

OPERATING INSTRUCTIONS

AUSTROMAT[®] 3001



SOFT 9.0X

Important!

Please read and observe the Safety Instructions in Part 2 of the operating instructions. The safety instructions also contain important technical information on the AUSTROMAT[®].

Version 6

DEKEMA Dental-Keramiköfen GmbH
Industriestraße 22
D-83395 Freilassing (Alemania)
Tel. +49 (0) 86 54 / 46 390 Fax +49 (0) 86 54 / 66 195
www.dekema.com info@dekema.com

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Part 1
Working with the AUSTROMAT[®] 3001

Introduction

Dear Dental Technicians,

You are in possession of the **AUSTROMAT® 3001**, a device that can improve your work and enhance its reliability. In developing this device, particular attention was given to your individual demands and needs.

The **AUSTROMAT® 3001** is distinguished by its outstanding functionality, its innovative technology and high level of quality. It is set up to run automatic programs based on your specific experience and knowledge. You can freely program up to 99 programs and give them any name you wish up to 25 letters and symbols. Program 0 serves to preheat the firing chamber.

When programming, you can enter the:

- temperature in °C: 0 or 100 to 1200°C, "C command"
- lift position in 10 steps: 0 (bottom-most) to 9 (top-most), "L command"
- vacuum in 10 steps, 0 (no vacuum) to 9 (maximum vacuum) "V command"
- time in seconds: range of 20 to 65,000 sec., "T command"
- acoustic signal: 1 to 9 beeps set as T1 to T9
- "command connector"
 - o **T360.C900** = heat gradually to 900°C over 360 sec.
 - o **T120.L9** = move lift in steps to L9 over 120 sec. (close firing chamber)
 - o **T055.C820** = heat at a rate of increase of 55°C/min to 820°C (the range extends from 02 to 099, i.e., 2°C/min to 99°C/min)

Several features allow you to program sequences much more easily and quickly: you can jump to other programs which are automatically continued, programs can be copied, and selected data can be easily changed by being overwritten.

To exploit the full potential of your **AUSTROMAT® 3001**, we suggest that you spend some time reading these instructions. The programming approach will be a bit unfamiliar at the beginning. However, it is logically structured, uncomplicated, and easy to understand.

When properly used, your **AUSTROMAT® 3001** will give you years of satisfaction.

Important!

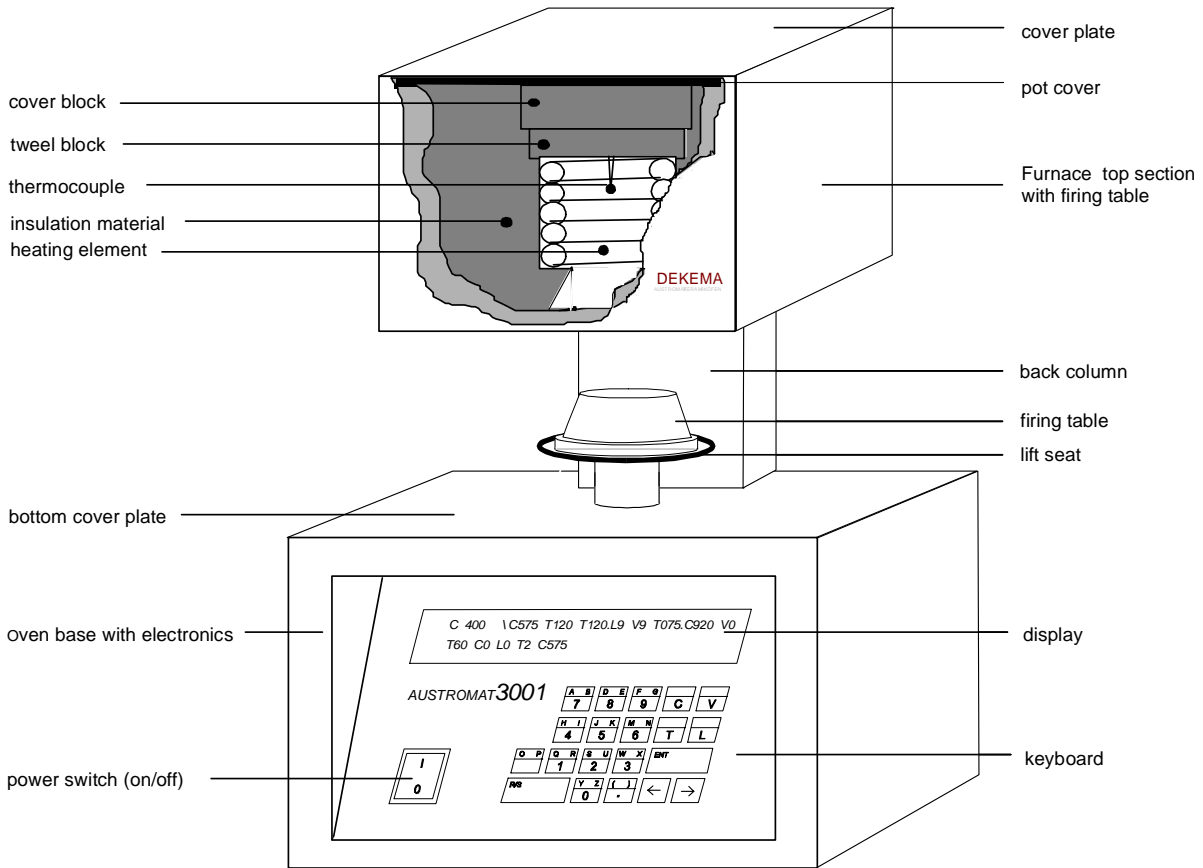
Please read and observe the Safety Instructions in Part 2 of the operating instructions. The safety instructions also contain important technical information on the **AUSTROMAT®**.

