# OPERATING INSTRUCTIONS

# AUSTROMAT D2


**Version 2**

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# 0 INTRODUCTION

Dear Customer,

Congratulations on your new **AUSTROMAT D2** ceramic furnace. DEKEMA's many years of experience in the field of dental furnace construction have gone into this equipment ensuring a very high level of quality and exceptional performance and reliability. In order to take full advantage of the possibilities your ceramic furnace offers so as to obtain optimum results, we would like to ask you to spend a little time studying these instructions. The technical specifications and a description of the furnace can be found in Sections 2 and 3. In order to ensure reliable, long-lasting operation of the ceramic furnace, please observe the safety measures indicated in Sections 4 and 5 and the suggestions regarding service and maintenance of the furnace in Section 6. The **AUSTROMAT D2** is a menu-operated furnace whose functions are controlled via keyboard input and VDU output. Working with keyboard input is described in Section 7. Practical examples will help you on your way. The Practical Tips section is designed to allow you to identify and, if necessary, remedy any problems.

Please note the following warning symbols:
This symbol warns of hazardous electrical voltage where there is a danger to life and limb. Note these instructions on the device, and be especially careful.

This symbol indicates a burning hazard from hot surfaces. Note these instructions on the device, and be especially careful.

This symbol indicates a personal hazard to life and limb. Take note of this warning in the operating instructions, and take extra precautions.

# 1 COMPONENTS

- **AUSTROMAT D2** ceramic furnace unit with mains cable
- firing table
- one soft module including software
- vacuum pump (diaphragm pump) with electric power supply cable and vacuum tube (silicone tube)
- furnace tweezers
- operating instructions
- packaging material

Ensure that all components have been supplied and that the equipment has not suffered any visible damage in transport. If this is not the case, please contact your service partner immediately. Please keep the packaging material (two boxes and foam material to protect against knocks during transport) in case you need to ship the equipment at a later date.

# 2 TECHNICAL SPECIFICATIONS

## 2.1 CERAMIC FURNACE UNIT

| | |
|---|---|
| Supply voltage | depending on the type (rating plate on the rear):<br>~ 230 V 220…240 VAC / 50 – 60 Hz<br>~ 115 V 110…120 VAC / 50 – 60 Hz<br>~ 100 V 95…105 VAC / 50 – 60 Hz |
| Power consumption (excl. pump) | max. 1200 W |
| Fusing | depends on type (name plate)<br>~ 230 V 2 x 6,3 A T 250 V<br>~ 115 V 2 x 16 A T 500 V<br>~ 100 V 2 x 16 A T 500 V |
| Battery | lithium cell 3.6 V / 2000 mAh |
| Vacuum pump connection socket | depends on type (name plate) |
| Interfaces | serial (to PC), recommended transfer rate 9600 baud; Soft or memory module (same construction) |
| Max. firing temperature | 1200°C |
| Max. rate of temperature rise | 160°C/min from 100°C - 500°C<br>120°C/min from 600°C - 1000°C<br>60°C/min from 1000°C - 1200°C |
| Dimensions | 35 x 63 x 28 cm (w x h x d) |
| Weight | 18 kg |

## 2.2 VACUUM PUMP UNIT

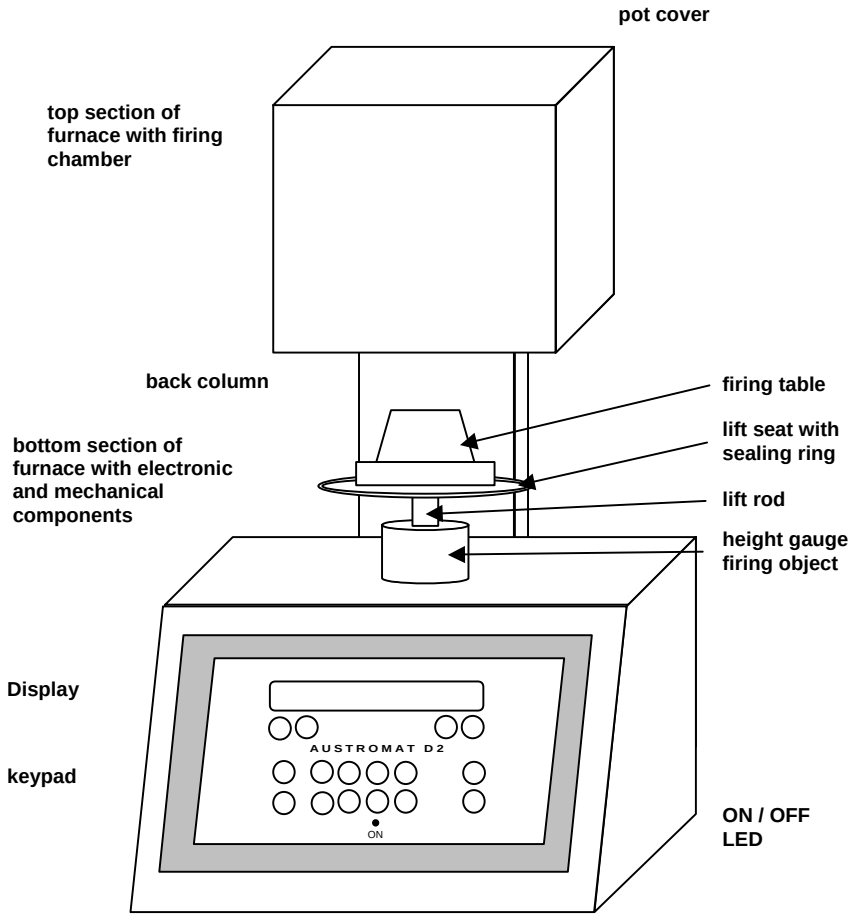
| | |
|---|---|
| Pump type | diaphragm pump |
| Supply voltage | depends on type (name plate)<br>~ 230 V 220…240 VAC / 50 – 60 Hz<br>~ 115 V 110…120 VAC / 50 – 60 Hz<br>~ 100 V 95…105 VAC / 50 – 60 Hz |
| Nominal suction capacity | 24 l / min |
| Weight | 6 kg |

