DUOTROnPRO

- Zirconia Sintering Furnace EX-7100

Operating Instructions



Make sure you carefully read this product manual before using product

Product Warranty is included at the back of this manual

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1. Introduction

Thank you for purchasing EX-7100 Furnace. EX-7100 Furnace is subject to stringent quality control procedures and patiently follows standard procedure. As results of our quality system, EX-7100 Furnace has better performance.
Also, EX-7100 has sturdily and gracefully designed and programmed as user friendly.

This Operators Manual will explain the installation and operation of the oven as well as help you get the most out of your new EX-7100 Furnace. Please read carefully the instructions in this manual for the best user experience.

©Attention

Please ensure that all safety information has been read by the operator before using the oven.

- The Safety information is divided into two sections: Warning and Caution as described below:

Warning

Violations of instructions may cause increased risk of serious injury or death.

Caution

Violations of instructions may cause increased chance of material waste or injuries.

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Warning

1. Do not disassemble, repair or modify any part of the machine without prior approval from an authorized technician. It could be out of warrantee and could cause damage, electric shock or fire.

2. Ensure the oven is properly grounded to prohibit error or electrical hazard.

3. Do not cut or modify the power cord. Do not stretch or bend the power cord that may cause electrical hazard.

4. Keep flammable materials away from the oven at all time.

5. Keep liquid away from the oven and avoid using the oven in damp environment to prevent electrical hazard.

6. Ensure that the power plug is firmly plugged into the proper section. Unstable contact may cause a electric spark and a fire.

7. Always wear heavy thermal insulated gloves when handling units with door open to avoid burns.

8. Always ensure that the oven is completely stopped before working with the oven and only operate the door when the machine is not in a cycle.

9. Do not touch or handing the power plug. It may cause a electric shock or a fire.

10. Carefully use tongs without touching wires when takeout Casting Ring from inside of Furnace.

11. Do not place flammable materials or body inside of Furnace. It may cause a burn or a fire.

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Caution

1 Keep away from Furnace during operation. While running, furnace generates high temperature.

2. Please handle the oven carefully to avoid damage. The furnace contain fragile parts.

3. Do not use in places with a lot of vibration.

4. Please read the manual and understand the instructions before using the oven.

5. Do not leave Furnace with a door open.

6. Keep away from flammable spray or materials from Furnace.

7. Do not install Furnace on place with gradient or rocking table

8. Do not pull a plug out with a strong force.

9. Keep temperature lower than 40 Celsius degree and sweep the dust out.

10. If detecting any defect during the operation, stop using and inquire manufacturer.

11. Use dry cloth and unplug power cords when cleaning Furnace. Do not use any detergent.

12. While operating and right after, do not touch Furnace. Especially, do not touch the upper part of furnace. It may cause a bum ora fire.

13. Keep away flammable materials from Furnace. It may cause a fire.

14. If Furnace is not in use, turn off switch to power off.

15. If Furnace is not in use for long term, pull out power plug.

16. Using Tray only from the manufacturer. If dimension of the tray is different, it could damage or break the Muffle. <Dimension of tray = lower than 095mm x 30mm> *It is not responsibility of manufacturer or seller, if muffle broke or damaged by using wrong size of tray.

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17. If continuously use the Furnace at high temperature, glass materials might lay on the moving insulation and could contaminate materials. To remove contaminated materials, use only vacuum cleaner. Do not use air compressor for health and safety.

18. To remove the tray after sintering, wait till inside temperature of the furnace is lower than 100°C. Higher temperature could damage on the tray and skin.

19. Cleaning Mode : Regularly inspect inside of the furnace. If oxide film on the heating elements are damaged or zirconia materials are contaminated, use Cleaning Mode to clean and prevent contamination. <Caution. Too often use of Cleaning Mode (less than 1 month period) could damage on Muffle/heating elements. If use of Cleaning Mode is getting shorter, contact manufacturer of seiler>

20. Changing insulation : Contact particulate from insulator with the eyes or skin may cause irritation. Long term and inhaling a large quantity of the particulate from insulator may cause respiratory disorders. Try protect skin, eyes and respiratory organs with wearing safety glasses and mask.
<Compliance matters : wear long sleeves clothes, safety glasses, mask and using vacuum machine. After work, wash unprotected skin with fresh water.>

21. Cracks in insulator should occur by a high temperature or a rapidly changing temperature. However, cracks by thermal shock in insulator does not critically affect Firing result. (In case of cracks on Tray insulator may affect on temperature. In that case, need to change tray insulator through manufacturer or local distributor.)

