagram on the right).

6. Close furnace
The buzzer indicates the end of the program.
Close the furnace with the key.
Note:
The outside of the furnace head becomes hot when the furnace is open!
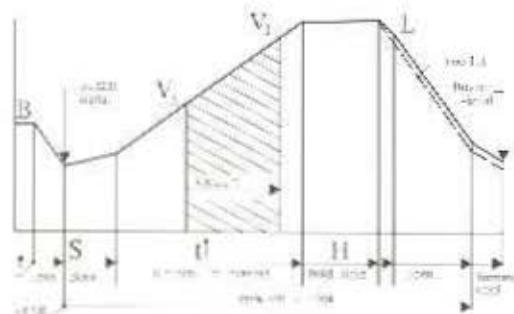
Programs P01-P91 and P99

Programs P01 to P08

Standard programs with some data automatical-
ly set. The following desired values can be free-
ly programmed within the limits of the T, S, H,
L (in P07 and P08 also V and V_z) listed on
page 31 (Celsius mode).

Program P01

Heat treatment (oxidation) under vacuum.
Automatically set:
B = 403 °C (757 °F)
T = 140 °C / min. (252 °F / min.)
V_1 = As soon as the furnace is closed
V_z = end of holding time

Program P02

As Program P01, but without vacuum.

Program P03

Vacuum firings (dentin, incisal)
Automatically set:
B = 403 °C (757 °F)
T = 60 °C / min. (108 °F / min.)
V = 580 °C (1076 °F)
V_z = start of holding time

Program P04

Glaze firings, as P03, but without vacuum.

Program P05

Opaque firings (dentin, incisal)
Automatically set:
B = 403 °C (757 °F)
T = 80 °C / min. (144 °F / min.)
V = 550 °C (1022 °F)
V_z = start of holding time

Program P06

Glaze firings, but without vacuum
Automatically set:
B = 403 °C (757 °F)
T = 80 °C / min. (144 °F / min.)

Program P07

Dentin firings "V", with vacuum
Automatically set:
B = 403 °C (757 °F)
T = 60 °C / min. (108 °F / min.)
(V_1 and V_z freely programmable)

Program P08

Opaque firings, with vacuum
Automatically set:
B = 403 °C (757 °F)
T = 80 °C / min. (144 °F / min.)
(V_1 and V_z freely programmable)

Program P09 to P69

Freely programmable programs with normal
opening of the furnace (1 minute).
For possible desired values, see page 31
(Celsius mode).

Programs P70 to P75

Special programs, each with a second, automati-
cally set holding time and temperature.
For other possible desired values, see page 31
(Celsius mode).

Program	Automatically set holding temperature	Automatically set holding time
P70	575 °C (1067 °F)	2 minutes
P71	575 °C (1067 °F)	3 "
P72	600 °C (1112 °F)	2 "
P73	600 °C (1112 °F)	3 "
P74	625 °C (1157 °F)	2 "
P75	625 °C (1157 °F)	3 "

Program P76

Special program in which the first half of the soaking time, which has to be entered specially, is carried out with vacuum and the second half without vacuum.
All values are freely programmable.
Example: holding time H3 carried out as 15 min. with vacuum, 15 minutes without vacuum.

Programs P77 to P87

Individually programmable special programs with rapid opening of the furnace (20 seconds). For possible desired values, see page 3.
(Celsius mode)

Program P88 to P90

Freely programmable "night-time" programs with normal opening of the furnace (1 minute). After the "night-time" program has been completed, the heating switches off without the buzzer sounding and the furnace closes automatically, after reaching a temperature of approx. 80°C (176°F) and cools to room temperature.

In the event of a power failure during the night, the furnace does not continue heating, but remains at room temperature.

Program P91

With this program, the acoustic buzzer signal can be individually set or completely switched off. Different buzzer signals can thus be generated if several devices are being operated simultaneously.
Set on-time with V_1 key (editing dot is lit) and "+" or "-" key from 0 to 9. The display in the V_1 sector corresponds to the on-time (×20 msec.).
Display 0 = buzzer completely switched off.
Set interval with V_2 key (editing dot is lit and "+" or "-" key from 0 to 9. The display in the V_2 sector corresponds to the off-time (×100 msec.)
Display 0 = buzzer sounds continuously.
Standard setting: V_1 = 5 (100 msec. On) and V_2 = 1 (100 msec. Off)

Note:
Programming is only possible when the editing dot is lit.

