USTHERMO®

PHOENIX—9C

高纯度 硅碳棒加热技术

Instructions

我们还有 烤瓷炉 铸瓷炉 烧圈炉 PEEK炉等产品

烧结炉使用说明书

ZIRCONIA SINTERING FURNACE

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1.SAFETY AND CLEANING

1. Sintering furnace is use for firing ceramic materials of teeth.
2. The device must be put at least 25-30cm away from the wall.Be assure that the sintering furnace must be under normal ventilation environment.
3. The sockets must be put near the power source.The instrument board behind must be connected firmly.
4. Do not operate near by inflammable.
5. Please use dry or a little wet cloth clean the surface of the sintering furnace.Do not use solvent or other liquid cleaner to purify the control panel.Please do not let the liquid seep into the sintering furnace.
6. Damages caused by mis-operation can not be included in warranty scope.
7. In order to the best work environment,we suggest you use a exclusive circuit. The socket use an overload resistant protector would be best.The three-phase circuit must have a dedicated line for a reliable grounding wire.
8. Before any maintenance,you must plug off from the electrical socket .
9. In order to avoid any accident of serious scald,please use proper instrument to put in or move the objects .
10. Do not use nippers or other instrument to operate the furnace,these instruments may damage the screen or the membrane.
11. The firing deck is a movable (up or down)part.The to-and-fro motion is controlled by the program.
12. The inner place of the furnace include fireproof ceramic-fiber and porcelain dust,these may be released by the movement of opening.Once these materials are inhaled by human,it may cause cancer.The dust can irritate the skin and eyes,cause the respiratory tract hoarse or fester.Do not use condense air blow the dust into the work environment.

CAUTIONS：

1. Please read the instruction carefully before you use the furnace.If you do not use the device according to the manual,the life span of the Sintering furnace may be reduced.

2. The producer do not take the responsibility of lost caused by fault operation or misunderstand of the instruction.

3. Before move or assemble the furnace,please cool down the temperature.

4. Be careful for the part of high temperature when the device is operating.

5. The device is constructed according to a state of the art design and recognized safety regulations. However, if it is used inappropriately, hazards for the health and safety of the user or third parties may arise as well as the risk of damaging the device and other valuable assets.

6. After the back-plate has been removed, a voltage of up to 400 volts may still exist in components in the area of the power supply unit on the circuit board, even when the device is switched off.

The manufacturer is not liable for accidents to the user occurring when the device is open!

1. The standard for the user disassemble the instrument privately is depend on whether the easily damaged sticker is damaged.

2. Never start up the device without the firing socket attached.

3. In continuous operation (max. final temperature, max. firing time), some parts of the firing chamber may reach high temperatures (above 70 °C).

4. Do not reach into the open firing chamber when the device is switched on. There is a risk of touching electrically live or hot parts.

2、THE INTRUDUCTION FOR THE SINTERING FURNACE

2.1   THE FUNCTIONS OF SINTERING FURNACE:
● Voice prompt function.
● High quality temperature automatic adjustment function, to ensure the actual temperature error within + / - 1.5 degrees.
● It is easy to operate and small in size. At present, it is one of the smaller furnaces in the world.
● Precision stepper motor drive, smooth free operation and no jitter.
● High purity silicon carbide rod / silicon molybdenum rod heater.
● Hyperbolic sintering system, automatic temperature calibration before each sinter process.
● Low noise tray and the speed is programmable.
● Fast sintering zirconia with full anatomical morphology.
● The pre-drying time can be set for baking zirconia denture.
● The maximum temperature can be set to 1530 ℃.
● Fast glazing is finished in 9 minutes.
● The maximum heating rate is 200 C/min.
● There is no need to preheat the sintering furnace in advance. Ready to use in any time.
● Automatic fast cooling technology.
● Up to 8-20 restorations (60mm tray) can be sintered.
● True color touch screen, easy to operate.
● 90 custom programs and built-in programs.
● Status indication.

2.2   THE INTRODUCTION OF SPECIFICATIONS：

OPERATION：

The velocity of temperature increasing: 200℃/min max.

The max temperature: : 1530℃ max

The time which can be kept at the max temperature: 2 H

ELECTRIC POWER：

Operation range：100-120V 50/60HZ   230V 50/60HZ

Electric current：14.5ampere@110V 7.0ampere@230V

Power：max 1300w

TYPICAL SPECIFICATION：

WXDXH :width 27cm Depth 36cm Height 56cm

Usable measure (firing chamber):：6.5cm（3.5"

Net weight：20Kg

Weight include the package:25.5Kg

2.3 AMBIENT CONDITIONS

- Indoor use
- Ambient temperature: 2°C to 40°C
- Relative humidity 80% at 31°C
- Maximum altitude: 1500 m (**Special Model:3500m**)
- Rated voltage fluctuations must not exceed plus/minus 10% of the rated voltage

2.4   DEVICE IN BOX COMPLETE WITH:

- 1 firing pan
- 1 connection cable for the mains power supply
- 1 instructions
- 1 Burning rack

3. SAFETY INSTRUCTIONS

3.1 PICTOGRAMS

This pictogram warns injured voltage. Before opening the device, it must be pulling out the mains plug.

This pictogram warns the hot surfaces. Burn injuries may occur.

This pictogram warns may cause personal injury or damage to the device.

This pictogram show useful tips, explanations and additional information.

4.INSTALLMENT AND START UP

4.1 THE PLACE OF INSTALLMENT

- The sintering furnace must be installed in the dry room,and it must be put at least 25cm away from the wall.
- If the temperature is below 15 °C (59 ºF) (e.g. after transport), leave the device to stand for approx. 30 minutes before using it for the first time at room temperature.
- Ensure that the device is on a heat-resistant surface. The radiation and heating of the device is in the non-hazardous range. However, heat-sensitive surfaces of furniture and veneers could become somewhat discolored over time due to the constant influence of heat.
- Please avoid direct sunlight.
- MUST NOT put flammable around the sintering furnace.

