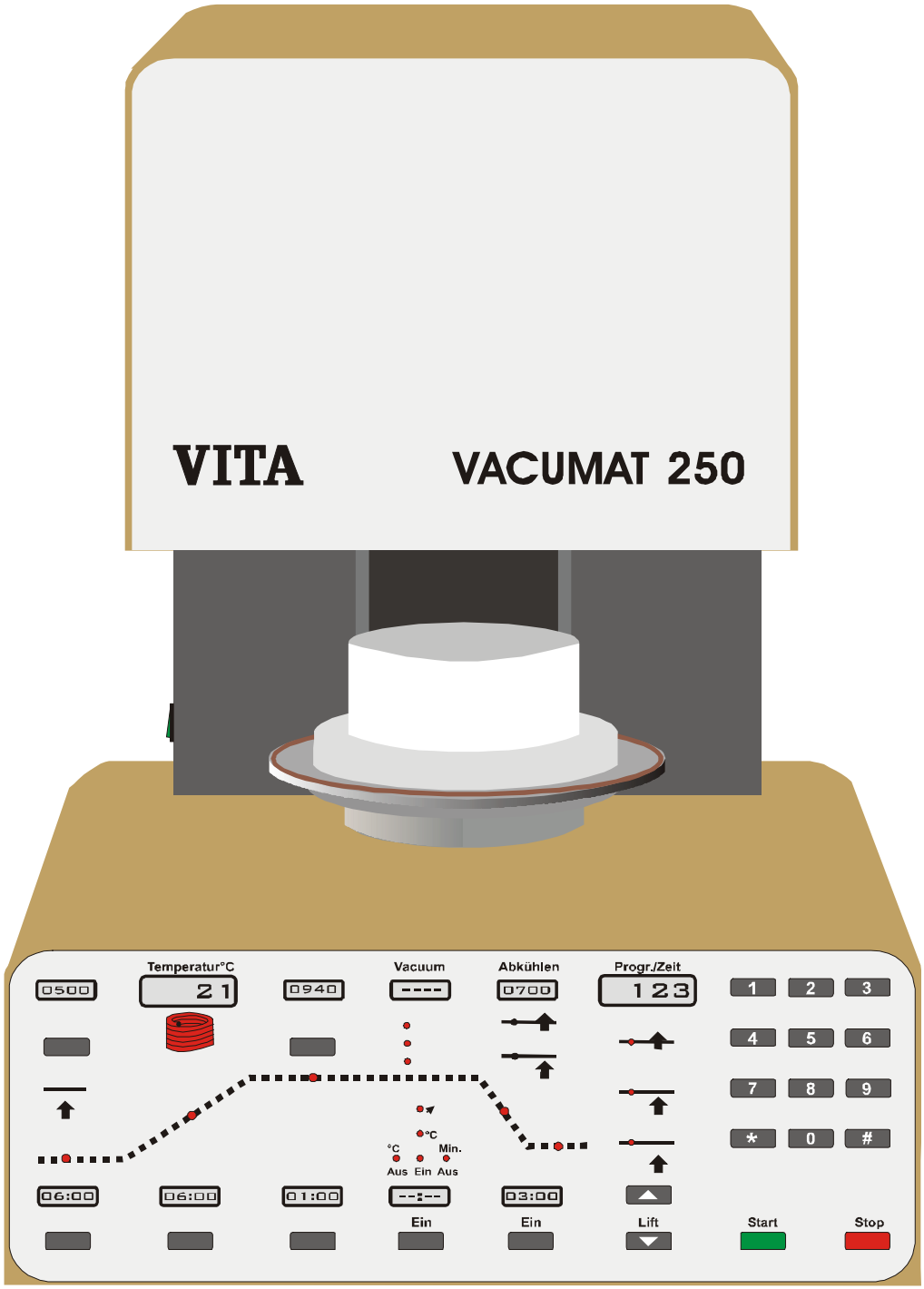
VITA - Vacumat 250

Service – Manual



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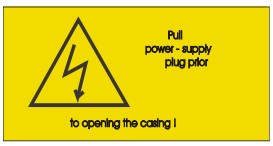
1 Safety advice

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 on page 3).
- 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 technicianif your furnace needs to be repaired or serviced.

Typ PJ 9080-023.3
230 Volt - 50/60 Hz

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

T8H 250V

This notice advises on the type of fuses used in this furnace. Another type may not be used.

