

Programat P95

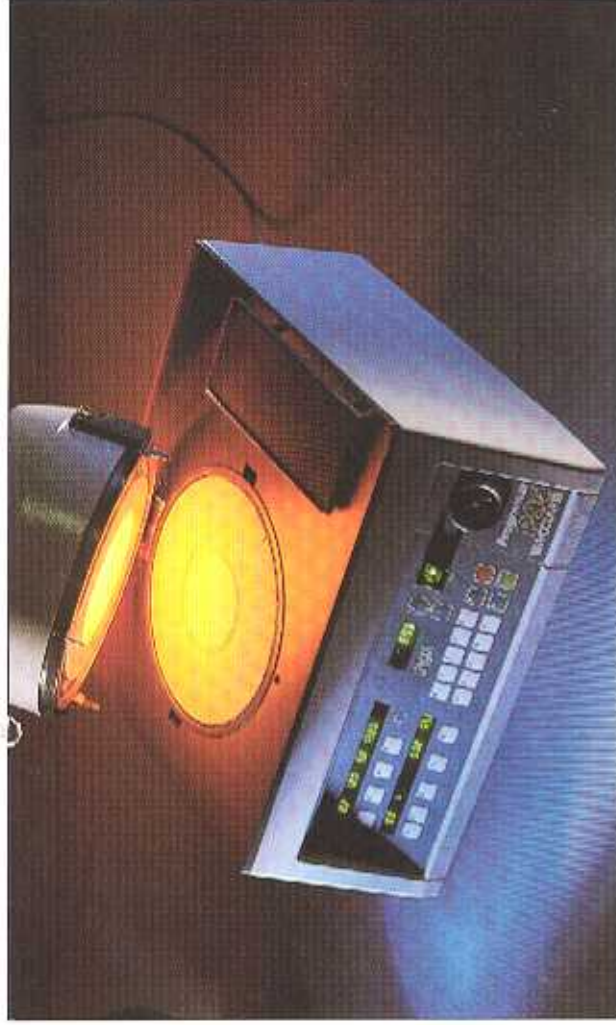
VDE

Operating Instructions

Schulungsunterlagen
Course material

CE

IVOCLAR



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The Programat P95 is a fully automatic ceramic vacuum furnace with sophisticated microprocessor control. It was developed from the tried-and-tested Programat P80.

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:

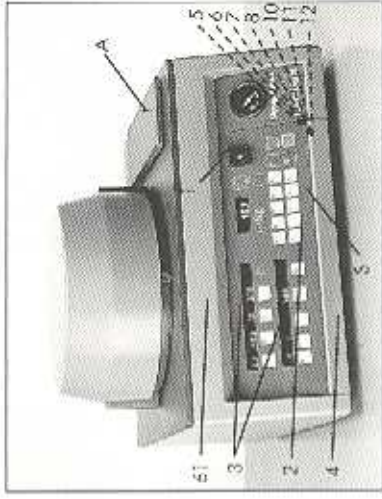
Colours	WÖGLAR colour name	RAL number and name
Standard colour	cream standard	RAL 1013 pearl white
Special colours	salmon pink	RAL 3014 old rose
	aquamarine	RAL 5014 pigeon blue
	turquoise	RAI 6027 light green
	grey	RAL 7035 light grey
	white	RAL 9016 traffic-sign white

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.