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2. Product Information

(1) Characteristics

► Easy to operate and full set of features
► 7" TFT LCD High quality display
► Touch screen
► 15 custom temperature settings
► Saving sintering time by applying Quick Mode
► Maximum ramp up rate 25°C/min
► Compact size
► Can double stock Tray on Tray for sintering
► Capability of using USB mouse with plug in USB port.

(2) Main Functions

► User defined programs
► Progress graph
► Display remaining time.
► User can fine-tune temperature.
► Easy to upgrade software.
► Use can define On/Off switch for cooling fan

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3. Technical Data

Temperature Sensor

Sensor Type	Thermocouple R-type
Sensor Range	0-1760°C

Main Controller

Voltage	DC5V
Display	7" TFT LCD (Touch screen capability)
Control(RS-232)	1 Ch. : Communicate with I/O Controller
USB	1 Ch. : USB port for updates, connect with USB mouse

I/O Controller

Voltage	DC 12V
Output	2 Ch. : Transformer,, Fan
Input	2 Ch. : Reserved
Control(RS-232)	1 Ch. : Communicate with Main Controller

General Information

Voltage	AC 230V, 50/60 Hz
Max. Current	12A
Dimensions	303mm(W)x 463mm(D)x 718mm(H)
Chamber	095mm x 110mm
Max. temp.	1600°C (For holding time longer than 30 min, 1580°C)
Max. ramp rate	25°C/min
Working Temp.	+2°C- +35°C
Working humidity	Less than 80%
Working altitude	Lower than 3800m
Weigh	50kg

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4. Install

(1) Connect AC Power

This product require AC 230V. Before connect power, ensure voltage.

(2) List of parts

After open a box, ensure there are every listed parts. Also, check any visual damage. If you find any damage or defect, contact a seller.

< List of Parts >

- Furnace housing..... 1pc
- Instruction..... 1pc
- Ceramic tray..... 2pc
- Ceramic lid..... 2pc
- Substructure for tray 1pc
- Zirconia beads (180g)..... 1pc
- POWER CORD..... 1pc

(3) Installation

Avoid sunlight or moist when installing the product. Also, install on a level place. Dust could damage on heating elements, thus, install in clean environment. Place a furnace at least 30 cm apart from the wall and 1.5 m away from the ceiling. If too close to wall or ceiling, may cause a fire and damage on product.

Do not place flammable materials on the top of product. Before use, install a ventilation system above the product to remove harmful gas during sintering.

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5. Appearance and Name

List of parts

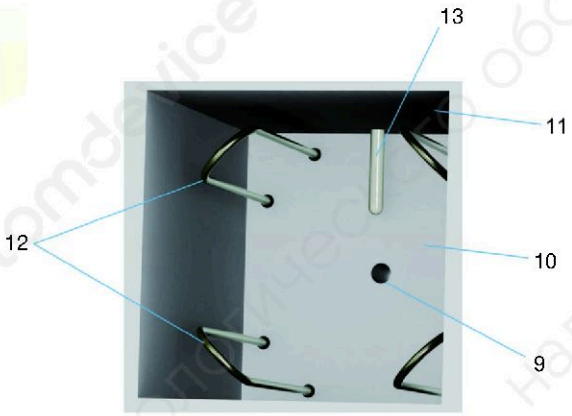
A) Front

1 Furnace housing
2 Sintering Platform
3 Air Ventilation opening
4 USB port for program upgrades
5 Touch Screen Monitor
6 Lower Housing
7 Sintering chamber
8 Oven Backing plate