Program P98

This program can be used to change the Program mode P96 from Celsius mode (°C) to Fahrenheit mode (°F) and vice-versa.

Program P99

Program for checking the furnace temperature with the "silver test" and for "recalibration". For detailed description, see page 17.

Summary of programs for operation in Celsius mode

Possible desired values for operation in Celsius mode
(for list of programs see page 3.)

Operation in Celsius (°C) or Fahrenheit (°F) mode

Note:
Program P98 is not a working program. Error indication Er00 and flashing of the program number are therefore of no significance.

1. Mode check
Enter P98:
- If a C is lit above the V₁ key, the furnace is in Celsius mode.
- If an F is lit above the V₁ key, the furnace is in Fahrenheit mode.

2. Changeover to Fahrenheit mode
Enter P98:
(C is lit above the V₁ key)
- Switch off 0/L.
- Press V₁ and keep pressing while switching on 0/L.
- Release V₁ key approx. 3 seconds after switching on. As soon as the F lights up above the V₁ key, the furnace is in Fahrenheit mode.

3. Changeover from Fahrenheit to Celsius mode
Follow the procedure described under 2. As soon as the C lights up above the V₁ key, the furnace is in Celsius mode.

downwards (minus)	programs P8C in P87 without long-term cooling L	-0.5		remove object as soon as furnace is completely open or no later than when the first buzzer signal sounds
standard (0)	programs P01 in P89/without long-term cooling L	+0		remove object when the buzzer signals sound
upwards (plus)	programs P01 to P79 with long-term cooling L	+0.5 L=800°C (1472°F)	-10 L=600°C (1112°F)	+15 L=400°C (752°F)	remove object when the buzzer signals sound

Controlling the CTE value

The CTE (Coefficient of Thermal Expansion) value of the ceramic material can be controlled as follows:

1. Immediate removal of the object from the furnace after firing results in a decrease in CTE (minus)

2. Slow cooling of the object in the furnace after firing (long-term cooling) results in an increase in CTE (plus)

Programming, change of program

- Program cards are available for noting the program data.

- Program numbers should be given in two digits, i.e. P01 to P09, P10, P11. (Not P1, P2 etc.).

- As long as no program is running, data may be entered or modified by the following procedure:
- Press selection key (A dot is lit at the end of the relevant display.)

- Enter the value.

- Important for the input of V_1 (vacuum off):
- If vacuum-off firing takes place during holding time H, the following input should be used with V_1:
Celsius mode $V_1 = T - 1°C$
(e.g. $T = 1050°C$, $V_1 = 1049°C$)
Fahrenheit mode: $V_1 = T - 2°F$
(e.g. $T = 1922°F$, $V_1 = 1920°F$)
(Vacuum is switched off at the start of holding time H).

- If vacuum-on firing takes place during the holding time, the following input should be used:
$V_2 = T$ (e.g. $T = 1050°C$, $V_2 = 1050°C$
or $T = 1922°F$, $V_2 = 1922°F$)
(Vacuum is not switched off until the end of the holding time H).

- If control is lost because of incorrect programming, the situation can be rectified by the following procedure:
- Switch off O/I.
- Press the STOP key and keep pressing while switching on again.
(The displays then show the desired values originally set by the manufacturer.)

- Once the program has been completed, it is automatically stored.

- Program changeover is possible at any time while the program is running:
1. To change from P01 to P02, P03 to P04, P05 to P06, P07 to P08 and vice-versa: press P and enter new program number (the program sequence is not interrupted).
2. To change from one program to another:
- Press STOP
- Press P and enter new program number
- Press START.

- It is possible to change preselected data while a program is running only if the effective temperature has not yet reached the preselected T value:
1. Desired values for S, H and L can be changed without interrupting the program sequence: Press the selection keys and enter the new value.
2. To change preselected data for t', T, V_1 and V_2: Press STOP

- Press the appropriate selection key and enter the new value.
- Press START.

- To interrupt a vacuum program which is running and release the vacuum:
Press STOP twice.

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Important practical information

- Always keep the furnace closed between firings.

- Optimum results can be obtained with Ivoclar silicon nitride firing mounts.

- Objects which have to be pre-dried should be placed on the firing mount only after the buzzer has sounded.

- A power failure will interrupt a program which is running and cause Er17 to appear. Press STOP and re-start the program for the program to continue its sequence. (Any adverse effect on the object depends on how long the power failure lasts.)