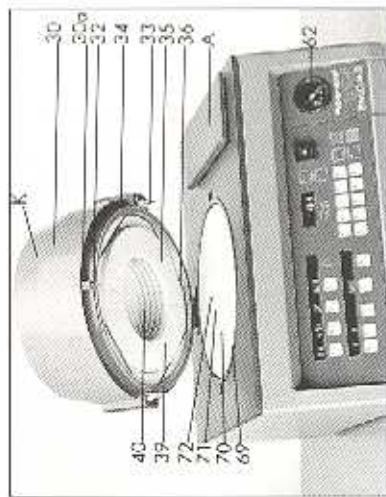
Parts list

- 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



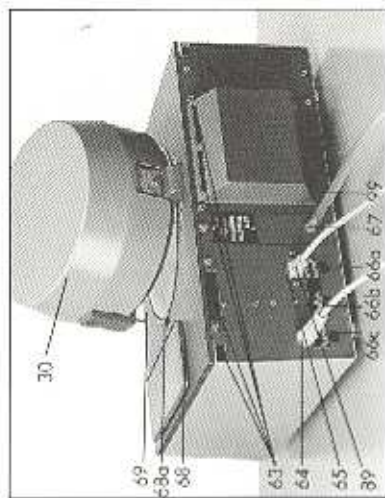
K-Furnace head

- 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 mantle
- 40a,b End of wire
- 41 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 (keep the packaging).
 - Check that the 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.

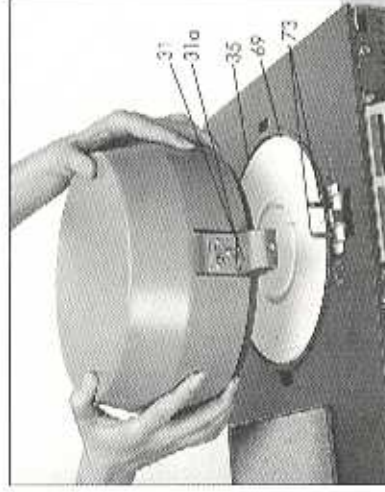
Important:

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

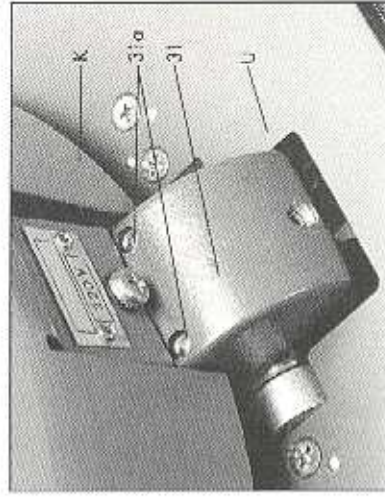
2. **Assembling the furnace base and its sections**
 - Position the furnace base (U).
 - Remove the firing mount (72) from the packaging material and introduce it into the stone lining insert (70).
 - Clean the sealing rim (69).
 - Mount the cooling plate (A) in the three indentations in the frame plate (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 hinge arms (73) perpendicular to the furnace base.



- Hold the furnace head and fit through the apertures (31a) in the mounting lug (31) onto the hinge pins (73).
- Keeping the furnace head level, push down in a parallel direction until 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.



1. 0/1 switch with green pilot lamp
 When the 0/1 switch has been pressed, the green pilot lamp is lit, the buzzer sounds and various data appear briefly on the display. 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
F	Firing temperature
S	Closing time
H	Holding time
L	Long-term cooling
V ₁	Vacuum on
V ₂	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

- 1 : to open furnace
- 4 : to close furnace

The control keys 1 (open furnace) and 4 (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 for:

- stop a program which is running
- stop furnace head movement
- stop heating
- stop the buzzer

Press twice for:

- 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, V₂, V₃; 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 (reflective 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 amount 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.

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_r = 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.

T₁ = 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

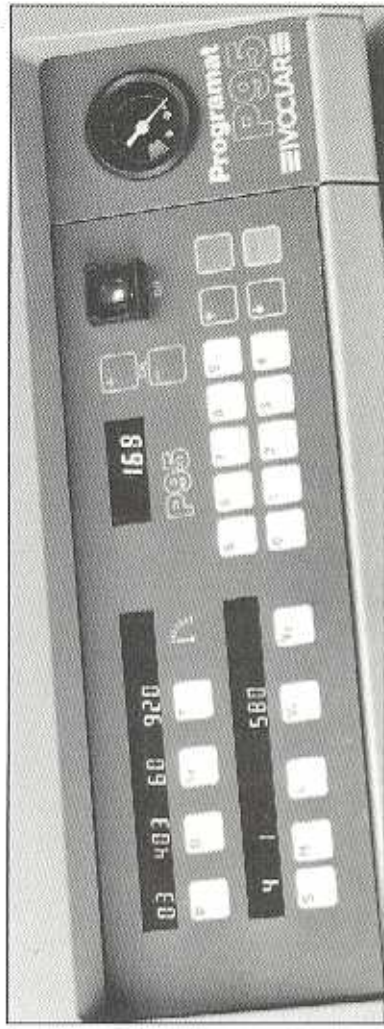
The furnace only opens when the temperature has fallen to the pre-set L value.

