DAIHAN Scientific
YOUR PARTNER *in* LABORATORY

Forced Convection type Smart Oven

Certifications by - - -

- ☑ **ISO 9001 Certified.**
- ☑ **ISO 13485 Certified**
- ☑ **UL/CUL Certified**
- ☑ **CE Certified**
- ☑ **PL Insurance. (Product Liability Insurance)**
- ☑ **Validation(IQ&OQ) Service.**

✧ English Page : P. 1 ~ 40

✧ Korean Page : P. 41 ~ 80

User Manual

(Version : 2.2.2)

written for

ThermoStable™ SOF-50/-105/-155/-W105/-W155 models

"ThermoStable™ SOF-105"

Forced Convection type Smart Oven, 105Lit.

Man266 (20 May. 2016)

EUROPEAN DECLARATION OF CONFORMITY

DAIHAN Scientific
YOUR PARTNER in LABORATORY

We, DAIHAN Scientific Co., Ltd.,
326, Sinpyeongseokhwa-ro, jijeong-myeon, Wonju-si, Gangwon-do, Korea
Tel: 82-2-967-5235, Fax: 82-2-967-5258
declare under our sole responsibility that the product

Oven

ThermoStable SOF-155, SOF-105, SOF-50, SOF-W155, SOF-W105

to which this declaration relates is in conformity
with the following standard or other normative document

EN 61326: 1997/A1: 1998/A2: 2001/A3: 2003
EN 61000-3-2: 2000
EN 61000-3-3: 1995/A1: 2001
EN 61010-2-010: 2003 used in conjunction with EN 61010-1: 2001

following the provisions of the directives:

Low-Voltage Directive 2014/35/EU
EMC Directive 2014/30/EU

Signed: _____ (Chong ku Shu)

Date: 18, April 2016
Authority: President / CEO

For

DAIHAN Scientific Co., Ltd.,
326, Sinpyeongseokhwa-ro, jijeong-myeon, Wonju-si, Gangwon-do, Korea
Tel: 82-2-967-5235, Fax: 82-2-967-5258

DH-DC140101-R02

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1. General

1

1.1 Precautions Before Use

Thank you for purchasing the Forced Convection type Smart Oven.

This manual describes the performance and usage instructions of the product, and the precautions in the handling. Please carefully read this manual, before using the product. The following warnings should be strictly adhered to: (The following warning sign is marked in the part that is required user attention, so please safely use the product after being well-acquainted with the meaning.)

	Warning Failure to follow the instructions may result in injury. **Caution** Failure to follow the instructions may result in product failure. **Proximity Caution** Keep clear of the product during use.
	Notification Do not disassemble or modify the product or use it for purpose other than its intended function.
	Caution: High Temperature High-temperature heating, pose a risk of burns.
	Danger of Explosion If volatile, explosive chemicals are used, there is a danger of explosion.
	This symbol indicates Protective earth (ground).
	This symbol indicates power "OFF" on the power on/off switch.
I	This symbol indicates power "ON" on the power on/off switch.
N	This symbol indicates the connection point of the neutral conductor on the installed unit.
	This symbol indicates alternating current Voltage.

1. General

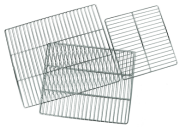
1.2 Product introduction

This product is equipped with the Forced convection air circulation system, and realize The Best Temp. Uniformity & Accuracy by 3-Side Pre Heating Zone which the heating elements wrap the three sides of the chamber.
In addition, it remotely controls the experimental equipment by building Smart-Lab™ System through WiRe™ App & web Service, and it is implemented so that anytime, anywhere can be monitored.
This product was developed and manufactured considering the best possible ease for use and safety, and has the following features.

1. This product is equipped with the high performance Heating Mechanism - Pre Heating Zone which realizes the best temperature uniformity and accuracy.
2. It minimizes the heating time and the temperature recovery time after open/close of door through the optimization of the high-precision Fuzzy-PID controller.
3. The actions of various menus have been simplified through 4 inches Full-Touch Screen by applying Smart-Lab™ Controller.
4. It sends the unusual condition in real time by the self-testing system of the experimental equipment through WiRe™ App & Web Service support over the user and the service center, and the remote monitoring and control are possible.
5. The insulating and thermal efficiency are maximized by putting the Air-Flow Layer between the advanced insulator and the enclosure.
6. The Chamber and inner shelf prevents corrosion by using Stainless Steel material.
7. This product minimizes the heat loss by being strongly adhered the door by up and down dual latch structure.
8. The safety device for overheating prevention, and over current and short circuit prevention circuitry that preferentially consider the user's safety are mounted.
9. The models that the observation of the inside is easy are supported through the Built Viewing Window. (Only in " ThermoStable™ SOF-W105", " ThermoStable™ SOF-W155")
10. The pollution prevention and the simple and convenient washing operation are possible because the seamless rubber packing is finished in the curved surface on the inside corners.
11. The Heating is stopped in the case of the Door Open during operating, the error in use is minimized because the alarm rings if the certain time elapses.
12. CE Certified Products.
13. PL(Product Liability) Insurance

1. General

1.3 Product Configuration

Component Photo	Component Name	No. of Configuration
	ThermoStable™ SOF- 50, 105, 155	1 unit
	ThermoStable™ SOF- W105, W155	1 unit
	Stainless Steel Shelves	2 ea

- Including a copy of the Operation Manual

*** Model.**

- ThermoStable SOF-50 : Smart Forced-air Oven, without Window, 50Liter.
- ThermoStable SOF-105 : Smart Forced-air Oven, without Window, 105Liter.
- ThermoStable SOF-155 Smart Forced-air Oven, without Window, 155Liter.
- ThermoStable SOF-W105 : Smart Forced-air Oven, Built-in Viewing Window, 105Liter.
- ThermoStable SOF-W155 : Smart Forced-air Oven, Built-in Viewing Window, 155Liter.
- ThermoStable SON-32 : Smart Gravity-air Oven, without Window, 32Liter.
- ThermoStable SON-50 : Smart Gravity-air Oven, without Window, 50Liter.
- ThermoStable SON-105 : Smart Gravity -air Oven, without Window, 105Liter.
- ThermoStable SON-155 : Smart Gravity -air Oven, without Window, 155Liter.
- ThermoStable SON-W105 : Smart Gravity-air Oven, Built-in Viewing Window, 105Liter.
- ThermoStable SON-W155 : Smart Gravity -air Oven, Built-in Viewing Window, 155Liter.

2. Installation

2

2.1 Product Installation

* Caution of Installation

1. The product is heavy. Be aware when moving the product.
2. Do not lay the product or allow sudden impacts. It may cause damage to the inside.
3. Install the product on a hard, flat surface and ensure to use in a stable location.
4. Do not install in dangerous locations or in where exposed to direct sun-light.
5. If moisture or organic solvent is allowed into the body or adjuster part, it may cause a short circuit. Avoid those locations.
6. Ensure to check the voltage before the product installation for it is manufactured to operate at rated voltage.
7. Make sure to use POWER CORD shipped with the product when installing or operating the product.
8. Do not install the product in environments where inflammable gas may leak or may explode due to organic vapor gas.
9. Make sure to prevent moisture, organic solvent, dirt, corrosive gases from the product.
10. Do not expose the product to direct heat sources.

* Installation Process

1. After receiving the unit and locating it in the specified location, remove the packaging.
2. Check the unit for any transport damages. If any such damages are found, please contact the deliverer of the product.
3. This Product is not equipped with casters. Units should be moved using a cart. Ensure that no damage is sustained by the units during transport. It is recommended that units are moved by at least 2 people and by lifting units up holding the indicated positions in the figure below.

4. The product should be positioned in a location where it has enough space for ventilation and prevention from fire. The recommended distance of each side is minimum 20cm from

the back wall, 100cm from the side walls and ceiling respectively.

5. Place the device on a level, horizontal surface to support the capacity of the device without vibration.
6. Once the unit is placed in its installation location, let the unit stand for 15-30 minutes so that all the internal parts of the unit stabilize.
7. Connect the power cord to the wall socket.
8. When installing the device, insure the wall socket is easily accessible.
9. Do not earth to gas pipe, plastic tap water pipe or phone line. It may cause an electrical shock, a fire, breakdown or explosion of the unit.

* Safety Symbols on a product

- Safety symbols stickers Attached to side of product. For meaning of each symbol, please refer to Precautions Before Use, Safety Instructions.

Safety symbols on units, for further description of each symbol, please refer to 3.1 Precautions for Use

□ Product Liability (PL) Insurance Admission

DAIHAN Scientific (Co., Ltd.) is a member of Product Liability Insurance (PL Insurance), so that its customers can trust our products, (believe and use its products,) by preparing against the accident which can be occurred during using the products by self-production.

[Contents] .....