DEKEMA does not take upon liability for damage caused by using another vacuum pump than delivered.

# 3 DESCRIPTION OF EQUIPMENT

igs. 1 and 2 display a diagram of the front and back views of the AUSTROMAT D2.

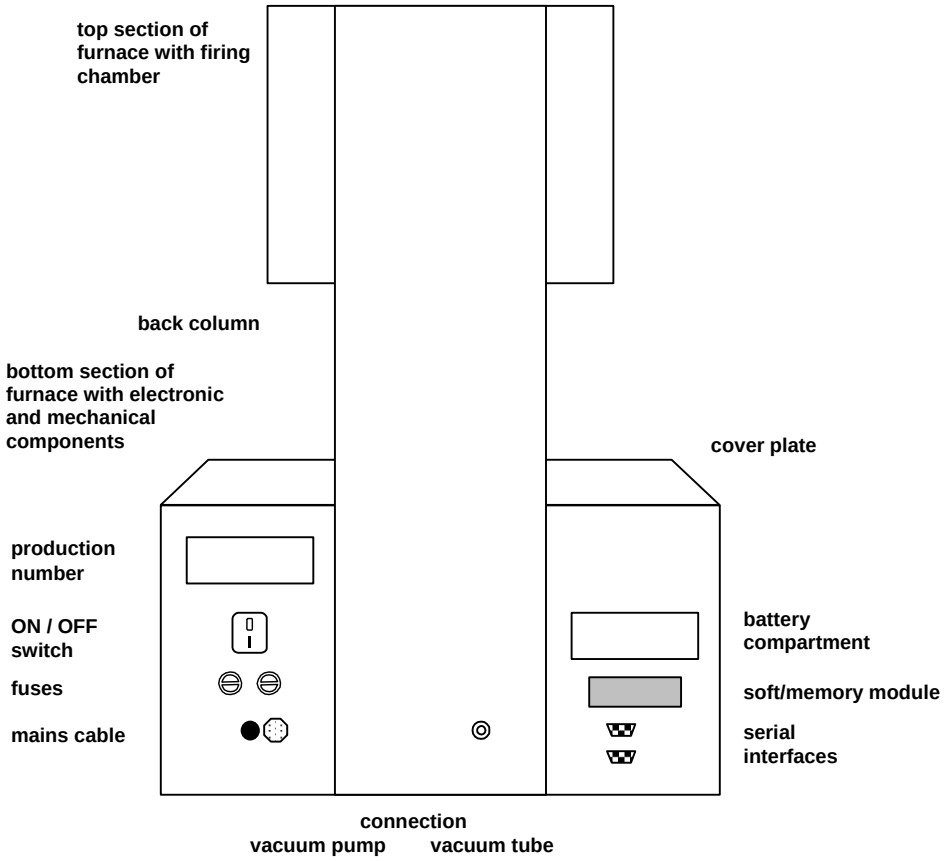
Fig. 1: Front view AUSTROMAT D2




The top section of the furnace houses the actual firing chamber and the heating element. The bottom section of the furnace contains the electronic and mechanical furnace components used to move the lift system, comprising the lift rod, lift seat with sealing ring (yellow O-ring), and the firing table on which the objects to be fired are placed. A cylindrical height gauge corresponding to the clear height of the firing chamber is located on the cover plate.
The front panel contains the display, keypad and an LED indicating that the equipment is ready for use.

Firing objects (including firing trays) rising above the height gauge may not be placed onto the firing table. The thermocouples in the firing room can be damaged.

Fig. 2: Back view **AUSTROMAT D2**

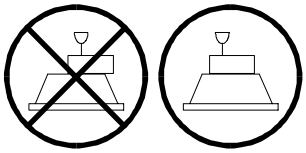



On the back of the bottom section of the furnace you will find a label with the production number, the main ON/OFF switch, the fuses, the fixed mains cable, the connection sockets for the vacuum pump mains cable and the vacuum tube, and the battery compartment .
The following connections are available: one plug connection with two clips to hold the soft or memory module for data storage, two serial interfaces for PC connection.

# 4 SAFETY MEASURES

## 4.1 NOTES REGARDING SAFETY

- **Never operate the furnace without the firing table!**
- Familiarize yourself with the safety steps and operating instructions to prevent damage to humans and/or materials.
- The AUSTROMAT D2 was designed for firing dental ceramic objects. We assume no liability or guarantee when the device is improperly used handled or not used according to instructions.
- In particular, materials may not be heated that may trigger explosions, implosions and hazardous or flammable gases.
- The equipment may only be operated with the indicated supply voltage (the rating plate is on the back). Please use only suitable power sockets with ground contacts, and never use adapter plugs.
- The power socket should be close to the device and easily accessible. In an emergency, unplug the power plug and turn off the furnace (the main switch is on the back, see p. 8, Fig. 2).
- When you mount the object to be fired and firing tray, make sure that nothing extends over the edge of the firing table. The object to be fired and the heat insulation material may otherwise be damaged when you close the furnace.