V₁ = Vacuum on

Development of vacuum (pump starts).

V₂ = 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. P05.

Program	°C mode	°F mode
B	406 (°C)	762 (°F)
P	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)
V ₁	510 (°C)	950 (°F)
V ₂	700 (°C)	1292 (°F)

4. Open furnace

Press key 1 (furnace opens).

5. Run program

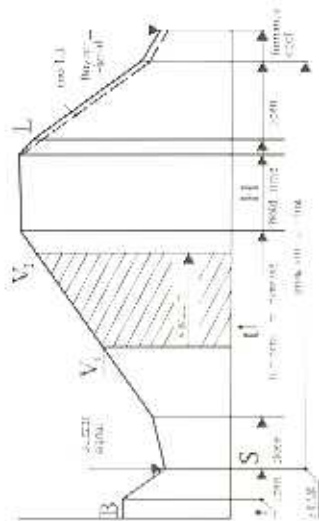
Press START after the buzzer sounds. The clock indicator shows the duration of the program sequence at any given time. The program runs automatically (see diagram on the right).

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 P91 to P98

Standard programs with some data automatically set. The following desired values can be freely programmed within the limits of the L, S, H, L (in P97 and P98 also V₁ and V₂) 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.)

V₁ = As soon as the furnace is closed

V₂ = 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.)

V₁ = 580 °C (1076 °F)

V₂ = 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.)

V₁ = 530 °C (1022 °F)

V₂ = 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 V₁, with vacuum

Automatically set:

B = 403 °C (757 °F)

T = 60 °C / min. (108 °F / min.)

(V₁ and V₂ freely programmable)

Program P08

Opaque firings, with vacuum

Automatically set:

B = 403 °C (757 °F)

T = 80 °C / min. (144 °F / min.)

(V₁ and V₂ 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, automatically 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 heating 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 1.5 min. with vacuum, 1.5 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 31 (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 V₁ key (editing dot is lit) and '4' or '1' key from 0 to 9. The display in the V₁ sector corresponds to the on-time (* 20 msec.).

Display 0 = buzzer completely switched off.

Set interval with V₂ key (editing dot is lit) and '4' or '1' key from 0 to 9. The display in the V₂ sector corresponds to the off-time (* 100 msec.).

Display 0 = buzzer sounds continuously.

Standard setting: V₁ = 5 (100 msec. On) and

V₂ = 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 Programmat. P95 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 31)

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 O/L.
- Press V₁ and keep pressing while switching on O/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 the C lights up above the V₁ key, the furnace is in Celsius mode.

downwards (minus)	programs P8C to 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 to P79 (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=860°C (1572°F)	remove object when the buzzer signals sound
		-1.0 L=600°C (1112°F)	
		+1.5 L=460°C (752°F)	

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 selector 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: $V_1 = T - 1^\circ\text{C}$
 - e.g. $T = 1050^\circ\text{C}$, $V_1 = 1049^\circ\text{C}$
 - Fahrenheit mode: $V_1 = T - 2^\circ\text{F}$
 - e.g. $T = 1922^\circ\text{F}$, $V_1 = 1920^\circ\text{F}$(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:

$V_1 = T$ (e.g. $T = 1050^\circ\text{C}$, $V_1 = 1050^\circ\text{C}$
or $T = 1922^\circ\text{F}$, $V_1 = 1922^\circ\text{F}$)

(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 0/1.
 - 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 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 M , I, V_1 and V_2 : Press STOP

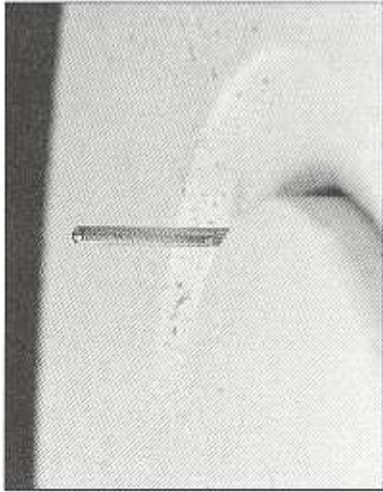
- Press the appropriate selection key and enter the new value.
- Press START.
- To interrupt a vacuum program which is running and release the vacuum: Press STOP twice.

