

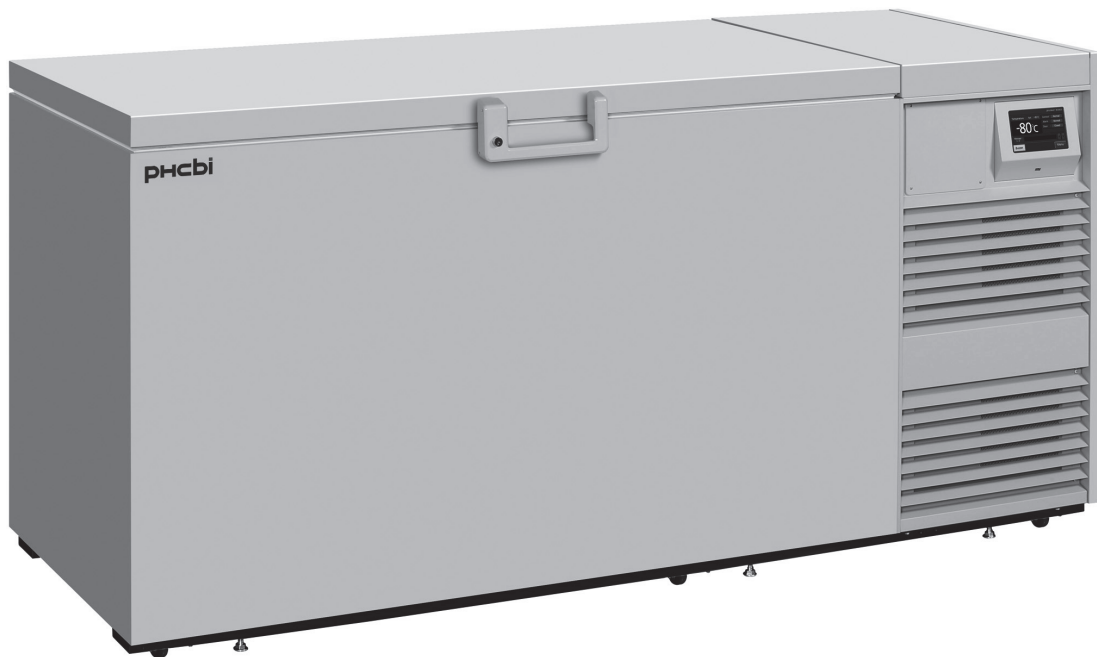


Operating Instructions

Ultra-Low Temperature Freezer

MDF-DC500VX

MDF-DC700VX Series



MDF-DC700VX

Please read the operating instructions carefully before using this product, and keep the operating instructions for future use.

See page 61 for all model numbers.

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INTRODUCTION

- Read the operating instructions carefully before using the product and follow the instructions for safe operation.
- PHC Corporation takes no responsibility for safety if the product is not used as intended or is used with any procedures other than those given in the operating instructions.
- Keep the operating instructions in a suitable place so that they can be referred to as necessary.
- The operating instructions are subject to change without notice for improvement of performance or function.
- Contact our sales representative or agent if any page of the operating instructions is lost or the page order is incorrect, or if the instructions are unclear or inaccurate.
- No part of the operating instructions may be reproduced in any form without the express written permission of PHC Corporation.

IMPORTANT NOTICE

PHC Corporation guarantees this product under certain warranty conditions. However, please note that PHC Corporation shall not be responsible for any loss or damage to the contents of the product.

PRECAUTIONS FOR SAFE OPERATION

It is imperative that the user complies with the operating instructions as it contains important safety advice.

Items and procedures are described so that you can use this unit correctly and safely. If the precautions advised are followed, this will prevent possible injury to the user and any other person.

Precautions are illustrated in the following way:


WARNING


Failure to observe WARNING signs could result in a hazard to personnel possibly resulting in serious injury or death.


CAUTION

Failure to observe CAUTION signs could result in injury to personnel and damage to the unit and associated property.