Sincerely,

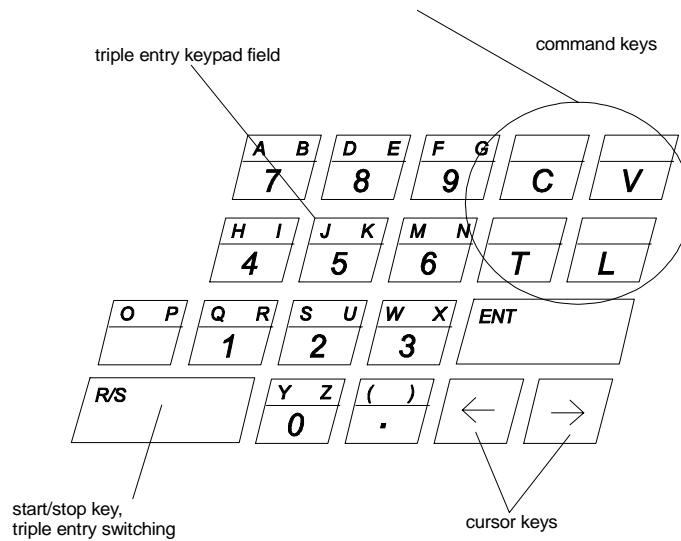
DEKEMA

Views and Names

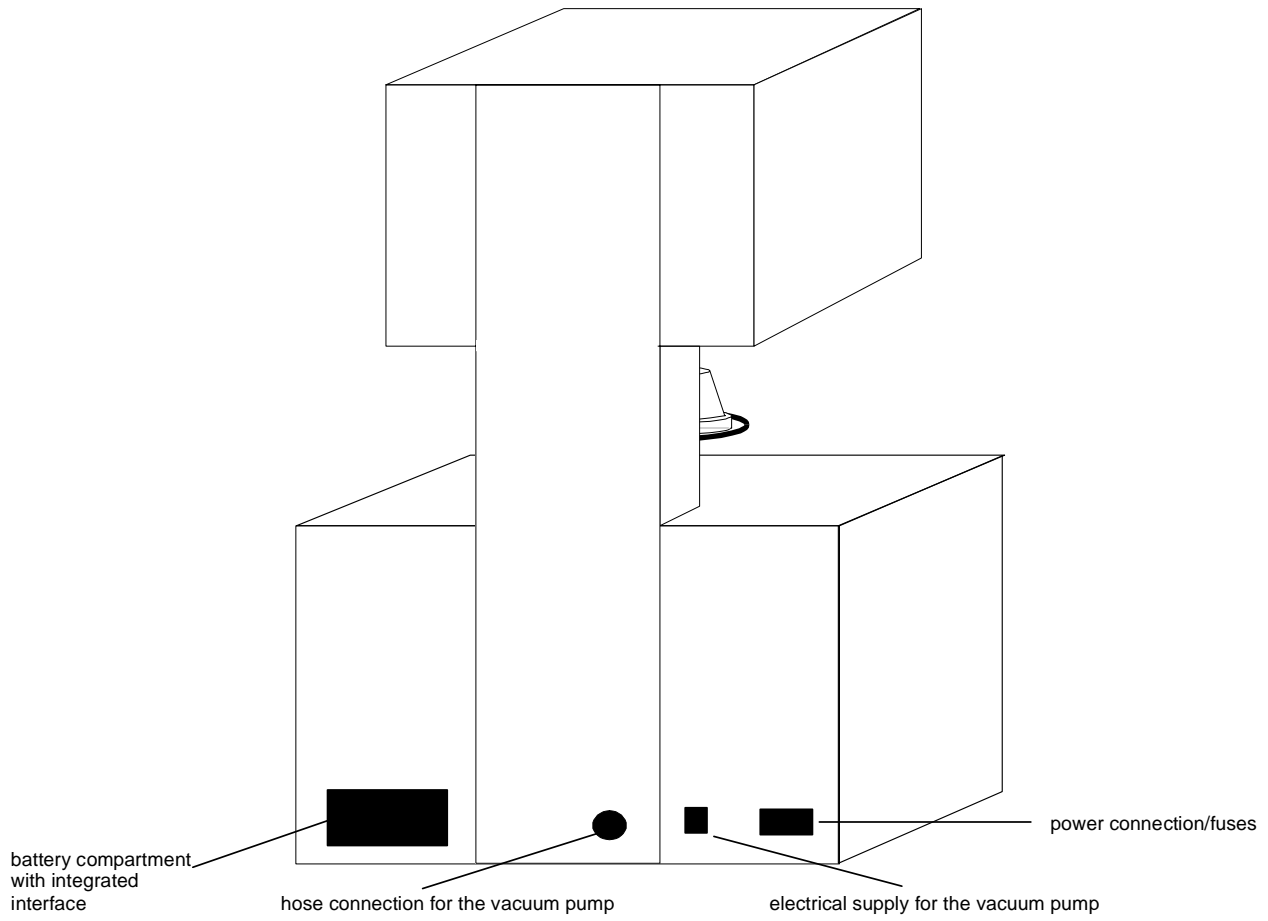
Front View



Keypad



Rear View



Setting Up the AUSTROMAT® 3001






- Set up the **AUSTROMAT®** at a suitable place.
- Set up the vacuum pump at a well-ventilated site protected from dust and dirt. Never cover the vents of the vacuum pump! Keep the pump away from easily flammable and temperature-sensitive materials.
- Shove approx. 2cm of the vacuum hose onto the hose nozzle.
- Affixing the pump plug:
Ensure that the connected loads of the vacuum pump (pump rating plate) correspond to the power supply (voltage/frequency).
230V version: Screw the pump plug tight with a screwdriver (cable at the bottom).
115V/100V version:
 1. Note the position of the guide groove, and correspondingly insert the pump plug.
 2. Manually screw the pump plug tight pushing the cable toward the device. A poor contact in the plug connection can damage the device!
- Connect the device power cord to a grounded standard socket. The connected loads of the **AUSTROMAT®** (rating plate on the rear of the device) must correspond to the power supply.

*Every time the device is moved (even after a repair), the **AUSTROMAT®** should be set up at the new site corresponding the instructions on page 28 under "Calibrating the Vacuum."*

Calibrate the vacuum before the first firing to ensure that the program runs smoothly.

First Start-Up

Before the first start-up, please carefully read the safety instructions starting on page 37 of these operating instructions!

1. Turn on the device with the power switch.
2. Press 
3. Press  and then  (L0: the firing chamber opens, the lift moves to the bottom-most position).
4. If necessary, remove ceramic dust beforehand from the lift seat and sealing ring:
 - carefully remove the ceramic dust with a brush and dustpan.
 - do **not** blow off the ceramic dust, do **not** vacuum it, and do **not** inhale it!Place the firing table on the lift seat.
5. Press  and then  (L9: the firing chamber closes, the lift moves to the top-most position).
6. When the firing chamber is closed, the device can be turned off.

Never operate the device without the firing table since this will overheat the lift seat!

Switching On the Device

Setting the Display Brightness / Main Menu

After switching on the **AUSTROMAT® 3001**, the display will show the following:

**** AUSTROMAT 3001 ****
B=XXX% \ SOFT ... \ (<- ->)

Voltage of the battery that supplies the memory with power. The voltage drops over time – starting at approx. 80%, it drops faster. At this point, get a new battery (see page 29). At 50% battery voltage, an acoustic warning signal sounds. All the data are reliably saved down to the bottom voltage (1%).

Version of electronics software

Arrow key display:
 The **→** key increases the brightness of the display to the maximum.
 The **←** key sets the brightness of the display to 60%.

Pressing one of the two arrow keys **→** or **←** causes the **main menu** to appear in the display.

Functions: (the selected function is in <-... ->)

Current temperature Current vacuum Program memory Entry key **Manually move lift** Copying function Switch vacuum Start/stop function

C 24 \ V0 \ <-MEM-> ENT LIF COP VAC R/S
MEM 0 \ PREHEAT FIRING CHAMBER

Selected function, here the program number

program name

The R/S key starts preheating the firing chamber

The **R/S key** starts a selected firing program

The **R/S key** can stop the vacuum pump while it is drawing air.

Start the program 0 every morning with the **R/S key** to preheat the firing chamber.

Manually set the lift position

Press the **⏏** key and select 0 to 9.
 0: bottom-most ... to ...
 9: top-most position

The **→** key stops the lift. The **←** key also stops the lift. When repressed, the lift returns to start position.

Manually set the vacuum

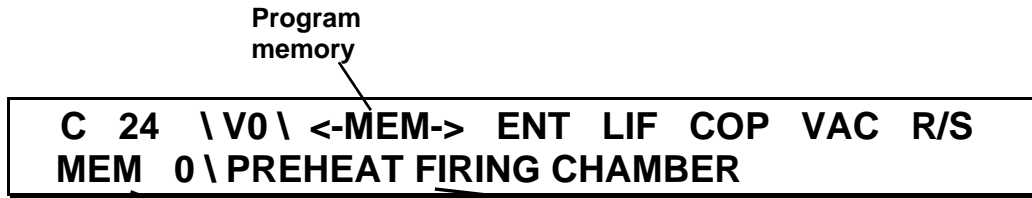
Press the **⏏** key and select 0 to 9.
 0: no vacuum ... to ...
 9: maximum vacuum

When V9 is selected, the pump runs continuously; with V1 to V8, the pump automatically switches on and off depending on the vacuum level.

Flooding the firing chamber:
 Press the **⏏** key and 0.

Creating Programs

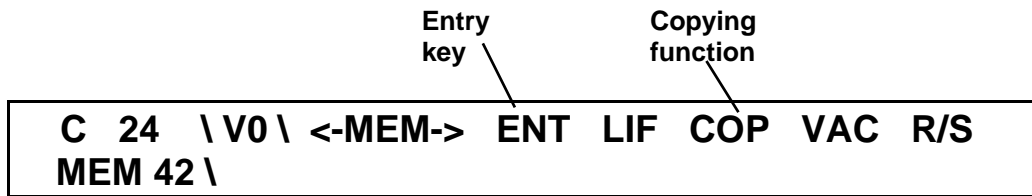
As mentioned in the prior section, the following appears on the display in the main menu:



Selected function, here the program number program name

<-MEM-> With the and keys, you can move the **memory** backwards and forwards in single steps (the “one place” of the memory number). You can directly select the “ten place” of the memory number (10, 20, etc.) with the **number keys**.

If an empty program memory was selected, the following image appears:

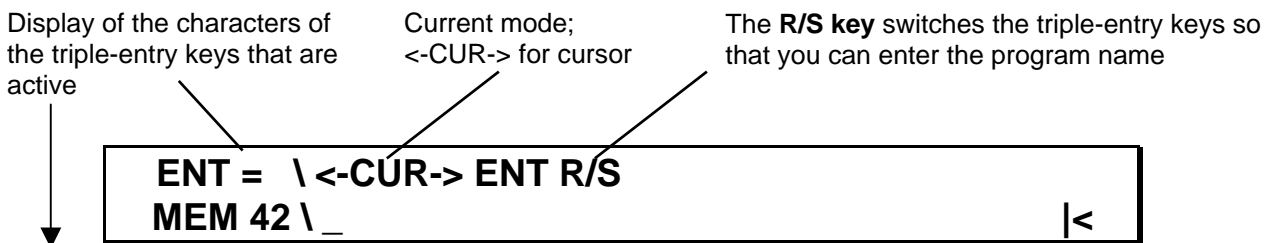


ENT The **ENT key** switches to *editing mode*. Here you can enter the program name and set the firing programs.