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:

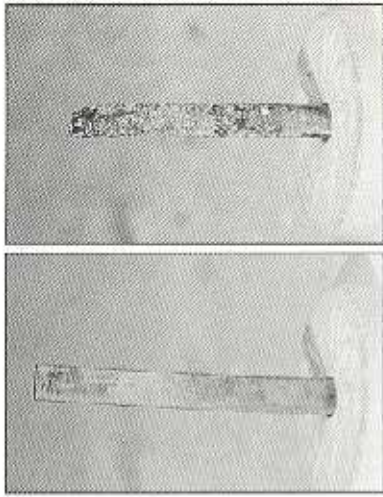
(in the temperature checking set)

- Firing tray marked IVOCLEAR-E (17 mm dia., white)
- Strip of silver, purity 99.999% (size 0.5 x 2 x 20 mm)

Procedure:

- The furnace must be at operating temperature (switched on for at least 30 minutes) and have a stand-by temperature of 400 °C (e.g. in P99).
- Insert silver strip into the IVOCLEAR-E firing tray.
- Select P99 (silver test program).
- Press F key and place firing tray with silver strip in the centre of the firing amount (72).
- Press START. (If error indication Tr14 appears, the furnace temperature is still too high for the 'silver test'. The furnace closes automatically at the correct temperature and the program starts.)

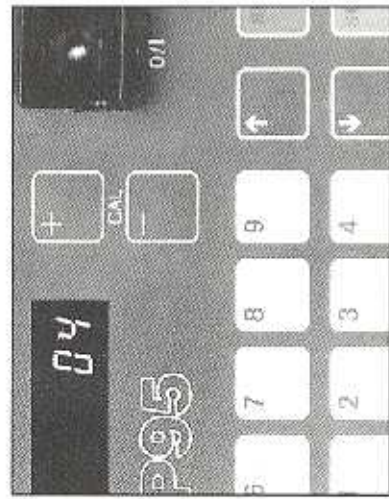
If the silver strip is melted at the end of the program, the furnace temperature is correctly calibrated. If not, recalibration is necessary.



Recalibration

A change in temperature of $+50^{\circ}\text{C}$ ($= +90^{\circ}\text{F}$) 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 $^{\circ}\text{C}$. 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/I switch is on:

1. The indicators are not lit: check 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/I.
- Press STOP and keep pressing while switching 0/I 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 appears 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... are 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 (burnase opens)	Press selection key above which preselected value flashes and then enter correct value*.)
Er02	T input below B or above 1200°C (2192°F)	
Er03	S input incorrect 0/0, 0/0, 1/0, 2 minutes	
Er04	H input incorrect over 30 minutes	
Er05	L input: 0 to 29°C / min., or over 140°C / min. 0 to 53°F / min. (or above 252°F / min.)	

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

Er06	B input 0 to 69 °C or above 700 °C (0 to 210 °F or above 1293 °F)	Press selection key above which presented value flashes and then enter correct value. 8)
Er07	B input above desired T value	
Er08	L input above desired I value	
Er09	V ₁ input above desired V ₂ value	
Er10	V ₂ input above desired T value	
Er11	V ₁ input or V ₂ input absent	

C

Indicated errors Er12 to Er99 and their correction

Error indication Er. appears in the effective temperature indicator.

