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Zirconia Sintering Furnace

Instruction Manual



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I. Overview

Thank you for purchasing and using our products, ZTCF-30B Zirconia Sintering Furnace using ergonomic design, novel, rational structure. This furnace is manufactured by modern machinery manufacturing and processing equipment with exquisite workmanship and high quality. High temperature furnace pipe using high purity alumina lightweight fiber materials, excellent thermal insulation properties, pollution free. Control interface is large-size high-definition True Color LCD touch screen, good graphic display, easy to operate. Advanced PID intelligent temperature control, high temperature control precision, reliable work.

Please read this instruction manual carefully before using the product.

II. Technical Parameters

Temperature accuracy: ± 1 ℃
Touch Screen Size: 7 "TFT
Rated power: 3KW
Voltage: 220V/50Hz/60Hz
Programs quantity: 40 programs
Number of molybdenum silicon rods: 4
Sensor Type: double platinum and rhodium
Maximum temperature: 1730 ℃
Operating temperature: less than 1650 ℃
Heating rate: ≤40 / min
Hearth size: Ø110mm × 120mm
Dimensions: Length 400 × depth 500 × height 850mm
Weight: 74KG

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III. Packing Configuration Checklist

No.	Product Name	Reference Diagram	Unit	Quantity
1	Zirconia Sintering Furnace		set	1
2	Zirconia Crucible		pair	3
3	Zirconia Beads		bottle	1
4	Furnace Base		piece	1
5	Spare Heating Rod		piece	1
6	Corundum tube		piece	1
7	Corundum tube base		piece	1
8	Instruction Manual		piece	1
9	Air Switch		piece	1
10	Multimeter		piece	1
11	Repair kit		piece	1

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IV. Equipment Structure Description



①: Sintering Furnace ②: the Bottom Tray ③: Touch Screen Control Panel

V. Device Installation

1. Installation hints:

※ Open packing boxes, check if all the equipments are intact, and if the random parts are complete according to the packing list.

※ Place the furnace on the dry, ventilated, dust-free platform, keep a distance from other objects around not less than 25cm, so that the device can work properly under good ventilation and cooling conditions.

※ Should take notice of the device heat resisting property around the furnace, the device will release heat in the surrounding environment, and its calorific value are within the safe range, but does not exclude the heat radiation in long-term use may cause the around device color fading due to close proximity.

※Forbid placing inflammables and explosives around the furnace.

2. Open the furnace upper cover, remove the cushioning foam pad protecting heating rod. Then visually inspect if heating element damaged during transportation, if no damage, fix the screws on the furnace cover. Remove the filler in the chamber.

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3. Pay attention to the power supply logo when install the power cable, be sure not to import non-confirming supply voltage to avoid control system damage. Please turn off the power if not use. The wiring mode please see below:



Note: This device is a large current equipment, with high requirements for the joint processing of power lines. Need compress the end of the power line directly and connect it to the wire holder of the air circuit breaker, and screw the bolt. Ensure to compress the power line end, no loose, otherwise will lead to accident or danger due to the heating caused by too large resistance at the thread juncture.

VI. Power On

A※ Air switch at closed furnace back;

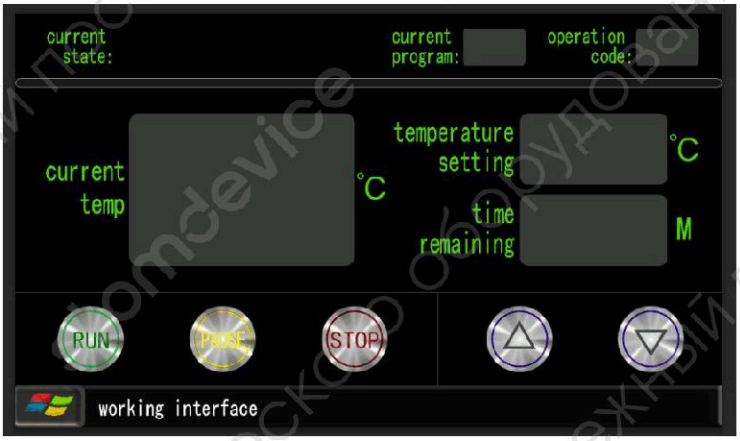


B※ Touch screen displays the initial interface as follows:



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After initialization, enter the main interface:



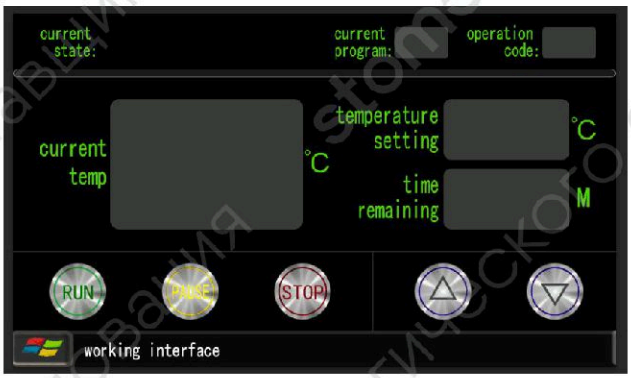
C※ Press button  on touch screen, decrease the lift down to the lowest position, remove the packing cushion from the hearth; and clear the dust particles on the lifting platform with vacuum cleaner.