COP The key switches to *copying mode*. You can transfer the contents of a program memory to a different program memory (see page 16).


1st level: Program name

After you have selected the desired program memory, press the **ENT key**. The display will show for example:



- ENT = ** all characters in the bottom half are active
- ENT ^\ ** all top left characters are active
- ENT /^ ** all top right characters are active




Cursor:
The cursor is moved with the key and or by entering characters

Deleting individual characters or numbers: overwrite characters with the **space key** .

Spaces can be removed and inserted with the **R/S key**.

Inserting spaces: Place the cursor under a character, and move everything to the right of the cursor with the R/S key. The cursor will also move. When the program string is at the end mark in the display, it is compressed from back to front (any existing spaces are deleted). The program data are not lost.

Deleting spaces: Place the cursor on the front space, and advance the program sequence with the R/S key to the right of the cursor (one space is deleted each time the key is pressed).

The **keys**  or  and the **space key**  automatically repeat the prior action when they are held down.

After the program name is entered, and the name is saved by pressing the **ENT key**. The software then automatically switches to the display where you enter the firing program.

2nd level: Firing program


In the 2nd level of the editing mode, you see the following image:



The display shows that entries can be made. You can now freely program the various commands. Please carefully read the following pages of these operating instructions that explain the task-specific commands. These will allow you to design your individualized firing program.

Enter your individualized firing program. You will find examples starting on page 19; non-binding suggestions for firing programs are in Part 3 of these operating instructions.




You can move the cursor to any desired position with the **keys**  and .

Delete individual numbers or commands by overwriting with the **space key** .

Spaces can be removed or inserted with the **R/S key**:

Inserting spaces: Place the cursor under a character, and move everything to the right of the cursor with the R/S key. The cursor will also move. When the program string is at the end mark in the display, it is compressed from back to front (any existing spaces are deleted). The program data are not lost.

Deleting spaces: Place the cursor on the front space, and advance the program sequence with the R/S key to the right of the cursor (one space is deleted each time the key is pressed).

The **keys**  or  and the **space key**  automatically repeat the prior action when they are held down.

Pressing the **ENT key** terminates editing mode. The data are checked by the electronic control to see if they can be logically executed. If the data are O.K., they are saved. If the programming is faulty, -ERROR- appears on the display, and the cursor remains at the beginning of the first faulty sequence.

Commands in the Editing Menu

A firing program is created with the associated numerical entries from the commands **C** for temperature, **L** for the lift, **T** for time, and **V** for the vacuum.

The individual program steps (= command + indicated value) are executed step by step in the entered sequence after the program starts. Each retrieved command remains active until it is changed or removed.

The **AUSTROMAT® 3001** understands and executes the following commands:

C command	Temperature control	page 11
L command	Lift control	page 12
T command	1. Time control 2. Programming the acoustic signal	page 12 page 12
V command	Vacuum control	page 13
. command	1. Command connector 2. Temperature increase rate	page 14 page 14
/ command	Jump command	page 15

C Command (Temperature)

For temperature settings, the **C** command must be entered in the entry sequence.

The command form is: **CXXXX**

The temperature is indicated in °C

Range: 0 or 100 to 1200, 1, 3 or 4 characters

Right: C0

Right: C625

Wrong: C90..... Temperature too low

Wrong: C1300..... Temperature too high

Wrong: C 400..... Do not insert a space between the **C** and the temperature!

Wrong: C..... No temperature is indicated

The C command sets the temperature to the desired temperature at the **maximum** rate of increase (see page 25; for information on time-controlled and linear increases in temperature, see page 14, etc.).

When **C0** is entered, the heating is switched off and the program continues.
The last temperature (C) command entered in the selected program remains active after the program is over!

L Command

Lift control:

For lift settings, the **L** command must be entered in the entry sequence.

The command form is: **LX**

Position 0 to 9: - Position 0 is bottom-most
 - Position 9 is top-most

Right: L0

Right: L3

Wrong: L10..... Indicated position too high

Wrong: L 6..... No spaces may be inserted between the L and the position!

Wrong: L..... No position is indicated

Note: A firing chamber under a vacuum is automatically flooded by lift commands L0 to L8; you do not have to select the V0 command.

Time-controlled lift movements can be programmed as described on page 14.

T Command

Holding period:

To program the time, the **T** command must be entered in the entry sequence.

The command form is: **TXXXXX**

The time is indicated in **seconds**

The range is 20 to 65,000 sec., 2 to 5-character

Right: T25

Right: T360

Wrong: T15..... time too low

Wrong: T100000..... time too high

Wrong: T 360..... no spaces may be inserted between the T and time!

The T command means: "Keep the prior command for the duration of the entered time." The program continues with the following command after the set time is over.

Note: Each command remains active until it is changed or removed.

Programming the acoustic signal:

To program the acoustic signal, the **T** command must be entered in the entry sequence.

The command form is: **TX**

Number of signals approx. 1.5 seconds long, 1 to 9

Right: T1


Right: T9

Wrong: T10..... Number of signals too high.

Wrong: T 3..... No spaces may be inserted between the T and number of signals!

Wrong: T No signals are indicated.

The acoustic signal can be entered at any place in the entry sequence.

The acoustic signal can be shut off with the  key during the program.

V Command (Vacuum)

Vacuum control:

To control the vacuum, the **V** command must be entered in the entry sequence.

The command form is: **VX**

Vacuum 0 to 9 in 10 steps.

Vacuum 0 means: no flooding of the vacuum or firing chamber.

Vacuum 9 means: maximum vacuum.

Right: V0

Right: V5

Wrong: V10..... Vacuum too high.

Wrong: V 6..... No space may be inserted between the V and the vacuum!

Wrong: V No value is indicated for the vacuum.

The level of the vacuum in **mbar/hPa** can be found in the vacuum table on page 25 of these operating instructions.

. Command (Command Connector)

Linking T with C and with L:

The . command connects a **T** command with a **C** command or with an **L** command.

The command form is: TYYYY.CXXX

or: TYYYY.LX

The . command must be entered directly after the **T** command!

Right: T20.L9

Right: T360.C958

Wrong: T60.V9..... The T command and V command cannot be linked.

Wrong: T360 .C930.... The . command must directly follow the T command!

The . command defines the period in which the temperature or a lift station is reached.

Examples:

- T360.C930 "Raise the temperature linearly to 930°C within 360 seconds"

- T90.L9 "Move the lift in steps to position 9 within 90 seconds"

Rate of temperature increase:

The **AUSTROMAT® 3001** can also understand an entry raising or lowering the temperature in °C/min (=temperature increase rate).

Command form: **T0**YY.CXXXX

Temperature rise per minute.

Range: 2 to 99, 1 to 2 characters directly following **T0**

By placing a zero directly before the temperature rise per **minute**, the electronic control is signaled that a temperature rise per minute has been entered, and not a time!

Example: T075.C930 "Heat/cool at a rate of 75°C/min to 930°C"

/ Command (Jump Command)

The / command causes a direct jump to a different memory with automatic continuation of the program.

The command form is: /XX

XX stands for the memory number of the program that is to continue.

Range: 0 to 99

Number of characters: 1 to 2 characters, directly following /

Right: /53

Right: /4

Wrong: / 7 No space may be inserted between the / command and the memory number!

The program is continued without interruption.


To place the / command at the end of the entry sequence, you need to place the cursor on the 3rd place before the end mark (end of the 2nd line in the display).

You can now set the / command with the **R/S key** and then enter the desired program memory with the **number keys**.


Additional Functions in the Main Menu

Quickly Cooling the Firing Chamber

You can quickly cool the temperature in the firing chamber to the indicated temperature when the firing chamber temperature is higher than the indicated starting temperature after a program is started.

The vacuum pump is switched on with the  **key**. It draws cool air through the firing chamber. Pressing this key is only accepted, however, when the following conditions are met:

- the display of the firing chamber temperature flashes at the top left of the display,
- the lift is not in the upper-most lift position.


As soon as the firing chamber temperature has fallen to the set temperature, the vacuum pump is **automatically** switched off (to manually switch off: press the  **key**).

Copying Individual Memories

The ability to copy memories makes it much easier for you to create firing programs. When different firing programs are very similar, you only need to enter one and then transfer it to a different program memory which gives you two identical program memories. Then you only need to alter the second memory as desired. You can then copy this program memory to a different program memory, etc.


When copying memories, both the program name and firing program are transferred.

Procedure:

1. In the main menu, select the program memory to be copied (source).
2. Active the copying mode with the  **key**.
3. In the copying mode, select the program memory to which the source data are to be transferred (target).
4. Confirm the copying with the **ENT key**, or terminate with the **R/S key**.
5. If desired, change the new program (see pages 11, etc.).

Deleting individual program memories: Copy an empty memory to the memory you want to delete.

