

Front loading Electric Kiln with Controller

DFA-200 • 300 • 500

INSTRUCTION MANUAL

Please make sure to read the entire instruction manual thoroughly before initial set-up, operation, maintenance and inspection to ensure proper use.

Please keep this instruction manual in a location that is always available to the user.

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Safety Precautions

Please be sure to closely follow all safety precautions and warnings.

Please be sure to read the entire instruction manual thoroughly before initial set-up, operation, maintenance and inspection and use.

Please start using only after you have read the equipment's function, safety information and precautions.

This instruction manual provides three grades of safety warnings: "Danger", "Warning" and "Caution". All precautions described hereunder which concern to the safety are to be read carefully. Please be sure to follow them.



Danger marking indicates possible death, severe injury or fire if the user disregards the instruction.



Warning marking indicates the possibility of severe injury if the user does not follow the instruction.



Caution marking indicates the possibility of minor injury or damage if the user operates the pug mill improperly. However, depending on the circumstances, it is still possible to cause severe injury. Please make sure to pay close attention to these warnings.

We call your attention to these warnings throughout the manual using the following symbols:



Warning; Pay Close Attention



Do Not



Please Follow Instructions

⚠ DANGER



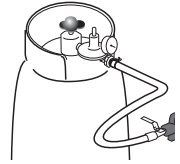
Be careful of high temperature!!

Surface and inside of kiln are subject to high temperature created by the electric heating elements. Please be careful of burns or injury.



Be careful of handling Gas

Please be sure to check if it leaks gas or not since explosion may occur.



Do not use the kiln other than for firing pottery.

Please do not use this product other than for firing pottery. This may cause serious accidents as fire, explosion or generation of harmful gases.



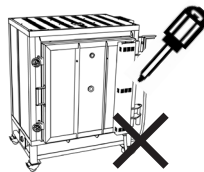
Stop using if you see smoke, smell fumes or hear unusual noises.

Please switch the power (breaker) off and contact us or our distributor.



Do not disassemble, repair or modify the kiln by yourself.

Electric shock, fire, explosion or injury could occur. Please be sure to follow the instruction manual for maintenance and for replacing the heating elements.



Do not put objects on the kiln or ride on the top of the kiln or the control box.

This may cause a fire or change in the shape of the kiln. Burn injury could occur or kiln may fall down if you ride on the top of kiln or control box.



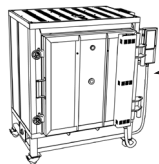
Connect earth wire (Ground wire).

Please be sure to connect earth wire to prevent electric shock.

Please do not connect earth wire to the following parts:

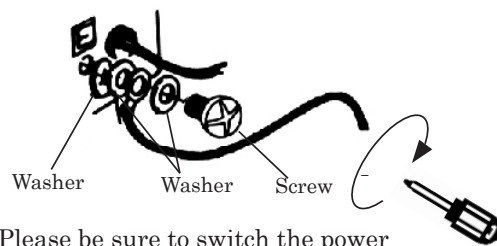
- *Water pipe
- *Gas pipe

(Electrical flash or explosion could occur.)



Please connect earth wire into the earth terminal of the front of the main body.

*Please connect earth wire after trial operation (dry operation).
(Please do not earth during trial operation.)



*Please be sure to switch the power (breaker) off when you touch the earth wire.

⚠ WARNING



Be careful when handling the side door!

Pay attention not to catch fingers when opening and closing since it is heavy. Excessive burden (For example, leaning over or hanging down from the top cover) may cause contingent accident due to falling of kilns.



Do not put any metal objects, foreign substances, or fingers into the vent holes or other openings in the kiln.

This may cause electric shock or burn injury.

 **CAUTIONS**



Be careful not to touch the outside surfaces of the kiln when opening or closing the side door.

This may cause damage to the kiln or injury.



Do not place kiln near a TV, radio, or antenna wire.

This may cause disturbances to the TV image and audio signals. Please keep a distance of 2 meters or more from these devices.



Prepare a safe operating environment.

Please be careful not to hit your head against the door, lid or kiln wall when placing pottery in the kiln or taking pottery out of the kiln.



Repair damages to bricks and insulating material immediately.

Damages to bricks or heat insulating materials affects the safety and performance of the kiln. Please consult our distributor. However, cracks on the surface due to use have no effect on the operation of the kiln.

Power supply These are safety precautions regarding the electrical components of the kiln.

 **DANGER**



Be sure to switch the power (breaker) off when opening the side door.

Electric shock could occur if you touch the heating elements without switching the power off.



Be sure to ask a qualified electrician to perform work pertaining to the electrical components of the kiln.

A qualified electrician is required for performing any electrical work on the kiln. Please be sure to use only a qualified electrician for electrical work on the kiln.



Do not operate any switches with wet hands.

This may cause an electrical shock if you operate switches or plug/unplug the power cord into the power outlet.



Do not insert hands into or touch electrical parts.

Electric shock could occur.

 **WARNING**



Turn the power off if you will not be using the kiln for an extended period of time.

This may cause electric shock or fire due to insulating degradation.



Keep the power cable free from the bottom of kiln or high-temperature surface.

It may cause a fire due to an electrical shock or electrical short.



Keep the power cable free from stress and obstructions.

Please do not twist, pull, put heavy objects on, or insert the power cable forcedly. It may cause a fire or electrical shock due to the damaged power cord.

Installation These are safety precautions regarding the installation of the kiln.

⚠ DANGER



Set up in a location which has enough space.

It may cause a fire or other accidents if an object is in touch with the top or side of the kiln.



Do not put flammable materials near the kiln.

Please do not put flammable materials such as curtains, paint, etc. within 1 meter of the kiln. It may cause a fire.



Do not set gas burner in an unstable location. Do not set gas hose in a transit space.

Gas burner may fall down and cause accident.



Be sure to ask a qualified electrician to perform piping work of gas.

It may cause a fire or gas leakage.



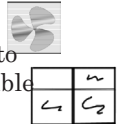
Set up in a location that is out of reach of children.

Please pay attention to this product strictly since it may cause fire, burn or serious accident if you operate incorrectly.



Set up in a location that is properly vented.

It may cause a fire. Please open a window a few centimeters for to allow fresh air into the room and use a portable fan for additional air circulation if required.



⚠ WARNING



Do not set in a location which is susceptible to rain and water or an area of high moisture.

This may cause a fire or failure from electrical shock or electrical leakage. Please set in a location which is dry and not susceptible to rain to prevent electrical shorts.



Do not set under the fire-alarm box or sprinkler.

It may cause improper operation due to the heat from kiln.



Keep sufficient space between the kiln and nearby walls.

Be sure to place the kiln on a nonflammable floor surface. Do not set up on flammable material such as carpet. It may cause a fire due to heat unless you keep at least 15cm or more from wall. Please use nonflammable material for floor or protect with heat insulating board or slate.



Be careful of strength of the floor in set-up location.

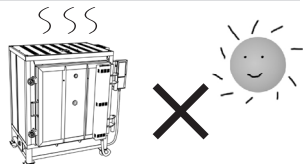
Since this product is heavy, floor material may be damaged or kiln may fall.

⚠ CAUTION



Do not use in a place which is susceptible to direct sunlight.

It may cause trouble due to the overheating.



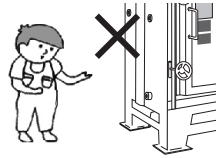
Firing These are safety precautions regarding with firing.

⚠ DANGER



Do not touch kiln due to high temperature.

It may cause burn injury if you touch kiln due to high temperature of the outside of kiln. Especially, be careful not to bring children close to kiln.



Never let unattended children use kiln, or set kiln in a location which children can reach.

It may cause burn injury, electrical shock or injury. Please set up barrier not to let children close to kiln since the temperature of the kiln surface becomes high during firing.



Do not touch heating elements.

It may cause an electrical shock or burn injury. It may also cause breaking of the element.



Do not do the reduction baking.

This product is for the oxidized fire. Do not do the reduction baking.

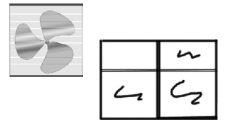


Be careful of burn injury when checking color or removing gas.

Please be careful not to get burned since the temperature of the surface and inside the furnace of kiln is high.



Ventilation



Please ventilate fully since gases that are harmful to the human body could occur depending on the variation of glaze or clay that is used.



Do not bring your face close to kiln. Do not look straight into kiln.

Please do not look straight into the inside of kiln or bring your face close to holes of kiln. It may cause accidents such as burn injury since hot air or flame comes out from holes. Please do not look straight into the kiln.



