Magma

Nr. 2300-0000 /-0500 /-3000 /-3500

Bedienungsanleitung
Instruction manual • Mode d´emploi
Istruzioni d'uso • Instrucciones para el servicio
Инструкция по эксплуатации
操作说明书

21-6530 0410 B

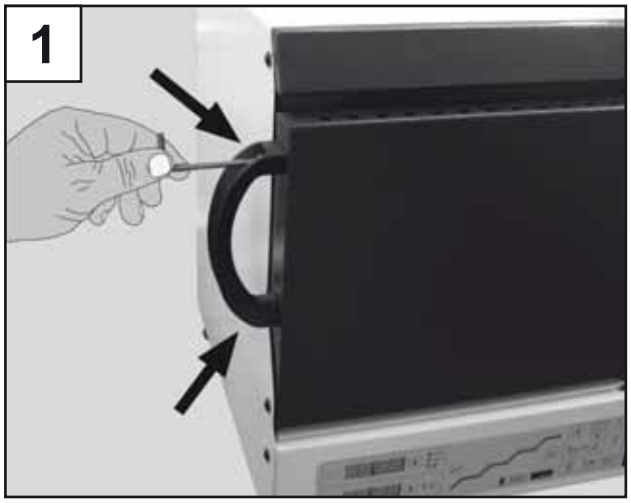
Made in Germany

Renfert

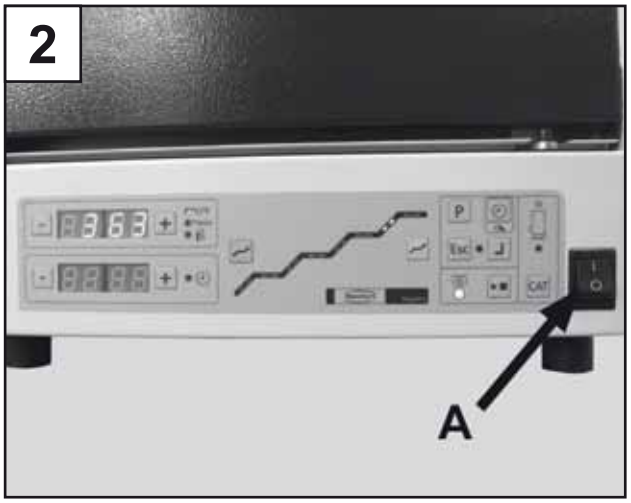
Ideas for dental technology

Seriennummer, Herstelldatum und Geräte-Version befinden sich auf dem Geräte-Typenschild.
Serial number and date of manufacturing are shown on the type plate of the unit.
Le numéro de série et la date de fabrication se trouvent sur la plaque signalétique de l'appareil.
Il numero di serie e la data costruzione si trovano sulla targhetta dell'apparecchio.
El número de serie y la fecha de fabricación están indicados en la placa identificadora del aparato.
Номер серии и дата изготовления указаны на фирменной табличке прибора.
产品编号和生产日期被标于本机的铭牌上。

