Programat P 90

Operating Instructions



IVOCLAR

Dental Servis
Serdar Ayısıt
0555 274 05 51

Parts list

S-Control unit

1	Switch 0/I with pilot lamp
2	Keyboard
3	Display and indicators

K-Furnace head

30	Dome
31	Mounting lug
32	Switch pin
33	Blade contacts
34	Protective caps
35	Sealing ring
39	Stone lining segments
40	Muffle

U-Furnace base

60	Casing
61	Front panel
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	Thermocouple
71a	Thermocouple well
72	Firing mount
89	Pump plug
99	Vacuum hose

P-Cooling plate

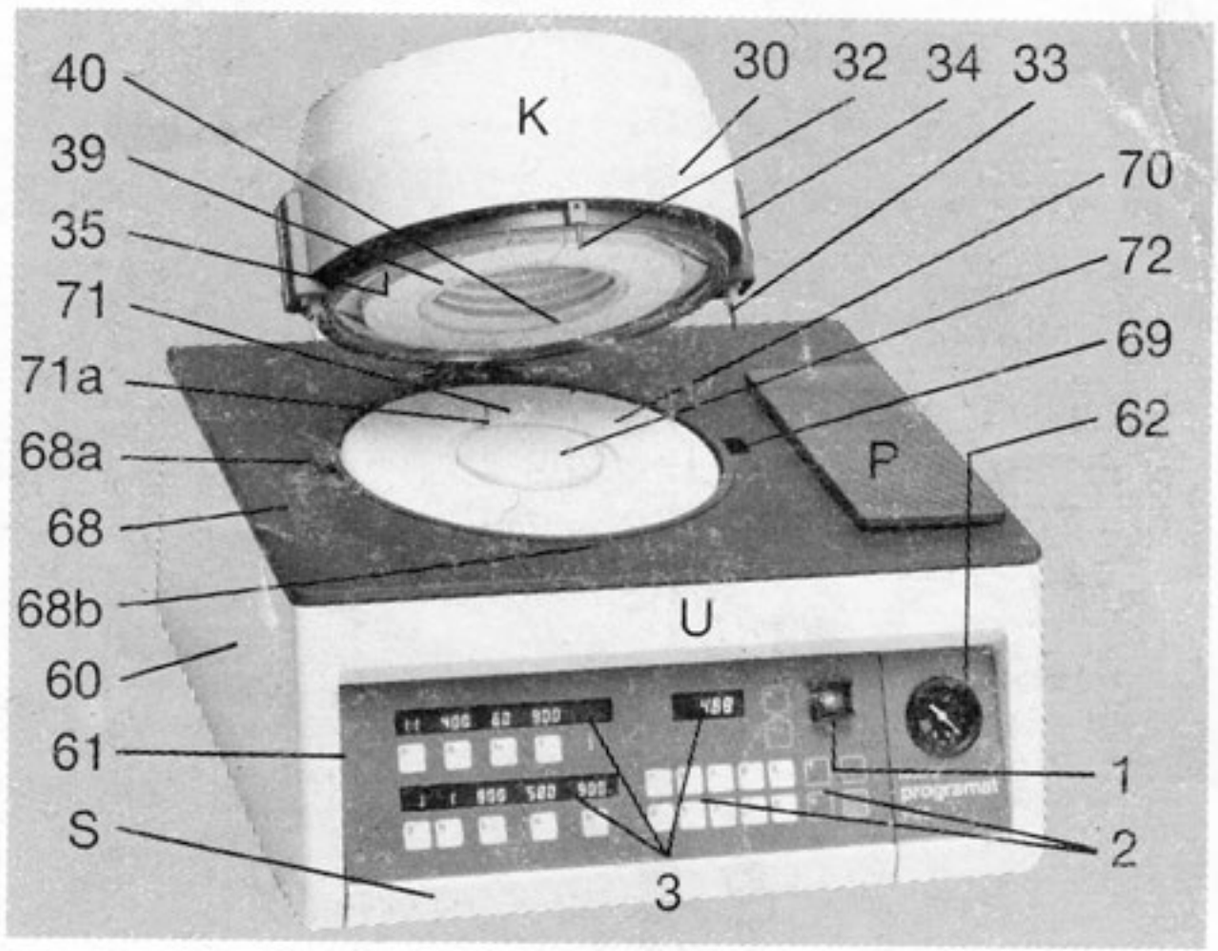


Fig. 1

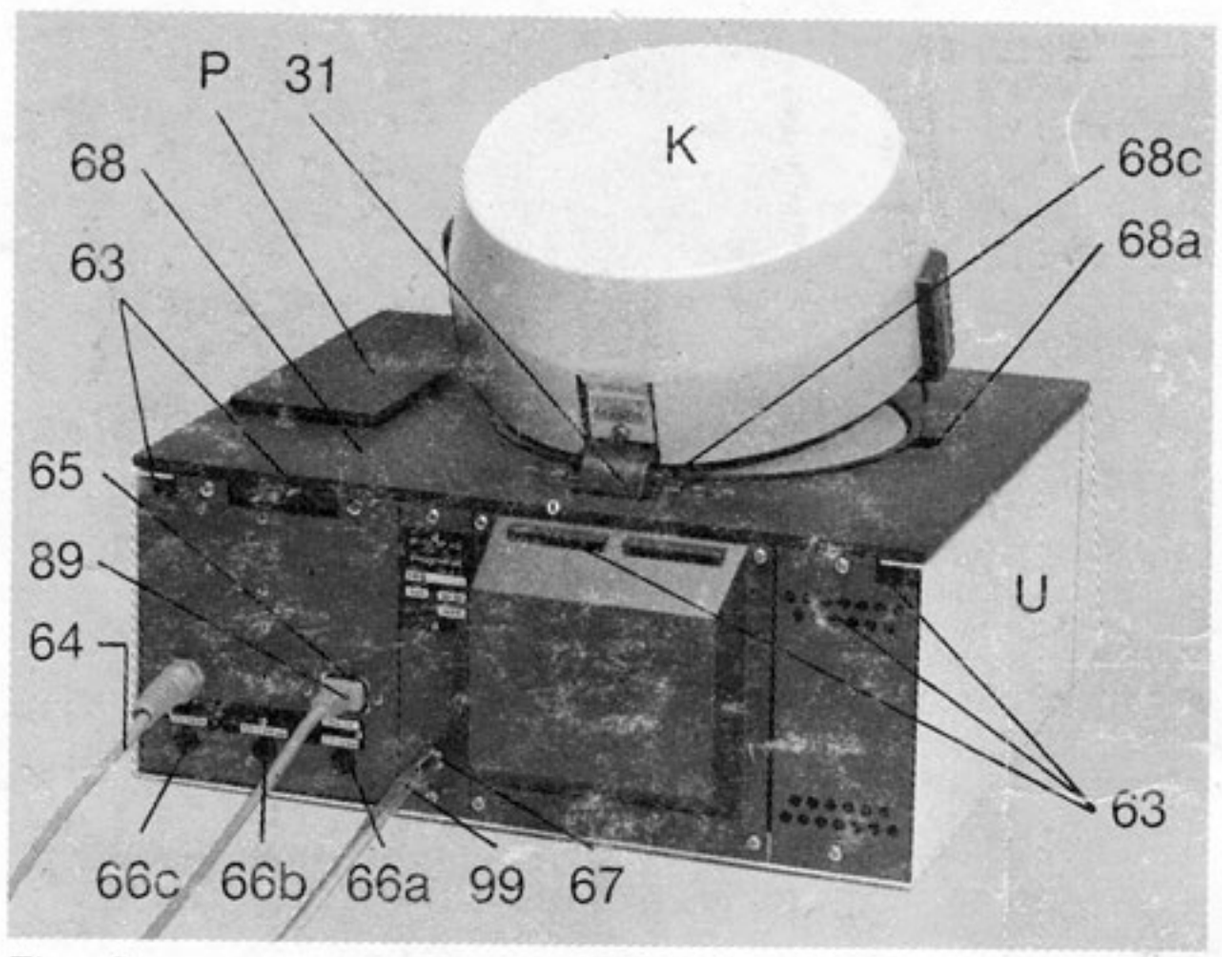


Fig. 2

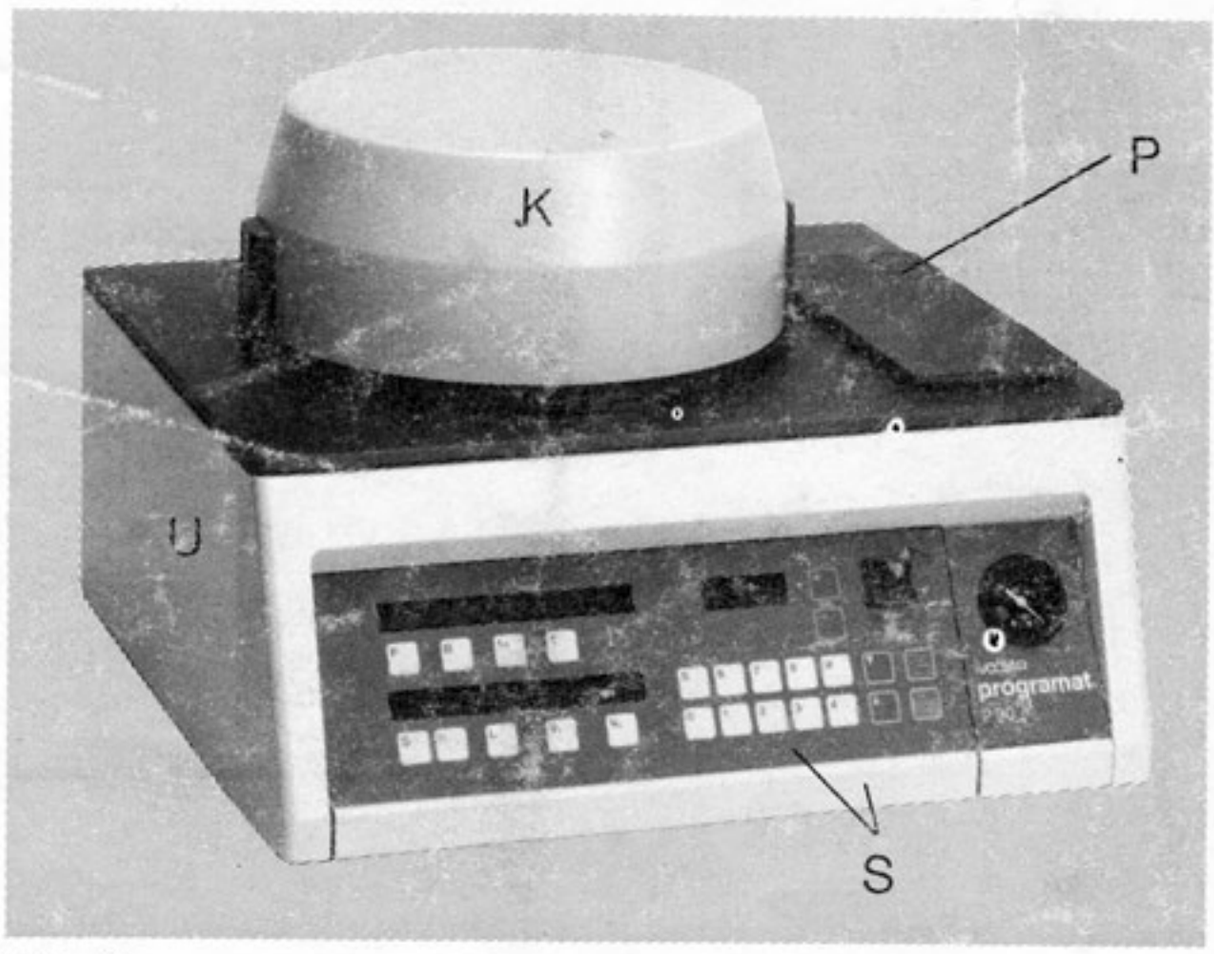


Fig. 3

Dental Servis
Serdar Ayısıt
0555 274 05 51

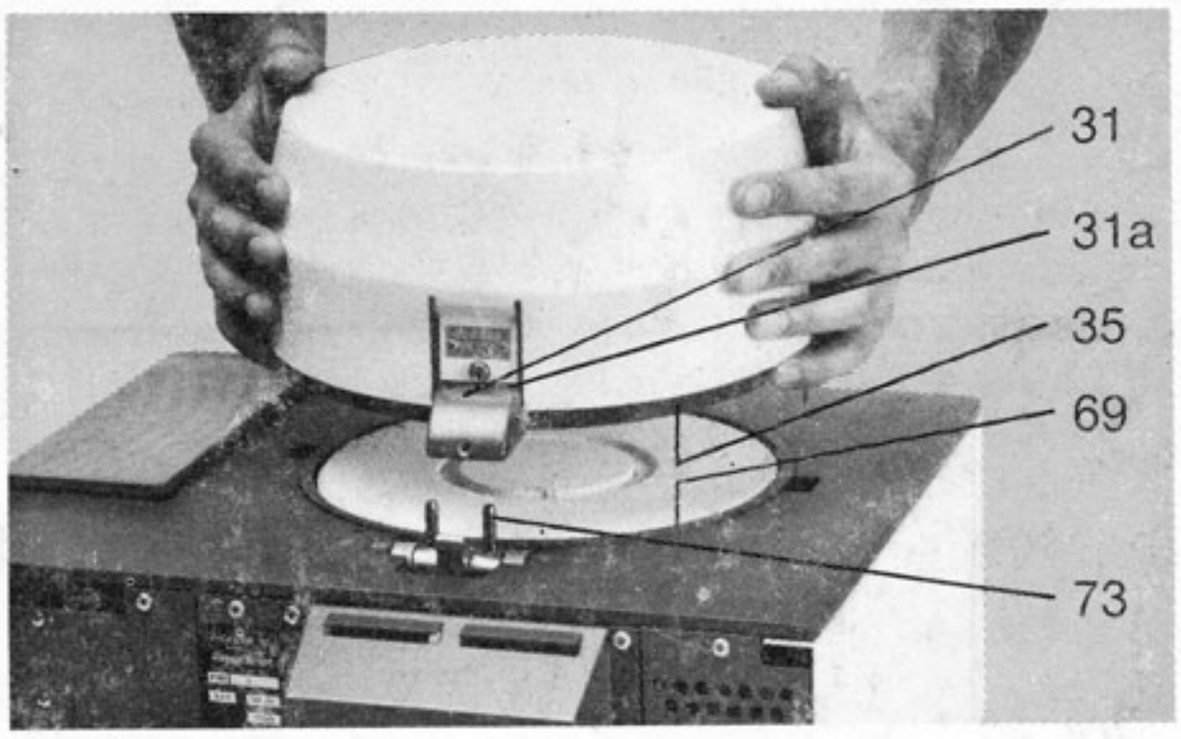


Fig. 4

c) Set the hinge pins (73) perpendicular to the furnace base (Fig. 4)

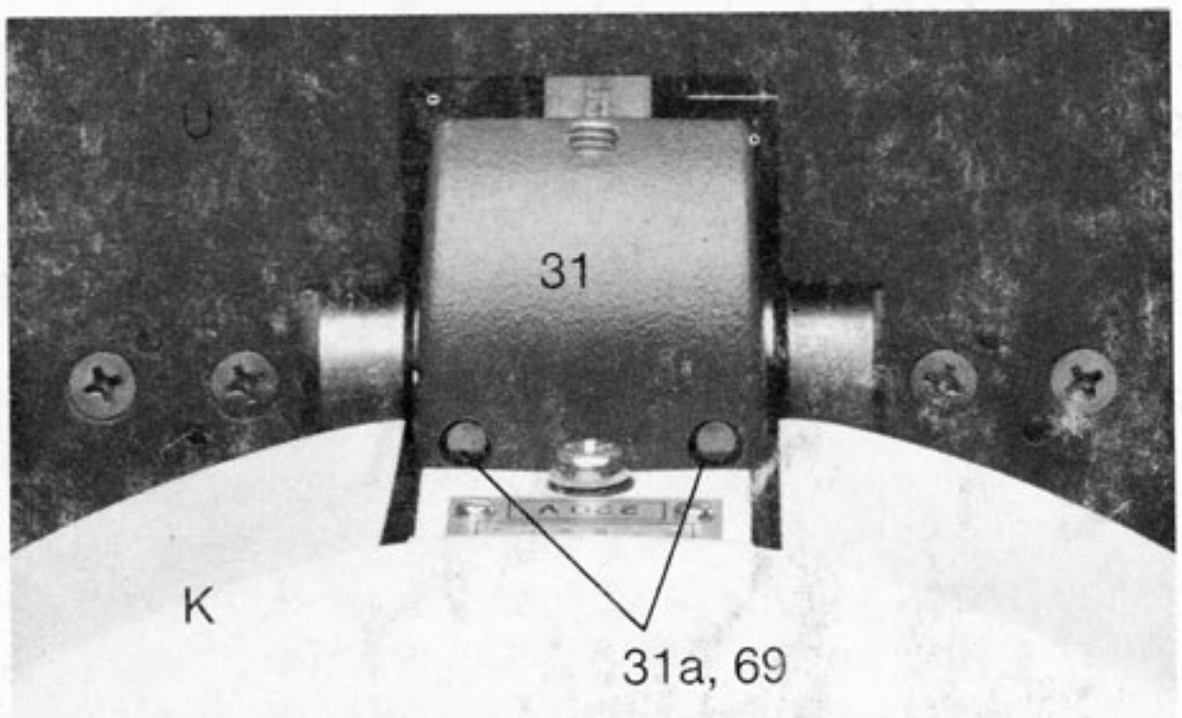


Fig. 5

d) Hold the furnace head as shown in Fig. 4 and fit the mounting lug (31), through the apertures (31a), over the hinge pins (73) (see Fig. 5). Keeping the furnace head level, push down in a parallel direction until it rests, with the sealing ring (35) evenly placed on the sealing rim (69) of the furnace base.

4. Mounting the control unit

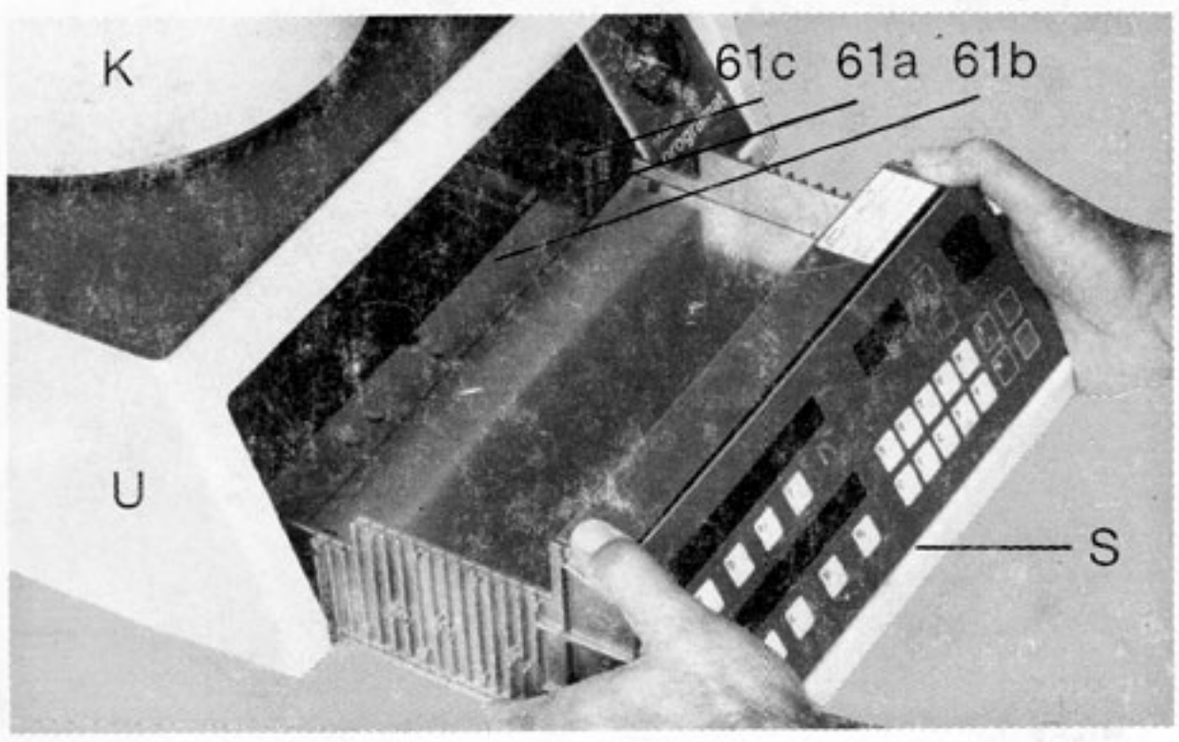


Fig. 6

Position the control unit (S) as shown in Fig. 6 so that it rests on the floor of the furnace base (61b) in alignment with the apertures (61a) in the front panel (61) and push in a parallel direction.
Push the control unit until the locking bolts (61c) engage with an audible click and the control unit rests firmly. The control unit should now be firmly fixed to the furnace base (Fig. 3)