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

2 Uilities

All programs listen in the table can be selected by entering the corresponding progr. no. using the programing input keys. All entries must be confirmed by pressing the key #. To stop a program which has already been selected, press the program interrupt key „Stop“ (J).

Progr. no.	Program	Entry/Description	Indicator	
370	time	hrs./mins.	indicator 6/11 progr./time	
371	date	month/day	indicator 6	★
372	year	year	indicator 6	★
379	acoustic signal volume	0 – 7	indicator 6 displays entered value from 00 – 77	
381	starting temperature	200°C – 700°C	indicator 1	
383	adjusting temperature	plus/minus 20°C	indicator 6 for + value only enter setting for – value, enter setting and press key A value appears preceded by minus sign on indicator 6	★★
384	measuring vacuum parameters	only for maintenance purposes calibration programme for vacuum indicator	automatic test run, duration approx. 3 min.	**0**
387	measuring lift positions and intervals for pre-drying stages	pos.1 pre-drying lift pos.1 enter 0 - 40 pos.2 pre-drying lift pos.2 enter 30 - 60 pos.3 pre-drying lift pos.3 enter 50 -150 pos.4 lift pos. for cooling enter 30 -120 interval enter 20 - 60 sec.	indicator 1 shows pos. 1-4 and I n E for interval key „A“ to select pos. indicator 2 shows value entered confirm setting by pressing key #.	**1**
389	lift speed deactivate lift	speed „S up“ enter 80-220 speed „S dn“ enter 80-200 switch-off value „L up“ 80-220 switch-off value „L dn“ 80-200	Indicator 1 display pos. key „A“ to select pos. indicator 2 displays value entered	**2**
391	initializing	all time and temperature settings given in VITA firing chart are read into the memory	all displays active	**3**
396	operating time meter		indicator 1 displays hrs indicator 1 displays min./sec.	
999	fast cooling	temperature in firing chamber rapidly cooled to 50°C below starting temperature.	indicator 1 displays target temperature	
0		closing firing chamber without heating up		
00		closing firing chamber when heating up to starting temperature.	indicator 1 displays starting temperature (end temperature)	

Legend:

This display can be activated by pressing kay „C“ when no firing program is running. The display is only active while in operation

★ ★ The temperature in the firing chamber can be alterd by +/- 20°C. The entire temperature range for all firing programs is altered by the entered value, i.e. an entry of + 20°C will result in a higher gegree of firing, an entry of – 20°C in a lower degree of firing.

0 The vacuum parameters are factory-calibrated. These settings only require to be changed when a pump other than that supplied with the furnace is used.

1 The lift position for pre-drying and cooling are also factory-calibrated. These settings can be altered by entering new settings using prog. no. 387. To check the altered lift positions, interrupt the program by pressing the Stop key (J), thwn start the program.

2 The speed at which the firing tray lift ascends and descends can be altered using prog. no. 389. Enter new settings to increase or decrease the lift speed. When altering the lift speed, also check the switch-off function and correct if necessary.

3 The setting for switching off the lift in the upper and lower positions must be selected to ensure the lift reaches the required position and does not switch off too early. The motor should switch off approx. 2 seconds after raeching the required (either upper or lower) positio (acoustic signal sounds). Find the correct switch-off value by checking with program „0“ (closing firing chamber without heating-up).

By activating this program, all settings required for VITA materials are reas into the memory. This means that after selecting a firing program according to VITA firing chart, all temperature and time settings are stored in the program.

3 Setting / altering firing chamber temperature

- **Observe safety information in the operating instructions!**
- **Unit must only be opened when unplugged !**

For temperature measurement the Vacumat 250 is fitted with a platinum/rhodium-platinum thermocouple, a high-quality temperature sensor suitable for constant operation at up to 1300°C, as corresponds to the German standard DIN 43710. The temperature is measured in a cycle of 250 ms and adjusted. The deviation at 1000°C is approx. 2°C.
Due to their absorption and reflection properties, firing trays have a strong influence on the result of firing. Dark ceramic and metal firing trays take up much heat (high absorption), while light firing supports (fibrous pad or honeycomb firing supports) absorb little heat (high reflection). This should be taken into consideration when evaluating the results of firing. Variations in the firing results can hence also be due to the use of different firing supports.
For adjusting the firing chamber temperature, a millivoltmeter for the range 0-10 millivolts is required. The meter is connected to the measuring points PT+ and PT- on the CPU microprocessor module. All the connections in the region of the thermocouple must be tight and free from corrosion. This applies particularly to the thermocouple connections in the firing chamber as well as the outgoing compensating line on the firing chamber. The position of the thermocouple in the firing chamber should also be checked (using a mirror). The thermocouple is situated in the centre at the top of the firing chamber and protrudes about 10 mm downwards.