Insurance Type: Product Liability Insurance

Publishing Office: Machinery Insurance Cooperative

Limit of Indemnity: 100 million won for Persons and Objects

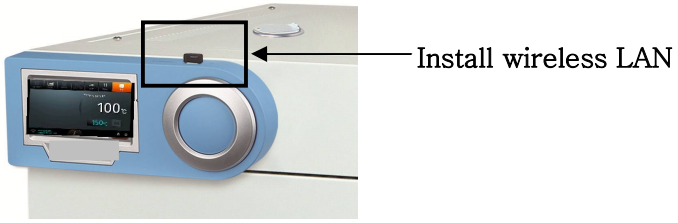
Secured Area: Worldwide (excluding North America)

Emergency Contact: **DAIHAN Scientific (Co., Ltd.) (TEL:** 080-008-3000, FAX: 033-737-7575)
(TEL: 02-369-8516, FAX: 02-369-8521)

2. Installation

2.2 Smart-Lab WiRe™ Service installation

- Those who use WiRe™ Service, make sure to connect WiRe™ Service before using after installing the product to a static location.
- Proceed with the installation from the Touch Screen in the front.
- Locate a wireless LAN for internet from the factory-shipped unit for it is not installed when shipped.



<Fig.2.2.1> Product adjuster

- This describes how to install WiRe™ Service.
  It only describes items that must be installed to use WiRe™ Service. Please refer to "How to use" page for more product operation details.
- It is described the procedure how to set WiRe™ Service in order in installation. Please follow the steps in order as described.
- Proceed to connect WiRe™ Service in "SETTING" menu on the top left of main screen.
- "SETTING" menu is disabled during operation. Stop operating it by touching "STOP" button on the top right and check if the SETTING menu is activated.

<Fig.2.2.2> Screen in opeation

<Fig.2.2.3> Screen when opeation is stopped

- "System", "WiRe", "WiRe Users" are specific menu items to connect WiRe™ Service in "SETTING". Proceed in order of description numbers as shown below.

<Fig.2.2.4> Settings menu details

- Proceed to set the system after pressing "System". When you touch the return button on the top right of screen in all menu screen, it switches to the previous screen.

① System Settings

<Fig.2.2.5> System Settings

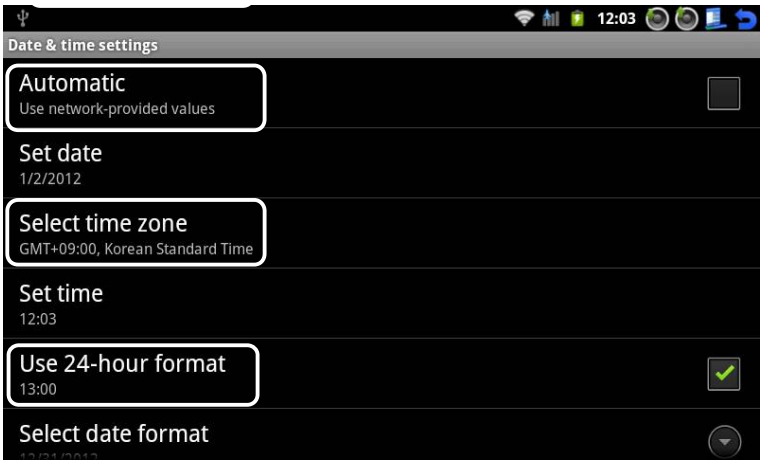
(1) Current Time Set

- Set the current time to enter the exact time of test by users. Touch the date time box on the right.

- If you randomly change the current time since supplied from the factory, please be sure to use after re-applying power to the equipment. If you have changed the time of product behavior it may also cause problems with some functions. Therefore if the current time changed be sure to use the device again after turning it off.

- Please use "Automatic" only with the Check Box is unchecked and disabled.

- "Select time zone" synchronizes to the time of a country if WiRe™ Service is used as a Mobile App that is using the device. Make sure to enter the country wherein a device is being used.



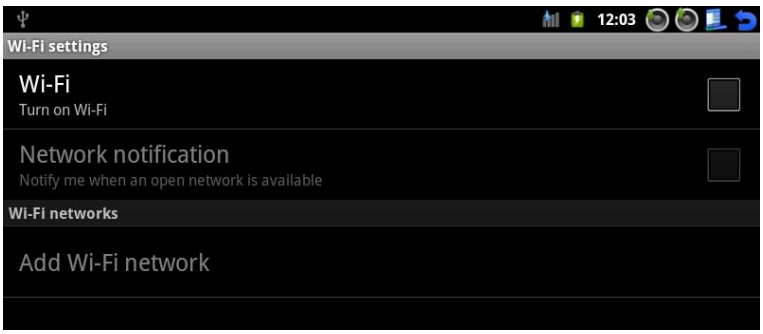
<Fig.2.2.6> Current Time Setup

- For "Use 24-hour format", make sure if it is checked as shown on the right for the precise operation of device and never change it.

- After setting, it switches back to the previous page if the blue return icon on the top right is clicked.

(2) Wifi Setup Set

- WiRe™ Service is possible to use only if connected to internet. Be sure to connect to a wireless LAN.



<Fig.2.2.7> WIFI SET

- Connect to WiFi by clicking Check Box on Wi-Fi window, and enter password if it requires. Be sure to check if USB dongle is properly installed if WiFi signal is not available. (check flashing LED light)

- After connecting to WiFi, it switches back to the previous page if the blue return icon on the top right is clicked.

② WiRe Settings

<Fig.2.2.8> WiRe Settings

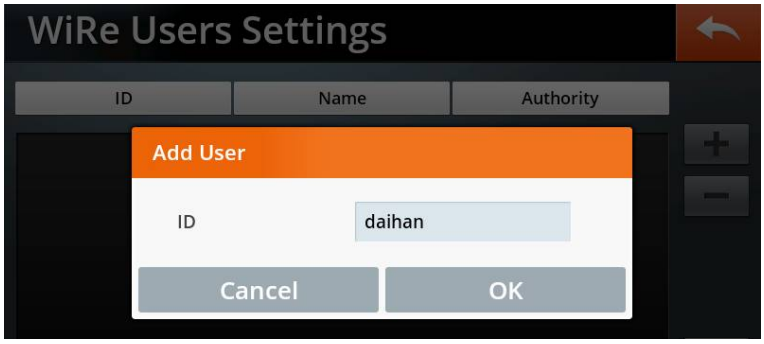
- If WiRe Mode button is set to the right, WiRe™ Service is connected. It is possible only if WiFi connection is stable.
- WiRe Mode is not possible if WiFi is not connected or network is unstable. Make sure the network is stable.
- It is possible to check Serial Number, Model, and Organization Name at below after connecting it.

③ WiRe Users

<Fig.2.2.9> WiRe Users

(1) Adding users

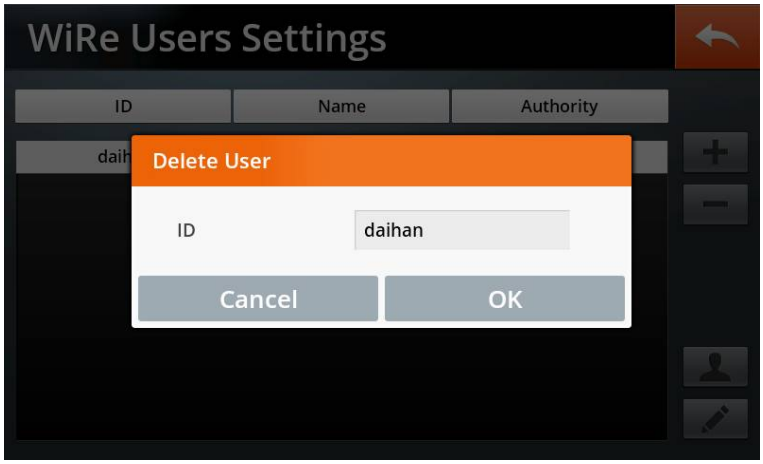
- If a user is registered in the existing Smart-Lab device, this device will register the existing user IDs. In such cases, a single user can check several devices for the list of registered devices emerges when logged in with a single ID from a mobile App.



<Fig.2.2.10> Existing UserID registration

(2) Deleting users

- Users are deleted when the button is touched after selecting users to delete from the user list.



<Fig.2.2.11> Delete users from the list

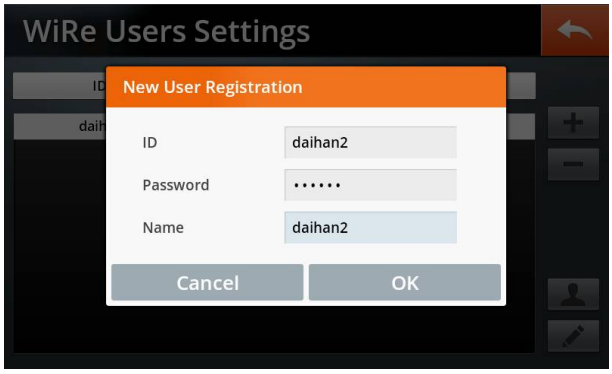
(3) Registering new users

- First-time users for Smart-Lab and WiRe Service must register user information. Enter ID, Password and Name.

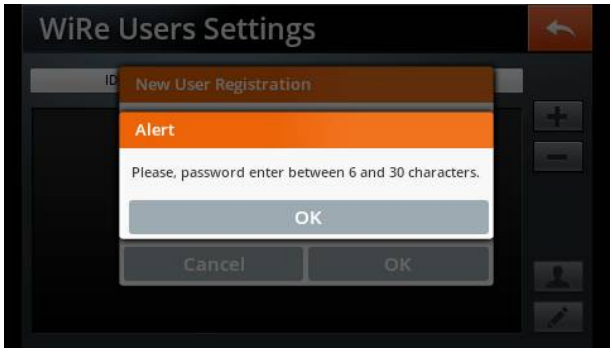
- ID must be entered in at least more than 6 and less than 20 lowercase alphabetic characters and digits. In cases of duplicate ID or less than 6 or more than 20 places other than lowercase, uppercase alphabets or numbers are entered, a pop up message will be shown alerting the ID setting is not allowed.