4.2 CONNECTING THE DEVICE TO THE MAINS POWER SUPPLY

A. Take out the sintering furnace core from the accessories for standby (it must be placed in a safe place)

B. Insert the output plug of the power unit into the sintering furnace and the input plug of the power unit into the external plug. (for 220 V instruments only)

B. Turn on the power switch of power unit,then turn on the power switch of sintering furnace.

E. When the sintering furnace starts and display the main interface (when the temperature is displayed), press the down button, and the sintering platform moves downward (do not place any obstacles on the track of the sintering platform)

F. Assemble the baking core on the sintering platform.

Never start up the device without baking core!

4.3 POWER UNIT:

The output voltage can be controlled to reduce the driving voltage. Effectively prolong the service life of silicon carbide rod. The lower voltage is used to drive the silicon carbide rod to reduce the heat load so the service life of the silicon carbide rod is greatly prolonged.
Power unit must be placed in a well ventilated and dry place.

4.4 SINTERING FURNACE STAND BY MODE INTRODUCTION

Idle temperature：

Idle temperature is sintering furnace not in firing ,a temperature value user hope to it static.The furnace will automatically adjust the idle temperature according to the current mode.

(when the silicon molybdenum rod is a heating body, it is not allowed to set the idle temperature, otherwise the heating rod will be damaged.)

Sound:

If sound function on,there will be a sound that press any key.

5、FURNACE HARDWARE (AND ACCESSORIES) INSTRUCTIONS

5.1 FUSES

On the back of the device, there are 2 device fuses. The identification plates show information about the fuse ratings used in the device. Fuses with other ratings must not be used.

230V **T8H250V** 100/110V **T20H250V**

5.2 FAN

The device is equipped with a fan. Activation, deactivation of the fan are controlled automatically. The fan prevents excessive heating of the device and contributes to its general operating safety. For safety reasons, the device must not be operated without a fan. The upper cover of the firing chamber and the openings in the rear cover must not be closed or blocked.

5.3 SPARE PARTS

Spare parts must comply with the technical requirements determined by the manufacturer. This is always assured when using original spare parts **.**

6. WARRANTY AND LIABILITY

The PHOENIX furnace provide 1 years (except heating body) limited warranty: warranty starting from goods delivery for the first vendors.

7. DESCRIPTION OF THE FURNACE

7.1 OPERATION PANEL

7.2 BUTTONS NAMES:

[SPEED/GLAZE] : Single curve sintering interface.
Glazing operation can be carried out.

[2 STEP/GLAZE] : Hyperbolic sintering interface can be used for zirconia
crystallization and glass-ceramic crystallization.

[STANDARD]: Standard procedure selection.

[CUSTOM]: Custom program selection.

[PROGRAM]: Program parameter setting interface.

[SET]:Other settings.

[UP]: The tray rises.

[DOWN]: Tray down.

7.3 THE DISPLAYS INTERFACE

P 01：The current chosen program ID is 01.The following is the status of the programme.

1 STEP = 1 step programme; **2 STEP** = 2 step programme

TEMPERATURE 27C：The furnace temperature 27℃.

7.4 CHOOSE A CURRENT FIRING PROGRAM

Press **[CUSTOM]** enter program ID choose interface , as follow

CHOOSE A PROGRAM

Press program number ,then it will jump a soft keyboard.Use the key 0-9 input a program ID which you want,input the number,press OK complete the current program number choose.

If input wrong program number ,press BACK to cancel.
You can also use the **PROGRAM SETING** interface to select the program with **"previous page, next page"**button.
You can also press "**STANDARD PROGRAM**" to call the built-in program directly.

NOTE: The built-in program of Standard Program corresponds to the program number, and the standard program 1 corresponds to the program number 1. The parameters of standard built-in program 1 can be edited by editing program 1.

7.5 SET PARAMETERS FOR A PROGRAM

Press **[program-set]** to enter the program parameter setting interface. Press **"previous page, next page"** to select a program, and finally input 11 parameters in turn to complete the parameter setting of the current program.
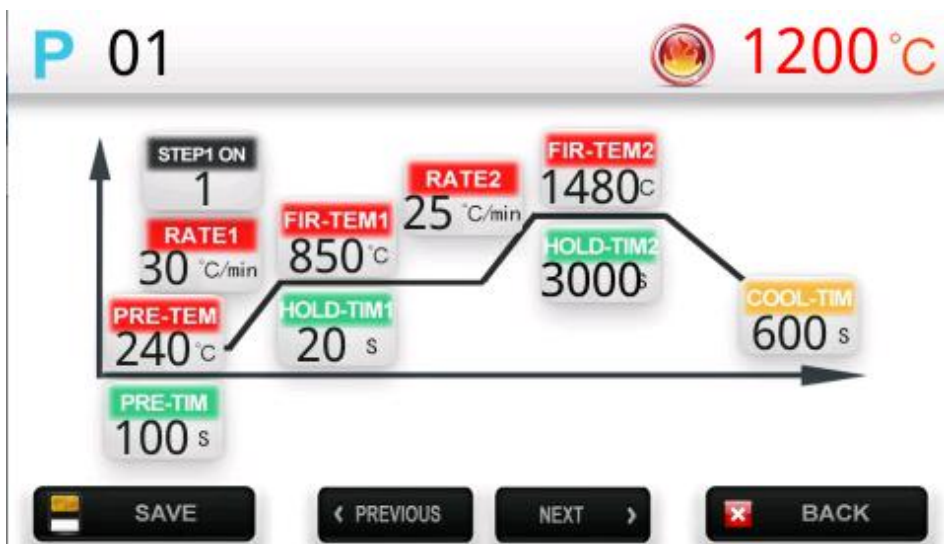
Input parameters ok then please press key **[SAVE]**to save,Press **[CANCEL]** back.