Symbol shows;

 This symbol means caution.

 This symbol means an action is prohibited.

 This symbol means an instruction must be followed.















Be sure to keep the operating instructions in a place accessible to users of this unit.

NOTE:

As with any equipment that uses CO₂ gas, there is a likelihood of oxygen depletion in the vicinity of the equipment. It is important that you assess the work site to ensure there is suitable and sufficient ventilation. If restricted ventilation is suspected, then other methods of ensuring a safe environment must be considered. These may include atmosphere monitoring and warning devices.

















PRECAUTIONS FOR SAFE OPERATION

WARNING

-  **Do not use the unit outdoors.** Current leakage or electric shock may result if the unit is exposed to rain water.
-  **Only qualified engineers or service personnel should install the unit.** The installation by unqualified personnel may cause electric shock or fire.
-  **Install the unit on a sturdy floor and take an adequate precaution to prevent the unit from turning over.** If the floor is not strong enough or the installation site is not adequate, this may result in injury from the unit falling or tipping over.
-  **Never install the unit in a humid place or a place where it is likely to be splashed by water.** Deterioration of the insulation may result which could cause current leakage or electric shock.
-  **Never install the unit in a flammable or volatile location.** This may cause explosion or fire.
-  **Never install the unit where acid or corrosive gases are present** as current leakage or electric shock may result due to corrosion.
-  **Always ground (earth) the unit to prevent electric shock.** If the power supply outlet is not grounded, it will be necessary to install a ground by qualified engineers.
-  **Never ground the unit through a gas pipe, water main, telephone line or lightning rod.** Such grounding may cause electric shock in the case of an incomplete circuit.
-  **Connect the unit to a power source as indicated on the rating label attached to the unit.** Use of any other voltage or frequency other than that on the rating label may cause fire or electric shock.
-  **Never store volatile or flammable substances** in this unit if the cylinder cannot be sealed. These may cause explosion or fire.
-  **Do not insert metal objects such as a pin or a wire into any vent, gap or any outlet on the unit.** This may cause electric shock or injury by accidental contact with moving parts.
-  **Use this unit in safe area when treating the poison, harmful or radiate articles.** Improper use may cause bad effect on your health or environment.
-  **Turn off the power switch (if provided) and disconnect the power supply to the unit prior to any repair or maintenance** of the unit in order to prevent electric shock or injury.
-  **Do not touch any electrical parts (such as power supply plug) or operate switches with a wet hand.** This may cause electric shock.







PRECAUTIONS FOR SAFE OPERATION

WARNING

-  **Ensure you do not inhale or consume medication or aerosols** from around the unit at the time of maintenance. These may be harmful to your health.
-  **Never splash water directly onto the unit** as this may cause electric shock or short circuit.
-  **Never put cylinders with liquid on the unit** as this may cause electric shock or short circuit when the liquid is spilled.
-  **Never bind, process, or step on the power supply cord, or never damage or break the power supply plug.** A broken supply cord or plug may cause fire or electric shock.
-  **Do not use the supply cord if its plug is loose.** Such supply cord may cause fire or electric shock.
-  **Never disassemble, repair, or modify the unit yourself.** Any such work carried out by an unauthorized person may result in fire, or electric shock or injury due to a malfunction.
-  **Disconnect the power supply plug if there is something wrong with the unit.** Continued abnormal operation may cause electric shock or fire.
-  **Do not position this unit and the other unit so that it is difficult to operate the disconnection of the power supply plug.** Failure to disconnect the power supply plug may cause fire if there is something wrong with the unit.
-  **When removing the plug from the power supply outlet, grip the power supply plug, not the cord.** Pulling the cord may result in electric shock or fire by short circuit.
-  **Disconnect the power supply plug** before moving the unit. Take care not to damage the power cord. A damaged cord may cause electric shock or fire.
-  **Disconnect the power supply plug when the unit is not used for long periods.** Keeping the connection may cause electric shock, current leakage, or fire due to the deterioration of insulation.
-  **If the unit is to be stored unused in an unsupervised area for an extended period, ensure that children do not have access and that doors cannot be closed completely with a key.**
-  **The disposal of the unit should be accomplished by appropriate personnel.** Remove doors to prevent accidents such as suffocation.
-  **Do not put the packing plastic bag within reach of children** as suffocation may result.
-  **Flammable and explosive product.** This product contains flammable refrigerant. Do not damage or break the pipework.
-  **Connect the power supply plug to the power source firmly after removing the dust on the plug.** A dusty plug or improper insertion may cause a heat or ignition.

