

Certifications by - - -

- ✓ **ISO 9001 Certified.**
- ✓ **CE Certified**
- ✓ **PL Insurance. (Product Liability Insurance)**

✧ English Page : P. 1 ~ 42

✧ Korean Page : P. 43 ~ 79

User Manual

(Version : 2.2.3)

written for

UniFreez™ U400 / U500 / U700 / U800 models

DuoFreez™ U400 / U500 / U700 / U800 models



"DuoFreez™ U500"

DuoFreez™ Ultra Low Temperature Freezer, 503Lit.

Sales & Basic A/S :

By the Nearest Official Distributors.

EUROPEAN DECLARATION OF CONFORMITY



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

Ultra Low Temp.(ULT) Freezer UniFreez U400, U500, U700

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

EN 61326, EN 61000-3-2, EN 61000-3-3
EN 61010-1, EN 61010-2

following the provisions of the directives:

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

EC Directive 2006/42/EC

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

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Ultra Low Temp.(ULT) Freezer DuoFreez U400, U500, U700

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1. General

1

1.1 Precautions Before Use

Thank you for purchasing the Ultra Low Temperature Smart Freezer.

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.)

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

1. General

1.2 Product introduction


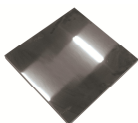


This product supports fast cooling speed and minimal power consumption by applying SimpleFreez™ (Simplified Hi-Efficiency Freezing System), an innovative cooling system. In addition, it remotely controls experimental equipment by building A Smart-Lab™ System through the WiRe™ App & web Service, and it is implemented so that monitoring can be done at any time, and anywhere.

This product was developed and manufactured considering the best possible ease of use and safety, and has the following features.

1. Its structure and electrical circuit are simplified, and the arrival time to objective temperature and the power consumption are minimized by applying SimpleFreez™ for high efficiency and safety.
2. Two independent DuoFreez™ structures maintain the cooling temperature and have the perfect backup function in case any trouble arises in one system.
3. The actions of various menus have been simplified through a 7-inch Full Touch Screen by applying the Smart-Lab™ Controller.
4. It sends the unusual conditions 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 remote monitoring and control are possible.
5. It can prevent cold air leakage and the intrusion of the outside temperature and maximize the insulation effect because of the rigid polyurethane foam insulation and the insulation for inside the door. 3 layers of insulation are equipped with this product.
6. The user can easily open the door immediately after opening or closing it by automatically relieving the pressure difference between inside and outside by employing an automatic vacuum breaker.
7. The user can easily operate the door by employing the rugged, ergonomic door handle, and a locking function has been attached for security.
8. The graphic display with high resolution can check data, and also data backups and program updates are possible through a USB port.
9. The position of the samples and a memo function are supported for efficient storage and the management of samples.
10. It can prevent damage to samples by preparing for sudden stops in movement through LCO2 spraying function support.
11. The user can randomly specify the crossover operation period of the compressor through Eco Mode, and support the power saving function.
12. It provides convenience for management to users because management tasks such as the replacement or cleaning of the filter are omitted by implementing a filter-free mechanism.
13. The strict production management is performed through CE certification.
14. PL(Product Liability) Insurance

1. General

1.3 Product Configuration

Component Photo	Component Name	No. of Configuration
	UniFreez™ U400 / U500 / U700 / U800 DuoFreez™ U400 / U500 / U700 / U800	1 Unit
	Stainless Steel Shelves (Over 16ea Clip)	3 ea
	Hand Remover of Ice	1 ea
	Door Lock Key	1ea

- Including a copy of the Operation Manual

* Models

- UniFreez™ U400: Ultra Low Temperature Freezer, Upright type, -86℃
- UniFreez™ U500: Ultra Low Temperature Freezer, Upright type, -86℃
- UniFreez™ U700: Ultra Low Temperature Freezer, Upright type, -80℃
- UniFreez™ U800: Ultra Low Temperature Freezer, Upright type, -80℃
- DuoFreez™ U400: Ultra Low Temperature Freezer, Upright type, -95℃.
- DuoFreez™ U500: Ultra Low Temperature Freezer, Upright type, -95℃.
- DuoFreez™ U700: Ultra Low Temperature Freezer, Upright type, -90℃.
- DuoFreez™ U800: Ultra Low Temperature Freezer, Upright type, -90℃.

2. Installation

2

2.1 Product Installation

1. Please be careful when transporting the product because it is heavy.
2. Please do not lay the product on the floor or subject it to shock. It can cause damage inside the product.
3. Please install the product in a hard, flat, and stable place.
4. If there is no regular interval between this product and the wall of the installation space, its cooling power becomes weak, and the power will be wasted, so this product should be installed in a place at least 15 cm apart from the rear wall and 10 cm or more apart from the side walls, and there should be an interval of 100 cm or more from the ceiling.
5. Please do not install the product in a place where it is exposed to direct sunlight, or in the dangerous places.
6. To minimize the risk of short circuits, do not install the product (in the) places where it will be subjected to the inflow of moisture or organic solvents on the regulator part or inside of the body.
7. This product was manufactured for normal operation at a rated voltage, so please check the voltage status before installing the product.
8. When installing and using the product, please certainly use the power cord provided with the products.
9. The power plug of this product contains a ground. Please connect it to a grounded power outlet. If the ground is unstable, it may cause electric shock.
10. If there is no ground in the power outlet, it must be installed by an electrical company. Please do not connect the ground wire to water pipes, gas pipes (explosive, inflammable risk), or the ground of a telephone line or a lightning rod (lightning hazards).

☐ **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

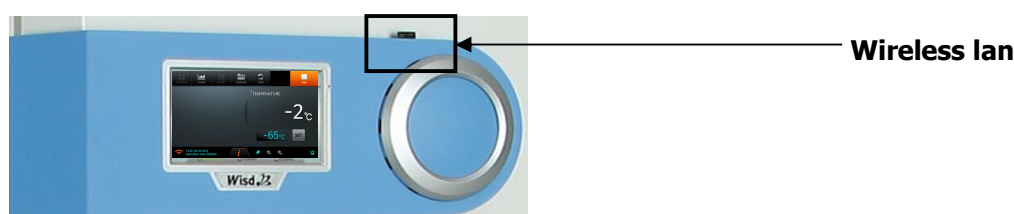
Secured Area: Worldwide (excluding North America)

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 Installation of WiRe™ App & Web Service

- After installing this product in a static position, the user who uses WiRe™ App & Web Service, please use this product after installing WiRe Service before using the product installed.
- This installation is progressed on the regulator of Touch Screen of the product.
- Because the Wireless LAN for using the internet is not installed in the product when shipping it at the factory, please connect by finding the wireless LAN among the components of the product.



<Fig.2.2.1> Control Panel

- This description is for the installation method for users who want to use WiRe™ App & Web Service. Only matters that should be installed when use WiRe Service are written, and the detailed description on the product Operation is listed in detail on "Instruction Manual".
- The sequence of the setting of WiRe™ Service during installation is as described in the following instructions. Please proceed with following instructions.
- Find the "SETTING" located on top-left of the main display to make settings required for the connection of WiRe™ Service.
- The "SETTING" displayed in the menu will be deactivated during the operation of the product. Push the "STOP" button located on top-right of the main display to stop the operation, and then find the "SETTING" becoming activated.



<Fig.2.2.2> Operation screen



<Fig.2.2.3> Stop operation screen



<Fig.2.2.4> Setting menu

- The "SETTING" has submenus of "System", "WiRe", and "WiRe Users" prepared for the connection to WiRe™ Service. Please follow following numbers of each instruction in order
- First, push the "System" menu to go on the system setting. Push the return button placed on top-right of all displays for each menu to go back to previous display.

1) System Settings

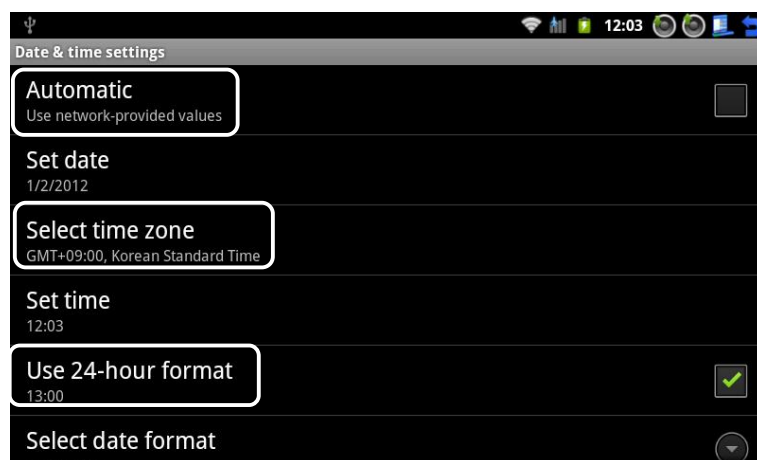


<Fig.2.2.5> System Settings

(1) Current Time Set

- The present time is set to input correct test time of user. Touch the box displaying time and date on the right side of the display.
- 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 select the "Automatic" with the Check Box unchecked.