Parameters table：

Parameter prompt	Description	Unit	
1.1 PRE-TEM	Pre drying temperature	℃	
1.2 PRE-TIM	Pre drying time	s	
1.3 STEP1 ON	The first temperature curve switch.		Set to 1 to activate, the first temperature curve is executed. Set to 0 to close, the program skips the first section of temperature curve and directly executes the second section of temperature curve.
1.4 RATE1	Temperature rate of the first temperature curve	℃/min	
1.5 FIR-TEM1	Maximum temperature of the first temperature curve	℃	
1.6 HOLD-TIM1	High temperature holding time of the first temperature curve	s	
1.7 RATE2	Temperature rate of the second temperature curve	℃/min	
1.8 FIR-TEM1	Maximum temperature of the second temperature curve	℃	
1.9 HOLD-TIM2	High temperature holding time of the second temperature curve	s	
1.10 COOL-TIM	Cooling time	s	

Step 1 on: when it is set to 1, the program is hyperbolic program,The program will run the first phase and then the second phase at runtime. and the main interface displays "2step".

When set to 0,It will skip the first phase and run the second phase directly.The program is identified as a single curve program. The main interface displays "1step".

Hyperbolic program is use for fast crystallization of zirconia or glass ceramics.

Error parameters remind:

When you input a program parameter or other parameters, you input a parameter the system can not run,or the parameter with Logic errors,system will automatic change into the maximum/minimum limit value.

7.6 COMPREHENSIVE PARAMETER SETTING

Press [SET] into SET interface,as follow:

VACUUM / VACUUM TEST	CORRECTION / TEMPERATURE	IDLE / TEMPERATURE	SPEED / MOTO	POSITION / PALLET
SETTINGS / FACTORY	CLEANING / FIRE CLEANING	SOUND / SOUND SET	ABOUT / INFORMATION	

BACK

7.7 BUTTONS NAMES:

[TEM FIX]: Fix the temperature correction.

[IDEL TEM]: Input the idle temperature.Idle temperature is Sintering furnace

  not in firing ,a temperature value user hope to it static.

[MOTOR SPEED]: Pan speed set.Too fast or too slow will cause noise.

[PAN POS]: Starting the program, in the Pre-dry stage, the pan will up two times ,

  this set are two up position.

[RESTORE FACTORY]: Restore to factory settings.

[CLEAN MODE]: Sintering furnace impurity.

[SOUND]: Set Sound ON or OFF.

[ABOUT]: About Sintering furnace.
[BACK]:Back to main interface.

7.8 TEMPERATURE FIX

TEMPERATURE CORRECTION

200

✓ SAVE   ✗ BACK

Temperature adjustment automatically before every firing procedure.

But we still provide manual methods of temperature correction.

Fix value 200 as the center, to increase this number means that reduce the actual temperature, reduce this number means increasing the actual temperature, usually this value is 200 .

Press **[SAVE]** to save temperature fix.

Press **[BACK]** to back to main interface.

7.9 IDEL TEMPERATURE

IDLE TEMPERATURE

ONLY FOR GLAZE/CRYTALLIZATION

500

✓ SAVE   ✗ BACK

Idle temperature is sintering furnace not in firing ,a temperature value user hope to it static.
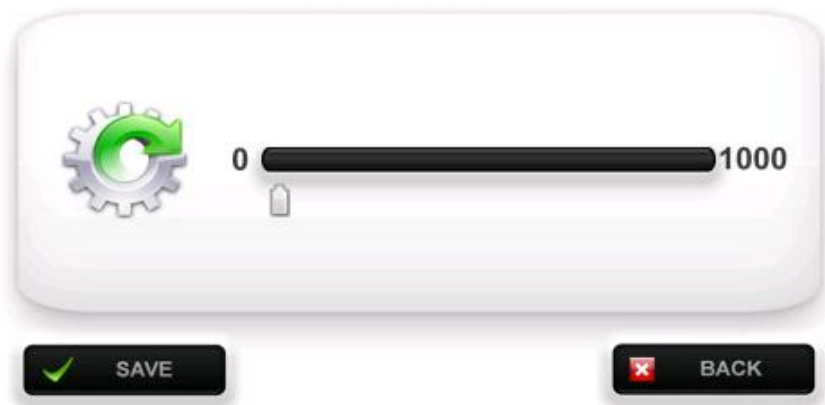
⚠ **If the sintering furnace using si-mo bar as heating body, please set the idle temperature to 0 as possible, the idle temperature will shorten the service life of heating body!**

Press **[SAVE]** to save idle temperature.

Press **[BACK]** to back to main interface.
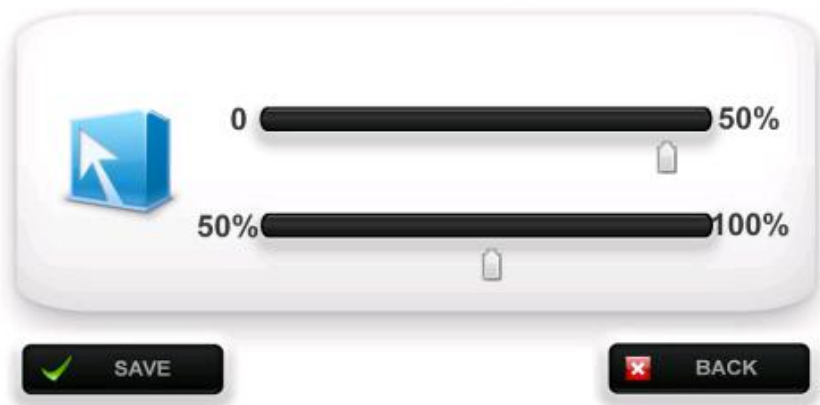
7.10 MOTOR SPEED

MOTO SPEED

Pan speed set.

Too fast or too slow will cause noise.

Press **[SAVE]** to save motor speed.

Press **[BACK]** to back to main interface.

7.11PAN POS

PALLET POSITION

Starting the program, in the Pre-dry stage, the pan will up two times , this set are two up position.

⚠️ **This tow parameters is very useful for steam Pre-evaporation,adjusted according to practical experience required.**

Press **[SAVE]** to save Pan position.

Press **[BACK]** to back to main interface.

7.12 RESTORE FACTORY

FACTORY SETTINGS

| ✓ START | | ✗ BACK |

Press **[RESTORE]** to restore to factory setting .

Press **[BACK]** to back to main interface.

