

VITA - Vacumat 500

Operating Manual

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1 Technical Specifications

Dimensions:	Height: 560 mm Width: 360 mm Depth: 335 mm
Firing Chamber (interior space):	Diameter: 96 mm Height: 70 mm
Weight:	19 kg
Power Supply:	110/230 Volts A.C., 50/60 Hz
Max. power consumption:	1,5KW
Classification:	Safety Class I
Fuse:	230V / 8 amp, 110V / 2 amp
Max. firing chamber temperature:	1200°C
Power supply for vacuum pump:	110/230 Volts A.C., 50/60 Hz, max. 0,2 KW
Vacuum pump (optional):	Type PJ 9080-023.3, 110/230 Volts A.C., 50/60 Hz, IP 20 Weight: approx. 6,4 kg

Supply schedule:

Special shipping carton, containing:

- 1 VITA VACUMAT 500 furnace
- 1 control panel
- 1 firing tray
- 1 mains power lead
- 1 pair of furnace tweezers
- 1 set of firing stands A+B, grey
- 1 set of firing stands G, grey
- 1 Operating Manual
- 1 vacuum pump (only supplied on special order)
- supplied with painted casing: 1 aluminium-plate for depositing hot firing trays

If any items are missing, contact your supplier immediately. Save the carton and packaging materials in case you ever need to relocate the furnace.

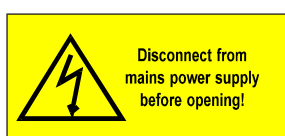
2 Safety advice

This furnace may only be operated with the supplied mains power lead!

Prior to making the electrical connection, make sure that

- the furnace power switch is OFF.
- the furnace voltage matches your power supply. Confirm the line voltage for your furnace by checking the line voltage designation on the rating plate on the back of furnace.
- the protection fuse and the wiring system in your laboratory are suitable to carry the total electric load of the furnace (see rating plate and/or technical specifications).
- the wiring system in your laboratory has an efficient earth connection in compliance with rules and laws in force.
- the plug is inserted into a suitable wall socket which can easily be reached.
- the mains power lead is laid out in such way as to ensure that it does not come into contact with any hot surfaces or objects and that it does not obstruct any passage way.

- The manufacturer disclaims any liability in case these accident-preventing rules are not observed ●



This is a warning symbol about dangerous electrical current. Disconnect furnace from the mains power supply before opening it for maintenance or repair work. Contact your VITA dealer or a qualified service technician if your furnace needs to be repaired or serviced.

Typ PJ 9080-023.3

or

Typ PJ 9081-023.3

This label gives information on the power connection of the vacuum pump.



It is not necessary to clean the inside of the firing chamber, but only to wipe the surface of the insulation at the lower edge of the firing chamber regularly with a damp cloth. This applies also to the O-ring on the lift support plate. The casing can likewise be cleaned using a damp cloth. In order to ensure smooth gliding of the firing tray lift at all times, the lift guide rails should be wiped regularly with a dry cloth.

Never use cleaning agents or flammable liquids for cleaning the furnace

3 Installation and Starting-Up

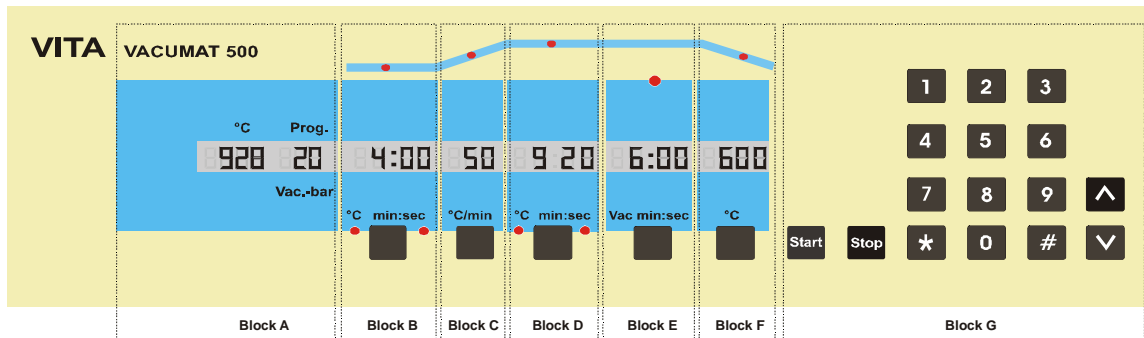
(see also Safety Advice)

1. When positioning the furnace, the minimum distance between all sides of the furnace and any wall should be at least 25 cm.
2. Make sure the furnace power switch is OFF. Connect the furnace to the mains outlet, using the supplied mains power lead.
3. Connect the plug of the vacuum pump to the socket at the rear of the furnace and then slide the vacuum hose onto the nozzle.
4. Attach the operating panel to the front of the casing and connect the spiral cable to the right or left side.
5. Press the Power ON/OFF switch at the left to switch on the furnace. The firing tray lift will descend to its lower position. The LCD indicators in Block A display the current firing chamber temperature and the time of day.
6. Place the firing tray onto the lift support plate.
Notice: Never operate the VITA VACUMAT 500 without the firing tray on the lift support plate. It may cause damage to the furnace.
7. Press the "Start" key. The firing tray ascends into the firing chamber, and the temperature starts rising until it has reached the factory-set starting temperature of 500°C.

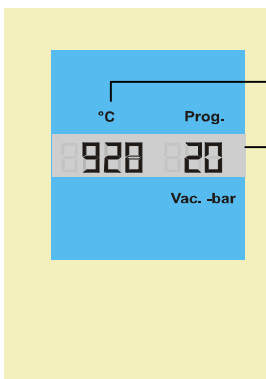
Once the starting temperature has been reached, the furnace is ready for use with any firing program.

For further operating information, see the appropriate section of the Operating Manual.

4 Control panel



4.1 Description (Block A)

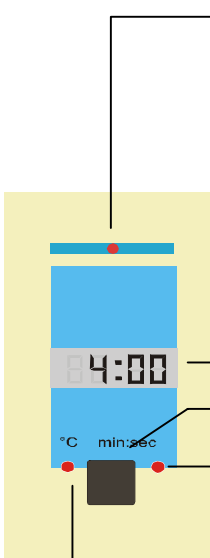


Firing chamber temperature 20°C - 1200°C

1. Program No. 0 Close without heating
2. Program No. 1 - 200 Firing programs
3. Program No. 250 - 295 Utility programs

VACUUM in millibar during active vacuum program

4.2 Description Pre-drying (Block B)



Pre-Drying LED

1. flashes when Input-Mode PRE-DRYING is active
2. „ON“ when PRE-Drying is a step of the selected program
3. flashes when PRE-DRYING is active

Display shows:

1. Stand-by temperature 200°C-800°C
2. PRE-DRYING temperature 200°C-800°C
3. PRE-DRYING time 0:00 min - 40:00min

Activates Input-Mode

1. Changes PRE-DRYING temperature
2. Changes PRE-DRYING time
3. Calls set-points (temperature&time) during running program