- Only use fuses with the indicated lag and nominal current (see p. 4, Technical Data).
- Do not use your hands or any objects for grasping things in the firing chamber. This can cause injury from burns or electrical shock.
- Never directly contact hot parts of the furnace. Do not grasp the lift seat, firing table or object to be fired with your bare hands. Never put your hand into the hot firing chamber.
- Before the top and bottom are opened, the furnace must be disconnected from the power source (turn off the furnace and pull the plug). The main switch is on the back (see p. 8, Fig. 2).
- If a lightening stroke hazard exists, separate the furnace from the power source (turn it off and pull the plug).

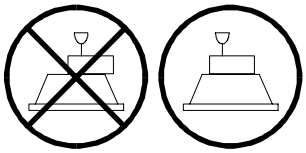
- If the furnace cannot be operated safely, pull the power plug, and make sure that the furnace cannot be unintentionally switched on, especially when the following error message appears: **TEMPERATURE LIMIT EXCEEDED. SWITCH FURNACE OFF IMMEDIATELY!**
- If the ground conductor is interrupted either inside or outside the device, or the ground conductor is released, the furnace is hazardous to operate. The connection may never be intentionally severed.
- Further reasons for assuming that the equipment cannot be used safely: Visible damage to the housing or power cable, malfunctioning, frequent need to exchange fuses, long storage in a bad environment (moisture). Please also follow the setup instructions in Section 4.2
- Note that the furnace requires several hours to cool after it is turned off.
- Do not run the connection lines past hot locations of the furnace, and especially avoid direct contact.

## 4.2 SET-UP

- Set up the furnace in a suitable place on a dry, flat, solid surface.
- Make sure that flammable materials or objects that can be damaged by heat are sufficiently distance from the furnace.
- Never place such materials or objects on the pot cover and the cover plate.
- The vents in the top section must not be obstructed in order to ensure circulation of cooling air.
- The vacuum pump should be set up in dust-free, well-ventilated area. Please also note that the length of the vacuum hose is approx. 1.5 m from the pump to the furnace. Never block the vents of the pump. Do not store easily combustible or flammable materials close to the pump.

## 4.3 OPERATION

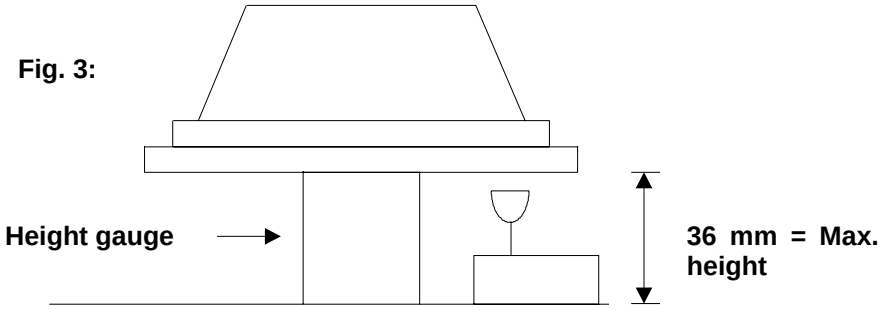
- Never operate the ceramic furnace without supervision.
- When positioning the firing object and firing tray, ensure that no parts jut out over the edge of the firing table. There is a danger of damaging the firing object and thermal insulation material when closing the furnace.



- Never directly contact hot parts of the furnace. Do not grasp the lift seat, firing table or firing object with your bare hands. Never put your hand into the hot firing chamber.

- Note that the furnace automatically heats up approximately 30 seconds after it is turned on, even when the firing chamber is open.
- After a program memory is selected or the program is aborted, the standby temperature of the selected or aborted program is automatically set in the firing chamber after approximately 20 seconds. This can be the preheating temperature or the firing chamber temperature required for drying.
- Do not use your hands or any objects to grasp things in the firing chamber. This can cause injury from burns or electrical shock.
- The firing chamber has a clear height of 36 mm. The fired objects (including the firing tray) may not exceed this height since the temperature sensor could otherwise be damaged. On the cover plate, there is a cylindrical height gauge that corresponds with the free height of the firing chamber.

**Fig. 3:**




- While the firing program is running, the lift automatically moves up and down. Make sure that no objects are in the way that could hinder the lift movement. Also do not attempt to manually stop or accelerate the lift.
- The furnace should not be operated for some time after sudden change of ambient temperature as otherwise condensation may occur in the electronic components, thus causing damage.
- **Never operate the furnace without the firing table!**

If technical servicing or repairs are necessary, they should only be performed by authorized professionals.

| | |
|---|---|
| Federal Republic of Germany | VDE 0701 |
| International | according to the respective national guidelines |

# 5 START-UP

First, please ensure that the package contains all parts indicated in the list of components (Section 1) and keep the packaging material for any later transport. Read the operating instructions before turning on the device. In particular, familiarize yourself with the furnace description in Section 3, and read the safety instructions in Section 4. Before starting the furnace, remove the software module on the back by slightly pressing together the clips on the narrow side and pulling of the module. Store it in a safe location.