- The "Select time zone" will synchronize the product with the time of selected zone (countries) for users using the 'Mobile App' to control the WiRe™ Service. Please be sure to select the time zone wherein the product is being used.

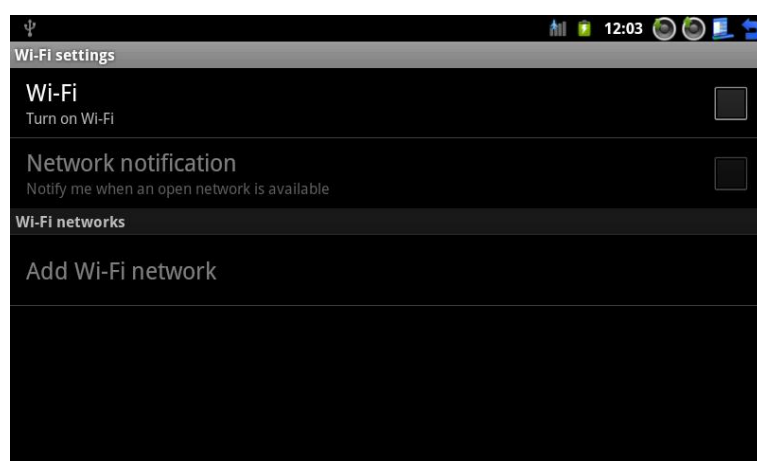


<Fig.2.2.6> Current Time Setup

- The Check Box on the right prepared for the "Use 24-hour format" must be checked for the correct operation of the product, and users should never change it.
- After completing the setting of the product, push the return button of blue icon to go back to previous page.

(2) WiFi Setup Set

- The 'WiRe™ Service' will only be available by the (wireless) internet connection. Users should make the product be connected to internet via wireless network.



<Fig.2.2.7> WIFI SET

- Click the 'Check Box' of Wi-Fi window to make the Wi-Fi connection (by typing set password if requested). In the case unable to detect Wi-Fi signals, please check the mounting of USB

dongle prepared for the Wi-Fi connection (Check the blinking of the blue LED).

- After completing the Wi-Fi connection to the product, push the blue return button located on top-right of the display to go back to previous page.

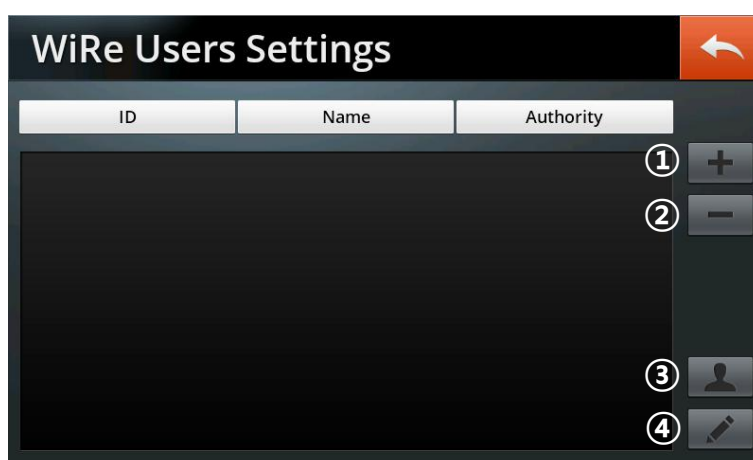
2) WiRe Settings



<Fig.2.2.8> WiRe Settings

- Slide the 'WiRe Mode' button to the right to connect to the 'WiRe™ Service'. This will only be enabled by the stabilized Wi-Fi connection.
- In cases of the unstable or disconnected Wi-Fi connection, the 'WiRe Mode' will not be switched normally. Be sure to secure stable Wi-Fi connection to the product.
- After completing the internet connection, users can find the 'Serial Number', 'Model', and 'Organization Name' as shown in the following display.

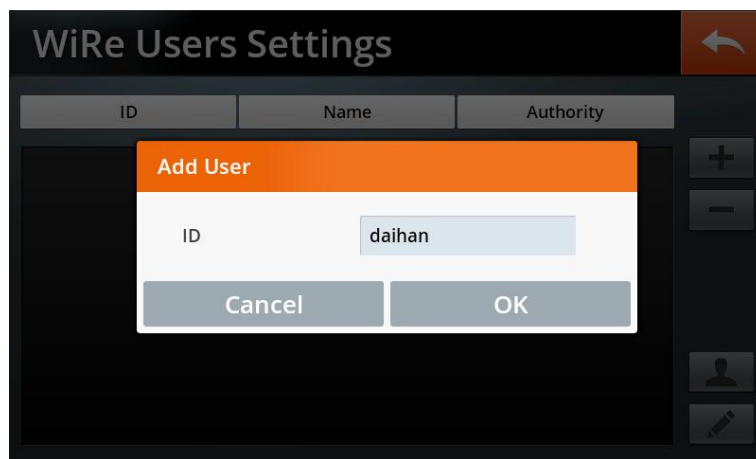
3) WiRe Users



<Fig.2.2.9> WiRe Users

(1) Registration of Additional Users

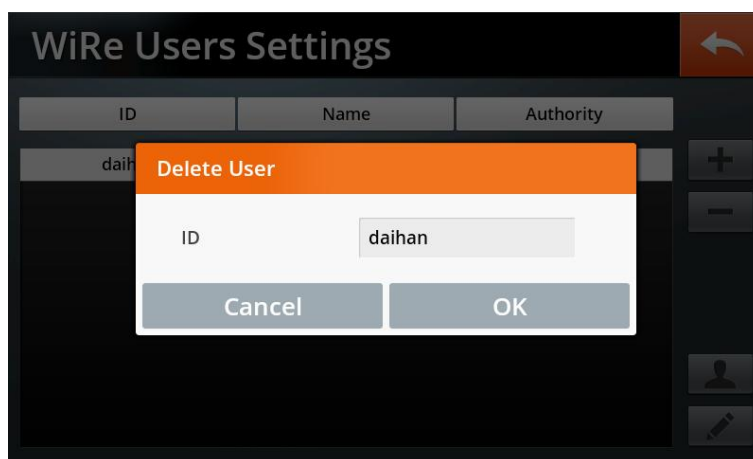
The users registered through existing 'Smart-Lab' device can use existing IDs to be registered in this product. When the user is logged in with the registered ID from the 'Mobile App' then the list of devices already registered will be appearing.



<Fig.2.2.10> Registration of the ID of existing User

(2) Deletion of Users

- Registered users may be deleted from the list by pushing the selected button corresponding to users to be deleted therefrom.

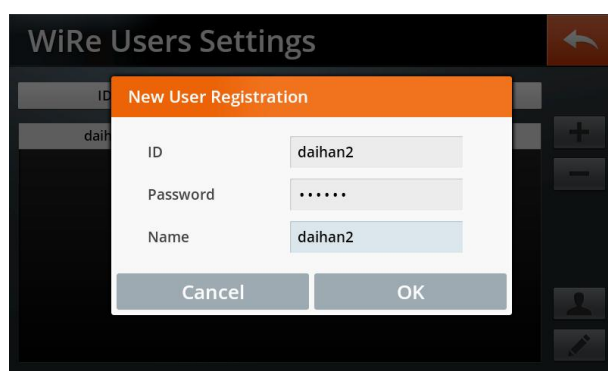
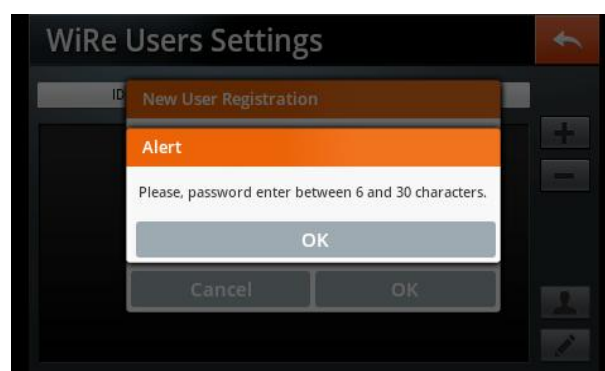


<Fig.2.2.11> Deletion of User from the List

(3) Registration of New User

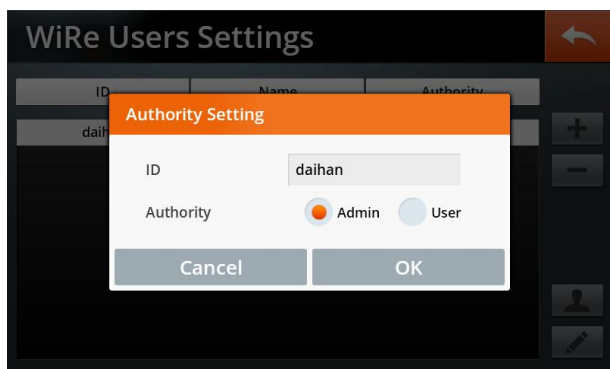
- Users who are using the 'Smart-Lab' device and 'WiRe Service' for the first time shall register users' information. Input the 'ID', 'Password', and 'Name' of the user for the registration.