When using a kiln with a gas burner, be careful and be sure that the burner flame does not extinguish.

Explosion or serious accident could occur due to the collection of gas inside the kiln if the fire of gas burner goes out.



Do not pour water on the kiln during firing.

Explosion could occur due to the sudden drop in the temperature.



Do not open the side door unless the temperature has become normal.

It may cause burn injury due to heated air unless it drops down to normal temperature (under 40°C) inside furnace.

⚠ WARNING



Do not put laundry near the kiln. Do not hang up cloths near the kiln.

These may catch on fire.



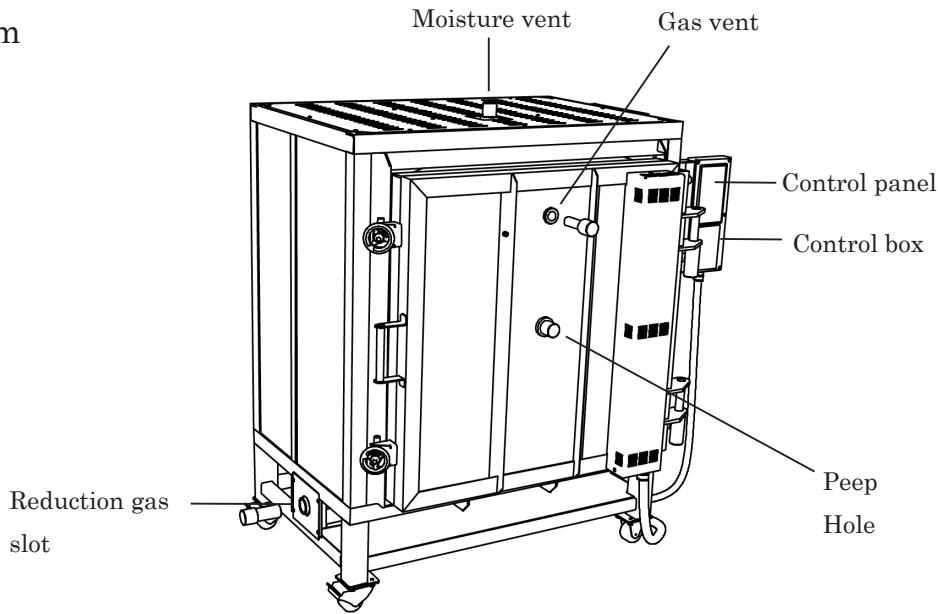
Be sure to secure the door with handle when you close it.

It may cause burn injury if the door opens by itself.



Do not strike the heating elements or insulating material with pottery or kiln shelving.

1 Kiln Diagram



2 Specifications

Model	DFA – 200	DFA – 300	DFA – 500
Inside volume(L)	200	300	500
Outside dimension (mm)	W:1120 x D:900 x H:1390	W:1350 x D:930 x H:1390	W:1450 x D:930 x H:1740
Inside dimension (mm)	W:570 x D:500 x H:700	W:800 x D:530 x H:700	W:900 x D:530 x H:1050
Shelf size (pcs/column)	450x400(1pc)	450x350(2pcs)	450x400(1pc)
Electric capacity	15kW	19kW	27kW
Power source	3φ380 V		
Max temperature	1300°C		
Insulation architecture	Insulating bricks + Insulating board / Thickness of wall 140mm		
Heating elements	Coil shape heater		
Controller	Kiln controller "MYC-5"		
Thermo couple	Type R		
Attachments			
Gas vent plug	2 pcs		4 pcs
Moisture vent plug	1 pc		2pcs
Peep hole plug		1 pc	
Gas slot plug		1 pc	

To Electricians

1 Electric works

Please consider the specification of kiln and circumstances of the set-up location, and undertake construction following all regulations.

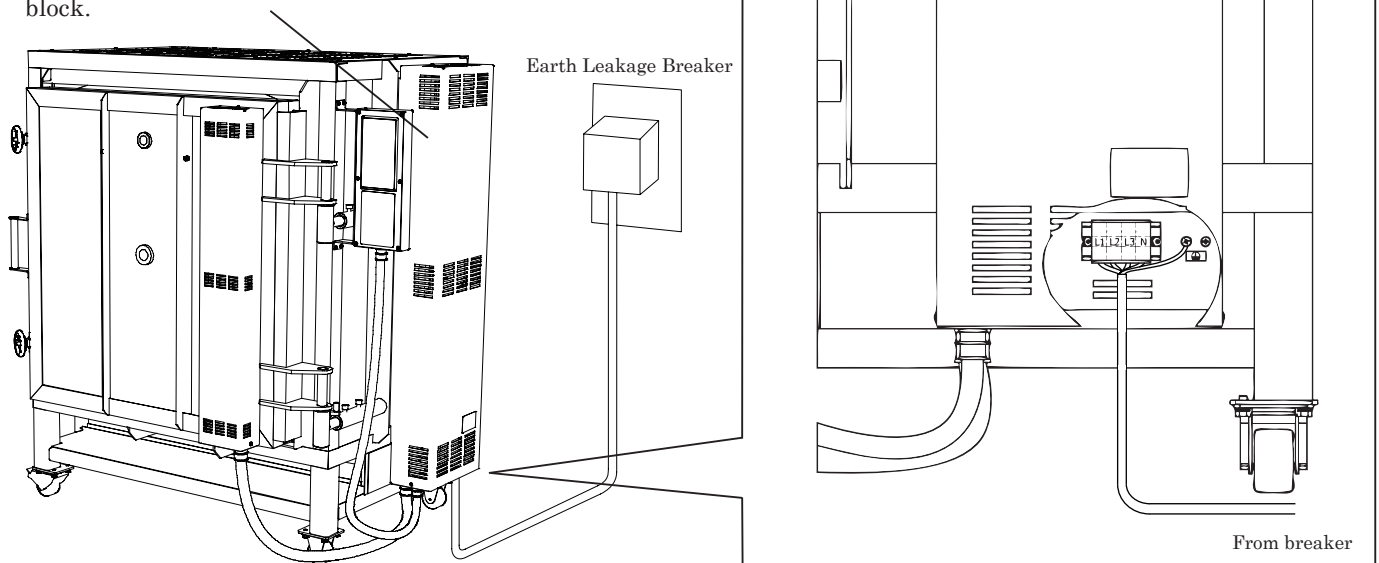


DANGER

Ask professional electrician to perform all electrical work.

1. Connection to power supply

Please open the side cover of control box and connect power cord to the terminal block.



《About short circuit sensitive power current》

1. Please use high-speed short circuit breaker which sensitive power current is 200mA. (100/200/500 switching)
2. Please confirm if the earth resistance is under 250 (125 for the location susceptible to water.) in case of using 200mA short circuit breaker.

《About earth wire》

1. Trial operation (Dry operation) is necessary for moisture-absorption characteristics of brick. Please undertake construction to be able to suspend the earth connection during trial operation since it may cause earth leakage. Please insulate by plastics pipe in case of connecting by metal pipe.

《Reference》 Size of breaker/wire

Model	Electric capacity [kW]	Power source	Voltage [V]	Rated current [A]	Earth leakage breaker		Cable size
					Rating capacity [AT]	detection range [mA]	
DFA-200	15	Three phase	380	23	30	200	STO/TC(CE) AWG 8 - 4C,E2.0
DFA-300	19			29	40		STO/TC(CE) AWG 6 - 4C,E2.0
DFA-500	27			44	50		STO/TC(CE) AWG 4 - 4C,E2.0

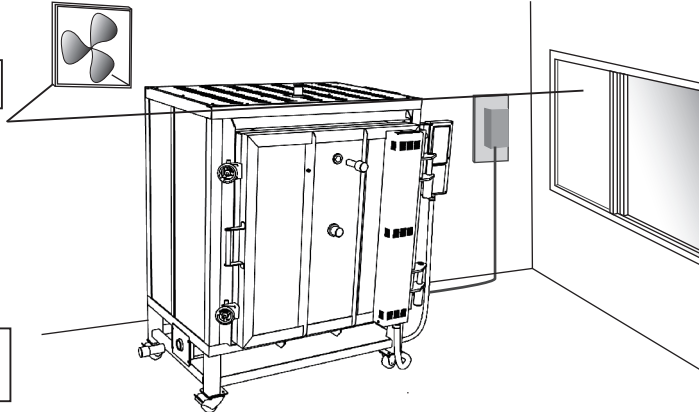
2 Installation

1. Installation

(1) For indoor

[1] Ventilate well.