1



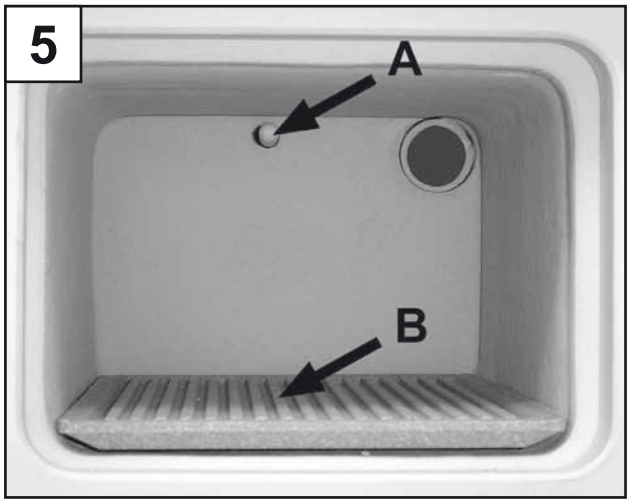
2



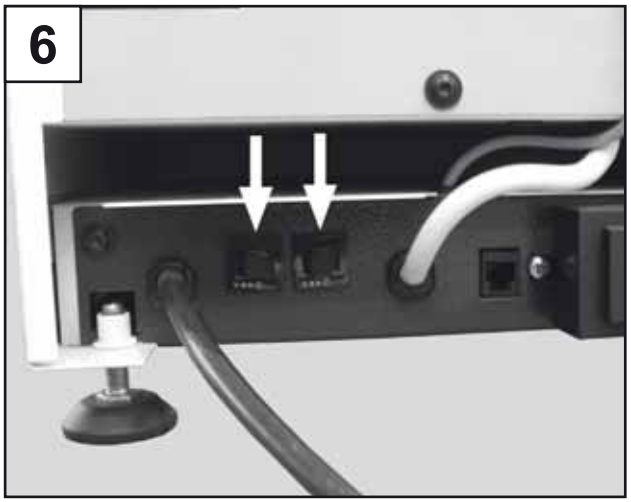
3

4

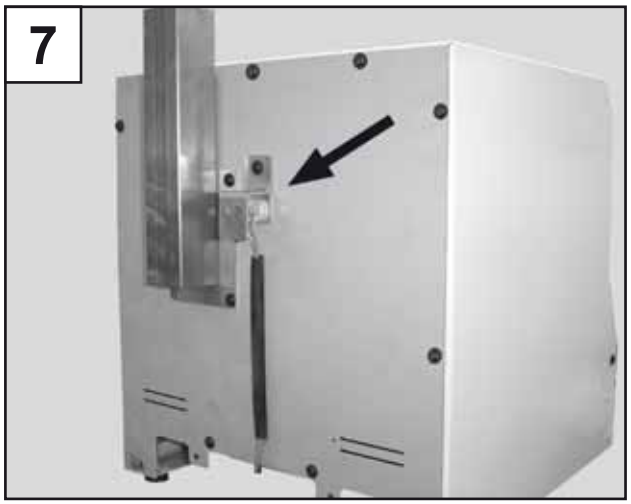
5



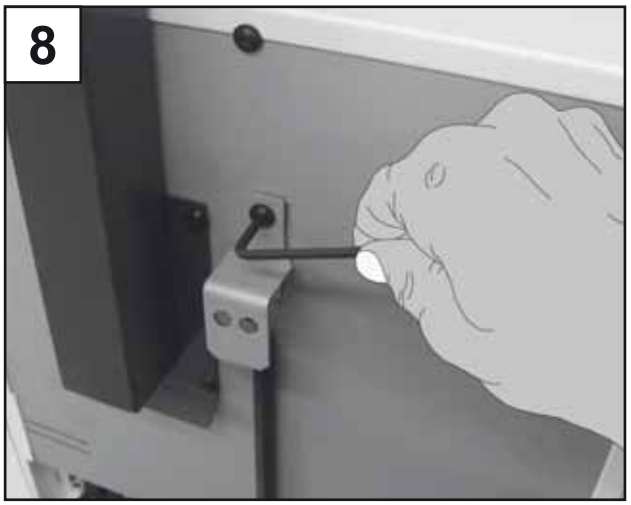
6



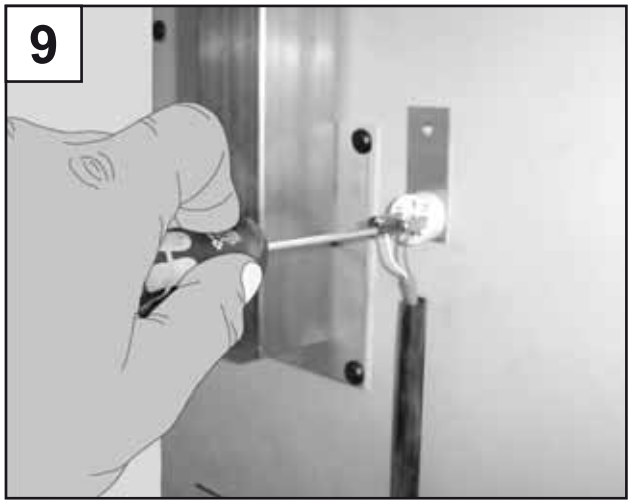
7



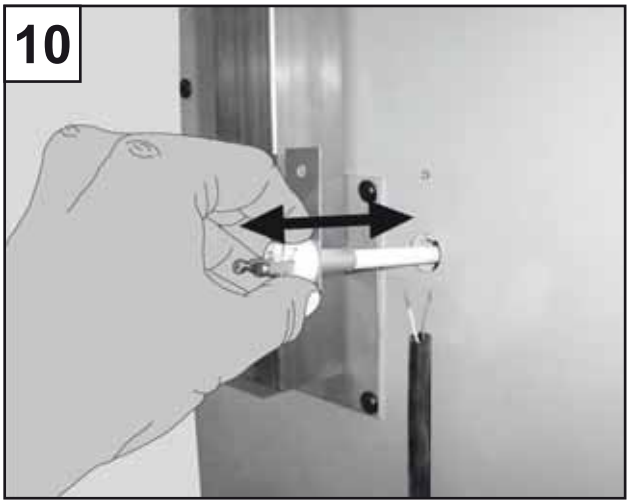
8



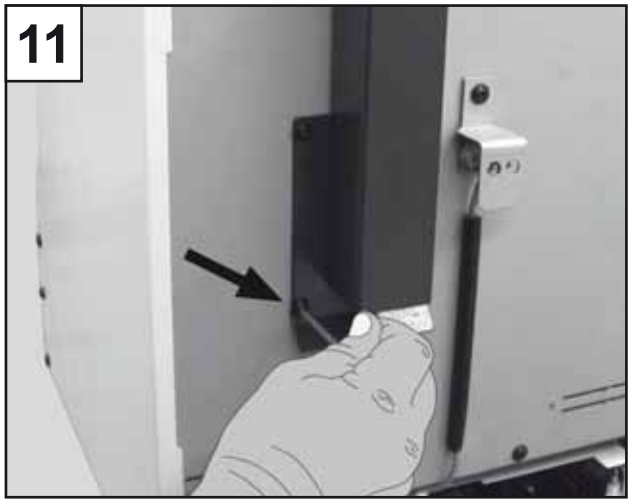
9



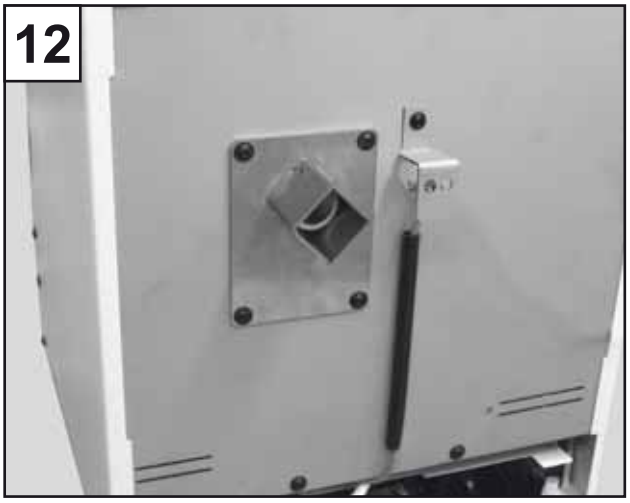
10



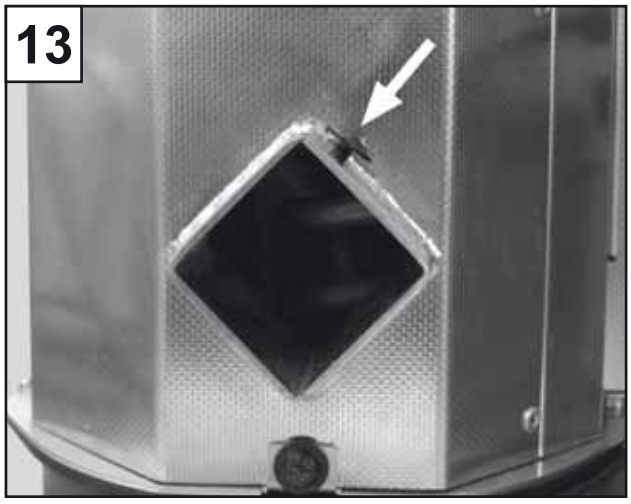
11



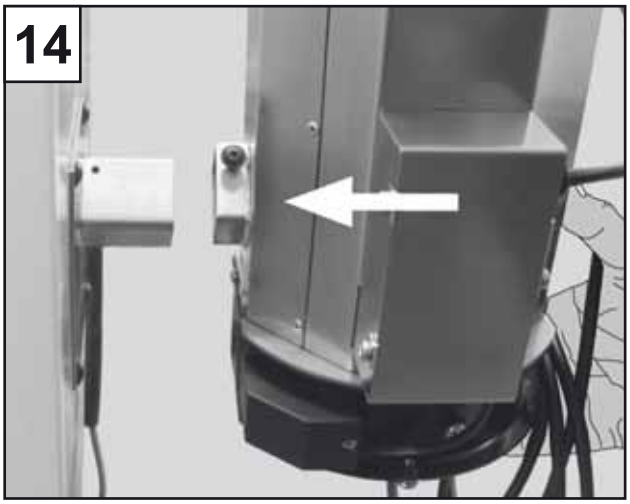