- The user ID can be composed of minimum 6 to maximum 20 lowercase alphanumeric characters. In cases of the input of duplicated ID or other characters beyond the lowercase alphanumeric characters, the message showing the disability of ID setting will be popped up.
- The Password can comprise minimum 6 to maximum 30 uppercase or lowercase alphanumeric or special characters. The input with less than 6 or beyond 30 characters thereof or the input of characters other than predefined characters will encounter the pop up message showing the disability of Password setting.
- Once the 'ID', 'Password', and 'Name' are set in the list then they cannot be modified thereafter.

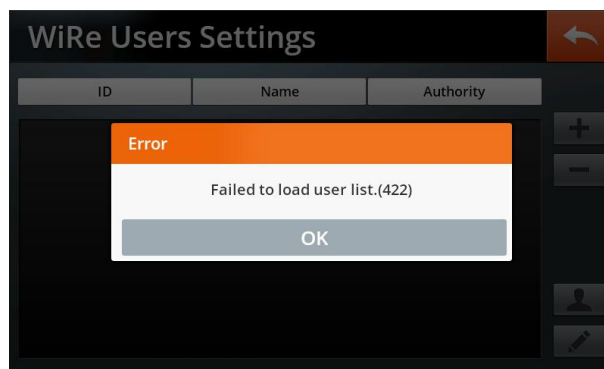
**<Fig.2.2.12> Registration of New User****<Fig.2.2.13> ID/Password Input Error**

(4) Setting of Authority of each User

- Users registered in the list can be set as an administrator or as a general user. The 'Admin' (the administrator) is the only one who can entirely administrate the 'Remote Control System'. Up to 100 users can be registered in the list as a 'User' allowed the monitoring of the status of device. (The remote control is not allowed for the 'User'.)
- The 'ID' among the list of registered users is selected to assign an authority set either as 'Admin' (the administrator) or as 'User' (general users).
- Since the authority of 'Admin' was prepared for the only one 'ID' of 'Admin', the existing 'ID' of 'Admin' will be turned into the 'ID' of 'User' with the appointment of new 'ID' of 'Admin'.



<Fig.2.2.14> Setting of Authority of Admin



<Fig.2.2.15> Communication Error Message

- The appearance of the message showing the disability to invoke the information of registered users may come from the unstable Wi-Fi connection. Check the status of Wi-Fi connection and then reenter into the menu of 'WiRe Users'.
- On completion of above procedure, the product will be connected to the 'Mobile App' enabling the service of 'WiRe™ Service'. To set the functions of the device, please refer to the instructions thereof.

2. Installation

2.3 Product Specifications

Models		DuoFreez™ U400 4 & 5 Door	DuoFreez™ U500 4 & 5 Door	DuoFreez™ U700 4 & 5 Door	DuoFreez™ U800 4 & 5 Door
Capacity		393Lit	503Lit	714Lit	796Lit
Freezing System		Dual Simplified Hi-Efficiency Freezing System(DuoFreez™)			
Temp.	Range	-95℃ ~ -65℃		-90℃ ~ -65℃	
		At room temperature of 30℃ and humidity of 70%			
	Sensor	PT 100 Sensor			
Compressor		Hermetic Type			
Condenser Type		Block Condenser, NO Pin, Filter Free Mechanism			
Refrigerant		Natural (CFC Free Refrigerant System)			
Controller & Display		7" Full Touch Screen TFT LCD (Smart-Lab™ Controller)			
Shelves		3ea(4 Door), 4ea(5 Door)			
Max. Q'ty of Racks	4-Door	16pcs of 15(5X3)- Placed Rack (RFU4234)	16pcs of 20(5X4)- Placed Rack (RFU4257)	24pcs of 20(5X4)- Placed Rack (RFU4257)	28pcs of 20(5X4)- Placed Rack (RFU4257)
	5-Door	20pcs of 12(4X3)- Placed Rack (RFU5234)	20pcs of 16(4X4)- Placed Rack (RFU5257)	30pcs of 16(4X4)- Placed Rack (RFU5257)	35pcs of 16(4X4)- Placed Rack (RFU5257)
Material	Internal	Stainless Steel (#304)			
	External	Powder Coated Steel Plate			
	Inner Door	Powder Coated Stainless Steel (#304)			
Chamber Dimension (wXdXh) (mm)	Internal	600X500X1,310	600X640X1,310	880X620X1,310	980X620X1,310
	External	840X750X1,900	840X890X1,900	1,120X870X1,900	1,220X870X1,900
Net Weight		260 kg	300 kg	320 kg	360 kg
Packing Size (wXdXh)(mm)		116 X 116 X 222	116 X 124 X 222	140 X 140 X 221	150 X 140 X 221
& Gross Weight		352 kg	392 kg	442 kg	482 kg
Energy Consumption at -80℃	Dual Mode	474 W/h	507 W/h	596 W/h	629 W/h
	Eco. mode	373 W/h	458 W/h	503 W/h	588 W/h
Power Supply & Cord Plug*		1 Phase, AC 120V, 60Hz or 1 Phase, AC 230V, 50/60Hz			

* Other Specifications are available upon Customer's Request


Models		UniFreez™ U400 4 & 5 Door	UniFreez™ U500 4 & 5 Door	UniFreez™ U700 4 & 5 Door	UniFreez™ U800 4 & 5 Door
Capacity		393Lit	503Lit	714Lit	796Lit
Freezing System		Dual Simplified Hi-Efficiency Freezing System(DuoFreez™)			
Temp.	Range	-86℃ ~ -65℃		-80℃ ~ -65℃	
		At room temperature of 30℃ and humidity of 70%			
	Sensor	PT 100 Sensor			
Compressor		Hermetic Type			
Condenser Type		Block Condenser, NO Pin, Filter Free Mechanism			
Refrigerant		Natural (CFC Free Refrigerant System)			
Controller & Display		7" Full Touch Screen TFT LCD (Smart-Lab™ Controller)			
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	External	840X750X1,900	840X890X1,900	1,120X870X1,900	1,220X870X1,900
Net Weight		210 kg	240 kg	320 kg	350 kg
Packing Size (wXdXh)(mm) & Gross Weight		116 X 116 X 222 296 kg	116 X 124 X 222 327 kg	140 X 140 X 221 442 kg	150 X 140 X 221 472 kg
Power Consumption		373 W/h	458 W/h	503 W/h	588 W/h
Power Supply & Cord Plug*		1 Phase, AC 120V, 60Hz or 1 Phase, AC 230V, 50/60Hz			

* Other Specifications are available upon Customer's Request

3. Product Usage


3.1 Precautions for Use







3


	Please be familiar with the user manual before using this product, and operation should be performed only by qualified personnel
	Please never tilt or lay the product during transportation, which the function of mounted cooling-related devices can be degraded, and problems can be result. Install the product in a place where the floor is hard and flat. Failure to do so can cause accidents. by negligence.
	This product should be connected to an 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).
	If the installation place was moved, do not connect the power immediately. It should be connected at least 30 minutes after moving. If you use this product immediately after moving, it may cause failure of the critical parts relevant to the freezer.
	The rack should be wiped with a soft cloth and then used after mounting it before connecting the power of this product. Please put the sample into the instrument after the instrument starts to operate and its inside is completely cooled. If a smell similar to plastic comes out from the instrument, the smell disappears after it is completely cooled.



– 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.

	Please, do not put bottles or cans into this product. If the contents in the can or bottle are expanded, it may cause the injury. Please do not put commercial bag-type coolants (including ammonium nitrate, urea) into this product. If the contents are leaked, it may cause rust and a malfunction.
	Please do not put commercial bag-type coolants (including ammonium nitrate, urea) into this product. If the contents leak, it may cause rust and malfunction.
	Please do not touch the samples or the containers in storage (especially metal goods) with wet hands or bare hands. Your hands may suffer frostbite. Please work after wearing gloves for low-temperature use. (If you search for "gloves for low-temperature use" in the DAIHAN Scientific Inc. Shopping Mall, www.AllforLab.com , you can purchase safety gloves for low-temperature with various specifications.)
	Please do not put goods or water containers on this product. If they fall down, people can be injured, or it may cause poor insulation and short circuit by water overflow.
	Please do not put your hands into the mechanical room, air outlet, or inlet. Since the fan is operating at high speed, it may cause burns or injury.
	Please do not hang on the door. It may cause personal injury or short circuit and electric shock.
	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).
	This device must be connected to an earthed power supply. Protective conductor terminal.
	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.
	Do not operate this product near a heater or an air-conditioner.
	Please do not use flammable or volatile products in the vicinity of the product to minimize the risk of fire. 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.