An odor may occur from the pottery or kiln during firing since the temperature of the kiln surface becomes high. Please set up a fan for air circulation and ventilate the area well.



[2] Do not put objects around the kiln.

Please do not put objects within 15cm around the kiln for safety. Please keep 50cm or more from walls.

[3] Insulate.

Please place rubber pads under the legs of kiln for protection to floor. (DFA-500 only)

[4] Use heat resistant floors and walls.

Please place kiln on a floor and near walls that are made of heat resistant material such as concrete or other such material.

[5] Set up kiln on a flat floor.

[6] Please fix the caster to ground firmly.

Please fix the caster to ground firmly so that the kiln should not move while baking it. (DFA-200/300 only)

※ The caster doesn't attach to DFA-500.

(2) For outdoor

Please set up kiln on a solid flat floor in a location that is not susceptible to rain or water.



WARNING

Do not set kiln in a location that is susceptible to rain and water.



WARNING

Do not set under the fire-alarm box or sprinkler.



WARNING

Do not set fluorescent light on the top of kiln.



CAUTION

Do not set in a location which is susceptible to direct sun light.

2. Set up of Timer

You can set current time and change it.
Please set current time in advance since it is necessary for set-up of timer.

P.20
Set up of Timer

[1] How to set time

⋮ shows flashing.

Operating procedure		Display panel
(1) Push Clock for more than 5 seconds.	Clock	
(2) Input current time. Example)	 Ejemplo 13:34	 For example 13:34
(3) Push Clock	Clock	 The indicator turns back to show temperature after displaying time for 5 seconds.

* If you do not operate any keys for 10 seconds, the display turns back to show the kiln temperature. Please operate from the beginning of operating procedure.

Time shows 24 hours a day. Please be careful.

Before noon 7:00
→

Afternoon 7:00
→

When you input incorrectly, please push 「0」 for 4 times in a row. Then you can start from the beginning of operating procedure.



[2] Display of time

Control panel usually shows the temperature inside of furnace.
When you want to confirm the current time, you can do as following procedure.

Operating procedure		Display panel
(1) Push Clock	Clock	

3 Trial operation 《Time required: About 5 hours》

- *When you do firing for the first time or haven't used for a long time, or in the rainy season, trial operation (dry operation) is necessary for moisture inside furnace.
- *Please cool the kiln off after trial operation once and use.
Please do bisque firing first and then do glaze firing.

Please check the following points before trial operation (dry operation).

- *Is ventilation enough?
- *Aren't flammable objects near the kiln?
- *Is attached rubber board matted under the kiln?
- *Disconnect earth wire.
- *Take the gas venting tap and the moisture venting tap off.
- *Check if thermocouples are inserted correctly.

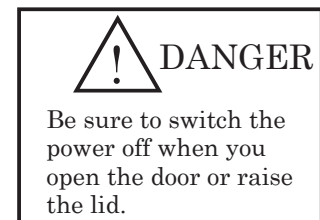
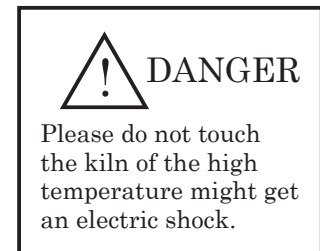
⋮ shows flashing.

Operating procedure		Display panel
(1) Be sure if attached rubber board is matted under the kiln. (DFA-500 only)		(3)
(2) Disconnect earth wire.		(2)
(3) Take the gas venting tap and the moisture venting tap off.		(1)
(4) Close the door.		
(5) Switch the power (breaker) on.		Display shows kiln temperature.
(6) Push 「Basic program」 key. Basic A		
(7) Push trial operation program.		
(8) Push 「Start」 key.		The indicator lights up.
During firing 《5 hours》		
(9) Firing completes when END is displayed.		
(10) Push 「Stop」 key.		The indicator lights off.
(11) Switch the breaker off.		
(12) Connect the earth wire into the electric kiln.		
(13) Insert the gas venting tap and the moisture venting tap into the electric kiln.		



Please ventilate well since odors occur from heating elements and heat insulating board for the first operation. Smoke and odors become less with future firings.

* If you do not operate any keys for 10 seconds, the display turns back to show the kiln temperature.



Please check the following before firing

- *When you use the kiln for the first time or there is a lot of moisture inside the kiln furnace (brick), please do trial (dry) operation.
- *Is there sufficient ventilation?
- *The earth wire (ground wire) is connected?
- *Gas venting tap and moisture venting tap are inserted correctly?
- *Thermocouples are inserted correctly?
- *Is insulated rubber board matted?
- *There are no flammable objects near the kiln?



Please ventilate well since odors occur from heating elements and heat insulating board for the first operation. Smoke and odors become less with future firings.

1 Precaution for setting / Taking pottery out of kiln

1. Instructions for putting pottery into kiln

(1) Placing kiln shelves

Please remove foreign objects inside the kiln.

(2) Caution for putting pottery into kiln

- [1] Place work and kiln shelves into kiln being certain that they do not be in contact with the heating elements. Heating elements may be damaged if work or shelving be in contact with them during firing.
- [2] Keep all items clear of the kiln wall when putting work into the kiln and removing it from the kiln. Heating elements are weak under high temperature.

《Bisque firing》

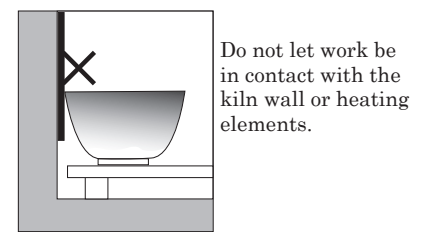
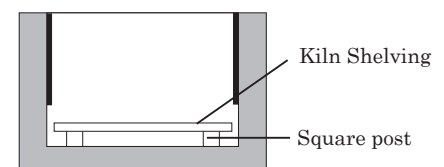
- *You can lay works since they are not glazed for bisque firing. However, please be careful to lay works since they might be difficult to come out after drying out.

《Glaze firing》

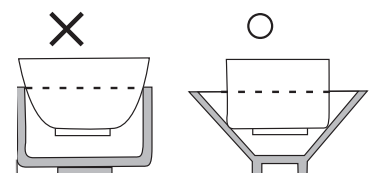
- *Please be careful not to let the glazed parts be in contact with other work, thermocouples, or kiln wall during glaze firing.

(3) Caution for removing pottery from kiln

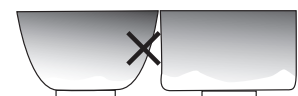
- *Open the door after switching the power off.
- *Take pottery out from kiln after the kiln temperature becomes normal. It may cause a burn injury or crack work if you take a pottery out at the high temperature inside kiln.



Be careful when placing work.



Separate work from each other.



2 How to remove moisture

Please remove all moisture inside furnace from the moisture venting hole. If you do firing without ventilation, the kiln will rust.

Take the moisture venting tap off until the temperature becomes from 200 to 300 °C after firing and remove the moisture inside a work.







Install the moisture venting tap once moisture is removed (when the temperature is from 200 ~ 300°C.)

4 Functions of controller

- 1 Variations of programs
- 2 Convenient and safe functions

1 Variations of programs

<p>Basic program</p> 	<p>Installing 10 functions including Raku firing, bisque firing, glaze firing which are often used. Easy operation only to put the 3 keys</p>
<p>Self-produced program</p> 	<p>You can make your own program based on the basic program (Possible to memorize 20 variations)</p>
<p>Continuing programs More than 5 seconds</p>  + 	<p>You can make processes having 16 stages at maximum. It is convenient when you want to set the temperature more minutely.</p>

P.14
Basic program

P.16
Self-produced program

P.18
Continuing programs

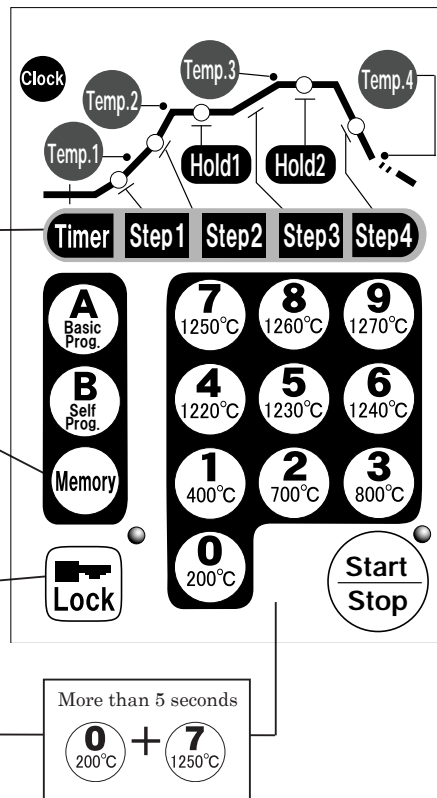
2 Convenient and safe functions

Timer You can set
 ① Starting time of firing
 ② After how many minutes you start firing

Memory Preserve the program you make

Lock Prevent improper key operations after setting the program.