Step 1: Remove the software module on the back, and store it in a safe place.

Step 2: Plug in the power cable into a power socket with a ground contact. The ON/OFF switch is on the back of the furnace.

Step 3: Make sure that the pump connected loads (rating plate) correspond to the furnace voltage supply values.

Step 4: Connect the vacuum pump: Plug in the vacuum pump power cable into the associated connection socket of the **AUSTROMAT D2** making sure that the guide groove is aligned. Screw tight the cable in the socket since a bad electrical contact can damage the furnace.

***TIP A***

***See p. 25***

Step 5: Connect the pump vacuum line (silicon tube) to the vacuum connector on the back of the furnace.

Step 6: Turn on the furnace. The furnace performs an internal software and hardware check and the lift moves down automatically. If necessary, remove any ceramic dust from the lift seat and the sealing ring. Brush the dust into a receptacle. Do not blow away the dust, and do not inhale it.

Step 7: After it is turned on, the furnace waits approximately 30 seconds and automatically heats up to the starting temperature of the preheating program or the program that has been set.

# 6 MAINTENANCE AND SERVICE

## 6.1 MAINTENANCE

- Clean the housing, control panel and control elements with a soft cloth moistened with a mild cleanser. Do not use scouring agents, scouring pads or solvents such as alcohol, gasoline or acetone.

- Never contact the screen surface with sharp, rough or pointed objects such as tweezers or ballpoint pens. These objects can scratch the screen surface.
- Always keep the sealing ring of the lift seat free of dust to ensure a reliable vacuum. Use a brush with a receptacle (for ceramic dust), or a moist cloth.
- Every now and then, clean the lift rod with a dry cloth. Never oil or grease.

## 6.2 TEMPERATURE CALIBRATION

***TIP F***
***See p. 26***

A number of factors influence the temperature of the firing object. These can include: The color and shape of the firing tray, or the number and type of firing objects. Other major influences can be age-related effects such as heating element wear and changes to the thermoelectric properties of the temperature sensor. To compensate for these factors and ensure normal firing results, we recommend that you calibrate the furnace when the firing results change, or at least once a year. Calibration is carried out by means of the calibration factor (CCF) . Observe the following instructions:

- For new furnaces, we recommend that you calibrate the temperature for the first time after approximately six months.

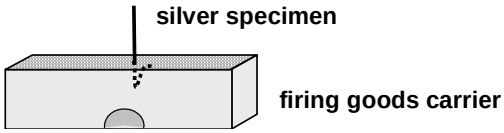
***TIP C***
***See p. 25***

- An internal monitoring program notifies you when you should calibrate the furnace temperature.
- Make sure that the heating element and thermocouple are not damaged.
- Only use the DEKEMA calibration set that is for the specific furnace. This consists of a curved silver wire and a white ceramic firing tray.
- Make sure that the temperatures of all the firing programs are adjusted when the CCF value changes. The firing temperatures of individual programs may have to be corrected.

Performing temperature calibration with the calibration set:

The furnace must be well warmed-up before calibration. This is generally the case when the side walls of the top section of the furnace are warm. Pin the bent silver wire from the calibration set in the middle of the firing tray, as illustrated in Fig. 4, and place it on the firing table.

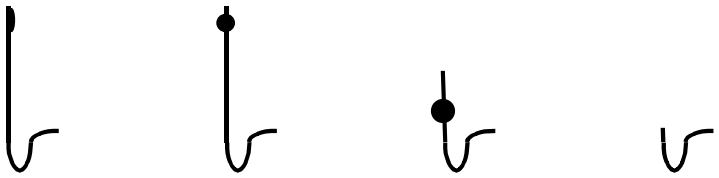
Fig 3: Positioning the silver specimen




Start the temperature calibration program by selecting ”Temperature Calibration” from the *Setup* menu (Section 7.3).

Consult Fig. 5 to evaluate the silver specimen.

Fig. 4: Evaluation of the silver specimen



| **temperature too low increase CF by 2** | **temperature o.k. CF correct** | **temperature too high reduce CF by 2** | **temperature too high reduce CF by 5** |
|---|---|---|---|

Adjust to the correct CF setting in small steps of two or three points at a time (e.g. 1004 to 1006). Increasing the CF value corresponds to increasing the firing temperature. Analogously, reducing the CF value implies reducing the firing temperature.

Proceed as follows to change the CF value: Select ”Temperature Calibration” from the *Setup* menu and enter the new calibration factor by pressing “+” and “-“ (Section 7.3).
Minor corrections can be made instinctively. If any severe or sudden deviations from the original CF value occur, check for technical faults.

## 6.3 SELF-CHECK

The **AUSTROMAT D2** has an internal program that checks the function of the major components (check program). Regularly using this non-editable program makes it easier for you and the responsible service personnel to identify aged components (such as heating element wear) and troubleshoot malfunctions (such as vacuum leakage). After approximately 500 firings, the device displays a recommendation on the screen to start the self check program (duration: approx. 45 min). In the *Setup* menu, select the “Check program” function, and start the program.

Start the check program only after running several firing programs so that the furnace is in the warm operating state.

The results of the self-check are saved in a diagnosis file. In certain cases, the **AUSTROMAT D2** automatically notifies you upon starting a firing program if diagnostic data indicate that a firing program will not run properly. This is the case for example when the heating element is too old, and you want to reach a firing temperature quickly.