Connections

1. Vacuum pump

— Programat vacuum pump:
Follow separate pump operating instructions.

— Pumps from other manufacturers:
(for reliable specifications, see p. 2)

a) Have the plug (89) for the Programat pump connected to the vacuum pump mains lead by qualified electrician.
b) Position pump and insert the pump plug (89) into the base socket (65).
c) Push the vacuum hose (99) into the vacuum recess (67) of the furnace and the pump.

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

2. Furnace

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

Dental Servis
Serdar Ayısıt
0555 274 05 51

Explanatation 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 (t) has been reached.

S = Closing time (in minutes)
of the furnace 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 decreased to the pre-set degree (L value)

V_1 = Vacuum on
Development of vacuum (vacuum pump start).

V_2 = Vacuum off
Release of vacuum (vacuum pump stop).

= Program duration in minutes with countdown.

Program sequence

(The example shown here corresponds to the trial run described on p. 7)

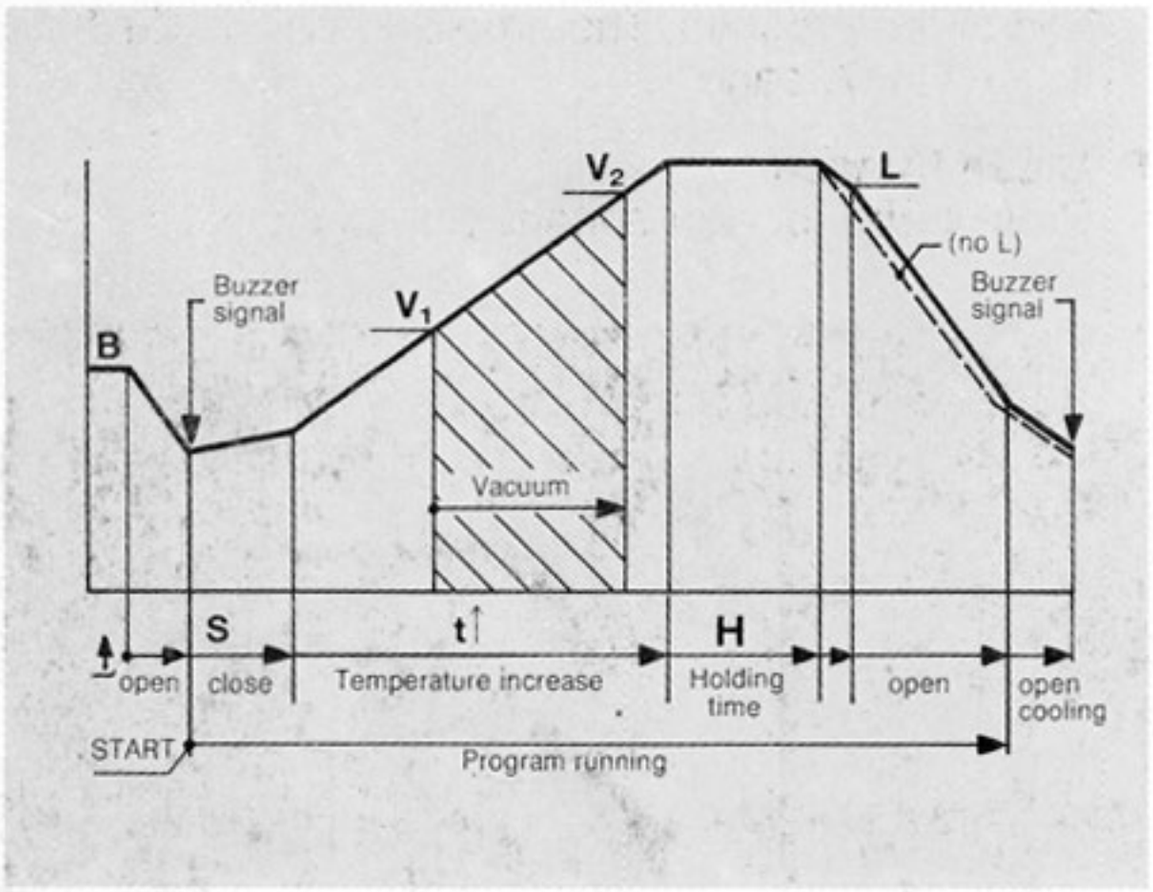


Fig. 7

Switches, keyboard, and indicators

1) Switch 0/I with green pilot lamp
On/Off switch for the furnace. After switching on (pressing the switch), the green pilot lamp illuminates, the buzzer sounds, and various data appear briefly on the display. After about 6 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
T	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 point illuminates at the end of the relevant display. This indicates that data input or modification may take place.