12



13

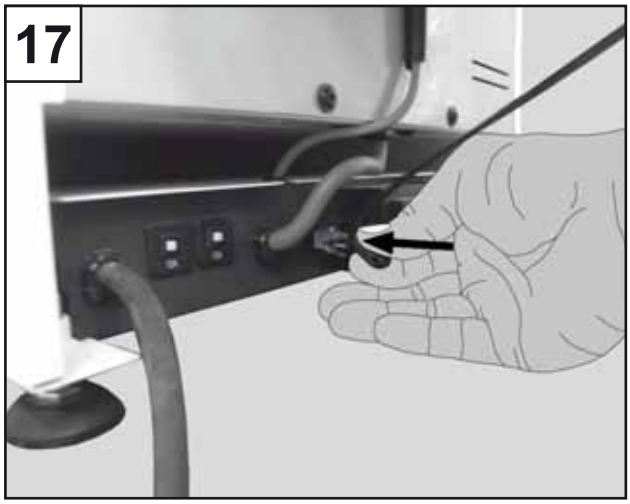


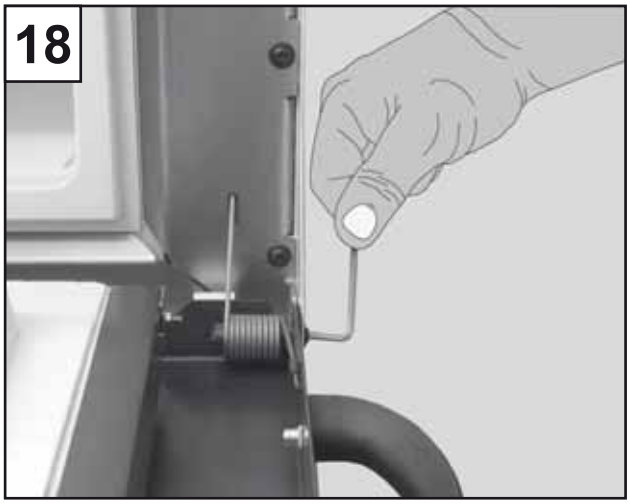
14

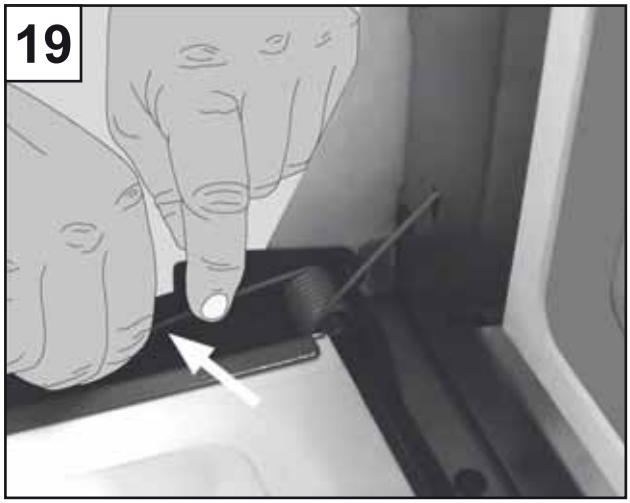


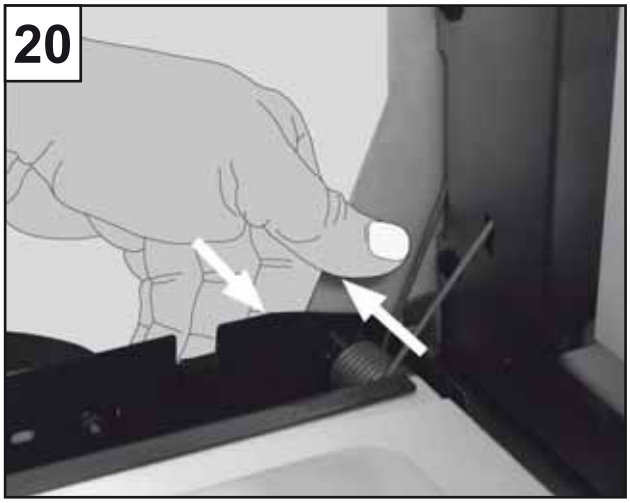
15

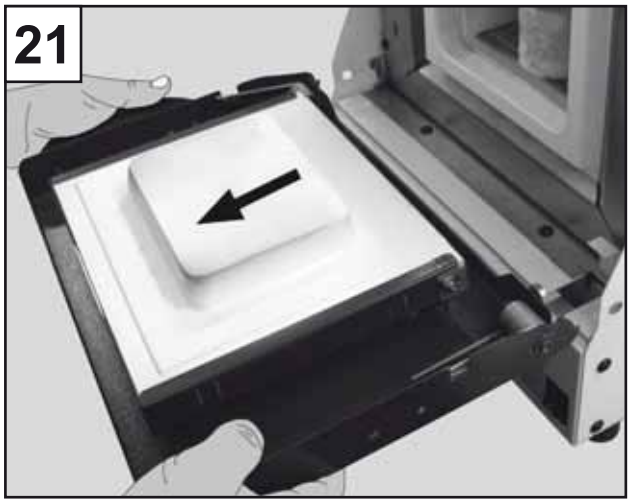
16

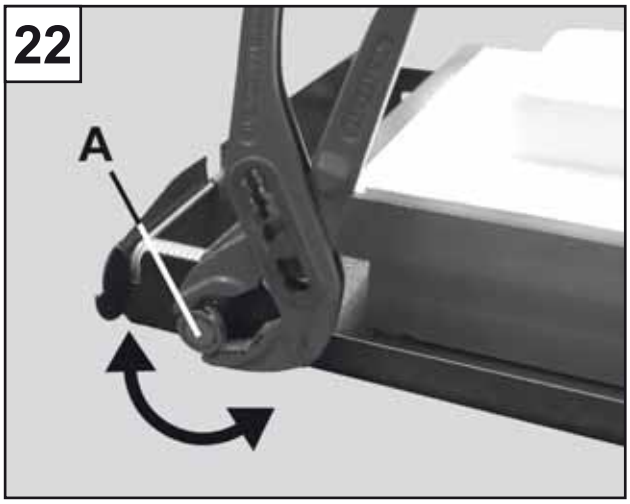

17

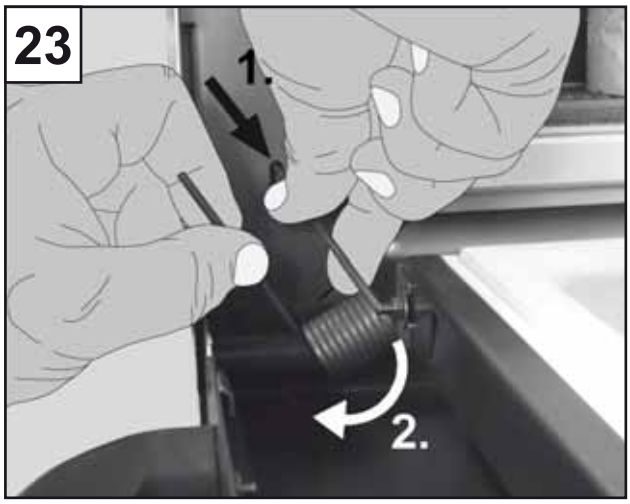

18

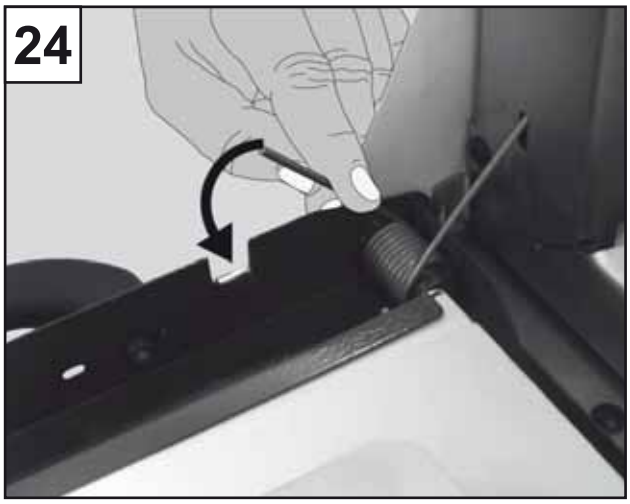

19


20


21

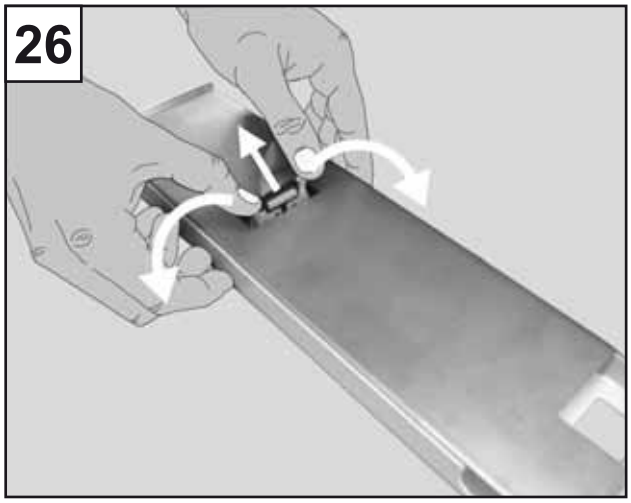

22
A


23
1.
2.

