VITA - Vacumat 2500

Service - Manual

Table of Contents

1 Technical specifications

Dimensions:	Height: 560 mm Width: 360 mm Depth: 335 mm
Firing chamber (interior space):	Diameter: 96 mm Height: 70 mm
Weight:	19,0 kg
Power Supply:	110/230 Volts A.C., 50/60 Hz
Max. power consumption:	1,5 KW
Classification:	Safety Class 1
Fuse:	230V / 8 amp, 110V / 2 amp
Max. firing chamber temperature:	1200°C
Power supply for vacuum pump:	110/230 Volts A.C., 50/60Hz, max. 0.2KW
Vacuum pump (optional):	Type PJ 9080-023.3, 110/230 Volts A.C., 50/60Hz, IP 20 Weight: approx. 6,4 kg

Supply schedule:

Special shipping carton, containing:

1 VITA VACUMAT 2500 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 glass platform for depositing hot firing trays

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

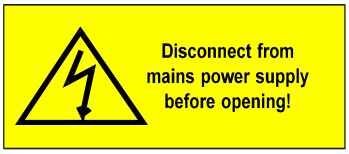
2 Safety advice

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 PM 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 low 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

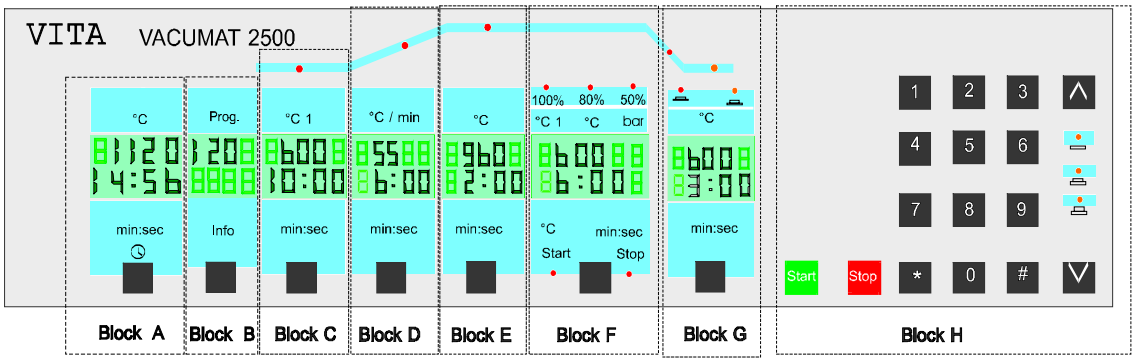
(see also Safety Advice)

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 fuirnace. The firing tray lift will descendto 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.

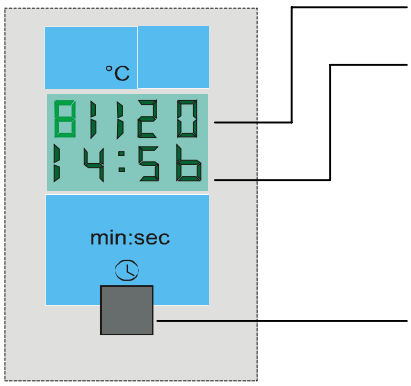
Once the starting temperature has been reached, the furnace is ready for use with any firing program.

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

4 Control panel



4.1 **Description** (Block A)

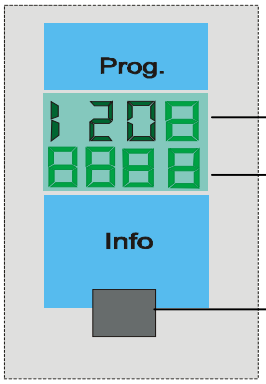


Display shows: Firing chamber temperarture 20°C - 1200°C

Display shows:
1. Time of day (while no firing program has been selected)
2. Time remaining of running firirng program
3. Date (call via key when no program is actve)
4. Utility values
5. Error messages
6. Millivolt display in adjustment program

Calls vaues utility programms

4.2 **Description** (Block B)

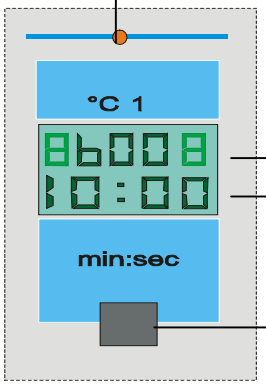


Display shows: Program No.: 1 – 499 (Firing programs 1 – 300)

Display shows:
1. Values for utility programms
2. Status for additional control panel (showa „OFF“ for disabled panel)
3. Programm phase in which power failure ocurred

Calls values for utility programs

4.3 **Description pre-drying** (Block C)



PRE-Drying LED
1. „ON“ when PRE-Drying is a phase of the selected program
2. flashes in Input-Mode
3. flashes when PRE-Drying is active
4. flashes when STAND-BY program is actic

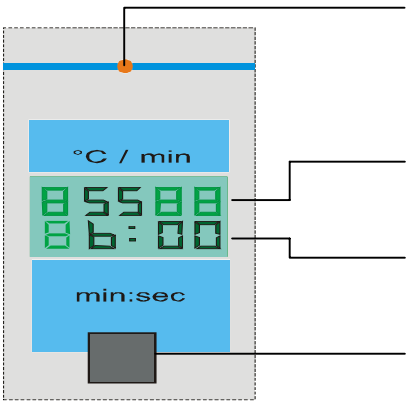
Display shows:
1. STAND-BY temperature 200°C - 800°C
2. PRE-Drying temperature 200°C - 800°C

Display shows:
1. PRE-Drying time 00:00 min - 40:00 min
2. Time remaining of running program
3. Set-Point during running program (when pressing Input-Mode key)

Activates Input-Mode
1. Changes PRE-Drying temperature
2. Changes PRE-Drying time
3. Calls set-points during running program

To select lift positions for PRE-Drying, see Block H - Keyboard &Lift Positions Keys
To edit values, see Operating Block C - PRE-Drying Temperature&Temperature Hold.

4.4 **Description heating-up** (Block D)



HEATING-UP LED
1. „ON“ indicates a firing program has been selected
2. flashes in Input-Mode
3. flashes whwn HEATING-Up is in Process

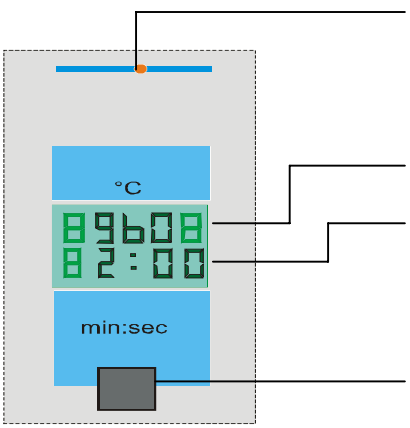
Display showes: Temperatur rising rate in °C/min
Valid entries 20°C/min 120°C/min

Temperatur rising time in min:sec
Valid entries 3:00min - 20:00min

Activates Input-Mode
1. Temperature rising rate in °C/min
2. Temperature rising time min:sec
3. Call set-points during running programm

To edit values, see „Operating Block D - HEATING-UP“

4.5 **Description firing temperature & end temperature** (Block E)



END temperatur LED
1. „ON“ indicates a firing program has been selected
2. flashes in Input-Mode
3. flashes whwn END temperatur „HOLD“ is active

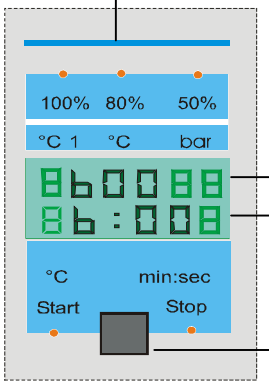
Display shows END temperature 200°C - 1200°C