- Check the furnace temperature by carrying out the 'silver test' (see page 17).

- After a control unit or furnace base has been changed, it is advisable to check the furnace temperature.

- Do not open the furnace head manually when the furnace is switched on. Error Er28 will otherwise be indicated. (For correction of error see page 22.)

Checking the furnace temperature (silver test)
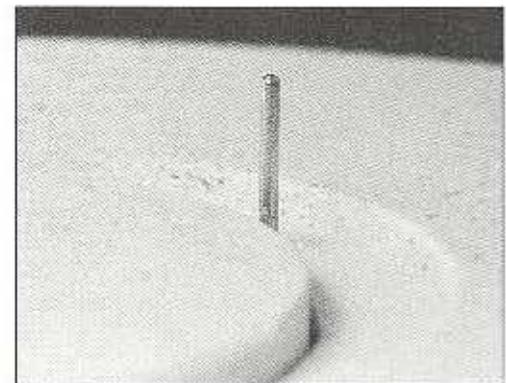
The sheathed thermocouple may be subject to changes which affect the furnace temperature, depending on the mode and period of operation.

Material required:
(in the temperature checking set)

- Firing tray marked IVOCLAR-E (17 mm dia., white)
- Strip of silver, purity 99.99% (size 0.5 x 2 x 20 mm)

Procedure:

a) The furnace must be at operating temperature (switched on for at least 30 minutes) and have a stand-by temperature of 403 C (e.g. in P99).

b) Insert silver strip into the IVOCLAR-E firing tray.

c) Select P99 (silver test program).

d) Press t key and place firing tray with silver strip in the centre of the firing mount (72).

e) Press START. (If error indication Er14 appears, the furnace temperature is still too high for the 'silver test'. The furnace closes automatically at the correct temperature and the program starts.

If the silver strip is melted at the end of the program, the furnace temperature is correctly calibrated. If not, recalibration is necessary.
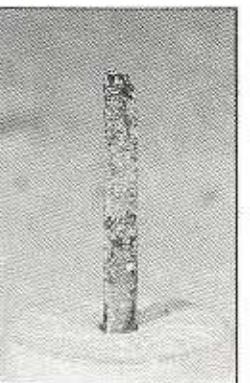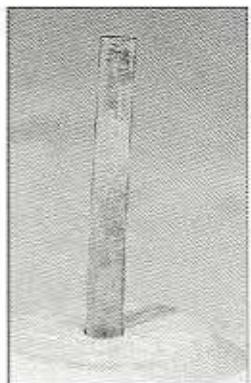
Recalibration

A change in temperature of + 50 °C (= +90 °F) is possible in the Programat P95. Select program P99 to activate the calibration keys + and -.

- If the silver strip has not started to melt after the 'silver strip' test, recalibrate using the + key.
- If the silver strip has melted down into a ball after the 'silver test', recalibrate using the - key.

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 calibration key five times. While the calibration keys are in use, the calibration value is shown in the small display in °C. Repeat the 'silver test' until the silver strip has started to melt.
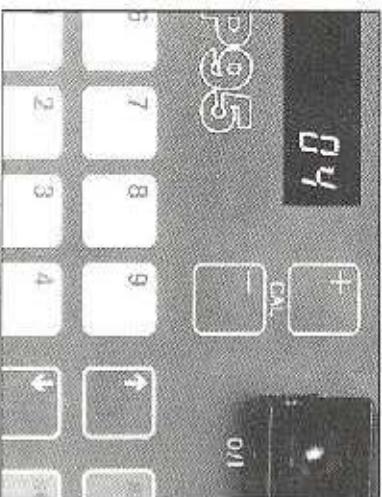
Errors not indicated on the display and their correction

- Green pilot lamp fails to light although the 0/1 switch is on:
  1. The indicators are not in cases fuses (66a) and (66b); replace if defective.
  2. The indicators are lit. Replace the defective pilot lamp. The furnace is nevertheless capable of operating.

- Incomplete or illogical values are displayed:
  - Switch off 0/1.
  - Press STOP and keep pressing while switching 0/1 on again.
  If incomplete or illogical values continue to appear, the control unit is defective. Replace as described in the instructions (page 7 and 23).

- No vacuum, pump is running:
  Check sealing rim (69) and sealing ring (35) and clean if necessary. Check that the vacuum hose (99) has no leaks and is firmly attached at both ends. If vacuum is still not obtained, consult after-sales service.