3) Data input keys
0 to **9**: for the input of program number and desired values.
For possible desired values, see page 9 (° C), or page 10 (° F).

4) Control keys
↑ : to open furnace
↓ : to close furnace
STOP : Press red key to
— stop program running
— stop furnace head movement
— stop heating
— stop buzzer

START : Press green key to start a program.

5) Calibration keys
+ , —: calibration of furnace temperature as described on page 13.

Dental Servis
Serdar Ayısıt
0555 274 05 51

6) 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)
- duration of program sequence is shown on the clock display once a program has been started. (Approximate time in minutes shown behind the flashing light diode. If L is pre-set below 500° C or 932° F, only the light diode flashes.).

Flashing of a data indicator signals an error in input (for explanation, see page 14).

7) Indicators in the small display

- furnace temperature (effective T value)
- ▼ = program running
- Er... flashing = error indication (for explanation, see pages 14 and 15)

8) Vacuum gauge (vacuum indicator)

- indicator at end of scale = no vacuum
- indicator in green field = effective vacuum

9) Buzzer

The buzzer sounds whenever it is necessary to close the door of the furnace, or whenever an object may be inserted onto or removed from the firing tray. Sequence: buzzer sounds for 10 seconds — stops for ca. 5 minutes — sounds for ca. 5 minutes).

Trial run

1. Switch on
Press switch 0/I 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 11.

3. Feed in trial run data
(Press selection key first in each case:)

P 09

	° C mode	° F mode
B	**406** (° C)	**762** (° F)
t↑	**140** (° C/min.)	**252** (° F/min.)
T	**730** (° C)	**1346** (° F)
S	**04** (0.4 min.)	**04** (0.4 min.)
H	**09** (0.9 min.)	**09** (0.9 min.)
L	**690** (° C)	**1274** (° F)
V_1	**510** (° C)	**950** (° F)
V_2	**700** (° C)	**1292** (° F)

4. Open the furnace
Press ↑ (furnace opens)

5. Run program
Press **START** immediately after buzzer sounds. (The clock indicator shows the approximate duration of the program. The program runs as illustrated in Fig. 7, page 6.

6. Close furnace
Press ↓ after buzzer sounds (furnace closes).

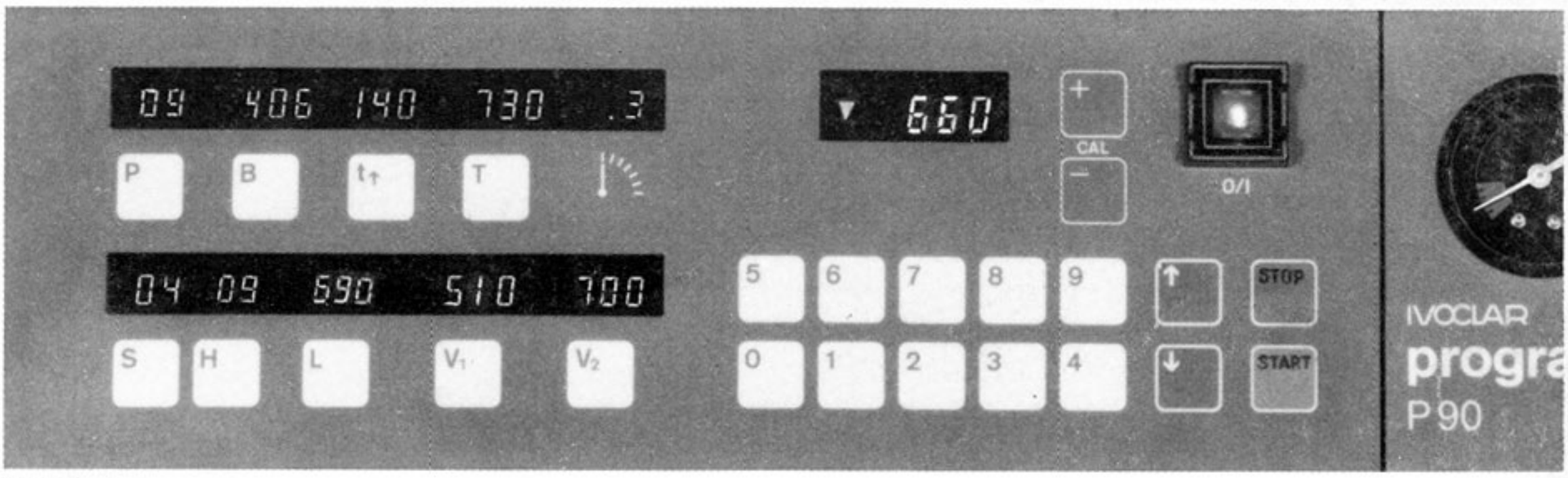


Fig. 8

Dental Servis
Serdar Ayısıt
0555 274 05 51

Programs P 01 to P 08

Standard programs with certain data automatically set and permanently stored. Only the following desired values, shown in the summaries on page 9 (Celsius mode) and 10 (Fahrenheit mode), can be preselected: T, S, H, L (in P 07 and P 08, also V_1 and V_2).

Program P 01

Heat treatment (oxidation) under vacuum.
Automatically set:
B = 403° C (757° F)
t↑ = 140° C (252° F/min.)
V_1 = whenever the furnace is closed
V_2 = end of holding time

Program P 02

As Program P 01, but without vacuum.

Program P 03

Vacuum firings (dentin, incisal)
Automatically set:
B = 403° C (757° F)
t↑ = 60° C/min. (108° F/min.)
V_1 = 580° C (1076° F)
V_2 = beginning of holding time

Program P 04

Glaze firings (as Program P 03, but without vacuum).

Program P 05

Opaque firings (with vacuum).
Automatically set:
B = 403° C (757° F)
t↑ = 80° C/min. (144° F/min.)
V_1 = 550° C (1022° F)
V_2 = beginning of holding time

Program P 06

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

Program P 07

Dentin firings «V» (with vacuum).
Automatically set:
B = 403° C (757° F)
t↑ = 60° C/min. (108° F/min.)
(V_1 and V_2 can be freely programmed)

Program P 08

Opaque firings (with vacuum).
Automatically set:
B = 403° C (757° F)
t↑ = 80° C/min. (144° F/min.)
(V_1 and V_2 can be freely programmed).

Programs P 09 to P 79

Freely programmable programs with normal opening of the furnace (1 minute)
For possible desired values, see page 9 (Celsius mode) and page 10 (Fahrenheit mode).

Programs P 80 to P 87

Freely programmable special programs with rapid opening of the furnace (20 seconds).
For possible pre-set data see page 9 (Celsius mode) or page 10 (Fahrenheit mode).

Programs P 88 to P 90

Freely programmable «nighttime» programs with normal opening of furnace (1 minute).
(Buzzer does not sound after furnace opens. After opening, furnace closes at T ≈ 80° C (≈ 176° F) and does not heat further).
For possible desired values, see page 9 (Celsius mode) or page 10 (Fahrenheit mode).

Program P 99

Program for the «silver test» to check furnace chamber temperature and to «recalibrate».
See page 13 for instructions.

Dental Servis
Serdar Ayısıt
0555 274 05 51

Summary of Programs

Possible desired values (preselectable) for operation in Celsius mode

Program **P**	Stand-by temperature **B** °C	Temperature increase **t ↑** °C/min.	Firing temperature **T** °C	Closing time **S** minutes	Holding time **H** minutes	Long-term cooling **L** °C	Vacuum on **V_1** °C	Vacuum off **V_2** °C
P 01 to **P 08**	**Standard program** with automatically pre-set data (Furnace opening time: 1 minute)							
P 01	403*	140*	403—1200	0.3—0.9 1—9	0.1—0.9 1—30	to T	with furnace closed**	end of H**
P 02	403*	140*	403—1200	0.3—0.9 1—9	input = 0: without holding time (display 0.0)	input = 0: without long-term cooling (no data displayed)	without vacuum**	
P 03	403*	60*	403—1200	0.3—0.9 1—9	as P 01	as P 01	580*	beginning of H**
P 04	403*	60*	403—1200	0.3—0.9 1—9	as P 01	as P 01	without vacuum**	
P 05	403*	80*	403—1200	0.3—0.9 1—9	as P 01	as P 01	550*	beginning of H**
P 06	403*	80*	403—1200	0.3—0.9 1—9	as P 01	as P 01	without vaccum**	
P 07	403*	60*	403—1200	0.3—0.9 1—9	as P 01	as P 01	to T input = 0: without vacuum	V_1 to T input = T: vacuum to end of H
P 08	403*	80*	403—1200	0.3—0.9 1—9	as P 01	as P 01	(no data displayed)	input = T −1°: vacuum to beginning of H
P 09 to **P 79**	**Freely programmable programs** (Furnace opening time: 1 minute)							
	300—700	30—140	300—1200	0.3—0.9 1—9	as P 01	as P 01	as P 07/P 08	as P 07/08
P 80 to **P 87**	**Freely programmable special programs** (Furnace opening time: 20 seconds)							
	300—700	30—140	300—1200	0.3—0.9 1—9	as P 01	as P 01	as P 07/P 08	as P 07/08
P 88 to **P 90**	**Freely programmable «nighttime» programs** (Furnace opening time: 1 minute. Buzzer does not sound. After opening, furnace closes at T ≈ 80° C does not heat further)							
	300—700	30—140	300—1200	0.3—0.9 1—9	as P 01	as P 01	as P 07/P 08	as P 07/08
P 99	**Program for «silver test»** (for instructions see page 13)							
	403*	60*	955*	1*	1*			

* Automatically set and permanently stored (data displayed)

** Automatically set and permanently stored (no display)

Dental Servis
Serdar Ayısıt
0555 274 05 51

Summary of Programs

Possible desired values (preselectable) for operation in Fahrenheit mode

Program **P**	Stand-by temperature **B** °F	Temperature increase **t ↑** °F/min.	Firing temperature **T** °F	Closing time **S** minutes	Holding time **H** minutes	Long-term cooling **L** °F	Vacuum on **V_1** °F	Vacuum off **V_2** °F
P 01 to **P 08**	**Standard program** with automatically pre-set data (Furnace opening time: 1 minute)							
P 01	757*	252*	757—2192	0.3—0.9 1—9	0.1—0.9 1—30	to T	with furnace closed**	end of H**
P 02	757*	252*	757—2192	0.3—0.9 1—9	input = 0: without holding time (display 0.0)	input = 0: without long-term cooling (no data displayed)	without vacuum**	
P 03	757*	108*	757—2192	0.3—0.9 1—9	as P 01	as P 01	1076*	beginning of H**
P 04	757*	108*	757—2192	0.3—0.9 1—9	as P 01	as P 01	without vacuum**	
P 05	757*	144*	757—2192	0.3—0.9 1—9	as P 01	as P 01	1022*	beginning of H**
P 06	757*	144*	757—2192	0.3—0.9 1—9	as P 01	as P 01	without vaccum**	
P 07	757*	108*	757—2192	0.3—0.9 1—9	as P 01	as P 01	to T input = 0: without vacuum	V_1 to T input = T: vacuum to end of H
P 08	757*	144*	757—2192	0.3—0.9 1—9	as P 01	as P 01	(no data displayed)	input = T −2°: vacuum to beginning of H
P 09 to **P 79**	**Freely programmable programs** (Furnace opening time: 1 minute)							
	572—1292	54—252	572—2192	0.3—0.9 1—9	as P 01	as P 01	as P 07/P 08	as P 07/08
P 176 to **P 87**	**Freely programmable special programs** (Furnace opening time: 20 seconds)							
	572—1292	54—252	572—2192	0.3—0.9 1—9	as P 01	as P 01	as P 07/P 08	as P 07/08
P 88 to **P 90**	**Freely programmable «nighttime» programs** (Furnace opening time: 1 minute. Buzzer does not sound. After opening, furnace closes at T: 176° F does not heat further)							
	572—1292	54—252	572—2192	0.3—0.9 1—9	as P 01	as P 01	as P 07/P 08	as P 07/08
P 99	**Program for «silver test»** (for instructions see page 13)							
	757*	108*	1751*	1*	1*			

* Automatically set and permanently stored (data displayed)

** Automatically set and permanently stored (no display)

Dental Servis
Serdar Ayısıt
0555 274 05 51

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

Note: : After input of Program P 98, the error indication Er 00 appears and the program number indicator flashes, but this is of no consequence. (It only shows that P 98 is not a work program).