## 6.4 REPLACING THE BATTERY

REPLACING THE HEATING ELEMENT The firing programs and the software of the **AUSTROMAT D2** are saved in electronic memory modules that require an uninterrupted power supply to maintain their memory function. When the furnace is turned off, this in ensured by a battery (lithium cell 3.6 V / 2000 mAh, non-chargeable) that lasts approximately three years. After a maximum of three years, the battery should be replaced for the memory modules to work properly and to avoid loss of your firing programs. When turned on, the furnace indicates the battery charge (Fig. 10). 100% means the battery is new, and approximately 10% means that the battery is an average of 2½ years old. Note that this value is reached much earlier when the furnace is always turned off. At a charge of 10%, the screen automatically displays a message that they battery must be changed. Observe the following procedure::

- Order a new battery module (original replacement part) order No. LNE18081.
- Turn the furnace on, and leave it on while the battery is being changed.
- Open the battery compartment on the back of the furnace (two Phillips head screws; see Fig. 2).
- Carefully pull off the battery compartment cover with the battery and twisted cable up to the cable plug. Unplug the cable.
- Insert the new unit comprising the battery compartment cover, battery and plug (lithium cell / 3.6 V / 2000 mAh). The plug is protected against polarity reversal.
- Screw closed the battery compartment cover.
- Instruct the software that a new battery has been installed by selecting “Change battery” in the *Setup* menu, and confirming that the battery has been changed (Section 7.3. S. 21).

Do not inform the software that the battery has been changed no new battery was installed. Otherwise this can lead to loss of the saved firing programs and software.

Do not throw away used batteries, but dispose of them as prescribed by law.

## 6.5 REPLACING THE HEATING ELEMENT

Only authorized personnel may perform technical work (see p. 8)

***TIP B***
***See p. 25***

Over time, the heating element wears out from use. This can have a negative influence on your firing results. For this reason, change the heating element at the proper time. If the self-check program is run regularly (see Section 7.3), a recommendation will be displayed when the heating element wear has exceeded the permissible limit. Follow the accompanying installation and safety instructions in Section 4 to install the replacement heating element.

## 6.6 SERVICE AND TRANSPORT

We recommend regular maintenance of the equipment by your service partner. This will ensure superior firing results.
If you need to replace wearing parts or want to update the set programs, please consult the responsible service partner. If more extensive repairs to the furnace or pump are required, please also contact your service partner. Please direct any questions for the manufacturer to the following address:
When transporting the furnace and/or the pump, please use the original cardboard box and packaging.

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Homepage http://www.dekema.com

Please proceed as follows when packing the equipment,:

- Note that the device needs several hours to cool down.
- Close the firing chamber.
- Turn off the device and pull the pump plug.
- Only use the original box and the supplied packaging material.

## 6.7 REPLACEMENT PARTS

Only use original DEKEMA parts for servicing and maintaining the oven. Contact your service partner, or contact DEKEMA directly.

# 7 OPERATING INSTRUCTIONS

In the event of a power failure, a program currently running is aborted.

## 7.1 OPERATING ELEMENTS AND PROGRAM PROCEDURE

The **AUSTROMAT D2** provides firing programs whose program procedure follows a fixed structure. Next, the furnace type, furnace ID, software version and the battery charge status are indicated on the display. The display switches to date and time. At the same time, the lift moves down and performs automatic lift calibration. The brief buzzing noise is due to technical reasons and is completely normal. Please note that the furnace does not react to any keypresses during this calibration time. After another automatic change, the program A/01 PREHEATING is displayed. Please note that the **AUSTROMAT D 2** heats up to the temperature at which the selected program is started (400°C for the preheating program).

The individual elements of the label field above the screen signify the following. The related values are indicated on the display in the line below.

- CHAMBER indicates the temperature of the firing chamber (401°C).
- MEMORY indicates the program level (A) and the program number (01). The **AUSTROMAT D2** offers four program levels A, B, C, D, in which you can for example store firing programs for mixes from different manufacturers.
- NAME indicates the name of the firing program (PREHEATING). The program name is pre-set and cannot be changed.
- # indicates the firing number (000018), i.e. how many firings have been performed in the furnace. Note that only a fully completed firing procedure counts.

The labels below the screen describe the program procedure. The appropriate values are displayed in the line above on the display.

- START °C Starting temperature (400)

***TIP E***
***see p. 26***

- ⩚ MIN Drying time (0): The firing object is dried at drying temperature for the specified holding time. The firing chamber remains open.
- ↑ MIN Closing time (0): The firing chamber is completely closed in the specified time and the firing object is heated to starting temperature.
- → MIN Preheating holding time (5): The firing object is subjected to the starting temperature in the closed firing chamber for the specified holding time.
- VAC % Vacuum level in % (100): After preheating, the firing chamber is evacuated. The vacuum is held until the final temperature is reached and then time [VAC HOLD] is held.

- °C / MIN — Temperature rise rate (MAX) from starting temperature to final temperature.
- END °C — Final temperature (800) With the firing chamber closed, final temperature is heated up from starting temperature at the specified heat-up rate.
- VAC HOLD / MIN:SEC > — Vacuum holding time (00:00): After the final temperature has been reached, the vacuum is held for the specified time.
- HOLD / MIN:SEC > — Final temperature holding time (01:00) When the final temperature has been reached, the firing object is subjected to final temperature for the holding time.
- 1 ↘ MIN — Cooling level 1 holding time (0): Starting from final temperature, the furnace is cooled down to cooling temperature 1 (90% of final temperature) as quickly as possible (firing chamber is opened) and the firing object is subjected to cooling temperature 1 for the specified holding time.