Buzzer You can ring a buzzer at
 ① set-up temperature in
 ② set-up process



P.20
Timer

P.21
Buzzer

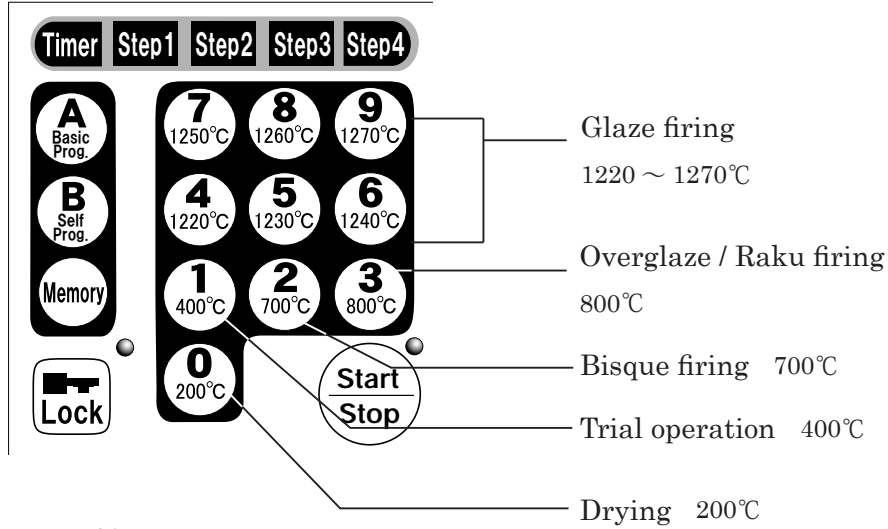
P.22
Lock

5 Firing by controller

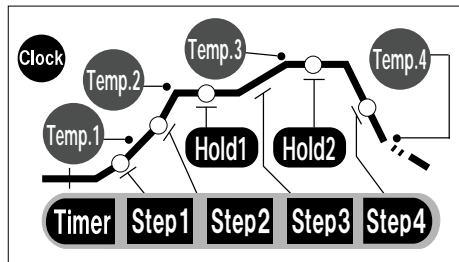
1 Firing by "Basic programs"

1 Firing by "Basic programs"

1. Variations and contents of basic programs



< Contents of basic program >



< Temperature list of basic programs >

Firing	Key	Timer	Step 1	Temp.1	Step 2	Temp.2 《Hold1》	Step 3	Temp.3 《Hold2》	Step 4	Temp.4	Total time
Drying	0 200°C	0 min.	300 min. (5 h.)	200 °C	0 min.	200 °C <0 min.>	0 min.	200 °C <0 min.>	0 min.	120 °C	300 minutos (5 h)
Trial operation	1 400°C		270 min. (4.5 h)	400 °C		400 °C <0 min.>		400 °C <30 min.>			
Bisque	2 700°C		420 min. (7 h.)	560 °C	90 min. (1.5 h)	700 °C <10 min.>		700 °C <0 min.>			520 minutos (8 h 40 min.)
Overglaze / Raku	3 800°C		210 min. (3.5 h)			800 °C <0 min.>		800 °C <0 min.>			
Glaze	4 1220°C	0 min.	210 min. (3.5 h)	560 °C	120 min. (2 h)	900 °C <10 min.>	210 min. (3.5 h)	1220 °C <20 min.>	0 min.	120 °C	570 min. (9.5 h)
	5 1230°C							1230 °C <20 min.>			
	6 1240°C							1240 °C <20 min.>			600 min. (10 h)
	7 1250°C							1250 °C <20 minutos>			
	8 1260°C							1260 °C <20 min.>			
	9 1270°C							1270 °C <20 min.>			

※ Total firing time includes up to Hold2

※ Firing time may be longer by contents or variations of the kiln, compared with those of the above list.

P.32

< Note for "Self-produced programs" >

2. Firing by “Basic programs”

⋮ shows flashing.

Operating procedure		Display panel
(1)	Switch the power (breaker) on.	It is showing the kiln temperature.
(2)	Push the “Basic program” key. A Basic	
(3)	Select the program and push the key. ※ Please decide the temperature by the characteristics of glaze.	 For example
(4)	Push “Start” key.	The indicator lights up.
— During firing —		
(5)	Firing finishes when the display shows “End”.	
(6)	Push “Stop” key.	The indicator lights off.
(7)	Switch the power (breaker) off.	

P.12

Please be sure to read 『Before Firing』 before firing.

※ If you do not operate any keys for 10 seconds, the display goes back to show the kiln temperature.

DANGER

Do not touch the kiln for high temperature.

▶ After finishing < Hold 2 > , it moves to natural cooling. The display panel flashes on and off showing “End” once the kiln temperature drops down to 120°C .

DANGER

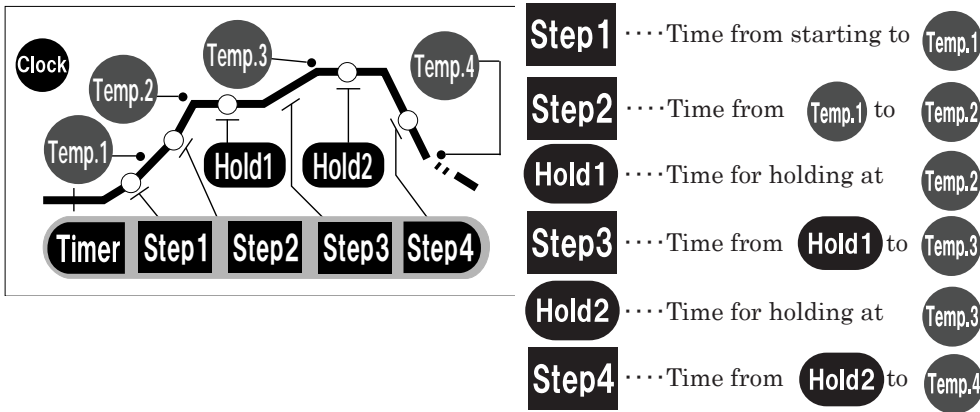
Be sure to switch the power (breaker) off when you open the door.

2 Firing by “Self-produced” programs

1. About self-produced programs

You can change a program into your own specification based on “Basic program”. It is possible to memorize 20 variations.

※ Self-produced programs are not registered with shipment.



2. How to make self-produced programs

⋮ shows flashing.

Operating procedure		Display panel
(1) Call up a “Basic program” similar with the program which you want to make.		
(2) Set Temp.1		
① Push Temp.1		
② Input the temperature which you want to set into Temperature 1		
(3) Set Step1		
① Push Step1		
② Input the time which you want to set into Step 1		
(4) Continue setting		

P.14 / 32
Refer for “Basic programs”

P.32
< Note for “Self-produced programs” >

P.31
< Examples of “Self-produced programs” by controller >

Range possible to input temperature setting
Maximum 1310°C
Minimum 0°C
Unit: 1°C

※ If you do not operate any keys for 10 seconds, the display goes back to show the furnace temperature.

- In the event that you continue the program to firing, please go to “When you start the program you make without registering (preserving)” of the next page.
- In the event that you register the setting, please go to “When you start firing by the program you register (preserve)” of the next page.

3. Registration (Preservation) of “Self-produced programs”

⋮ shows flashing.

Operational procedure		Display panel
(1) Push Memory after making self-produced programs.		
(2) Number the programs which you register (preserve). Input any numbers (1 ~ 20).		 For example
(3) Push Memory again and fix it.		
(4) Registration finishes when buzzer rings.		

◀ You can register 20 self-produced programs.
Number the program number from 1 ~ 20.

P.32

< Note for “Self-produced programs” >

4. Firing by “Self-produced programs”

When you want to start firing by self-produced programs you make without registering (preserving).

⋮ shows flashing.

Operating procedure		Display panel
(1) Push “Start” key after making programs (continuing of P.16). — During firing —		 The indicator lights up.
(2) Firing finishes when the display shows “End”.		
(3) Push “Stop” key.		 The indicator lights off.
(4) Switch the power (breaker) off.		

P.12

Please be sure to read 『Before Firing』 before firing.