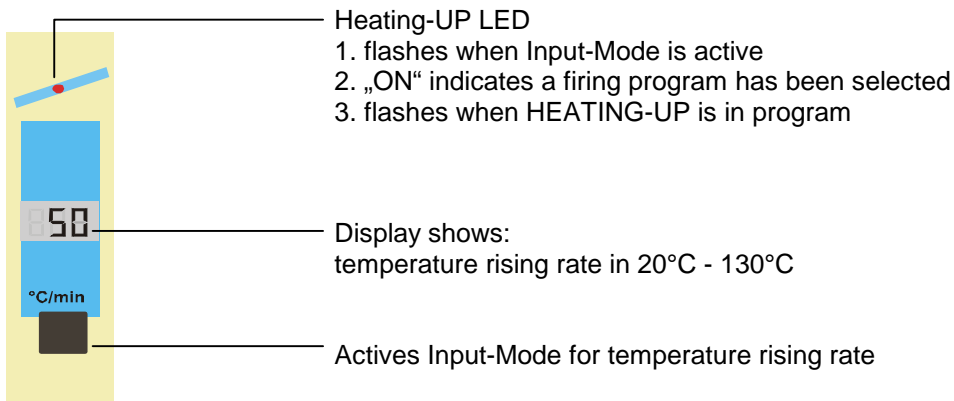
LED min:sec

1. „ON“ when Input-Mode for PRE-Drying time is active
2. „ON“ for approx. 3 sec. when selected PREY-DRYING time is called during running program

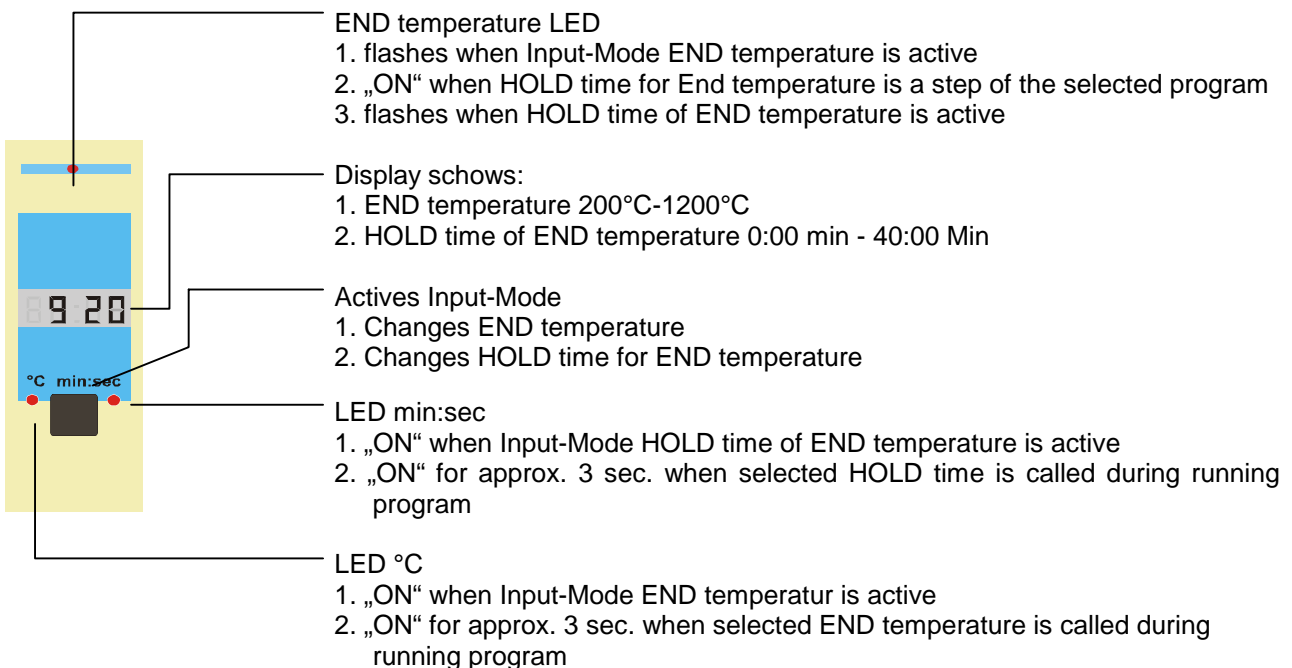
LED °C

1. „ON“ when Input-Mode for PREY-DRYING temperature is active
2. „ON“ for approx. 3 sec. when selected PREY-DRYING temperature is called during running program

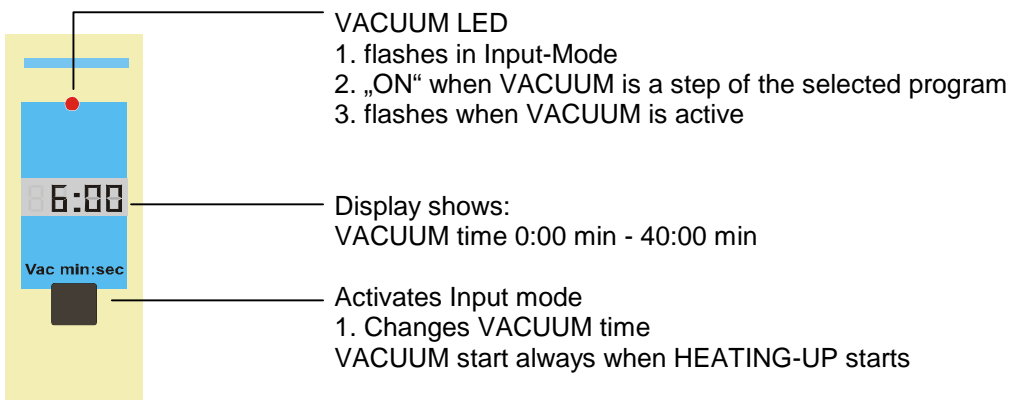
4.3 Description Heating-up (Block C)