Dispaly shows:
1. Time for firing at END temperature
2. Remaining time of running program
3. Set-Point during running program (when pressing Input-Mode key)

Acitvates Input-Mode
1. END temperature 200°C - 1200°C
2. Temperature rising time min:sec
3. Call set-points during running programm

To edit values, see „Operating Block E - Firing temperature & Temperature HOLD“

4.6 **Description vacuum parameters** (Block F)



MAX.Vacuum and reduced VACUUM LED

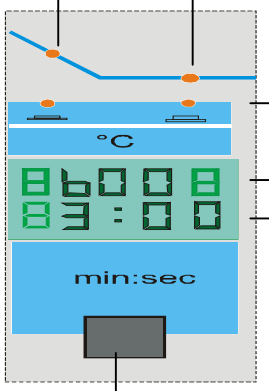
Display shows:
1. VACUUM pump START either:
a) at the beginning of the heating-up phase
(display shows PRE-Drying temp.)
b) at a selectable temperature during HEATING-Up
2. Vacuum in millibar during active vacuum program

Display shows:
1. Vacuum „STOP“ controlled by temperature
(max value = end temperature)
2. Vacuum „STOP“ controlled by time (1:00 - 60:00 min)

Activates Input-Mode
1. Vacuum pump „START“ controlled by temperatue
2. Vacum pump „STOP“ controlled by time
3. Vacuum pump „STOP“ cotrolled by tempertature
4. Calls set-points during running program

To edit values, see Operating Block F- Vacuum Parameters

4.7 **Description slow cooling** (Block G)



COOLING LED
1. flashes when COOLING is a phase of the selected program
2. flashes in Input-Pode
3. flashes when COOLING is the active phase in the running programm
4. flashes in FAST COOLING phase of firing chamber

COOLING „HOLD“ LED
1. flashes when COOLING „HOLD“ is a phase of the selected program
2. flashes in Input-Pode
3. flashes in COOLING „HOLD“ phase

Flashes in Input-Mod
1. flashes when COOLNG with closed or open firing chamber has been selected
2. flashes in Input-Mod
3. flashes in COOLING phae

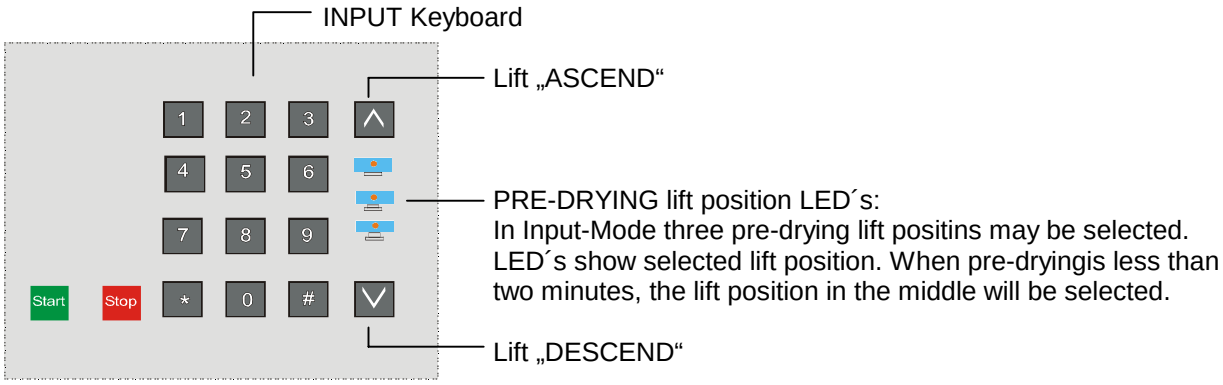
Display shows:
1. COOLING teperature 300°C - 1000°C
2. Fas COOLING of firing chamber to 50 °C below STAND-BY temperature

Display COOLING phase „HOLD“ 00:00 min - 40:00 min

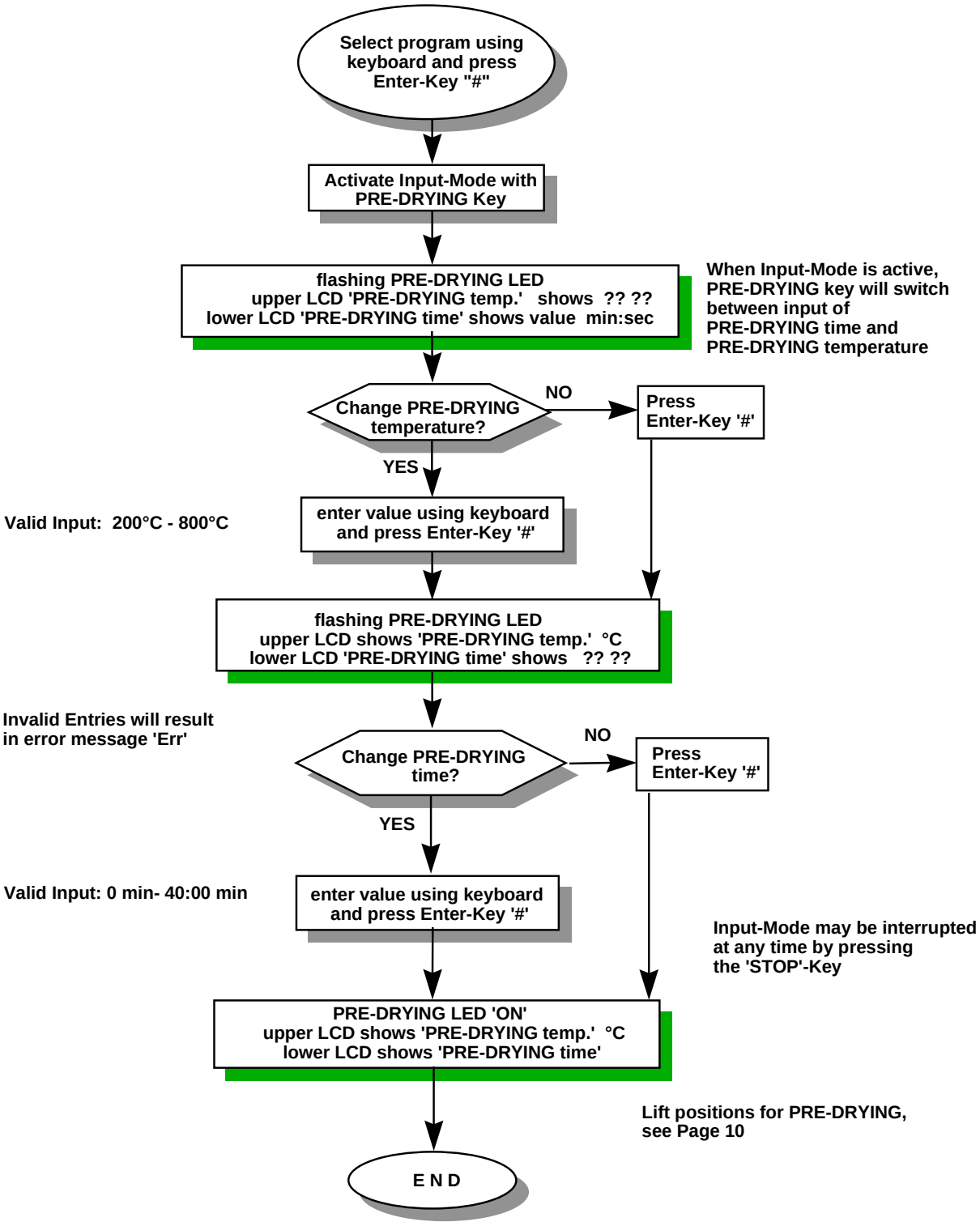
Activates Input-Mode
1. COOLING temperature 300°C - 1000°C
2. Time for COOLING „HOLD“ 0:00 min - 40:00 min
3. Select lift tray position
4. Select programm FAST COOLING of firing chamber to 50°C below STAND-BY temperature

