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DUOTRORPRO

- Zirconia Sintering Furnace S-600

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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Table of Contents

1. Introduction 3

2. Product Information 7

3. Technical Data 8

4. Install 9

5. Appearance and Name 10

6. Front Panel Information 11

7. Program and Temperature Setting 13

8. Edit Default Setting 15

9. Run 16

10. Sintering Bridge Frameworks 18

11. Pre-Set Sintering Schedules 19

12. Trouble Shooting 22

13. Warranty 23

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1. Introduction

Thank you for purchasing S-600 Furnace. S-600 Furnace is subject to stringent quality control procedures and patiently follows standard procedure. As the results of our quality system, S-600 Furnace has better performance.

Also, S-600 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 S-600 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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Waming

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 an 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 an 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 contains 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 burn or a 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 Ø95 ㎜ x 30 ㎜> ♣It is not responsibility of manufacturer or seller, if muffle broke or damaged by using wrong size of tray.
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.

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19. Cleaning Mode: Regularly inspect inside of the furnace. If oxide films 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 seller>

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 protecting 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 do not critically affect Firing result. (In case of cracks on Tray insulator may effect 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
- Easy-to-use display provides all available information and setting control
- Store 100 different schedules
- Maximum ramp up rate 25°C/min (Under 1100 °C) and 15°C/min (Above 1100 °C)
- Compact Size
- 1 tray only (25-30 units can be placed per tray)

(2) Display Feature

- User defined programs
- Progress indicates with LED lights.
- Display remaining time
- User can fine-tune temperature
- User 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	DC 12V
Display	LED Display

I/O Controller

Voltage	DC 12V
Output	1 Ch. : DC Fan

General Information

Voltage	AC 230V, 50/60 Hz
Fuse	30A / AC250V
Max. current	8A
Dimensions	345 ㎜(W) x 340 ㎜(D) x 370 ㎜(H)
Chamber size	110 ㎜ x 110 ㎜ x 50 ㎜ (h)
Max. temp.	1550°C
Max. ramp rate	25°C/min (Under 1100 °C) and 15°C/min (Above 1100 °C)
Working Temp.	2°C ~ 35°C
Working humidity	Less than 80%
Working altitude	Less than 3800m
Weigh	27kg

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4. Install

(1) Connect AC Power

This furnace requires AC230V and maximum current is 8A. This furnace should be connected directly to over 15A breaker in a panel board. (Do not use extension cords and connecting to other equipment. Insufficient capacity may cause a short circuit and fire.)

(2) List of parts

After open a box, ensure there are all parts. Also, check any visual damage. If you find any damages or defects, contact seller.

- Furnace housing 1pc
- Instruction 1pc
- Ceramic tray 1pc
- Ceramic Plate 2pc
- Cooling Station 1pc
- Zirconia beads (100g) 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.

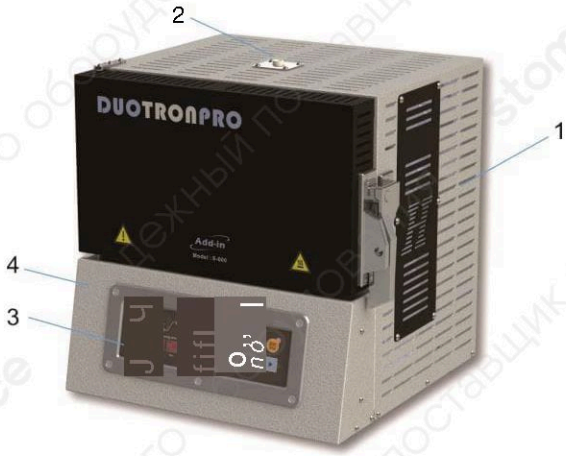
Do not place flammable materials on the top of product. Before use, install a ventilation system above the product to remove harmful gas during sintering.