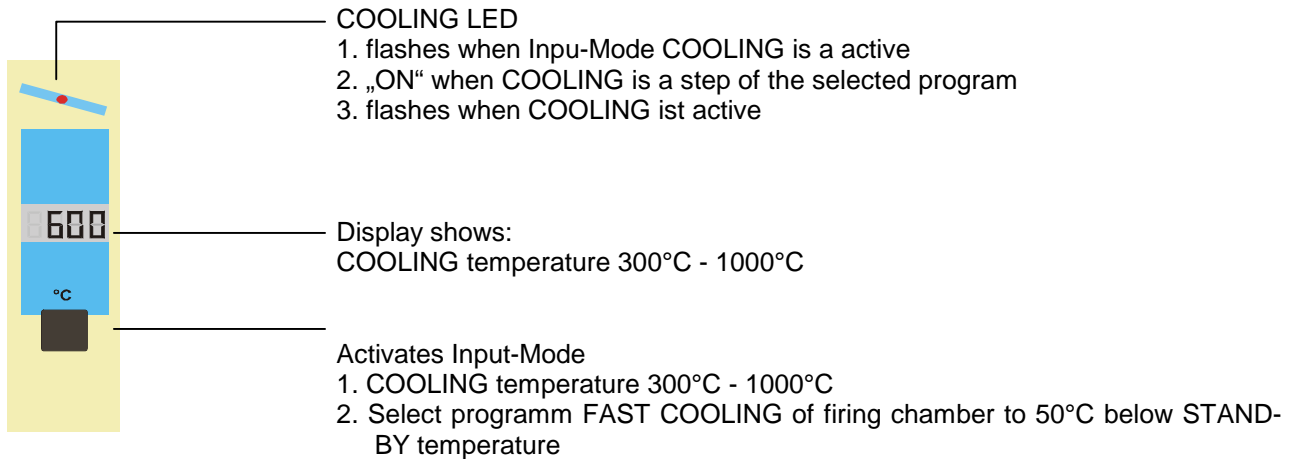
4.4 Description Firing temperature & End temperature (Block D)



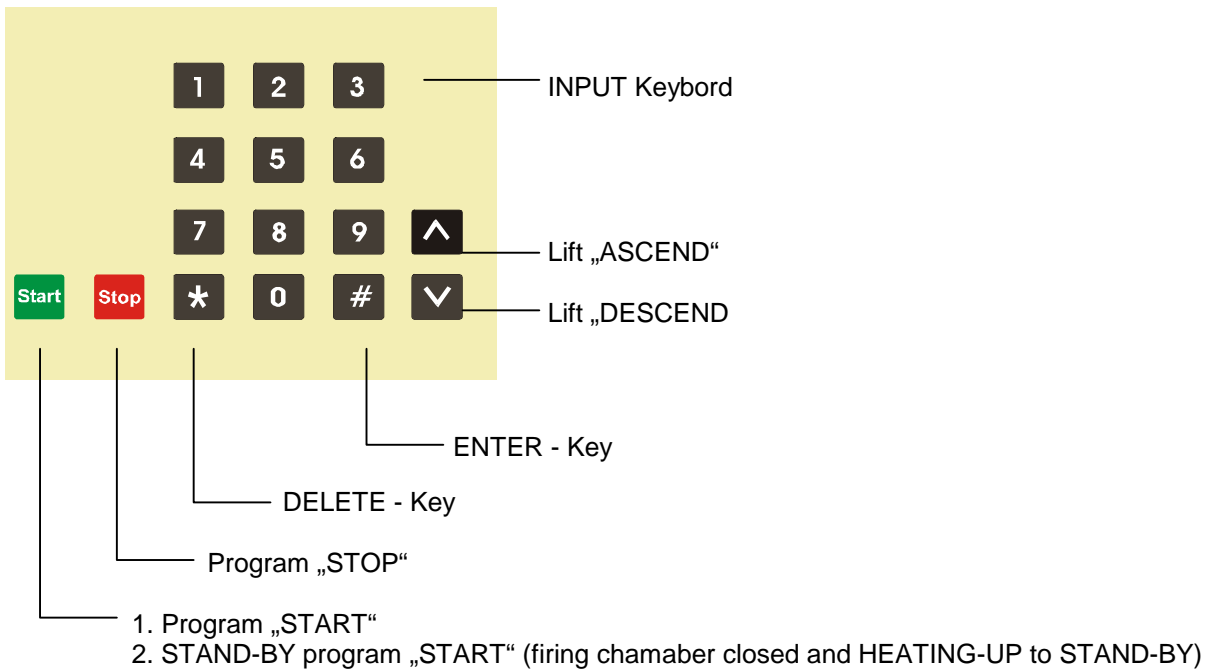
4.5 Description Vacuum (Block E)



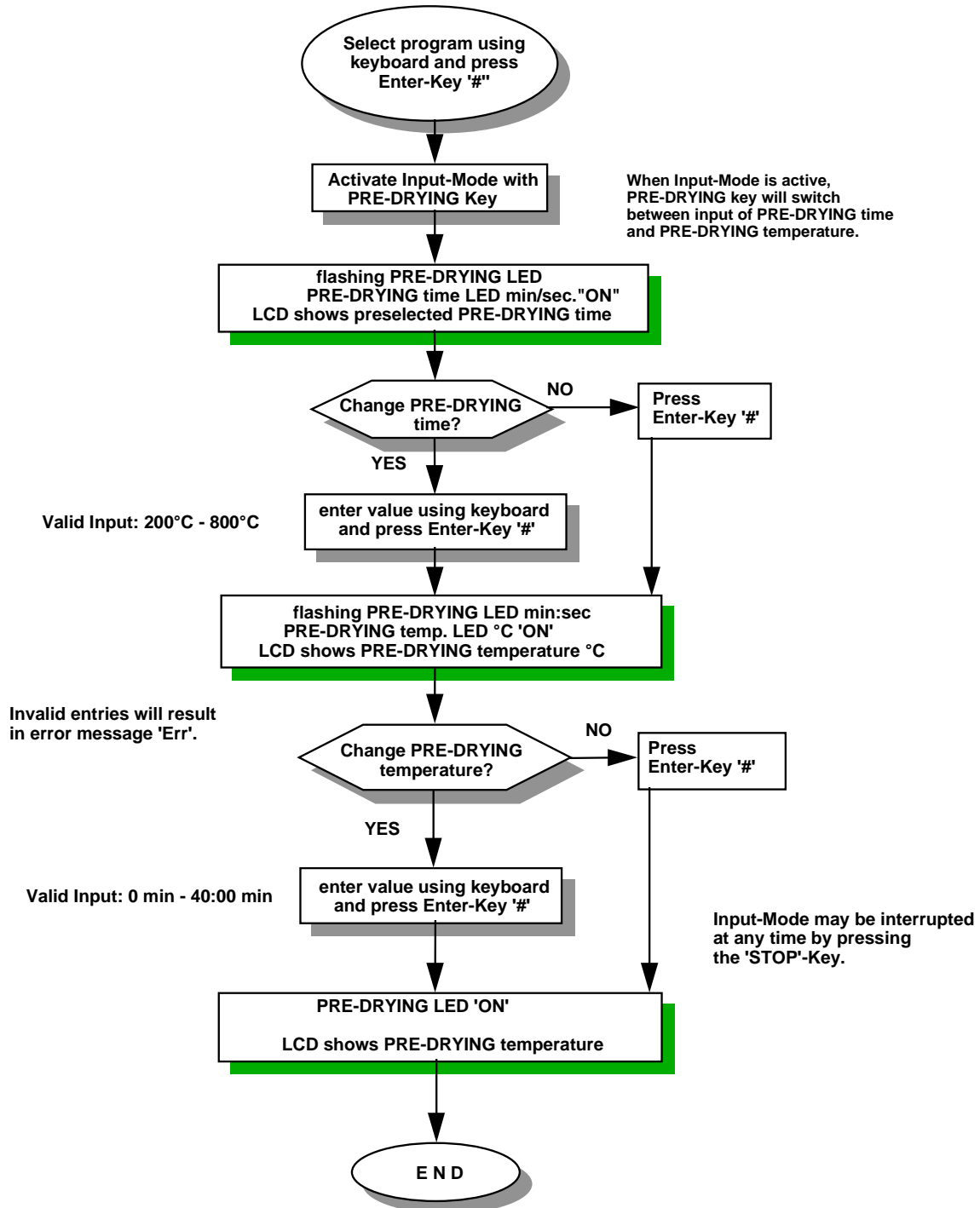
4.6 Description Slow / Fast cooling (Block F)