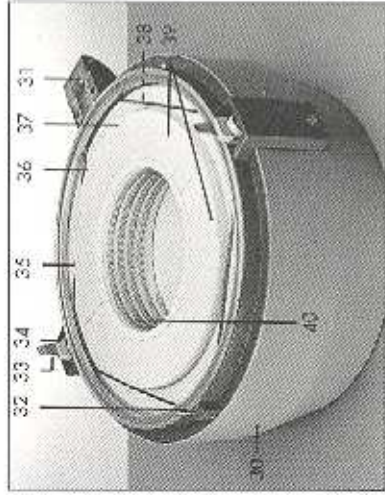
Error	Cause of error	Correction
Er12	Battery in control unit is low and has to be replaced quickly with a new one.	Press STOP (Er12 goes out). Obtain new battery from the after-sales service unit and install it in accordance with the instructions on page 24. Until battery is changed, operate furnace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

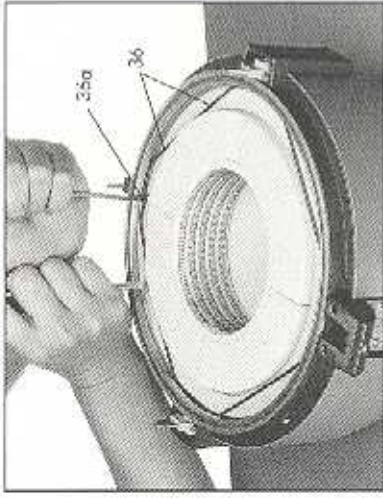
Er23	Heating muffle defective (furnace does not heat)	Press STOP (Er25 goes out). Work can proceed as normal). Obtain new heating muffle from after-sales service unit and install in accordance with instructions on pages 26 to 30.	1 → Switch off 0/1 and switch on again after a few seconds. If Er. re-appears, press STOP and repeat the procedure.
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.	If Er. continues to flash, replace control unit according to the instructions on pages 7 and 23. (State Er number when requesting repairs).
Er25	Internal chamber temperature above 55°C (131°F)	1 Chamber temperature too high: cool furnace base with fan	2 → Proceed as described under 1, but without replacing the control unit, and consult after-sales service.
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 (E62).	
Er29	Defect in control unit	1 Initialisation, see page 25.	
Er30	Defect in control unit	1	
Er32	Battery low	Replace battery and initialise (see page 25).	
Er50 to Er59	Defect in control unit	1	



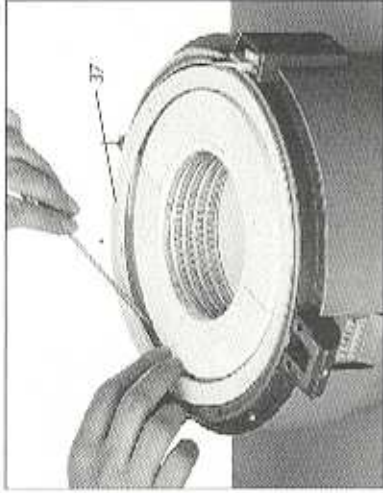
The heating muffle must be changed if heating performance becomes inadequate as a result of wear or if it is defective (see error indications Er23, Er24 on page 22).

1. Allow furnace to cool completely.
2. Press **L** key (furnace closes).
3. Once the furnace is fully closed, switch off 0/1 and disconnect mains plug.
4. Lift furnace head (K) 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 29.
7. Replace furnace head on furnace base, following the instructions on page 6.
8. Re-connect mains lead.

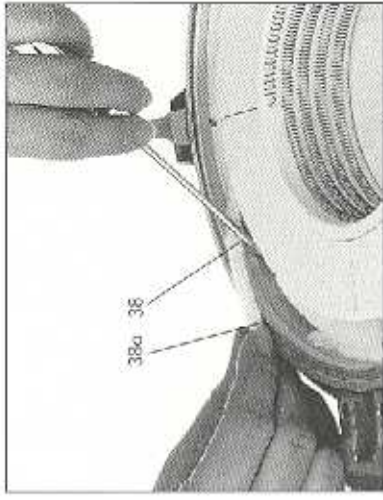
Removal of heating muffle



1. Press spring clip (36) inwards with a screwdriver and, using a second screwdriver, lift the end (35a) free. Remove spring clip.