1. **Control of mode**
   - Feed in P 98
   - If C illuminates above the V_1 key, the furnace is in Celsius mode
   - If F illuminates above the V_1 key, the furnace is in Fahrenheit mode

2. **Changeover from Celsius to Fahrenheit mode**
   - Feed in P 98
   - (C illuminates above V_1) key
   - Switch off 0/I
   - Press V_1 and, maintaining pressure, switch on 0/I
   - ca. 3 seconds after switching, on release V_1

   As soon as F illuminates above V_1 the furnace is in the Farenheit mode.

3. **Changeover from Fahrenheit to Celsius mode**
   Follow the procedure given under point 2. As soon as C illuminates above V_1 the furnace is in the Celsius mode.

Programming, change of program

a) **The program cards are used to note the particular data for each program.**

b) **Program numbers should be given in two digits even for programs P 01 to P 09 (not P 1, P 2, etc)!**

c) **As long as no program is running, data may be fed in or modified by the following procedure:**
   - Press selection key (the diode after the relevant indicator iluminates);
   - feed in required data.

d) **Particularly important for the input of V_2 (vacuum off):**
   - If **vacuum-off** firing takes place during holding time H, the following input should be used with V_2:

   ° Celsius mode: $V_2 = T - 1\,°C$
   (e.g.: $T = 920\,°C$, $V_2 = 919\,°C$)
   °Fahrenheit mode: $V_2 = T - 2\,°F$
   (e.g.: $T = 1688\,°F$, $V_2 = 1686\,°F$
   (Vacuum is switched off at the beginning of holding time!)

   - If **vacuum-on** firing is done, the following input should be used:
     $V_2 = T$ (e.g.: $T = 920\,°C$, $V_2 = 920\,°C$ or $T = 1688\,°F$, V_2 $1688\,°F$)
     (Vacuum is switched off at the very end of holding time!)

e) **If control is lost because of incorrect programming, the situation can be saved by the following procedure:**
   - switch off 0/I
   - Press STOP and, maintaining pressure, switch on
     0/I Displays show the original data pre-set by the manufacturer).

f) **Once terminated, the program automatically remains stored.**

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

h) **It is only possible to change preselected data while a program is running before the effective temperature has reached the preselected T level:**
   1. Desired values for S; H and L can be altered without interrupting the program sequence:
      - press the appropriate key and feed in the new data.
   2. To change preselected data for B, t↑, T, V, and V_2:
      - press STOP
      - press the appropriate key and feed in the new data
      - press START.

i) **To interrupt a running program with vacuum and release the vacuum:**
   Press STOP twice.

Dental Servis
Serdar Ayısıt
0555 274 05 51

Control of the CTE value

The CTE (**C**oefficient of **T**hermal **E**xpansion) of the ceramic material can be controlled as follows (see also table below):

1. Immediate removal of the object from the furnace after firing results in a decrease in CTE (minus). For composites with low CTE values, programs P80 to P87 should be employed.
2. Slow cooling of the object in the furnace after firing (long-term cooling) results in an increase in CTE (plus).

Control of CTE:

decrease (minus)	standard value (0)	increase (plus)
programs P80 to P87 (without long-term cooling L)	programs P01 to P79 (without long-term cooling L)	programs P01 to P79 without long-term cooling L
− 0.5	± 0	+ 0.5 L = 800° C (1472° F)
		+ 1.0 L = 600° C (1112° F)
		+ 1.5 L = 400° C (752° F)
Remove object as soon as the furnace opens completely or at the latest when the buzzer sounds.	Remove object when the buzzer first sounds	Remove object when the buzzer first sounds

Important practical information

Always keep the furnace closed between firings. Optimum firing results may be obtained with Ivoclar silicon nitride firing mounts.

Object to be dried should only be placed on the firing mount after the buzzer sounds.

Power failure
Interrupts any program. After a power failure, press START to continue the program. (The effect on the object depends on the duration of the power failure).

Furnace temperature can be checked
by means of the «silver test» described on page 13.

When changing the control unit or the furnace base, it is recommended that room temperature of furnace be checked by means of the «silver test» described on page 13.

Avoid opening the furnace head manually when the furnace is switched on! (Otherwise error Er 28 is indicated. For correction, see page 15).

Dental Servis
Serdar Ayısıt
0555 274 05 51

«Silver test»

(Furnace chamber temperature check)

The thermocouple may be subject to changes depending on the mode and duration of operation, and furnace chamber temperature thus influenced.

Furnace chamber temperature can be checked by means of the «silver test».

Material required:

(supplied in the temperature control set)

1 firing tray marked IVOCLAR-E (∅ 17 mm, white).

Strips of silver, purity 99.99%; (0.5×2×20 mm)

Procedure:

a) The furnace must be at operating temperature (switched on at least 30 min beforehand)
b) Insert silver strip into IVOCLAR-E firing tray (Fig. 9).
c) Select P99 (silver test program)
d) – press ↑ (to open furnace)
   – place firing tray silver strip in center of firing mount (72)
   – press START. Appearance of error indication Er 14 shows that the furnace chamber temperature is still too high; when correct temperature is reached, furnace closes automatically and program starts.

Upon completion of the program, if the silver strip is melted so that it appears as in Fig. 10, the furnace temperature is correctly calibrated. If not, recalibration is necessary.

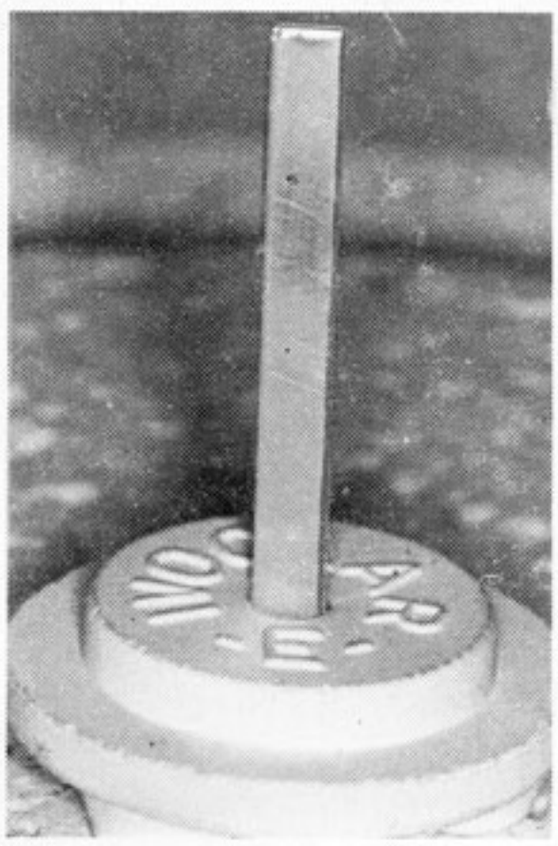


Fig. 9

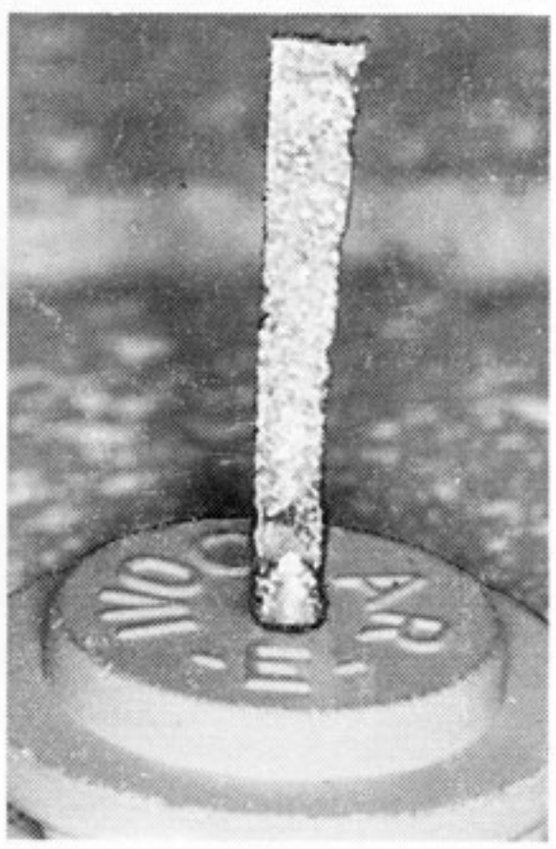


Fig. 10

Recalibration

The calibration keys + and – only function after input of program P 99.

a) If the silver strip did not appear as in Fig. 10, the + key should be used to recalibrate.*)
b) If the silver strip melted into a ball, the – key should be used to recalibrate.*)

***) Every time one of the calibration keys is pressed, the set temperature alters by 1° C (1.8° F). Experience has shown that a recalibration of 5° C (9° F) is usually appropriate, i. e. the relevant calibration key should be pressed five times.**
While the calibration keys are in use, the calibration value is shown in the small display in ° C.
The «silver test» should be repeated until the silver strip appears as in Fig. 10).

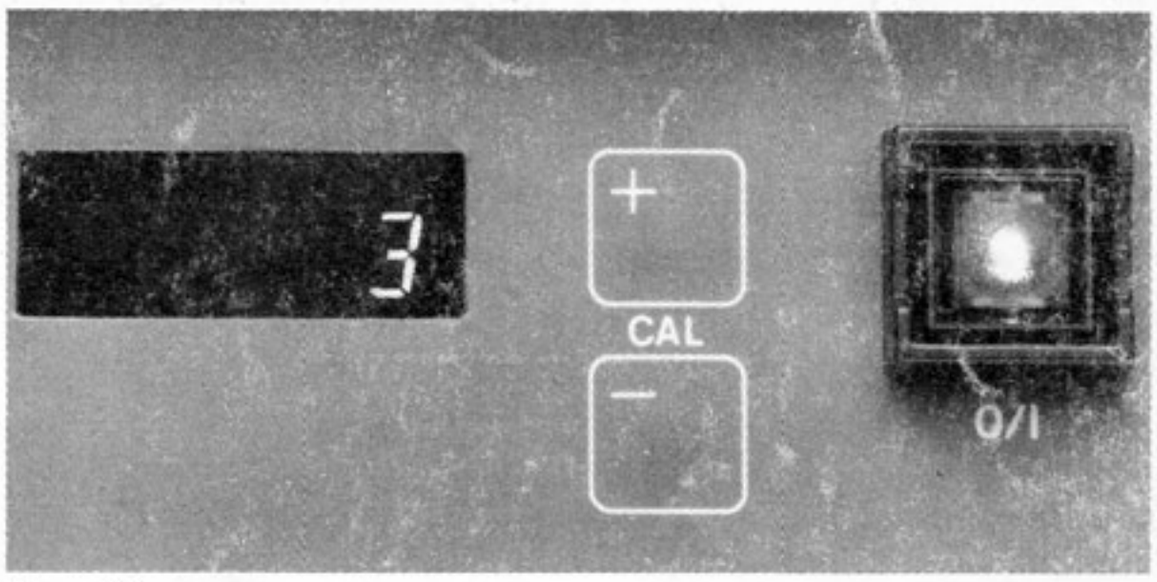


Fig. 11

Dental Servis
Serdar Ayısıt
0555 274 05 51

Failures not indicated on display and their correction

a) Green pilot lamp fails to illuminate even though 0/I is switched on

1st possibility:
If the indicators do not illuminate, check fuses (66a and 66b) and replace if necessary.

2nd possibility
If the indicators do illuminate, the pilot lamp is defective and must be replaced (the furnace functions properly in other respects.

b) Display shows incomplete or random data:

- switch off 0/I
- press STOP and, maintaining pressure, switch on 0/I. Should irregular displays continue, the control unit is defective and must be replaced as described on page 16.

c) Vacuum is not obtained although the pump is operating:

Check the sealing rim (69) and sealing ring (35) and clean if necessary. Check that the vacum hose (99) has no leaks and is firmly attached at both ends. If vacuum still cannot be obtained, consult customer service.

d) Vacuum is not obtained and pump fails to operate:

Check fuses (66a) and (66b) and replace if necessary. 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 customer service.