4.7 Description of Keyboard & Lift position keys (Block G)

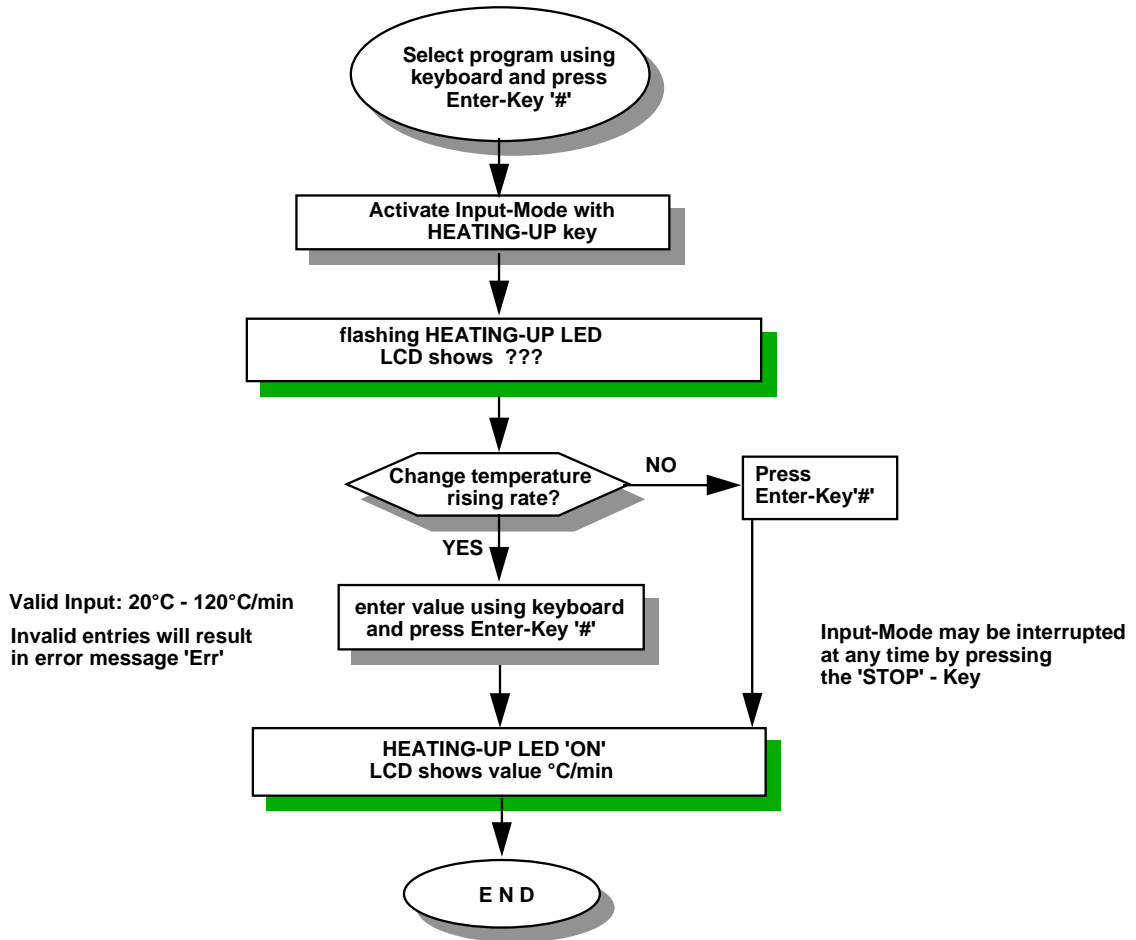


4.8 Operating Block B – Pre-drying temperature & Pre-drying time



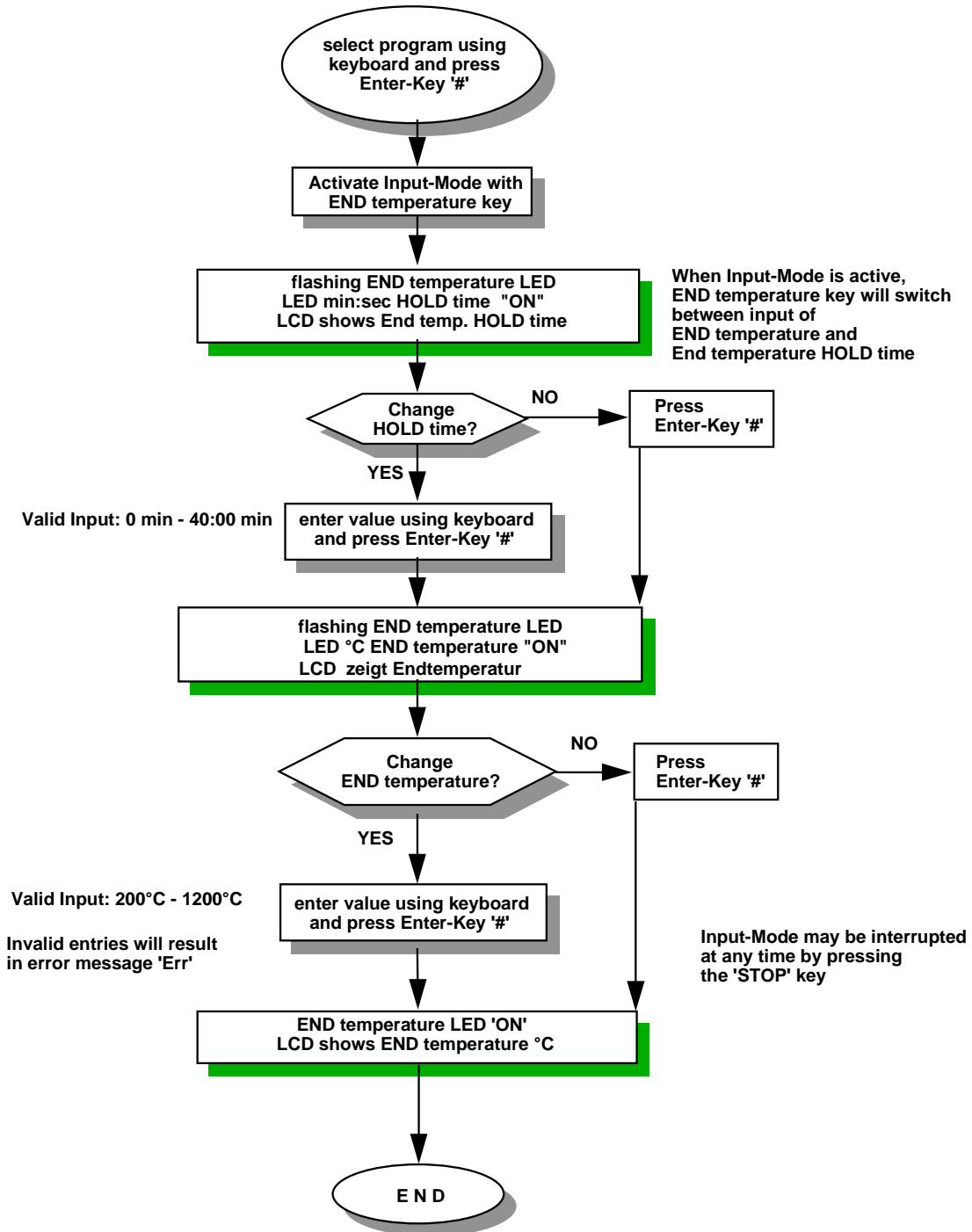
After program start PRE-DRYING values may be changed until PRE-DRYING LED is flashing. Thereafter program sequence is active and changes are no longer possible.