	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.
	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.
	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. It may cause electrical shock or ignition due to damage to the cord.
	If removing the power plug, please wait 10 minutes or longer until plugging it in again. If you just plug it in again, it may cause a malfunction by placing a burden on the freezer.
	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.
	Set the device a lightening place. When you set the device at a dark place, it may cause an unexpected accident by mistake in operation.
	Mains supply voltage fluctuations up to +/- 10% of the nominal voltage Pollution degree : 2 (Applicable RATED POLLUTION degree.)
	Overvoltage Category: III Transient overvoltages typically present on the MAINS supply NOTE: Then normal level of transient overvoltages is impulse withstand (overvoltage II of IEC 60364-4-443
	Depending on the material that shall be treated there could exist unhealthy gases that have to be led-out of the room in the most suitable way (by connecting an exhaust pipe)
	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.
	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.
	<p>This Symbol indicates that this product is to be collected separately. The following apply only to users in European countries:</p> <ul style="list-style-type: none"> ● This product is designated for separate collection at an appropriate collection point. Do not dispose of as household waste. <p>This product is required to comply with the European Union's Waste Electrical & Electronic Equipment(WEEE) Directive 2002/96/EC</p>

● When reinstall products

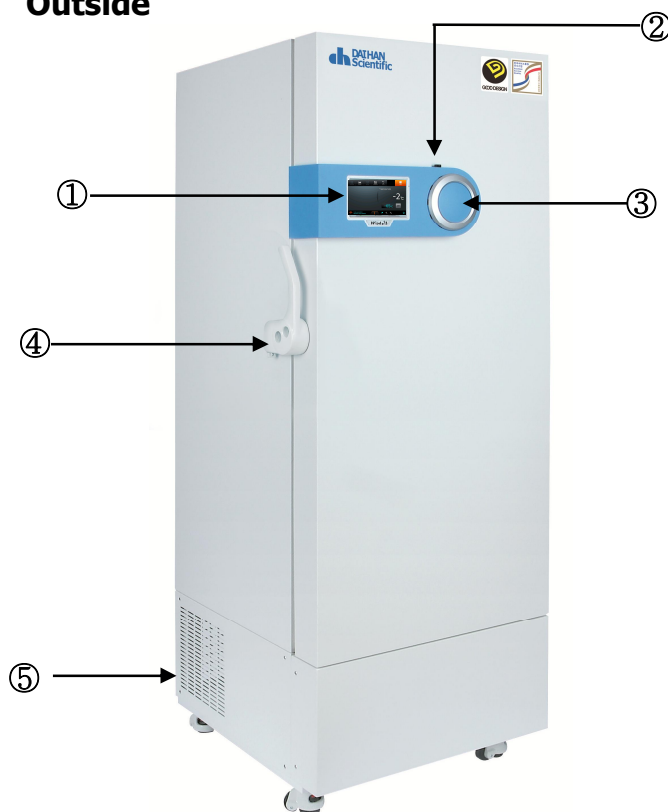
	When moving this product, please, consult with a DAIHAN Scientific Inc. Service Center or Nationwide Agents. If non-specialists install this product, it may cause short circuit, electric shock, and fire.
	Because of the very heavy weight of the product, when moving the product, please be careful to prevent overturning.
	When moving the product, please move it so that the power cord is not damaged after disconnecting the power plug from the electrical outlet. It may cause electrical shock or ignition due to damage to the cord.
	When moving this product, please move it after removing all of the samples in the instrument.
	When moving or installing the product, please do not move it when it is lying down. It can cause malfunction. If you move this product when it is tilted or lying down, please operate it after letting it be stable for approximately 24 hours.

※ 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.

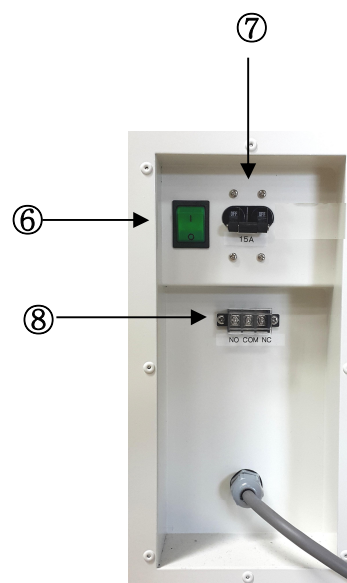
3. Product Usage

3.2 Names of Each Part

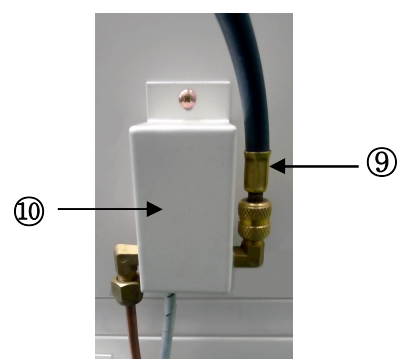
● Outside



<Fig.3.2.1> " DuoFreez™ U500 "
Ultra Low Temperature Freezer



<Fig.3.2.2> Back side of ULT Freezer.



<Fig.3.2.3> Automatic Valve of LCO2 Gas

NO	Names	Description
①	Controller	Full Touch-Screen TFT LCD
②	USB Port	For Data Back Up
③	Automatic Vacuum Releasing System	Helping re open the Door
④	Door Handle	Door open and close
⑤	Block Condenser	Condenser without Pin and Filter
⑥	Main Power Switch	Power ON/OFF
⑦	Circuit Breaker	Leakage Breaker
⑧	Alarm Signal terminal	For Remote warning alarm system
⑨	Inlet of LCO2 Gas	LCO2 Gas
⑩	Automatic Valve of LCO2 Gas	Automatic LCO2 Gas inject operation

<Table.3.2.1> Names of each part and description

● Controller



<Fig.3.2.4> Controller for Ultra Low Temperature Smart Freezer

NO	Names	Description
①	SET TEMP	Adjust and check the setting temperature.
②	CURR TEMP	Display the current temperature.
③	START/ STOP	Adjust the start and the stop of operation.
④	LCO2	Prepare for the state of emergency by injecting LCO2.
⑤	STORAGE	Enter and store the sample storage information.
⑥	OFF SET	Set the value of the calibration temperature.
⑦	CHART	Monitor the operating status by chart.
⑧	SETTINGS	Set up and adjust various functions of the instrument
⑨	Error	If the error of the instrument occurs, perform the alarm function.
⑩	WiFi status	It shows the status of the internet connection.
⑪	Date	Display the current date and time.
⑫	Operation Information	Show the state of the operation through LED Lamp.
⑬	ON/OFF ICON	Display operating part of device

	ECO funtion ON (Only DuoFreez)		ECO funtion OFF (Only DuoFreez)		Operaing of device		Stop of device
	Comp 1 ON		Comp 1 OFF		Comp 2 ON (Only DuoFreez)		Comp 2 OFF (Only DuoFreez)

<Table.3.2.2> Controller for Freezer

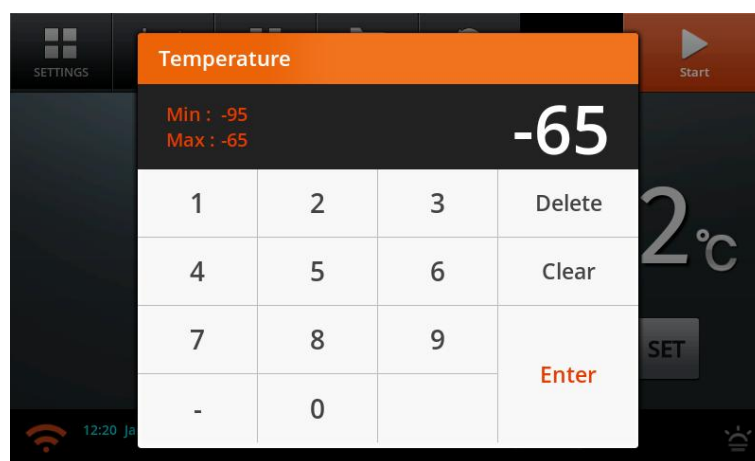
3. Product Usage

3.3 Usage Instructions

- If turning ON the power of this product, please turn ON the Main Power Switch after turning ON the Leakage Breaker located at the bottom of the rear panel.
- If turning OFF the power of this product, please turn OFF the Leakage Breaker after turning OFF the Main Power Switch. If you turn OFF the Leakage Breaker without turning OFF the Main Power Switch, the operation of the controller will be continued by the battery built into this product. This system is prepared for the controller being operated by the battery built into this product, and the alarm and LCO₂ spraying can be operated when there is a problem in the power supply such as a power outage.
- Please start operation after at least one minute when you turn ON the power supply again.
- The operation of the refrigerator will start operating after 1 minute after power. Since then, the refrigerator is also alternately starts and stops at predetermined intervals.
- All the operations should be operated through the touch screen.