Restore factory settings.
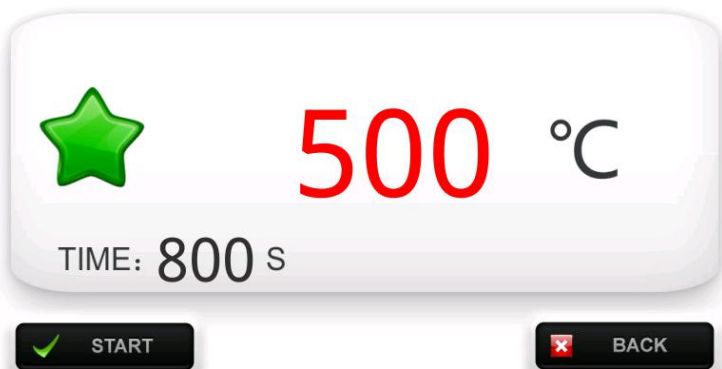This operation is irreversible.
Do you want to continue?

CONTINUE   CANCEL

Press [RESTORE]A dialog box will pop up for asking the user continue or NOT,press CONTINUE to restore the factory data.CANCLE to abort.

⚠ **This operation will restore all parameters back to factory set.**

7.13 CLEAN MODE

FIRE CLEANING

⭐ **500** ℃

TIME: **800** S

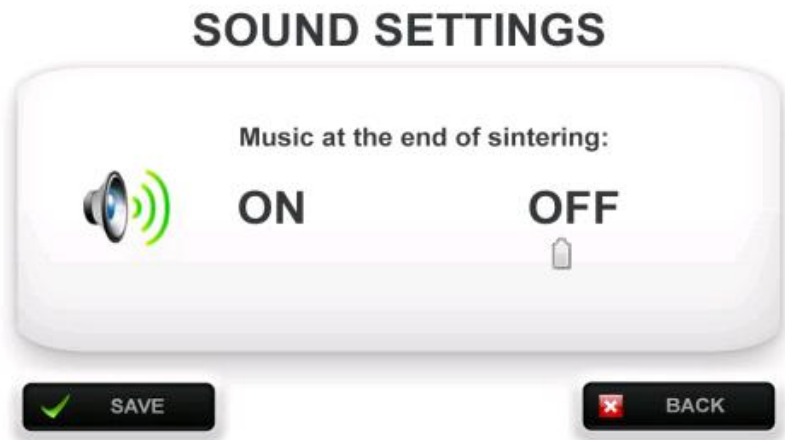✓ START   ✗ BACK

Press **[START]** to start clean mode .

Press **[BACK]** to back to main interface.

User must placed the activated carbon on the pan,then up the pan upper.

⚠

User must proper treatment the activated carbon which is used, discarded will occurrence fire.

7.14 SOUND

SOUND SETTINGS

Music at the end of sintering:

ON   OFF

✓ SAVE   ✗ BACK

Use the scroll bar select sound ON or OFF.

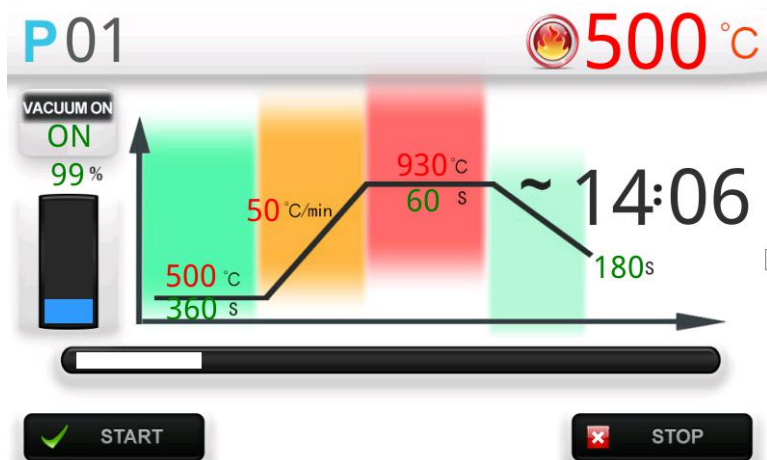Press **[SAVE]** to save sound statu .

Press **[BACK]** to back to main interface.

7.15 ABOUT

Contains the version dates and other information.

7.16 START A 1 STEP FIRING PROGRAM

Press **[SPEED/GLAZE]** in 1step firing interface,press **[START]** to start a 1 step firing program,the current firing program number which is the Program ID display number, pan will automatic down to the bottom, after ,you can put the porcelain teeth in the firing pan, It will automatically complete the firing process.

7.17 START 2 STEP FIRING PROCESS

Press **"2 STEP/GLAZE"** button to enter the **2 STEP** interface. At this time. After placing the glass or zirconia, press **[start]** to start a **2 STEP** process.

7.18 STOP A FIRING PROGRAM

When a firing program is running,press **[STOP]** to stop a firing program,system will back to the main Interface and temperature will stable at stand by temperature when the program end.

8.TROUBLE SHOOTING

In case of the following fault, please contact customer service:

- Hardware failures：Memory chips ,real time chips,or the other problem, Power off to restart.

- Temperature failures: After start up,the display of temperature too large,or

temperature too small.may be the thermocouple damage cause the
Sintering furnace temperature display too hot or too cold.for
this ,please turn off the power and restart,then to cheak out the temperature
control.

- The parameters value for program may beyond the Max value,the Factory
  Settings of max temperature cannot exceed 1200 (units℃), vacuum value
  cannot exceed 110 (%), time can not exceed 9999 (S), limit temperature
  cannot exceed 1000 (℃).