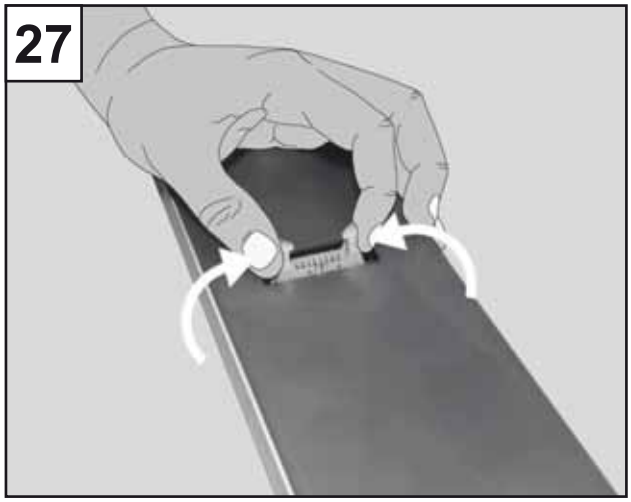

24

25

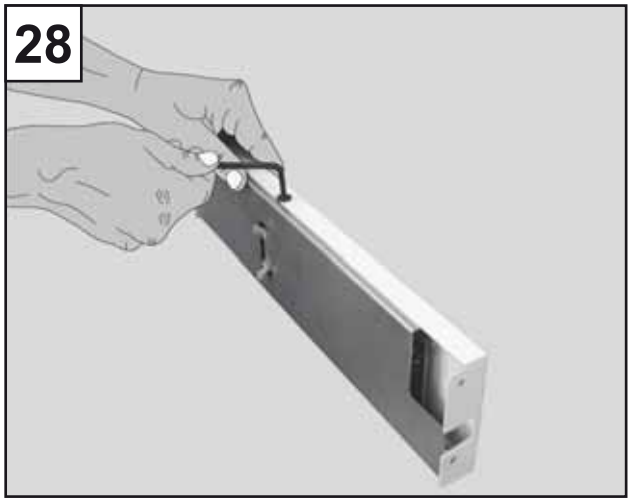
26



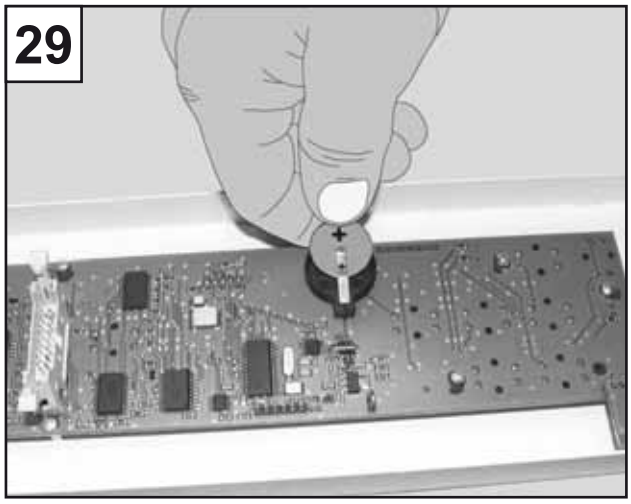
27



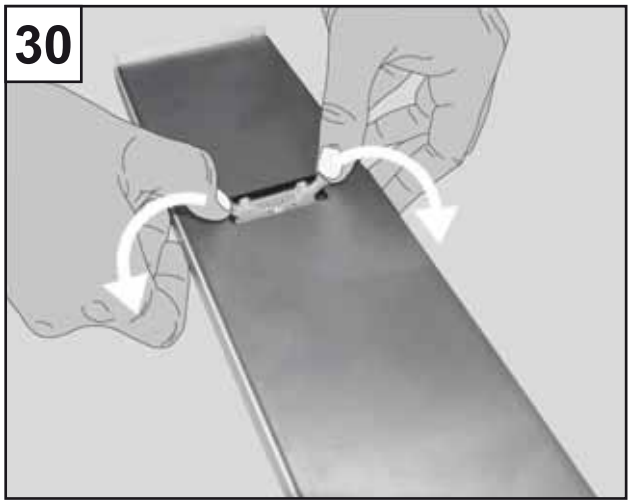
28



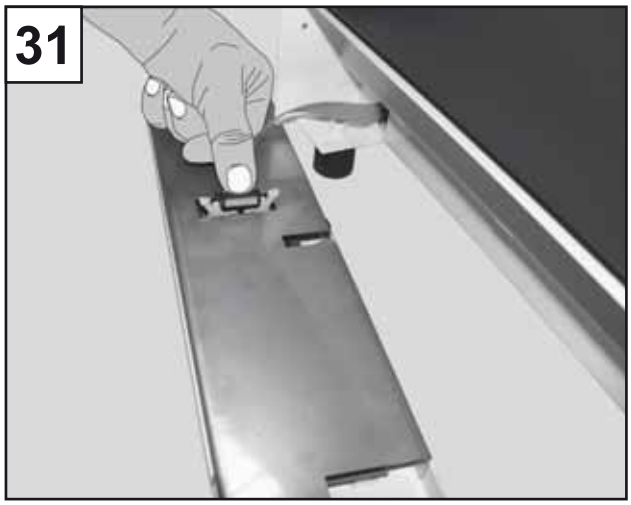
29



30



31



Magma

No. 2300-0000 /-0500 /-3000 /-3500

ENGLISH

Content

Introduction

We are pleased with your decision to purchase the *Magma* preheating oven.

⚠ **Please read the following operating instructions carefully and observe the safety information they contain in order to ensure a long and trouble-free service life.**

Symbology

The following symbols and key terms are employed in these instructions and on the unit itself:

⚠ **Danger**
This indicates a direct risk of injury. Please consult and observe the operating instructions.

⚠ **Electrical current**
This indicates a hazard due to electrical current.

! **Attention**
Failure to observe the associated information can result in damage to the unit.

i **Note**
This provides the operator with useful information to make working with the unit easier.

Only intended for indoor use.

Before opening the unit, disconnect it from the mains power supply by unplugging the power cord from the wall outlet.

Hot surface. Burn hazard!

Press the key.

Other symbols are explained as they occur.

Information for Operators

Using these operating instructions as a starting point, instruct all operators of the unit with regard to the area of application, the possible hazards during operation, and the proper operation of the preheating oven.

Please have these operating instructions readily available for the operators.
Additional information can be found in the Section, **"Information for Operators"**, at the end of these instructions.

Operating Instructions

1. Setup and Commissioning

Remove the packed components from the interior of the oven and insert the ceramic pad.

Preheating furnaces with Art. no. 2300.x500 have been set up for operation with a catalyst converter and are delivered without a flue. The catalyst converter (Art. no. 2300.0001) must first be installed before the oven can be operated (refer to Sec. 5.6.1)

1.1 Installing the Handle

Using the included screw, mount the handle on the side of the oven door (Figure 1), 4mm SW Allen key. The handle can be mounted on either the left or the right side.

1.2 Setup

- Set up the oven so that it is easily accessible from the front and so that stooping or other uncomfortable positions are avoided when working with the unit.
- The oven must be set up on a stable, fireproof surface.

Please note the following when selecting the setup area:
Corrosive condensation from the flue may drip onto the setup surface.

- A space of at least 10 cm (4 inches) to adjacent ovens or walls must be left free.

Flammable or combustible objects may not be placed or stored on or near the oven.

A fireproof surface on which hot items removed from the oven can be placed should be provided in close proximity to the preheating oven.

1.3 Adjusting the Unit's Feet

The height of the feet on the rear of the oven can be adjusted to compensate for uneven or sloping surfaces.
To adjust the feet:

- Loosen the locknuts (SW 13 mm spanner);
- Manually adjust the feet;
- Retighten the locknuts.

Adjust the unit's feet so that the oven slopes slightly to the rear, thus allowing any wax spills to flow to the back and burn rather than flowing out of the front of the oven.

1.4 Power Connection

The oven is connected to the power supply via the permanently attached power cord, equipped with a grounded plug.
Before starting the oven, make sure the wall outlet to which it is connected is protected by a 16A fuse.

Before connecting the unit to the wall outlet, make sure the voltage information on the nameplate corresponds to your local power supply!

- Unroll the power cord.
- Plug the power cord into the wall outlet.
- Switch the oven on at the main power switch (Figure 2).
  - When the oven is first switched on the display asking you to set the system time will flash (refer to Sec. 2.3.1).
  - Display of the unit of temperature to be indicated, °C / °F. (Refer to Sec. 2.3.2 for instructions on how to modify the displayed units.)

Make sure no parts of the power cord are in contact with hot areas of the housing! Do not lay the power cord on top of the oven!

1.5 Curing

The oven has already been cured at the factory during manufacturing.
This can be determined by the discolouration around the door panel, the ceramic in the oven and the door jamb.
These discoloured areas are not quality faults.

2. Operation

2.1 Operating Elements

A Main power switch (Figure 2)

2.1.1 Keys

(Refer to Figure 3, 4)

Increase value

Decrease value

Cursor to the next stage

Cursor to the previous stage

"P" key, programme selection

Timer key (casting time / clock)

ESC key, exit current mode without saving modifications

ENTER key, accept and permanently save the input values

Start/Stop key

Catalyser key

2.1.2 Status LEDs

(Refer to Figure 3, 4)

Selection indicator in the upper display:
- Temperature display (°C/°F)
- Programmed heating rate display (°/min)
- Date display

Selection indicator in the lower display:
- Time display

Heating status LED:
- OFF:
  Heater off
- Red:
  Oven temperature LOWER than the setpoint
- Green:
  Setpoint reached or exceeded

Programme LED:
- LED flashing:
  Programme being copied (refer to Sec. 4.3)
- LED continuously on:
  Input modifications have not yet been saved.

Catalyser status LED
- Flashing:
  Catalyser heating
- Continuously on:
  Catalyser has reached its operating temperature.

Heating phase LEDs:
- 4 increase phase LEDs
- 4 holding phase LEDs

2.2 Switching the Oven ON / OFF

The oven is switched on and off at the main power switch A (Figure 2).

If the clock has not been set, the oven will automatically go into the "Set system date / time" mode when it is switched on (refer to Sec. 2.3.1).

You can only exit this mode by changing the default system date / time (01.01.2000 / 00:00).

Once the oven has been switched on, the following are shown:

- Upper display (approx. 2 sec. each)
  - The selected unit of temperature, °C or °F (Refer to Sec. 2.3.2 for instructions on how to modify the displayed units.)
  - The actual temperature.

After this, the most recently selected programme is called up. The heating phase LEDs for which a value has been stored go on for approx. 2 sec.
The controller switches to the normal display which indicates the following:

- Upper display:
  - The last stage holding temperature.
- Lower display:
  - The programme number.

If no key is pressed within 30 seconds, the controller returns to the standby mode (refer to Sec. 2.5).
If the oven was switched off during a heating programme, the mains power failure detection takes effect (refer to Sec. 2.6).

2.3 Basic Settings

The following are part of the basic settings:

- Setting the system date / time with a choice of the date format (Day:Month / Month:Day);
- Selection of the unit of temperature measurement (°C / °F);
- Switching the acoustic signal generator on and off.

2.3.1 Setting the System Date / Time

The following sequence is used to set the system date / time:

Year - Month - Day - Hour - Minute.