- No vacuum, pump is not running:
  Check fuses (66a and 66b). Replace if defective. If the pump still fails to operate, have it checked by an electrician. If the pump an-pears to be in order but still fails to operate, consult after-sales service.

Indicated errors Er00 to Er11 and their correction

Er00 to Er11 indicate incorrect input. Er. and the input to be corrected flash in the effective temperature indicator. (Program is interrupted).

Error	Cause of error	Correction
Er00	Incorrect P number 00 1 to 9 91 to 98	Press selection key P and enter correct program number.*) Error indication in P98 indicates that this program is not a working program.*)
Er01	T input below actual temperature (furnace opens)	Press selection key above which preselected value flashes and then enter correct value.*)
Er02	T input below R or above 1200°C (2192°F)	
Er03	S input incorrect 9/0, 0/0, 1/0, 2 minutes	
Er04	H input incorrect over 30 minutes	
Er05	t input 0 to 29°C / min. or over 140°C / min. (0 to 53°T / min. or above 252°T / min.)	

*) Take correct program number and correct desired value from the summary table on page 31 (Celsius model).

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Er06	B input 0 to 99 °C or above 700 °C (0 to 210 °F or above 1295 °F)	Press selection key above which preselected value flashes and then enter correct value.*)
Er07	B input above desired T value	
Er08	L input above desired T value	
Er09	V₁ input above desired V₂ value	
Er10	V₂ input above desired T value	
Er11	V₁ input or V₂ input absent	

Indicated errors Er12 to Er99 and their correction

Error indication Er. appears in the effective temperature indicator.

Error	Cause of error	Correction
Er12	Battery in control unit is low and has to be replaced quickly with a new one.	Press STOP. Er12 goes out. Obtain new battery from the after-sales service unit and install it in accordance with the instructions on page 24. Until battery is changed, operate furnace as usual.
Er13	Overheating	1 Error in programming: input preselected T value lower than effective temperature or furnace
Er14	Furnace chamber temperature too hot, for "silver test"	Furnace closes automatically at correct temperature and program runs
Er17	Mains failure when program has started	Press STOP. Er17 goes out. It is then possible to continue working.
Er20	Defect in furnace base or in control unit (furnace opens)	2
Er21	Defect in control unit (furnace opens)	1
Er22	Defect in furnace base or in control unit (furnace opens)	2

1 → Switch off 0 / 1 and switch on again after a few seconds.
If Er. re-appears, press STOP and repeat the procedure.
If Er. continues to flash, replace control unit, according to the instructions on pages 7 and 23.
(State Er number when requesting repairs).

2 → Proceed as described under 1, but without replacing the control unit, and consult after-sales service.

Er23	Heating muffle defective (furnace does not heat)	Press STOP (Er23 goes out). Work can proceed as normal. Obtain new heating muffle from after-sales service (p8) and install in accordance with instructions on pages 26 to 30.
Er24	Heating muffle defective (furnace does not heat)	Switch off. Obtain new heating muffle and install in accordance with instructions on pages 26 to 30.
Er25	Internal chamber temperature above 55°C (131°F)	1 Chamber temperature too high, cool furnace base with fan.
Er26	Loss of stored values	1 Initialisation, see page 25.
Er27	Defect in control unit (furnace opens)	1
Er28	Heating circuit interrupted; furnace was opened manually or is defective	2 If furnace was not opened manually, check heating circuit fuse (F55).
Er29	Defect in control unit	1 Initialisation, see page 24.
Er30	Defect in control unit	1
Er32	Battery low	Replace battery and initialise (see page 25).
Er90 to Er99	Defect in control unit	1

1 — Switch off 0 / 1 and switch on again after a few seconds.
If Er. re-appears, press STOP and repeat the procedure.
If Er. continues to flash, replace control unit according to the instructions on pages 7 and 23.
(State Er. number when requesting repairs).

2 — Proceed as described under 1, but without replacing the control unit, and consult after-sales service.

The heating muffle must be changed if heating performance becomes inadequate as a result of wear or if it is defective (see error indications Er23, E-24 on page 22).