To edit values, see Operating Block G - SLOW COOLING

4.8 **Description of keyboard & lift position keys** (Block H)

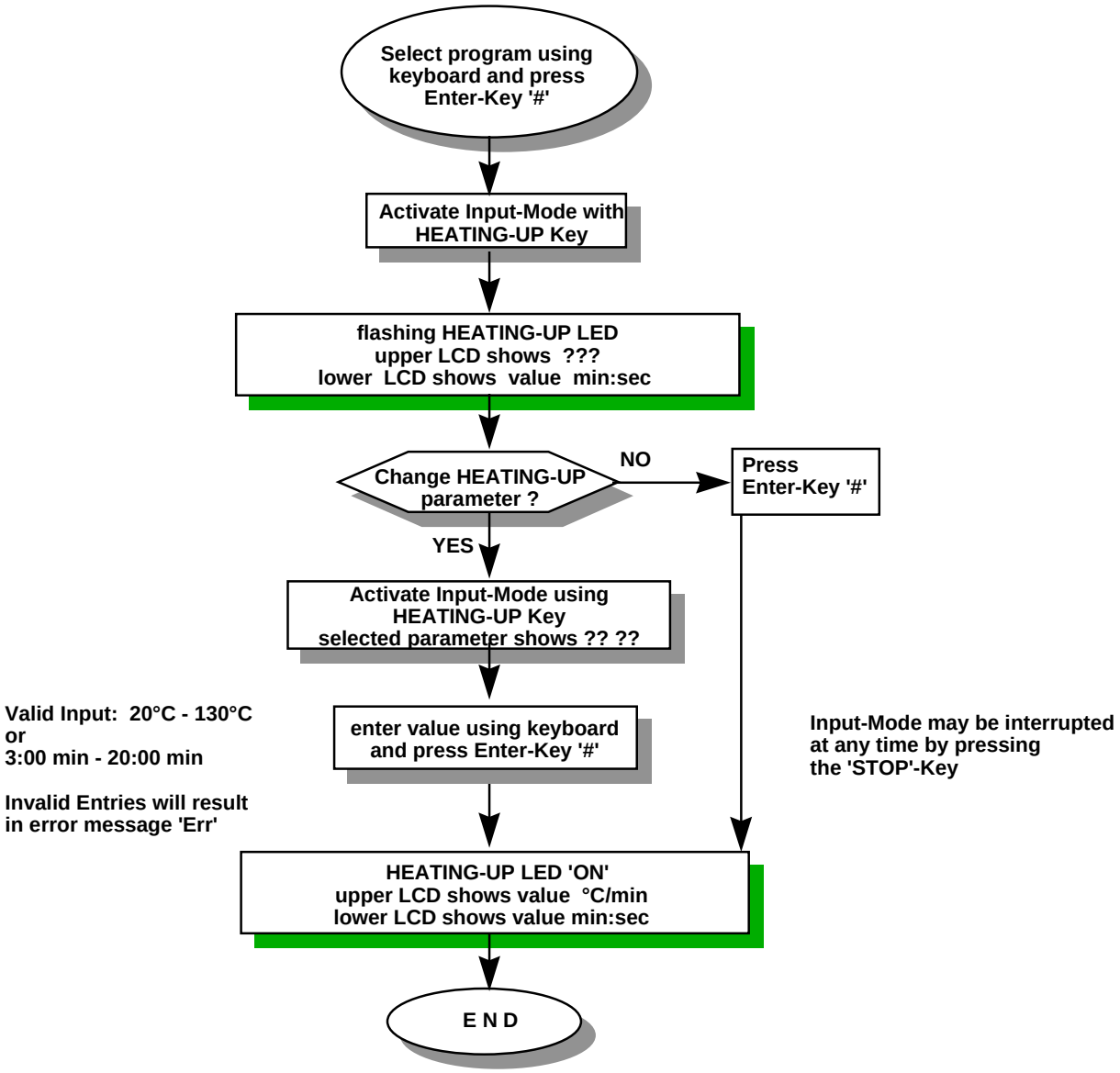


4.9 **Operating Block C -** pre-drying temperature & pre-drying time



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.

4.10 Operating Block D- heating-up

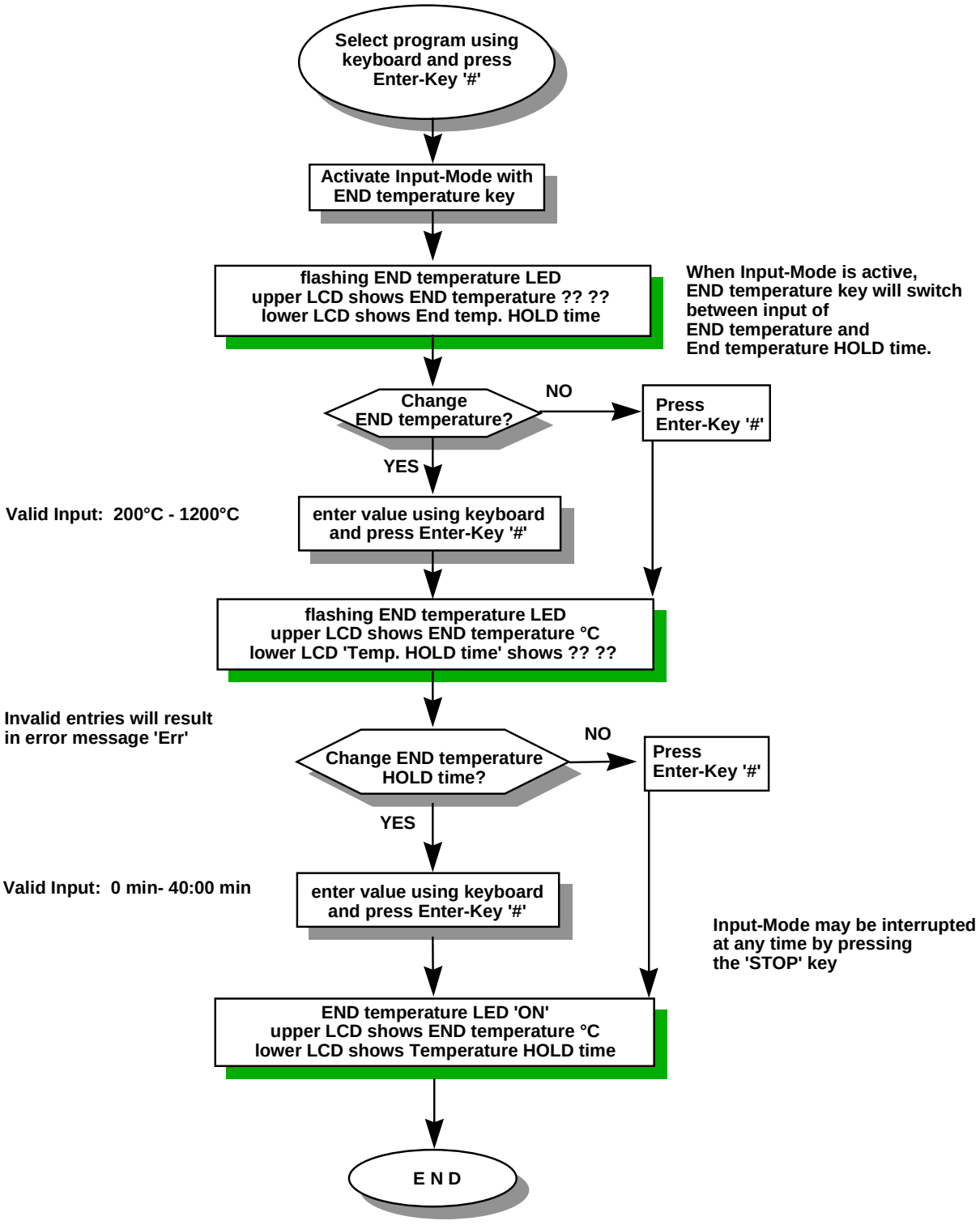


Notice: **Changes of PRE-DRYING temperature or END temperature after this input sequence will result in a change of the HEATING-UP time (min:sec). The HEATING-UP rate (°C/min) is not affected.**

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.