Sintering process fault and treatment:

1. ***Prompt program selection error:*** It is because the currently selected
 program is not consistent with the sintering interface to be entered. For
 example, if the current setting program is hyperbolic program, it is unable to
 enter the single curve interface. Please select the appropriate program to
 operate.
2. ***Prompt program logic error***: Program parameter setting requires that the
 temperature of the first stage must be greater than or equal to the starting
 temperature, and the temperature of the second stage must be greater than
 or equal to the first stage. If the parameter is not set in this way, an error will
 be reported.
3. ***Dullness / dull color of denture crystal***: It is caused by low crystallization
 temperature or too short crystallization time. Generally, zirconia ceramic
 blocks begin to transform from square crystal to cubic crystal (crystallization
 starts) from 1300, and the zirconia crystal is incomplete in short
 crystallization time. Performance for the contraction is not in place, the color
 is dim. At this time, it is necessary to increase the crystallization temperature
 or extend the crystallization time.
4. ***Excessive gloss / color whitening of denture***: this phenomenon is mainly

manifested in the fast crystallization of zirconia ceramic block. Because the fast zirconia ceramic block stabilizer is too much.The temperature is too high, or the crystallization time is too long, resulting in the precipitation of glass components, which shows that the denture is too smooth, and the color components volatilize from the block, resulting in the denture color is lighter. At this time, it is necessary to reduce the crystallization temperature or shorten the crystallization time.

5. *Opaque glass ceramics:* The crystallization temperature is too low, or the crystallization time is too short, please refer to the instructions of glass ceramics for details.

6. *Glass ceramic deformation*: The crystallization temperature is too high. Reduce the crystallization temperature.

7. *Glaze without luster:* If the glaze coating is too thin or the maximum temperature is not enough, please spray appropriate thickness or increase the maximum temperature.

8. *The glaze is water like (water mark)*, The coating is too thick or the glaze temperature is too high.

9. *Fracture of denture after sintering*: It is always caused by too fast cooling, so please increase the cooling time appropriately. If it is zirconia crystallization, it is generally suitable to set it to 600 seconds of cool time. If it is glass-ceramic crystallization or glazing, it is suitable to set it to 180 seconds for cool time.

10. *There are blue spots and green spots after denture sintering:* due to metal ion pollution, please clean the denture to be sintered, and ensure that the CNC engine room is cleaned after the metal denture is finished, and ensure that the metal fragments do not stick to the denture to be crystallized. Make sure the cut metal shop is away from the denture . **Green dot**: iron, nickel, cobalt, chromium metal ion pollution; **blue dot:** copper ion, titanium ion pollution; **gold dot:** titanium ion pollution.

目录

一、安全和清洁

1. 结晶炉是专门用来烧结牙齿陶瓷材料的。
2. 设备放置至少距离墙壁 25-30cm，保证烤炉正常的通风，台架要接近电源开关，后部仪表板要连接的牢靠。
3. 不要在易燃物附近操作。
4. 用拧干或微湿的布清洁烤炉的表面。不要在控制面板上用溶剂或者液体清洁剂，保证液体不要流入烤炉。
5. 对于使用或清洁操作不当引起的显示屏损害，不被列入保修范围。
6. 为了达到最佳的工作环境，建议使用专用的电路，插座最好有超载保护器。专用线应该是有可靠的接地线的三相电路。
7. 在进行任何维护之前，一定要从插座上拔掉烤炉的插头。
8. 为避免可能发生的严重烫伤，用适当的工具从烤炉伸入或者移动对象。
9. 不要用钳子或者其它工具操作烤炉，它们可能损坏触摸屏区域的薄膜。
10. 烧结平台是可（上、下）移动的部分。它的往复动作是由程控的。

注意：

11. 操作前请仔细阅读说明书，如果不依照此手册的方法操作烤炉，有可能减少结晶炉的使用寿命。
12. 制造商不承担由于操作失误或者误解操作说明造成的损失。
13. 在想要移动或者装配运输烤炉之前，应当首先降温冷却。
14. 注意设备运行时的高温部位。
15. 仪器基于艺术化的角度出发，根据人体健康安全的原则设计。但是,如果不正确使用仪器，则有危害用户健康或第三方安全的可能性出现。
16. 用户绝对不可私自拆装仪器，即使在系统断电的情况下打开下盖，主电板上还可能有400伏的剩余电压。