1. Switch the oven off at the main power switch.
2. Press and hold the timer key.
3. Switch the oven on at the main power switch.
   - The year flashes in the upper display.
4. Use the upper +/- keys to enter the year.
5. Confirm your input by pressing ENTER.
   - The month flashes in the upper display.
6. Use the upper +/- keys to enter the month.
   - If you wish:
     Press the upper +/- keys simultaneously:
     The date format changes from Day:
     Month <> Month:Day
7. Confirm your input by pressing ENTER.
   - The date flashes in the upper display.
8. Use the upper +/- keys to enter the date.
9. Confirm your input by pressing ENTER.
   - The hour flashes in the lower display.
10. Use the lower +/- keys to enter the hours.
11. Confirm your input by pressing ENTER.
    - The minutes flash in the lower display.
12. Use the lower +/- keys to enter the minutes.
13. Confirm your input by pressing ENTER.

The oven then behaves in the same way as after a normal start-up (refer to Sec. 2.2).

Pressing the ESC any time prior to the last time you press the ENTER key (step 13) takes you back one setting step.

2.3.2 Setting °C / °F

The currently selected unit of temperature is displayed in the upper display for approx. 2 sec. after the oven is switched on.

To modify the unit of temperature:

1. Switch the oven off at the main power switch.
2. Press and hold down the upper + key.
3. Switch the oven on at the main power switch.
   - Upper display:
     Current unit of temperature (“C” or “F”)
4. Continue holding the key until the other unit (“F” or “C”) is displayed (after approx. 5 sec.).

The oven then behaves in the same way as after a normal start-up (refer to Sec. 2.2).

2.3.3 Switching the Acoustic Signal Generator ON / OFF

The *Magma* preheating oven is equipped with a signal generator to acoustically indicate the end of a heating programme. This function can be activated or deactivated.

To do this:

1. Switch the oven off at the main power switch.
2. Press and hold down the “P”.
3. Switch the oven on at the main power switch.
   - If the signal generator was previously on, it is now off:
     Lower display: S : OF and a brief sound.
   - If the signal generator was previously off, it is now on:
     Lower display: S : ON and longer sound.

The oven then behaves in the same way as after a normal start-up (refer to Sec. 2.2).

2.4 Display the Current Time / Date

No matter what mode you are operating in, you can always display the current time and date.

- Press the timer twice quickly (within 3 sec.)
  - In the upper display:
    Current date
  - In the lower display:
    Current time.

The display remains on for 3 sec.

2.5 Standby

If no key is pressed within 30 seconds, the oven switches to the “Standby” mode.

The following are displayed in this mode:

- Upper display: Current temperature,
- Lower display: Current time.

At the same time, the brightness of the displays and the LEDs is reduced.

Press any key to exit the standby mode.

The unit does not switch to the standby mode while the oven is heating, during waiting phases prior to heating, or while values are being entered.

2.6 Mains Power Failure Detection

The controller is equipped with a mains power failure detection function which activates to overcome brief power outages or if the main power switch is accidentally switched off.

If the power supply fails for less than 10 minutes during heating, the controller will continue from the point in the program at which the power failed.

The timer is battery-buffered and may react to a power failure with a delayed start. The casting time will be recalculated to reflect this.

The heating programme will not be restarted if power is not restored until after the programmed casting time has passed!

3. Speed Programming Simple Heating Processes

The speed programme is indicated by the programme number „P_ _“.
The speed programme includes only the increase and holding phases for stage 4.
During the increase phase, heating always occurs at the maximum rate (not programmable).

1. Press the “P” key,

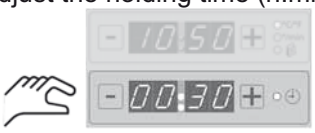
2. Select the speed programme

The speed programme, „P_ _“, is located between P99 and P01.

You can also switch to the speed programme if you press the upper + OR - key from the normal display.

3. Adjust the holding temperature

4. Adjust the holding time (h:min), max. 3 hr.



5. Program the casting time (if desired)
   - Briefly press the timer key:

   - Current casting time displayed
     Date
     Time

   - Set a new casting time is desired (in 15-minute increments):

6. Press the Start/Stop key – start the speed programme

   - The casting time is displayed (for approx. 2 sec.):
     Date
     Time

   - Increase phase:
     Current oven temperature

   - Display in the holding phase:
     Current oven temperature
     Remaining holding time (h:min)

Other possible displays are described in Sec. 5.3.1.

7. The speed programme ends at the conclusion of the 4th stage holding time. This is indicated by an acoustic signal.

The following actions can be performed once the speed programme has run out:

- NONE:
  The acoustic signal automatically switches off after approx. 15 sec. and the temperature is maintained.
- Open and close the oven door:
  The acoustic signal switches off, die and the temperature is maintained.

or :

- The acoustic signal switches off, and the temperature is maintained.

or (upper +/- keys):
The acoustic signal switches off, the oven switches to the post-heating mode (refer to Sec. 5.5).

:
The acoustic signal switches off, the heater switches off and the programme terminates.

4. Programming

The *Magma* preheating oven gives you the option of creating and saving heating programmes.
You can store up to 99 different heating programmes (P01 to P99).
A heating programme comprises a maximum of 4 heating stages.
Each heating stage consists of the following heating phases:

- Increase phase:
  Heating rates in the range between 0 - 9 °C/min. (0 - 17°F/min.) can be specified. An input of “0” is interpreted as the maximum heating rate.

If an increase phase is used for cooling in a programme (the holding temperature of the subsequent stage is lower than that of the previous stage), the controller sets the rate to 0 °C/min. (0 °F/min.). Cooling always takes place at maximum speed which is determined by the oven’s heat loss.

- Holding phase:
  You can also enter the holding temperature and holding time (max. 3 hr.). If no holding temperature is entered (0°C / 0°F), the programme skips over this heating stage.

4.1 Programme Selection

You can store up to 99 different heating programmes.
To select a specific heating programme:

1. Press the “P” key.
   

2. Press the lower +/- key until the desired programme number is displayed.
   

4.2 Entering Heating Phase Values

1. Use the cursor keys to select the heating phase:
   
2. Modify the desired value(s):
   - Increase phase:
     Enter the heating rate in °C/min (°F/min).
     

   - Holding phase:
     Enter the holding temperature in °C (°F) and the holding time in hours:minutes (max. 3 hr.).
     

Holding down the +/- key will change the value in larger increments.

As soon as you modify a value the programme LED goes on to indicate that values have been modified and can be saved.

3. Permanently save values and remain in the input mode:
   
   (Briefly press the ENTER key.)
   This will save any value you have modified in this heating programme and you will remain in the input mode.
   A successful save is indicated by a brief acoustic signal and by the programme LED simultaneously going out.

Follow this process (steps 1 - 3) to enter the values for all desired heating phases.

4. Exit the input mode.
   
   Immediately start the heating programme.

OR


Display the current casting time starting point.
You can program a new, later casting time starting point (refer to Sec. 5.2.2) and then start the heating programme.

OR


Return to the normal display.
If there are still any unsaved values, this will be indicated by the programme LED going on.
Press the ENTER key to save these values now.

OR


Cancel the input and exit the input mode.
All modifications not yet saved with the ENTER key are deleted and the original values are reset.
In addition, the controller exits the input mode and returns you to the normal display.

If you press the ENTER key for a longer period (2 sec.), previous values you entered for this programme will not be saved. Instead, you will be taken to the “Copy programme” mode (refer to Sec. 4.3).

4.3 Copying Heating Programmes

Copying an existing heating programme allows you to quickly and easily create new, similar heating programmes.
To do this:

1. Press the “P” key:


2. Select the heating programme you wish to use as a template:


3. Select the “Copy heating programme” mode:

(press the ENTER key approx. 2 sec.) until:
   - The programme LED;
   - The programme number display flashes.

4. Select a new heating programme:


5. Transfer the values from the template to the new heating programme:


While you are selecting a new programme number in step 4, the LEDs of those heating phases for which values have been programmed go on for every selected programme. This makes it easy to find “empty” or unused programme numbers.


Heating phase LED

If you press the ESC or P key during step 5 no values will be saved under the new number.

5. Operating the Oven

- Place the ceramic slab (B, Fig. 5) into the furnace with the arrows pointing towards the rear wall and push the slab fully to the rear.

Always use the ceramic pad when operating the oven!
Contamination of the heating muffle by wax, cinders or soot can result in damage to the heating muffle.

- Place the material to be heated in the oven.

Do not stack casting moulds!

Do not allow material being heated to be in contact with the temperature probe (A, Figure 5) as this will result in an incorrect temperature reading.

- Close the furnace door.

The furnace door is mounted on floating bearings to ensure complete and secure closure and thus provide the best possible temperature distribution in the furnace‘s interior.
Therefore, when closing the door, its bottom edge contacts the furnace opening first, followed by the remaining door border. In turn this results in a palpable increase in the force required to close the door accompanied by a slight grinding sound just before the door closes fully.
This is intentional and does not represent a door fault.