B) Sintering chamber

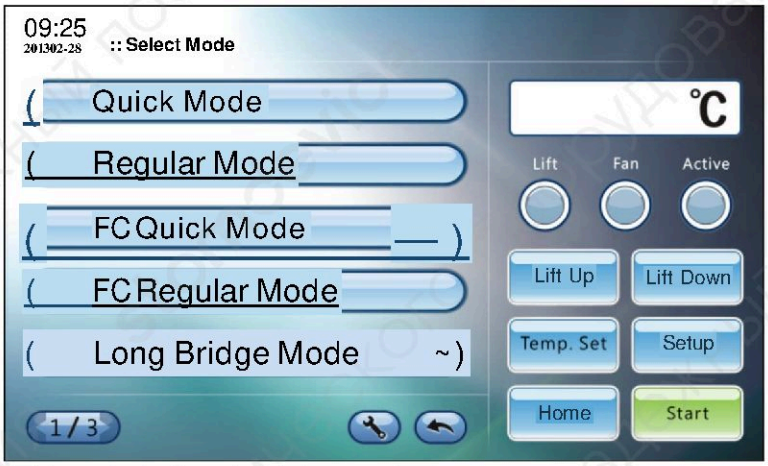
9 Air ventilation opening (top)
10 Insulation (top)
11 Insulation (side)
12 Heating elements
13 Thermocouple



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6. Front Panel Information

(1) Display



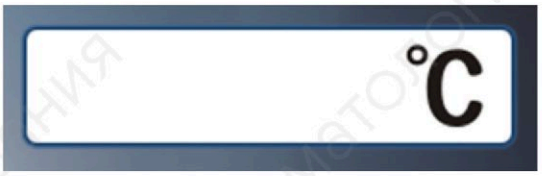
< Information in picture is only for examples>

1) Time and Mode display



◎ Displays current time and date.
(§)(§) Changing time or date : Double clicking time or date window.
Displays the current mode.
Ex) Quick, Regular

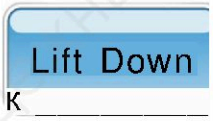
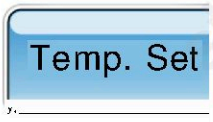
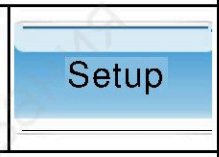
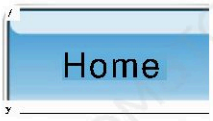
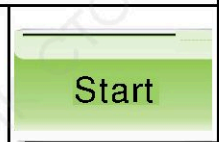
2) Current Temperature Display



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(2) Button Explanation

Button	Description
	Lift move up
	Lift move down
	Set the temperature for selected mode. < Reference-Section 8. Temperature setting, p.15 >
	Setting additional functions <Reference-Section 9. Setup p.17>
	- Goes to main menu - Settings reset
	Starts the current program. If mode is not selected, the oven will not start
	Stops the current program during operation

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Button	Description
	Display close/open for Lift. With check mark, lift closed. Without Lift close, heater can't pull the power and pop up "Limit Switch error!"message.
	Displays Fan status. < Upper Case, Power Trans. Cooling fan>
	Displays if the power is going to the heating elements
	Move between pages. (Total 15 schedules can be saved)
	Change name of the schedule.
	Returns to previous menu
	Display connection of USB drive

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7. Changing Name

ф To change the name of the program, press the tool button ( ) then,

press the mode button (Quick Mode)



(2) Type the name of the new program then press the OK button.