Start the firing programme with the following values for temperature testing:

pre-drying temperature	600°C
pre-drying time	6.00 min.
heating-up time	6.00 min.
end temperature	1000°C
temperature hold time	5.00 min.

After 2 min hold time at 1000°C the meter must display approx. 9.25 millivolts. Deviations can be corrected with the potentiometer POT on the CPU microprocessor module.

Attention: If the temperature adjustment is made using a meter, the pre-stored temperature adjustment programme no. 383 (s. Utilities) is called up and the value set to zero.

A temperature test or adjustment without using a meter can be carried out with the help of the silver sample in connection with the pre-stored programme no. 383. For this purpose, a test set consisting is 6 ceramic firing trays (white), 3 pieces of silver wire each 70 mm long and a set of instructions is available and can be ordered.

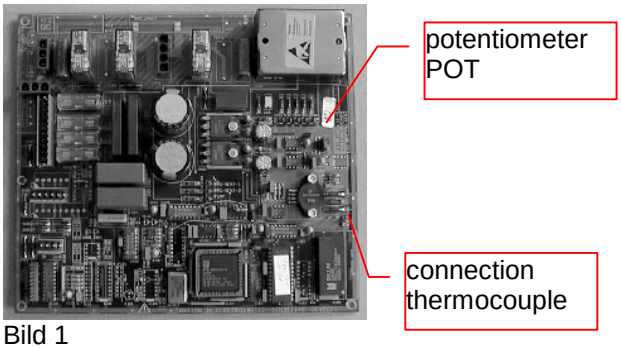


Bild 1

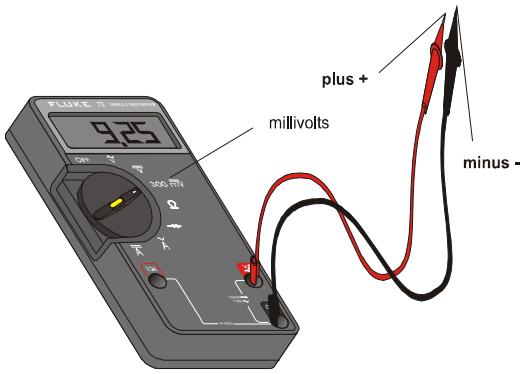


Bild 2

Attention: Before return the cover – disconnect the power supply!