4.9 Operating Block C - Heating up



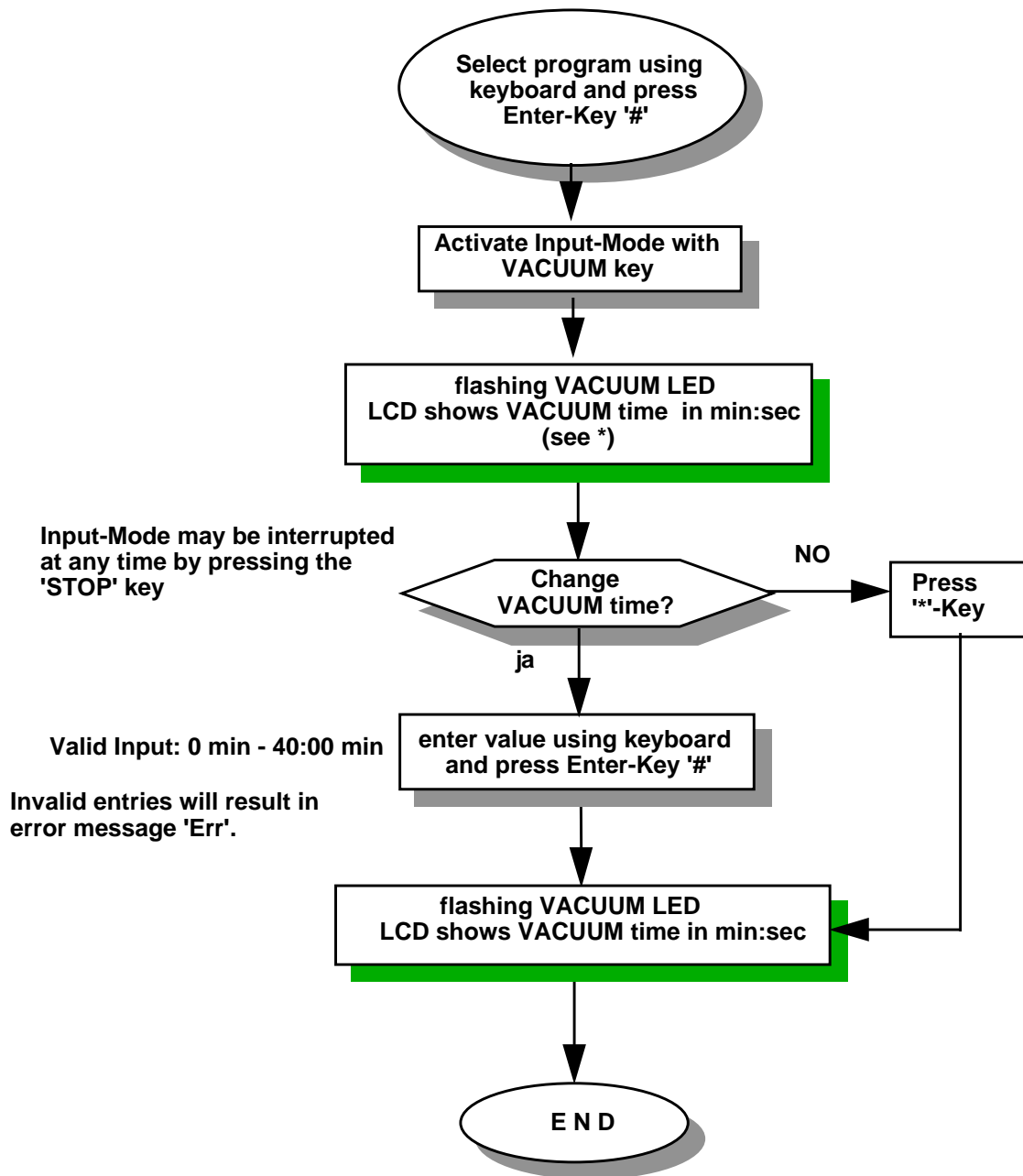
After program start HEATING-UP values may be changed until HEATING-UP LED is flashing. Thereafter program sequence is active and changes are no longer possible.

4.10 Operating Block D - Firing temperature & End temperature



After program start END temperature and END temperature HOLD time may be changed until LED °C or LED min:sec are flashing. Thereafter program sequence is active and changes are no longer possible.

4.11 Operating Block E - Vacuum parameters



* VACUUM time:

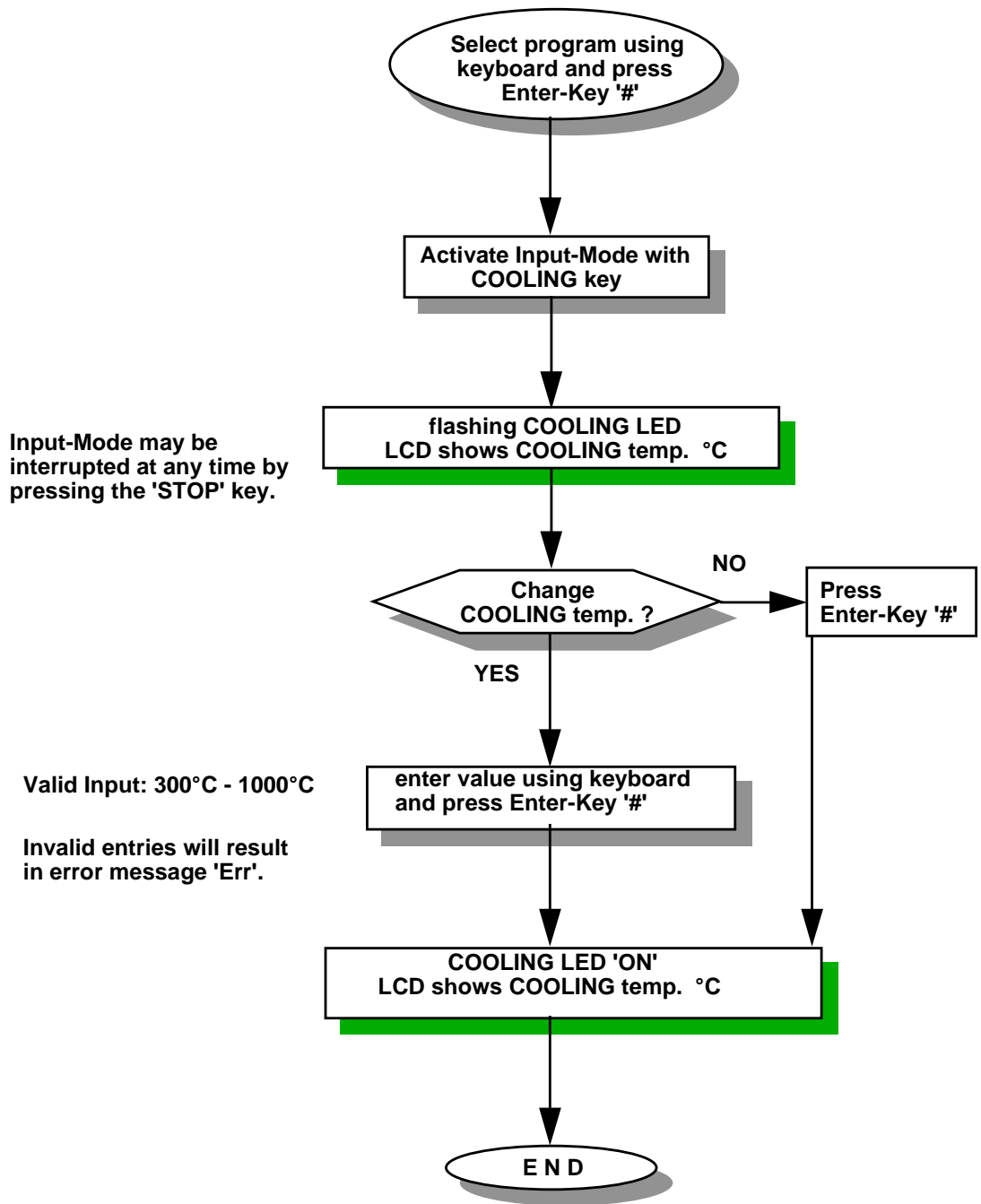
Based on the selected temperature rising rate (°C/min), VACUUM time is calculated and preselected automatically.

The VACUUM pump starts as soon as the temperature starts rising. When END temperature has been reached, VACUUM stops.

The calculated VACUUM active time is equal to the temperature rising time, i.e. until END temperature has been reached.

If either a longer or shorter VACUUM time is required, change the preselected VACUUM time as described above.

4.12 Operating Block F - Slow cooling



After program start COOLING values may be changed until COOLING LED'S are flashing. Thereafter program sequence is active and changes are no longer possible.

5 Adjusting the firing chamber temperature

The VITA - VACUMAT 500 furnace is supplied with a digitally controlled potentiometer for automatic adjustment of the firing chamber temperature. The factory-set temperature test circuit is adjusted as follows: At 1000°C a voltage of 9.25 millivolt may be measured at the built-in thermocouple (PtRhPt). Should the measurements differ during the life of the furnace, the adjustment may be checked and corrected using the supplied program.

The adjustment program is selected as follows:

1. Select program No: 294 and press the "#"-Key

The program displays the following settings:

Pre-drying temperature:	600°C
Pre-drying time:	6:00 min
Heating-up time:	66°C / min
Final temperature:	1000°C
Hold-time for final temperature:	5:00 min

2. press the "Start"-Key

The program starts, parameters may not be changed, the program must be stopped by pressing the "Stop" Key.

The LCD-Display in Block A indicates the temperature of the firing chamber in °C (degrees Celsius).
The LCD-Display in Block B indicates the value in millivolt.

After two minutes in the hold-phase at a temperature of 1000°C, a short signal sounds which indicates the lift-keys "UP / DOWN" may now be used for adjustment. Using the "UP / DOWN" keys (UP = Increase, DOWN = Decrease), the voltage value may now be adjusted to 9.25 millivolt. At a temperature range of 1000°C a change of 0.01 millivolt causes a change in the firing chamber temperature of 1°C.

6 Protection against Power failure

The VITA VACUMAT 500 is protected against power failure. This backup device is activated immediately in the event of a mains power failure during a firing or stand-by program. If the power failure lasts for less than 20 seconds the program continues. In case of power failure for more than 20 seconds the program is aborted and the following is displayed:

The LCD-Display of Block B indicates the phase where the program aborted:

- Phase 1 = Pre-drying phase
- Phase 2 = Heating-up phase
- Phase 3 = Hold-temperature phase
- Phase 4 = Cooling phase

Pressing of the "STOP"-key deletes all messages and the furnace is once more ready for use.

Notice: In case of the mains power supply in the laboratory being turned off accidentally with the furnace in operation or on stand-by, the same symptoms as those of a power failure will be indicated after the power resumes.

7 Utilities

All programs listed may be selected by entering the respective program number using the keyboard (BlockH). The selection must be confirmed by pressing the "#"-Key. The programs may only be selected if no firing program is active. To stop or cancel a program, press the "Stop"-Key

Number	Program	Description	Display	Operating Keys
276 + #	Show Operating Hours	Display in hours and minutes	LCD Block A	
277 + #	Show Software Version	displays software version	LCD Block A	
281 + #	Stand-by temperature	Entry: 200°C - 800°C (500°C ∂)	LCD Block B	Keys Block G + #
282 + #	Set signal on program end	Selection 1 = signals once Selection 2 = continuous signal ∂	LCD Block B	Pre-Drying Key + #
283 + #	program termination with 'Stop' Key	Selection 1 = press 'Stop' 2x Selection 2 = press 'Stop' once ∂	LCD Block B	Pre-Drying Key + #
284 + #	start firing program when temperature of firing chamber is higher than stand-by temperature	Selection 1 = start when temp. is higher than stand-by temperature ∂ Selection 2 = start at stand-by temperature	LCD Block B	Pre-Drying Key + #
285 + #	Set volume	select '0' - '9'	LCD Block B	Keys Block G + #
289 + #	Initialization	all factory-set time/date values are read into memory (VITA settings)	LCD Block B	
291+ #	Liftpositions: Pre-Drying and Cool-Down	Pos.1, 1st pre-drying step Value 0 - 40 Pos.2, 2nd pre-drying step Value 30 - 60 Pos.3, 3rd pre-drying step Value 50 - 150 Pos.4, cool-down step Value 30 - 120 Inv., intervall time Value 10 - 60 sec	LCD Block B	input with Block G + # keys select pos. with pre-drying key
292 + #	Lift speed	select S up 0 - 99 select S down 0 - 99	lower LCD Block B	Keys Block G + # select using pre-drying key
293 + #	Lift stop	select L up 0 - 99 select L down 0 - 99	lower LCD Block B	Keys Block G + # select using pre-drying key
294 + #	Temperature-Adjustment	see description 'Adjusting the firing chamber temperature'		
0	close firing chamber without heating			Keys Block G + #