C ※ Place the furnace base on the working table(don't place any other articles around the lifting tray to avoid hindering the operation when the tray rise and fall causing equipment malfunction). First time use, press the "rise key"  and the "fall key" , observe whether the alignment of the furnace base and hearth bottom, and keep no rub when furnace base in and out of the hearth.

VII. Equipment Operation



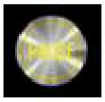
A※ Main interface, ie work interface.
Machine power on, the screen appears initialization interface , after the initialization, automatically enter the main interface, as shown below:



among them:



Program run key. Press this button, the current program will run.



Pause key. Press this key in running state, the program will be in a suspended state, the temperature remains constant.



Stop key. Press this button under operating state or suspended state, the program will end.


Tray rise key. Press this key, the tray will rise, press again, the tray will stop.


Tray fall key. Press the key, the tray will fall, press again, the tray will stop.

Note: When the furnace temperature is above 300 degrees, propose to ban starting hearth, because there is large temperature difference between hearth inside and outside, too much cold shock could cause heaters and furnace insulation materials damage, then press DOWN key, there will be a warning statement appears in the status bar below the screen.


Menu key. Press this button, pull-down menu appears, as shown below:

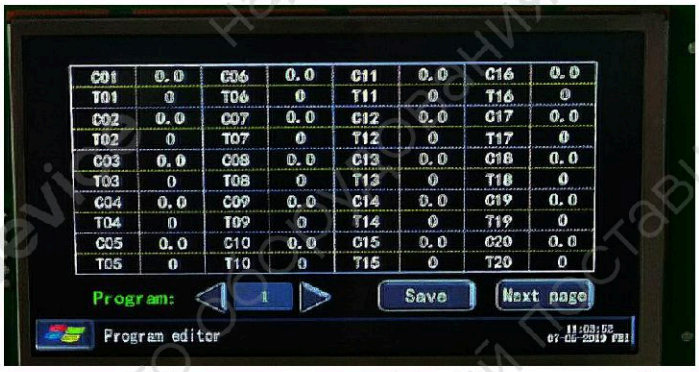


B※ Real-time curve interface, as shown below

C※ Program editing interface, as shown below



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This interface, you can edit the program. Total of 40 groups of programs can be edited and saved by selecting a different program number, each group of program can be edited. Wherein C represents temperature, T represents time. After editing, press “store” key to save.

D ※ parameter setting interface. There are important arguments, we do not recommend frequent changes, incorrect modify of some parameters may cause thermal runaway, and even damage to the machine. Therefore, needs authorized password to modify the parameters.

- Program Setup Instructions

C represents temperature, T represents the time
Note: Temperature 1, time 1 ..... and other parameters can be modified directly by the display position on the touch screen. Temperature 1: used to fill the "starting point temperature value" is usually set to 0 ° C

Time 1: Run time of the first block, setting range: 0 to 9999 minutes;
Temperature 2: End of the first block. Starting temperature is also the start point of the second running stage. If the temperature values C1-> C2 as temperature rising program, typically C2 setting range is recommended as (: C2-C1) / Time1 ≦ 10 ℃ / min.

Time 2: The program running time of the second paragraph, setting range: 0 to 9999 minutes;
Temperature 3: End temperature value for the second running program, it’s also the starting temperature point of the third paragraph running programs, if C2-> C3 for the temperature drop process, usually the setting range of C3 is recommended as: (C2-C3) / Time2 ≦ 30 ℃ / min.