***TIP E***
***see p. 26***

- 2 ↘ MIN — Cooling level 2 holding time (0): Starting from cooling temperature 1, the furnace is cooled down to cooling temperature 2 (65% of final temperature) as quickly as possible (firing chamber is opened) and the firing object is subjected to cooling temperature 2 for the specified holding time.

The parameters of the program procedure are edited with the function keys. Please note that the preheating program cannot be modified. The functions of the control keys are explained below:


These control keys are used to increment and decrement the program number. The number of available program slots depends on the version of the software installed in the furnace. Please note that the **AUSTROMAT D2** automatically heats up to the temperature required to start the program approx. 30 sec after a program is selected.

***TIP E***
***see p. 26***


Press control key **"START"** to launch the program. The program step currently being processed will blink while the program is running. In addition, the program name and the message "Program running" are displayed alternately. A firing program can be aborted at any time by pressing **"STOP"**.

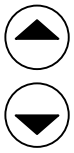

This key is used to activate fast cooling. The firing program is processed after the correct temperature has been reached for starting the selected program. If the furnace is too hot, the message "FIRING CHAMBER TOO HOT" is displayed. You can wait (i.e. abort) or cool the furnace quickly with the aid of the vacuum pump. You can terminate fast cooling any time by pressing **"STOP"**.

***TIP D***
***see p. 25***


You can switch between the four program levels A, B, C, D by pressing the key ABCD repeatedly. You can store firing programs for mixes from different manufacturers in the various program levels or use each level for one furnace user (if several users share the furnace).


This key is used to open the Setup menu. The available functions are described in Section 7.3.


Creates a protocol print-out of the last completely processed firing program. Note that a suitable protocol printer must be connected.



These keys are used to move the lift up and down. The lift can be stopped by pressing one of the keys again while it is moving.


Simply copy firing programs to different memories.


Press EDIT to enter the programming mode.


Confirms entered data with the ENTER key. The cursor jumps to the next parameter.

## 7.2 PROGRAMMING

***TIP*** **F**
***see p. 26***

The firing programs of the **AUSTROMAT D2** have fixed program structures, i.e. the firing procedure is pre-defined and only individual parameters may be modified within certain limits. These are starting temperature, drying and closing time, temperature rise rate, final temperature, final temperature holding time, and cooling level 1 and 2 holding times. Note that drying and closing time and cooling times 1 and 2 may only be modified in pairs.
In order to edit a parameter, simply press the function key below the appropriate label (Fig. 7). The connected value or pair of values start to blink (cf. final temperature holding time in Fig. 7) and can be changed step-by-step by pressing the keys **"+"** and **"-"** (CHANGE) within the permissible range. The new value is automatically accepted after a short time (approx. 5 s), or by pressing the appropriate function key again, or by pressing **"START"** (this also launches the program). The permissible values are indicated in Table 1 below.

| Program Stepp | Range | Step width |
|---|---|---|
| Starting temperature | 100°C – 700°C | 25 °C |
| Drying time | 0 – 9 min | 1 min |
| Closing time | 0 – 9 min | 1 min |
| Preheating time | 0 – 9 min | 1 min |
| Vacuum level | 0 – 100% | 10% |
| Temperature rise | 2°C/min – 99°C/min or MAX | 1°C/min |
| Final temperature | 500°C – 1200°C | 1°C |
| Vacuum holding time | 00:00 – 60:00 min | 10 s (< 3:00)<br>30 s (> 3:00) |
| Final temperature holding time | 00:00 – 60:00 min | 10 s (< 3:00)<br>30 s (> 3:00) |
| Cooling level 1 [min] [1) 3)] | 0 – 9 min | 1 min |
| Cooling level 2 [min] [2) 3)] | 0 – 9 min | 1 min |

1) Cooling level temperature 1 (cooling) fixed at 90 % of final temperature
2) Cooling level temperature 2 (relief) fixed at 65 % of final temperature
3) Cooling level temperature 1 / 2 is acitvated as quickly as possible (firing chamber opens)

In addition, the **AUSTROMAT D2** offers the possibility of changing firing parameters as described above while the program is running. However, there is a restriction that only the values of unprocessed program steps may be edited. Note also that a change in the running program is accepted and stored (no provisional programs).

## 7.3 THE SETUP MENU

The *Setup* menu is used to edit less frequently required furnace settings, to launch maintenance programs, to record and transfer data, and also offers several additional functions. The *Setup* menu is activated by pressing the appropriate control key. The following functions are available and are activated successively by pressing the Setup key repeatedly. The **"START"** key is generally used to confirm settings and changes and to quit setup. Press **"STOP"** to quit Setup without saving any changes. Changes are made by pressing the **"+"** and **"-"** keys.

**Display-contrast** — Sets display contrast

**Protocol printing** — Note that a suitable protocol printer must be connected for printing (cf. Section 8). The Protocol printing option is activated by pressing **"+"** and deactivated by pressing **"-"**. When this option is activated, a protocol print-out is automatically created after each completely processed firing. You can always create a protocol print-out manually after firing by pressing **"PRINT"**.

**Data recording on computer** — Data recording on computer is activated by pressing **"+"** and deactivated by pressing **"-"**. Note that a PC must be connected and suitable software installed for data recording (cf. Section 8).