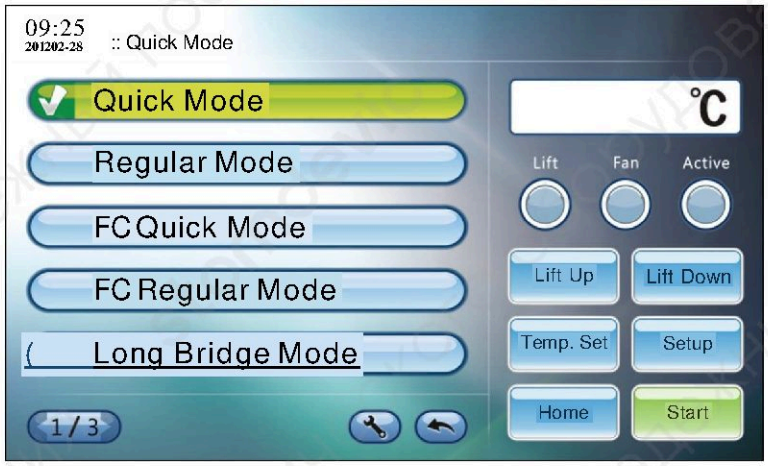


*Change font size : Click this button (20) <This function apply to all letters>

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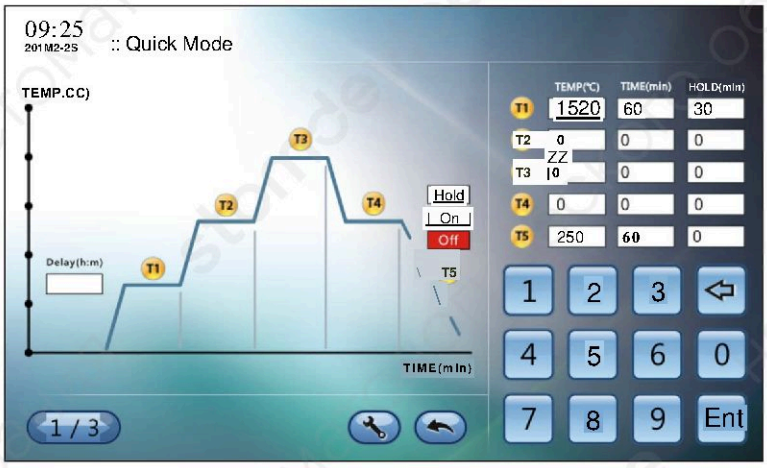
8. Temperature Setting

① Press the mode you want to modify.



② Press the Temp Set button (Temp, set)

③ The display will change to below

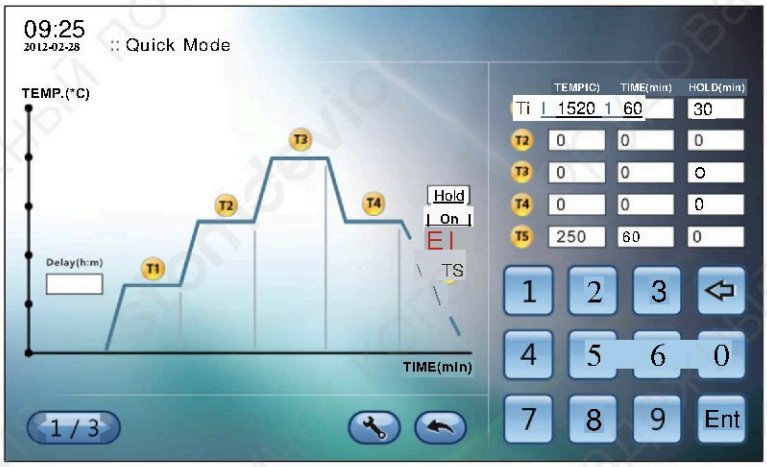


4 Change the Temp, time and hold time to desired settings and then press

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the Enter button (Q).

To move back to the main menu press the back button (( ))



<Detail Information>

- Delay(h:m) : Setting delay starting of sintering time
- TEMP(C) : Setting set point temperature <Max : 1,600 °C>
- TEMP(°C/min) : Temperature ramp rate <Max : 25°C/min >
- HOLD(h:m) : : Setting holding time at given temperature <hour :min >
  <ex 0:02 = 2 min., 0:20 = 20 min., 2:00 = 2 hour, 20:00 = 20 hour >

● Setting T5 when temperature ramp down (Hold / On / Off)

– Select Hold : Keep temperature at T5 after finish program.

– Select On : Ramp up temperature at T5 then start cooling.

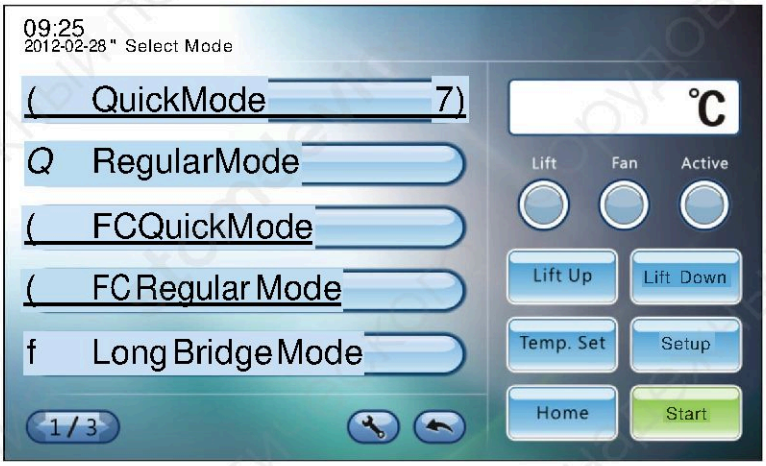
– Select Off : Cooling till temperature at T5 with heater power off.