厂家对用户私自拆卸设备造成的事故不承担任何责任。

18. 用户对结晶炉的私自拆卸以**易损贴纸是否损毁为准**，因用户私自拆装导致易损贴纸损毁不予保修。

19. 设备没有放置工作台（焙烧台）时绝对不能启动升温。

20. 在连续操作时（在最高工作温度和最长工作时间下），结晶炉外壳局部可能会产生 70℃以上的过热现象。

21. 当系统与主电源相连时勿将手触及炉膛，以防触电及烫伤。

二、结晶炉简介

2.1 PHOENIX系列结晶炉的功能特点：

● 高质量的温度自动调节功能，保证实际温度误差在+/-1.5°以内。

● 操作简便，体型小巧，目前世界体积较小结椅旁晶炉之一。

● 精密步进电机驱动，平滑的自由运作和无抖动。

● 高纯硅碳棒/硅钼棒加热体。

● 双曲线烧结系统，每个焙烧程序前进行温度自动校准。

● 托盘无噪音，速度可编程。

● 快速烧结全解剖形态氧化锆。

● 可以设置预干时间。

● 最大温度可设置到1530摄氏度。

● 快速上釉9分钟执行完毕。

● 最大升温速率200度每分钟。

● 即开即用，不用提前预热。

● 自动快速冷却技术。

● 可最多烧结4-10个修复体（60mm托盘）。

● 真彩色触摸屏，操作简单方便。

● 90条自定义程序和内置程序。

● 状态指示。

2.2 规格介绍：

操作：

升温速度：最大200摄氏度/分钟

最高温度：最大1530摄氏度

最高温度保持时间：最长2小时46分钟

电力：

操作范围：100-120V 50/60HZ　　230V 50/60HZ

电流：14.5安培@110V 7.0安培@230V

功率：最大1300瓦特

典型规格：

体积：WXLXH:27*36*56cm AND 29*22*13.5cm

炉芯平台：6.5cm直径

净重：20Kg（视配件酌情加减1Kg以内）

含包装重量25.5Kg（视配件酌情加减1Kg以内）

2.3 设备清单：

- 1台结晶炉主机
- 1个焙烧底座
- 1条电源线
- 1本操作手册
- 1个电力单元
- 1个冷却架

三 安全标识

3.1 标识

这个标志是警告有电危险，再拆开外壳前需要切断电源连接，即拔下电源插头。

这个标志是警告高温的表面，触摸可能会引起烫伤。

这个标志是警告有可能会发生人身伤害的警示。

这个标志是提示注意有用的信息标志。

四、安装与启动

4.1 安装位置

● 结晶炉应安放在干燥的室内，离墙壁的距离应不少于 25 厘米。

● 当温度低于 15℃时（比如搬运后），应在室温放置下 30 分钟在启动。

● 应注意该设备放置台面的抗热性，该设备释放的热辐射和热效应应均在无损范围内，但也不排除由于设备长期使用而引起的家具表面及贴面的轻微变色。

● 避免阳光直接照射。

● 该系统周围严禁放置易燃物品，不可在无人的情况下单独过夜使用。

● 请勿将可以燃烧的物品放在炉膛辐射范围内。

4.2 结晶炉与主要附件的连接

A、将结晶炉芯从附件中取出备用（必须放置在一个合理安全的地方）

B、将能量单元输出插头插入结晶炉，将能量单元输入插头插在外部插头上。（仅限于220V仪器）

D、打开结晶炉电源开关，打开结晶炉电源开关。

E、待结晶炉启动进入主接口时（当显示温度时），按下向下键，结晶炉烧结平台即向下移动（在结晶炉烧结平台运动的轨迹路线上不要放置任何阻碍物）

F、将焙烧炉芯装配在焙烧托盘上。

4.3 能量单元：

输出电压可控，降低硅碳棒驱动电压，有效延长硅碳棒寿命，使用更低的电压驱动硅碳棒，降低硅碳棒热负荷，使硅碳棒寿命大大延长。必须放置于一个通风干燥的地方。

通过上述操作，结晶炉的硬件安装配置完成。

4.4 结晶炉待机快速入门：

闲置模式：

当结晶炉闲置时，如果用户设定了闲置时间在指定的时间过后工作台将自动回到炉膛内。

闲置温度：

闲置温度是结晶炉在暂不使用时用户希望结晶炉所静止在的温度。

（硅钼棒为加热体时不可以设置闲置温度，否则会损坏加热棒）

声音：

当声音选项被启动时，每次按键按下及程序结束后都会有提示音的产生。

五、结晶炉硬件（及配件）的说明维护

5.1 保险丝

结晶炉的背部有一个系统保险丝,保险丝的型号分别用标签标出，请勿选用不同型号的保险丝。

100/110 伏 **T20H250V**

5.2 排风扇

能量单元后表面装有排风扇。风扇是用来控制温度的，风扇避免了能量单元过热，保证了系统的安全性。出于安全考虑，系统在没有风扇运行的情况下不可启动。在结晶炉工作时，不可遮挡或打开炉膛上盖及后盖。

5.3 零备件

零备件以具体零备件所附带的说明书为准。

六、保修责任

此系列结晶炉公司提供1年保修（**炉膛，加热体，热电偶除外**）有限责任担保期限：质保期从货物运达第一销售商起始。

七、结晶炉的正常使用

7.1 操作面板

7.2 按键名称:

[SPEED/GLAZE] :单曲线烧结界面.可以进行上釉操作

[2STEP/GLAZE]:双曲线烧结界面.可以进行氧化锆结晶和玻璃陶瓷结晶操作。

[STANDARD]:标准程序选择.

[CUSTOM]: 自定义程序选择.

[UP]:托盘上升.

[DOWN]:托盘下降.

[STOP]:在托盘运行时按下反方向按钮即可停止.

[PROGRAM]:程序参数设定界面.

[SET]:其他设置界面.

7.3 显示界面

　　P：01：当前选择的程序号为 01。后面为当前程序的状态显示。

　　TEMPERATURE 27C：结晶炉当前温度为 27℃。

7.4 选择一个当前需要的使用的程序

CHOOSE A PROGRAM

按下【**CUSTOM PROGRAM**】进入程序选择界面，如图：

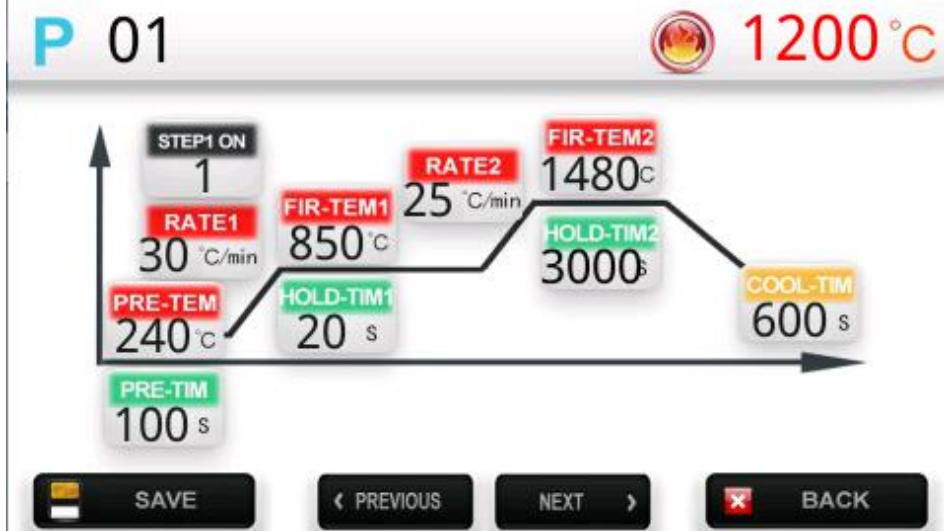　　按下程序数字，会弹出一个软键盘，此时，使用按键 0-9，即可输入一个当前所选择的程序号，当输入完所需的程序号后，按下OK 即完成了当前程序号的选择。在输入的过程中如果输入错误，按下BACK SPACE键即可清除当前错误的数值。