- Password must be entered in at least more than 6 and less than 20 capital, lowercase alphabetic characters, special symbols. If not at least more than 6 and less than 20 capital, lowercase alphabetic characters, special symbols are entered, a pop up message not allowing registering will appear.

- ID, Password, Name once entered is not possible to change.



<Fig.2.2.12> Enter new usser information



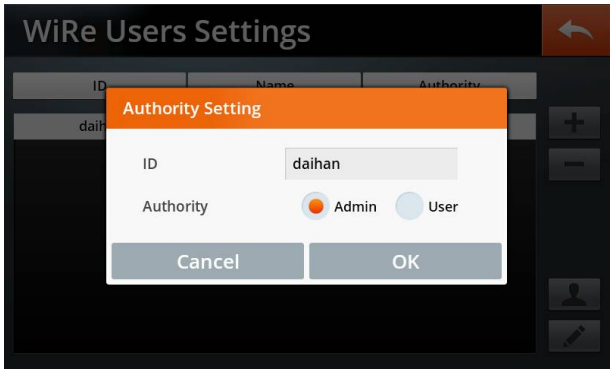
<Fig.2.2.13> ID, Password error message

(4) Authority settings

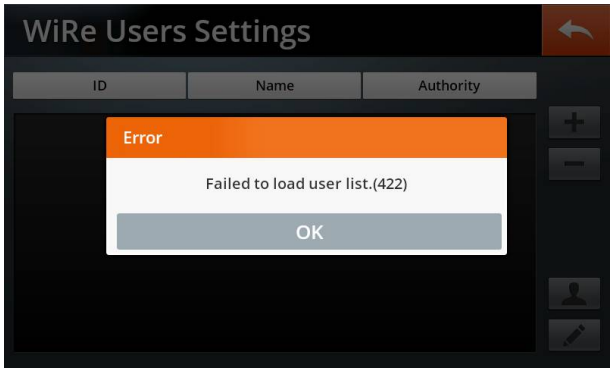
- Set a registered user as an administrator or end user. Admin (administrator) controls Remote Control System as a single administrator. Up to 100 User (general user) can be registered and can monitor the status of device. (User can not remotely control)

- After selecting an ID that wants to change authority from the registered user list, set and select from Admin or User.

- Since only one Admin is allowed, Admin ID other than the latest ID will be changed to User.



<Fig.2.2.14> Setting authority



<Fig.2.2.15> communication error

- If a message that it cannot load registered user information pops up, check if WiFi connection is weak and reenter in WiRe Users menu.

- After proceeding to the steps above, WiRe™ Service is ready to use for it is connected to a Mobile App. Please refer user's manual for setting device functions.

2. Installation

2.3 Product Specifications

Model		Standard Model, without Window		
		ThermoStable™ SOF-50	ThermoStable™ SOF-105	ThermoStable™ SOF-155
			Built-in Viewing Window Model	
			ThermoStable™ SOF-W105	ThermoStable™ SOF-W155
Capacity		50Lit	105Lit	155Lit
Dimension (w x d x h)	Interior(mm)	370X345X420	485X415X535	550X480X600
	Exterior(mm)	518X647X724	653X712X882	718X777X947
Heater Power		650W	1.4kW	1.6kW
Temp.	Range	Ambient Temperature +5℃ to 250℃		
	Fluctuation	±0.3℃ at 100℃, ±0.5℃ at 150℃		
	Variation	±1℃ at 100℃, ±1.8℃ at 150℃ ±1℃ at 100℃, ±2℃ at 150℃		
	Sensor	PT 100		
Control Resolution		±0.1℃		
Heat-up Time		25min. to 100℃ 43min. to 150℃		25min. to 100℃ 40min. to 150℃
Recovery Time (Door open 30sec)		8min. to 100℃ 8min. to 150℃	6min. to 100℃ 6min. to 150℃	
Controller		Smart-Lab™ Controller		
RS232 Port		Available to connect with PC		
Display		4"Full Touch Screen TFT LCD		
Timer		99hr 59min (delay/continuous function)		
Material	Internal	Stainless Steel(#304)		
	External	Powder Coated Steel		
	Insulation	Glass Wool		
Shelves		Stainless steel shelves included		
		2ea		
Ventilation		Ventilation hole with Stainless Steel Cap, Hole Diameter 40mm		
		1ea	2ea	
Circulation		Forced Air Convection Type		
Safety device		Over Temp. and Over Current Protector, Sensor Error Detector		
Others		UL / CUL Certified Storage Function (Temp. and Time) Locking Mode (Jog-Dial Input Disabled) Alarm (Error Status and Timer-end)		
Net Weight (kg)		44	69	78
Packing Size (wxdxh)(mm)		622X754X807	743X819X1,068	808X884X1,133
Shipping Weight(kg)		59	79	92
Power Consumption		674 W	1390 W	1566 W
Energy Consumption, at 100℃		117 Wh	187 Wh	204 Wh
, at 150℃		230 Wh	337 Wh	398 Wh
Power Supply		120V, 60Hz or 230V, 50/60Hz		

3. Product Usage

3

3.1 Precautions for Use

	Please be familiar with the user manual before using this product, and operation should be performed only by qualified personnel
	This product should be connected to a appropriate power source that it is generally used. Please use a lower power source than the regulation load permitted (AC 120, 60Hz or AC 230V, 50/60Hz, Single-phase).
	Place the product on a level, horizontal surface to support the weight of the product without vibration. Install the product in a place where the floor is hard and flat. Failure to do so can cause accidents. by negligence.

- **Warnings**

- **Please observe the following precautions**.

	This product should be operated in a room with temperature maintain between 5℃ and 40℃. Long-term use in an environment that exceeds the allowable range may cause a malfunction.
	Please do not damage or distress the power cord. (Please do not hurt on the power cord, or process it, or force bend it, or pull it, and tie it.) Also, if heavy objects are placed over the power cord, or the power cord is inserted in between objects, the power cord can be damaged and may cause fire or electric shock.
	Please do not directly spray water on the product or wash it with water, to avoid short circuits or electric shock.
	Please do not touch or manipulate the electrical parts such as the power plug with wet hands electric shock.
	Please do not operate the product by manipulation of the plug to avoid electric shock or short circuits
	Do not install the product where it can get damp or in a dusty environment. It may cause overheating or short circuit. – Pollution Degree 2
	Do not install the product in a location at an altitude of over 2,000 meters (6,562 feet).
	Please do not use any kind of plastic container or the goods for dry purpose. The temperature around the heater mounted on the floor of the chamber is higher than the operating temperature, and if the internal temperature is rapidly risen due to the malfunction of user, there may present a fire risk.

	The internal temperature rises up to 250℃, so please be careful when opening or closing Air Duct or Door.
	The inner chamber is hot during an operation, do not touch the inner chamber without proper hand protection during operation as burns may occur.
	Do not operate this product near a heater or an air-conditioner.
	Clean the bottom of inner chamber and install the shelves properly before use.
	Do not close your face, hands or body into a chamber. It may cause an injury or burn by high temperature.
	Only operate unit after checking the safety of the unit.
	The temperature of the regulator SAFETY should be set up 30 ~ 40°C higher than the operating temperature. If the regulator SAFETY is set to 0, the heater does not operate.
	If unexpected sound, smell or smog is generated, pull the main plug out from the wall socket and contact the technical assets of DAIHAN Scientific
	If irradiated or contaminated samples are placed in the chamber, the warranty is voided. Do not use this product to sterilize or disinfect objects or samples.
	Do not use outdoors avoid overheating or electrical faults. The use in the place where the sun continuously shines and can get rained on it is prohibited. It may cause overheating or electrical fault of the product.
	Please do not use flammable or volatile products in the vicinity of the product to minimize the risk of firer. Please do not use the flammable spray such as lacquers and paint, or volatile, flammable chemicals and its similar product, in the proximity of the product. They may cause the ignition due to the spark of switch.
	Please avoid the disassembly or modification of this product by a non-authorized person to avoid serious electrical problems and to retain the warranty service of DAIHAN Scientific Co., Ltd.
	This product must be connected to a properly grounded power supply.
	Please regularly check whether dust or dirt are on the power plug and completely connect the plug. If the plug is covered with dust, or the connection is not complete, it will cause an electrical shock or fire.
	Please separate the power plug from the outlet for safety when the product is unused for long periods of time to avoid overheating or ignition due to dust.
	When disconnecting the power plug, it must be grasped by the hands and then pulled. Grasping only the cord and then disconnecting it may cause overheating or ignition because of internal lines being disconnected.
	Insert the plug securely into an appropriate wall socket. Loose connections result in excessive heat generation to the device and may cause arcing to occur at the connection.