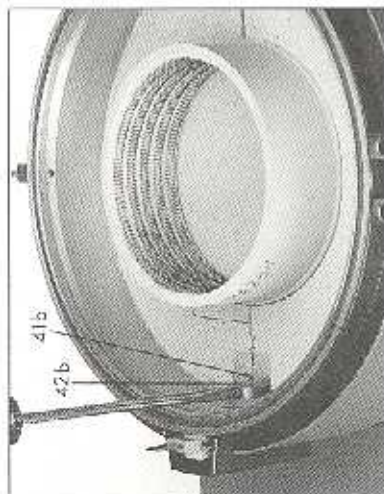
2. Lever up and remove ring (27).



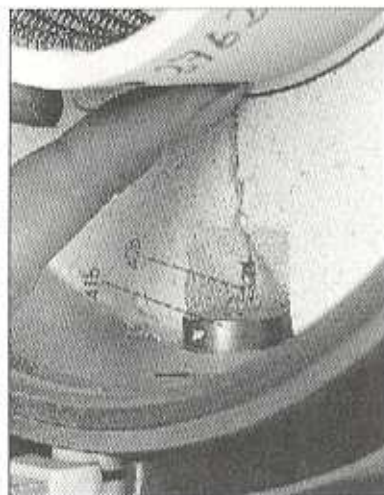
3. Lever out ends of insulation cord (38a) with spatula and gently pull out cord (38) by hand.



4. Carefully remove the stone lining 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 (40b) from terminal (41b), lifting the heating muffle (40) slightly.



7. Withdraw end of wire (41a) from terminal (40a) and remove muffle (40).

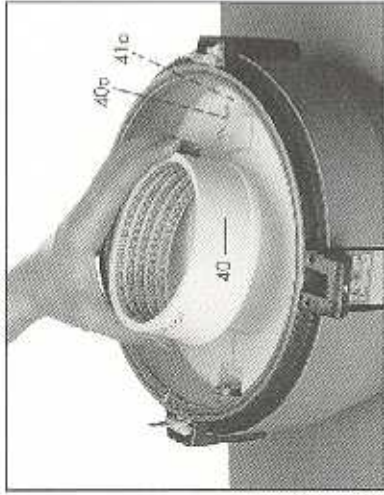


Assembly of heating muffle

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

Note:

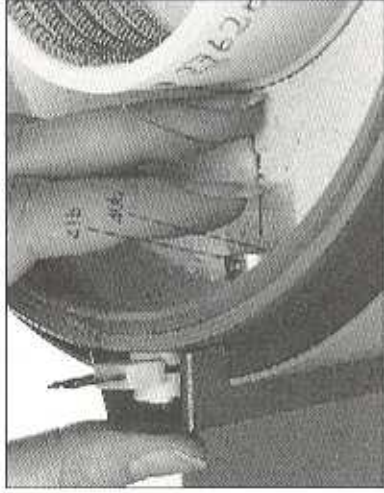
Handle wire ends and heating element with care. Avoid contact between heating element and fingers or hard objects.



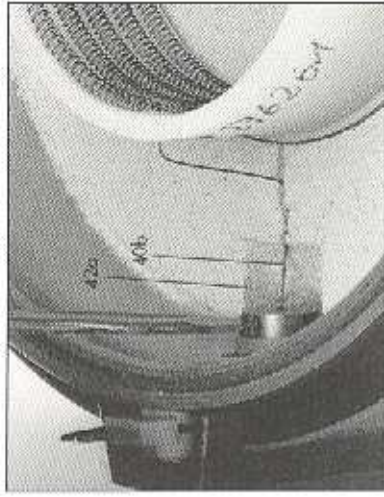
2. Insert short end of wire (40a) into the terminal hole (41a).