1. Allow furnace to cool completely.

2. Press I-key (furnace closes)

3. Once the furnace is fully closed, switch off 0/1 and disconnect mains plug.

4. Lift furnace head (R) clear of the furnace base and place on a soft surface.

5. Remove heating muffle following the instructions on Page 27.

6. Mount new heating muffle, following the instructions on page 26.

7. Replace furnace head on furnace base, following the instructions on page 6.

8. Reconnect mains lead.

Note:
In all procedures, avoid damaging the sealing ring (35), blade contacts (33) and switch pin (32).

Removal of heating muffle
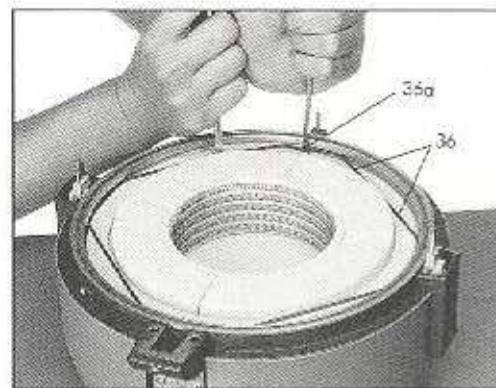
1. Press spring clip (36) inwards with a screwdriver and, using a second screwdriver, lift the end (36a) free. Remove spring clip.
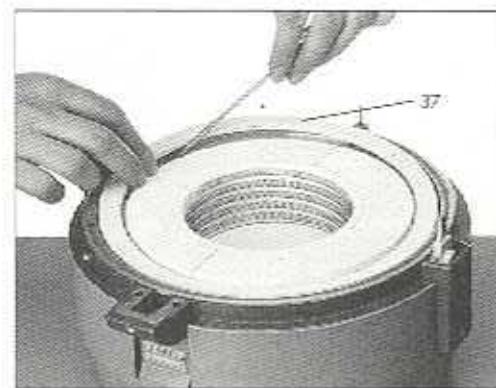
2. Lever up and remove ring (37).
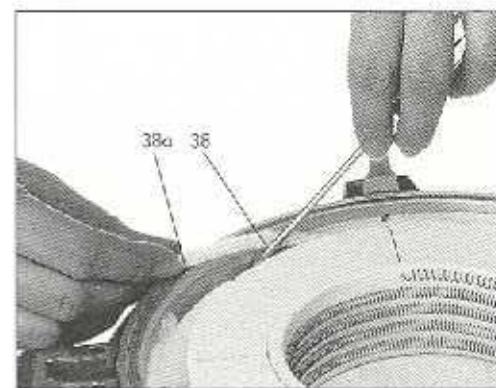
3. Lever out ends of insulation cord (38a) with spatula and gently pull out cord (38) by hand.
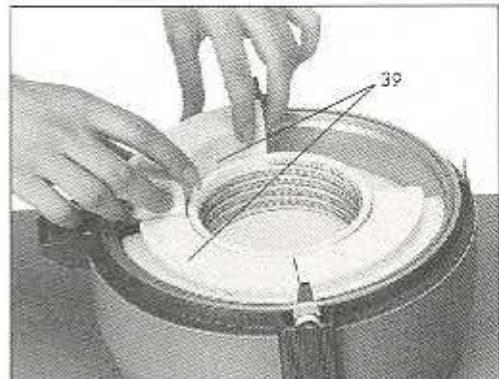
4. Carefully remove the stone firing segments (39).
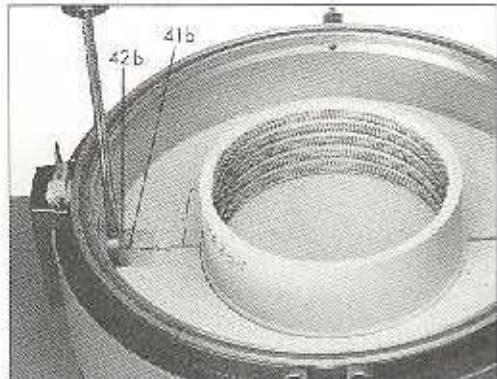
5. Release the terminal screws (42a and 42b) of the terminals (41a and 41b) with approx. six turns of a screwdriver.
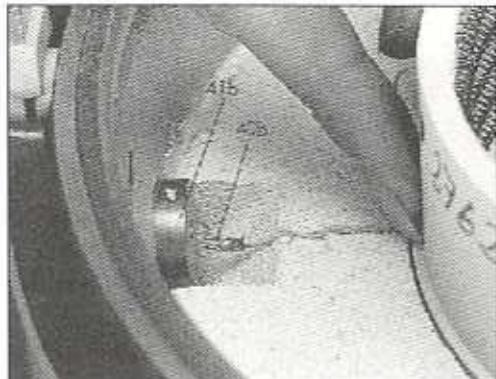
6. Withdraw end of wire (41b) from terminal (41b), lifting the heating muffle (40) slightly.
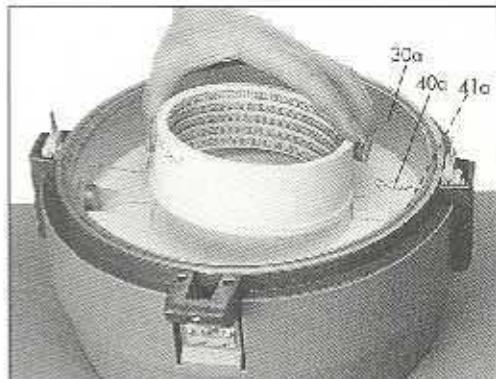
7. Withdraw end of wire (41a) from terminal (41a) and remove muffle (40).