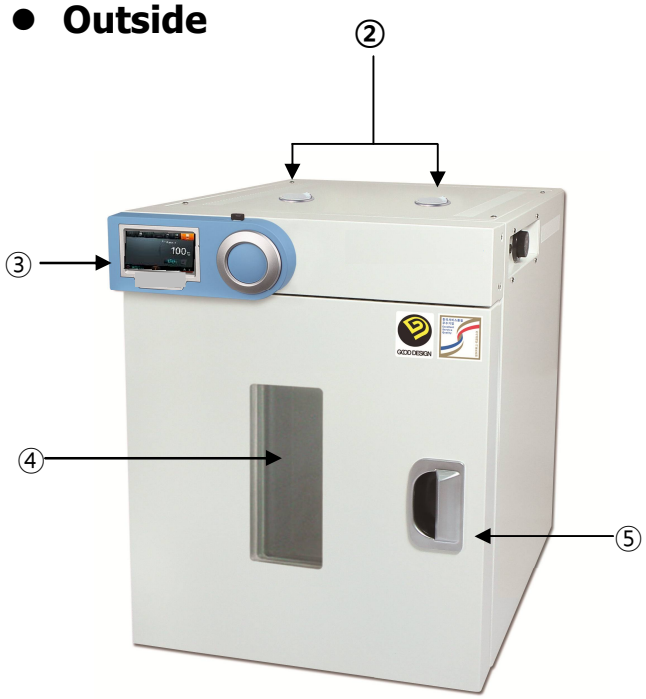
	If unusual noise or signs of abnormal behavior are found during use of this product, please immediately contact the supplier or DAIHAN Scientific (Co., Ltd.) after turning off the power supply and disconnecting the power line.
	When moving the product, please move it so that the power cord and the product are not damaged after disconnecting the power plug from the electrical outlet, in order to avoid the electrical shock or the ignition due to the damage to the cord.
	Please maintain the clean condition of this product by removing the foreign matter while gently wiping with the neutral detergent and a dry cloth after checking whether the foreign matter present or not, before and after using this product.
	The fluctuation of main power voltage should be lower than +/-10% of the nominal voltage..
	The maximum relative humidity is 80% at 31°C and 50% at 40°C .
	If a product was transported or stored in high humidity condition, please check packaging condition before use. If the carton or wooden box is waterlogged, please contact the deliverer or our technical service engineer. Do not operate the unit before checking with an engineer, otherwise it may cause an electrical shock or a fire.
	The Sound Level of the buzzer is maximum 60dB in 1 meter distance when an error is detected.
	The device should be set at a well ventilated place. Be sure the holes on the side or rear surface of the body are blocked by a wall or an object. And do not operate the device at a poor ventilated place or use closed. It may cause a fire or damage of the device as not to release heat or insufficient ventilation may result.
	This Symbol indicates that this product is to be collected separately. The following apply only to users in European countries: ● This product is designated for separate collection at an appropriate collection point. Do not dispose of as household waste. This product is required to comply with the European Union's Waste Electrical & Electronic Equipment(WEEE) Directive 2002/96/EC

※ All of the circuits, electrical or mechanical parts and configurations used in this product are the technical assets of DAIHAN Scientific (Co., Ltd.). Only technicians of the technical support team at DAIHAN Scientific (Co., Ltd.) or technicians approved through the education from DAIHAN Scientific should be allowed to repair this product.

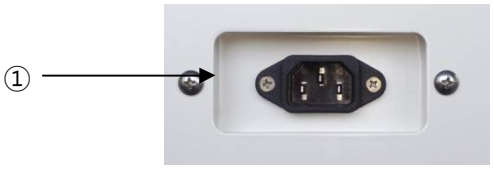
3. Product Usage

3.2 Names of Each Part

- **Outside**

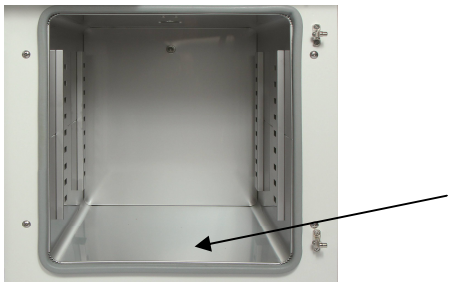


<Fig.3.2.1> Built Viewing Window Oven,
" ThermoStable^{TM} SOF-W105"



<Fig.3.2.2> Back of " ThermoStable^{TM} SOF-50"

<Fig.3.2.3> Back of
" ThermoStable^{TM} SOF-105, 155"
" ThermoStable^{TM} SOF-W105, W155"



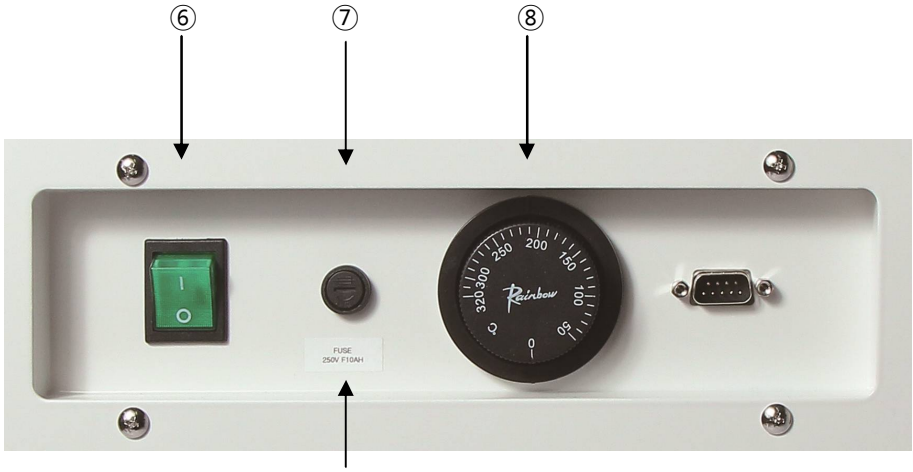
Heater is equipped in the bottom and two sides of the chamber.
Do not put any object on the bottom.

<Fig.3.2.4> Inner chamber of Oven

NO	Names	Description
①	Power Connection	Power Cord Apply
②	Air Duct	Ventilation of Chamber ThermoStable^{TM} SOF-50 1ea ThermoStable^{TM} SOF-105/-155/-W105/-W155 2ea
③	Controller	Set and Check operation
④	Window	Safety Double
⑤	Door Handle	Door open and close

<Table.3.2.1> Names of each part and description

<Fig.3.2.5> Standard Model,
"ThermoStable™ SOF-105"



ThermoStable SOF-50 (120V) : 250V F 10AH
ThermoStable SOF-105, -155 (120V) : 250V F 20AH
ThermoStable SOF-50, -105, -155 (230V) : 250V F 10AH

<Fig.3.2.6> Side of " ThermoStable™ SOF"

NO	Names	Description
⑥	Power Switch	Power ON/OFF
⑦	Fuse	Protect unit from High Current
⑧	Safety Switch	Prevent overheat

<Table.3.2.2> Names of each part and description

• Controller

<Fig.3.2.7> Controller for SMART Laboratory Oven

NO	Name	Description
①	Set temperature	Controls and checks temperature
②	Current temperature	Indicates current temperature
③	START/ STOP	Controls operation starts and stops
④	Program Mode control	Sets programs and controls operations
⑤	OFF SET	Set compensating temperature values
⑥	CHART	Monitors operational status in graph
⑦	SETTINGS	Sets various functions of device
⑧	Error	Notifies device's error
⑨	WiFi connectivity	Indicates internet connectivity
⑩	Date	Indicates current date, time, operation hours
⑪	Operation Information	Indicates operation information
⑫	Operation ON/OFF ICON	Indicates ON/OFF in operation with icons

	Heater ON		Heater OFF		In operation		Stopping

<Table.3.2.3> Name and description of parts

3. Product Usage

3.3 Operation instructions

- Make sure to set the SAFETY Knob at 30~40℃ higher than the operation temperature before operating the product.
- Connect the power and turn the switch ON
- Control all operation of the product with Touch Screen

3.3.1. TEMPERATURE setting and operation

- You can set the temperature by entering the number directly on the Temperature Setup screen by pressing "SET" button on the right where the set temperature is shown.

<Fig.3.3.1> Operation temperature setting

- You can set the temperature at a 1℃ increment and can set between 25℃ to 250℃. Press "ENTER" after entering the set temperature. It returns to the main screen when the set temperature is applied.

3.3.2. Product SETTINGS

- All functions on this device can be set in "SETTING" menu. When you touch the return button on the top right of screen in all menu screen, it switches to the previous screen.
- Touch the "STOP" button on the top right to stop the device and check the SETTING menu being activated since SETTIGN menu is disabled during operation.
-

<Fig.3.3.2> SETUP Mode

- It is described in order for the operation of product. Proceed with the following steps in order.

- In order to use the product's WiRe™ Service, please refer to how to install "WiRe™ Service".

① Operation Settings

<Fig.3.3.3> Operation Settings

(1) Running Mode After Power Failure

- It sets a mode for power is abruptly cut off and turned back up due to power supply issues such as power outage.

- When setting a Stop mode: It stands ready at the value prior to the power outage and maintains the operation on hold.

- When setting a Restart mode: It operates depending on (4) Operation Mode.

  A) Fixed Mode: When reauthorizing the power, it automatically operates at a temperature set that it previously operated on and the operation time on main screen starts from 0 again.

B) Program Mode: It restarts from the first segment of the previous pattern it operated on.