**Temperature calibration** — For temperature calibration please use the DEKEMA calibration set and preheat the furnace. Press **"START"** to launch the calibration program. The program runs automatically and lasts approx. 8 min. During the program, the message PROGRAM RUNNING blinks on the screen. The program can be aborted by pressing **"STOP"**. If you press STOP when the following security prompt is displayed, the program is resumed; press START to abort the program.
The calibration factor (range 0.970 to 1.050) is changed by pressing **"+"** und **"-"**.

**acoustic signal** — There are 5 acoustic signals to choose from, consisting of individual tones whose duration and number can be varied. The signal currently active is sounded after a firing program is completed.
Signal 1: 1 tone, short
Signal 2: 2 tones, short
Signal 3: 2 tones, long
Signal 4: 4 tones, short
Signal 5: 9 tones, long

**Time and date** — The time and date are displayed on the screen. Press **"START"** to switch between hours, minutes, seconds, day, month, year and confirm the time and date.

**ID** — In order to avoid confusion of several furnaces (e.g. protocol printing), each furnace can be assigned an individual number from 0 to 30. This is done via the **"+"** and **"-"** keys.

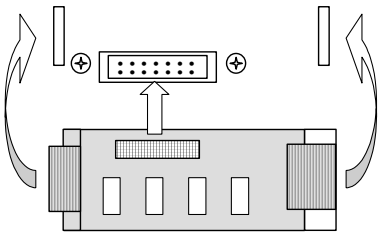
**Data transfer**

The **AUSTROMAT D2** allows the user to save the ceramic furnace firing program data in an optionally available memory module (D2 → Memory module). It is also possible to restore firing programs in the furnace (Memory module → D2). Note that all programs are transferred to the recipient during data transfer and that the previous data stored in memory are deleted.

***TIP G***
***see p. 26***

Please see Fig. 6 for instructions on how to connect the Memory module on the back of the casing. In order to remove the Memory module, press the two clips on the thin edges of the module together gently and pull the module out of the socket.

Fig. 6




**Language**

Language selection.

**Check program**

The check program is used to monitor proper technical functioning of the furnace and lasts approx. 45 minutes. It is recommended that you perform this check program on a regular basis. The **AUSTROMAT D2** automatically reminds the user to perform the check after 500 firings. The check can be prematurely cancelled while it is running by pressing **"STOP"** and then confirming a security query. However, please note that no check (diagnosis) is performed in this case. The results of the check program are saved in a diagnosis file that is displayed when the program is completed. If necessary, the furnace indicates any malfunctions and displays a warning if it is likely that the firing process will not be correctly completed. Performing the check program regularly also makes it easier to identify a worn heating element and to diagnose any faults in the vacuum system.

The structure and interpretation of the diagnosis data are important for the service personnel (see also the "Diagnosis data" menu item). The data have little significance for the user. Thus they are not detailed here.

**Battery change**

A battery change must be notified to the software in order to be able to record the decreasing charge status of the battery due to ageing. This is necessary to preserve saved firing programs when the furnace is switched off.

Do not notify a change of battery to the software when no new battery was installed. Otherwise this can lead to loss of the saved firing programs.

**Diagnosis data**

The values and interpretation of the diagnosis data are important for the service personnel. For remote diagnosis (e.g. by phone) it is possible to display the diagnosis data on screen or to print them via a protocol printer. The data have little significance for the user. Thus they are not detailed here.

**Service funktions**

The service functions are password-protected and are only available to authorised service personnel.

# 8 PRINTING RECORDS AND CONNECTING TO A PC

## 8.1 PRINTING RECORDS

As a standard feature, the **AUSTROMAT D2** allows you to document a completed firing program for quality assurance. In addition, we offer you the option of manually retrieving records through our PC software, DREAM® .

The internally unchangeable record monitors and documents the progress of the set program, especially the target and actual values of the programmed parameters for the vacuum and heating, as well as established fluctuations in temperature during the holding periods (only when the firing chamber is closed).

Printer requirements:

- Modern printer with a serial RS232 interface (9600, 8, N, 1)
  (any printing method: needle, thermal, ink, laser, etc.)
- Minimum input memory (input buffer) 1 Kbyte
- Minimum line length: 50 characters

To connect the printer to the furnace, you need a well-screened (serial) printer cable with a socket connector to connect to the furnace. The data is printed out in standard printing characters (ASCII).

Connection:

- Turn off the furnace (ON/OFF switch is on the rear).
- Make sure that the printer is turned off.
- Connect the furnace and printer with the interface cable.
- Turn on both devices.

There are two options for printing the records:

1. Manual printout
   After the program is finished, press the function key Print. The record is then printed out on the printer.

2. Automatic printout
   In this case, a record is printed out automatically each time a program is completely finished. Activate the menu item Print record in *Setup*.

In any case, you can manually print out a record after a firing is completely finished.
You can obtain as many additional copies of the printout as you want by pressing the function key Print.

The following record diagnoses are possible in deviation from the following example of a record:

1. Firing processed correctly
2. Temperature could not be reached
3. Vacuum could not be attained
4. Excessive temperature fluctuations

When messages 2 and 3 occur, start the check program and take appropriate actions.