∂ Factory settings

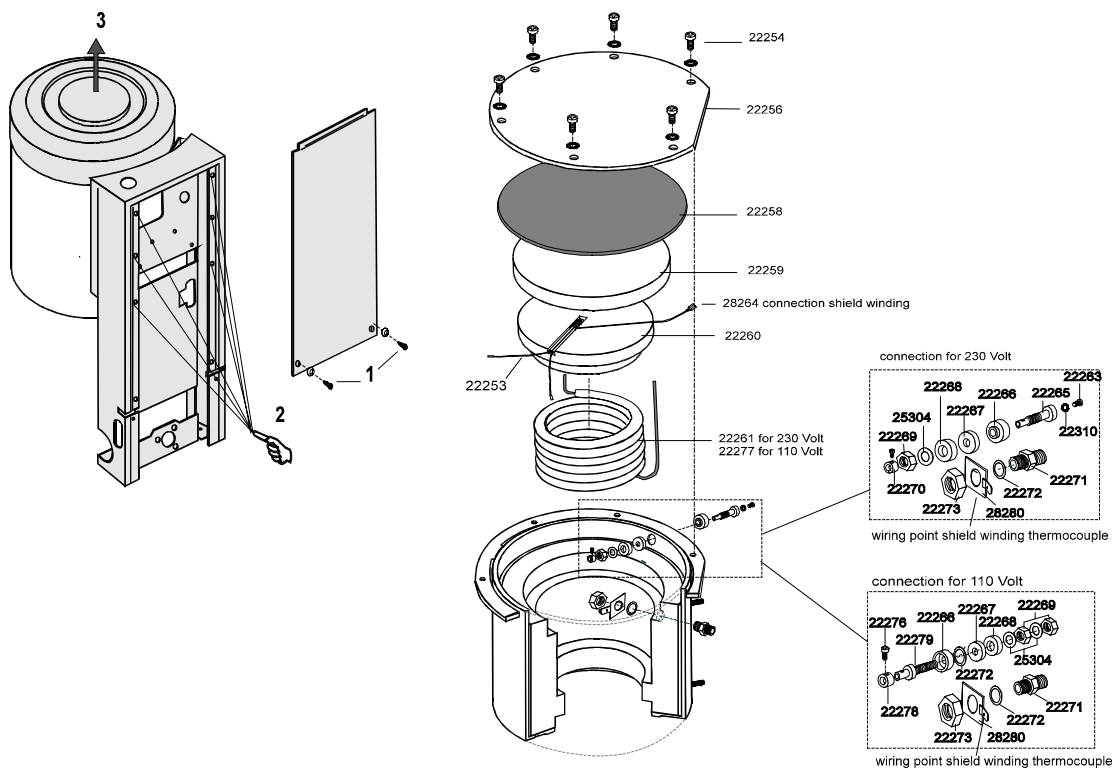
8 Changing the muffle



- Only to be carried out by a qualified service technician!
- Contact your VITA dealer or authorized service personnel!

Switch off furnace and disconnect from the mains power supply!

1. Unscrew the 2 screws on the rear panel and remove it.
2. Unscrew the six screws on the top casing of the furnace.
3. Lift off top casing of the furnace
4. Unscrew and remove the screws (22254) on the top cover of ring chamber.
5. Disconnect all wires from the thermocouple.
6. Lift out insulation stone complete with thermocouple.
7. Disconnect the wires from the defective quartz glass spiral muffle and then lift it out.
8. Place new muffle into position, then reassemble the furnace in reverse order to that given above



CAUTION: Do not forget to reconnect the earthed conductor wire to the furnace top casing!

9 Error Messages / Service

The VITA - VACUMAT 500 furnace is equipped with a self - checking system which detects and indicates possible errors. The following error messages may occur:

- Err 1** the required i.e. the preselected temperature has been exceeded by 80 °C.
1. Hardware failure, change CPU-board
- Err 2** Rupture of thermocouple
1. Defective temperature sensor, change thermocouple
- Err 3** Error in vacuum system
1. Check and clean lift plate seal and lower edge of firing chamber
2. Check/change seals at firing chamber connections.
3. Check vacuum pump, change of membran and/or valve flap may be required.
- Err 4** Furnace does not heat
1. Check/change fuse T8H 110 V at back of furnace
2. Check/change firing muffle
- Err M** Should the lift not have reached ist upper or lower within a certain time, the error message „errM“ will appear in flash mode in the temperature indicator °C. At the same time, this monitors the microswitches for the upper lift positions.

The error message „errM“ will also appear if the microswitch contact is defect. To delete the error message „errM“, press „STOP“ key. The time lapse until this error message appears can be set using programm 901 and key #. The time value can be selected in the range 10 - 20 seconds; the factory stored value is 15 seconds. The time selected must be longer than the time the lift drier takes to move from the lower to the upper position. If the time is too short, the motor will switch off too early and the lift will be unable to reach ist nd position. In case of incorrect input of program parameters, a short signal indicates the error and the last valid input is assumed. In order to recognize the reliable closing contact of the mocroswitches, the debounce-time is set via program no. 902 and key #. The range for the setting is 2 - 10 (number x 15 msec. = debounce time). The factory-set value is 3. This setting should not be altered.

In case of incorrect input of program parameters, a short signal indicates the error and the last valid input is assumed.

In case of recurring "Err"-Messages after Power OFF/ON, please contact the VACUMAT service Department of your local VITA distributor.

10 Additional service advice

Daily usage of the VITA VACUMAT 500 is highly demanding. Due to external influence, such as very fine dust, the lift drive system needs to be cleaned regularly with a dry cloth.

The following problems/changes may be solved using the supplied utilities:

1. Lift drive too slow : Program 292 increases/decreases the lift speed.
2. Change lift position „Pre-Drying“ and „Cooling“: Program 291 will change the respective positions.

For servicing, the VITA VACUMAT 500 may only be shipped in special packing cases. If the original packing case is unavailable, special packing cases may be ordered.