Assembly of heating muffle

1. Clean inside wall of dome (30a) and recess in stone roof.

Note:
Handle wire ends and heating element with care. Avoid contact between heating element and fingers or hard objects.
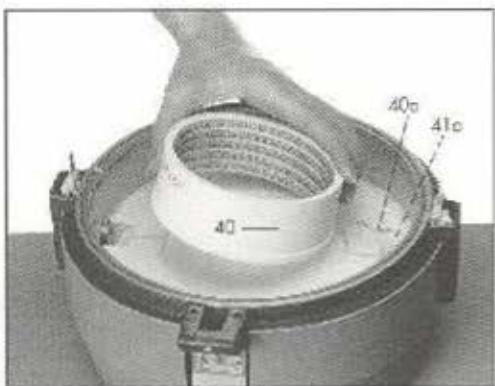

2. Insert short end of wire (40a) into the terminal hole (41a).

Note:
Set mark on muffle opposite mark on interior wall of dome (30a).
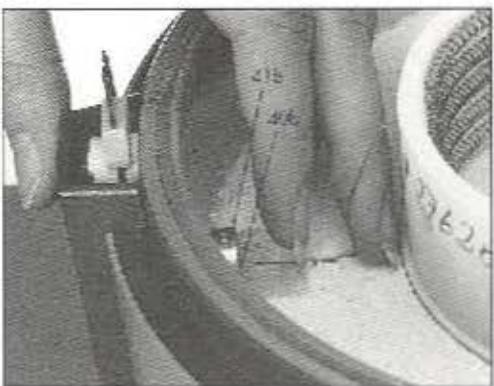

3. Insert end of wire (40b) into terminal hole (41a). Set new heating muffle (40) in the recess in the stone roof.
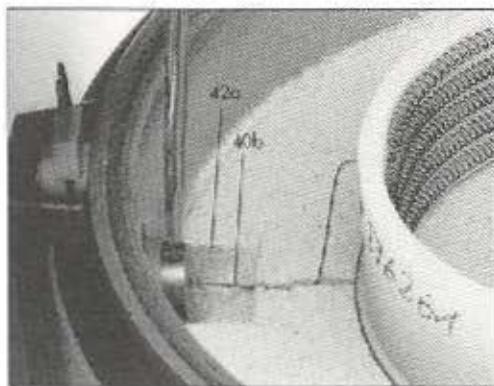
4. Attach two ends of wire (40b) with terminal screws (42a) in the terminals (41a).

Note:
Both ends of the wire must be situated correctly and firmly secured in the terminals.

5. Re-insert the stone lining segments (39) so that they rest against the heating muffle (40). Introduce insulation cord (38), using a screw-driver, without tensioning, along the entire circumference between the stone lining segments (39) and the interior wall of the cover (30a). Ensure that stone lining segments (39) fit tightly against the heating muffle. Lay ring (37) on the stone lining segments (39).
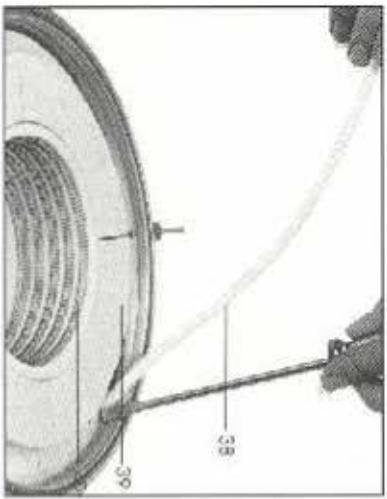

6. Secure spring clip (36) under the recess (30b) at the positions marked 'X'. Pull spring clip (36) against the interior wall of the cover (30a), using two screwdrivers, as illustrated, until the ends (36a) and (36b) fit together. Release spring clip (36) with the two screw-drivers.