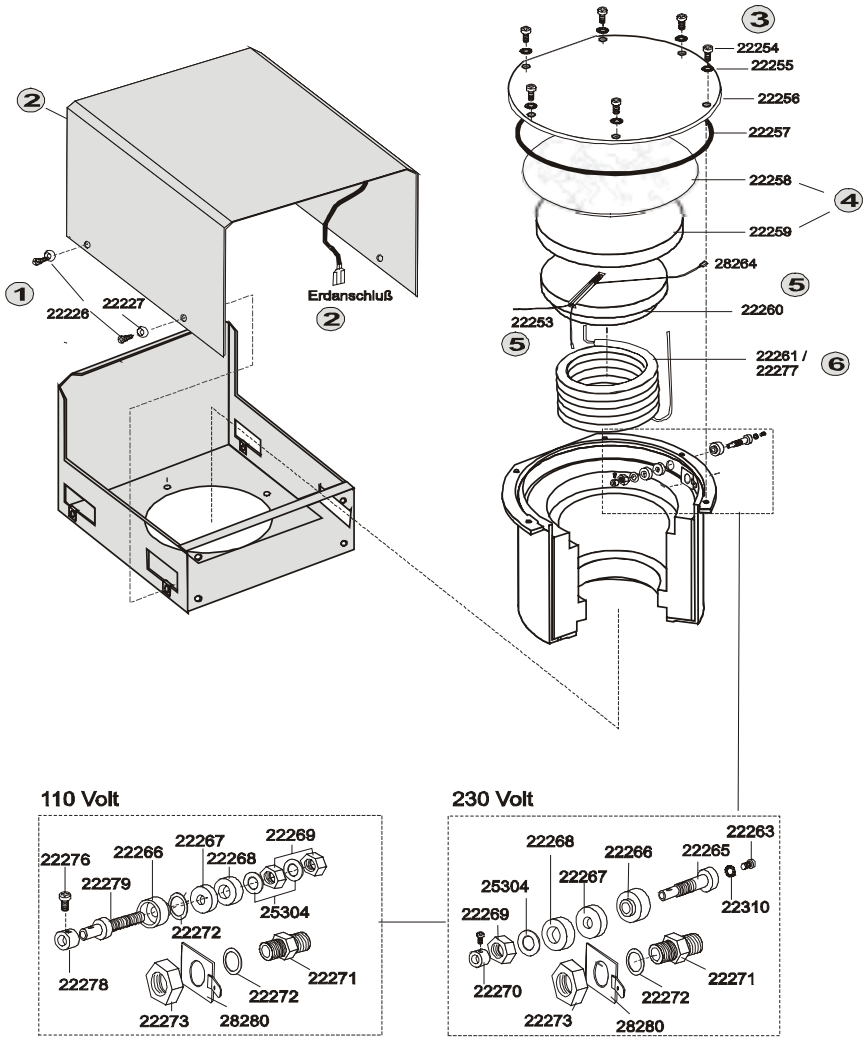
4 Changing the muffle

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

1. Unsrew the srews (22226) on the sides of the top cover of the furnance.
2. Lift of top cover, disconnect earth connection 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).
   Lift out insulation stone (22260) complete with Thermocouple.
6. Disconnect wires from the muffle (22261), and then lift it out.
   Place the new muffle into position, then reassmble 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.



5 Errors in the vacuum system

The error message is activated if the vacuum value of 30% 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 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.

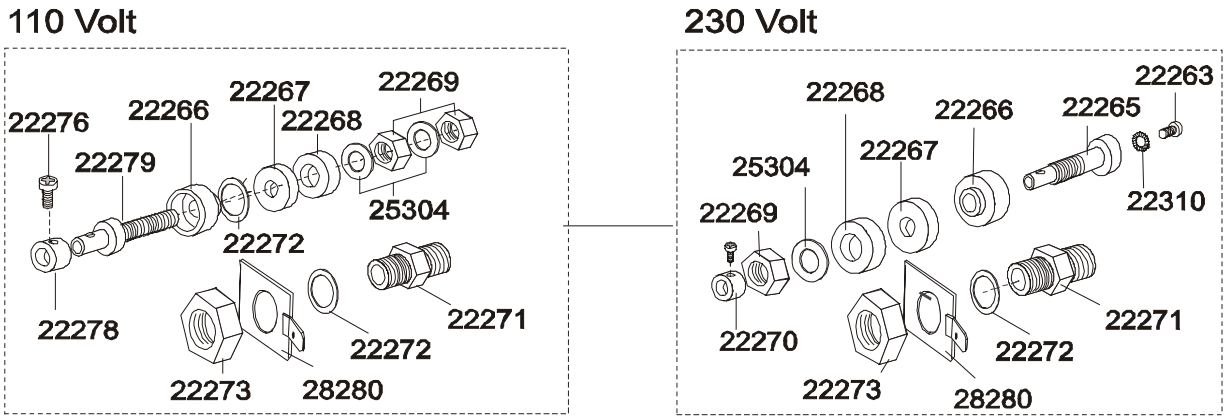
The type no. of the vacuum pump should be given when ordering replacement parts.

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.



6 Exchanging the lift motor

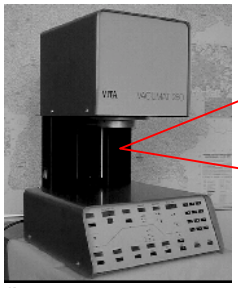


fig. 1

Move lift into the upper position.

Remove lift support plate screws (2 x M4 x 10)

Move lift into the lower position. Remove lift support plate with firing tray

Unplug furnace to disconnect from the mains power supply!!

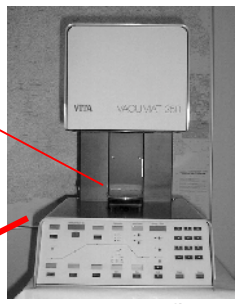


fig. 2

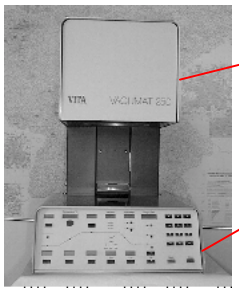


fig. 3

Unscrew the 4 fastening screws for top cover, lift cover, disconnect earth connection and remove top cover.

Remove the 6 screws for lower section cover, lift cover, disconnect ground connection, remove lower section cover.

Remove screws for rear panel (6 screws), remove rear panel.