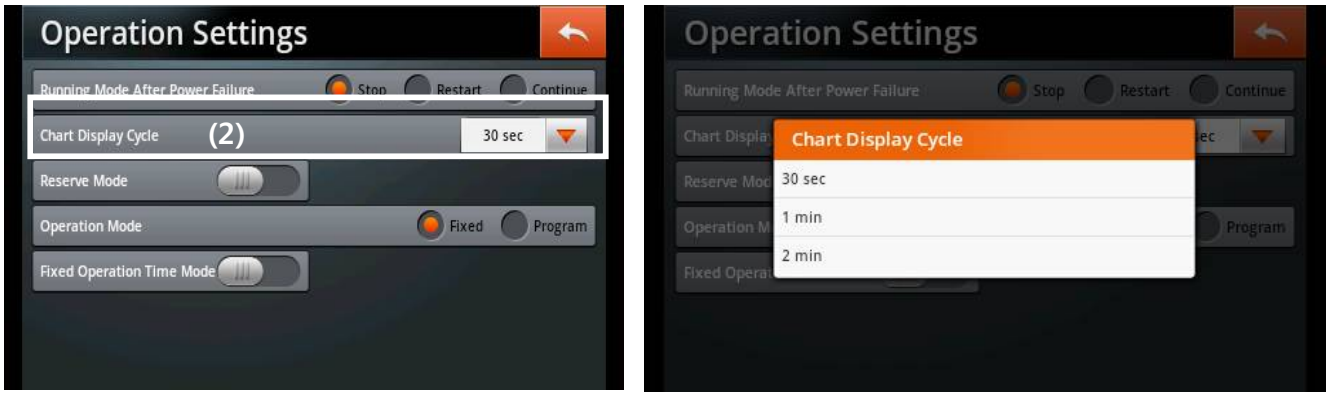
- Setting a Continue mode: It operates depending on (4) Operation Mode.

A) Fixed Mode: When reauthorizing the power, it automatically operates at a temperature set that it previously operated on and the operation time on main screen continues its counting.

B) Program Mode: It restarts the count from the remaining time of first segment that stopped and it restarts.

(2) Chart Display Cycle

- You can set the temperature cycle shown on Chart. User can select from 30 seconds, 1 minute and 2 minutes.

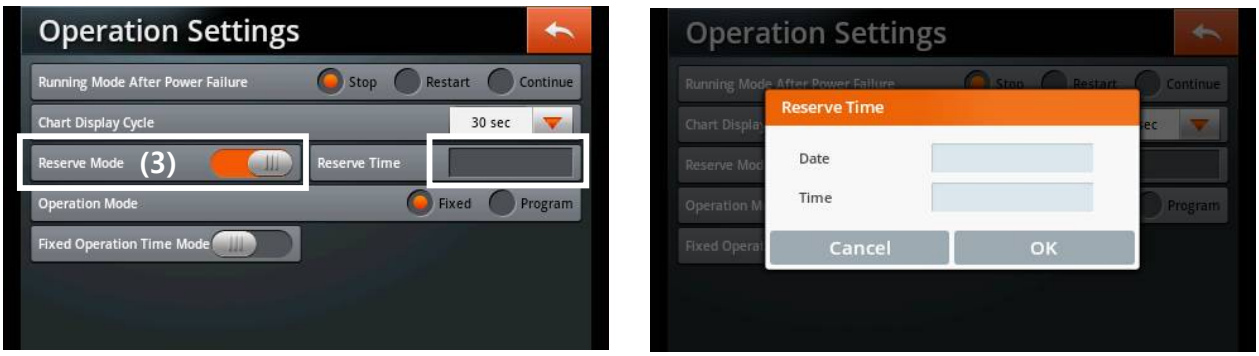


<Fig.3.3.4> set graph display cycle

(3) Reserve Mode

- Set date and time you want to operate the device and it will start at the reserved time. Minimum time required to use this mode is 5 minutes.

- It automatically turns off after being applied one time.



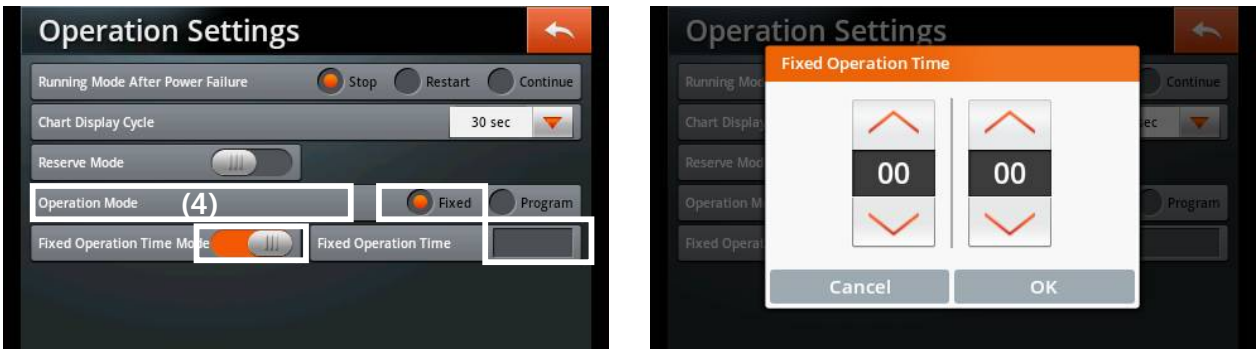
<Fig.3.3.5> reserve opeation setting

(4) Operation Mode

- There are two choices: the Fixed Mode that operates within the fixed temperature range and the Program Mode that operates in various temperature in sequence by patterns.

* Fixed Mode

- If Fixed is selected, Fixed Operation time Mode window is activated.



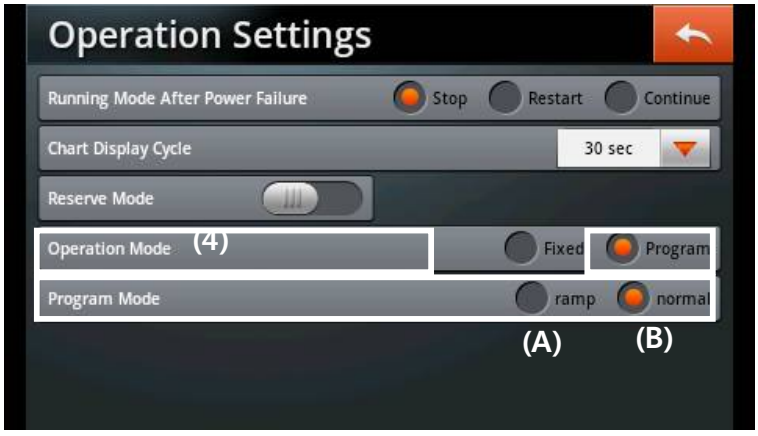
<Fig.3.3.6> Fixed Mode setting

- Set Fixed Operation Time Mode to ON and press Fixed Operation Time to set the value of timer. It operates for a time it set when you start the product from main screen.

- If Fixed Operation Time Mode is set to OFF, the set temperature keeps operating. Limit of Operation Time is 3 minutes ~ 23 hours and 59 minutes.

* Program Mode (in order)

- If the program is selected, Program Mode window shown below is activated.
- Program Mode can select one of two different methods to reach a target temperature.
- The following describes how to set the product operation. Please refer to ④Program for how to set Program Mode in detail.



<Fig.3.3.7> Program Mode setting

A) Ramp: It can set time to reach a target temperature.
Per one target temperature, it needs a segment time setting to maintain a target temperature after setting the segment time to reach the target temperature. If the maintaining time for target temperature is not needed, do not make second segment for the target temperature.

B) Normal: It operates at the maximum performance to reach a target temperature.

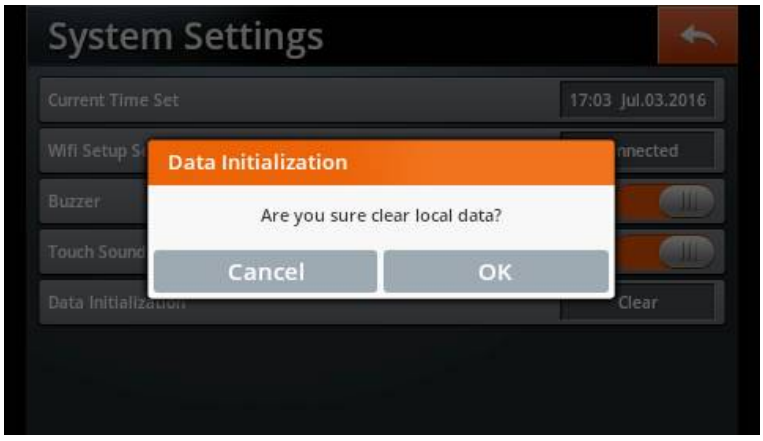
② System Settings

<Fig.3.3.8> System Settings

(1) Buzzer
- You can select ON/OFF for Error alarm.

(2) Touch Sound
- You can select ON/OFF for Touch Button sound.

(3) Data Initialization
- It initializes Operation Settings stored and Chart Data.



<Fig.3.3.9> Data Initialization

③ About

- You can check information of the device as Serial Number, Model, Temp Range and a version of Touch App.