Note:
The ends (36a and 36b) should now abut each other.

Furnace servicing

Servicing is normally restricted to:
• occasionally checking that the sheathed thermocouple is perpendicular
• examining and cleaning the sealing ring (49) of the furnace base and the sealing ring (35) of the furnace head

Vacuum pump servicing

Refer to the operating instructions for the vacuum pump.
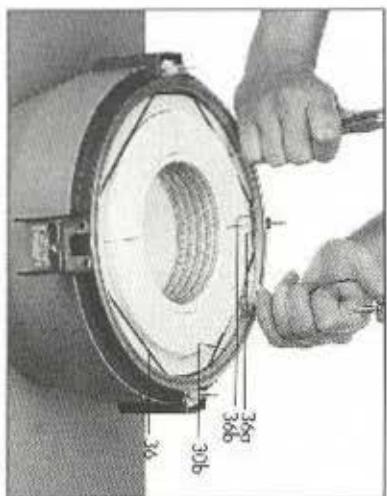
Summary of programs

Possible desired values in "Celsius mode

Program	Stand-by temperature	Temperature increase	Firing temperature	Closing time	Holding time	Automatically set holding temperature	Automatically set holding time	Long-term cooling	Vacuum-on	Vacuum-off
F	Ti °C	t °C/min.	T °C	S minutes	H minutes	H1 °C	FH minutes	°C	V1 °C	V2 °C
P01 to P08	Standard programs with different automatical reset times (open furnace 1 minute)									
P01	495*	140*	400-1200	0.3-0.9 1-9	0.1-9.9 10-39			as T	furnace closed**	end of H**
P02	100*	140*	400-1200	0.3-0.9 9	input 0.0 without holding time (display 0.0)			input 0.0 without long-term cooling (no display)	without vacuum**	
P03	100*	60*	400-1200	0.3-0.9 1-9	as P01			as P01	380*	start of H**
P04	100*	60*	400-1200	0.3-0.9 9	as P01			as P01	without vacuum**	
P05	400*	80*	400-1200	0.3-0.9 9	as P01			as P01	550*	start of H**
P06	100*	80*	400-1200	0.3-0.9 1-9	as P01			as P01	without vacuum**	
P07	100*	60*	400-1200	0.3-0.9 1-9	as P01			as P01	V1 to T input = 0 without vacuum (no display)	V2 to T input = 1 vacuum to end of H input = 1-1 vacuum to start of H
P08	100*	80*	400-1200	0.3-0.9 1-9	as P01			as P01		
P09 to P17	Freely programmable programs (open furnace 1 minute)									
P17	100-700	30-140	100-1200	0.3-0.9 1-9	as P01			as P01	as P07/P08	as P07/P08

P 76	100 – 200	30 – 140	300 – 1200	0.5 – 0.9	as P 01			as P 01	as P 07 / P 08	as P 07 / P 08
P 77 to P 87	colspan	Freely programmable special programs (open furnace: 20 seconds)								
	100 – 200	30 – 140	300 – 1200	0.5 – 0.9 / 1 – 9	as P 01			as P 01	as P 07 / P 08	as P 07 / P 08
P 88 to P 90		Freely programmable night time programs (open furnace: 1 minute. Without buzzer. Furnace closes after opening at T – 50°C and does not continue to heat)								
	100 – 700	30 – 140	300 – 1200	0.3 – 0.9 / 9	as P 01			as P 01	as P 07 / P 08	as P 07 / P 08

Programs for individual setting or completely switching off the buzzer

P 91	V₁ = 0 – 9 (volume of signal)		V₂ = 0 – 9 (influence of signs 1 / ... or ... used for melting)					–		
		Program for changing over from Celsius mode (°C) to Fahrenheit mode (°F) and vice-versa								
P 98	For detailed description see page 17									
		Program for silver test. For instructions see page 12								
P 99	963°	60°	V 55°							