11 Firing Cycle

VITA OMEGA	Progr. no.	Pre-Drying °C	→ min.	↗ °C/min.	Temp. approx °C	→ min.	VAC
Oxidation firing	1	600	0.00	110	980	5.00	---
NEW (1) 1st opaque firing (powder)	2	600	2.00	55	970	1.00	x
1st opaque firing (paste)	52	500	6.00	110	950	1.00	x
NEW (1) 2st opaque firing (powder)	3	600	2.00	55	950	1.00	x
2st opaque firing (paste)	53	500	6.00	55	930	1.00	x
Dentine firing	4	600	6.00	55	930	1.00	x
2nd dentine firing	5	600	6.00	55	920	1.00	x
3rd dentine firing	6	600	6.00	55	910	1.00	x
Glaze firing	7	600	0.00	110	930	1.00	---
Glaze firing with VITACHROM DELTA Fluid / Akzent Fluid	8	600	4.00	110	930	1.00	---
Glaze firing with Glasurmasse 740 / Akz 25	9	600	4.00	100	900	1.00	---
Margin porcelain firing "MARGIN*"	10	600	6.00	55	950	1.00	x

(1) = Firing of opaque porcelains marked with an asterisk at approx. 20°C higher.

The vacuum time, indicated in the "VAC" column by an „X", results automatically from the given temperature rise °C/min. The vacuum switches on at the beginning of the temperature rise and switches off again when the end temperature is reached. Follow manufacturer's instructions !

VITA OMEGA 900	Progr. no.	Pre-Drying °C	→ min.	↗ °C/min.	Temp. approx °C	→ min.	VAC
Oxidation firing	41	Follow manufacturer's instructions !					
1st opaque firing (powder)	42	600	2.00	75	900	2.00	x
1st opaque firing (paste)	54	500	6.00	50	900	3.00	x
2st opaque firing (powder)	43	600	2.00	75	900	1.00	x
2st opaque firing (paste)	55	500	6.00	50	900	2.00	x
Dentine firing	44	600	6.00	50	900	1.00	x
2nd dentine firing	45	600	6.00	50	890	1.00	x
3rd dentine firing	46	600	6.00	50	890	1.00	x
Glaze firing	47	600	0.00	75	900	2.00	---
Glaze firing with VITACHROM DELTA Fluid / Akzent Fluid	48	600	4.00	75	900	2.00	---
Glaze firing with Glasurmasse 740 / Akz 25	49	600	4.00	75	900	1.00	---
Margin porcelain firing "LUMINARY"	50	600	6.00	50	900	2.00	x

Alloys with a thermal expansion coefficient $\geq 14.5 \times 10^{-6} \times K^{-1}$ should be fired using slow cooling from the 1st dentine firing onwards. Slow cooling from firing temperature to starting temperature should take no less than 5 minutes. This increases the leucite content in the metal ceramic and raises the thermal expansion coefficient of the ceramic.

The vacuum time, indicated in the "VAC" column by an "X", results automatically from the given temperature rise °C/min. The vacuum switches on at the beginning of the temperature rise and switches off again when the end temperature is reached.

VITA VMK 95	Progr. no.	Pre-Drying °C	→ min.	↗ °C/min.	Temp. approx °C	→ min.	VAC
Oxidation firing	11	600	0.00	110	980	5.00	---
1st opaque firing (powder)	12	600	2.00	55	950	1.00	x
1st opaque firing (paste)	52	500	6.00	110	950	1.00	x
2st opaque firing (powder)	13	600	2.00	55	930	1.00	x
2st opaque firing (paste)	53	500	6.00	55	930	1.00	x
Dentine firing	14	600	6.00	55	930	1.00	x
2nd dentine firing	15	600	6.00	55	930	1.00	x
3rd dentine firing	16	600	6.00	55	920	1.00	x
Correction porcelain firing CORRECTIVE	*)	600	4.00	50	900	1.00	---
Glaze firing	17	600	0.00	110	930	1.00	---
Glaze firing with VITACHROM DELTA Fluid / Akzent Fluid	18	600	4.00	110	930	1.00	---
Glaze firing with Glasurmasse 740 / Akz 25	19	600	4.00	100	900	1.00	---
Margin porcelain firing "MARGIN"	20	600	6.00	55	930	1.00	x

*) = Enter program number yourself

The vacuum time, indicated in the "VAC" column by an "X", results automatically from the given temperature rise °C/min. The vacuum switches on at the beginning of the temperature rise and switches off again when the end temperature is reached.

VITA VMK 68	Progr. no.	Pre-Drying °C	→ min.	↗ °C/min.	Temp. approx °C	→ min.	VAC
Oxidation firing	21	600	0.00	110	980	5.00	---
1st opaque firing	22	600	2.00	110	950	1.00	x
2st opaque firing	23	600	2.00	55	930	1.00	x
Dentine firing	24	600	6.00	55	930	1.00	x
2nd dentine firing	25	600	6.00	55	920	1.00	x
3rd dentine firing	26	600	6.00	55	910	1.00	x
Glaze firing	27	600	0.00	110	930	1.00	---
Glaze firing with VITACHROM DELTA Fluid / Akzent Fluid	28	600	4.00	110	930	1.00	---
Glaze firing with Glasurmasse 740 / Akz 25	29	600	4.00	100	900	1.00	---

VMK 68 N porcelains should all be fired at approx. 10°C higher.

The vacuum time, indicated in the "VAC" column by an "X", results automatically from the given temperature rise °C/min. The vacuum switches on at the beginning of the temperature rise and switches off again when the end temperature is reached.

VITADUR ALPHA	Progr. no.	Pre-Drying °C	→ min.	↗ °C/min.	Temp. approx °C	→ min.	VAC
Hard core porcelain	31	600	0.00	90	1.120	2.00	x
Hard core porcelain with provile	*)	600	0.00	90	1.120	2.00	x
Dentine firing	32	600	6.00	60	960	1.00	x
1st +2st corection firing	33	600	6.00	60	950	1.00	x
Glaze firing	34	600	0.00	60	940	1.00	---
Glaze firing with VITACHROM DELTA Fluid / Akzent Fluid	35	600	4.00	110	940	1.00	---
Glaze firing with Glasurmasse 740 / Akz 25	36	600	4.00	110	920	1.00	---

*) = Enter program number yourself

The vacuum time, indicated in the "VAC" column by an "X", results automatically from the given temperature rise °C/min. The vacuum switches on at the beginning of the temperature rise and switches off again when the end temperature is reached.

Additional programs	Progr. no. *)	Pre-Drying °C	→ min.	↗ °C/min.	Temp. approx °C	→ min.	VAC
Metall - Corrector	91	600	2.00	75	1.040	1.00	---
Spectra-Gold	92	550	0.00	90	820	1.00	---
Furnace soldering 1	93	600	5.00	40	800	3.00	---
Furnace soldering 2	94	600	1.00	50	800	4.00	---

Soldering in the VITA VACUMAT

Method 1:

Preheat the restoration, complete with flux and beads solder, in a preheating furnace for 15 – 20 min. at 400°C.

Program no. 93

End temperature is the working temperature of the chosen soldering material + 50°C.

Pre-drying time: 5.00 min
 Heating-up time: 40°C/min
 Hold time: 3.00 min

Method 2:

Preheat the restoration, with flux but without solder, in a preheating furnace for 15 – 20 min. at 400°C.

Program no. 94

End temperature is the working temperature of the chosen soldering material + 50°C.

Pre-drying time: 1.00 min
 Heating-up time: 50°C/min
 Hold time: 4.00 min