PRECAUTIONS FOR SAFE OPERATION



CAUTION

-  This unit must be plugged into a dedicated circuit protected by branch circuit breaker.
-  Use a dedicated power source as indicated on the rating label attached to the unit. A multiple-tap may cause fire resulting from abnormal heating.
-  **Never store corrosive substances such as acid or alkali** in this unit if the container cannot be sealed. These may cause corrosion of inner components or electric parts.
-  **Check the setting when starting up of operation after power failure or turning off of power switch.** The stored items may be damaged due to the change of setting.
-  **Be careful not to tip over the unit** during movement to prevent damage or injury.
-  **Prepare a safety check sheet (copy the last page)** when you request any repair or maintenance for the safety of service personnel.

LABELS ON UNIT






Warning safety labels applied to the ultra-low temperature freezer.

Users are advised to avoid accidents by carefully reading the warnings and cautions contained on warning labels at key locations on the interior and exterior of the ultra-low temperature freezer.

Possible Danger	Warning/Caution Type Location of Danger	Warning/Caution Label	Description of Danger
Personal injury	Environment Refrigerating circuit		Warning fire.
Personal injury	Frostbite and frost Interior		Frostbite and frost caution label.

SYMBOLS ON UNIT

The symbols are attached to the ultra-low temperature freezer. The following table describes the symbols.

	This symbol is attached to covers that access high-voltage electrical components to prevent electric shock. Only a qualified engineer or service personnel should be allowed to open these covers.
	This symbol indicates that caution is required. Refer to product documentation for details.
	This symbol indicates an earth.
	This symbol means “ON” for a power switch.
	This symbol means “OFF” for a power switch.

ENVIRONMENTAL CONDITIONS

This equipment is designed to be safe at least under the following conditions (based on the IEC 61010-1):

- Indoor use;
- Altitude up to 2000 m;
- Ambient temperature 5°C to 40°C;
- Maximum relative humidity 80% for temperature up to 31°C decreasing linearly to 50% relative humidity at 40°C;
- Mains supply voltage fluctuations up to $\pm 10\%$ of the nominal voltage;
- Transient overvoltages up to the levels of OVERVOLTAGE CATEGORY II;
- Temporary OVERVOLTAGES occurring on the mains supply;
- Applicable pollution degree of the intended environment (POLLUTION DEGREE 2 in most cases);