- Select the desired heating programme (refer to Sec. 5.1):
- Adjust the casting time as required (timer) (refer to Sec. 5.2.2).
- Start the heating programme (refer to Sec. 5.2).

5.1 Heating Programme Selection

1. Press the “P” key.

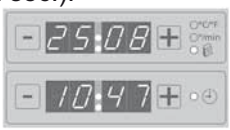

2. Press the lower +/- key until the desired programme number is displayed.


5.2 Start the Heating Programme

5.2.1 Without a Programmed Casting Time

- Start the heating programme:

- The current casting time is displayed (for approx. 2 sec.):



The heating programme switches the heater on and works its way through the programmed values.

5.2.2 With a Programmed Casting Time

The *Magma* preheating oven allows you to programme the timer so that the selected heating programme concludes at a specified time (= casting time).

1. Briefly press the timer key:

   - The current casting time is displayed
     Date
     Time

OR

1. Press and hold the timer key:
   - The most recently programmed casting time is displayed
     Date (next available date)
     Time (previously set casting time)

The controller automatically advances the date by one day if the casting time is no longer possible on the current date.

2. If desired, set a new casting time is desired (in 15-minute increments):

3. Start the heating programme:

The controller waits and switches the heater on when the conclusion of the heating programme matches the programmed casting time.
During this waiting period:

- The time LED flashes;
- The green heating status light remains on;
- The displays indicate the casting time.

- Press the timer key.
  - The heater start time is displayed for approx. 3 sec..
- A programmed casting time can be deleted if:
- You modify programmes;
- You modify values in a programme;
- You exit the casting time input mode by pressing the ESC key;
- You press the ESC key in the normal display;
- You start and then stop the heating programme.

The duration of the programme is derived from the sum of the programmed holding times in the holding phases together with the heating rates during the increase phases, starting with the current oven temperature.

5.3 Running a Heating Programme

After pressing the Start/Stop key or after the wait time has expired, the heating programme starts with the first programmed heating phase.
While the heating programme is running, the individual displays indicate the following:

- During every increase phase:
  - Current oven temperature.

- During every holding phase:
  - Current oven temperature;
  - Remaining holding time (h:min).

In addition:

- The heating phase LED of the currently active phase flashes;
- The heating phase LEDs of those phases which have already been concluded are continuously on;
- Heating status LED state:
  - Green
    Holding temperature reached;
  - Red
    Holding temperature not yet reached;
  - Off
    Heater switched off (e.g., when the door is open).

You can open the oven door at any time during heating programme without the programme being cancelled.

If the oven door is opened during an increase phase, the heating phase is extended, thus changing the casting time.

Opening the oven door during a holding phase the phase holding stage continues and, when it has run out, the next phase is started. The heater, however, remains off.

The heating programme can be terminated at any time by pressing the Start/Stop key.

5.3.1 Other Indicators During Heating

You can use the following keys to display additional information during heating.

- “P” key:
  - Upper display:
    Holding temperature of the last programmed stage in the current programme.
  - Lower display:
    Number of the current programme.
  - Heating phase LEDs for those phases for which a value has been saved are continuously on.
    The LED for the current heating phase flashes.
- Up / Down cursor keys:
  - Select a heating phase. The selected heating phase goes on (the current one continuous to flash).
  - The values programmed in the heating phase are displayed for approx. 5 sec. and may be modified (refer to Sec. 5.3.2).
- Timer key:
  - Displays the currently calculated casting time (date / time).

The casting time is continuously re-calculated. This may result in deviations with regard to a programmed casting time, e.g., if the oven door was opened during an increase phase.

- Pressing the timer key twice in rapid succession:
  - Displays the current time (date / time). Refer also to Sec. 2.4.

5.3.2 Modifying Parameters During a Heating Programme

The following temporary modifications can be made:

- For all as yet not started phases:
  >>All values
- In the current holding phase
  >>The holding time
- In the current increase phase
  >>The increase rate

Modifications CANNOT be made to phases which have already been processed.
Change values:

- Up / down cursor keys
  - Select the heating phase whose values you which to modify. The LED of the selected phase goes on.
- Use the +/- keys to modify the values.
- The controller automatically exists the modification mode after approx. 5 sec. The values are now temporarily saved and will be used for the remainder of the current heating programme,.
  - The re-calculated casting time is displayed for approx.. 3 sec.

The ENTER, P or ESC keys are functionless during temporary parameter modifications.

These modifications are only temporary and are not saved as part of the current programme. To permanently save the values, proceed as described in Chapter 4.

5.4 Ending a Heating Programme

A heating programme can be prematurely cancelled at any time with:

If it is not prematurely cancelled it automatically ends once the holding time in the last programmed stage expires. This is indicated by an acoustic signal.
The following actions can be performed once the heating programme has run out:

- NONE:
  The acoustic signal automatically switches off after approx. 15 sec. and the temperature is maintained.
- Open and close the oven door:
  The acoustic signal switches off, die and the temperature is maintained.
-  or  :
  The acoustic signal switches off, and the temperature is maintained.
-  or  (upper +/- keys):
  The acoustic signal switches off, the oven switches to the post-heating mode (refer to Sec. 5.5).
- 
  The acoustic signal switches off, the heater switches off and the programme terminates.

5.5 Post-Heating

By pressing the upper + or - keys, you can access the post-heating mode at the conclusion of any heating programme which was no cancelled with the Stop/Start key:

The following appears:

- In the upper display:
  The holding temperature of the 4th stage of the last programme.
- In the lower display:
  P_ _, for approx. 2 sec,
  followed by:
  The hold time last used in the speed programme.

You can now:

- Immediately change the holding temperature;
- Immediately change the holding time.

The oven then heats at the maximum heating rate (which cannot be changed) without any further input until the new holding temperature is reached (or until the oven cools to this temperature).
During post-heating you can also modify the holding temperature and holding time.

5.6 Catalyser

A catalyser can be connected to the oven (refer to the accessories).
The controller automatically detects the presence of a connected Renfert catalyser.

5.6.1 Mounting the Catalyser

1. Loosen the fastening screws on the preheating oven and remove the flue (Figure 11).
2. Install the Catalyser's mounting plate (Figure 12).

! Take care no to damage the ceramic oven flue!

3. Before mounting the Catalyser, make sure its fastening screw is retracted (Figure 13).
4. Push the Catalyser completely onto the mounting plate up to the stop (Figure 14).
5. Tighten the Catalyser's fastening screw (Figure 15).

5.6.2 Connecting the Catalyser

Before connecting the unit to the wall outlet, make sure the voltage information on the nameplate corresponds to your local power supply!

- Plug the power cord into the wall outlet. (Please use a separate outlet for the Catalyser!)
- Use the included cord to connect the Catalyser to the oven (Figure 16 and Figure 17).

5.6.3 Automatic Operation

The controller automatically switches the catalyst converter on and off during the course of a heating programme.
The catalyst converter is automatically switched on or off whenever:

- The P_ _ programme is running;
- A phase programme with only a single phase is running;
- The oven temperature is less than 650°C in a phase programme consisting of multiple phases;
- The temperature is retained at the conclusion of a heating programme (refer to Sec 5.4);
- If the oven switches to the post-heating mode at the conclusion of a heating programme (refer to Sec 5.5).

The catalyst converter is automatically switched off whenever:

- A heating programme has been completed (refer to Section 5.4);
- The oven temperature exceeds 650°C during multi-stage programmes with several phases.

5.6.4 Manual Operation

The catalyst converter can also be manually switched on and off by the operator during a heating programme.

- To switch the catalyst converter on:
   Press briefly.
  An extended audible tone provides confirmation of the action.
- To switch the catalyst converter off:
   Press and hold for at least 2 seconds.
  An short audible tone provides confirmation of the action.

Once the catalyst converter has been manually switched on, the current heating programme will no longer switch it off, that is, the catalyst converter operates independently of the controller.
Only if the heating programme is ended by pressing the STOP button will the catalyst converter also be switched off. During the next heating programme, the catalyst converter will again be automatically controlled by the heating programme.

! The catalyst converter must be switched on at least 10 minutes prior to charging the oven with material.
A cold catalyst converter will be damaged by the generated combustion vapours.

5.6.5 Status Display

The status LED  indicates the current Catalyser state:

- Flashing:
  Catalyser heating up.
- Continuously on:
  The Catalyser has reached its operating temperature.
- Off:
  The Catalyser is switched off.

6. Cleaning / Maintenance

Only perform cleaning and maintenance if the oven is cold!