DANGER
Do not touch the kiln during firing.

DANGER
Be sure to switch the power off when you open the door.

When you want to start firing by self-produced programs which you register (preserve).

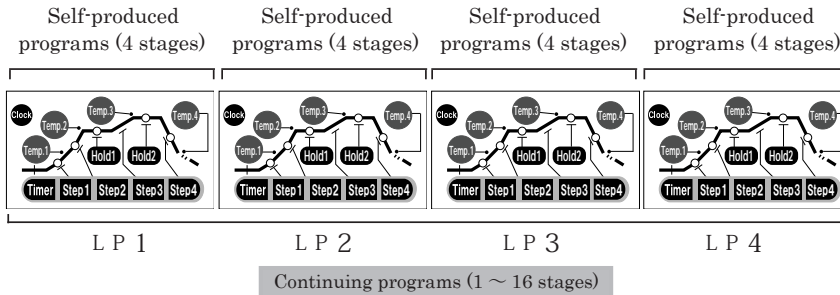
⋮ shows flashing.

Operating procedure		Operating procedure
(1) Push “Self-produced program”.		
(2) Input the program number which you register (preserve).		 For example
(3) Push “Start” key. — During firing —		 The indicator lights up.
(4) Firing finishes when the display shows “End”.		
(5) Push “Stop” key.		 The indicator lights off.
(6) Switch the power (breaker) off.		

3 Firing by “Continuing programs”

1. About continuing programs

You can set the temperature in 16 stages at maximum by combining 4-stages firings based on “Self-produced programs”.



※ Self-produced programs are not registered with shipment.

2. How to make continuing programs

⋮ shows flashing.

Operating procedure		Display panel
(1) Enter into continuing program mode. More than 5 seconds	More than 5 seconds 	
(2) Set the continuing programs.		
① Call up the original self-produced program.		 For example
② Change the contents of the self-produced program you call up in your preference.		
Set		
Push		
Input the temperature which you want to set into Temperature 1.	 For example 600°C	
Set		
Push		
Input the time which you want to set into Step 1.	 For example 300min.	
Continue setting 		
Push when setting finishes		
Input again and again since the display moves to the next LP inputting.		

◀ If you push for more than 5 seconds again, the display turns back.

※ If you do not operate any keys for 10 seconds, the display goes back to show the kiln temperature.

◀ If you do not want to set 16 stages and stop in the middle, input 0°C into the temperature in the next stage you want to stop.

◀ If you want to change the program you input, move to the stage you want to change and input again.

- In the event that you continue the program to firing, please go to “When you start the program you make without registering (preserving)” of the next page.
- In the event that you register the setting, please go to “When you start firing by the program you register (preserve)” of the next page.

3. Registration (Preservation) of “Continuing programs”

⋮ ⋮ shows flashing.

Operating procedure		Display panel
(1) Push Memory after making continuing programs.		
(2) Number the programs which you register (preserve). Input any numbers (1 ~ 20).		 For example
(3) Push Memory again and fix it.		
(4) Registration finishes when buzzer rings.		

◀ You can register 20 self-produced programs. Number the program number from 1 to 20.

P.32

Use < Note for “Self-produced programs” >

4. Firing by “Continuing programs”

When you want to start firing by continuing programs you make without registering (preserving).

⋮ ⋮ shows flashing.

Operating procedure		Display panel
(1) Push “Start” key after making programs (continuing of P.18).		 The indicator lights up.
— During firing —		
(2) Firing finishes when the display shows “End”.		
(3) Push “Stop” key.		 Switch the power (breaker) off.
(4) The indicator lights off.		

P.12

Please be sure to read 『Before Firing』 before firing.

DANGER

Do not touch the kiln for high temperature.

DANGER

Be sure to switch the power off when you open the door.


When you want to start firing by the continuing program which you register (preserve).

⋮ ⋮ shows flashing.

Operating procedure		Display panel
(1) Enter into continuing program mode.	More than 5 seconds +	
(2) Input the program number which you register (preserve)		 For example
(3) Push “Start” key.		 The indicator lights up.
— During firing —		
(4) Firing finishes when the display shows “end”.		
(5) Push “Stop” key.		 The indicator lights off.
(6) Switch the power (breaker) off.		




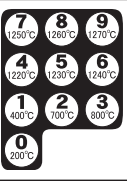




1 Timer

You can set the timer in the following 2 ways.

- 1 In how many minutes you start firing after pushing  key.
- 2 What time you start firing







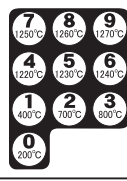






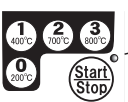
1. In how many minutes you start firing after pushing  key.

 shows flashing.

Operating procedure		Display panel
(1) Push  after inputting the program.		
(2) Input time.		 For example 65min.
(3) Push 		 The indicator lights up.

2. What time you start firing



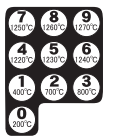

 shows flashing.

Operating procedure		Display panel
(1) Push  after inputting the program.		
(2) Push 		
(3) Input the starting time of firing.		 For example 13:34
(4) Push 		
(5) Push 		 The indicator lights up.

Time shows 24 hours a day.
Range to input
Within 23 hours and 49 minutes

※ If you do not operate any keys for 10 seconds, the display turns back to show the kiln temperature.

When you want to cancel the timer you set

Operating procedure	
(1) Push  and input another program.	 →  

P.12
Setup of Timer

Unit of time is "minute"
Maximum 9999 minutes
(6.9 days)
Minimum 0 minutes

2 Buzzer

You can set buzzers in the following 3 ways.

Buzzer rings for 20 seconds.

- | | |
|--|----------|
| 1. You do not ring buzzers. | [AL-0] |
| 2. You ring the buzzer at the designated temperature in the process you specify. | [AL-1] |
| 3. You ring the buzzer after the designated process finishes. | [AL-2] |

Note:

Once you set the buzzer, the setting continues in the next firing unless you change.

If buzzers are unnecessary, please set back to “No buzzer (AL-0)”.

1. You do not ring buzzers.

shows flashing.

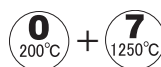
Operating procedure		Display panel
(1) Enter into buzzer setting mode.	More than 5 seconds 	
(2) Set the buzzer “0”and ”AL-0”.		
(3) Register (Preserve) the setting.		

※ If you do not operate any keys for 10 seconds, the display turns back to show the kiln temperature.

When you want to confirm the buzzer you set.

Go back to the buzzer setting mode and confirm the contents of the display.

More than 5 seconds



2. You ring the buzzer at the designated temperature in the process you specify.

shows flashing.

Operating procedure		Display panel
(1) Enter into the buzzer setting mode.	More than 5 seconds 	
(2) Enter into the buzzer setting mode “AL-1” .		
(3) Push the key of the process which you want to ring the buzzer		The indicator flashes. For example Step2
(4) Input the temperature you want to ring the buzzer.		 For example 1275°C
(5) Register (Preserve) the setting.		

※ If you do not operate any keys for 10 seconds, the display turns back to show the kiln temperature.

Note:

If you set the buzzer during hold, it often rings.

3. Ring the buzzer after finishing the designated process. : shows flashing.

Operating procedure		Display panel
(1) Enter into buzzer setting mode.	More than 5 seconds 	
(2) Enter into the buzzer setting mode "AL-2".		
(3) Push the key of the process which you want to ring the buzzer.		 The indicator flashes. For example Time 2
(4) Register (Preserve) the setting.		

3 Lock

You can lock input keys to prevent operating mistake of the program during firing or the registered program.

※ You can confirm the process, setting temperature, and program number during firing even if key input is locked.

1. Lock

Operating procedure		Display panel
(1) Push for more than 5 minutes.	More than 5 seconds 	The indicator lights up.
(2) Buzzer blips.		

2. Cancel the lock.

Operating procedure		Display panel
(1) Push for more than 5 seconds.	More than 5 seconds 	The indicator lights off.
(2) Buzzer blips.		

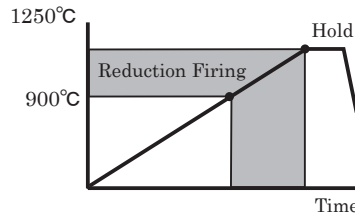
7 Reduction Firing

1 About Reduction Firing

2 Equipment /Installation/ Electric Work for Reduction Firing

1 About Reduction Firing

Reduction Firing is a way to fire which air inside the kiln is reduced increasing combustion flame of propane gas or utility gas until the temperature get to from approx.900 °C to set-up temperature (For example, 1250°C).It removes oxygen inside of glaze or body of pottery and makes original color of glaze.