Indicated errors Er 00 to Er 11 and their correction

Er 00 to Er 11 indicate incorrect data inputs. Er... and the input to be corrected flash in the effective temperature indicator. (Program is interrupted)

***) Correct program numbers and desired values are given in the summaries on page 9 (Celsius mode) and page 10 (Fahrenheit mode).**

Error	Cause of error	Correction
Er 00	Incorrect program number (0 / 1 to 9 / 19 to 98)	Press selection key P and feed in correct program number.*) (With P 98, error indication merely shows that this is not a work program).
Er 01	T programmed below actual temperature (furnace opens)	Press selection key above which preselected data flashes, then feed in correct figure.*)
Er 02	T programmed below B or above 1200° C (2192° F)	
Er 03	S input incorrect 0 / 0.0 / 0.1 / 0.2 minutes	
Er 04	H input incorrect over 30 minutes	
Er 05	t input incorrect 0 to 29° C/min. or above to 140° C/min. (0 to 53° F/min. or above to 252° F/min.)	
Er 06	B programmed 0 to 299° C, or above 700° C (0 to 571° F or above to 1293° F)	
Er 07	B programmed above desired T value	
Er 08	L programmed above desired T value	
Er 09	V_1 programmed above desired V_2 value	
Er 10	V_2 programmed above desired T value	
Er 11	V_1 or V_2 input absent	

Dental Servis
Serdar Ayısıt
0555 274 05 51

Indicated errors Er 12 to Er 97 and their correction

Error indication flashes in the effective temperature indicator.

Error	Cause of error	Correction
Er 12	Battery in control unit is so low that it must be replaced by a new one.	Press stop (Er 12 disappears). Determine what type of battery has been built into the control unit by pressing P 98: – If H does not light up or shows r1, it is a round battery (see fig. 15, page 16) – If H lights up and shows r2, it is a square battery (see fig. 15a, page 17) Obtain a new battery from customer service immediately and install it according to the directions, page 16 or 17! (The furnace can be operated normally prior to battery change.)
Er 13	Overheating (furnance opens)	1 *)
Er 14	Furnace chamber temperature still too high for «silver test»	Refrain from making adjustments. (Once correct temperature is achieved, furnace closes automatically and program runs.)
Er 20	Defect in furnace base or control unit (furnace opens)	3 *)
Er 21	Defect in control unit (furnace opens)	2 *)
Er 22	Defect in furnace base or control unit (furnace opens)	3 *)
Er 23	Muffle worn out (Rapid temperature increases cannot be obtained much longer).	Press STOP. (Er 23 disappears. Work may proceed as normal). As soon as possible, obtain new muffle and mount according to instructions on pages 17 to 19.
Er 24	Defect in muffle (furnace does not heat).	Switch off. Obtain new muffle and mount according to instructions on pages 17 to 19.
Er 25	Fault in control unit.	2 *)
Er 26 Er 27	Defect in control unit (Furnace opens)	2 *)
Er 28	Interruption of heating circuit due to defect or manual raising of furnace head.	3 *) If furnace has not been opened manually, check heating circuit fuse (66c)
Er 29 Er 30 Er 32 Er 90 to Er 97	Defect in control unit	2 *)

1 *) Open furnace completely. Switch off 0/I, leave furnace open for some minutes, switch on 0/I. If Er... re-appears, press STOP
If Er... continues to appear, repeat procedure. Should Er... continue to flash, replace control unit following the instructions on pages 16 and 5. (Please give Er... indication when contacting customer service).

2 *) Switch off 0/I, switch on after a few seconds. If Er... reappears, press STOP. If Er... continues to appear, repeat procedure.
If Er... continues to flash, replace control unit according to instructions on pages 16 and 5. (Please give Er... indication when contacting customer service).

3 *) Proceed as under 2 *), but without replacing control unit; contact customer service directly.

44 0027

Dental Servis
Serdar Ayısıt
0555 274 05 51

Removal of control unit

1. Close the furnace if possible.
2. Switch off 0/I.
3. Unplug the mains cable.
4. Position the furnace as close to the edge of the bench as possible, in such a way that the furnace still rests on its pads (61d) and the locking bolts (61c) are accessible from below.
5. Hold the furnace as shown in Fig. 12. Using the index fingers, release the locking bolts (61c) and simultaneously insert middle or ring fingers under the front panel (4) of the control unit, drawing it away from the main unit. (Release control unit).
6. Lift control away from furnace base.

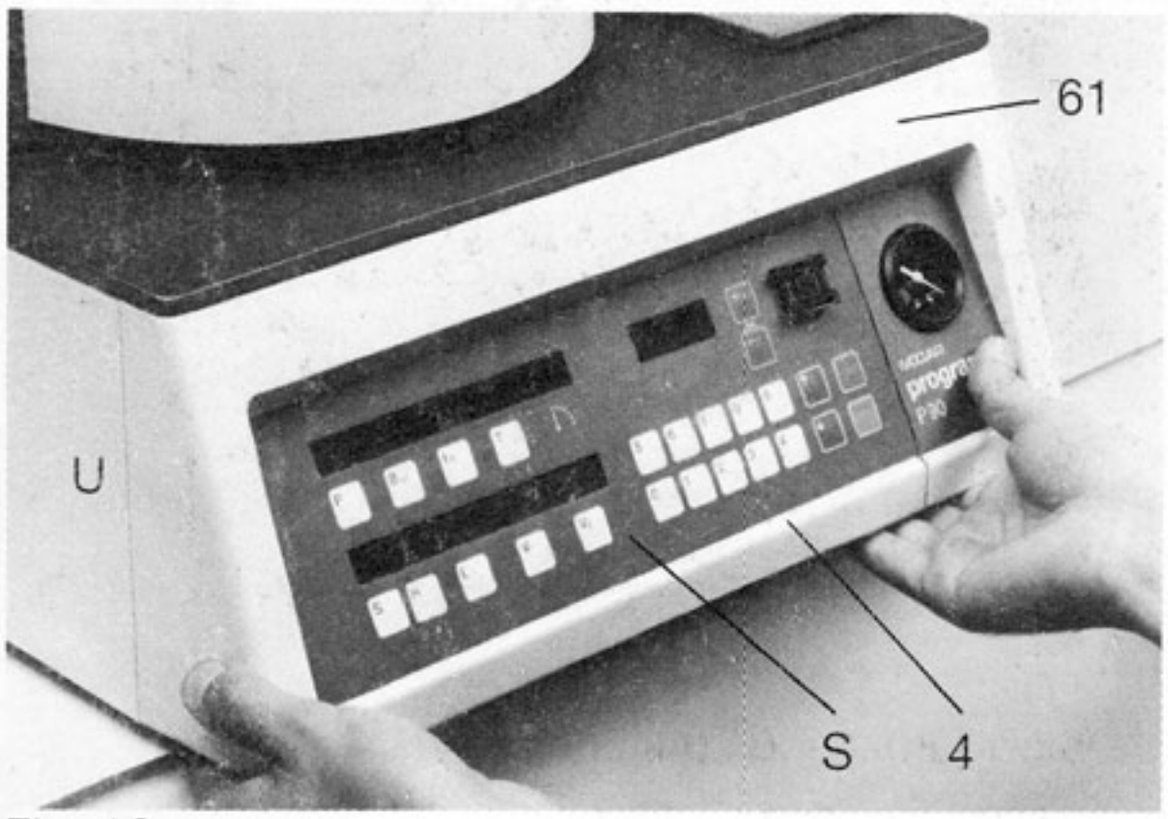


Fig. 12

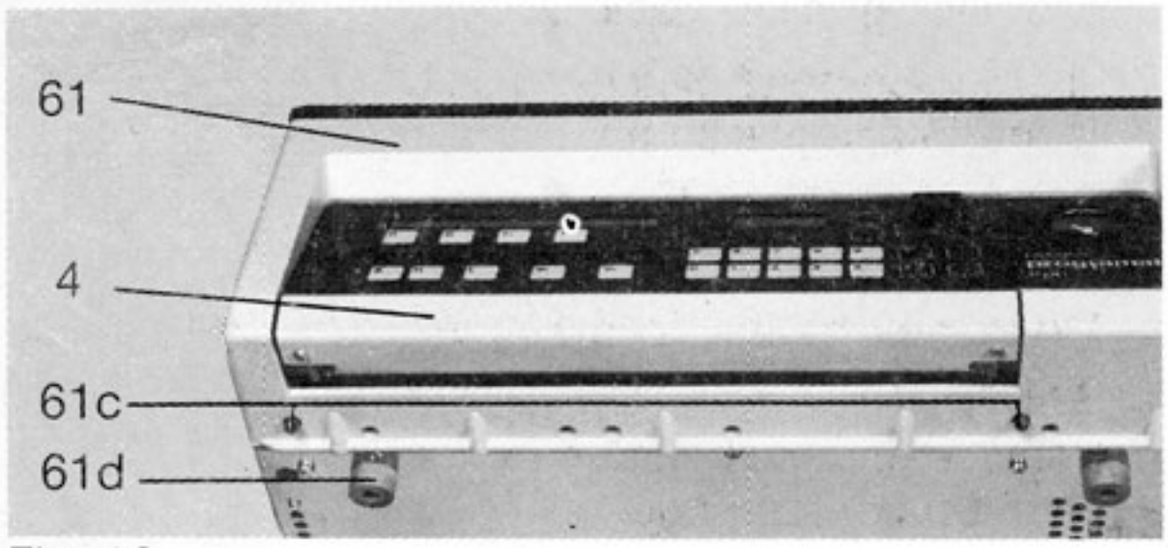


Fig. 13

Note: Use original packing when forwarding control unit for repairs.

Change of battery

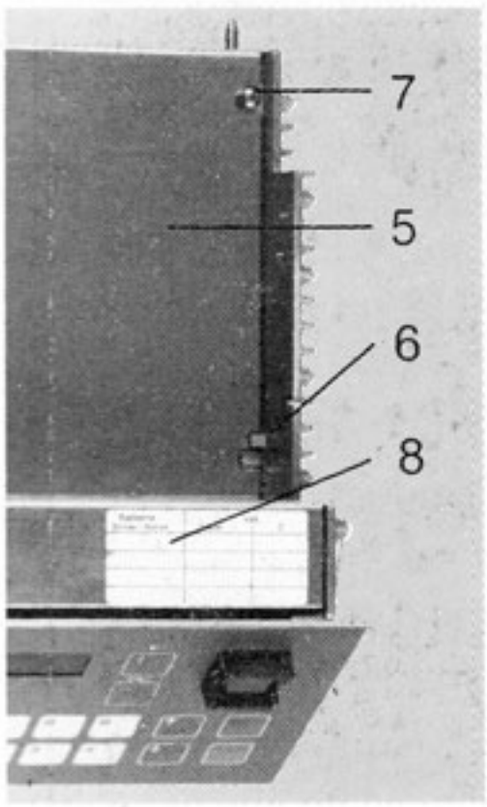


Fig. 14

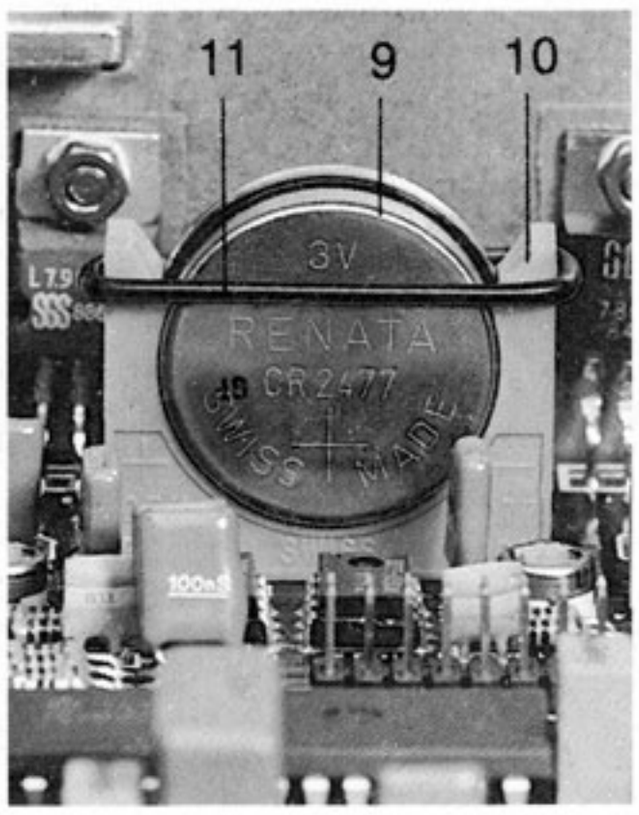


Fig. 15

a) Changing a round battery (9)
(A round battery is in the control unit if no lighted indication or r1 appears at H when P 98 is entered.)

1. Remove control unit as described in the preceding section.
2. Remove the two screws (7) with a Philipps screwdriver.
3. Position the cover (5) and slide free from the tabs (6).
4. **Note the position of the battery (9) in the clip (10) and ensure that the new battery is at hand.**
5. Remove rubber ring (11) from clip (10), without loosening or removing the battery while doing so.
6. Remove the old battery (9) from the clip (10) and **insert the new one correctly (+terminal of battery against + terminal of clip) within 30 seconds, pressing it home firmly.** If the batteries are not exchanged within 30 seconds, all stored data will be lost!).
7. Replace rubber ring (11) over clip (10). (See Fig. 15) Be sure the battery is securely positioned in clip.
8. Replace cover (5) and fasten screws (7).
9. Enter date of insertion of new battery in table (8).
10. Replace control unit, following instructions on page 5.