<Fig.3.3.10> device information check

④ Security Settings

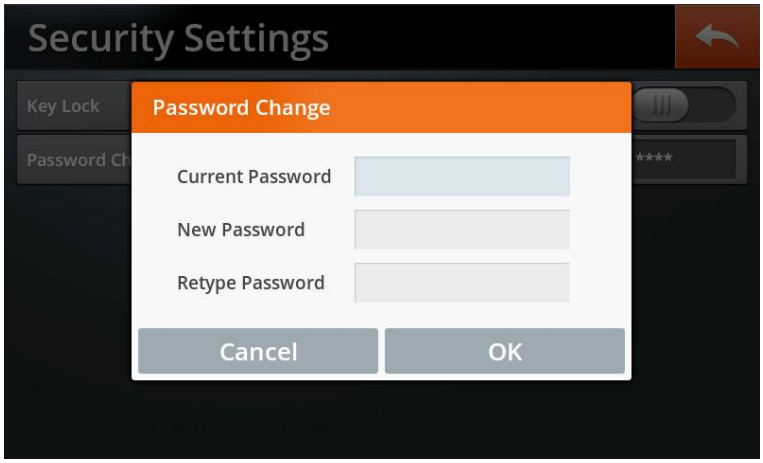
<Fig.3.3.11> Locking setting

(1) Key Lock

- It requests password to access some key menu settings in menu. Key Lock is activated by setting button to the right.

(2) Password Change

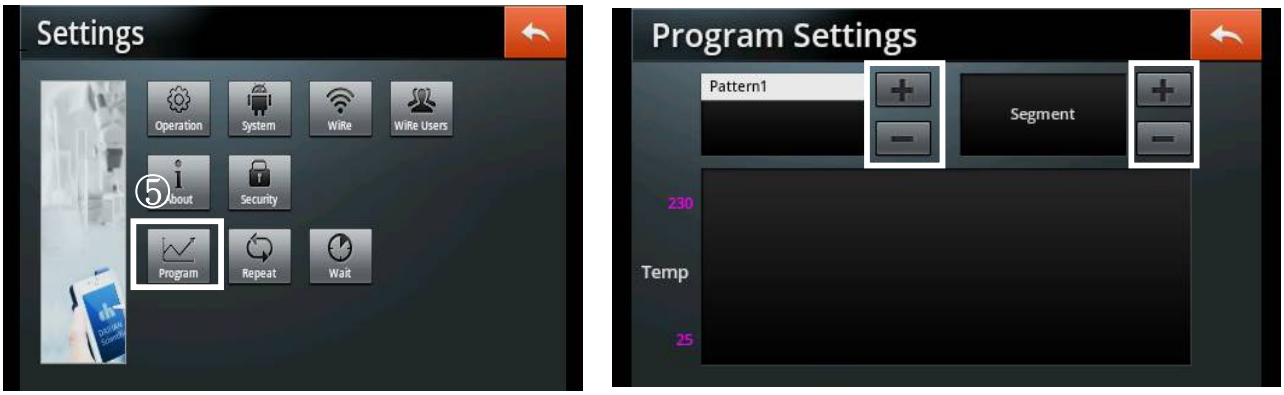
- It allows password to change. Enter 4 digits password stored in "Current Password" (factory setting "0000") and type in "New Password" and "Retype Password" to finalize the process.



<Fig.3.3.12> Password change setting

⑤ Program(In order mode)

- You can select and store operation program as pattern and segment.
- You can select and use one of several programs stored when using the product.
- Program is a collection of Pattern and pattern is a collection of Segment.

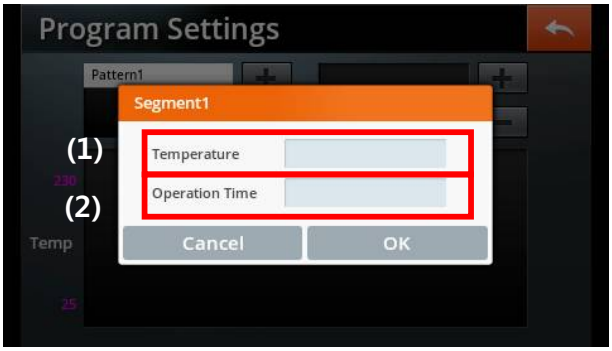


<Fig.3.3.13> Set Pattern

- Pattern can store up to 120 and a maximum of 100 segments can be stored in 1 Pattern.
- Pattern is created by using + button, and in case you want to delete, press the number of Pattern you want to delete and verify the Pattern number selected in white color and delete using – button. If Pattern is deleted, the Segment stored within the Pattern also is deleted.
- If you want to set Segment within Pattern, select the Pattern number you want to select as Segment, create by using + button next to Segment. If you want to delete, press the corresponding Segment number and verify the selection in while color, delete using – button.

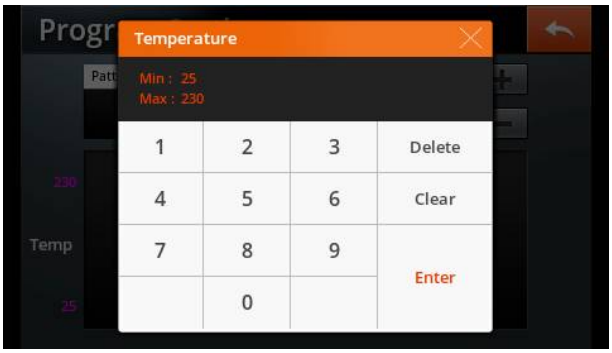
- Pattern and Segment created can be immediately verified on screen in graph, and can enter or change values by clicking the graph.

- Enter the value of Segment after creating Pattern and Segment. You can verify the temperature and time set for the Segment selected when you select Segment from the Segment window and touch.

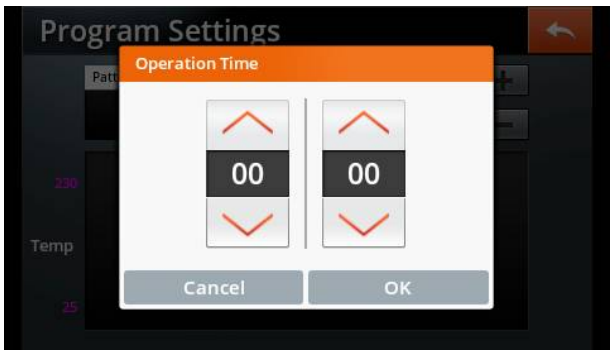


<Fig.3.3.14> verify values of Segment

- You can reset temperature by clicking (1) Temperature window of Segment and can reset the timer by clicking (2) Operation time window.



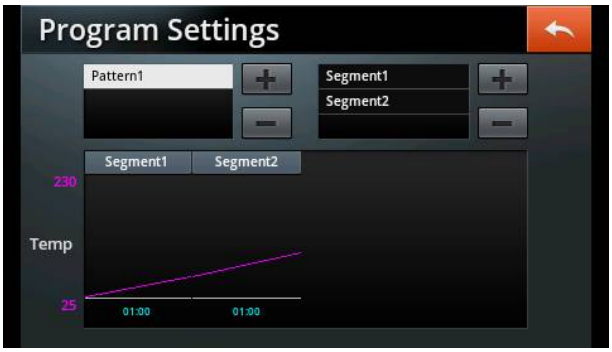
<Fig.3.3.15> enter temperatue of Segment set



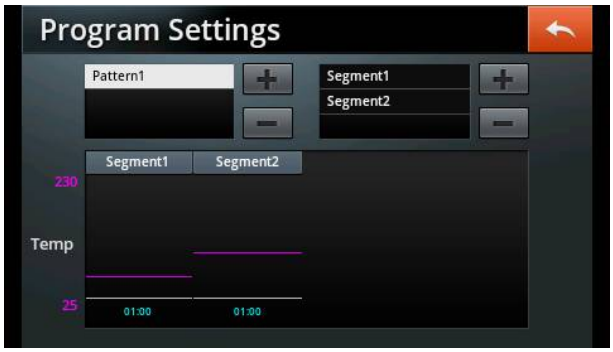
<Fig.3.3.16> enter opertion time of Segment

- If OK is pressed after entering the value set, you can immediately verify the changes from graph.

- Segment graph is displayed depending on the operation method selected from ramp or normal from Program Mode of Operation Mode.



<Fig.3.3.17> setting ramp



<Fig.3.3.18> setting normal

- When setting with Program Mode, it is activated when (1) Program menu is created and operation is stopped. (2) STEP and (3) buttons are created in the operation of Program Mode.

<Fig.3.3.19> Main screen when Program Mode is in operation

(1) Program button: it enters into the Program setting screen rapidly.

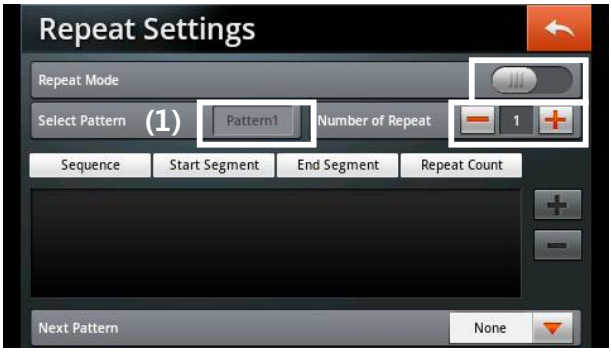
(2) Step button: It skips to next Segment while in operation.