INTENDED USE AND PRECAUTIONS

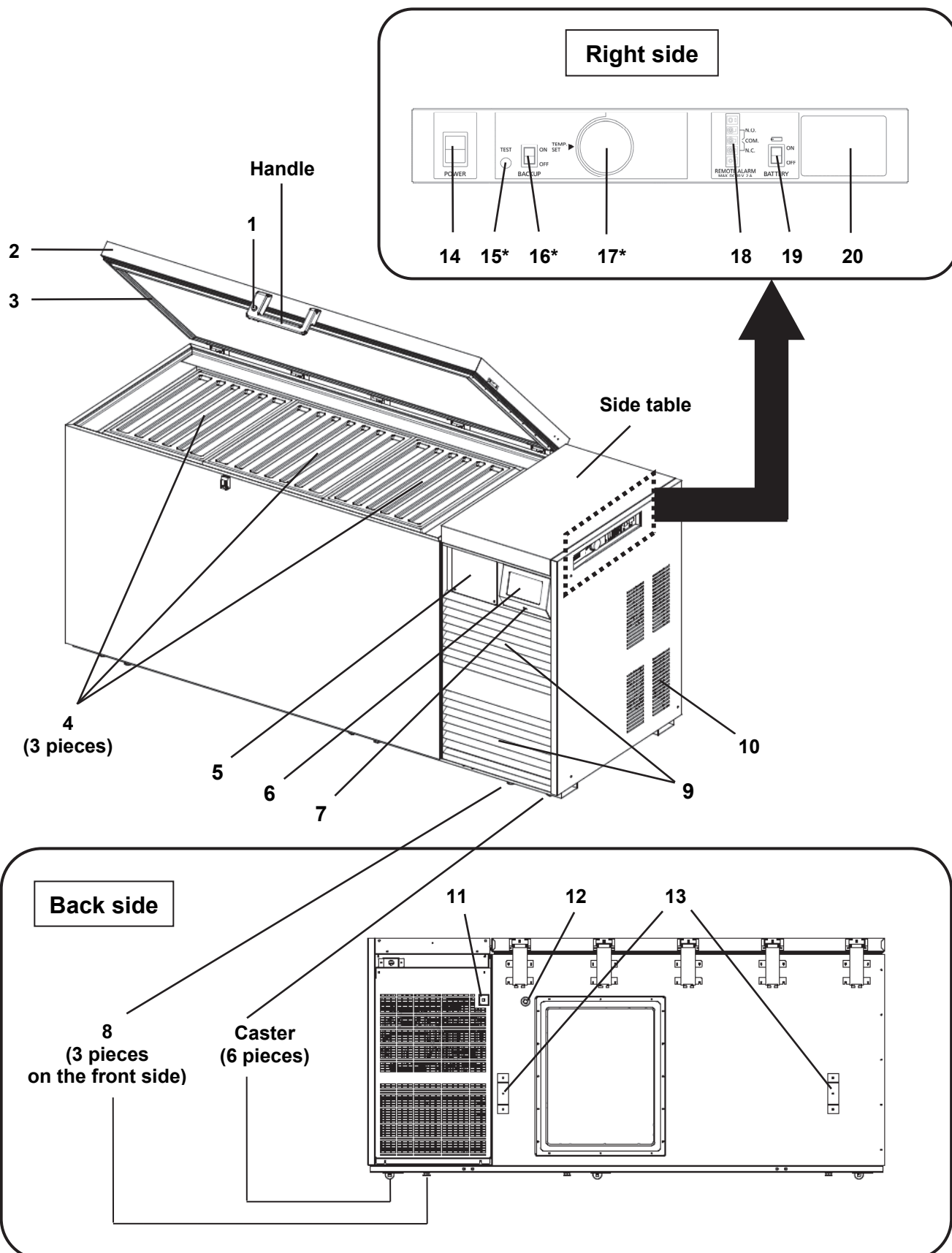
This equipment is designed for low temperature storage of human cells, organs, plasma and DNAs.

- The effective storage period depends on the sample condition and storage temperature. It is necessary to determine the storage temperature and period suitable for the purpose.
- For the live cells, the lower storage temperature should be required for long term storage. It is recommended to store the live cells at -130 °C or lower.

FREEZER COMPONENTS

Unit

The model below is the MDF-DC700VX. However, the MDF-DC500VX is also equivalent structures.