Use a soft, moist cloth and cleanser to clean the housing.
Never use abrasive cleansers or cleansers containing solvents!

6.1 Heating Muffle Inspection

Inspect the heating muffle regularly (at least once per month) for damage and cracks.

The oven must be immediately taken out of service if cracks result in a risk of the heating elements being able to be touched.

The heating muffle may only be replaced by an authorised specialist. The following hazard information must be observed during replacement:

Dust particles from the insulation jacket trapped between the heating muffle and the housing represent a health hazard if inhaled!

Always wear respiratory protection during disassembly / assembly work!

Always wear gloves protection during disassembly / assembly work!

6.2 Cleaning the Oven Chamber

The oven chamber should be cleaned regularly to remove dust and broken muffle and die pieces.

Switch the oven off at the main power switch before cleaning.

Only clean the oven chamber once it is cold.

Use only a dry cloth or vacuum cleaner to clean the oven chamber. Never use cleanser or other liquids.

The investment materials used for the dies represent a health hazard.
Comply with the investment material manufacturers' safety data sheets and always wear appropriate protective equipment.

6.3 Replacing the Fuses

The circuit breakers are located on the rear of the unit (Figure 6) and can be reset if required (press the button).

6.4 Replacing the Thermocouple

The thermocouple must be replaced if the protective ceramic tube surrounding it is damaged.
Proceed as follows:

1. Switch the oven off at the main power switch.
2. Unplug the power cord at the wall outlet.
3. Turn the oven so that the thermocouple on the back is easily accessible (Figure 7).
4. Loosen the fastening screw (Figure 8) and remove the protective cover.
5. Disconnect the cable (Figure 9).
6. Pull the thermocouple straight out, towards the rear (Figure 10).
7. Insert a new thermocouple into the oven, making sure it is straight (Figure 10).
8. Connect the cable, making sure the colours match (Figure 9):
   - White: Negative
   - Orange: Positive
9. Install the protective cover and secure it together with the thermocouple using the fastening screw (Figure 8).

6.5 Replacing the Door Sensor

The door sensor is a safety component. It may not be manipulated.
After replacing the sensor it must be examined for proper function.

A sensor located on the underside of the door is used to detect the door position. Should the oven overheat, the sensor can become inactive so that the door's closed state will no longer be detected.
To replace:

1. Switch the oven off and unplug the power cord at the wall outlet.
2. Allow the oven to cool off.
3. Completely open the door and loosen the door's fastening screws (Figure 18).

Injury hazard!
The springs are under tension. Hold them when loosening.

4. Unhook the springs from their holder in the door (Figure 19).
5. Gently press the metal housing outwards until the door is released from its retainer (Figure 20).
6. Remove the door (Figure 21), leaving the springs on the door pivots to avoid mixing them up.
7. The sensor (Figure 22-A) can be replaced using pliers (Figure 22).
8. Reinsert the door in the housing and screw the fastening screws down.
9. Remove the springs from the door pivots and first insert them into the opening in the oven wall, then rotate them and pull them back onto the pivots (Figure 23).
10. Hook the springs to the door retainer (Figure 24).
11. Plug the power cord into the wall outlet and switch the oven on.
12. Check that the switch is functioning properly:
    - Select the speed programme;
    - Enter a holding temperature of 30°C;
    - Start the heater.
    - Open / close the oven door: With the door closed the heater status indicator should be red or green and must go out when the door is opened.

6.6 Backup Battery Replacement

1. Switch the oven off and unplug the power cord at the wall outlet.
2. Allow the oven to cool off.
3. Loosen the operating unit fastening screws (Figure 25).
4. Pull the operating unit out towards the front and lay it aside.
5. Unplug the ribbon cable (Figure 26) and close the connector retainer clips (Figure 27).
6. Loosen the top housing cover screw (Figure 28).
7. Remove the top housing cover.

! Do not touch any components or solder points on the PCB!

8. Replace the battery (Figure 29), taking care not to reverse the polarity. The + pole is on top.

! When reinstalling the top housing cover make sure no components on the PCB are damaged!

9. Replace the top housing cover and secure it with the screw.
10. Open the connector retainer clips (Figure 30).
11. Reconnect the ribbon cable (Figure 31).
12. Push the operating unit straight back into the oven and secure it with the screws.
13. Check the system time as described in Sec. 2.3.1 and reset, as required.

6.7 “Err” Display

The controller is able to detect a variety of fault situations which it indicates by displaying “Err” in the upper display (refer to Sec. 11, “Error List”).
The “Err” display appears whenever an anticipated reaction on the part of the oven (or the oven temperature) fails to occur.
The heater is simultaneously switched off.

Burn hazard!
Do not touch the oven if “Err” is displayed. Switch the oven off at the main power switch and allow it to cool off.

7. Spare Parts

Refer to the spares list at the end of this manual for numbers of wearing and replacement parts.

8. Standard Delivery

1 *Magma* preheating oven
1 Ceramic pad
1 Operating instructions
1 Handle set

9. Delivery Versions

No. 2300-0000	*Magma*, 230V, 50/60 Hz
No. 2300-0500	*Magma*, 230V, 50/60 Hz, for Catalyser, only together with No. 2300-0001
No. 2300-3000	*Magma,* 230 V, 50/60 Hz, with NEMA6-15P plug
No. 2300-3500	*Magma,* 230 V, 50/60 Hz, with NEMA6-15P plug for Catalyser, only together with No. 2300-3001

10. Accessories

No. 2300-0001	Catalyser
No. 2300-3001	Catalyser with NEMA6-15P plug
No. 9-0003-5962	Flue
No. 9-0003-6000	Handle set

11. Error List

Error	Possible cause	Corrective action
Displays remain blank after the oven is switched on at the main power switch.	• Power cord not plugged in. • Building fuse blown. • Device fuse blown.	• Plug the power cord into the wall outlet. • Check the building fuse and replace, as required. • Check the device fuse and replace, as required (refer to Sec. 6.3).
The building fuse blows each time the heater is switched on.	• Inadequate mains power protection.	• The building fuse must be at least 16A.
Heating status display fails to go on even though the heater has been switched on with the Stop/Start key.	• Oven door not closed. • Door sensor fallen off. • Faulty door sensor. • Faulty internal door open detection switch.	• Close the unit door. • Reinstall the door sensor (refer to Sec. 6.5). • Replace the door sensor (refer to Sec. 6.5). • Have the unit repaired.
Heating status display indicates heating but the oven fails to warm.	• Faulty thermocouple. • Faulty heater coil. • Faulty power electronics.	• Replace the thermocouple (refer to Sec. 6.4). • Have the unit repaired. • Have the unit repaired.
Temperature display stays at a specific value even though the oven heats.	• Faulty thermocouple.	• Replace the thermocouple (refer to Sec. 6.4).
Extremely excessive temperature; oven overheats.	• Faulty thermocouple. • Faulty power electronics.	• Replace the thermocouple (refer to Sec. 6.4) • Have the unit repaired.
The programme immediately starts when the oven is switched on.	• Oven was switched off before programme ran to completion. Switching the oven off was interpreted as a power failure.	• Wait until the programme concludes before switching the oven off or prematurely terminate the programme with the Stop/Start key.
The wrong time is indicated in the standby mode.	• Clock not set. • The clock backup battery is dead.	• Check the system time and reset, as required (refer to Sec. 2.3.1). • Replace the backup battery (refer to Sec. 6.6).
The indicated casting time makes no sense	• Faulty system time.	• Check the system time and reset, as required (refer to Sec. 2.3.1).
The year indicator flashes each time the oven is switched on	• Backup battery is dead.	• Replace the backup battery (refer to Sec. 6.6).
Err 1 to Err 4	• External fault • Faulty controller	• Switch the oven off, then on, and repeat the interrupted procedure (e.g., restart the heating programme). • Have the unit repaired.
Err 5 and Err 6	• Too much cold material placed in a warm oven. • Door left open too long. • Thermocouple cable loose. • Faulty thermocouple.	• Restart the heating programme. • Restart the heating programme. • Check that the heating cable is securely attached. Reattach as required. • Replace the thermocouple (refer to Sec. 6.4).

Error	Possible cause	Corrective action
Err 7	• Faulty thermocouple. • Oven cooled with compressed air and heating programme started (temperature increase due to the heat retained in the oven).	• Replace the thermocouple (refer to Sec. 6.4). • Allow the oven to cool off.

Information for Operators

The following information is intended to assist you, the operator, in safely working with the *Magma* preheating oven in your laboratory.