3.3.1. TEMPERATURE Setting and Operation

- When the product is "ON", then the temperature thereof will be automatically rising or falling toward the set value.
- By pushing the "SET" button located on the right of the display of set temperature, the 'Temperature Setup' window will be popped up wherein users may set desired temperature with the value inputted directly through the numeric 'Button'.



<Fig.3.3.1> Set up of Operating Temperature

- The available ranges of set temperatures are as follows: -86℃~-65℃ for 'UniFreez Models' and -95℃~-65℃ for 'DuoFreez Models' (DuoFreez U700: -90℃~-65℃)

3.3.2. SETTINGS

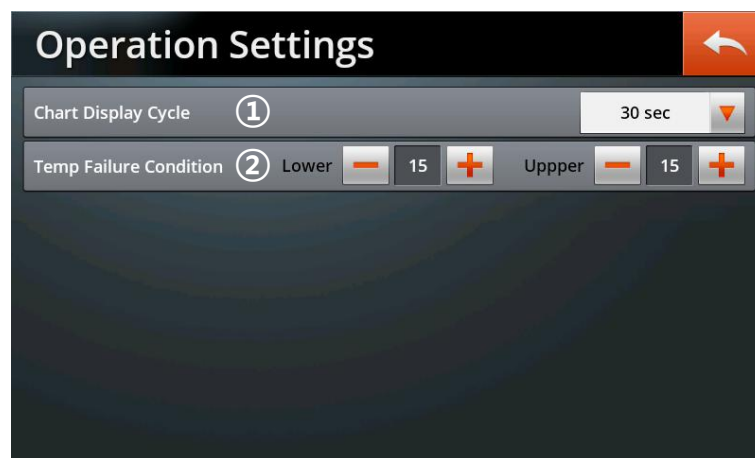
- Functions embodied in this product can be set in the "SETTING" menu. Push the return button located on top-right of all display to go back to previous display
- The 'SETTING' menu will be deactivated during the operation of the product. Push the "STOP" button located on top-right of the display to stop the operation and to activate the 'SETTING' menu.



<Fig.3.3.2> SETUP Mode

- Following are the sequentially arranged instructions prepared for the operation of the product. Please follow the instructions described in order.
- To use the 'WiRe™ Service' of the product, please refer to the "WiRe™ Service" included in the installation manual.

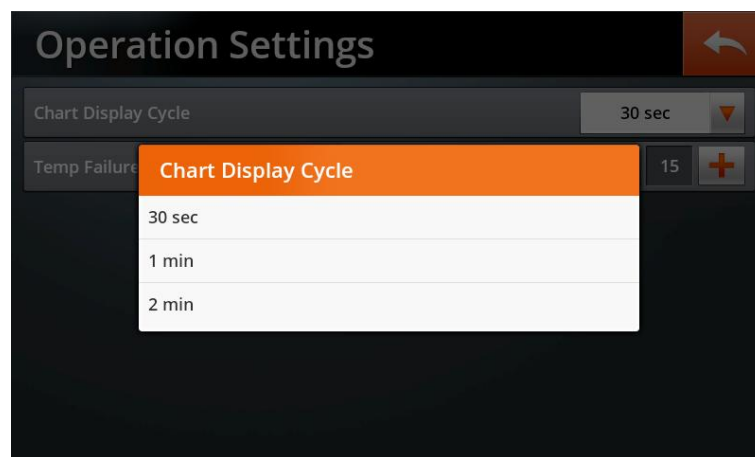
① Operation Settings



<Fig.3.3.3> Operation Settings

(1) Chart Display Cycle

- The period of the graph of temperature to be displayed in the 'Chart' can be set. Users can select the one among the options of 30 seconds, 1 minute, and 2 minutes.



<Fig.3.3.4> Set up of the Period of Temperature Graph in the Display

(2) Temp Failure Condition

- The value of temperature deviation from the target temperature can be set to generate an alarm. The value will span from the value set with the 'Lower' to that of the 'Upper' in the allowed temperature range of 8°C~20°C.
- Set the values by using the icons of '+' and '-', and then push the return button to activate the set values.

② System Settings



<Fig.3.3.5> System Settings

(1) Buzzer

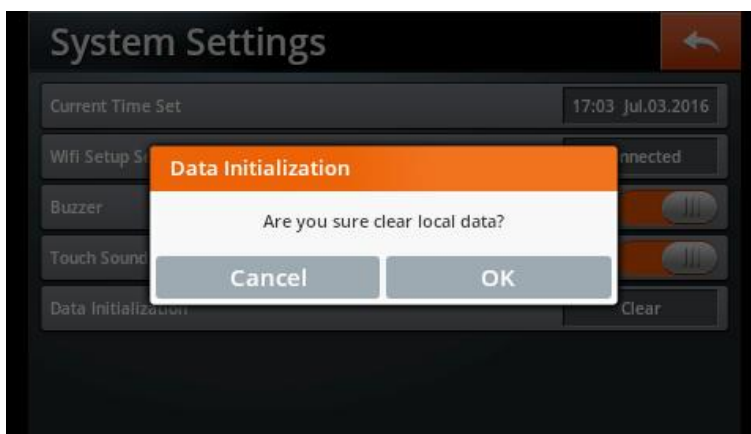
- The alarm of error can be set as 'On' or as 'Off'.

(2) Touch Sound

- The sound of 'Touch Button' can be set as 'ON' or as 'OFF'.

(3) Data Initialization

- The stored data of 'Operation Settings' and 'Chart Data' can be initialized.



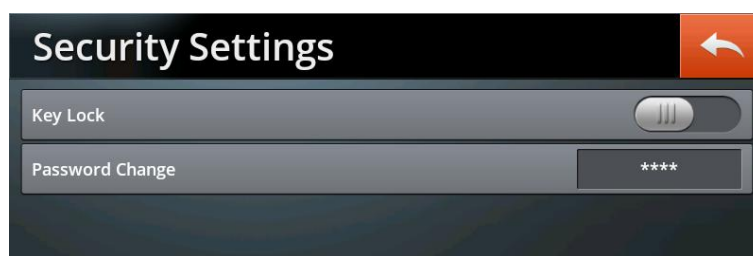
<Fig.3.3.6> Data Initialization

③ About

- Users can find the information of 'Serial Number', 'Model', and 'Temp Range' of the product with the version of the 'Touch App'.

**<Fig.3.3.7> Product Information**

④ Security Settings

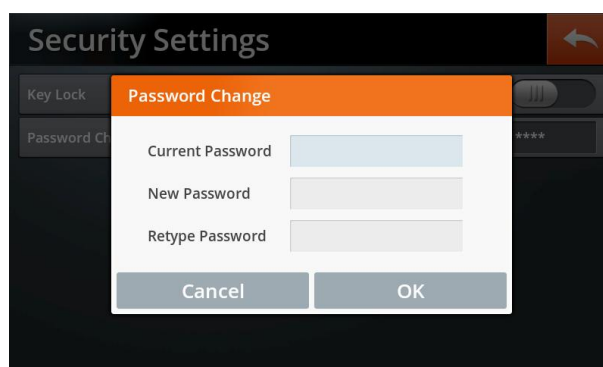
**<Fig.3.3.8> Security Settings (Locks)**

(1) Key Lock

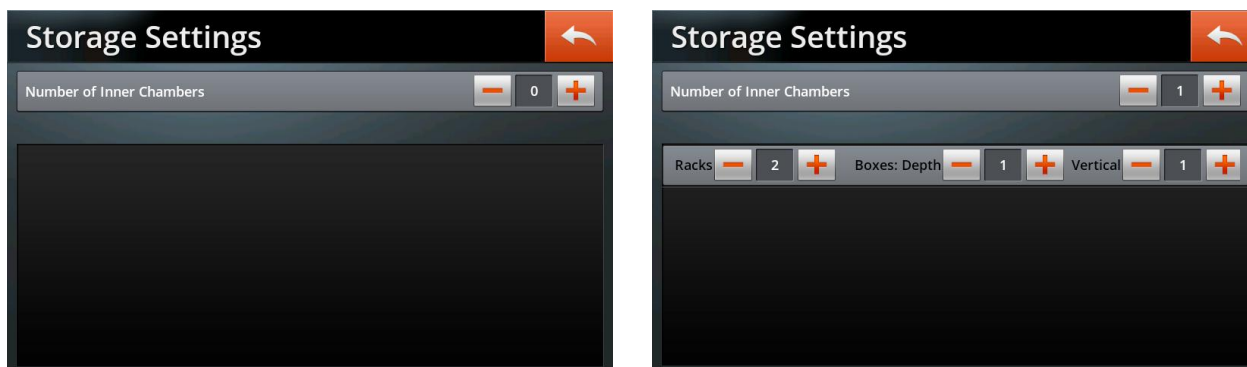
- The password enabled to operate the product can be locked to prevent unauthorized operation of the controller for particular settings of the product. Slide the button to the right to activate the lock.