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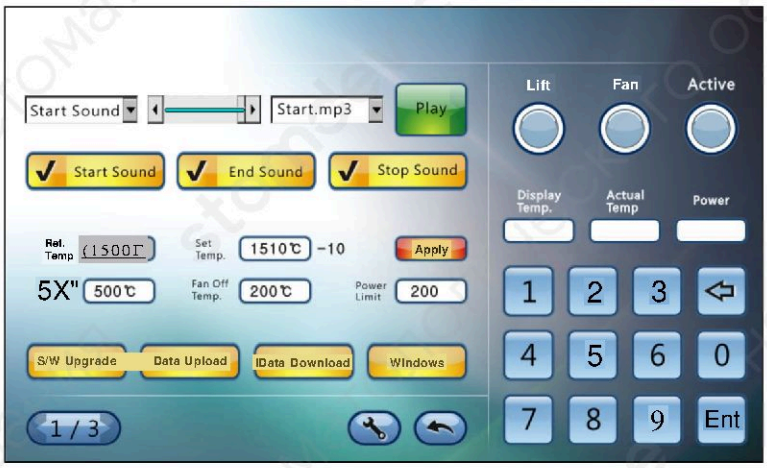
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9. Setup

(1) Press the setup button to enter setup menu (setup).



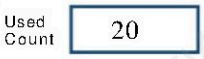
(2) Press the setup to enter the screen below (setup).



Button Description

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Button	Description
	Change the alert sound for Start, End and Stop functions. (DuoTron Pro, sound is low because speaker is internally installed)
	Temperature Fine Tuning. Use caution when changing value as it may affect units.<Before use, contact manufacturer or seller> (Example) 1. For lowering 10°C = Set.Temp. 1510 2. For increasing 10°C=Set.Temp. 1490 < Value after change will display right next to Apply >
	Setting Trans cooling fan working temp.. <Fan On = 200°C, Fan Off = 200°C>
	Counting number of Furnace used
	Perform Software Upgrade
	Upload temperature date for program
	Download temperature date for program
	Exits to Windows CE menu (To restart the program please shut the oven off)

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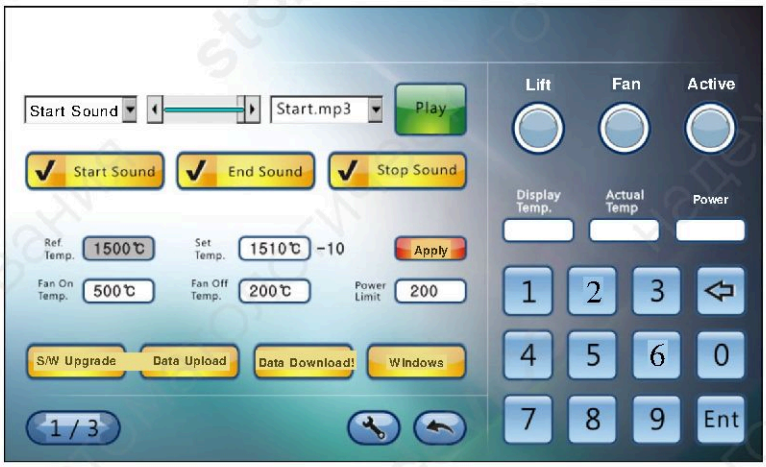
Software Upgrade



Create Run_V folder in USB drive, then copying a file want to upgrade.

Insert USB drive to USB port where right hand side of DuoTron Oven.

3. Click (S/W Upgrade) button will start upgrade and program will restart.



4. Upload and Download are following same steps as well.



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10. User Instruction

1. Drying materials (About 30 min.)



2. Furnace Main S/W, Power S/W On.



(For power on, both S/W lift up)