Manually Setting the Lift Position

If you want to manually set the lift position, you can do it in *lift mode*. Get to the lift mode from the main menu by pressing the  key. The following is displayed:

L . ==
L . NEW LIFT POSITION (0 to 9)

L . == shows the current lift position.

Lift position 0 means: bottom-most lift position

Lift position 9 means: top-most lift position, the firing chamber is closed


All lift positions between 0 and 9 can be set.

L . NEW LIFT POSITION (0 to 9) You can enter the desired lift position with the **number keys**.

After the lift reaches the desired position, you are automatically returned to the main menu.

Note: - Firing chambers with a vacuum are automatically flooded by lift commands L0 to L8. You do not have to enter command V0.
- A safety period follows flooding. The software waits for 10 seconds before the firing chamber is opened (time TXX displayed at the left top of the display).

Manually Switching On the Vacuum Pump

If you want to manually generate a vacuum in the firing chamber, you can do it in *vacuum mode*. Get to the vacuum mode from the main menu by pressing the  key. The following is displayed:

V . ==
V . NEW VACUUM (0 to 9)

V . == shows the actual value for the vacuum in the firing chamber.

Vacuum 0 means: no vacuum

Vacuum 9 means: maximum vacuum

Any level of vacuum can be set in steps from 0 to 9. At levels V1 to V8, the pump automatically switches off after the corresponding vacuum is reached; when V9 is set, the pump runs continuously.

V . NEW VACUUM (0 to 9) You can enter the desired vacuum with the **number keys**.

After reaching the desired vacuum, you are automatically returned to the main menu.

Turn off the vacuum pump while it is operating by pressing the **R/S key**.

Flood the firing chamber by activating vacuum mode in the main menu and enter 0.

Note: A safety period follows flooding. The software waits 10 seconds before the firing chamber is opened (time TXX is displayed at the left top of the display).

Monitoring the Program

After starting a program with the **R/S key** (=Run/Stop), the following is displayed:

Example:

```
-TEST- \ C625 T120 T180.L9 V9 T075.C930 V0 T60 C0  
L0 T2 C625
```

The entered data are checked by the electronic control. If the data is faulty, **-ERROR-** appears in the "Info Field", and the cursor rests on the faulty program step. If the data are acceptable, the program automatically starts, and you see the following image:

Example:

```
C 625 \ C625 T 120 T180.L9 V9 T075.C930 V0 T60 C0  
L0 T2 C625
```

The command and the number of the running program step appear separated.

Procedure for monitoring the program progress:

Viewing the program name: By pressing the **ENT key**, the program name can be shown on the display during the program.

Stopping a running program: By continuously pressing the **R/S key** or pressing it briefly twice, you can terminate a running program.

When a program is stopped, the heating is also switched off. This means that the firing chamber cools to room temperature if no standby program is started, or a different program is started that contains a temperature command.

Example of Firing Program with Explanations

Typical Dentin Firing

After the program is started with the **R/S key**, the following is displayed:

```
-TEST- \ C500 T120 T120.L9 T60 V9 T045.C770 V0 T60  
C0 L0 T1 C500
```

Spaces may be inserted between the individual program sequences, but must not be inserted within these sequences.

C500	Start heating/cooling the firing chamber to 500°C
T120	Wait 120 seconds (2 minutes) (drying)
T120.L9	Close the firing chamber in steps to position 9 over 120 seconds (2 minutes)
T60	60 seconds (1 minute) at starting temperature, and preheat closed firing chamber
V9	Generate maximum vacuum
T045.C770	Heat to 770°C at 45°C/min (end temperature)
V0	Flood the firing chamber
T60	Wait 60 seconds (plateau/holding period)
C0	Heating off
L0	Move the lift to the bottom position
T2	Two beeps
C500	Standby temperature for the subsequent firing

Why enter a C0 command (shut off heating) in the program?

After the lift moves down, the firing chamber is open. The electronic control maintains the temperature of the prior C commands as long as no new C command has been programmed. The heating is switched off with the C0 command:

- The following commands are executed immediately.
- The standby temperature for the following programs is reached more quickly.

Why use a standby temperature?

1. To keep the firing chamber temperature from falling too low from the prior C0 command.
2. So that the firing chamber temperature is already at the starting temperature when the subsequent program starts.

-ERROR-, Acoustic and Visual Warning Signal

- ERROR -

The **AUSTROMAT® 3001** displays **-ERROR-**:

1. when checking a program – No error should arise in this instance since each program written directly on the **AUSTROMAT®** has already been tested –, when
 - faulty programming exists, for example of programs that are created on a PC and have not been tested.
 - errors have arisen from transferring data from a PC to the **AUSTROMAT®**.
 - the **AUSTROMAT®** is faulty: **In Germany, please contact the DEKEMA manufacturer or one of our service partners; in an export country, contact the respective DEKEMA service partner.**
2. when the following temperature thresholds have been exceeded:
 - top temperature limit of 1,250°C.
 - bottom temperature limit of 5°C

The firing chamber temperature and **-ERROR-** rapidly alternate on the display. In addition, you will hear an acoustic warning signal.

The bottom temperature threshold can only be reached when the temperature sensor is faulty, or when the room temperature is below 5°C – let the device acclimatize.


The top temperature threshold can only be reached when the electronic control is defective. In this case, immediately turn off the device with the main switch: **In Germany, please contact the DEKEMA manufacturer or one of our service partners; in an export country, contact the respective DEKEMA service partner.**

The vacuum, the lift position, or the firing chamber temperature is flashing at the top left of the display

The vacuum flashes:

The current vacuum flashes at the top left on the display if the desired vacuum is not attained during the running program within the set time.


There are two options depending on the attained vacuum:

1. Press the  **key** to continue the program with the current vacuum.
2. Stop the running program with the **R/S key**:
 - Then lower the lift and clean the dust off the sealing ring on the lift seat with a moist cloth.
 - Clean the surface against which the sealing ring presses when the firing chamber is closed.If the desired vacuum is still not reached, this indicates that the vacuum pump output has become very low, or the vacuum system is defective. **In Germany, please contact the DEKEMA manufacturer or one of our service partners; in an export country, contact the respective DEKEMA service partner.**

The lift position is flashing:

If the lift mechanism does not work correctly for any reason, the current lift position will flash at the top left of the display. **In Germany, please contact the DEKEMA manufacturer or one of our service partners; in an export country, contact the respective DEKEMA service partner.**

The firing chamber temperature flashes continuously:

1. While heating:
 - the heating element is not generating the necessary heat.
 - the entered temperature rise time is too short.
 - the heating element is worn: **in Germany, please contact the DEKEMA manufacturer or one of our service partners; in an export country, contact the respective DEKEMA service partner.**
2. While cooling: whenever a temperature is set that is lower than the current firing chamber temperature.
 - See page 16 (quickly cooling the firing chamber).
 - The program can be forced to continue with the  **key**.

Part 2

Technical Information and Safety Instructions

Scope of Delivery

AUSTROMAT® 3001

Vacuum pump with vacuum hose and power cord (depending on the version)

Firing table

Device power cord

Furnace tweezers

Operating instructions

Technical data

Supply voltage	depending on the type (rating plate on the rear): ~ 230 V 220...240 VAC / 50 – 60 Hz ~ 115 V 110...120 VAC / 50 – 60 Hz ~ 100 V 95...105 VAC / 50 – 60 Hz
Power consumption incl. pump	max. 1450 W
Device dimensions	610 x 385 x 285 mm (H x W x D)
Weight	18 kg without pump 24 kg incl. pump
Max. firing temperature	1200°C
Device fuses	according to type ~ 230 V 2 x 6,3 A T 250 V ~ 115 V 2 x 16 A T 500 V ~ 100 V 2 x 16 A T 500 V
Delivered vacuum pump	depending on the type (pump rating plate on the rear): ~ 230 V 220...240 VAC / 50 – 60 Hz ~ 115 V 110...120 VAC / 50 – 60 Hz ~ 100 V 95...105 VAC / 50 – 60 Hz

The indicated values are only valid if the delivered original vacuum pump is used!

We assume no liability for damage arising from the use of a different vacuum pump.

Temperature Guide Values when the Firing Chamber is Open

The table provides guide values for the approximate temperature in °C at the fired object (firing table + 20mm).