(2) Password Change

- The password set for the operation of the product can be changed. Input the 4-digit existing password to the "Current Password" (the value initialized by the factory is "0000") and then input the new password to the "New Password" and "Retype Password" and store them to change the password.

**<Fig.3.3.9> Set up of New Password**

⑤ Storage Settings



<Fig.3.3.10> Storage Settings (Input of the Number of Chambers)

(1) Number of Inner Chambers

- The number of 'Chambers' created by the shelves installed inside of the product is inputted (Max. 5).

(2) Racks, Boxes

- The number of 'Racks' and 'Boxes' therein that are to be stored in each 'Chamber' are inputted.
- Check the storage space of 'Sample Box' prepared for the 'Rack' and then input each number to 'Boxes: Depth' and 'Vertical', respectively.

Example)



※ For the Rack same with left image: Boxes Depth 4 and Vertical 3

⑥ Eco Settings



<Fig.3.3.11> ECO Mode 설정

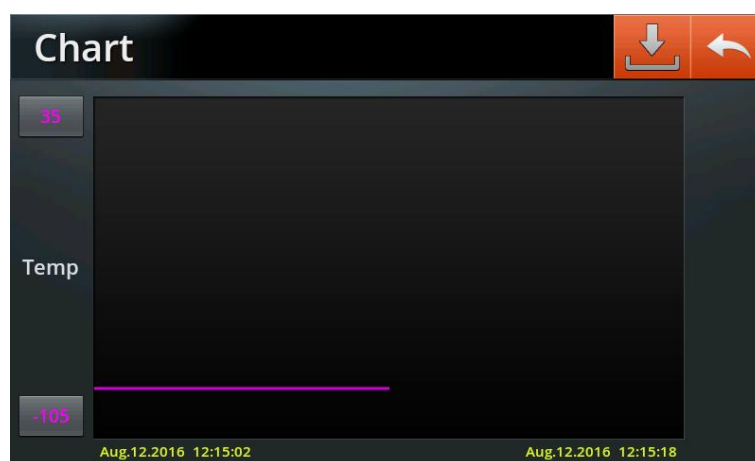
(1) Eco Mode

- For the 'DuoFreez™(Dual Compressor)' model of the product, the two independent compressors will run until the product reaches target temperature. Thereafter, one of the two compressors runs alternately by the operation of 'Eco mode' set from the 'Eco Settings' menu to keep the set temperature of the product and to reduce the amount of power consumption. The button will 'ON' or 'OFF' the alternate operation of the two compressors. The 'ECO mode' is deactivated in the product of 'UniFreez™' model.

(2) Compressor Switching Period

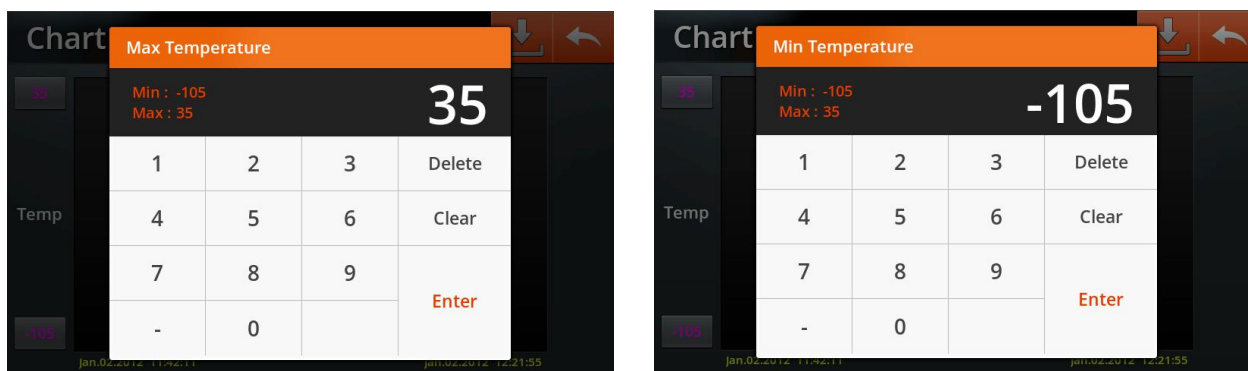
- Here, the period of alternate running of the two compressors can be set. The set number implies the number of days during which the selected compressor will run. The range of set values spans from 8 (days) to 99 (days).

3.3.3. CHART



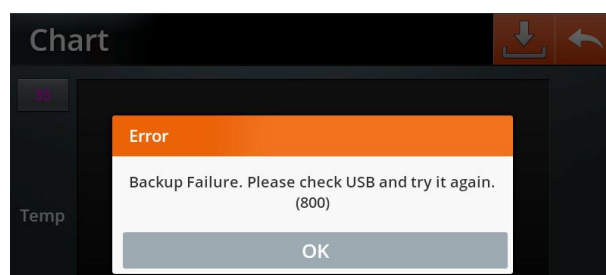
<Fig.3.3.12> Temperature Chart

- The temperature measurements are stored in the internal memory by an interval of 10 seconds. The memory can hold the data accumulated for 6 months. Users are recommended to back up the stored data by every 6 month.
- The range of the display of temperature graph can be modified by using the set buttons located on top-left and bottom-left of the display. The 'Maximum' and 'Minimum' values thereof can be modified within the range displaying in the pop up window.



<Fig.3.3.13> Change Display Range

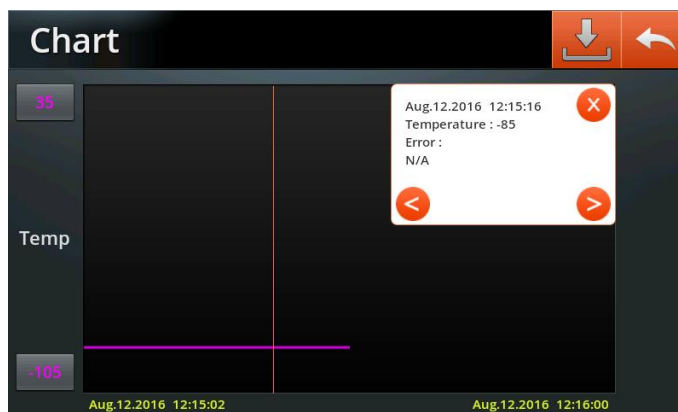
- The recorded data can be backed up into USB memory and thereby can be checked from a PC. Insert the USB into the port thereof and push the icon located on top-right of the display to store the data into the USB.
- When the inserted USB is not recognized then it will be notified through the pop up message. Press the button "OK" and then separate the USB from the port. Insert the USB into the port again and then push the icon to store the data into the USB.



<Fig.3.3.14> USB Recognition Error Message

- Locate and push the one point in the graph then the details of the point including the date, time, temperature, and even error message can be found thereby. Dragging the cursor laterally while the point is being pushed or locating and pushing other point will also display the details of corresponding point(s).

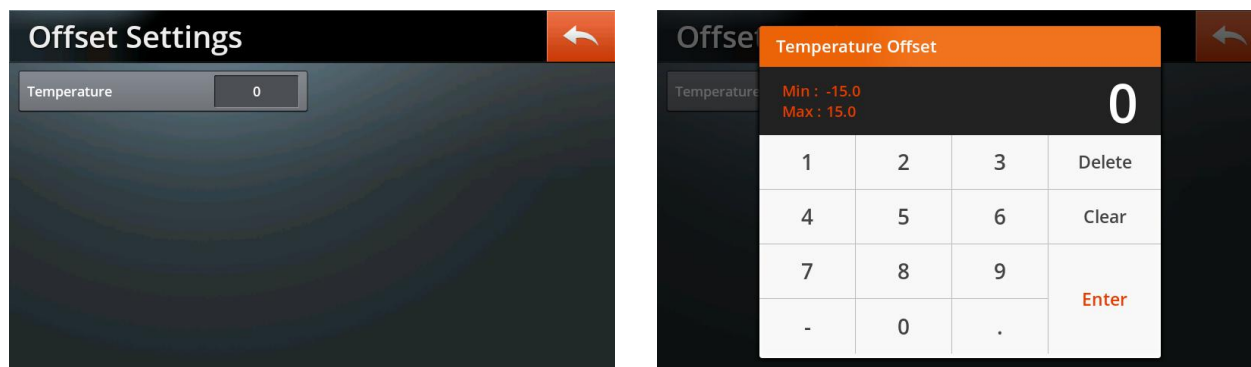
- By using the rightward or leftward arrow buttons in the display of details, the cursor can make fine move along the points on the graph. The part of the display of details is the vertical line of orange color that is indicated as a straight line on the whole graph.