3. Lift move Down



4. Place empty tray on the bottom



5. Place beads in the tray and place materials for sintering.

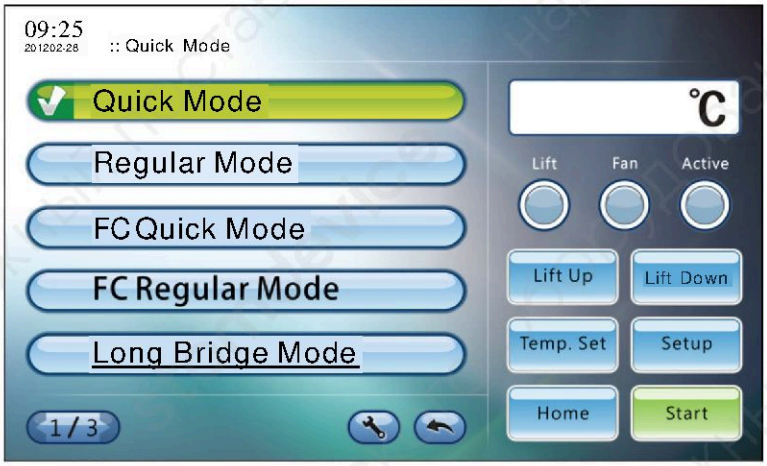


6. Covering lid to prevent contamination.



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7. Select sintering schedule.

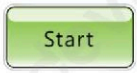


Display G mark on selected schedule.

8. For confirm/change selected sintering schedule, click



< Referrence-P. 15 Changing temp>

9. If ready for sintering, click button. 

10. Finishing sintering. ■Finish' message pop up.

-For Quick Mode, tray will move down rlutomatically.

- All other Mode, tray vill move down w nen inside temperature of the furnace lower than 300 °C.

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11. Sintering Bridge Frameworks

Design method 1:

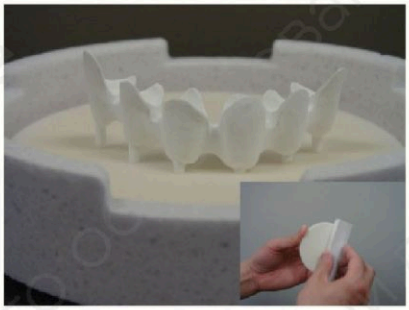
Without sintering pins



Ensure that the entire surface of the substructure is supported by the sintering beads. This avoids deformation. Care should be taken to prevent sintering spheres becoming "jammed" in the connector areas, (for Sirona Cerec, MC-XL users)

Design method 2:

With sintering pins



This method reduces the surface friction and allows the framework to 'slide' on flat pins as it shrinks. Make sure to frequently polish the surface of the round zirconia plate by rubbing it with a grinding stone. This plate is from Katana, Noritake and works well to prevent "deformation" of your framework, (for DelCam and other open CAM software users)

Design method 3:

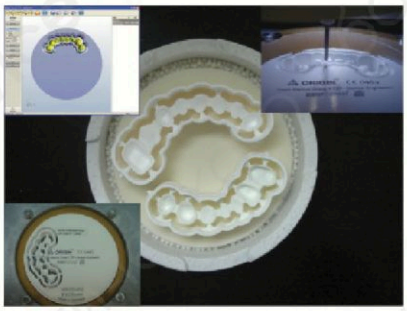
With extra support strut of zirconia



This proven method employed by experienced technicians is especially effective for large unit bridges. The "holding" effect of the extra support of zirconia prevents the warping of large unit bridges with dense pontic areas that shrink comparatively more than the abutments

Design method 4:

Profiling wall from CAM software



This is another proven method for medium to large unit bridges used by outsourcing centers. The surrounding wall automatically designed by CAM software provides for uniform and even shrinkage. It prevents deformation even though there are dense pontic areas that shrink substantially more than the abutment copings. (ORIGIN CAM software users)

12. Troubleshooting

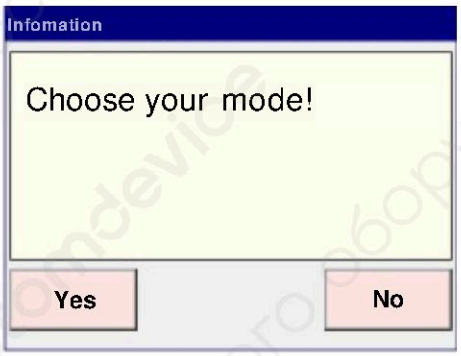
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(1) Messages during programming

И “Choose your mode!”

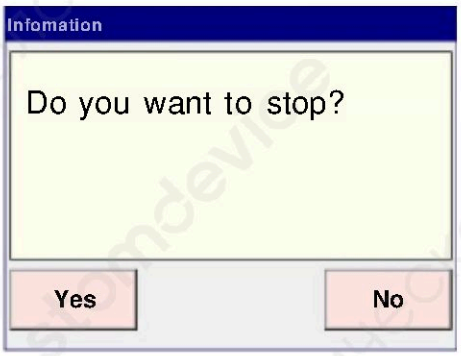
When a mode is not selected when trying to start the program this message will pop up.