同样也可以使用参数设定界面用"上一页，下一页"来选择程序。
也可以按"STANDARD PROGRAMME"直接调用内置程序。

7.5 为一个程序设置参数

按【PROGRAM-SET】进入到程序参数设置模式。按"上一页,下一页"选择一个程序,最后依次输入 10 个参数后即完成了当前程序的参数设置工作:

输入参数完成后,按【SAVE】保存,按【BACK】放弃保存,返回主界面。

程序参数对应表：

参数提示	对应中文名称	单位
1.1 PRE-TEM	预干温度	℃
1.2 PRE-TIM	预干时间	s
1.3 STEP1 ON	第一个阶段是否使用开关	
1.4 RATE1	第一阶段升温速率	℃/min
1.5 FIR-TEM1	第一阶段最高温度	℃
1.6 HOLD-TIM1	第一阶段最高温度保持时间	S
1.7 RATE2	第二阶段升温速率	℃/min
1.8 FIR-TEM2	第二阶段最高温度	℃
1.9 HOLD-TIM2	第二阶段最高温度保持时间	s
1.10 COOL-TIM	冷却时间	s

STEP1 ON 设置为 0 跳过第一阶段直接运行第二阶段，此程序被定义为一阶段程序，当这个程序被选择时，主界面左上角显示 ONE STEP

STEP1 ON 设置为 1 为双曲线运行程序，这个程序在运行时会先运行第一阶段，然后运行第二阶段，氧化锆快速结晶和玻璃陶瓷结晶时建议使用双曲线程序。当这个程序被选择时，主界面左上角显示 TWO STEP

错误的程序参数提醒：

当您在输入程序参数或其它参数时，当您输入了一个结晶炉无法达到或者在逻辑上是错误的参数时，会自动将此参数修改为上限/下限值。

7.6 系统参数设定与功能界面

按下【SET】进入 系统参数设定与功能界面，如下图：

7.7 系统参数与功能按键名称解释:

[CORRECTION]: 进入温度修正界面。

[IDEL TEM]: 闲置温度界面，闲置温度是结晶炉在暂不使用时用户希望结晶炉所静止在的温度。

[MOTOR SPEED]: 电机速度设置界面，太快或太慢都会导致电机噪声过大。.

[POSITION]: 当程序开始时, 在预干阶段, 托盘会停在两个不同的位置 ,这个设定就是设定两个托盘停止的位置。

[SETTINGS FACTORY]:恢复出厂设置。

[CLEANING]:结晶炉炉膛清洁程序。

[SOUND]: 设定声音打开或者关闭。

[ABOUT]:关于凤凰结晶炉的信息。

[BACK]:返回主界面。

7.8温度校准

TEMPERATURE CORRECTION

200

SAVE   BACK

结晶炉在每次程序开始之前，都会自动校准温度，确保温度在**+-1 摄氏度**之内。

但是当热电偶长时间使用之后，热电偶本身会产生偏差，我们提供手动的校准方式，来修正这个误差。

修正参数以 200 为中心， 增加这个数值时显示的温度会减少，,减少这个温度时显示的温度会增加, 通常这个数值设定为 200 .

按下 **[SAVE]** 保存校准参数。.

按下**[BACK]** 返回主界面。

7.9 闲置温度

IDLE TEMPERATURE

ONLY FOR GLAZE/CRYTALLIZATION
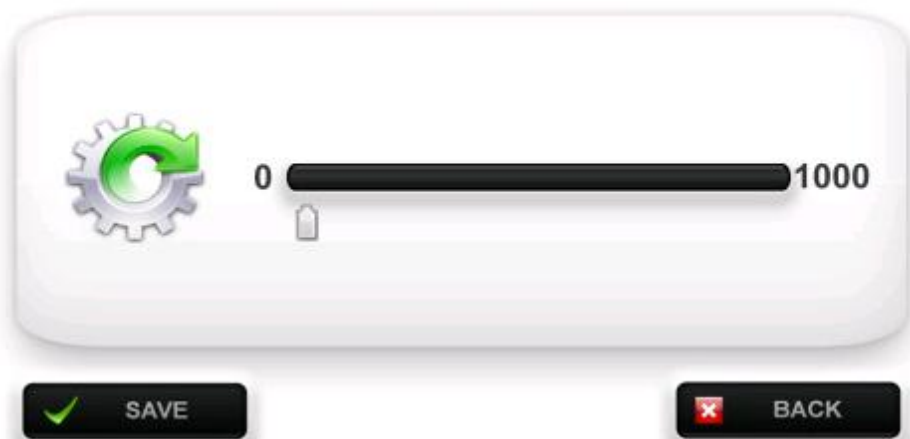
500

SAVE   BACK

闲置温度是结晶炉在暂不使用时用户希望结晶炉所静止在的温度。

⚠️ 在使用硅钼棒作为加热体的结晶炉中，尽可能的把闲置温度设置成0，闲置温度会缩短加热体使用寿命！

按下 **[SAVE]** 保存闲置温度。.

按下 **[BACK]** 返回主界面。

7.10 电机速度设置

MOTO SPEED

0 ———————————————————— 1000

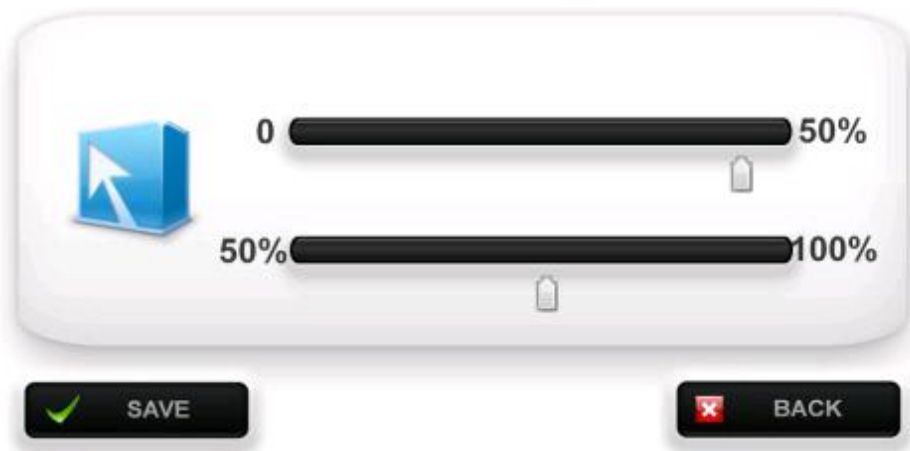✓ SAVE   ✖ BACK

电机速度设置。.