Time 3: Running time of the third paragraph, setting range: 0 to 9999 minutes; other "temperature - time" parameter of temperature ranges is set according to the method described above.
Last time: "-121" indicates the end of program, temperature controller runs

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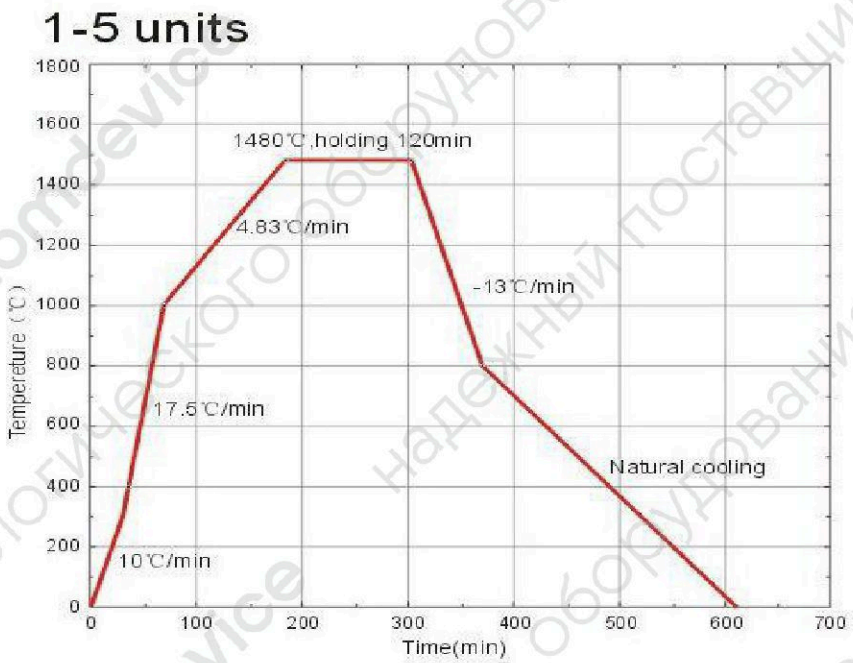
by “Temperature Time" parameter setting, when the program detects a "-121", the control program will be executed "STOP command" to return to the first program segment, -121 corresponds to a single set of sintering curve set well.

- stored sintering curve

No.1 Sintering Curve（1--3unit bridge）			No.2 Sintering Curve（4--5unit bridge）		
temperature segment	temperature	time	temperature segment	temperature	time
1	C1：0	Time1：30	1	C1：0	Time1：30
2	C2：300	Time2：30	2	C2：300	Time2：60
3	C3：1000	Time3：120	3	C3：1000	Time3：180
4	C4：1480	Time4：60	4	C4：1480	Time4：90
5	C5：1480	Time5：60	5	C5：1480	Time5：60
6	C6：800	Time6：-121	6	C6：800	Time6：-121
No.3 Sintering Curve（6—8unit bridge）			No.4 Sintering Curve（9 unit bridge and above）		
temperature segment	temperature	time	temperature segment	temperature	time
1	C1：0	Time1：30	1	C1：0	Time1：30
2	C2：300	Time2：60	2	C2：300	Time2：90
3	C3：1000	Time3：240	3	C3：1000	Time3：360
4	C4：1480	Time4：90	4	C4：1480	Time4：90
5	C5：1480	Time5：90	5	C5：1480	Time5：90
6	C6：800	Time6：-121	6	C6：800	Time6：-121

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Below take zirconium block Ireland record sintering curve as an example:



1.0℃ ~300 ℃ 10℃/min need 30min

2.300℃~1000℃ 17.5℃/min need 40min

3.1000℃~1480℃ 4.83℃/min need 100min

4.1480℃ keep 120min

5.1480℃~800℃ 13℃/min need 52min

6.natural cooling

setting as：

temperature 1: 0℃

time 1:30min

temperature 1: 300℃

time 2:40min

temperature 3: 1000℃

time 3:100min

temperature 4: 1480℃

time 4:120min

temperature 5: 1480℃

time 5:52min

temperature 6: 800℃

time 6：-121

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Notes:

[A] For the first time or after a long time use, need to bake about one hour at 120 ℃, and bake about two hours at 300 ℃, so as to avoid furnace hearth cracking. Furnace temperature shall not exceed the rated temperature, so as not to damage the heating element and the brasque.

[B] After the program finished running, it will automatically come to a standstill state. When the temperature is below 200 ℃, can close the furnace back breaker.

[C] When the equipment is idle, should keep the lift station to the top, to ensure oven cavity be dry.

[D] Although this device design based on human security perspective, but incorrect use of equipment may still cause damage. Do not allow users to modify the equipment without permission. Prohibit placing toxic, hazardous chemical products and high-contaminated items into the cavity, otherwise it may cause harm. Under continuous rising working temperature, furnace surface local temperature may reach above 70 ℃, do not directly touch the furnace with the body surface, so as not to cause harm. Please turn off the power when clean furnace, do not use any cleaning agents and flammable liquids to clean it, wipe it with a damp towel. Do not use sharp objects to click unit control display screen, avoid screen damage and body harm. Regularly use screen cleaner to clean the display unit control, this cleaning agent will not produce any scratches and can prevent the generation of static electricity. For the damage caused by improper operation of using and cleaning the display, it is not included in the warranty. The system is equipped with exhaust fan, which is used to control the temperature of the system to ensure the safety of the system, do not block the furnace cover.