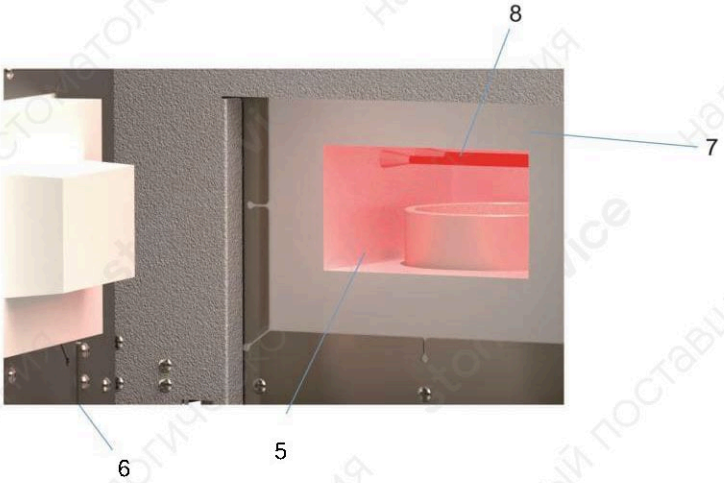
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5. Appearance and Name

List of parts

1. Furnace housing
2. Air Ventilation opening
3. Control Panel
4. Control Housing
5. Sintering chamber
6. Oven Door Plate
7. Insulation
8. Heating elements



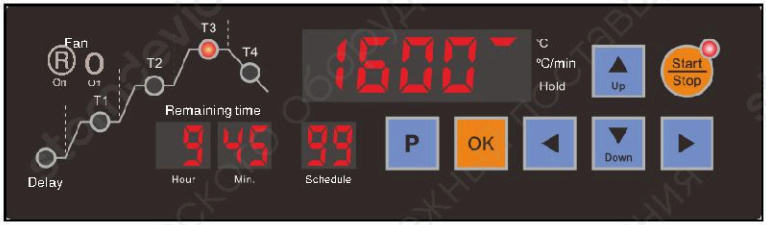


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6. Front Panel Information

Display



<Information in picture is only for examples>

1) Time and Mode display



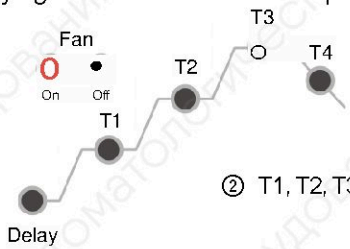
① Displaying the time required for selected sintering schedule

② Changing schedule: Changing schedule with pressing PRG. button

2) Displaying current temperature.



3) Displaying current progress.



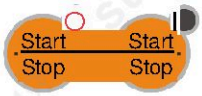
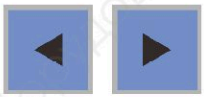
① Fan on : Fan on, Fan off : Fan off.

② T1, T2, T3, T4 : Light on to display current progress.

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(2) Function Buttons

Buttons	Description
	Start Program button Click Once : Selected Schedule Start During schedule is running, click this button will stop schedule
	Display LED 1. Light Blinking : Stand-by 2. Light On : Program (Schedule) is running 3. Light Off : Program (Schedule) is stopped or off
	Program Button - Change and Select programs with adjust arrow button () - Select and change next setting values at selected program During program (Schedule) is running, Program Button will display setting values of selected program.
	Select and Save Program Button To go User Set Mode - Click OK button six times at Stand-by
	Up Arrow Button Change numbers
	Down Arrow Button Change numbers
	Left/Right Arrow Button Change selected digit

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7. Program and Temperature Setting

(1) Change Program

Click P → Use (Up , Down) →Select Schedule 99 Schedule

→ Ok

(2) Run Selected Program (Schedule)

Click Start/Stop (Before start, check LED light is blinking)

Click Start/Stop will LED light on and program(Schedule) start.

(3) Edit Program settings

① Select program which need to be edit

② Click P (P button will move to next settings)

③ After finishing edit, click Ok will save changed data.