注意，速度过高或过低可能产生一定的噪音。

按下 **[SAVE]** 保存电机速度参数。

按下 **[BACK]** 返回主界面。.

7.11 托盘位置

PALLET POSITION

当程序开始时, 在预干阶段, 托盘会停在两个不同的位置 , 这个设定就是设定两个托盘停止的位置。
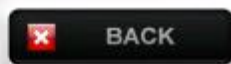
这两个参数对牙齿水汽蒸发非常有用，用户可根据经验来设定这两个值。

按下 **[SAVE]** 保存托盘位置参数。

按下 **[BACK]** 返回主界面。

7.12 恢复出厂设置

FACTORY SETTINGS

START   BACK

按下 **[START]**恢复出厂数据。按

下 **[BACK]** 返回主界面。.

Restore factory settings.
This operation is irreversible.
Do you want to continue?

CONTINUE   CANCEL

当按下**[RESTORE]**会弹出一个窗口询问是否继续，按 **OK** 继续恢复出厂设置.**CANCLE** 终止恢复。

这个操作将会把所有数据恢复到出厂状态。

7.13 清洁模式

FIRE CLEANING

⭐ 500 ℃

TIME: 800 s

✓ START   ✖ BACK

按下 **[START]** 开始清洁结晶炉炉膛。.

按下 **[BACK]** 返回主界面。.

请用户将活性炭置于托盘之上，并且关闭炉膛。

⚠

用户须妥善处理残留的活性炭，随意丢弃可能会发生火灾。

7.14 声音设定

SOUND SETTINGS

Music at the end of sintering:

ON　　　　　　　　**OFF**

✓ SAVE　　　　　　　　✗ BACK

使用滚动条打开或关闭声音。.

按下 **[SAVE]**保存声音状态 .

按下 **[BACK]** 返回主界面。.

7.15 关于结晶炉

包含版本信息和其他信息。

7.16 开始一个烧结程序

　　当系统处于待机状态下时，按下【SPEED/GLAZE】或者【2STEP/GLAZE】进入烧结界面，然后按下【START】即开始了一个烧结程序，所开始的烧结程序即是当前程序号所指向的程序，此时烧结工作台会自动降低到最底端，您可以将要烧结的牙齿放置于焙烧托盘之上，结晶炉会自动完成烧结过程，当烧结过程结束后，结晶炉会自动发出警报声已提示烧结已经完成（如果声音功能被启动）。

7.17 停止一个烧结过程

　　在一个烧结过程进行中，按下【STOP】即停止了一个烧结程序，烧结程序终止后，系统自动回到主界面，温度稳定在闲置温度之上。

7.18 参数显示

所有参数显示在焙烧主界面方便用户观察；并且倒计时功能，能让用户合理安排时间。

八、发现并处理故障

如遇以下故障，请联系售后服务：

● 硬件故障：记忆芯片，实际时间晶片，或者周边元件的自诊断决定性问题，关闭电源重新启动。

● 温度故障：开机后，温度显示过大，或者加热一段时间后温度显示过小。可能由于热电偶的缺陷而导致烘炉过热或过冷。关闭电源重新开机，并且看下面的温度损失控制。

● 输入的程序参数值可能超越程序模式参数。出厂设置为温度数值不可超过1530（输入以℃为单位），真空度不可超过110（％），时间不可超过9999（S），限制温度不可超过1200（℃）。

● 不升温，程序不开始工作，需要更换加热棒。

烧结过程故障以及处理：

1. **提示程序选择错误：** 是因为当前选择的程序与要进入的烧结界面不符，比如当前设定程序为双曲线程序，是无法进入到单曲线界面的。请选择适合的程序进行操作。
2. **提示程序逻辑错误：** 程序参数设置要求第一阶段的温度必须大于等于起始温度，第二阶段的温度必须大于等于第一阶段。如果参数没有这样设置，就会报错。
3. **义齿结晶无光泽/颜色暗淡：** 结晶温度过低或者结晶时间过短造成的，通常氧化锆瓷块从1300开始大规模从平方晶体向立方晶体转化（结晶开始）较短的结晶时间氧化锆结晶不完全。表现为收缩不到位，颜色暗淡。这时需提高结晶温度，或者延长结晶时间。
4. **义齿过分光泽/颜色发白：** 这种现象主要表现在快速结晶氧化锆瓷块上。因为

快速氧化锆稳定剂添加较多，温度过高，或者结晶时间过长，导致稳定剂成分析出，表现为义齿过分光滑，颜色成分从瓷块中挥发出来，导致义齿颜色偏浅，这时需要降低结晶温度或者缩短结晶时间。

5. **玻璃陶瓷不透明：** 结晶温度太低，或者结晶时间太短，具体请参照玻璃陶瓷说明书。

6. **玻璃陶瓷变形：** 结晶温度过高。降低结晶温度。

7. **上釉无光泽：** 釉层喷涂过薄，或者最高温度不够，请喷涂适当的厚度或者增加上釉最高温度。

8. **上釉呈流水状（水痕），** 釉层喷涂太厚或者上釉温度太高。

9. **义齿烧结完成后破裂：** 一般是冷却过快引起的，请适当增加冷却时间，如果是氧化锆结晶一般设置到600秒比较适合，如果是玻璃陶瓷结晶或者上釉，180秒比较适合。

10. **义齿烧结后有蓝点，绿点：** 金属离子污染造成的，请清洁要烧结的义齿，并确保CNC在车完金属义齿后要清洁CNC机舱，**确保**金属碎末不要粘到要结晶的义齿上。**确保**车金车间远离要烧制的义齿。绿点：铁，镍，钴铬金属离子污染；蓝点：铜离子，钛离子污染；金点：钛离子污染。

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