<Caution>






- *Please be sure to do reduction firing after oxidized firing.
- *Please don't make reduction firing in a row. Please make oxidized firing for 2 or 3 times before next reduction firing.
- *Heating elements may break if you do reduction firing excessively.
- *The brick might hurt when strong reduction is done.

2 Equipment/Installation/Electric work for Reduction Firing

(1)Equipment

Optional burner sets are available for reduction firing.

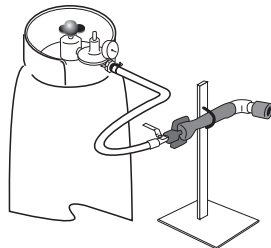
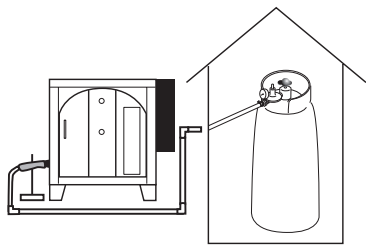
- *Please be sure to use burner sets which are suitable for the type of gas you use.
- *Utility gas is correspondent to 13A cord.

Burner sets for utility gas	Burner sets for propane gas
 Burner stand for utility gas 1 set	 Burner stand for propane gas 1 set
 Gas hose 3m 1set Hose Clip 2pcs	 Pressure regulator 1pcs
	 Gas hose 3 meters 1set Hose Clip 2pcs

※ Pressure regulator is not attached to the set for low-pressure propane.

(2)Installation/Gas fitting work (Piping work of propane gas)

How to install

<p>* Gas cylinder is close</p> 	<p>* Gas cylinder is far away</p> 
--	--

Operating Procedure

- (1) The burner is installed in the stand as shown in figure. At this time, the height of the burner is put together on the reduction gas slot.
- (2) The pressure regulator is installed in the gas canister. (Low-pressure propane and the city gas are not necessary.)
 - ※ The screw is a left-hand screw.
 - ※ The installed thing cannot be done on the way of piping.
- (3) Plumbing is done from the pressure regulator to the vicinity of the burner when the distance from the gas canister to the burner is away. Please do plumbing to the vicinity of the burner when in low-pressure propane and the city gas, there are no connected entrances to be near.



DANGER

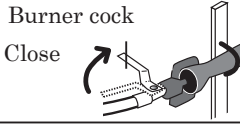

Ask professional Electrician to perform all piping work.



DANGER

Keep gas cylinder in an airy space and keep away from direct sunlight.

7 Reduction Firing

Operating Procedure	
(4) Connect pressure regulator to the burner with piping or hose which length is 2 or 3 meters and cover it with hose band.	
(5) Turn the knob of pressure regulator in counter-clockwise rotation and loosen it until force isn't applied. * Gas doesn't leak even if the knob is taken off. Please turn the knob in right direction a little and put it back.	
(6) Close the burner cock and loosen main tap of gas cylinder. Burner cock/Close	
(7) Please turn to the turn in total, and set it to 0.003MPa for the inside pressure propane gas specification while seeing the pressure gauge.	
(8) Close the tap of gas cylinder tightly after setting up the pressure.	

3 Before reduction Firing

(1) Please check if gas doesn't leak or not.

[Method] Put some soap water on parts (Pipe joint etc) which gas tends to leak by brush.

[Result] No change → No gas leakage
 Bubble up → Gas leakage

[Measure] Close the gas tap and contact gas company for repair.

(2) About how to put the column plate and how to pack the work.

[Notes when kiln is packed]

How to put column plate

< The lower >

To do an even space, the column plate and the wall put the column plate in each front, back, left and right. When two column plates are paved, the space is empty or it additionally puts it on the column plate with fit.

< The second step or more >

To do an even space up and down and right and left as well as the the lower, respectively the column plate is put. The column plate of the second step or more is not cared about even if there is a space.

How to put work

The work is arranged without stuffing so much so that the space between the work and the work may almost become even. Irregular reduction decreases.

P.12

Please be sure to read 『Before Firing』 before firing.



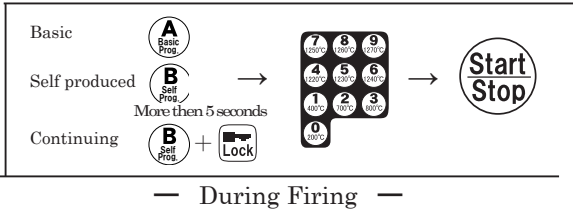
DANGER

Do not touch kiln due to high temperature.

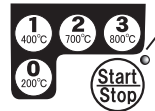
4 Reduction Firing

Operating Procedure

(1) Start the program



The indicator lights up.



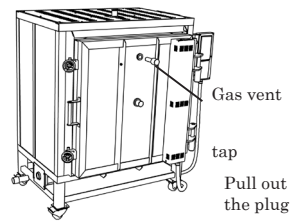
— During Firing —

(2) Prepare for reduction firing when the temperature becomes around 900°C .

① The deflation stopping before and behind the gas slot stopping is pulled out.

Pull out the plug.

Reduction gas slot



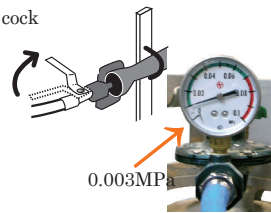
② Adjust the height of the top of gas burner to the height of gas injecting tap.

(3) Beginning of reduction firing(From 900°C .)

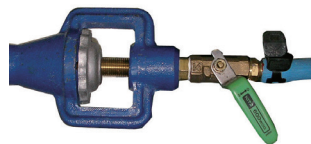
① It is confirmed that closed the gas burner cock and air valve shut, and opens the main cock of the gas canister. The thing that the pressure adjustment machine indicates 0.003MPa at this time is confirmed.

Burner cock

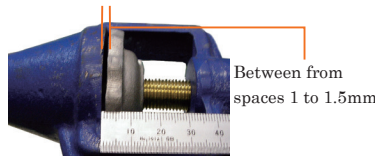
Close



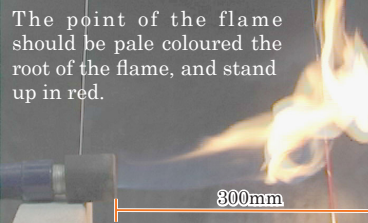
② The flame of ignition apparatus on the market is brought close to the point of the burner, it opens slowly, and it ignites.



③ The air valve is rotated, and the space is made to become between from about 1 to 1.5mm.

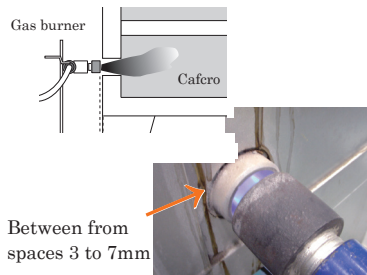


④ Gas burner cock and the air hole are adjusted, and it makes it to the flame like a right photograph.



⑤ After the flame is adjusted, the flame of the burner is put from the gas turning on entrance in the furnace. At this time, the space between from 5 to 7mm is opened between the point and the turning on entrance of the burner.

When the flame protrudes beyond the turning on entrance, the burner cock is shut little by little, and the amount of the gas is decreased.



Please ventilate it

It may cause carbon monoxide poisoning when reducing. Please be sure to keep the temperature near controller same as the external temperature.



Be careful of gas

Since it may cause explosion, please be sure if gas doesn't leak or not. Please check gas leakage in advance.



It is stinky without putting reduction at 900°C or less in in-furnace temperature.

Carbons (soot) ball and heat ray might cut in the furnace.



Please handle and note the gas.

There is fear of the explosion, and the gas leakage is not done or take care enough, please. The gas leaks without fail beforehand and it checks it.



Be careful when you ignite the gas.

Please turn the burner in a safe direction when igniting it. Please note the ignition with the ignition apparatus enough.

Operating Procedure

(4) Strength of reduction is adjusted. (From 1000°C.)

①

The flame comes out from the gas pulling out hole after a while after turning on the gas.
(The flame colors in red as the in-furnace temperature rises though the flame is not seen at about 900 °C when the surrounding is bright.)

The gas burner air valve is adjusted so that smoke white (gray) may rise a little the flame ahead.

(It doesn't change at once even if it controls pneumatic valves. Please look at the appearance of smoke after it waits for a while.)

◎ It makes it to strong reduction
⇒ The amount of the gas is increased.