FREEZER COMPONENTS

- 1. Keyhole:** Turn clockwise to 180° with a key and the outer door is securely locked.
- 2. Door:** Hinged type. The door can be opened in any angle on the way to full open.
- 3. Magnetic door gasket:** Seals the door and prevents leakage of cold air.
- 4. Inner lid:** Serves as a means of reducing cold air leakage when the door is open. Remove the frost regularly (refer to page 50).
- 5. Space for temperature recorder:** An optional automatic temperature recorder MTR-85H or MTR-G85C can be attached here (refer to page 58). For the usage, refer to the INSTRUCTIONS FOR USE enclosed with an optional temperature recorder.
- 6. LCD touch panel:** Refer to page 11~12.
- 7. USB port:** Insert USB memory to export operations and alarms log. Refer to page 34~41.
Note: It is impossible to use USB memory which is required password input.
- 8. Leveling feet:** It is possible to adjust their length by turning them. When installing, lengthen the leveling feet to steady the unit (refer to page 15).
- 9. Grille:** Do not block this vent to keep the proper cooling performance.
- 10. Exhaust air vent:** Be careful not to block this.
- 11. Backup cooling kit joint:** When installing an optional backup cooling kit MDF-UB5, connect here the pipelines from a liquid CO₂ cylinder (refer to page 59).
- 12. Access port:** This is used for leading a cable and sensor of a measuring equipment to chamber.
Note: Re-install the access port cap and the insulating pad after use. Incomplete installation may cause poor cooling or dew condensation outside the access port.
- 13. Fixture:** 2 fixtures are provided as spacers between the cabinet and wall and also serve as hooks to fix the unit (refer to page 15).
- 14. Power switch:** Turn ON the power switch (ON-“I”, OFF-“O”).
- 15. Backup test switch (TEST)*:** It is the switch to confirm that the backup cooling kit can inject liquid CO₂ (refer to page 59).
- 16. Backup power switch (BACK UP)*:** Power switch of the backup cooling kit (refer to page 59).
- 17. Temperature setting knob (TEMP. SET)*:** It is the knob which adjusts injection set temperature of the backup cooling kit (refer to page 59).
- 18. Remote alarm terminal:** This terminal informs the alarm to remote location by connecting to external alarm unit. Refer to page 13.
- 19. Battery switch for power failure alarm:** Normally, turn ON this switch. Be sure to turn OFF this switch if the unit is not in operating.
- 20. Communication box cover:** An optional LAN interface board MTR-L03 or an optional interface board MTR-480 can be attached here.
Note: For the data acquisition system MTR-5000 user only. Contact our sales representative or agent for purchase.

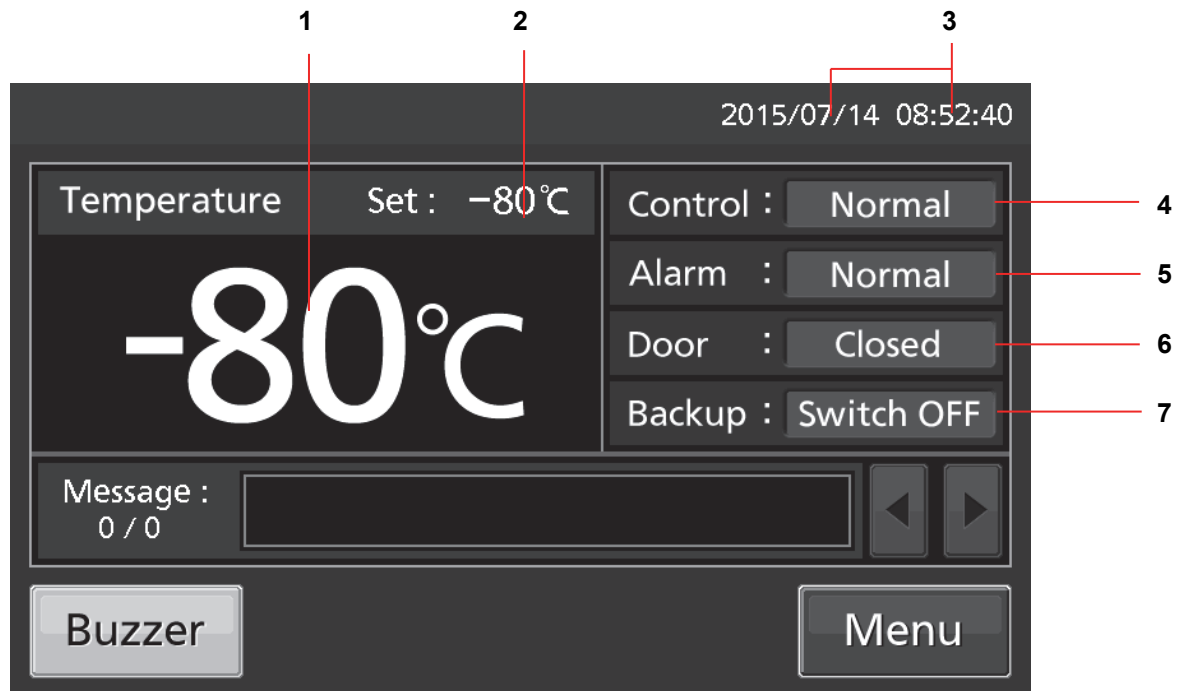
* When an optional backup cooling kit MDF-UB5 is installed.