<i>Lift position</i>	<i>Current firing chamber temperature in °C</i>															
	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	
9	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	
8	200	250	295	340	390	440	490	540	585	635	690	735	790	845	900	
7	175	215	255	295	345	385	435	480	520	570	620	670	720	775	-	
6	150	185	225	255	300	340	380	425	460	505	550	595	655	-	-	
5	140	165	200	235	270	310	340	380	420	460	505	550	-	-	-	
4	125	155	185	210	245	280	315	345	390	425	465	-	-	-	-	
3	120	140	170	190	225	250	290	320	355	390	-	-	-	-	-	
2	110	130	150	170	200	220	250	290	320	350	-	-	-	-	-	
1	90	110	130	145	170	190	215	245	270	290	-	-	-	-	-	
0	80	100	115	130	150	170	195	205	225	245	-	-	-	-	-	

Maximum Heating Speed

Only the C command with the indicated value without heat up time or rate of temperature increase

300 -> 1200°C:

400 - 500°C	approx. 200°C/min
500 - 600°C	approx. 180°C/min
600 - 700°C	approx. 160°C/min
700 - 800°C	approx. 140°C/min
800 - 900°C	approx. 120°C/min
900 - 1000°C	approx. 100°C/min
1000 - 1100°C	approx. 80°C/min
1100 - 1200°C	approx. 60°C/min

600 -> 1000°C:.....approx. ave.130°C/min

Vacuum Table

Original setting, VCA at 232 (see page 28), measurements at 969hPa

	Relative pressure hPa/mbar	Absolute pressure hPa/mbar
V0	0.....	969
V1	52.....	917
V2	153.....	816
V3	264.....	705
V4	365.....	604
V5	472.....	497
V6	577.....	392
V7	685.....	284
V8	793.....	176
V9 minimum (= switching point).....	866.....	103
V9 maximum (=45 sec. after V9 min.).....	<934.....	<35

Temperature Calibration

1st option: Individual adjustment

All **AUSTROMAT**[®] ceramic ovens are adjusted and calibrated with the **tsw** method (traditional silver wire) using the DEKEMA silver wire test calibration set. Nevertheless, deviations from the expected firing temperatures may arise since many factors influence the effective temperature at the firing object. It can hence be necessary to adapt the temperature calibration as needed. The temperature deviations can be compensated by changing the "Celsius calibration factor," or **CCF**.

How to set the CCF:

In the main menu, select program memory 0 (PREHEAT FIRING CHAMBER) and switch on editing mode by pressing the **ENT key**.

The calibration factor can only be changed after a code word is entered.

The code word is: **CCF.1**

After the code word is entered, the first five places of the program name after the slash are overwritten. If you do not enter it correctly, only the program name will be changed.

By pressing the **ENT key**, the entered CCF appears on the display (the permissible CCF range is in parentheses). If necessary, make a correction with the number keypad. After correcting the CCF, return to the main menu by pressing the **ENT key**.

We recommend that small CCF changes be made intuitively:

effective temperature too low	->	increase CCF
effective temperature too high	->	reduce CCF

Make small corrections (for example, changing CCF 0.985 to 0.982 means that the effective temperature is reduced by approx. 3°C).

If there are large temperature deviations, they should not be corrected using the CCF. In this case, first ensure that there are no technical errors.

2nd option: Silver wire test

DEKEMA offers you the option of testing the calibration with the **tsw** method (traditional silver wire). Please ask **DEKEMA** for necessary silver wire test set for your type of oven. The set contains detailed adjustment and calibration instructions. Only use this set to calibrate the **AUSTROMAT® 3001!** It is not suitable for calibrating ceramic ovens of the **AUSTROMAT® 3001 press-i-dent®** series.

Explanation:

We recommend using the silver-wire test for calibration once a year. If the oven is new, calibrate for the first time after approx. 6 months. Calibrate also if there are irregularities (firing results have changed).

- ⇒ The silver-wire test is the reference for adjusting the ceramic oven so that its values are nearly equivalent to those of new DEKEMA devices leaving the factory.
- ⇒ Before calibration, the firing chamber must be examined. The heating element and thermocouple have to be in working order.
- ⇒ Only use the original calibration set from DEKEMA!
- ⇒ If the value of the temperature calibration (CCF) is changed, the firing temperatures of all programs also change. Consequently, the firing temperatures of the individual programs may have to be modified.

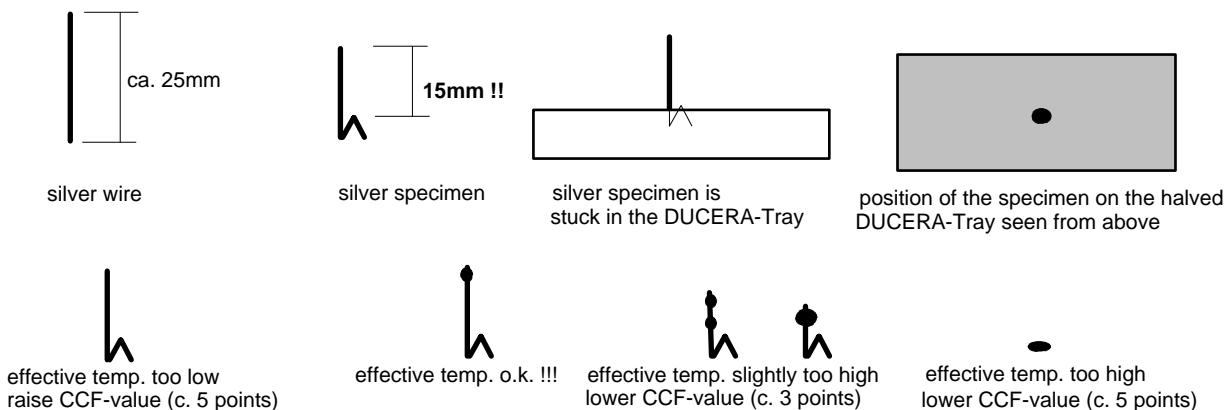
Carrying out the test:

Preheat the furnace before calibration (MEM 98)!**

The fine silver wire is positioned on the firing tray (see figures), and silver wire test firing program (MEM 99) is started.

After the program ends, the silver specimen is analyzed according to the following illustrations. By means of the **CCF** temperature calibration, the indicated temperature can be adjusted to the effective temperature directly next to the silver wire (silver specimen). See the prior page on how to set the **CCF**.

- Programs: 1. C700 T300 L9 C1150 T300 V9 T300 V0 C0 L0 T2 C625 (MEM 98)
 2. C625 T120.L9 T075.C961 T60 C0 L0 T2 C625 (MEM 99)



** **Important:** Before calibrating the temperature, the firing chamber and the insulation material must be preheated. As a general rule, the side walls of the top oven housing must be warm to the touch!

Calibrating the Vacuum

Vacuum steps V1 to V9 can be optimized to adjust to the absolute elevation of the site of use. The vacuum calibration system (**VCA**) can be used to set the best possible vacuum for the **AUSTROMAT®** with its vacuum pump whether you are at sea level or in the mountains.

How to adjust and calibrate the vacuum:

The standard value V-SET is set at 232 points (internal scale in the **AUSTROMAT®** of 0 to 255 points). During adjustment, the **AUSTROMAT®** automatically measures and displays the maximum vacuum that can be attained within 3 minutes with the connected vacuum pump. Then the seal of the vacuum system is automatically checked. If the attained vacuum drops within 1 minute by more than 2% of the attained V-REF, the new V-REF is rejected, and the original value is reset. Otherwise, the new value can be accepted as the V-REF (reference vacuum in reference to the location) (you can always return to the standard value of 232 points).

Procedure:

1. In the main menu, select program memory 0 (PREHEAT FIRING CHAMBER), and switch on the editing mode by pressing the **ENT key**.
2. The vacuum calibration system can only be activated by entering a code word.

The code word is: **VCA.9**

After the code word is entered, the first five places of the program name after the slash are overwritten. If you do not enter it correctly, only the program name will be changed.

3. By pressing the **ENT key**, the vacuum calibration mode appears on the display. The valid V-REF is shown.
 - 3.1. By pressing **key 9**, the VREF is accepted, and the automatic adjustment system starts.
 - 3.2. By pressing **key 2**, the VREF is replaced by the standard value (232); pressing the **→ key** starts the automatic adjustment system with the standard value. The **← key** terminates vacuum calibration mode and returns you to the main menu.
4. This is followed by the automatic tests of the vacuum, seal and flooding.
5. As a result, the following are shown:
 - 5.1. The new VREF is the test was successful, or
 - 5.2. **-ERROR-** if
 - no vacuum could be generated.
 - a vacuum corresponding to more than 140 points could not be reached.
 - the rise in pressure in the seal test was greater than 2% of the attained end vacuum.In these cases, the original, V-REF valid before calibration from 3.1 or 3.2 is retained.
6. You now have the following options:
 - 6.1. Accept the new or old VREF as the new VCA, and return to the main menu by pressing the **ENT key**.
 - 6.2. Repeat step 3.1 or 3.2 of the procedure.

Deleting All Program Memories

In the main menu, select program memory 0 (PREHEAT FIRING CHAMBER), and switch to editing mode by pressing the **ENT key**.