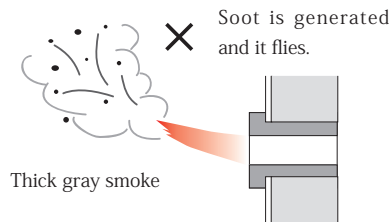
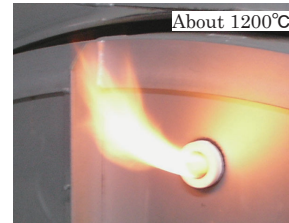
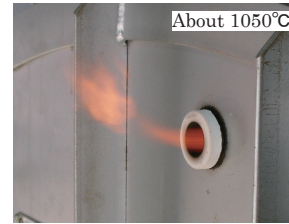
◎ It makes it to weak reduction.
⇒ The amount of the gas is decreased.

White smoke hardly rises.

When it reduces from the neutral or less, and the amount of white smoke is large, it becomes strong reduction.

Smoke hardly rises from twice smoke that contains a lot of soots in a thick gray (black).

Excess is being reduced. The invasion of heat ray and the brick is caused, it dances, and weaken reduction, please.



DANGER

It doesn't part from the kiln while reducing it.

Please take care enough about the fall and the gas leakage etc. of the gas burner.



DANGER

Please ventilate it

When the gas is reduced, it is likely to become poisoned one oxidation.

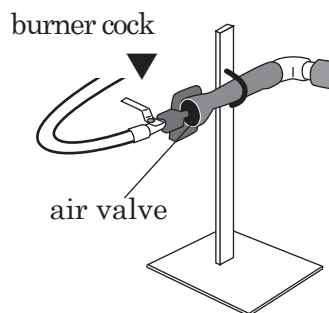
(5) When the in-furnace temperature reaches at the preset temperature, it is a reduction end.
It ends reduction at the preset temperature. (example 1250°C)

① The main cock of the gas is closed.

② The gas burner cock is closed.

③ The gas burner is separated from the kiln.

④ The gas secret passage and the gas turning on entrance are stopped respectively.



(6) Hold

(7) Firing finishes.

①

Firing finishes when the display of controllers shows "END"

⋯ shows flashing.

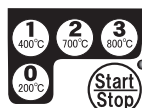


②

Push 「Stop」 .



The indicator lights off.



③

Turn the power off.



DANGER





When the door is opened, the power supply (breaker) is turned off without fail.

1 About controller

Error message

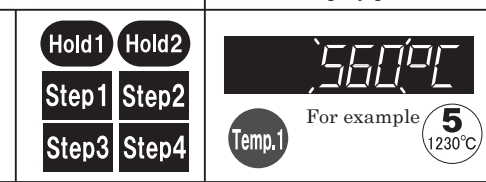

Error message : The error shows the problems of the kiln during firing.

Please correspond to the error message, push  and cancel the error.

Display	Name of errors	Reason	Countermeasure
	Inability to raise the temperature	<ul style="list-style-type: none"> • Thermocouples are forgotten to be set in kilns. • The temperature setting is beyond the heating ability of the kiln. • The hot wire of the kiln is disconnected. • Door is opening during firing 	<ul style="list-style-type: none"> • Install the thermocouples into the kiln. • Set the suitable temperature. • Stop firing, and change the hot wires after cooling the inside of the kiln sufficiently. • Close the door paying close attention to the heat of the kiln.
	Disconnection of thermocouples and electrical conductors or Detection of abnormal high temperatures	<ul style="list-style-type: none"> • Disconnection of the thermocouples or electrical conductors Loosening of connection • Abnormal high temperature inside the kiln 	<ul style="list-style-type: none"> • Repair and change the thermocouples or electrical conductors by the condition of heat insulation. Tighten the connection if it is loose. • Please consult Nidec Drive Technology ceramics department in the event that the display still shows F3 even if you try the above countermeasures
	Reverse connection of thermocouples	<ul style="list-style-type: none"> • Polarity is reversely connected in connection of thermocouples. 	<ul style="list-style-type: none"> • Shift the polarity of wire connection.
	Abnormal temperature of microcomputers or breakdown of temperature sensors	<ul style="list-style-type: none"> • High abnormal temperature inside the microcomputer • Breakdown of the temperature sensor 	<ul style="list-style-type: none"> • Please consult Nidec Drive Technology ceramics department when it occurs.

When you want to make sure the content of the program you set




 shows flashing.

Operating procedure	Display panel
(1) Push the key of the process you want to confirm	 For example 
(2) The display automatically turns back to show "In operation" in about 5 minutes.	

When you want to make sure if the firing mode is on or off

Confirmation if the microcomputer is in firing mode or not after starting firing

 shows flashing.

Operating procedure	Display panel
(1) Make sure if the display panel shows the furnace temperature and the maximum setting temperature. ※ This shows time (minutes) to start firing in the event that you set timers.	The kiln temperature   The maximum setting temperature 

※ The maximum setting temperature
It flashes on and off for 3 seconds every 20 seconds.

Display panel does not light up.

Contents to confirm	Countermeasure
(1) Make sure if the power (breaker) is on or off.	Switch the power (breaker) on if it is off.
In the event that the power (breaker) shuts down	Make sure if the power cord reaches to the kiln itself.
The display shows an electrical leak.	Do trial operation (dry operation).
In the event that the power (breaker) shuts down not because of an electrical leak, but because of an electrical short	Contact of hot wires may be the one of the reasons. Repair is necessary. Please consult "Nidec Drive Technology" ceramics department.
(2) Confirm if the connection of hot wires is correct or not.	

Please consult "Nidec Drive Technology" ceramics department when the above countermeasures are not effective.

P.12

Please be sure to read 『Before Firing』 before firing.

P.8

Please be sure by 『Electrik works』

P.21

About Buzzer

Buzzers do not ring

Problems	Countermeasures
The buzzer rings even if you do not set it.	Confirm if the buzzer setting which you set last time does not remain or not. ※ If you set buzzers in the process of holding, the buzzer responding to the change of the temperature in often rings.
	In continuing program, buzzer settings do affect even when you use other programs. If buzzer settings are unnecessary, please set "No buzzers (AL-0)" .

2 Others

Blackout

Power supply is restored within 10 minutes : Firing continues in the process before blackout.
Blackout takes more than 10 minutes : Firing automatically stops.

Replacement of heating elements

1. How to replace heating elements

(1) Order of heating elements

Please specify the below content and order.

- | | |
|-------------------------------------|------------------------------------|
| ① Model of the electric kiln | DFA - () |
| ② Inside dimension(mm) | Width () × Depth () × Height () |
| ③ Configuration of heating elements | (Coil) |
| ④ Position of wire disconnected | () from the top |
| ⑤ Year, month and day of purchase | () |

(2) Replacement of Heating Elements

Operating Procedure	
(1) Take the heating elements off.	
① Take the terminal cover off.	
The door terminal cover or the main body terminal cover is detached.	
② Check the position of heating elements you want to exchange and take the connection screw off.	
Loosen set bolt with the attached L wrench.	
③ Remove ceramic tube.	
④ Pull the heating elements slowly and remove it paying attention not to damage bricks.	
(2) Install new heating elements	
① Insert the both sides of new heating element into the hole inside the kiln. Put the rest of elements to the ditch.	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> When closing the set bolt with the attached T wrench, please fix and close tightly by pleyer. </div>
② Put the ceramic tube into the original position. (Put the heating elements into the inside.)	
③ Connect with insulating electric wire with connection screw pulling the heating elements a little.	
④ Install stainless-steel cover.	

▶ Please be sure the model and manufacturing date described in serial number of the door.

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Please check the inside dimension of furnace in specification list.