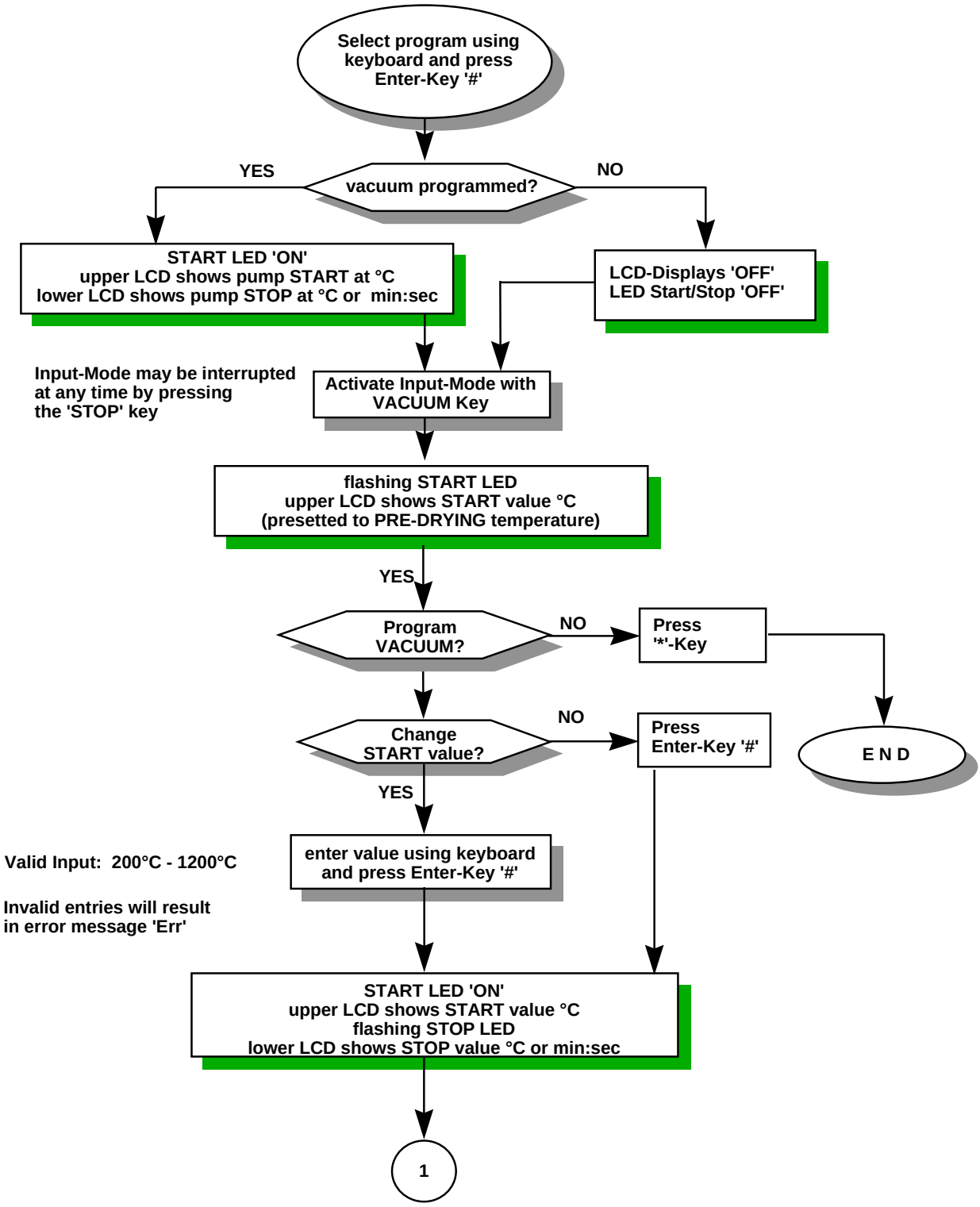
To call the set-points display during the running program, press the HEATING-UP Key. Display-Reset is done automatically.

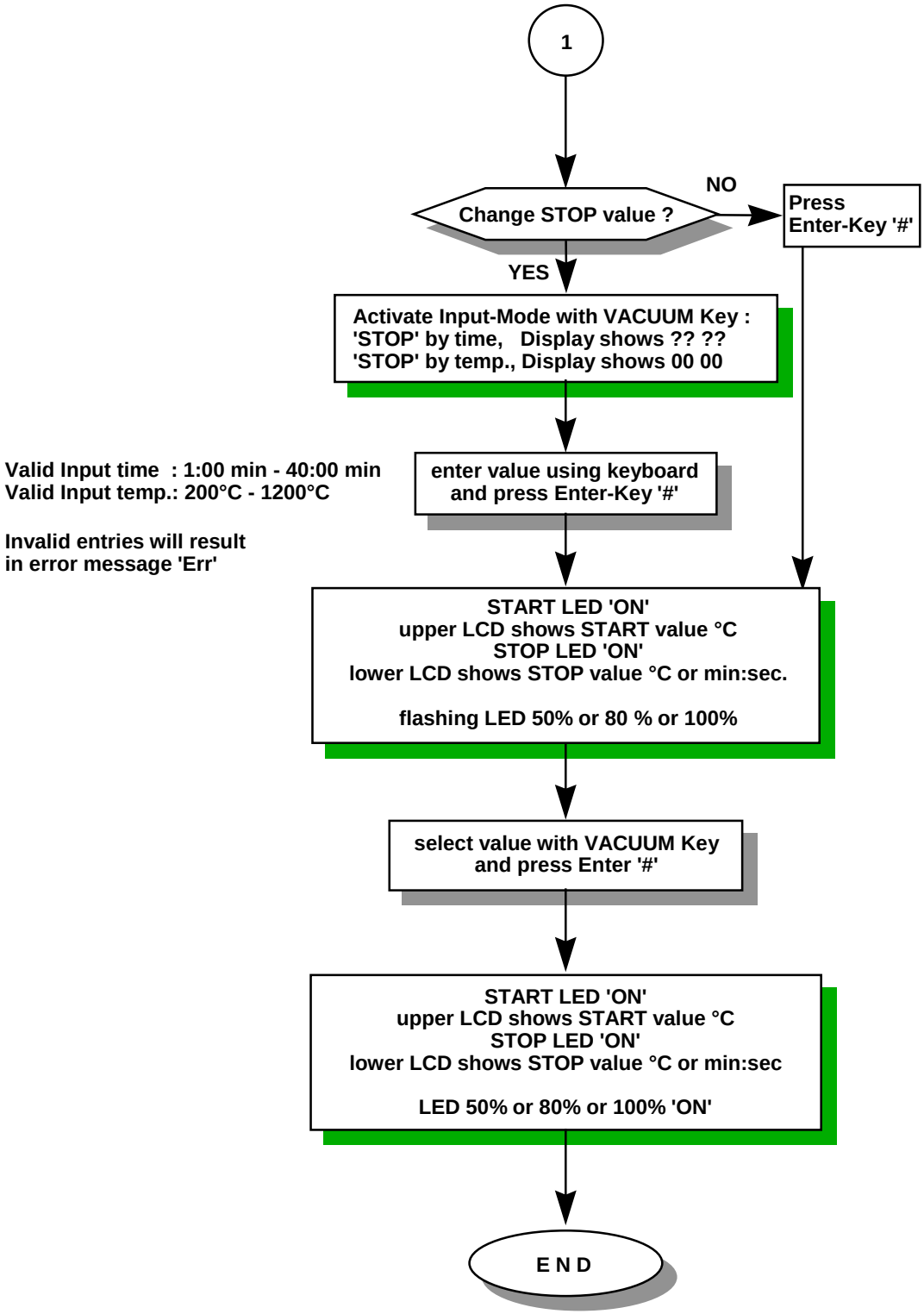
4.11 **Operating Block E -** firing temperature & end temperature