<Fig.3.3.15> Details in the Graph

3.3.4. OFFSET

- When the two thermometers that are displayed in the controller of this device and the one prepared for an experiment are to be compared and corrected thereby, the value needed for the correction thereof can be set.

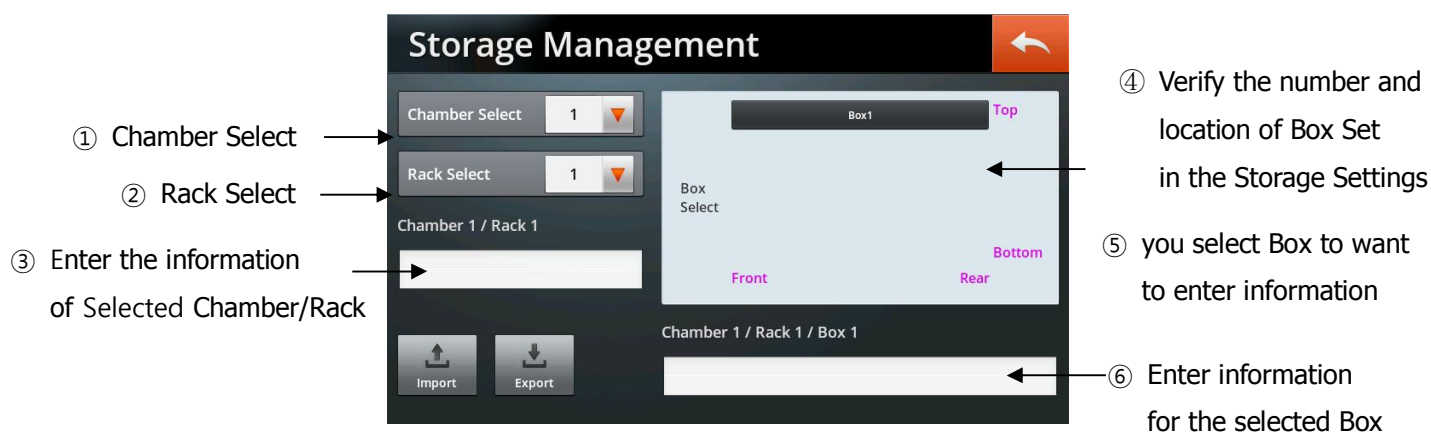


<Fig.3.3.16> Setting of Offset Values (for Calibration)

- The value of correction ranges from -15.0°C to $+15.0^{\circ}\text{C}$, and the current temperature to be displayed after the correction will reflect the correction made therefor.

3.3.5. STORAGE

- This will allow users to record the position of samples for users' convenience and to reduce the duration of the door of product being opened to improve the preservability of samples.



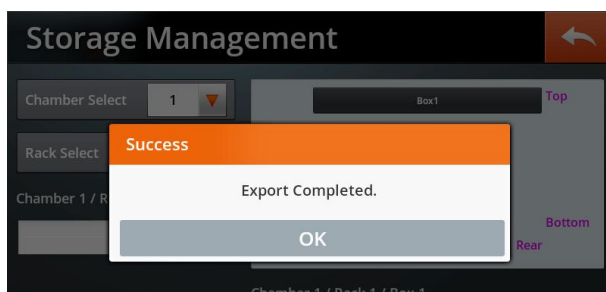
<Fig.3.3.17> Storage Management

- Numbers of the 'Chambers', 'RACKs', and 'Sample Boxes' that were set at the "Settings/Storage Settings" and were stored therein are appearing in the right display.
- Select the 'Chamber' and 'Rack' wherein the 'Sample Box' is stored to input information. Users may write the name of selected 'Rack' or information thereof.
- Click the 'Box' in the right picture representing the position of the 'Box' to input information thereof.
- Please follow the sequence of the numbers represented in above figure.

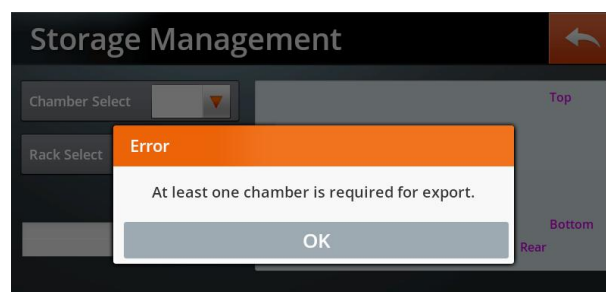
(1) Export

- The numbers and information of 'Chamber', 'Rack', and 'Box' that were inputted through the device can be exported into the format of Excel file to see or to change them in a PC.
- Remove the Wi-Fi dongle after completing the input of information of the 'Chamber', 'Rack', and 'Box' and then insert the USB to the port.

- Push the button “Export” then the folder(s) and file(s) thereof are created in the USB wherein the inputted information will be stored. At least one ‘Chamber’ must be created by the device to enable the export of information.



<Fig.3.3.18> Export Completed



<Fig.3.3.19> If there is not chamber, not export

- When the file(s) are already created in the USB by previous export, then the existing file(s) will be removed by pushing the button “Export” that initiates the overwriting execution of current information. Be sure to back up previous information before doing every “Export”.

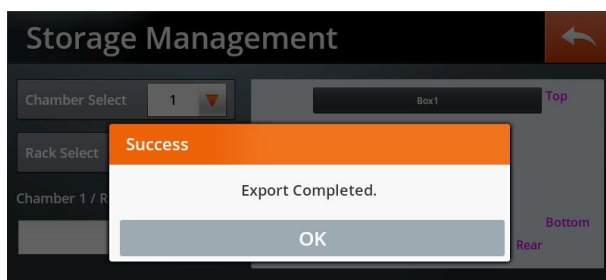


<Fig.3.3.20> When writing files to overwrite, confirmation message

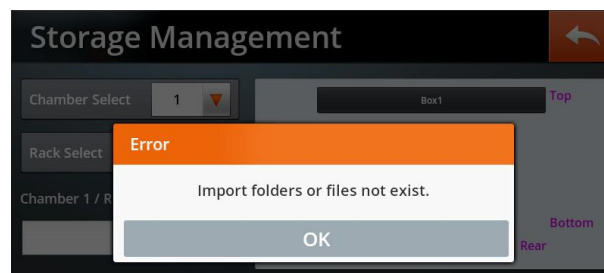
- The folder created in the USB by the “Export” will have the pathname comprising the ‘Model name’, ‘Capacity’, and ‘Serial number’.
(“/udisk/smartlab/Device Type and Capacity(Serial number)/storage”)
Ex) In case of the Model name of DuoFreez U400 with Serial Number 12345678DFU400, then the pathname would be “/udisk/smartlab/DF-U400(12345678DFU300)/storage”.
- The file name to be created will contain the numbers of each ‘Chamber’ (“chamber number.xls”)
Ex) In the case where 2 ‘Chambers’ were created then the file name would be as follows:
“/udisk/smartlab/DF-U400(12345678DFU400)/storage/chamber1.xls”
“/udisk/smartlab/DF-U400(12345678DFU400)/storage/chamber2.xls”

(2) Import

- The name of 'BOX' or other information thereof can be modified in the file created by an "Export".
- If the information would be imported to the files and folders created by the PC then errors of filename and arrangement thereof would occur thereby the normal process of import will be disturbed. To minimize the possibility of error occurrence thereof, the 'Chamber(s)', 'Rack(s)', and 'Box(es)' should be selected in the device for the 'Export'. Thereafter, the modification of the contents therein would be enabled and we recommend this way to make modifications of exported information.
- Do not change the names of created folder(s) and file(s) with during the work of modification. These were created according to the rule predetermined for the normal Import.
- Be sure to check whether the files created in the PC have names as they were sequentially assigned. Otherwise, the Import would not be enabled.
Ex) If there are files in the PC with the names assigned as they were created sequentially like those of 'chamber1.xls', 'chamber2.xls', and 'chamber3.xls' then the 'Import' would be enabled. Otherwise, if there are 2 files with respective names of 'chamber1.xls' and 'chamber3.xls' then the 'Import' would not be enabled.
- The folders created by the 'Export' can hold maximum 5 files. The files imported into the created folder can hold maximum 5 sheets. And, each sheet in the imported file can receive the 'Cells' of the range up to 1~5 X 1~5. Users should take this into account for each modification.
- On completion of modification in the created folder, the modified folder will be stored in the USB and then, the dongle of Wi-Fi in the device should be removed from the port into which the USB will be inserted.
- Press "Import" button then the folder(s) stored in the USB will be applied to the 'Storage Management' of the product.