Note:

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



3. Insert end of wire (40b) into terminal hole (41b). Set new heating muffle (40) in the recess in the stone roof.

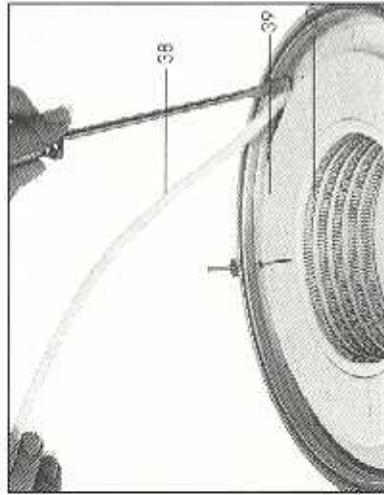


4. Attach two ends of wire (40b) with terminal screws (42a) in the terminals (41a).

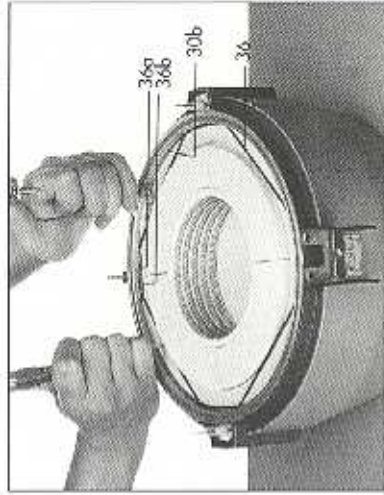
Note:

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 screwdriver 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 screwdrivers.



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

Furnace servicing

- Service is normally restricted to:
- occasionally checking that the sheathed thermocouple is perpendicular.
 - examining and cleaning the sealing rim (68) 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"

* permanently programmed and stored (delay)
 ** permanently programmed and stored (no delay)

Program	Start-by temperature	Temperature increase	Thermostat temperature	Closing time	Holding time	Automatically set holding temperature	Automatically set holding time	Logic	Visibility	Vacuum-off
F	°C	°C/min.	°C	minutes	minutes	°C	min	°C	°C	°C
(Same as programs with different automatic set points)										
P-01	4:55*	1:00*	4:5-12:00	0.2-0.9 10-20	0.1-0.9 10-20			as P-01	1-lampset closed**	end of H**
P-02	5:55*	1:00*	4:5-12:00	0.2-0.9 10	0.1-0.9 10 without holding time of delay (0)			as P-01 with a vacuum**	1-lampset with a vacuum**	
P-03	5:55*	3:00*	4:5-12:00	0.2-0.9 10	0.1-0.9 10			as P-01	3:00*	start of H**
P-04	5:55*	3:00*	4:5-12:00	0.2-0.9 10	0.1-0.9 10			as P-01	without vacuum**	
P-05	5:55*	3:00*	4:5-12:00	0.2-0.9 10	0.1-0.9 10			as P-01	3:00*	start of H**
P-06	5:55*	3:00*	4:5-12:00	0.2-0.9 10	0.1-0.9 10			as P-01	without vacuum**	
P-07	5:55*	3:00*	4:5-12:00	0.2-0.9 10	0.1-0.9 10			as P-01	1-lampset with a vacuum**	start of H** (0.1-0.9) vacuum for start of H** (0.1-0.9) vacuum to start of H**
P-08	5:55*	3:00*	4:5-12:00	0.2-0.9 10	0.1-0.9 10			as P-01	without vacuum**	
(Each program has its own open circuit number)										
P-09	100-700	30-110	100-200	0.2-0.9 1-9	0.1-0.9 1-9			as P-01	as P-07/P-08	as P-07/P-08

Special programs with a second, automatically set holding temperature and holding time

P-10	100-700	30-40	300-1200	0.3-0.9	as P-01	0.55*	2	as P-01	as P-07/P-08	as P-07/P-08
P-11	100-700	30-40	300-1200	0.3-0.9	as P-01	0.75*	3	as P-01	as P-07/P-08	as P-07/P-08
P-12	100-700	30-40	300-1200	0.3-0.9	as P-01	0.60*	2	as P-01	as P-07/P-08	as P-07/P-08
P-13	100-700	30-40	300-1200	0.3-0.9	as P-01	0.67*	3	as P-01	as P-07/P-08	as P-07/P-08
P-14	100-700	30-40	300-1200	0.3-0.9	as P-01	0.55*	2	as P-01	as P-07/P-08	as P-07/P-08
P-15	100-700	30-40	300-1200	0.3-0.9	as P-01	0.25*	3	as P-01	as P-07/P-08	as P-07/P-08