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

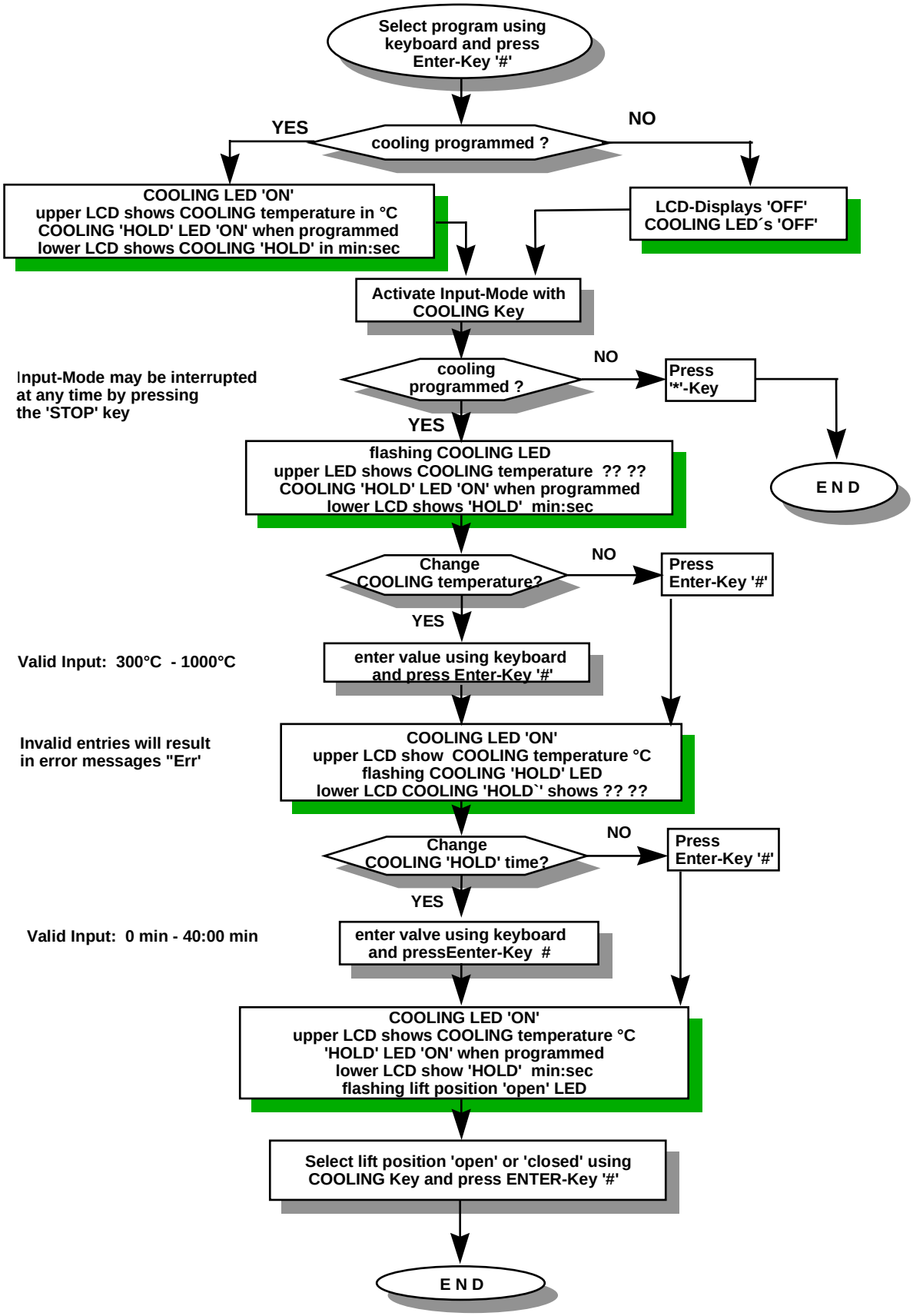
4.12 **Operating Block F -** vacuum parameters





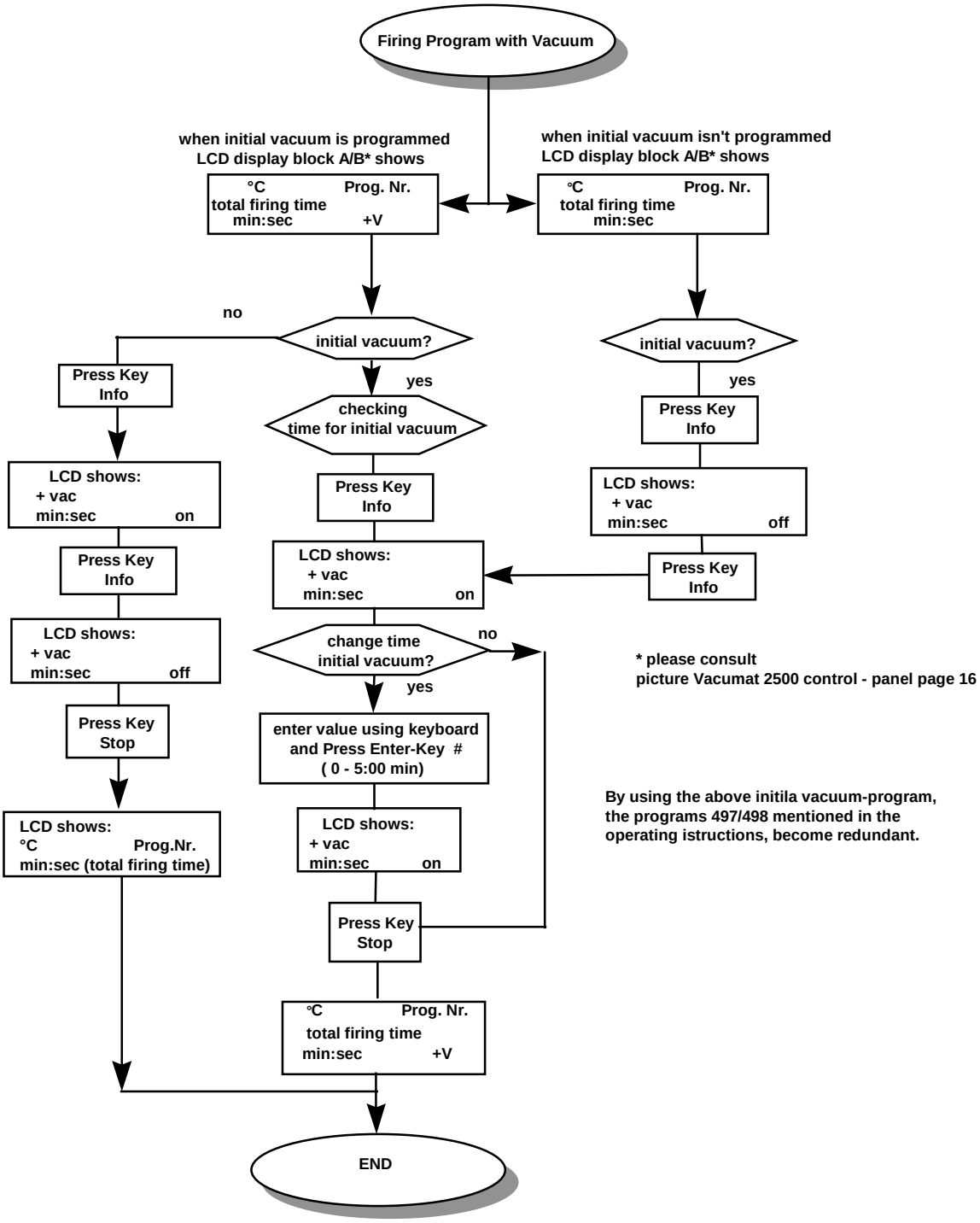
After program start changes of VACUUM values are no longer possible.
After start of vacuum-pump the LCD 'START value' shows the vacuum 0 to -bar.