Dental Servis
Serdar Ayısıt
0555 274 05 51

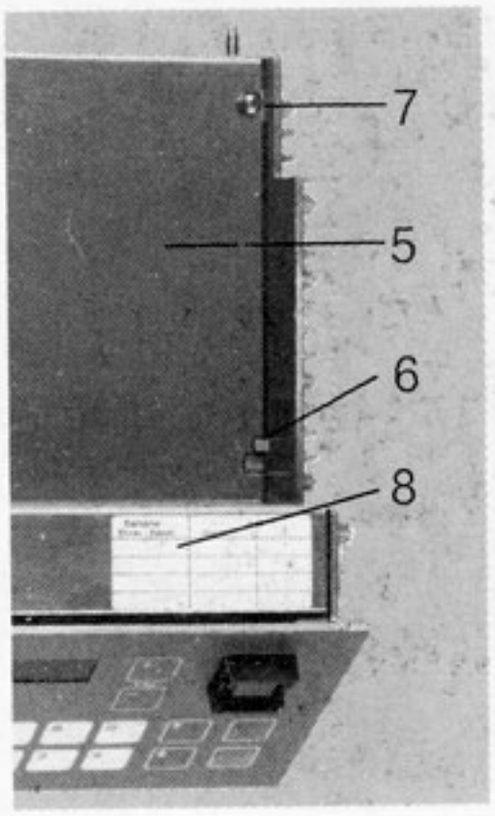


Fig. 14

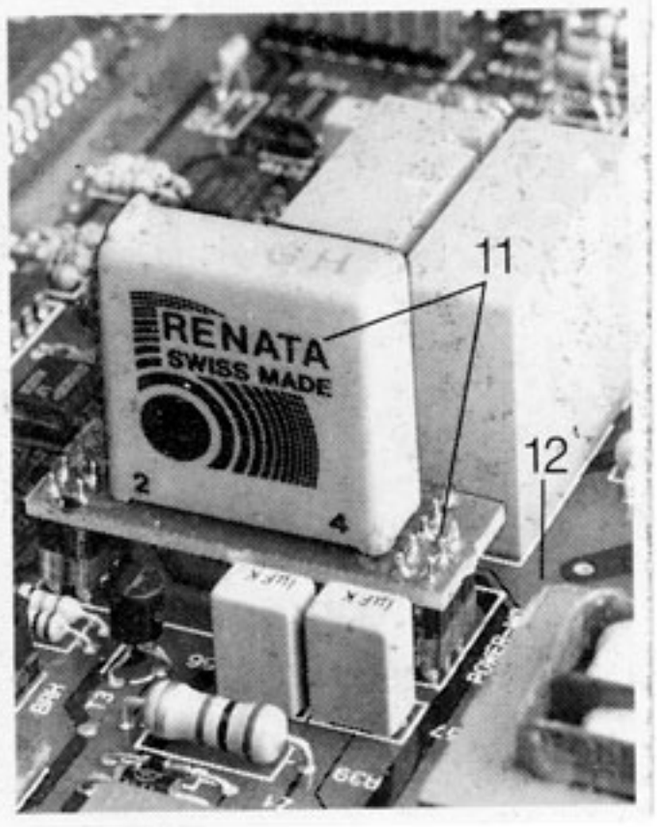


Fig. 15a

b) Changing a square battery (11)
(A square battery is in the control unit if r2 lights up at H when P98 is entered.)

1. Remove control unit, following instructions on page 16.
2. Remove the two screws (7) with a Philipps screwdriver.
3. Position the cover (5) and slide free from the tabs (6).
4. **Note how the battery (11) is connected to the circuit board (12) behind the POWER-MO inscription an make sure the new battery is at hand.**
5. Pull old battery (11) up and **insert new battery correctly within 30 seconds, following fig. 15a. Push battery all the way down!**
   If the batteries are not exchanged within 30 seconds, all stored data will be lost!
6. Replace cover (5) and fasten screws (7).
7. Enter date of insertion of new battery in table (8).
8. Replace control unit, following instructions on page 5.

Furnace servicing

Servicing is normally required only for the following occasional items:

1. Inspection of the thermocouple well (71a) and checking that the thermocouple (71) projects 3 mm perpendicular away from well.
2. Inspection and cleaning of the sealing rim (69) of the furnace base and the sealing ring (35) of the furnace head.

Vacuum pump servicing

Refer to operating and servicing instructions for the vacuum pump.

Change of muffle

The muffle must be changed whenever heating performance becomes inadequate as a result of wear, whenever insufficient heating becomes apparent. (See page 15, Error Indicatons Er23, Er24)

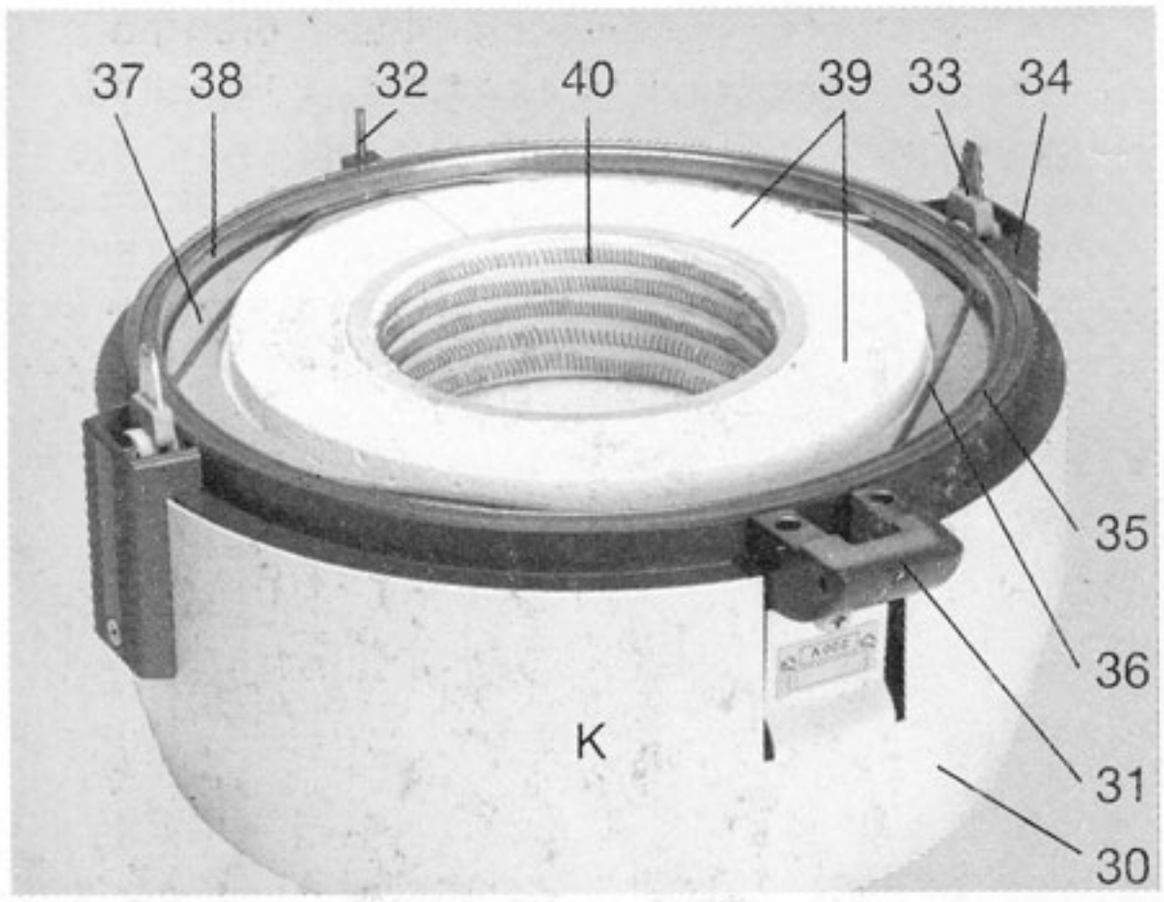


Fig. 16

1. Allow furnace to cool completely!
2. Press ↓ to close furnace.
3. Once the furnace is fully closed, switch off 0/I and unplug mains cable.
4. Lift furnace head (K) clear as shown in Fig. 4 (page 5) and place on a soft surface.
5. Remove muffle, following instructions on page 18.
6. Mount new muffle, following instructions on page 19.
7. Replace furnace head on furnace base, as described on page 4.
8. Plug in mains cable.

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

Dental Servis
Serdar Ayısıt
0555 274 05 51

Removal of muffle

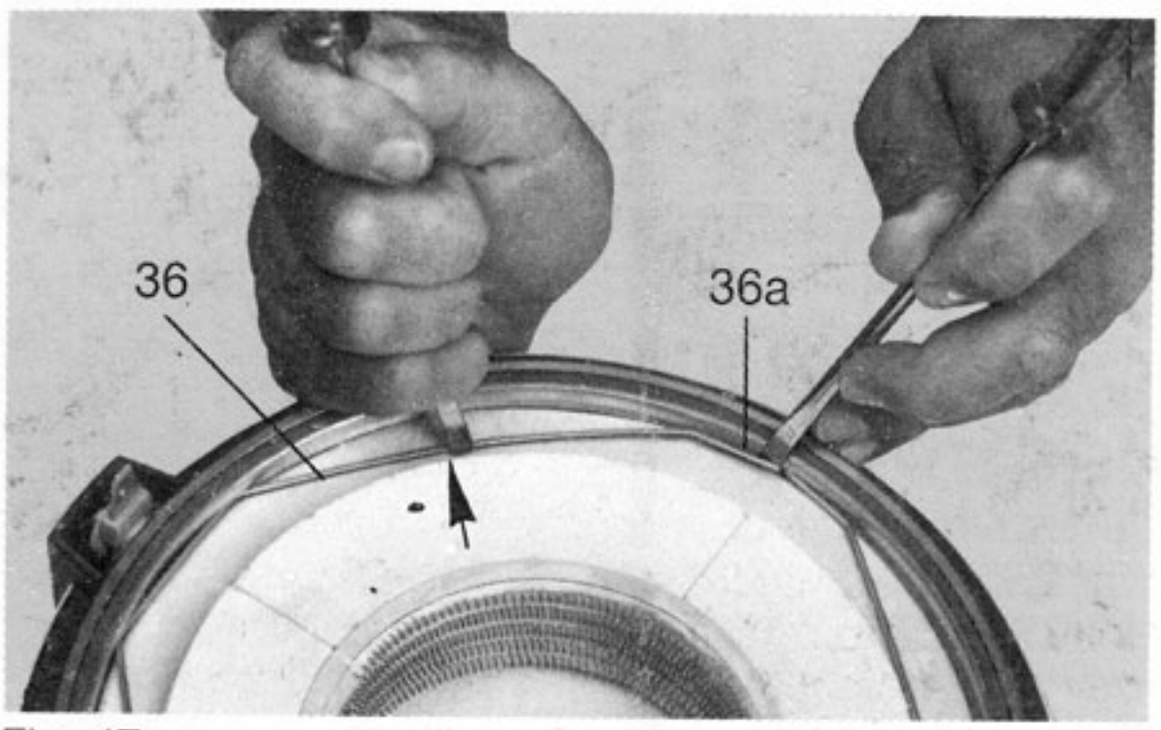


Fig. 17
Press spring clip (36) inwards with screwdriver and, using a second screwdriver, lift end (36a) free. Remove spring clip.