☞ - Solution —▶Press the desired mode.

S “Do you want to stop?”

When you press the "Stop" button while the oven is running a cycle this will pop up.



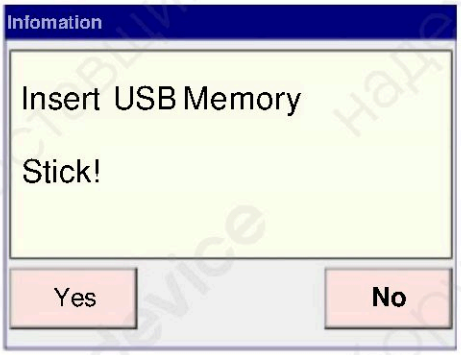
☞Solution —>To stop the program press the yes button, if you want to keep running, press the no button. If there is no action performed for 5 sec. the program will continue.

S “Insert USB Memory Stick!”

Have not insert USB drive or oven does not recognize USB drive.

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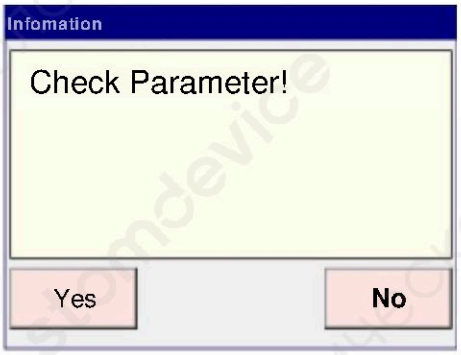
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☞Solution -+After insert USB drive, wait 5 sec. Or use USB drive lower than 4g memory.

E "Check Parameter!"

Input wrong schedule.



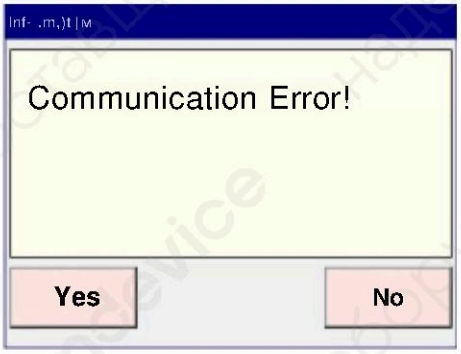
"Solution —> Check sintering schedule. If the problem persists please contact a manufacturer for further troubleshooting.

E "Communication Error!"

If there is no communication between the display controller and I/O controller for more than 10 seconds this message will pop up.

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• Solution —>Restart the oven. If the problem persists please contact a manufacturer for further troubleshooting.

S "Transformer Error!"

When turned off transformer switch, this message will appear.



☞Solution —▶Turn on transformer switch.

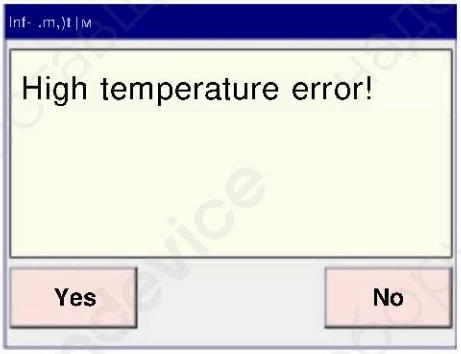
S "High temperature error!"

Inside of the furnace temperature is over 1700 °C or damaged on thermocouple.

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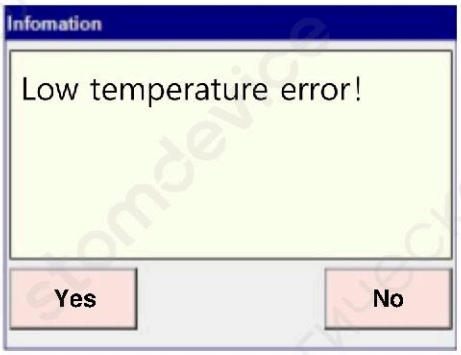
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「 Solution Check temp, setting / Replace thermocouple.

S "Low temperature error!"

Inside temperature of the furnace is not ramping up.