Technical data

Power supply:
Single-phase AC
Standard model
Special models

220 V / 50 - 60 Hz
220 V / 50 - 60 Hz; 240 V / 50 Hz
118 V / 60 Hz
110 V / 60 Hz

Tolerated voltage fluctuations:

+ 10% to - 15%

Power consumption:
Furnace and vacuum pump
Furnace alone (without pump)

approx. 1100 W (max. 1600 W)
max. 960 W

Vacuum pump data (other manufacturers):
Max. permitted
rated current:
Max. permitted
peak current
(0.1 sec.)
Suction capacity
Final vacuum

3 A at 200 to 240 V
4.4 A at 110 to 120 V
5 A at 200 to 240 V
8 A at 110 to 120 V

1.3 to 1.5 m³/h
27 to 40 mbar
(20 to 30 Torr)

Electrical fuses:
Values

200 - 240 V: T 6.3 A (heating circuit)
T 315 mA (mains)
T 3.15 A (pump)
110 - 118 V: T 12.5 A (heating circuit)
T 500 mA (mains)
T 5 A (pump)

Fuse dimensions

200 - 240 V: dia. 5 x 20 mm
100 - 118 V: dia. 6.3 x 32 mm

Dimensions of closed furnace:
width / depth / height:
Effective firing chamber dimensions:
Max. firing temperature:
Weights:
Furnace head (K)
Control unit (S)
Furnace base (U)
Cooling plate (A)
Furnace complete
Space muffle

415 x 433 x 295 mm
dia. 80 mm, height 38 mm
1200°C (2192°F)

3.45 kg
2.30 kg
10.45 kg
0.30 kg
16.50 kg
0.25 kg

EC Declaration of Conformity

Document: No./
Month, Year   105/12/95

Manufacturer: IVOCLAR Dental GesmbH
Werk Burs

Address: Bremschstr. 16
A-6700 Bludenz-Burs

Product
Name: Programat P95
Type P: 1

The product mentioned complies with
the following European Directives:

Number: a) 73/23/EEC
b) 89/336/EEC

Text: a) Low Voltage Directive
b) Electromagnetic
Compatibility

The appendices Form FN and Form
BM-CP contain further information on
the fulfilment of these Directives.

Issued by: Ivoclar AG
FL-9494 Schaan

Place, Date: Schaan,
December 20, 1995

Valid Signature:

The appendices are an integral part of this declaration. The declaration confirms the compliance with
the Directives mentioned, but constitutes no warranty of attributes. The safety notes of the product
documentation have to be observed.

The Ivoclar Info System

This Info System comprises clearly arranged data and information for easy reference at your workplace.

Organisation of the System

• Foldable system binder with dividers

Should you not yet possess an Ivoclar Info System, please contact any Ivoclar demonstrator or Ivoclar directly.
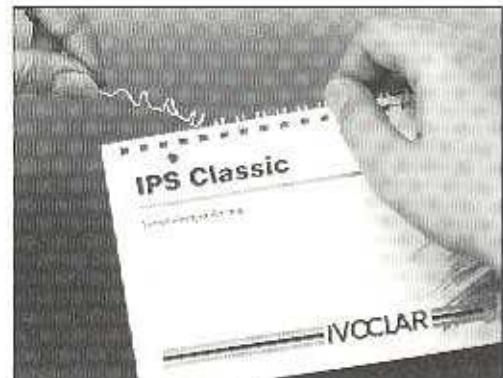
With the assortment you will receive a system binder containing a complete index of all parts. Each assortment is delivered with the respective punched Instructions for Use. Just remove the wire from the saddleback to file the Instructions for Use in the systems binder.

Shorter Instructions for Use are perforated. After removal of the perforation, the Instructions for use can be filed in the system binder.
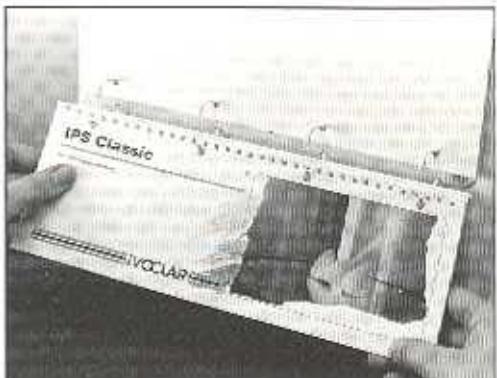
File Instructions for Use in the system binder.

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