4.13 Operating Block G - 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.

4.14 Initial vacuum programing



5 Utilities

All programs listed may be selected by entering the respective program number using the keyboard (Block H). 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
470 + #	Enter time	time-format 12 or 24 hours∂ select with program 473	lower LCD Block A	Keys Block H + #
471 + #	Enter date	format MM:DD or ,,DD:MM∂ select with program 474	lower LCD Block A	Keys Block H + #
472 + #	Enter year	4-digit entry	lower LCD Block B 2 digits	Keys Block H + #
473 + #	Enter time format	Selection 1 = time-format 12hours Selection 2 = time-format 24hours∂	lower LCD Block B	Keys Info + #
474 + #	Enter date format	Selection 1 = Format MM:TT Selection 2 = Format TT:MM∂	lower LCD Block B	Keys Info + #
475 + #	Display off furnace serial - number	6 digits maximum	lower LCD Block A+B	
476 + #	show operating hours	display in hours and minutes	lower LCD Block A+B	
477 + #	show software version	displays software version	lower LCD Block A	
481 + #	stand-by temperature	Entry: 200°C - 800°C 500°C∂	lower LCD Block B	Keys Block H + #
482 + #	signal on program end	Selection 1 = signals once Selection 2 = permanent signal∂	lower LCD Block B	Keys Info + #
483 + #	program termination with "Stop"-Key	Selection 1 = press "Stop" 2x Selection 2 = press "Stop" 1x∂	lower LCD Block B	Keys Info + #
484 + #	start firing program when temperature of firing chamber is higher than stand-by temperature	Selection 1 = start when temperature is higher than stand-by temperature ∂ Selection 2 = start at stand-by temperature	lower LCD Block B	Keys Info + #
485 + #	set volume	select "0" - "9"	lower LCD Block B	Keys Block H + #
486 + #	brightness of control panel display	select "1" - "4"	lower LCD Block B	Keys Block H + #
487 + #	brightness of remotel display	select "1" - "4"	lower LCD Block B	Keys Block H + #
488 + #	remote display control	Selection 1 = OFF Selection 2 = ON	lower LCD Block B	Keys Info + #
489 + #	Initialization	all factory-set time/date values are read into memory (standard settings)	lower LCD Block B	
491+ #	Liftpositions: Pre-Drying and Cool-Down	Pos.1, 1st pre-drying step Value 0 - 100 Pos.2, 2nd pre-drying step Value 10 - 180 Pos.3, 3rd pre-drying step Value 20 - 250 Pos.4, cool-down step Value 30 - 200 Inv. = intervall time Value 10 - 250 sec	lower LCD Block A+B	Keys Block H Save:Key #
492 + #	Lift speed	select S up 0 - 99 select S down 0 - 99	lower LCD Block B	Keys Block H + #
493 + #	Lift stop	select L up 50 - 250 select L down 50 - 250	lower LCD Block B	Keys Block H + #
494 + #	Temperature-Adjustment	see description "Adjusting the firing chamber temperature"		
495 + #	Vacuum-Adjustment	automatic program run (approx. 4 min)		Keys Block H
0	close firing chamber without heating			

∂ Factory settings

6 Adjusting the firing chamber temperature

The VITA VACUMAT 2500 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:

Select program No: 494 and press the "#"-Key

The program displays the following settings:

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

Press the "Start"-Key

The program starts, parameters may not be changed, the program must be stopped by pressing the "Stop"-Key. The upper LCD-Display in Block A indicates the temperature of the firing chamber in °C (degrees Celsius). The lower LCD-Display in Block A 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.

7 Protection against power failure

The VITA VACUMAT 2500 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 upper LCD-Display of Block A indicates program time remaining, min:sec.
The lower LCD-Display of Block A indicates phase where program was aborted:

Phase 0 = Stand by
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.

8 Error messages

The VITA VACUMAT 2500 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 (see Errors in the 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 back of furnace
2. Check/change firing muffle (see Page 21)

Err M Should the lift not have reached ist upperor 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 micro-switches 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 factorystored value is 15 seconds.The time selected must be longer than the time the lift drie 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 recurring "Err"-Messages after Power OFF/ON, please contact the VACUMAT service Department of your local VITA distributor.

8.1 Error in the vacuum system

The error message Error 03 is activated if the vacuum value of - 0.3 bar is not reached within 30 seconds. The cause of this error may be found in the vacuum pump or the furnace.

Testing the vacuum pump
The vacuum pump type 9080 or 9081 supplied with the furnace is an oil-free and hence also practically maintenance-free pump. For smooth and efficient operation of the vacuum pump, attention should be paid to the following:

1. Maximum ambient temperature = + 45°C
   When fitting in closed casings or cupboards make sure of adaquate ventilation.
2. Minimum ambient temperature = + 5°C
3. Install only in a dry place.

The performance of the vacuum pump can be tested with a corresponding vacuum guage. A drop in performance can result from the formation of condensation and dirt in the area of the pump head. Unscrew the pump heads and clean, if necessary replace membrane and valve plates.

The type no. of the vacuum pump should be given when ordering replacement parts.

Checking the furnace
A leak in the vacuum system of the furnace may be found in the lift support plate seal, the firing chamber seals, solenoid valve or in the solenoid valve/firing chamber connections. The vacuum system of the furnace can be checked by starting a vacuum programme and disconnecting the plug of the vacuum pump from the furnace after the maximum vacuum value is reached on the vacuum indicator. The vacuum value displayed on the indicator must not drop - then the system is in order. A noticeable drop in the displayed value means there is a leak in the system.

In case of leakage, check in the following order:

1. Lift support plate seal
2. Firing chamber seals
3. Seals in vacuum system

9 Additional service advice

Daily usage of the VITA VACUMAT 2500 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 492 increases/decreases the lift speed.
2. Change lift position "Pre-Drying" and "Cooling": Program 491 will change the respective positions.

For servicing, the VITA VACUMAT 2500 may only be shipped in special packing cases. If the original packing case is unavailable, special packing cases may be ordered frrom your local VITA distributor.

10 Changing the eprom

Before changing the eprom, the programs listed in the table below must be selected and the corresponding values called up and taken note of:

Program No.	Code-No. for Software No. lower 2.	Code-No. for Software No higher 2.	Value
477 # (Software No.)			
453 #	8719 #	9224 #	
454 #	8719 #	9224 #	

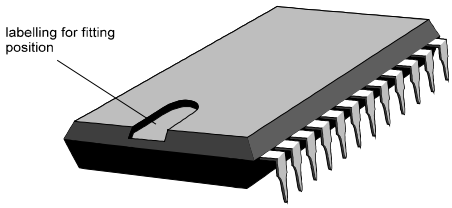
* see Operating Manual
„# “ = key on keyboard (confirm key)

After noting the values, switch off the furnace and dsconnect it from the mains power supply (see Operating Manual, Safety advice).

Remove the lower casing of the furnace and exchange the eprom.

Attention!

Pay attention to the fitting position
(labelling faces the direction of the motor).



Replace the lower casing

Attach the operating panel to the front of the casing and connect the spiral cable to the right hand side.

Reconnect the furnace to the mains power supply and switch it on again.