FREEZER COMPONENTS

LCD touch panel

The following display (called the Top screen) will appear when the power switch is turned ON.

Note: It takes approximately 20 seconds until Top screen is displayed.



1. Present temperature display field: The current chamber temperature is displayed.

Note: An integer rounded off below a decimal point is displayed.

2. Set temperature value display field: The set value of chamber temperature is displayed. Default setting: -80 °C.

3. Present date/time display field: Normally, this indicator shows date and time. The date and time is simply set when the freezer is shipped from the factory. Refer to page 42 for details.

4. Control display: The present operation control mode is displayed (refer to page 22~23 for setting).

Normal control: "Normal" is displayed.

Eco control: "ECO" is displayed.

5. Alarm display: Refer to page 46~47 for details of alarms.

Normal condition: "Normal" is displayed.

Alarm-activated, buzzer-delayed: "Alarm" is displayed alternately in normal characters and reverse video.

Alarm-activated, buzzer-sounding: "Warning" is displayed alternately in normal characters and reverse video.

6. Door (opening/closing) display:

Open: "Open" is displayed alternately in normal characters and reverse video.

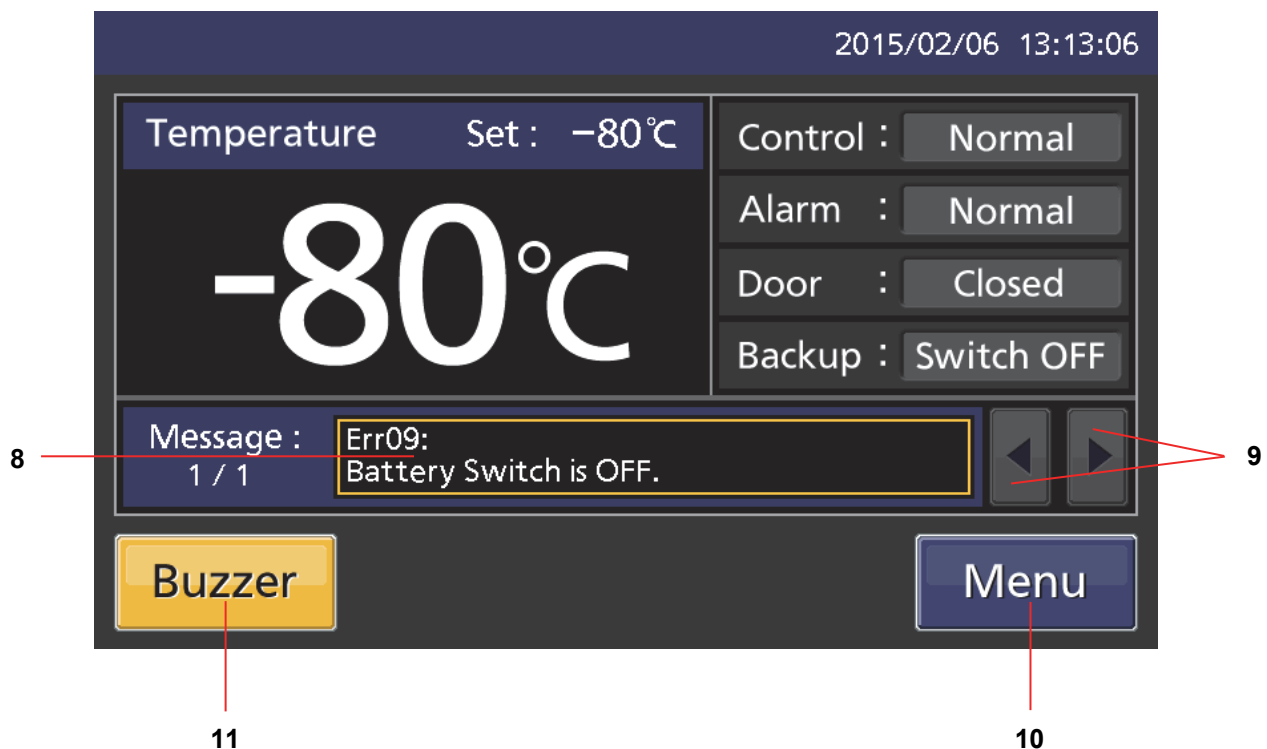
Close: "Closed" is displayed.