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(4) Program Setting Information Display ➔ Remaining time displaying window

Setting	Display	Description
T1 Temp.	t1 1	T1 temp
T1 Ramp Up	t1 2	Ramp up rate till T1 (°C/min)
T1 Staying	t1 3	Staying time at T1 temp. (00.00 hour)
T2 Temp.	t2 1	T2 temp. (0000 ➔ not use)
T2 Ramp Up	t2 2	Ramp up rate till T2 (°C/min) (0000 ➔ Not use)
T2 Staying	t2 3	Staying time at T2 temp. (hour) (00.00 ➔ Not use)
T3 Temp.	t3 1	T3 temp. (0000 ➔ not use)
T3 Ramp Up	t3 2	Ramp up rate till T3 (°C/min) (0000 ➔ Not use)
T3 Staying	t3 3	Staying time at T3 temp. (hour) (00.00 ➔ Not use)
T4 Co	t4 Co	Cooling rate (°C/min)
Fan ON	S on	Cooling fan ON temp. (Do not change value unless under instruction by manufacturer)
Fan Off	S of	Cooling fan Off temp. (Do not change value unless under instruction by manufacturer)

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8. Edit Default Setting

(1) Enter Default Setting

Ok Click 6 times

(2) Edit Setting Values

① P (Allow to move next setting values)

② (Up , Down) → Change setting values

③ Ok : Save and Exit.

(3) Setting Value Information Display ➔ Remaining time displaying window

Values	Display	Default	Description
N/A	US Er 0	0	n/a
N/A	US Er 1	0	n/a
Door S/W	US Er 2	1	Door Switch (0: Not use, 1:Use)
Output Test	US Er 3	0	0:Off , 1:Relay #1 On, 2:Relay #2 On, 3: 4:
N/A	US Er 4	0	n/a
Buzzer Volume	US Er 5	100	1 ~ 100 Buzzer volume, 0 Mute
Button Sound	US Er 6	1	0 : Off / 1 : On
Run Count	US Er 7		Display schedule running count
Schedule Factory Reset	US Er 98	0	Temp. display (8888) → P button→ ▲ button
Device Factory Reset	US Er 99	0	Temp. display (8888) → P button → ▲ button

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9. Run

1. Drying materials (About 30 min.)



2. Furnace Main S/W on



3. Open the door



Push handle counter clack wise to open door

4. Place restorations on the zirconia beads in Tray.



5. Place Plate in the center of the chamber (marked area)



6.Place Tray in the chamber



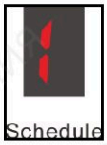
7. Covered tray with lid (recommand)



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8. Select sintering schedule. 9. Confirm temperature and adjust if it is necessary







. < Refer page 15 to set temperature>

10. Ready to sinter ->Start sintering 11. Finish sintering





12. Remove tray after finishing sintering





<Caution>

① Do not place hot tray in front of the furnace. May cause controller damage.

② Place hot tray sides of the furnace.

③ Open the door when temperature is lower than 100 °C. May cause burn skins and fire.

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10. 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)

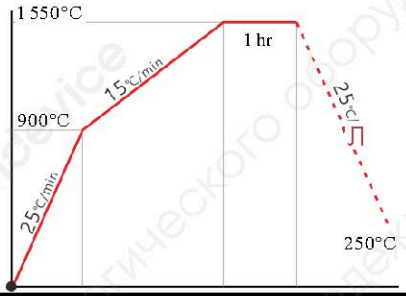
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11. Pre-Set 10 Sintering Schedules

Schedule : 0 (Cleaning Mode)