[E](1)The crucible should be placed in the center of the base brick and in the right center place to avoid damage to the chamber in the process of pallet lifting.

(2)Click "Run" and the tray will rise and then the tray will drop, that is normal. Six minutes later, the tray will rise again (the tray will rise to half of its position), and when the temperature reaches 500 degrees Celsius, the tray will rise to complete closure.

(3)After clicking “Run”, please do not touch the screen again to avoid terminating the program manually

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VIII. Heating Element Replacement



A.OPEN THE TOP COVER



B.UNSCREW THE COLLET SCREW THAT NEEDS TO BE REPLACED



C.REMOVE THE CONNECTING ALUMINUM BRAID



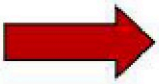
F.REMOVE THE HEATING ELEMENT THAT NEEDS TO BE REPIACED



E.REMOVE THE ALUMINA SPACER



D.REMOVE THE FIXED PORCELAIN CLAMP SCREW



G: replace the new heating rod, invert step E,D,C,B,A: put in the alumina spacer block, screw on the porcelain block fixing clip, cover and tighten the aluminum woven bag, install the cover plate, and complete the change.

Note: the heating rod is fragile, handle it lightly.When the porcelain block is screwed on to fix the clamp, lift 5mm on the silicon molybdenum rod so that the silicon molybdenum rod does not touch the bottom plate in the furnace to prevent the thermal deformation of the heating rod element.In case of any indiscretion, please contact us.

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IX. Maintenance Precautions

[A] Under high temperature firing process, do not open the furnace. Because this is not only dangerous, but also the heating element is easily bending deformation, the furnace is also easy to crack, causing damage.

[B] After firing completed, make sure the furnace temperature is below 300 ℃, if it's above 300 ℃, do not cut off the power supply, thus will cause the cooling fan to stop working, the surface temperature of the furnace may swells, damage furnace body.

[C] For the first time or after a long time not use, should bake the furnace one hour at around 120 ℃ , brake 2 hours at about 300 ℃, so as to avoid furnace cracking. Furnace temperature shall not exceed the rated temperature, so as not to damage the heating element and the brasque. Prohibit directly pouring various liquids and dissolved metal into the furnace, keep furnace clean.

[D] If using silicon-molybdenum rod furnace as heating elements, based on the physical properties of silicon molybdenum rods, very brittle at room temperature, therefore can not freely disassemble and move the furnace after the heating element is installed.

[E] When use the cold stove, because the furnace is cold, should absorb a lot of heat, so the heating rate should not be too fast at low-temperature segment, the heating rate difference of each segment should not too big. Should take full account of the sintered material physical and chemical properties when set the heating rate to avoid the spray material phenomenon and hearth pollution.

[F] Periodically check the connection of the electrical contact portion of the temperature control system is good, special attention should be taken for the connections of heating element connecting point are tight.

[G] Silicon molybdenum rods as heating element, should not run for a long time at temperature ranges 400-700℃, otherwise silicon molybdenum rod will occur low-temperature oxidation.

[H] If silicon carbide rods as heating elements, the resistance will gradually increase after long-time running, this phenomenon is called "aging." Stove after running for some time, the aging of silicon carbide can cause the heating rate and the desired temperature can not reach the original value. If the element is damaged much or resistance growing too large, can not achieve the required temperature, it's better to replace with new element.

[I] The furnace applies to the following operating conditions:

1) ambient temperature between -10~75℃;

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2) the relative humidity of the surrounding environment does not exceed 85%;
3) no conductive dust, explosive gas and corrosive gas which seriously damage the metal and insulated material around the stove;
4) there is no obvious tilt, vibration and bumps.
[J] Users are in compliance with the storage, use, installation and transportation regulations, from the date of delivery within 12monts, unable to work due to product quality problems, our company will provide users with the whole free services(except artificial damage). After the warranty expires, we will continue to make the paid lifetime maintenance according to user's requirements. Heating element belongs to consumable parts, it's beyond the warranty scope.

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Note: Our products must be used in accordance with the instructions for use. We accept no liability for any damage resulting from incorrect handling or usage. The user is furthermore obliged to check the product before use with regard to its suitability for the intended area of applications. We cannot accept any liability if the product is used in conjunction with materials and equipment from other manufacturers that are not compatible or not authorized for use with our product.

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