The delete command can only be activated by entering a code word.

The code word is: **MEM.0**

The code word overwrites the first five places of the program name after the slash. If you do not enter it correctly, only the program name will be changed.

By pressing the **ENT key**, all program memories are deleted. The software returns to the main menu.

Note: deleted programs cannot be restored!

Changing the Battery

All programs are saved in a RAM module. The RAM requires a continuous supply of power. When the **AUSTROMAT® 3001** is switched off, the battery supplies the current. The battery is a lithium cell with **3.6V** nominal voltage and **750mAh** capacitance and cannot be charged.

Note: The battery may only be changed with the device is **switched on** since the correct program data could be lost!

Changing the battery:



- Turn the **AUSTROMAT® 3001** off and on with the main switch.
 - Do not press any key.
 - Open the battery compartment in the rear of the device and note how the battery is installed; remember the positive and negative sides!
 - After loosening the terminals, you can remove the battery.
- Before inserting the new battery, appropriately bend the connection wires.
- Properly insert the new battery, make sure that the poles are correct, and tighten the setscrews.

Checking the battery:

- By pressing the **R/S key**, a measured value is shown on the display. It should be at least 100%.
Tip: What to do when 0% is displayed:
 - o Leave the **AUSTROMAT® 3001** switched on; otherwise saved data will be lost.
 - o Recheck that the positive and negative sides of the battery are in the correct positions.
 - o Even new batteries can sometimes be dead.

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


The Quality Management Module

When the QM (=quality management module) is active, a report printer can receive data from the oven. Alternately, data can be received by a PC and be saved and processed with the data-recording program (DRP). The data-recording program is in the **DEKEMA Software Package** (DSP).

In the main menu, select memory 0 (PREHEAT FIRING CHAMBER), and switch to editing mode by pressing the **ENT key**. Enter the following code word on the display after the slash:


General code words:

QM.E to QM.Z The code word with letters E to Z activates QM.
Letters E to Z name an oven so that each oven has an unchangeable ID. (A, B, C and D cannot be used).

QM. Deactivating QM:
Reenter the code word, but this time with a space instead of the letters!
(enter the space with the space key )

Report printer code words:

QM.E. to QM.Z. The additional period at the end of the code word activates the transmission of data to the printer directly connected to the AUSTROMAT (=print).

QM.E to QM.Z Deactivating the transmission of data to the printer:
Reenter the code word, but this time with a space instead of the period
(enter the space with the space key )

This code word overwrites the first five places of the program name after the slash, and it is confirmed with the **ENT key**. If it is not correctly entered, only the program name is changed!

When the QM is activated, the QM status with the firing number is shown on the oven display. Each started program is assigned a consecutive number (#).

Firing Report

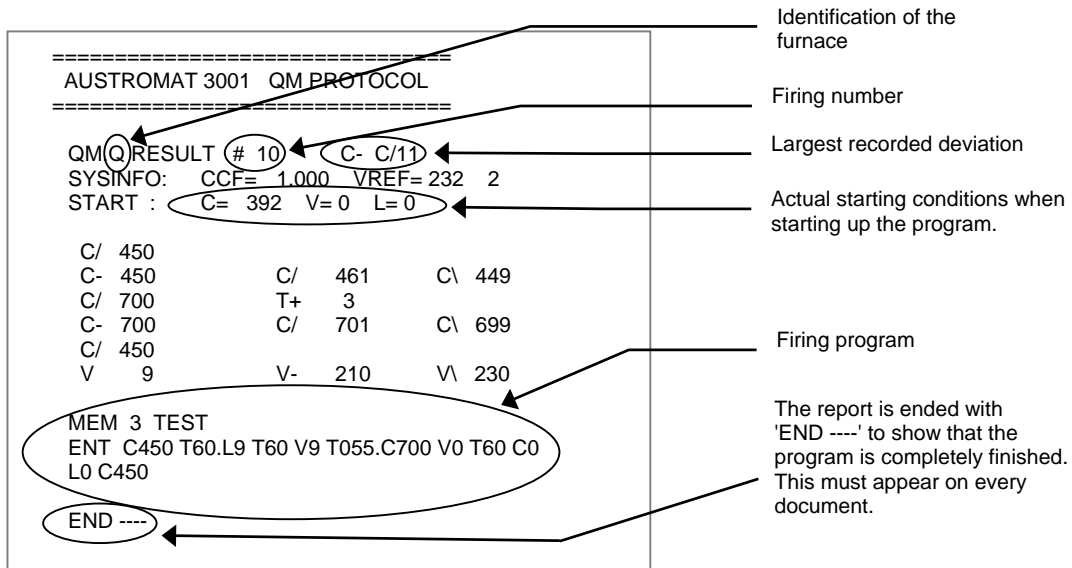
Condition: The QM module and the transmission of data to the printer must be activated (see page 33)!

Note: If a firing program is terminated, there is no evaluation and hence no printout of the report!
Three dashes appear on the display.

Each started program is monitored from the very start and is automatically assigned a running number. The temperature and vacuum are monitored closely by the QM module, saved with any deviations from the set point and actual value, and automatically printed out after each firing.

The user may evaluate whether the firing went well or not. The printout is filed with the work documentation.

A typical printout can look like this:




Line 1: QM status message: # 10 stands for firing number 10
 C- C/11 means that the largest recorded error is 11°C. Note: The maximum display is 99!
Note: \ means negative temperature error, i.e., the temperature is too low
 / means positive temperature error, i.e., the temperature is too high

Line 2: System data CCF and VREF.
 If VREF is the standard value (SET = 232), a 2 follows.
 If VREF was set by calibrating the vacuum, a 9 follow.

This is followed by information about the temperature and vacuum:

- C/ 450:** The C command was reached without a delay
- C- 450 C/ 461 C\ 449** Temperature stability at 450°C with the maximum and minimum values.
- C/ 700 T+ 3** The C command was reached with a 3 second delay. The reason could be decreased performance of the heating element, or poor power supply. Another reason could be that the chosen temperature increase is set too fast. Monitoring only occurs during heating up, and a time value is displayed only when a delay occurs (T>0).
- C- 700 C/ 701 C\ 699** Temperature stability at 700°C with the maximum and minimum value.
- C/ 450** No evaluation from a delay since we are dealing with cooling (there is no evaluation when cooling).
- V 9 V- 210 V\ 230** The ceramic was fired with a maximum vacuum (V9). **V-** indicates the measured value when switching to program continuation (=V9min), **V** indicates the measured value directly before flooding. Note the V- measured value at the switching point to program continuation: The vacuum continued to increase after switching point V9 since the pump continued to operate (but it is no longer shown on the display). At V1 to V8, the measured value remained constant since the pump was switched off.

Note: A maximum of 8 temperature settings can be transmitted from the program with actual/actual value deviations.

Note: A report is automatically printed out after each firing. In the information field, the display shows '-PRINT-' until the printout is finished. Additional printouts can be started in the main menu with the  key. (This is not possible when firing programs have been copied in the mean time, a firing program has been written, or a program was transmitted between the oven and PC).

Definition of firing: A firing is held to be an increase in temperature > 50°C with a closed lift (L>8).

The QM status message in the display automatically shows the largest C error so that a user without a printer is at least notified.

The QM status message for the above example would be: **QM.Q RESULT # 10 C- C/11**

For further information, a printout is required.

Where are errors of the lift and vacuum settings reported?

At the end of the QM status message under the following conditions:

For the V setting: After expiration of the internal time limit (current value flashes in the display)

For the L setting: After expiration of the internal time limit (current value flashes in the display)

The QM status message for the above examples would be: **QM.Q RESULT # 10 C- C/11 V L**

Printer

If the printer output is activated, the QM sends the 'AUSTROMAT 3001 QM PROTOCOL' to the interface. The QM does not check if a printer is connected and/or if it is ready to print.

There is no coordination of software between the **AUSTROMAT®** and printer.

Printer:

- Any modern printer with a serial RS232 interface (*9600,8,N,1*)
- The user can select any type of printing (*needle, thermal, ink, laser, etc.*)
- The printer should have a minimum input memory (*Input buffer*) of at least 1 Kbyte
- The length of a line must be at least 32 characters

Test the printer to make sure it works.

Data cable: The data cable must have good shielding!

Note: In the external data cable running from the **AUSTROMAT®** to the printer, the wires to pins 2 and 3 must be cross-connected!
Alternately, the data cable can plug into an adapter in which the wires are already crossed (obtainable from a specialty store).

This always occurs with two devices with equal access and the same pin assignment need to be connected (the other lines can remain unchanged in this case).

Note: Both devices should be switched off when connecting the printers to the oven!


For the report, only standard fonts are used that are understood by every printer.