<Fig.3.3.21> Import Completed



<Fig.3.3.22> If the folder or file name incorrect, Not recognized

- On completion of the "Import", the 'Storage' information in the device will be deleted and then be replaced with the information contained in the imported Excel file.



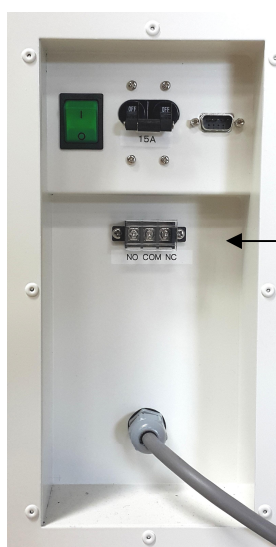
<Fig.3.3.23> Overwrite confirmation message

3.3.6. LCO₂ Injection

- When the temperature of the instrument is suddenly increased due to power outage, etc., damage to valuable samples can be prevented by LCO₂.
- This operation is activated when reaching the setting temperature, and if the temperature becomes higher than the setting temperature, LCO₂ is automatically sprayed into the instrument by "Temp Error" setting, and LCO₂ is sprayed while the LCO₂ button on the screen is pressed, if necessary.
- If Freezing System error occurs in situations that the user cannot control, the light is turned on automatically, and LCO₂ is sprayed until the error is solved.
- When you open the door during operation, this function becomes disabled, so LCO₂ spraying with the door open is prevented. When the door is closed and the objective temperature is recovered, the reactivation is achieved.

3.3.7. Alarm Signal terminal

- The 'Alarm Signal' terminal supports users to receive alarms of critical 'Error(s)' occurred in the device through separate device.
- On the occurrence of the 'Power Fail Error' caused by the failure of power supply or on the occurrence of the 'Out Of Control-High/Low Error' owing to the anomalous value of temperature, the 'Alarm Signal' terminal will enable the generation of external alarm output.
- The 'Alarm' will also be generated with the occurrence of the above two errors while the door is being opened ('Door Open').
- The option of "Remote Wire/Wireless Alarm System" can be applicable to the device. Besides, users can connect separate devices to the product.



Alarm Signal terminal

NC(Normal Connect)

COM(Common)

NO(Normal Open)

3.3.7. 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	Reasons	Actions
Temp Sensor Error	This will be generated by the error of temperature sensor.	Please refer to the A/S Center to correct error of sensors.
Door Open	This will be generated when the door is remaining opened more than 1 minute.	Check the status of the door.
Out of Control – High	This will be generated by the temperature deviation exceeding the 'Upper Limit' set in the menu of 'Temp Failure Condition' by users.	Check the set temperature and set 'Upper Limit'.
Out of Control – Low	This will be generated by the temperature deviation exceeding the Lower Limit set in the menu of Temp Failure Condition by users.	Check the set temperature and set 'Lower Limit'.
Compressor #1 Error	This will be generated by the anomaly of Compressor #1.	Please refer to the A/S Center to correct failures of internal components.
Compressor #2 Error	This will be generated by the anomaly of Compressor #2.	Please refer to the A/S Center to correct failures of internal components.
Power Error	This will be generated by the anomaly of power supply.	Check the 'Circuit Breaker'.
Control Response Error	This will be generated by the failure of communication between device and 'Touch Board'.	Check the connection to 'Touch Board'.

<Table.3.3.1> Error Message Table

* 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. Products Management

4.1 Accessories

4

Image	Ordering Number	Information
	DH.RFU4234SD	Rack, Sliding Drawer-type, SUS304, 15 places," RFU4234SD" w140 X d420 X h290mm, for" U400", without boxes,
	DH.RFU4257SD	Rack, Sliding Drawer-type, SUS304, 20 places," RFU4257SD" w140 X d560 X h290mm, for" U500/600/700", without boxes,
	DH.RFU5234SD	Rack, Sliding Drawer-type, Aluminum, 12 places," RFU5234SD" w140 X d420 X h232mm, for "U400", without boxes,
	DH.RFU5257SD	Rack, Sliding Drawer-type, SUS304, 16 places," RFU5257SD" w140 X d560 X h232mm, for "U500/700/800", without boxes,
	DH.RFU4234SA	Rack, Side Access-type, Stainless Steel, 15 places, "RFU4234SA" w140 X d420 X h290mm, for "U400", without boxes
	DH.RFU4257SA	Rack, Side Access-type, Stainless Steel, 20 places, "RFU4257SA" w140 X d560 X h290mm, for "U500/700/800", without boxes
	DH.RFU5234SA	Rack, Side Access-type, Stainless Steel, 12 places, "RFU5234SA" w140 X d420 X h232mm, for "U400", without boxes
	DH.RFU5257SA	Rack, Side Access-type, Stainless Steel, 16 places, "RFU5257SA" w140 X d560 X h232mm, for "U500/700/800", without boxes
	C11.001	Hard Board Box, with Hard Board Divider, 81 Holes, 127 X 127 X h52mm
	C11.002	Hard Board Box, with PolyPropylene Divider 81 Holes, 127 X 127 X h52mm
	DH.KT622	Tem. Chart Recorder, "KT622", with "C657" Chart Paper
	DH.C657	Chart Paper, "C657", 60 Charts, for 420 days recording
	DH.P222	Replacement Pens, "P222", 6ea Red color, for "KT622" Chart Recorder
	DH.LCO2B	LCO ₂ Back up System, "LCO2B"
	DH.RWAS	Remote Wire/Wireless Alarm System, "RWAS"

4. Products Management Method

4.2 Maintenance and Management

Ultra Low Temperature Smart Freezer was manufactured with the consideration of various situations that may occur during the operation. However, for long-term use with stable performance, please observe the following precautions:



1. Please use rated power of AC 120V, 60Hz or AC 230V, 50/60Hz, single-phase.
2. This product should be operated in a room with as little moisture as possible, and the room temperature should be maintained between 5°C and 40°C.
3. If this product is not used for long periods of time, it should be stored by packaging after disconnecting the plug and drying it.
4. If parts should be replaced due to failure during use, only genuine parts provided by DAIHAN Scientific should be used.
5. When cleaning the product, please unplug this product and take out the conservation samples from the instrument, and wipe it off with a dry cloth and dry it while leaving the door open after washing it out with warm water and some neutral detergent.
6. Please apply the polish for commercial use on the outside of the cryogenic chamber in this product. Please be careful so that the glazing agent is not stained on the plastic parts in the refrigerator.
7. The condenser and the refrigerator are very hot. Please be careful not to touch them when managing them.
8. Failures due to use beyond normal limits cannot be maintained or repaired.
9. Please clean up at least once in a year with a vacuum cleaner or a brush to remove the dust of the condenser and both galleries mounted inside the bottom of the cryogenic freezer.
10. Please pull the plug out from the freezer if you do not use it for long periods, and dry it by leaving the door open for a few days after cleaning inside the freezer so that mildew or smells do not form.
- 11. Frost can occur according to the flow of outside air in the interior door and inside the chamber. Please regularly check the thickness of the frost, and remove the frost at least once every six months.**

4. Products Management

4.3 Troubleshooting

Situation	Confirmations and Solutions
If power does not turn ON.	Please check the connection of the power switch, and if there are not any troubles, check the power supply in the installation site of the device.
If the freezer is not operating,	<ul style="list-style-type: none"> - If the freezer is not operating although the freezer was operated at the corresponding temperature, because the freezer or the condenser may be failing, please request A/S.
If the freezer is operated but temperature has not fallen,	<ul style="list-style-type: none"> - Please check the thermostat setting. - Please make sure that direct sunlight or the material of high temperature exists close to the freezer. - Confirm that the ventilation around the instrument is good. - The same abnormal status as above does not exist, but if the temperature does not fall well, please request A/S.
If noise occurs from the freezer,	<ul style="list-style-type: none"> - Make sure that the installation is not wrong or the product is tilted. - Check that the back of the instrument is attached to the wall or it is not too close to the wall. - Make sure that foreign substance has not entered into the machine room at the bottom of this product and caused the noise by hanging on the cooling fan. <p>* The longer the period of use of the freezer is, the more the noise becomes gradually louder. If there is no abnormal operation in that state, it is a normal phenomenon. If the freezer is operating in an abnormal state, the freezer should be replaced.</p>
<p>※ If you have any problem other than the above, please call technical service of manufacturer or an official agent.</p>	

5. Product Assurance

5

5.1 Quality Assurance

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	Ultra Low Temperature Smart Freezer
Model No.	UniFreez/DuoFreez
Serial No.	
Date	
Customer	

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