(3) Hold button: It temporarily stops while in operation.

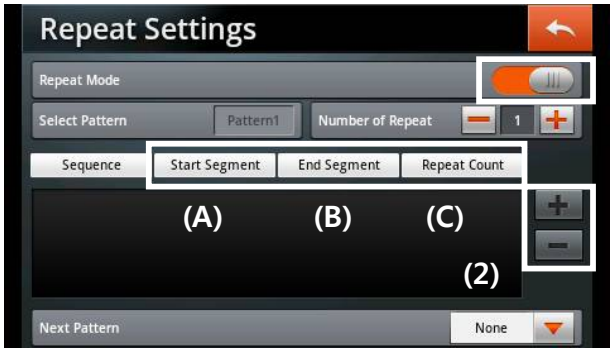
⑥ Repeat

You can set to repeat the operation within the selected Pattern by entering Repeat after selecting Pattern from Program Settings screen.

- If Pattern is created from Program Settings, you can set and store Repeat Mode regardless of Operation Mode. However, when operating with Program Mode, you must set Repeat Mode to ON.

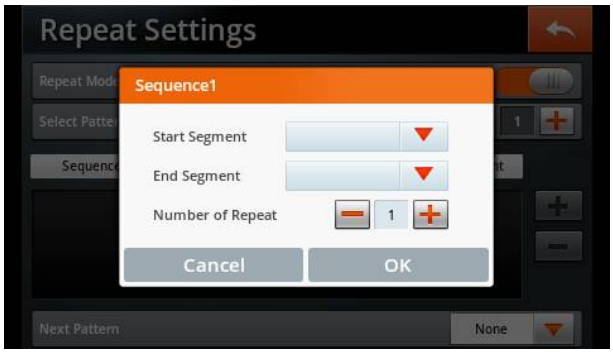


<Fig.3.3.20> Repeat Mode OFF



<Fig.3.3.21> Repeat Mode ON

- (1) You set the number of repetition after verifying the Pattern number of Select Pattern. You can set to repeat up to 100 times, and can be set to ∞ infinity by pressing – button at 1.
- (2) You can edit the order of operation after setting the number of repeat. Select Start Segment and End Segment by pressing + button from Sequence list, and set the number of repetition between the Sequences selected.
  (A) Start Segment: Select first Segment for repeat operation
  (B) End Segment: Select final Segment for repeat operation
  (C) Segment Count: Set the number of repeats from Start Segment till End Segment



<Fig.3.3.22> Enter Sequence

- You can enter maximum Sequence of 10

- (3) Next Pattern enters Pattern that operates after the repeat operation of selected repeat Pattern is completed.

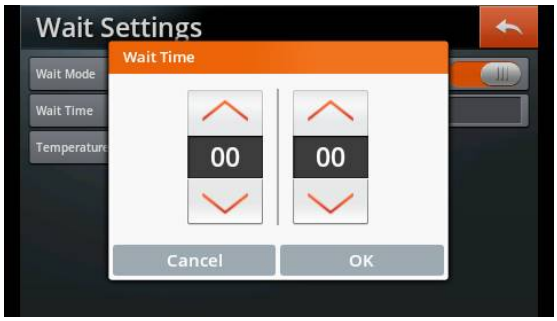
- Next Pattern can select from stored Pattern other than selected Pattern with Repeat operation, it does not allow to operation in continuation of other Pattern after the Repeat operation if set to None.

<Fig.3.3.23> Next Pattern selection

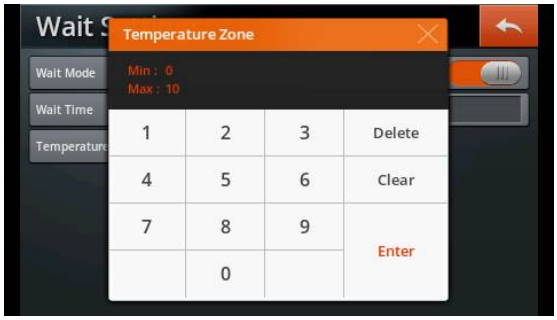
⑦ Wait

- In operation of Program Mode, if Segment of selected Pattern has not reached the temperature set within the time set, Wait Time allows to wait until the temperature reaches Temperature Zone (set error of the target temperature ± value) without moving into the next Segment.
- If not reached the temperature set within Remaining Time in Ramp Mode, Wait Time starts.

<Fig.3.3.24> Wait Settings



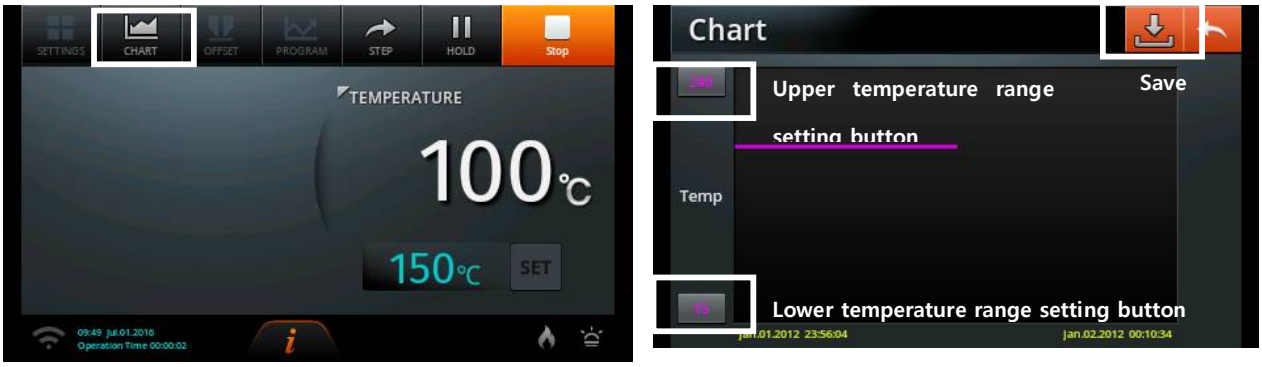
<Fig.3.3.24> Wait time Settings(1)



<Fig.3.3.24> Wait time Settings(2)

- Wait time can be set to 23 hours and 59 minutes and Temperature Zone can be set to ±10℃.
- If the target temperature does not reach Temperature Zone within Wait Time, it moves on to the next Segment.

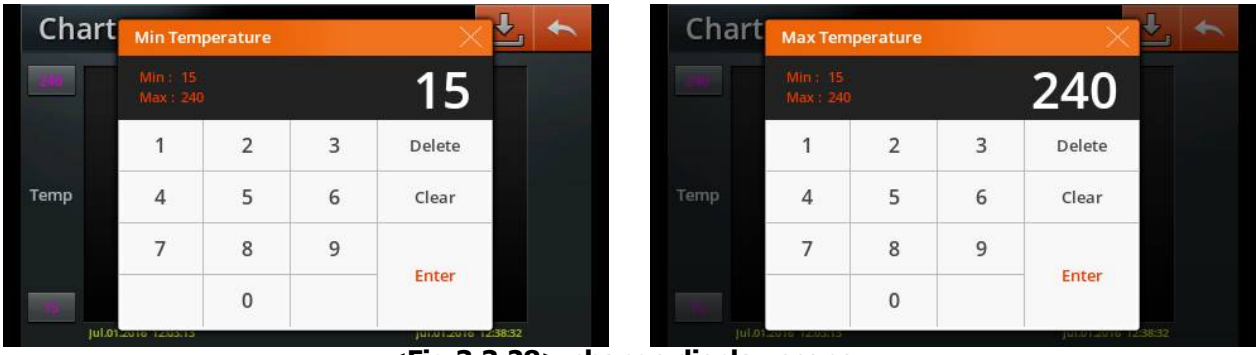
3.3.3. CHART



<Fig.3.3.27> check temperature graph

- Temperature data is stored at internal memories at every 10 seconds and maximum 6 months of data are stored. Please use Data Backup once every 6 months.

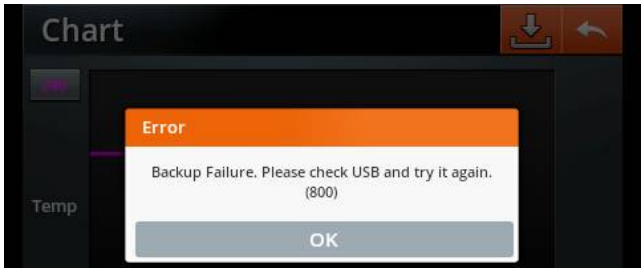
- Temperature scope shown on graph can be changed using the set button on the low left. Maximum and minimum values can be changed within limits shown on a pop up window.



<Fig.3.3.28> change display scope

- After inserting a USB into the port on top of controller, it stores in the USB if the store icon on top right is pressed.

- Error message appears if USB is not recognized. Press "OK" button and remove USB and reinsert and press the store icon.