At the beginning of printing, the QM sends an ESC control character to the printer to set the line spacing at 1/8 inch (*ESC control characters are understood by nearly every printer*). Otherwise, the line spacing will remain as preset in the printer.

The report title and all subsequent lines up to the printout of the firing program are formatted for the text width to be exactly 32-characters. This is a standard print width, and it should also be the minimum width that the printer can print on paper; it would otherwise becomes unclear.

When printing out the firing program, the text width is not limited so that the printer can use the entire paper width.

A few lines are added to the paper at the end of the report so that the paper can be torn off without losing any text. The user may also add space with the feed key on the printer.

By pressing the  key, the program can be forced to continue. Normally, the program is automatically continued only when the respective target is reached (such as the temperature C450 in the first example).

However if the vacuum, current lift station, or the temperature flash in the top left of the display, the user can force the program to continue by pressing the  key.

A few examples are provided below so that you can monitor such interventions which may cause faulty firing.

```

=====
AUSTROMAT 3001  QM PROTOCOL
=====
QM.F RESULT # 35  C- C/ 2  *
SYSINFO: CCF= 0.993  VREF= 232  2
START:  C= 450  V=0  L=0

C/ 450
C- 450  C/ 452  C\ 449
C/ 660
C- 660  C/ 661  C\ 659
C/ 450
C- 450
V  9  V- 218  V\ 230

MEM 76  Test 3
ENT C450 T180.L9 T120 V9 T055.C660
V0 T60 L0 T2 C450
END ----

```

The actual temperature during the holding phase was recorded since a holding period was programmed. If no holding period was programmed, the temperature would not be evaluated.

```


=====
AUSTROMAT 3001  QM PROTOCOL
=====
QM.F RESULT # 31  C- C/21  *
SYSINFO: CCF= 1.000  VREF= 232  2
START:  C=(503) V=0  L=0

C/ 450
C- 450  C/ 471  C\ 449
C/ 700
C- 700  C/ 701  C\ 700
C/ 450
C- 450
V  9  V- (217)  V\ (226)

MEM 40  DUCERAM LFC Wash
ENT C450 T30.L9 T120 V9 T055.C700 V0 T60
C0 L0 T2 C450
END ----

```

When the program was started, the actual temperature in the firing chamber was higher than the first temperature command (C450). The oven activated the first temperature command, C450. The program is automatically continued only if this temperature has been reached.

Apparently the  key was pressed to intervene in the execution of the program. The program was forced to continue although the temperature was too high. A temperature deviation of 21°C arose in the holding period. The temperature was monitored in the holding period (T120), and the minimum value was printed out.

In the bottom printout line directly following V- is the vacuum that was attained at the switching point to continue the program (V9min) (the indicated values correspond to the scale when calibrating the vacuum.)

Measured vacuum directly before the firing chamber was flooded.

```


=====
AUSTROMAT 3001  QM PROTOCOL
=====
QM.M RESULT # 42  C- C\ 1 V
SYSINFO: CCF= 0.995 VREF= 232  2
START:  C= 450  V=0  L=0

C/ 450
C- 450 C/ 450 C\ 449
C/ 655
C- 655 C/ 656 C\ 655
C/ 450
V  9  V- 191 V\ 226

MEM 40  DUCERAM LFC DENTIN 2
ENT C450 T120 T120.L9 T120 V9 T055.C655
V0 T60 C0 L0 T2 C450
END ----

```

If a V appears at the end of the QM status message, it means that the vacuum could not be attained within the internally preset time (flashes as an error message on the oven display).

The very low measured vacuum at the switching point in comparison to the above example indicates that the  key was pressed to intervene in the program. The program was forced to continue by the user although the vacuum was insufficient (flashes as an error message on the oven display).

```



=====
AUSTROMAT 3001  QM PROTOCOL
=====
QM.F RESULT # 39  C- C/ 95  *
SYSINFO: CCF= 0.990 VREF= 232  2
START:  C= (689) V=0  L=0



C/ 575
C- 575 C/ 670 C\ 670
C/ 920
C- 920 C/ 920 C\ 919
C/ 575
V  9  V- 216 V\ 228

MEM 13  DUCERAM DENTIN 1
ENT C575 T180.L9 V9 T075.C920
V0 T60 C0 L0 T2 C575
END ----

```

When the program was started, the actual temperature in the firing chamber was still higher than the first temperature command (C575). The oven activates the first temperature command C575. The program automatically continues only after this temperature has been reached.

Apparently, the  key was pressed to intervene in the program. The program was forced to continue by the user although the temperature was too high. There was a temperature deviation of 95°C. The evaluated temperature (C670) is the temperature measured when the  key was pressed.

If there is no time command up to the next temperature command after the program is forced to continue by pressing the  key, the valued measured upon pressing the  key is printed out as the minimum and maximum value (T180.L9 is not a time command!).

```

=====
AUSTROMAT 3001  QM PROTOCOL
=====
QM.F RESULT # 40  C- C/ 95  *
SYSINFO: CCF= 0.990 VREF= 232  2
START:  C= 689  V=0  L=0

C/ 575
C- 575 C/ 670 C\ 590
C/ 920
C- 920 C/ 920 C\ 919
C/ 575
V  9  V- 216 V\ 228

MEM 13  DUCERAM DENTIN 1
ENT C575 T120 T180.L9 V9 T075.C920
V0 T60 C0 L0 T2 C575
END ----

```

The same situation as in the prior example, however a time command has been programmed. For this reason, the minimum value (C590) is evaluated during the holding period T120.

System Data

In the main menu, select program memory 0 (PREHEAT FIRING CHAMBER) and switch to editing mode by pressing the **ENT key**.

The system data can only be activated by entering a code word.

The code word is: **SYS.I**

This code word overwrites the first five places of the program name after the slash. If it is not correctly entered, only the program name is changed!

After pressing the **ENT key**, SYSINFO shows the current system data as a series of numbers as follows (helpful for telephone service):

Example: 107 1.000 232 2 12 (battery, CCF, VREF, VCA, firing number)

Note: VCA = 9 if the VREF was determined by the VCA, VCA = 2 if the set value was accepted.

The arrow keys return you to the main menu.

Safety Instructions

AUSTROMAT® ceramic ovens are constructed so that a long and flawless service life can be anticipated under very high loads. If however technical intervention is required (such as changing the heating element), it should be done by an authorized professional.


After the ceramic oven has been restored to operation, check for safety:

Federal Republic of Germany	VDE 0701
International.....	follow legal requirements

I. General Safety Instructions



This symbol warns of hazardous electrical voltage where there is a danger to life and limb. Take note of this warning and take extra precautions.

1. Before starting the device, be thoroughly familiar with the operating instructions.
2. The operator must be especially familiar with the safety instructions and the operating conditions to prevent damage to people and materials. No claims to liability and guarantees exist for damage that arises from improper operation and/or use.
3. Before switching on the device, ensure that the supply voltage is appropriate for the device design.
4. The power plug may only be inserted in a socket with a ground contact.
5.  Before calibration, servicing, maintenance or exchanging parts, the device must be separated from all sources of voltage when it has to be opened (exception: Changing the battery).
6. Ensure that only the indicated types of fuses with the indicated nominal current are used as replacements (see rear of device).
7. If it becomes apparent that that device is hazardous to operate, unplug it and take precautions so that it will not be accidentally used. It is no longer safe to operate the device when:
 - the device has visible damage,
 - the device no longer functions,
 - the device has been stored for a long time under poor conditions.
8. Unplug the power cable from the socket if there is a threat of lightning!

Warning!

Any interruption of the protective earth conductor within or outside of the device or the severance of the protective earth conductor connection can cause the device to become hazardous. The connection may never be intentionally severed.

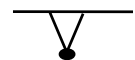
II. Special Notes and Important Technical Information

Observe instructions for setting up and initially starting up the device on page 7 of the operating instructions.