⚠ **Using these operating instructions as a starting point, instruct all operators of the unit with regard to the area of application, the possible hazards during operation, and the proper operation of the preheating oven.**

Please have these operating instructions readily available for the operators.

A. Application Area

A.1 Proper Use

The *Magma* preheating oven is solely intended for use in dental technology laboratories as well as arts and crafts and jewellery workshops. The preheating oven is solely intended for waxing up and preheating casting dies. Only modelling waxes and modelling plastics may be employed as modelling materials. Only specialist personnel may operate the unit as incorrect operation can result in extreme deterioration in the quality of individual pieces and may also present extreme hazards to the operator.

A.2 Improper Use

Modelling waxes and modelling plastics MAY NOT be placed directly in the oven without being embedded in a casting die.

A.3 Setup

The preheating oven is solely designed to be used under an extractor or extraction hood.
The extraction equipment must comply with all local ordinances and regulations.
The extraction equipment must be dimensioned on the basis of the materials being processed and the eventual emissions of other devices.
No vapours may escape into the room atmosphere. Depending on the types of vapours produced, it may be necessary to obtain approval from the appropriate local authorities for the operation of the extraction equipment.
The hazardous emissions generated by the oven can be significantly reduced by the employment of a ctalyst converter (optional accessory).

A.4 Ambient Conditions

(in accordance with DIN EN 61010-1)

The unit may only be operated:

- Indoors;
- Up to an altitude of 2,000 m above sea level;
- At an ambient temperature range between 5 - 40ºC [41 - 104ºF] *);
- At a maximum relative humidity of 80% at 31ºC [87.8ºF], dropping in a linear manner to 50% relative humidity at 40ºC [104ºF] *);
- With mains power where the voltage fluctuations do not exceed 10% of the nominal value;
- Under contamination level 2 conditions;
- Under over-voltage category II conditions.

*) Between 5 – 30°C [41 – 86°F], the unit can be operated at a relative humidity of up to 80%. At temperatures between 31 – 40°C [87.8 – 104°F], the humidity must decrease proportionally in order to ensure operational readiness (e.g., at 35°C [95°F] = 65% humidity; at 40°C [104°F] = 50% humidity). The unit may not be operated at temperatures above 40°C [104°F].

A.5 Ambient Conditions for Storage and Shipping

The following ambient conditions must be maintained during storage and shipping:

- Ambient temperature: -20 – +60ºC [-4 – +140ºF],
- Maximum relative humidity: 80%.

B. Hazard and Warning Information

Only intended for indoor use. The unit is only designed for dry applications and may not be operated or stored outdoors or under wet conditions.

The unit may not be taken into service until any required alterations to comply with regionally specific power plug configurations have been made. Such alterations may only be performed by a qualified electrician.

The unit may only be operated if the information on the nameplate conforms with the specifications of your local mains power supply.

The unit may only be plugged into an outlet which is connected to a ground wire system.

Regularly inspect connecting lines and hoses (e.g., the power cord) for damage (e.g., kinks, cracks, porosity) or signs of aging. Units exhibiting damaged connecting lines, hoses, or other defects must be taken out of service immediately.

Always unplug the unit from the wall outlet before beginning any work on the unit's electrical components.

Only operate the oven with the supplied ceramic pad.

The oven must be immediately taken out of service if cracks result in a risk of the heating elements being able to be touched.

Warning
Burn hazard
The exterior of the oven as well as the oven door may be hot.

Caution
Burn hazard
Only open the door with the handles.

Warning
If waxes have not completely combusted, they may burst into flame when the door is opened.

Caution
Burn hazard!
Use sufficiently long tongs to remove hot casting dies.

Only wear clothing made of non-melting material (cotton).

Caution
Burn hazard!
Always wear heat protection gloves when loading or unloading the oven.

Caution
Opening the oven door may release an initially hazardous amount of heat.
Always wear face protection when loading or unloading the oven.

An "Err" display may indicate an overheating of the oven. Do not touch the oven. Burn hazard!
Switch the oven off at the main power switch and allow it to cool off.

Warning
Only operate the oven in well ventilated rooms.

Vapours generated during waxing and preheating must be removed by a suitable extraction hood. Refer to the wax and investment material manufacturers' safety data sheets and comply with all local regulations with regard to possible hazards associated with these vapours.

The oven may only be set up on a non-flammable and non-combustible surface.

Never place any flammable or explosive materials on the oven or store them in the vicinity of the oven.

Never store any flammable or explosive liquids or gases in the vicinity of the oven.

Never heat liquids in the oven.

Particles of the door firebrick can be hazardous if inhaled! Do not damage the door firebrick. Wear personal protective equipment such as respiratory protection and gloves when changing the door firebrick.

B.1 Personal Protective Equipment (PPE)

These recommendations regarding "personal protective equipment" are solely intended to apply to the product described above.
Other requirements which may arise as a result of the on-site ambient conditions or other products or as a result of the employment in conjunction with other products have not been taken into consideration.
These recommendations in no way absolve the operator of his obligations with regard to occupational health and safety to ensure the safety and health of his employees.

C. Authorised Individuals

Only authorized individuals may operate and maintain the *Magma* preheating oven *) (e.g., trained dental technicians or goldsmiths).
The unit may not be operated by minors.

*) Authorised individuals are those who, due to their technical training, knowledge and experience are able to evaluate and perform the tasks assigned to them. They are familiar with all pertinent regulations and are capable of comprehensively recognizing potential hazards.

D. Preparations Prior to Starting

Before starting the oven, inspect the wall outlet and ensure that it has been outfitted with at least a 16A fuse.

E. Repairs

Any maintenance tasks which go beyond the scope of the descriptions in Chapter 6 as well as any repairs may only be performed by qualified electricians or authorized retailers.
All hazard information in Chapters

- **6 “Cleaning / Maintenance”,**

and;

- **B “Hazard and Warning Information”;**

must be observed.
The housing may only be opened by qualified electricians or authorized retailers.

F. Disposal Information

F.1 Device Disposal

The unit must be disposed of by a qualified specialist disposal service. The disposal service must be informed of the possibility of hazardous residue in the unit.

F.1.1 Disposal Instructions for EU Member Nations

To conserve and protect the environment, prevent environmental pollution and improve the recycling of raw materials, the European Commission adopted a directive that requires the manufacturer to accept the return of electrical and electronic units for proper disposal or recycling.
Within the European Union units with this symbol should not therefore be disposed of in unsorted domestic waste:

For more information regarding proper disposal please apply at your local authorities.

F.2 Insulation Material

Particles of the insulation material installed between the heating muffle and the housing as well as particles from the door firebrick can be hazardous if inhaled!

Always wear respiratory protection during disassembly / assembly work!

Always wear gloves protection during disassembly / assembly work!

G. Technical Specifications

Mains voltage:	230 V, 50/60 Hz
Power consumption:	1900 W
Mains input fuse:	12 A (T)
Temperature range:	0°C - 1100°C (30°F - 2010°F)
Programmable heating rate:	0°C/Min. - 9°C/Min. 0°F/Min. - 17°F/Min.
Oven chamber (height x width x depth):	120 x 160 x 180 mm [4.7 x 6.3 x 7.1 inches]
Dimensions, incl. one handle and flue: (height x width x depth):	500 x 430 x 440 mm [19.69 x 16.93 x 17.32 inches]
Dimensions, incl. one handle and installed Catalyser: (height x width x depth):	610 x 430 x 550 mm [24.02 x 16.93 x 21.65 inches]
Weight (empty):	approx. 30 kg

H. Liability Exclusion

Renfert GmbH shall be absolved from all claims for damages or warranty if:

- **The product is employed for any purposes other than those cited in the operating instructions;**
- **The product is altered in any way other than those alterations described in the operating instructions;**
- **The product is repaired by other than an authorized facility or if any but Renfert OEM parts are employed;**
- **The product continues to be employed, despite obvious safety faults or damage;**
- **The product is subjected to mechanical impacts or is dropped.**

I. Warranty

Provided the unit is properly used, Renfert **warrants** the all components of the *Magma* preheating oven for a **period of 3 years**.
Warranty claims may only be made upon presentation of the original sales receipt from the authorized dealer.
Components subject to natural wear as well as consumables (e.g., thermocouple, etc. ...) are excluded from this warranty.
Renfert also warrants the heating muffle for a period of 3 years or maximum 6,000 hours of operation.
The warranty is voided in case of improper use; failure to observe the operating, cleaning, maintenance, and connection instructions; in case of independent repairs or repairs by unauthorized personnel; if spare parts from other manufacturers are employed, or; in case of unusual influences or influences not in compliance with the utilization instructions.
Warranty service shall not extend the original warranty.

We reserve the right to make technical changes