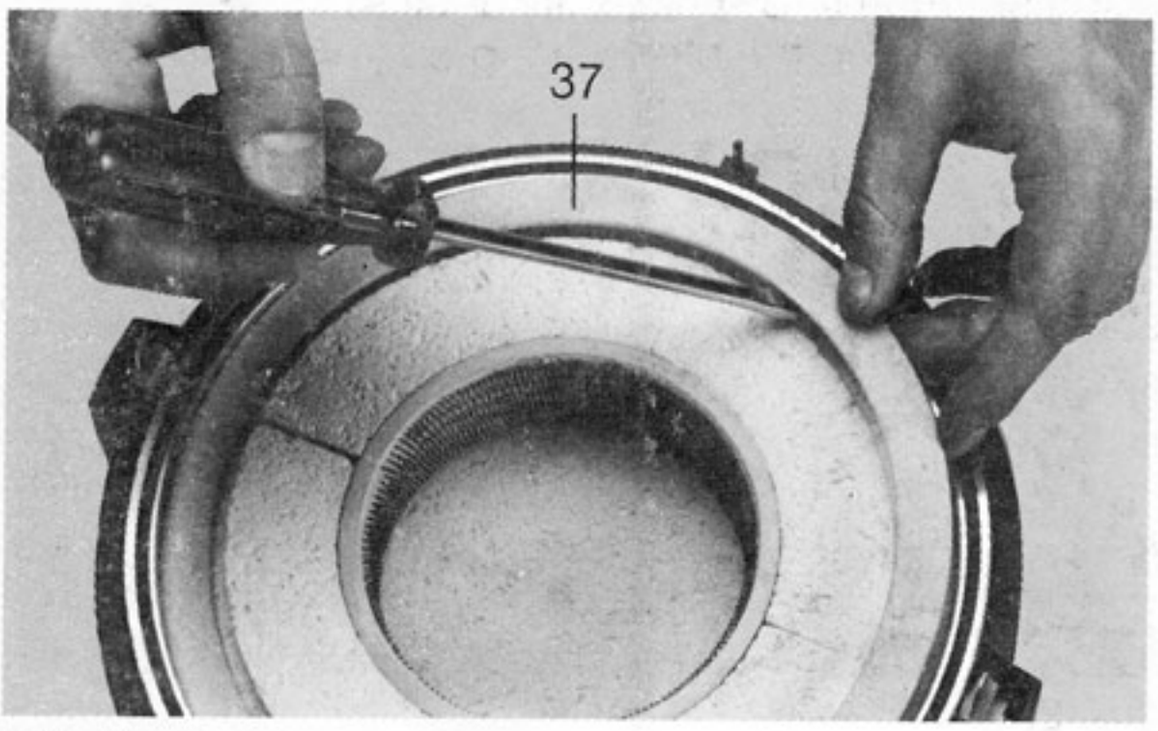


Fig. 18
Lever up and remove ring (37).

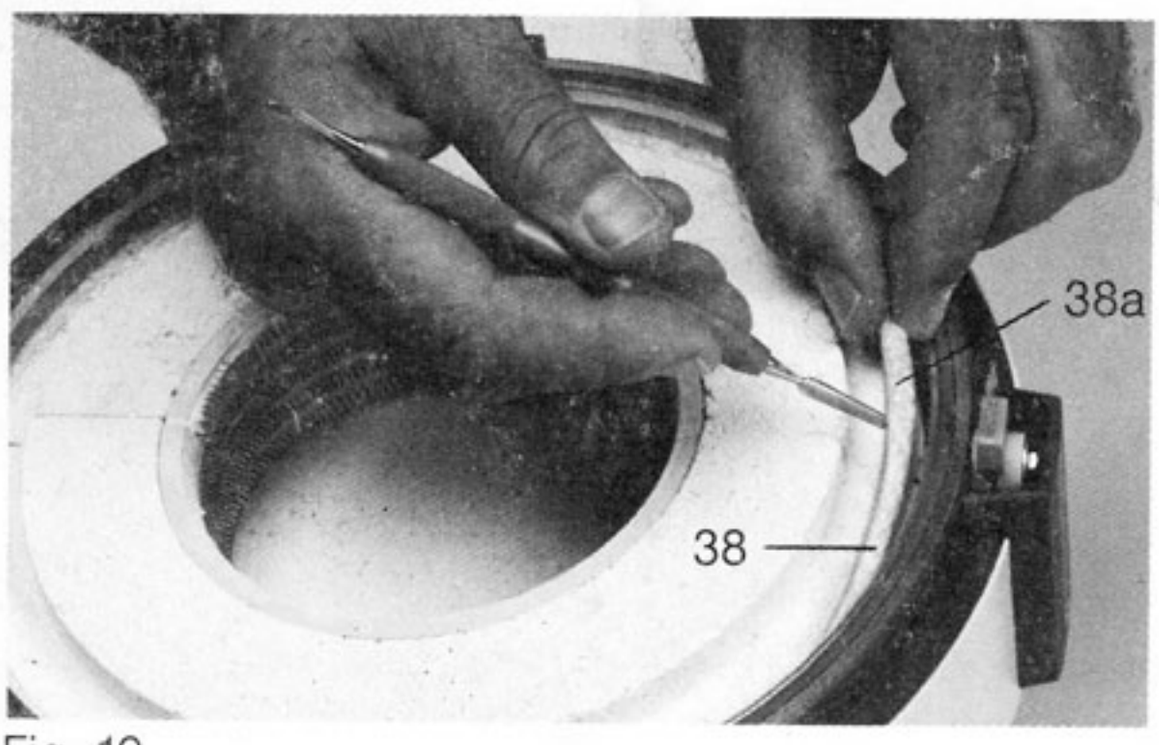


Fig. 19
Lever out ends of insulation cord (38a) with a spatula and gently pull out cord (38) by hand.

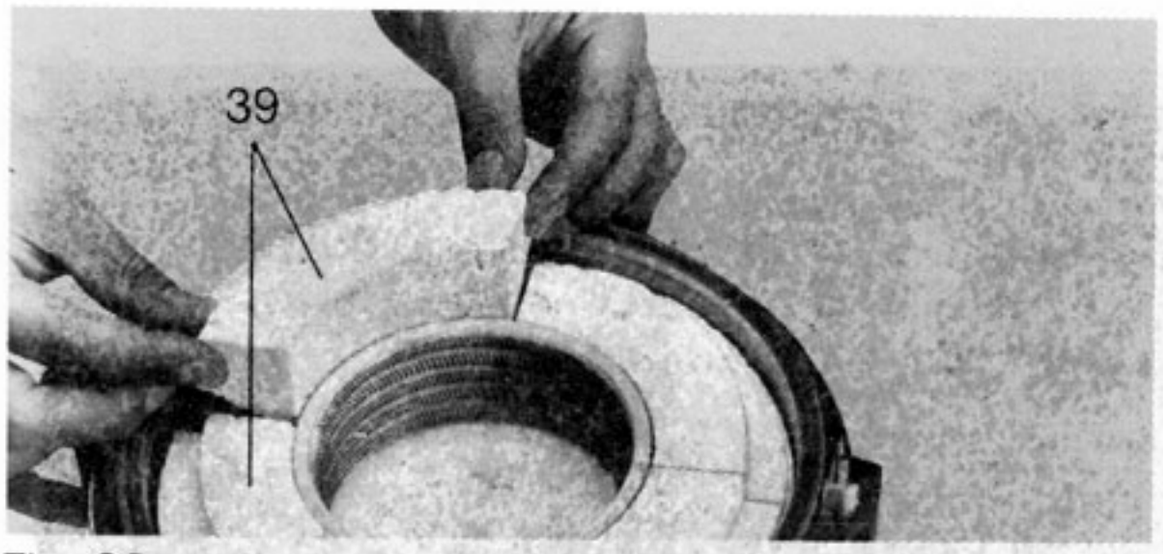


Fig. 20
Carefully remove the four stone lining segments (39).

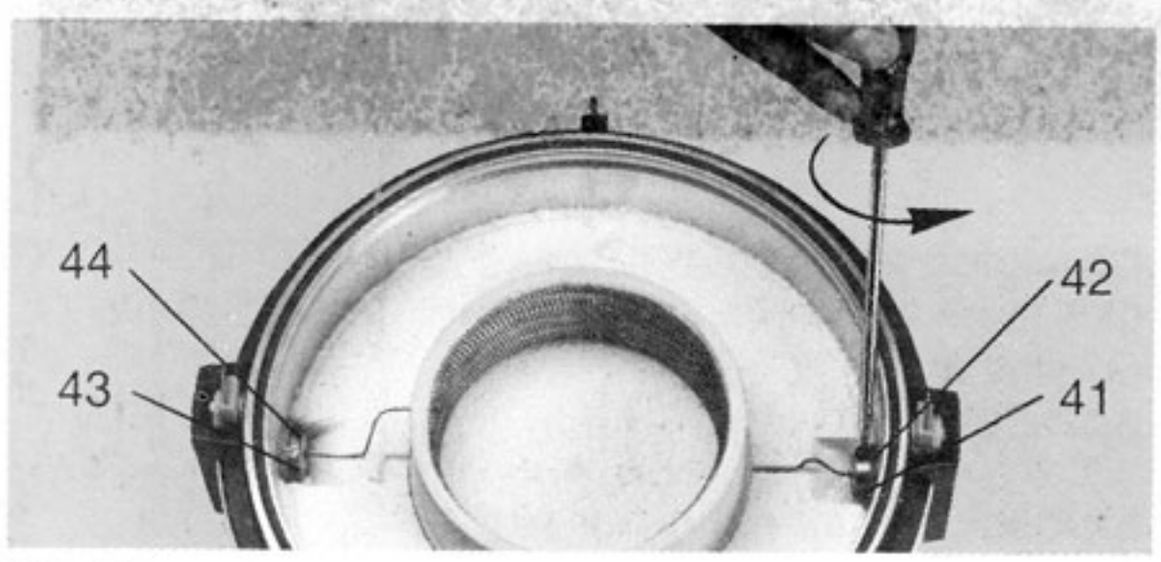


Fig. 21
Release locking screws (42) at terminal (41) with a screwdriver with approx. 6 turns. Also release locking screw (44) at terminal (43).

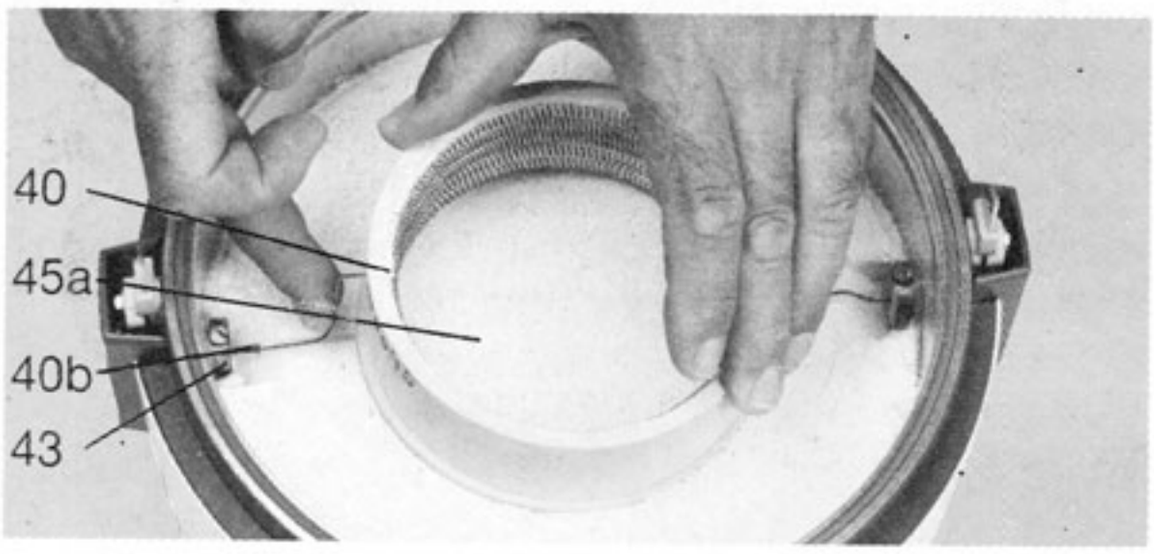


Fig. 22
Withdraw the end of connecting wire (40b) from terminal (43) by tilting the muffle (40) slightly upwards.

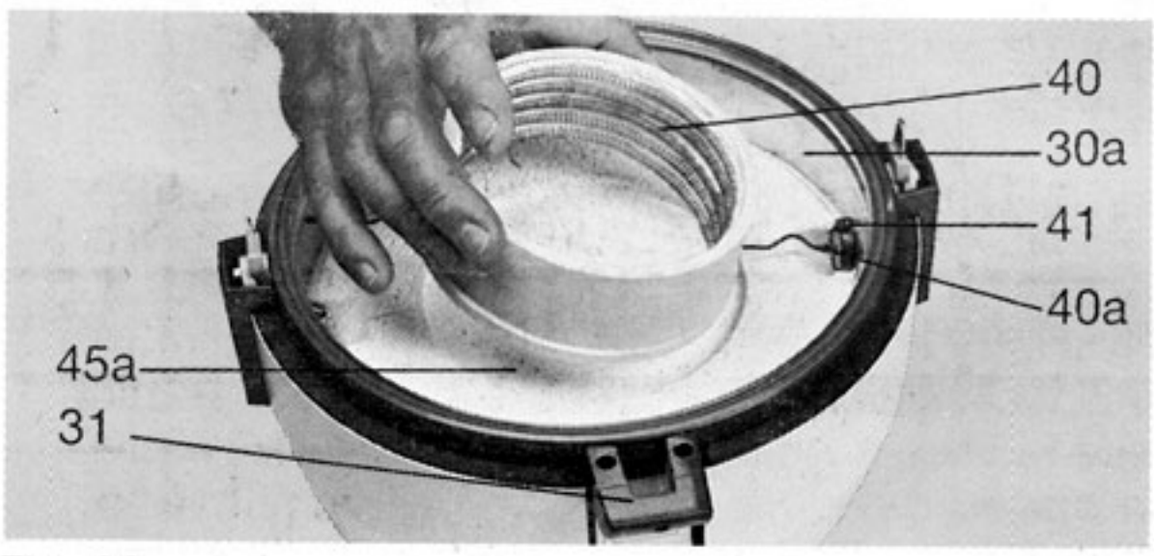


Fig. 23
Withdraw the end of the connecting wire (40a) from terminal (41) and remove muffle (40).