<Fig.3.3.29> USB recognitiion error message

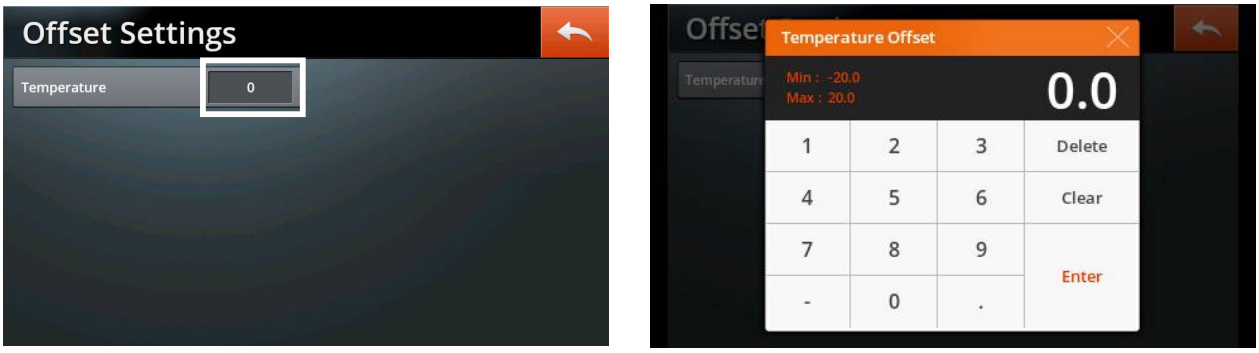
- You can see the detailed information such as date, time, temperature, Error, etc. if you press a point on graph. If you drag right and left or press other points while pressing the point, detailed information of the location emerges on a detail display.

- You can check the information on graph by moving at a small increment of the point using arrows on the detail display. The area showing detail information is displayed in a straight line on the overall graph in yellow vertical lines.

<Fig.3.3.30> verifying detail graph information

3.3.4. OFFSET

In case a user must test by matching temperature gauge used as a standard for test with temperature gauge shown on the controller, you can set the value of offset and increase or decrease the temperature displayed on the screen.



<Fig.3.3.31> setting offset values

- Limit of offset values are -20.0℃ ~ +20.0℃, and current temperature after setting offset value displays the value that includes the offset.
- Once you set the offset value, the value is stored and the offset value is reflected in the current temperature even you press ON/OFF button.

3.3.5. Error Message

- If happen a error, Error notice will be showed in the display and if you click it, you can see what happened in detail.

ERROR Message	Causation	Solution
Temp Error	When display show unreasonable temp. value by out of order of temp. sensor	Call the A/S Center.
Door Open	When over 10 Sec. after open the Door.	Check status of the Door and if still happen it even door closed, call the A/S center.
Revolution Error	When the Communication error problem of equipment and Touch Board.	Please check the connection of the Touch Board.

* When malfunctions in the Touch Screen occur, please press the Reset Button by inserting an appropriate tool (such as a paper clip) into the Reset hole, which is located in the right frame of the Touch Screen as shown in the figure below. The Touch Screen is rerun by pressing the Reset Button.

4. Maintenance

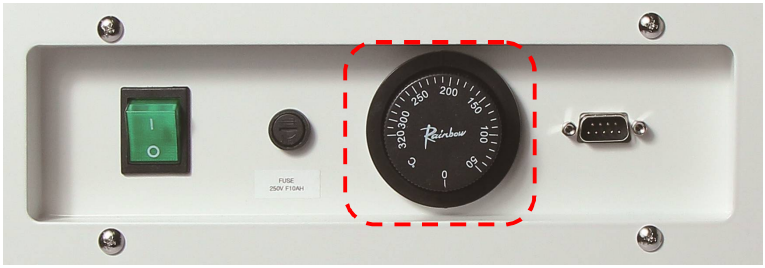
4

4.1 Maintenance

Smart-Lab Natural Flow type Oven is manufactured considering various situations that may occur during operation. However, make sure to comply with the following in order to use the device at a reliable performance for a long period.

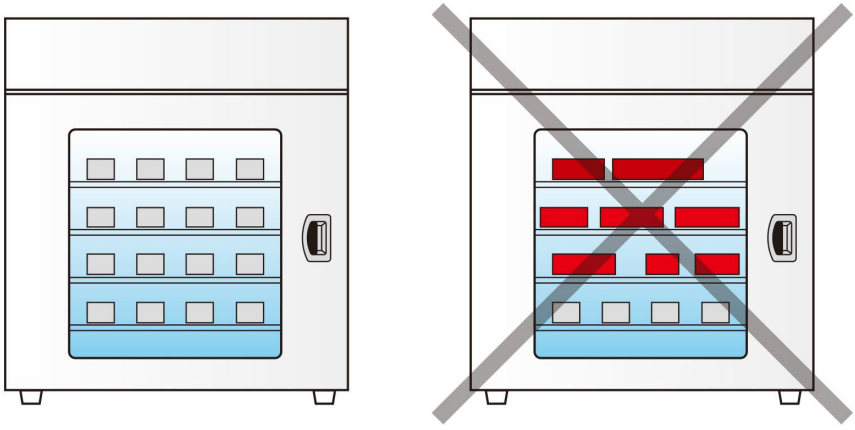
1. Make sure to use rated power source of AC 120V, 60Hz or AC 230V, 50/60Hz, Single phase
2. Operate in a dry indoor location if at all possible and maintain the indoor temperature at 5°C ~ 40°C
3. If not being used for a long period, unplug and dry before packaging for storage.
4. If replacement parts are required due to the failures while in use, it must use the original parts supplied by the company.
5. Failures occurred from using its outer limits cannot be repaired.
6. Power sources authorized must be used.
7. Do not touch power plug and electrical devices with wet hands.
8. Do not put conductive or flammable materials into the vents on the outside of product for it may cause fire or electric shocks.
9. Wipe with soft towels after unplugging power, and moisten a towel with lower-temperature freezing solvent to remove dirt.
10. Adjust air ducts as needed and close the entrance to store for contaminants may enter from outside when not in use.

*** Check Safety Knob by Regulation.**



1. On the product Side, check the Safety Knob.
2. If the power of the product is OFF, check the 'Tak' sound in the vicinity of room temperature when slowly turning clockwise up to 320℃ after adjusting the Safety Knob to 0℃.
3. If the power of the product is ON, check the 'Tak' sound in the vicinity of current temperature of product when slowly turning clockwise up to 320℃ after adjusting the Safety Knob to 0℃.
4. 'Tak' sound is Normal, If 'Tak' sound is not occurred A/S is required.
5. Please check the progress on a regular basis. Proceed at least once to 6 months.

*** Sample loading method.**



1. Please don't place samples to the floor of inner chamber, it may cause overheating or fire.
2. For proper air circulation in the working chamber, please don't load samples too tightly and give enough and regular space between samples.
3. Please don't touch side or floor in the chamber, it may have high temperature still and may cause injury.

4. Products Management

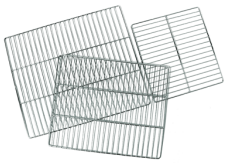
4.2 Troubleshooting and solution

Situation	Confirmations and Solutions
If power does not turn ON.	Make sure that Power Cord is plugged well. Check that there are no problems in the power supplied. Make sure that the circuit breaker is in the ON position. Check the short circuit status of the fuse.
Power Failure	Check the power cord is plugged into wall socket. Check the supplied voltage is proper and regulated.
Heating, but temperature is fluctuated	Check the temperature that is currently set. Make sure that the power switch is in the ON position. Check that SAFETY Knob is not placed in the "0" position, and if SAFETY Knob is in the "0" position, sets up 30℃~40℃ higher than the service temperature.
Heating, but unit not reaching temperature	Check the Set Temperature is higher than ambient temperature (recommended min set temp: 10℃ higher than ambient temp). Problem in the sensor or main controller.
Fuse is blown OR circuit breaker is flickered.	Check power source of wall socket and see what other loads are on wall circuit.
※ If you have any problem other than the above, please call technical service of manufacturer or an official agent.	

4. Products Management

4.3 Accessories

*** Ordering Information**

Image	Ordering Number	Information
	DH.WOF11050	Wire Shelf, for 50 Lit., "OFS050", w340xd310mm
	DH.WOF11105	Wire Shelf, for 105 Lit., "OFS105", w455xd375mm
	DH.WOF11155	Wire Shelf, for 155 Lit., "OFS155", w520xd440mm
Validation(IQ, OQ) Service	DH.SWOF31050	Validation Service(IQ, OQ), "OFV1050", for ThermoStable™ SOF-50
	DH.SWOF31105	Validation Service(IQ, OQ), "OFV1105", for ThermoStable™ SOF-105
	DH.SWOF31155	Validation Service(IQ, OQ), "OFV1155", for ThermoStable™ SOF-155
	DH.SWOF32105	Validation Service(IQ, OQ), "OFV2105", for ThermoStable™ SOF-W105
	DH.SWOF32155	Validation Service(IQ, OQ), "OFV2155", for ThermoStable™ SOF-W155

5. Product Assurance

5.1 Quality Assurance

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CERTIFICATE

of
Quality Tested by Manufacturer
and Free Warranty up to 2 years
for Laboratory Instrument

Limited Warranty

1. This instrument has gone through our testing process about all functions before shipment.
2. This instrument is warranted for 2 years from purchasing date.
3. A breakdown caused by customer's improper use or natural disaster is excepted from this warranty.
4. This certification is only for international customers.

Item	**Forced Convection type Smart Oven**
Model No.	**ThermoStable^{TM} SOF-**
Serial No.	
Date	
Customer	

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