Special program in which the electrolytic current remains time activated until the current and gas vacuum are in the second half-silboos vacuum

P 76	100 - 200	30 - 40	200 - 1200	0.2 - 0.4	as P 71	as P 71	as P 07 / P 08	as P 07 / P 08
P 77 to P 87			Feeds program with special program (to be followed after 20 seconds)					
	300 - 300	30 - 40	300 - 2000	0.2 - 0.4 1.2 - 0	as P 71		as P 07 / P 08	as P 07 / P 08
P 88 to P 90			Feeds program with high time program (open furnace, 1 minute, 0.1000, 0.0200, furnace closed after opening at T = 2000, address not complete or bad)					
	100 - 700	30 - 40	200 - 2000	0.2 - 0.4 2	as P 71		as P 07 / P 08	as P 07 / P 08

Program for individual setting or completely switching off the burner

P 94	$V_1 = 0 - 9$ (code of sign)	$V_2 = 0 - 9$ (code of sign)	$V_3 = 0 - 9$ (code of sign)					
P 95	Program for changing over from Celsius mode (°C) to Fahrenheit mode (°F) and vice versa							
P 99	403*	404*	405*	Program for solvent test, for instructions see page 17				

Technical data

Power supply:

Single-phase AC
Standard model
Special models

Tolerated voltage fluctuations:

Power consumption:

Furnace and vacuum pump
Furnace alone (without pump)

Vacuum pump data (other manufacturers):

Max. permitted

rated current:

Max. permitted

peak current

(0.1 sec.)

Suction capacity

Final vacuum

220 V / 50 - 60 Hz

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

1.8 V / 60 Hz

1.0 V / 60 Hz

+10% to -15%

Approx. 1100 W (max. 1600 W)

max. 960 W

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

1.5 to 1.5 m³/h

27 to 40 mbar

(20 to 30 Torr)

Electrical fuses:

Values

Fuse dimensions

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

200 - 240 V: T 6.3 A (heating circuit)
T 3.15 mA (mains)

T 3.15 A (pump)

110 - 118 V: T 12.5 A (heating circuit)

T 500 mA (mains)

T 5 A (pump)

200 - 240 V: d.a. 5 x 20 mm

100 - 118 V: d.a. 6.3 x 32 mm

475 x 433 x 295 mm

d.a. 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: IVOCLEAR Dental GmbH
Werk Bürs
Bremschistr. 16
A-6700 Bludenz-Burs
Product
Name: Programat P95
Type Pt 1

The product mentioned complies with
the following European Directives:

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

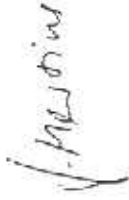
Text: a) Low Voltage Directive
b) Electromagnetic
Compatibility

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

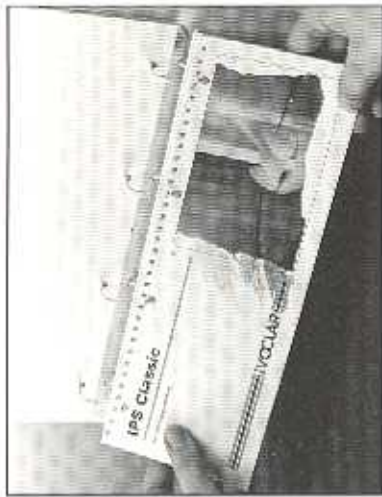
Should you not yet possess an Ivoclar Info System, please contact our Ivoclar demonstrator at Ivoclar directly.



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 system 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.

Ivoclar- worldwide

This information has been developed solely for use in dentistry. Start-up and operation should be carried out strictly according to the IVO instructions. Liability cannot be accepted for damage resulting from misuse or failure to observe the IVO instructions. The user is solely responsible for testing the apparatus on its suitability for any purpose not expressly stated in the instructions. Descriptions and illustrations are not warranty of attributes and are not binding.

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