Max. temp : 1550°C

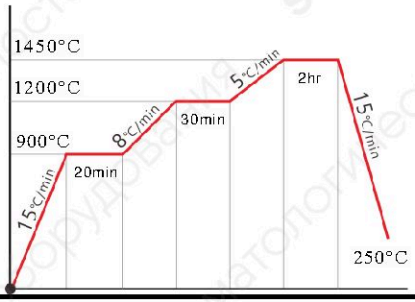
Total hours : 3hr 10min



Schedule : 1

Max. temp : 1450°C

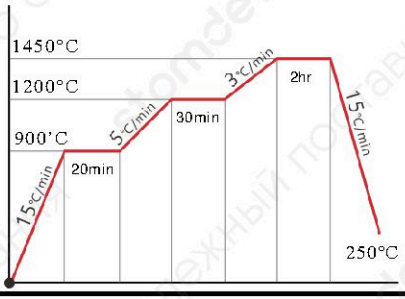
Total hours: 6hr 30min



Schedule: 2

Max. temp : 1450°C

Total hours: 7hr 20min

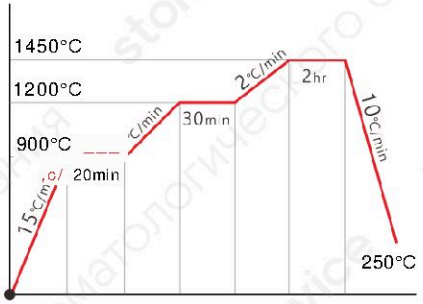


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Schedule: 3

Max. temp : 1450°C

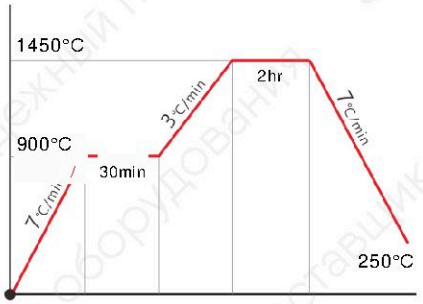
Total hours: 9hr 20min



Schedule: 4

Max. temp : 1450°C

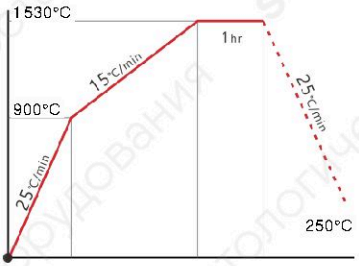
Total hours: 10hr 30min



Schedule : 5

Max. temp : 1530°C

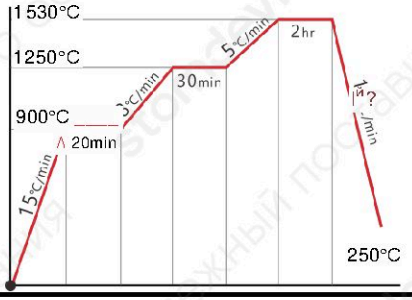
Total hours: 3hr 08min



Schedule : 6

Max. temp : 1530°C

Total hours: 6hr 50min



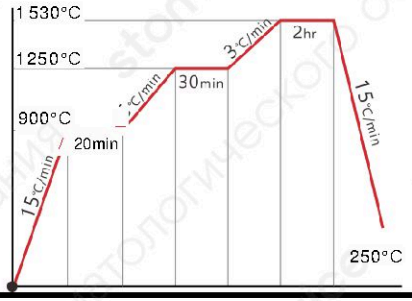
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Schedule : 7

Max. temp : 1530℃

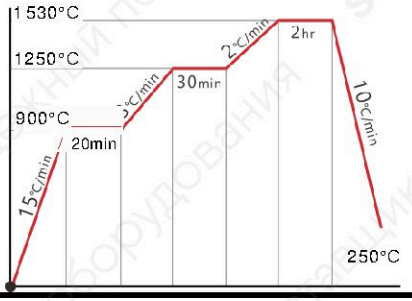
Total hours: 7hr 50min



Schedule : 8

Max. temp : 1530℃

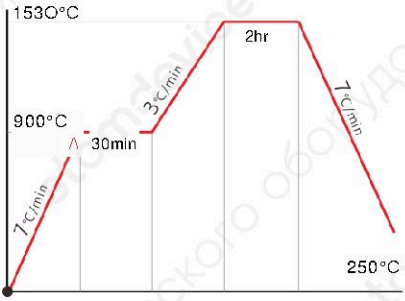
Total hours: 10hr 10min



Schedule : 9

Max. temp : 1530℃

Total hours: 11hr



※ Prog. No. : 10~ Prog. No. : 99, User can modify schedules

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12. Trouble Shooting

(1) Possible error messages and trouble shooting

Error	Error description	Trouble Shooting
door	Furnace door is opened or Door Switch error	Close the door and check the switch
ProG	Program setting value error	Check setting values.
Err01	Disconnected the sensor	Replace the sensor
Err02	Board or control IC is damaged	Inspection control PCB
Err03	Heating elements damaged	Replace heating elements
Err04	Incoming an electric noise, short sensor or no heat or	Use other wall outlet or place the furnace another room. Inspection control PCB sensor part and check heating element

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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	Exchange parts
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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Memo

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Memo

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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 toe .mail (addins@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		

Add-in 주식회사 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
- 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

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 2020.09.05>

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DUOTROnPRO

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