Dental Servis
Serdar Ayısıt
0555 274 05 51

Assembly of muffle

Clean inside wall of dome (30a) and recess in stone roof (45a).

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

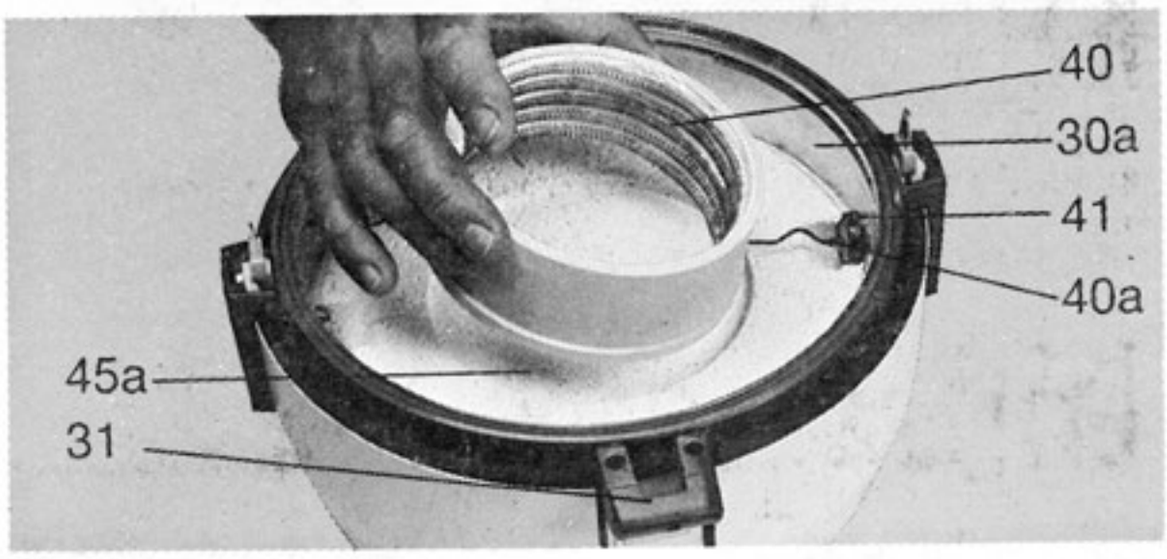


Fig. 24
Insert end of short connecting wire (40a) into the terminal aperture (41).
Important: Ensure fitting with correct side facing mounting lug (31) as shown. Set mark on muffle opposite mark on interior wall of dome (30a)!

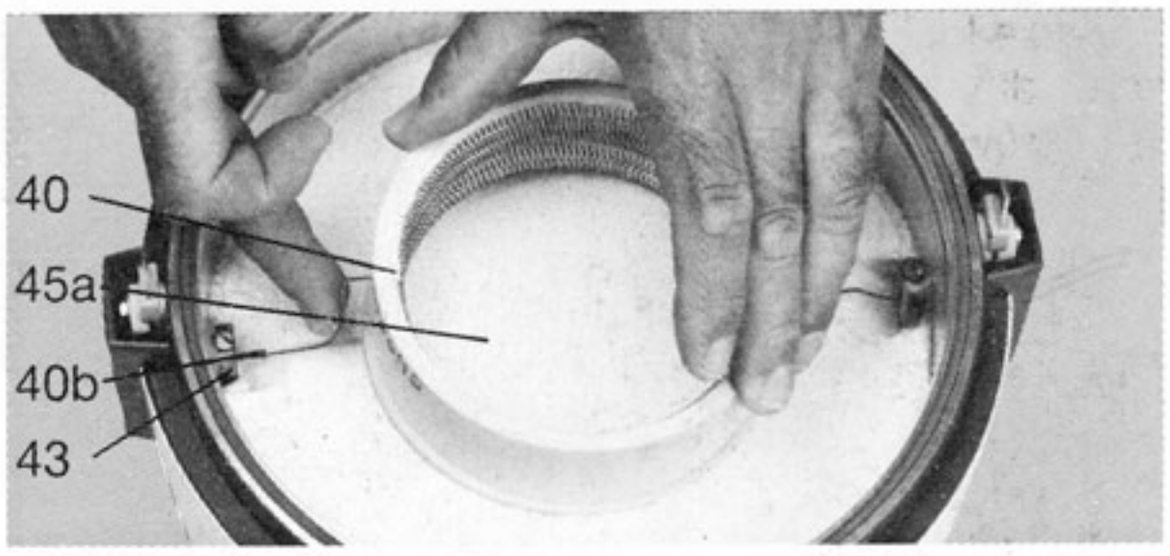


Fig. 25
Insert end of connecting wire (40b) into terminal aperture (43). Set new muffle (40) in recess (45a).

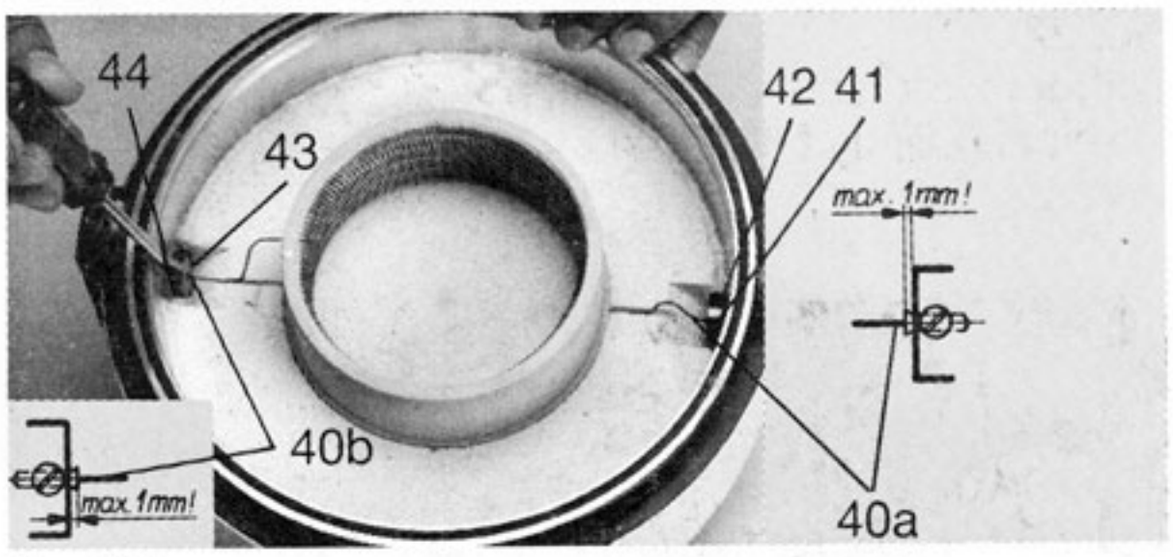


Fig. 26
Fix end of connecting wire (40b) in terminal (43) with locking screw (44). Also fix end of connecting wire (40a) in terminal (41) with locking screw (42).
Important: Ends of connecting wires (40a and 40b) should be situated correctly, as illustrated, and firmly secured in terminals (41 and 43).

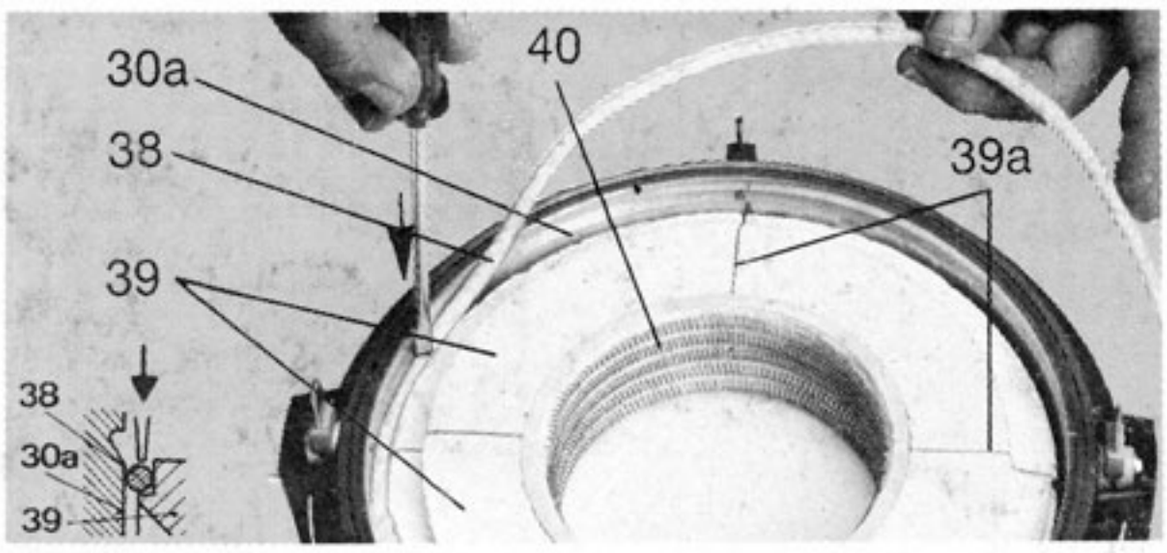


Fig. 27
Reinsert the four stone lining segments (39) so that they rest against the muffle (40) with the four gaps (39a) approximately the same distance apart. Introduce cord (38) by means of a screwdriver, without tensioning, along the entire circumference between the stone lining segments (39) and the interior wall of the cover (30a), as illustrated. Ensure that stone lining segments (39) fit tightly against the muffle. Lay ring (37) on the stone lining segments (39).

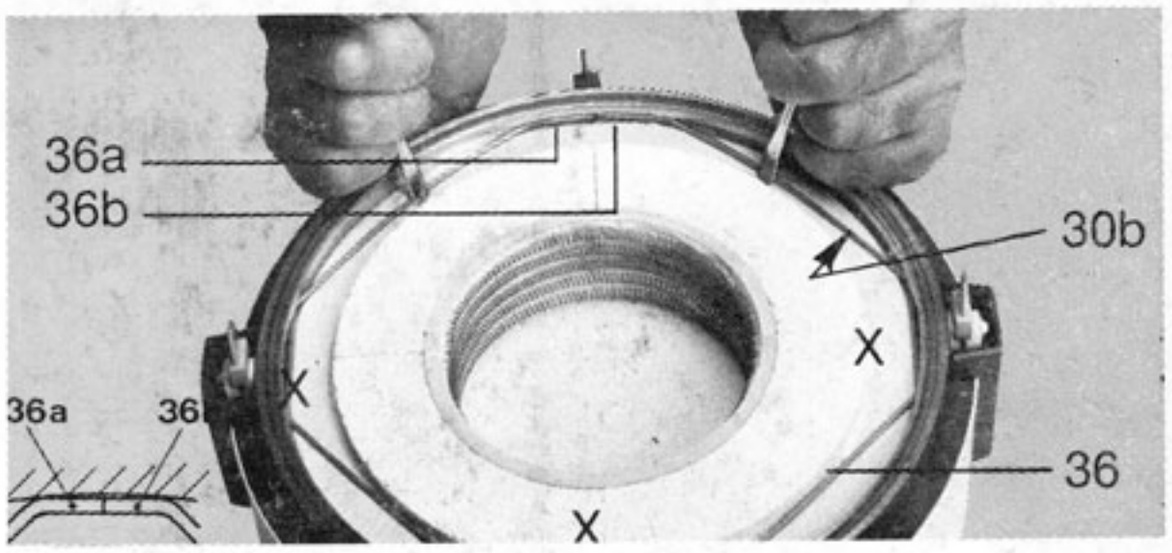


Fig. 28
Secure spring clip (36) under the recess (30b) at the positions marked «X». Pull spring clip (36) against the interior wall of the cover (30a) with two screwdrivers as illustrated, until the ends (36a and 36b) fit together. Slowly release spring clip (36).
Important: The ends (36a and 36b) should securely abut each other as illustrated.

Dental Servis
Serdar Ayısıt
0555 274 05 51