Select program no. 451 # 8719 # (independent program sequence, duration approx. 25 sec.)

Switch furnace off at the mains and on again after ten sec.

Select program no. 933 # 8719 # (independent program sequence, duration approx.)

Select program no.489 # (independent program sequence, duration approx.)

Call up all programs (except no. 477) as indicated in the table. Check or reenter values as required and confirm with key #

Select program no 495 # (independent progam sequence for vacuum adjustment,duration approx. 4 min.)

After completion of this progam the furnace is once again ready for operation.

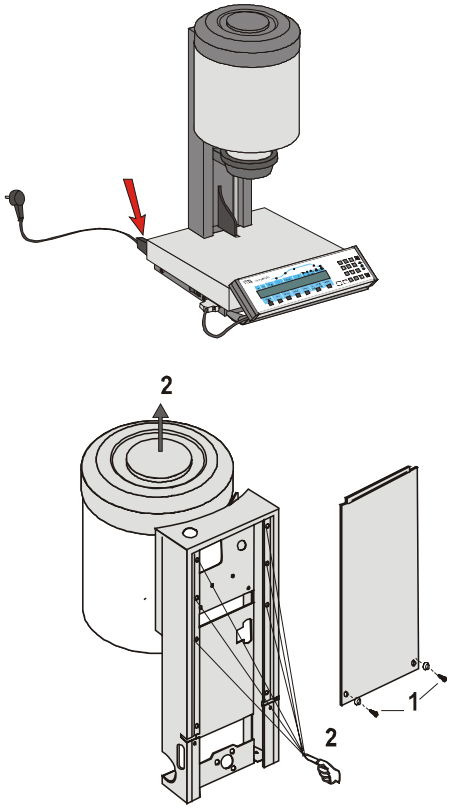
11 Changing the muffle

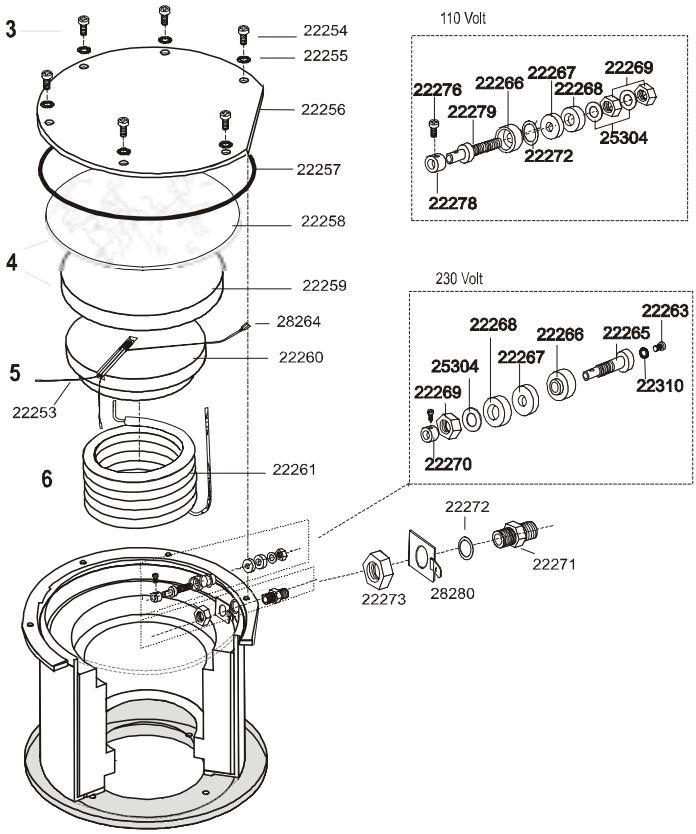
Before opening the furnance disconnect from the mains.
Exchange the muffle while the firing chamber is cold.

1. Remove the rear panel of the furnance
2. Unscrew the screws on the top cover of the furnance and lift cover off.
3. Unsrew the 6 srews (22254) on the top cover of the firing chamber and then lift this off also.
4. Remove the insulating disc and insulating slab (22258 + 22259)
5. Disconnect wires from the thermocouple, disconnect insulation stone connection (28264). Liftm out insulation stone (22260) complete with Thermocouple.
6. Disconnect wires from the muffle (22261), and then lift it out.
7. Place the new muffle into position, then reassemble the furnace in reverse order to that given above.

When replacing the top cover of the firing chamber (22256), make sure the o-ring seal (22257) is positioned correctly in the groove.

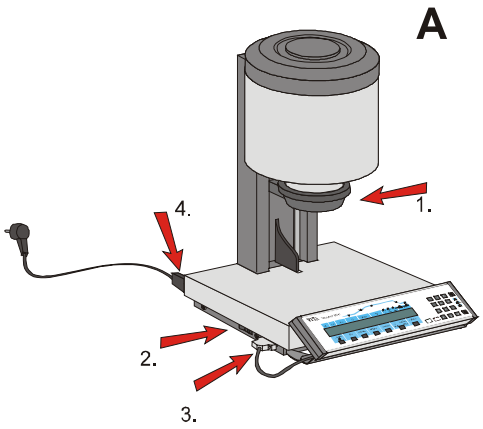
Replace and tigthen all the screws (22254) to the same torque, moving from one screw to the next diagonally across the cover plate.

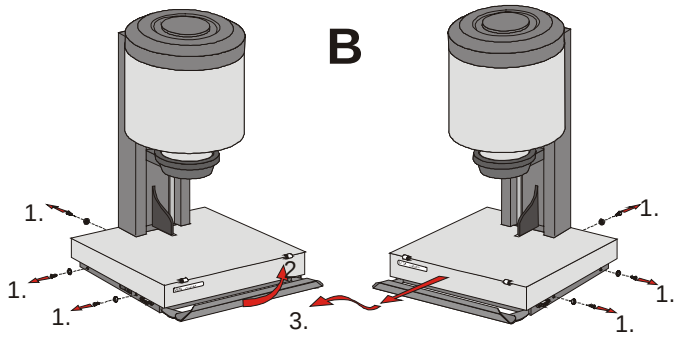




12 Changing the liftmotor

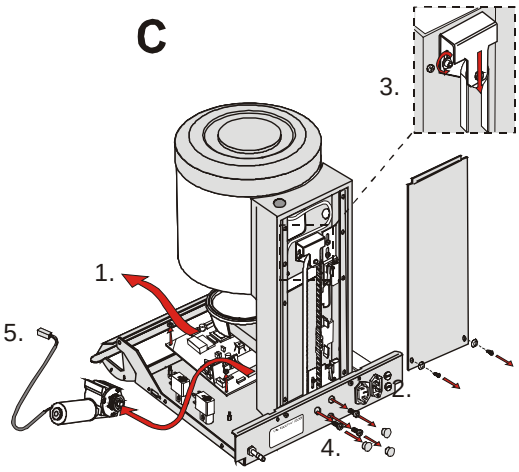
1. Take the lift to the top position. If it is not possible, due to an electrical failure, the lift can be lowered by removing the toothed belt at rear.
   See Diag. C.:
   - Remove backing plate
   - Loosen screw holding top cog.
   - slide the bracket downwards
   - adjust the lift by hand
2. Turn off the mainswitch
3. Remove the plug for the control panel and remove the control panel.
4. Remove plug.