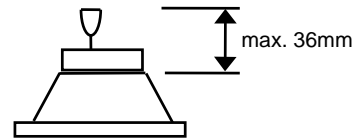
1. Never operate the device without a firing table since the lift seat and hence the seals would become overheated.
2. This device was designed exclusively for firing dental ceramic objects.
3. Never heat materials that may explode, implode or generate hazardous or flammable gases! Sufficient ventilation must always be provided.
4. The firing chamber may cause injury from heat and electrical shock. Never operate the device when your fingers or other objects are in the firing chamber except the above mentioned objects.
5. Never contact hot parts such as the firing table, firing tray or fired object with your bare fingers!
6. For reasons of safety, the oven should not be operated for extended periods without supervision.
7. In particular, never leave the oven unsupervised when the firing chamber is open at the rear (lift is not in top-most position).
8. In pauses between the individual firings, the firing chamber should be closed (the lift is in the top-most position). This will extend the life of the heating element, promote safety and prevent unnecessary energy consumption).
9. If the firing chamber is left open for a long time (the lift is in a bottom position), the cover plate of the oven base and the entire top of the oven can become strongly heated.
10. Place easily flammable materials at a sufficient distance from the device and the pump.
11. To avoid unnecessary condensation, close the firing chamber (move the lift into the top-most position) before turning off the device. This especially holds true in the evening.
12. Never cover the vents in the top of the device.
13. Servicing: We recommend that the oven and vacuum pump be regularly checked. In Germany, have them checked by DEKEMA, and in export countries have them checked by the respective service partner. This will ensure the best possible firing results.
14. Temperature calibration: We recommend calibrating with the silver wire test once per year. With new devices, calibrate for the first time after approx. 6 months. Adjustment and calibration should also be done if you notice anything different (such as the firing results have changed).
 - ⇒ The silver wire test is a means to adjust the ceramic ovens so that they are almost the same as new devices shipped from the DEKEMA plant (traditional silver wire test = reference).
 - ⇒ The firing chamber must be checked before calibration. The heating element and the thermocouple must operate properly.
 - ⇒ Only use the original tsw calibration set by DEKEMA!
 - ⇒ If the value from the temperature calibration (CCF) changes, this will change the firing temperatures in all the programs. The firing temperatures of the individual programs may have to be correspondingly corrected!
15. The heating element is a wearing part and must be replaced by the repair service when worn. When exchanging the heating element, please observe the installation instructions for the replacement heating element!

The service life of the heating element depends on its load. There are two signs of wear that a user can see:

- ⇒ Check the firing chamber by looking from below into the open firing chamber. The heater coil must be evenly inserted in the glass tube. Deformations of the heater coil indicate wear.
 - ⇒ The output of the heating element is reduced by wear. Watch the display when the temperature rises. If the temperature does not rise at the set rate, the current firing chamber temperature will flash on the display. If the same temperature rise rates could be maintained earlier, it may indicate that the heating element is worn. Caution: Voltage fluctuations can influence the output of the heating element!
16. The thermocouple measures the temperature within the firing chamber and may never be bent. This would influence temperature measurement. It needs to extend vertically downward from the roof of the firing chamber. It can be checked by looking from below into the open firing chamber (opening for the lift). A small mirror placed diagonally below the firing chamber makes this easier.



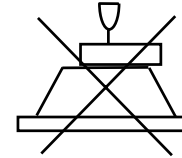
17. The firing chamber has a useful height of 36 mm. The combined height of the firing tray and fired object may hence not exceed 36 mm measured from the top surface of the firing table (possible hazard of damaging the fired material and/or the thermocouple)!



18. The vacuum pump is service-free: However, the output can be impaired from soiling of the cylinder interior or its valves. Such problems can be avoided before they negatively influence the firing quality by regularly checking the output.

19. The firing tray (object carrier) needs to be positioned so that it does not extend over the top edge of the firing table on the side.

20. Take care when exchanging the firing tray since each one has a highly individualized influence on the effective temperature of the fired object. Always use the same type of firing tray.



21. The fired objects should never be placed directly on the firing table or firing tray since their exposure to heat is inferior at this location.

22. Extreme care must be taken when creating firing programs. Faulty firing programs can impair the quality of the fired objects. For safety's sake, we recommend test firings.

23. The recommendations for firing temperatures and other parameters for setting the firing programs are only guide values. The user must therefore use the guide values as a reference and determine his individual parameters.

24. Cleaning:

- ⇒ clean the housing with a moist cloth.
- ⇒ never use cleansers or flammable materials.
- ⇒ always keep the sealing surface of the lift seat free of dust (with a brush or moist cloth).
- ⇒ clean the lift plunger now and then with a dry cloth, but never with oils.

25. Observe the following when packing the device to transport it:

- ⇒ let the device cool down
- ⇒ remove the firing table
- ⇒ close the firing chamber (lift in top-most position)
- ⇒ pack the firing table and power cord separately and ship with the device together with the equipment in the original packaging

26. Running programs are terminated when there is a power failure.

For all technical questions, please contact the DEKEMA manufacturer or one of our service partners in Germany; in an export country, contact the respective DEKEMA service partner.

Part 3

Short Instructions and Programming Suggestions

Short Instructions for the AUSTROMAT® 3001

To start:

- Turn on the oven; after a few seconds, press \rightarrow . The following is displayed:
MEM 0: PREHEAT FIRING CHAMBER
- Start the program MEM 0 with the **R/S key**. The oven preheats the firing chamber.

Select programs: with the keys \rightarrow and \leftarrow and the numeric keypad.

Lift movements: open/close the oven: press \square and **0/9**.

Start the program: briefly press the **R/S key**.

Terminate the program (emergency): hold down the **R/S key** or press it twice briefly.

End program:

After the lift has moved down, the temperature display flashes for a few seconds. The user then has the following options:

1. Wait until the standby temperature is reached. The software returns to the main menu, and the firing chamber is closed with \square and **9**.
2. The vacuum pump is switched by pressing the **V key**. The firing chamber cools faster to the standby temperature, the software then returns to the main menu, and the firing chamber is closed with \square and **9**.
3. By pressing the \rightarrow key, you skip the last program step (the standby temperature is automatically selected). The software returns to the main menu, and the firing chamber is closed with \square and **9**.

Change program data:

- Select the program to be changed.
- Press the **ENT key** twice. press \rightarrow or \leftarrow to move the cursor to the desired position and overwrite the data to be changed.
 - o Insert space: place the cursor under a character and move everything to the right of the cursor position with the **R/S key**. The cursor also moves.
 - o Remove space: Place the cursor on the space and delete the program string to the right of the cursor position with the **R/S key**. Confirm the entry with the **ENT key**. The changed data are saved.

Enter the program name:

- Select a free program.
- Press the **ENT key**. The program name can be entered.
- Confirm the program name with the **ENT key**. Enter your firing program.

Enter the program string:

The possible commands that can be used to create an individual firing program are as follows:

- **C** temperature (e.g. C500 = 500°C), Range: 0, 100 to 1200
- **L** lift position (e.g. L9 = firing chamber closed), Range: 0 to 9 (0 = open, 9 = closed)
- **T** time (e.g. T180 = 180 sec.), Range: 20 to 65000
- **T** beep (e.g. T1 = 1 beep), Range: 1 to 9
- **V** vacuum (e.g. V9 = approx. 20mbar), Range: 0 to 9 (0 = no vacuum, 9 = maximum vacuum)
- . Command connector
 - o **T360.C900** = heat linearly to 900°C over 360 sec.
 - o **T120.L9** = move lift in steps to L9 within 120 sec. (close firing chamber)
 - o **T055.C820** = heat at a rate of increase of 55°C/min to 820°C, range from 02 to 099 (2°C/min to 99°C/min)

Pressing the ENT key terminates editing mode. The data are checked by the electronic control to see if they can be logically executed. If the data are O.K., they are saved. If the programming is faulty, -ERROR- appears on the display, and the cursor remains at the beginning of the first faulty sequence.

Programming Suggestions

On our website www.dekema.com you will find non-binding programming suggestions for conventional ceramic materials. These are firing programs created based on manufacturer's information for the AUSTROMAT® 3001 series of DEKEMA dental ceramic ovens. The programs contain the parameters indicated by the respective manufacturer such as the rate of increase, temperatures and holding periods. These quantities depend on the respective conditions of use such as the size and material of the firing tray or firing cushion, the size and weight of the fired object, or the firing oven used when the ceramic manufacturer was determining the firing parameters.

To obtain the best firing results, DEKEMA recommends that you carry out a sample firing before the first ceramic firing. If different firing material is fired in your AUSTROMAT® 3001, regular cleaning firings are recommended without any cleaning additives. This reduces contamination and foreign impurities on the fired material and thermocouple to an acceptable level.

GENERAL SAFETY ADVICE

AUSTROMAT® ceramic ovens are constructed so that a long and flawless service life can be anticipated under very high loads. If however technical intervention is required (such as changing the heating element), it should be done by an authorized professional.

After the ceramic oven has been restored to operation, check for safety:

Federal Republic of Germany	VDE 0701
International.....	follow legal requirements

Please follow the safety instructions in the second part of these operating instructions!

CERTIFICATION OF THE MANUFACTURER/IMPORTER

The manufacturer hereby confirms that the **AUSTROMAT® 3001** complies with the regulations of the **postal decree 1046/1984** referring to interference suppression.

The German Post AG has been informed that this unit has been put on the market and the German Post AG has been granted the right to check the compliance of this series with the regulations.

Valid only for the 230 Volt –Version from model 1993 onward.