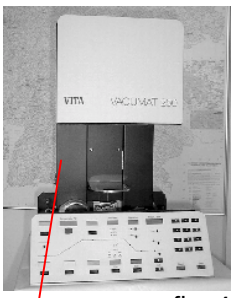


fig. 4

fig. 5

Remove plug connections (7 connections) from the CPU microprocessor module, disconnect vacuum hose from the sensor, disconnect the thermocouple connection (1 x red, 1 x white).
Attention: These connections must not be mixed up when installing !
Remove fastening nuts for CPU microprocessor module, lift out CPU microprocessor module.

Vacuum pump connection

230 volt connection

Transformator connection

Motor connection

Connection soleniod valve

Connection for front panel module

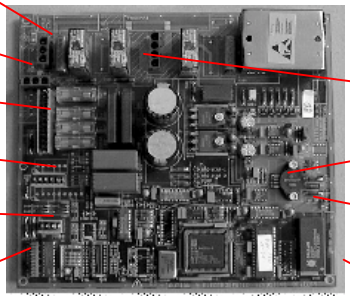


fig. 6

Heating connection

Vacuum hose

Thermocouple connection

Vacumat 250 CPU microprocessor module

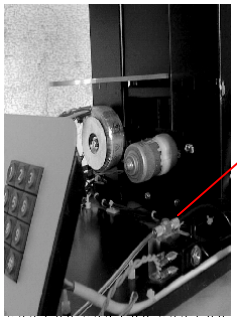


fig. 7

Remove lower fastenings screws for lift mechanism support frame (2 x M4 x 10)

Remove upper fastening screws for lift mechanism support frame (2 x M4 x 10)

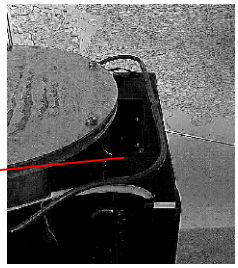


fig. 8

Lift out drive unit.

fig. 9

Remove screws for top bushing and press downwards.

Remove fastening screw for toothed spring washer (lower bushing) remove toothed spring washer.

Remove motor fastening screws (2 x nut M4) Cut off connecting wires from motor, insulate ends of plug.

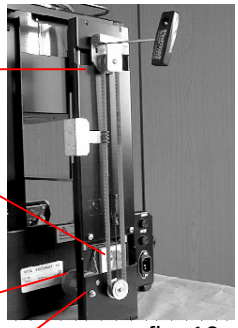


fig. 10

Secure new motor with screws. Position toothes spring washer and fasten with screw.

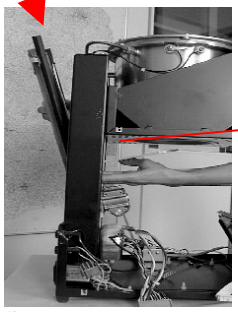


fig. 11

Pass drive unit through the lift mechanism support frame. Insert drive unit and secure with upper and lower fastening screws (see fig. 7+ 8)

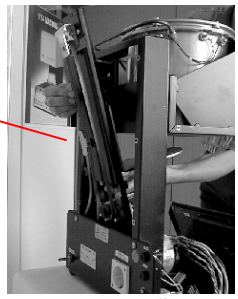


fig. 12

Connect motor.
Attention: If, after installation, the direction of motor rotation does not match the key pressed, swap over the motor connection wires

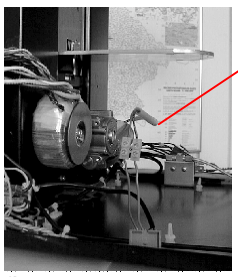


fig. 13

Tighten and secure the toothed belt with top bushing.

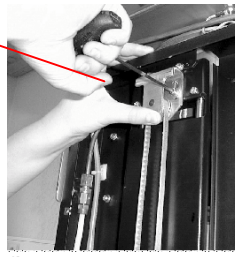


fig. 14

Continue asssembly of furnace as shows in Figs. 5 - 1.
When replacing the top cover and the lower section cover do not forget the earth connection!

To secure and adjust the lift plate, proceed as follows:

a) While the furnace is closed, plug it into the mains and switch on with the main switch.
b) Put the lift support plate with firring tray into position.
c) Push the lift upwards by hand until the lift plate firing tray can be put in such a position that the firing tray does not brush against the firing chamber insulation.
d) Secure lift support plate.

If you have any further questions, please call the Furnace-Service Depot: Tel. ++49 7761 / 562-108.