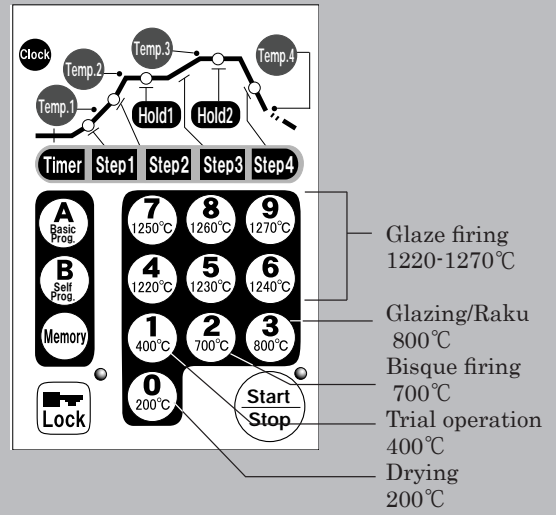
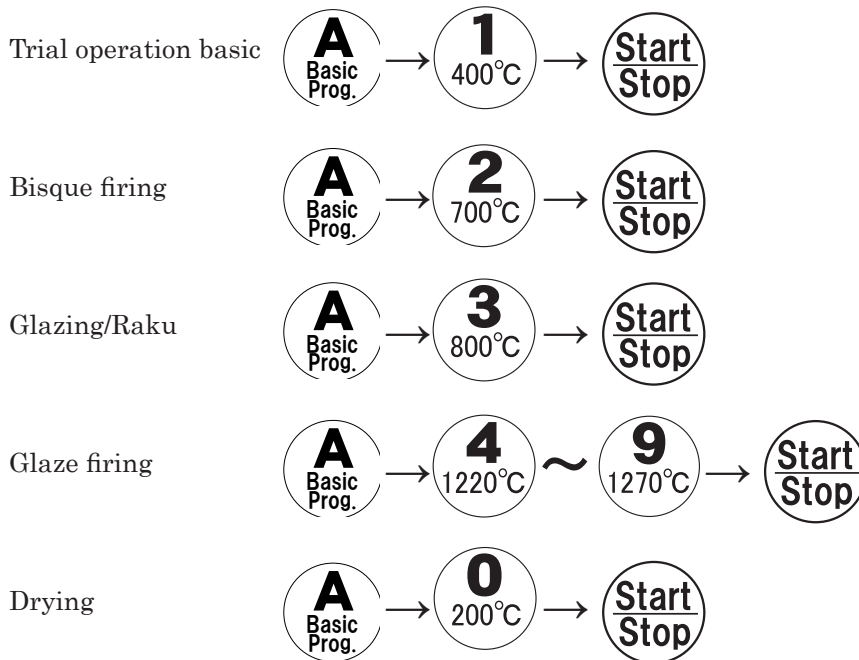
Caution)
Please be careful not to broke the U pin holding the heating elements inside the bricks.

Caution)
Please be careful not to damage bricks.

Caution)
Please be careful not to hit U pin too strongly since it tends to be broken easily.

Caution)
Please cut the leftover of the heating elements by pleyer not to let heating elements be in contact with the outside boards.

Basic program

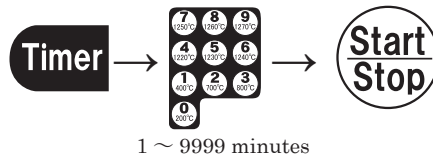


Glaze firing
1220-1270°C
Glazing/Raku
800°C
Bisque firing
700°C
Trial operation
400°C
Drying
200°C

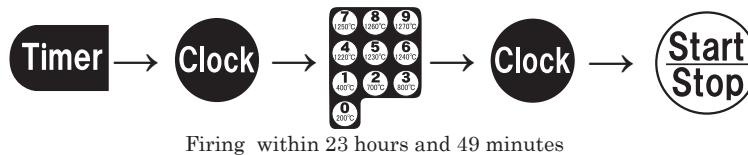
Convenient functions

Timer

In how many minutes you start firing

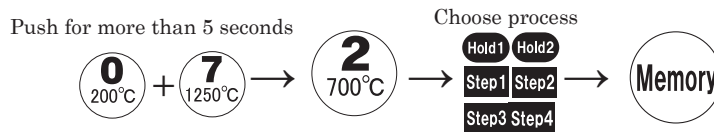


What time you start firing

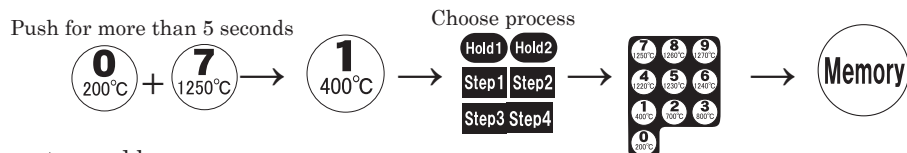


Buzzer

Sound buzzer after the designated process finishes.

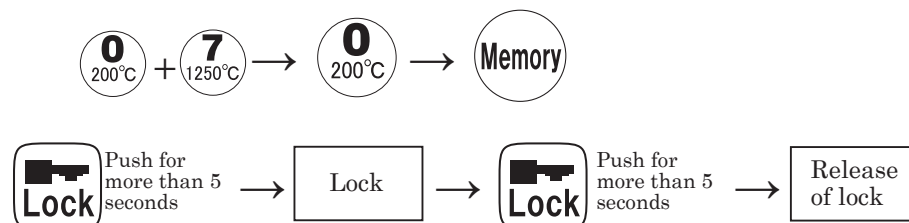


Sound buzzer at the designated temperature



Lock

Do not sound buzzer




















You can change a program into your own program based on “Basic program”.

You can make your own program easily by changing the content based on “Basic program” which is similar with the one you prefer

*When you want to set maximum temperature at 1240°C

⋮ shows flashing.

Operating procedure		Display panel
(1) Call up a “Basic program” similar with the program which you want to make. Choose [7] since you want to set maximum temperature at 1240°C this time and the content is similar.		
(2) Push  Display shows the temperature which is set in at present.		
(3) Input 1245°C which you want to set. 〈In case of starting firing without registration 3→7〉		
(4) Push  after making custom program in order to preserve the setting content.		
(5) Number the programs which you register (preserve). Input any numbers (1 ~ 20).		
(6) Push  again and secure it. Registration finishes when buzzer sounds.		
(7) Push 「start」.		The indicator lights up 

You can register 20 variations for custom programs. Please number program. (1 ~ 20).

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Please use 〈Temperature chart for basic program〉 to understand the content of basic program and 〈Note for custom program〉 to register your own program.

<Temperature chart of “Basic program”>

*Total time is to completion of 《Hold 2》

Process Temperature Program		Timer	Temperature 1	Time 1	Temperature 2	Time 2	Hold 1	Temperature 3	Time 3	Hold 2	Temperature 4	Time 4	Total time
A-0	Drying	0	200	300	200	0	0	200	0	0	120	0	300
A-1	Trial operation	0	400	270	400	0	0	400	0	30	120	0	300
A-2	Bisque firing	0	560	420	700	90	10	700	0	0	120	0	520
A-3	Glazing Raku	0	560	210	800	90	0	800	0	0	120	0	300
A-4	Glaze firing	0	560	210	900	120	10	1220	210	20	120	0	570
A-5	Glaze firing	0	560	210	900	120	10	1230	210	20	120	0	570
A-6	Glaze firing	0	560	210	900	120	10	1240	240	20	120	0	600
A-7	Glaze firing	0	560	210	900	120	10	1250	240	20	120	0	600
A-8	Glaze firing	0	560	210	900	120	10	1260	240	20	120	0	600
A-9	Glaze firing	0	560	210	900	120	10	1270	240	20	120	0	600

<Note for “Self-produced programs”>

	Timer min.	Temperature 1 ℃	Time 1 min.	Temperature 2 ℃	Time 2 min.	Hold 1 min.	Temperature 3 ℃	Time 3 min.	Hold 2 min.	Temperature 4 ℃	Time 4 min.	Total time min.
B-1												
B-2												
B-3												
B-4												
B-5												
B-6												
B-7												
B-8												
B-9												
B-10												
B-11												
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B-16												
B-17												
B-18												
B-19												
B-20												

Warranty Provision

*Nidec Drive Technology warrants, to the original purchaser of new products only, that this product shall be free from defects in workmanship and materials under normal use following to the precautions of the instruction manual and label in the main body for one year from the date of original purchase.

*Expendables (Board shelf, post, brick, wool, heating elements, thermocouples, gas venting tap, peep hole, gas inserting tap etc) are not free.

*Minute cracks inside furnace or door, or let-go of wool are not free.

*The doneness of a work is out of our responsibility. (For example, firing irregularity of a work or cracks)

*The following matters are not for free despite of the warranty period.

*Breakdown or damages due to your wrong operation or remodeling.

*Breakdown or damages due to your drop after purchasing.

*Breakdown or damages due to firing, earthquake, flood damage, lightning stoke, public hazard, gas hazard, salt damage, or unusual power voltage.

*Changes of apparent condition such as scar while using or keeping

Disposal method

*Please consult with local government since the disposal method for the kiln is different in each local government.

*Please do not disassemble the kiln when you dispose of it. (Dust could occur.)

～ MEMO ～

NIDEC DRIVE TECHNOLOGY CORPORATION

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NIDEC DRIVE TECHNOLOGY CORPORATION

Nidec Shimpo Corporation change its company name to Nidec Drive Technology Corporation on April 1, 2023.