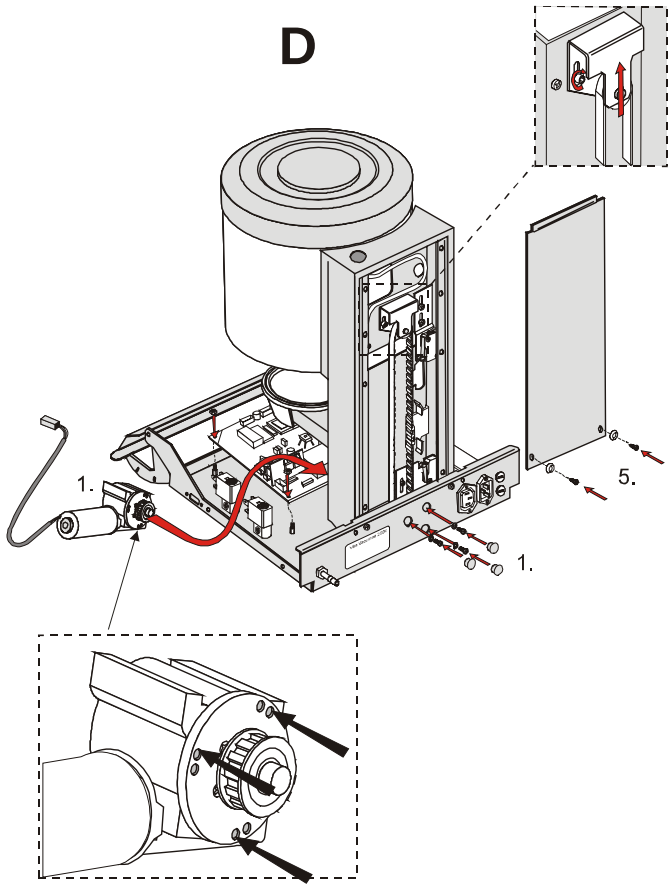




1. Remove holding screws for the lower cover.
2. Pull the control panel forward.
3. Remove the lower by lifting forward and up.
   CAUTION: The earth cable must be removed from the cover.

1. Remove the screws (4 x M3) that hold the CPU-Board. Lift the board slightly and bring 4-6 cm forwards. (Not necessary to disconnect the cable attachements).
2. Remove holding screws for rear cover and lift away rear cover.
3. Loosen screws hoding top cog, hold the lift fest and push the bracket downwards, to release the toothed belt, then lower the lift.
4. Remove the black plastic screw covers and release the screws holding the motor.
5. Unplug the motor and remove the motor.

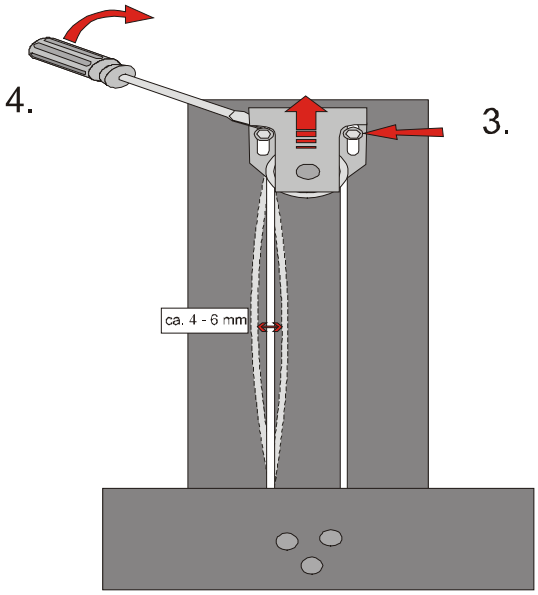




1. Place the motor in position and secure with the screws. Repleace the black plasic screw covers.
2. Reseat the CPU - board and secure with 4 x M 3 screws. Plug in the electrical connector from the motor.
3. Push the top bracket up by hand and secure the right screw.
4. 4.Using a screwdriver, push the bracket up and secure the lift screw.
5. 5.Replace the rear panel secure.
6. 6.Repleace the lower cover and refasten the screws. Do not forget to attach the Earth connection.
7. Place the control panel on the swing arm and plug in the attachement, and secure with the two screws.

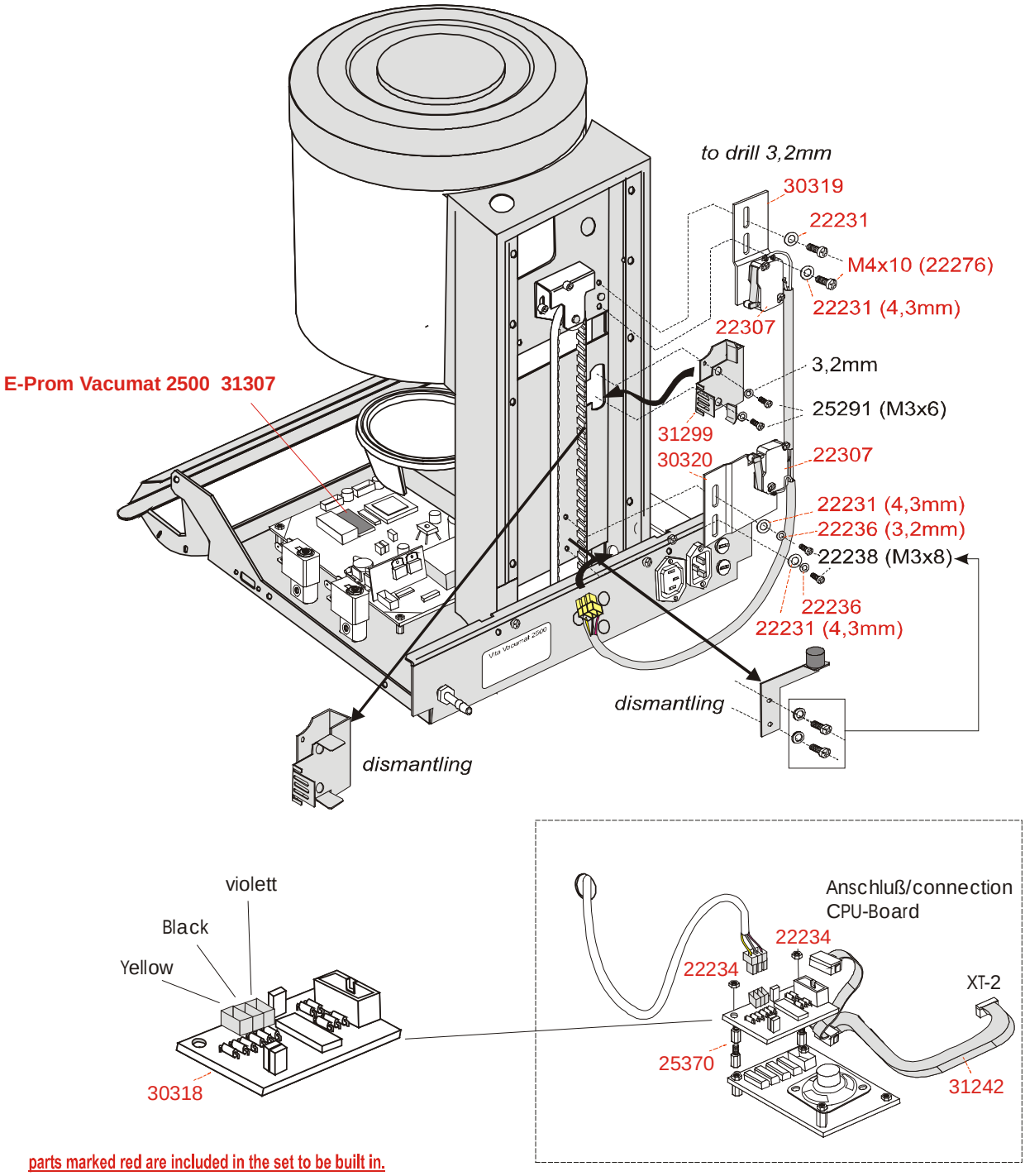
The oven is now for use

Adjustments to the lift speed can now be carried out using Prog. 492



The toothed belt should have lateral movement of 5 - 6 mm in either direction.

13 Installation microswitch for lift-motor



parts marked red are included in the set to be built in.