Record printout example:

| | | | |
|---|---|---|---|
| Date | Fr. 07.16.99 | | |
| Firing number | #000000007 | | |
| Laboratory information | | | |
| Name: | | | |
| Job number: | | | |
| Job type: | | | |
| Furnace data | | | |
| Oven ID | 00 | | |
| Software version | D2 V. 01.20 | | |
| Last check program | 14.07.99 | | |
| Temperature calibration | 1.010 | | |
| Firing program | | | |
| Program number | 102 | | |
| Program name | | | |
| DENTIN 1 | | | |
| Program procedure: | | | |
| Dry | | | 3:00 |
| Close | | | 3:00 |
| Preheat | 550 | | 2:00 |
| Firing temperature | 920 | 55 | 1:00 |
| Cool | | | -:-- |
| Relax | | | -:-- |
| VAC (level) | | 100 | |
| Starting the program | 16:24:56 | | |
| Air pressure | 961 | | |
| Total firing time | 00:17:10 | | |
| Firing processed correctly | | | |

## 8.2 PC CONNECTION (DREAM®)

DREAM® (**D**EKEMA **Re**mote **A**ccess **M**anagement) is software for the external programming, archiving and quality management of your AUSTROMAT® D2. DREAM® supports you in the following tasks:

- Administering and archiving firing programs.
- Interactive creation and editing of firing programs.
- Transfer of firing programs.
- Reading out and archiving QM reports.
- Converting firing programs.

In addition, DREAM® allows you to directly access our comprehensive firing program database on the Internet.

DREAM® can be downloaded free of charge from the download area of our internet site www.dekema.com.

# 9 PRACTICAL TIPS

### A) General operation of the furnace

After switching on the furnace, the lift moves down and performs automatic lift calibration. The brief buzzing noise is due to technical reasons and is completely normal. Please note that the furnace does not react to any lift commands during this calibration time.

The furnace heats up automatically to the temperature required to start the next firing program (i.e. preheating program after switching on). In general, it occurs when the firing chamber is open.

When the ceramic furnace heats up from the cold state, you will initially hear a rustling noise of the heating element. This noise is due to technical reasons and is completely normal.

Close the firing chamber in the event of prolonged breaks between firings. This will save energy and avoid unnecessary wear on the heating element. This also prevents unnecessary warming of the pot cover. The **AUSTROMAT D2** displays the message "Energy Save" on the screen.

Close the firing chamber before switching off the furnace so as to avoid unnecessary condensation in the ceramic furnace.

### B) Heating element

D The heating element is a wear-sensitive part whose service life depends on how much it is used. Performing the check program regularly makes it easier to identify the correct time to replace a heating element. Another way of identifying heating element wear is visual inspection. Look into the open firing chamber from below while the furnace is switched off and cold. The heating spiral should be homogeneously distributed in the glass tube. If the heating spiral is deformed or if the glass is broken, the heating element should be replaced.

### C) Thermoelement – temperature calibration

Perform visual inspection of the thermoelement regularly - particularly before temperature calibration - while the furnace is cold and switched off and the firing chamber is open. A mirror held at an angle under the firing chamber is a great help. The thermoelement is attached to the middle of the ceiling of the firing chamber and juts out vertically into the firing chamber. Ensure that it is not bent as this influences temperature measuring and thus firing results.

### D) Fast cooling

During fast cooling the vacuum pump draws outside air through the open firing chamber. In this way, the temperature sensor is in a cool air current and simulates that the chamber temperature is too low. When the pump is switched off, this cooling current stops and the temperature begins to rise slightly. In order to eliminate this falsifying effect, the pump is operated at intervals. Thus, wait until the initial temperature is actually achieved and fast cooling is automatically finished.

If you activate fast cooling with the pump, you should not place the firing object on the firing table until cooling is completed, as otherwise the temperature may be too high for drying.

### E) Programming and program procedure

If a program is aborted while under vacuum, the furnace is vented. After venting and an additional waiting time of approx. 10 s the lift moves down.

The firing table is still very hot immediately after firing. The temperature at the firing object may thus be too high for drying. Wait a few minutes until the firing table has cooled down before placing the new firing object on the firing table for drying!

Do not worry if the furnace sets a stand-by temperature in the firing chamber that is lower than starting temperature. If a drying time has been programmed, the furnace automatically sets a temperature in the firing chamber that is necessary for the "Drying" temperature stored in *Setup*.

In program steps COOLING LEVEL 1 and 2 the respective temperatures are activated as quickly as possible. The firing chamber is opened in order to move the firing goods out of the hot chamber. As the firing chamber now cools down, the firing goods are subjected to less radiation heat than corresponds to cooling temperature. To offset this effect, the lift moves up slightly closer to the hot chamber. When the firing chamber has reached cooling temperature, the lift should be completely at the top and the firing chamber should be closed again. This ensures that the firing goods are always approximately subjected to cooling temperature during the cooling time.

### F) Firing programs

Every type of firing tray has an effect on the temperature of the firing object due to its colour and composition. Using a standardised firing tray can thus be an advantage in terms of firing results.

Care in creating firing programs and editing firing parameters has a significant effect on the quality of firing results. The recommended firing parameters are thus to be seen only as guidelines. Perform test firings to identify your individual firing parameters based upon these guidelines.

### G) Data security

The furnace includes a memory module containing the fixed program structures of the AUSTROMAT D2. For reasons of data security, we recommend removing the memory module from the furnace and storing it in a safe place. Also, save your firing programs regularly on an optionally available memory module. You should at least note down your firing program parameters on paper or save on PC.