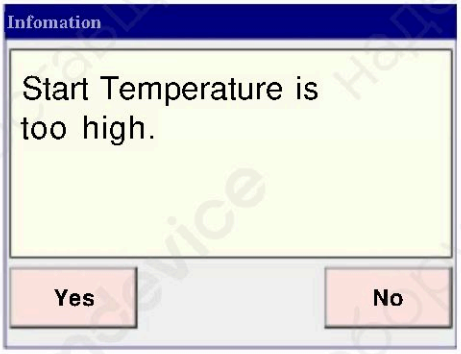
☞Solution Check heating element. For changing heating element, contact manufacturer or seller.

S "Start Temperature is too high."

When inside temperature of the furnace is higher than the first set temperature, this message will appear.

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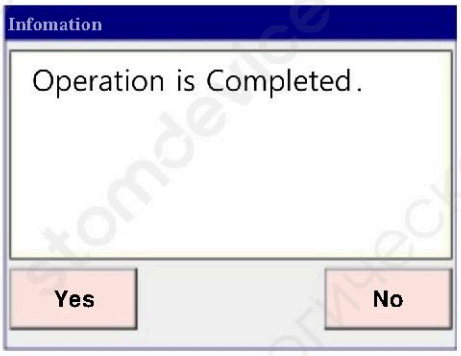
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- Solution —>Wait till inside temperature of the furnace is cool down.

S "Completed."

When the program operation is completed this message pops up.



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13. Warranty

No.	Condition	Within warranty period	After warranty period
1	Within 10 days of purchase, require major repair by defect even though used in normal condition	Exchange or refund	
2	After 1 month of purchase, require major repair by defect even though used in normal condition	Exchange	
3	Manufacturer could not repair for a month from customer request to be fix	Exchange	Exchange + Charge for depreciation in price
4	Same problem occur 3 times	Free Repair	Repair + fee
5	Same problem occur 4 times	Exchange	Repair + fee
6	Within 6 month after repairing with charging fee, same problem occur	Repair without fee or refund repair fee	
7	5 times repaired by troubles in several parts, but detecting trouble again	Exchange	Repair + fee
8	Cannot be repaired although have the spare parts. (Within spare parts holding period)	Exchange	Exchange + Charge for depreciation in price
9	Cannot be repaired by out of parts (Within spare parts holding period)	Exchange	Exchange + Charge for depreciation in price
10	Incident due to operator error	Repair + fee	Repair + fee
11	Lost parts or products by manufacturer	Exchange	Exchange + Charge for depreciation in price
12	Damage in delivery	Exchange (Claim for damages to carrier)	
13	Lost or damaging parts during delivery from customer to manufacturer	Customer fault.	
14	Damage during the install by manufacturer	Exchange	Repair + fee
15	Any other quality issue	Additional progress	

* It is not manufacturer's responsibility that any loss of business while product is not working.

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WARRANTY CARD

To protect benefit of customers and official dears, Addins inc, assure product quality as follow

Warranty is void under these circumstances

- Modification not approved by authorized support technician
- Incident due to operator error
- Sales performed by unauthorized persons
- Oven not operated as outlined in the manual
- Damage caused by external sources such as power outage, fire, act of God, etc.
- Without a warranty

Fill out this warranty card and send to e-mail (addins(8>korea.com) or fax to 031-848-2072.
Without submitting this warranty card, warranty may not be covered.

Customer	Name	
	Phone	
	Address	
Seller	Company	
	Phone	
	Address	
Install date		
Serial No.		Warranty period
Product Name		

Addm ~ 에드인

Warranty Info

1. Warranty Length

Warranty is good for 1 year after purchase for malfunctions due to manufacturer defects

2. Warranty Exclusions

Warranty is void under these circumstances

- Modification not approved by authorized support technician
- Inddent due to operator error
- Sales performed by unauthorized persons
- Oven not operated as outlined in the manual
- Damage caused by external sources such as power outage, fire, act of God, etc.
- Without a warranty

3. Miscellaneous

Sales must be invoiced to be eligible for warranty

4. Caution at use

- Avoid places of sudden and/or drastic temperature changes
- Do not use flammable material for cleaning
- Do not install near high voltage usage or voltage fluctuations
- Avoid heavy shock to the machine
- Do not place oven in direct sunlight or in place with heavy dusts
- Store in dry places
- Do not use in area with vibrations

* For upgrade product, function can be changed without notice. <Updated 05. 20. 2015>

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