7. Backup display: (It is displayed only when an optional backup cooling kit MDF-UB5 is installed)
ON/OFF of the backup power switch is displayed (refer to page 59).

ON: "Switch ON" is displayed.

OFF: "Switch OFF" is displayed.

FREEZER COMPONENTS



8. Message display field: The information of the operation monitor system, alarms or errors are displayed when fault occurs. Refer to page 45~47.

9. Message select key: When there are a number of alarm, errors or information of the operation monitor system, the message on the screen is changeable.

10. Menu key: Press this key to lead the Menu screen. It is possible to set various setting on the Menu screen. Refer to page 18.

11. Buzzer key: Press this key to silence the buzzer. However, when the ring back is ON, the buzzer will sound again when the ring back passed and the alarm state still continues. Refer to page 28 and 48.

FREEZER COMPONENTS

Remote alarm terminal

The alarm of this unit can be informed at a remote location from this unit by connecting the external alarm device to the remote alarm terminals. For the type and behavior of remote alarm output, refer to page 46~47.

The terminal of the remote alarm is installed at the right side of the unit (See the figure on the point). The alarm is outputted from this terminal. Contact capacity is DC 30 V, 2 A.

When Buzzer key is pressed, the behavior of the remote alarm is shown in Table.1.

Note: In the door alarm, the remote alarm does not work. Refer to page 46.

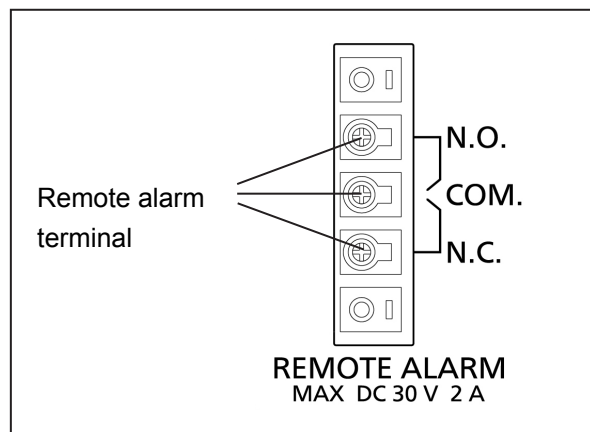


Table 1 The behavior of the remote alarm when pressing Buzzer key

Remote Alarm setting (Refer to page 27~29)	Connecting terminal	Normal condition	Abnormal condition (Including in the cases of power outage and of where the power plug is pulled out.)	
			When pressing Buzzer key	
ON: Non-interlock with Buzzer key	COM.-N.C.	Close	Open	Open (Maintain in abnormality)
	COM.-N.O.	Open	Close	Close (Maintain in abnormality)
OFF: Interlock with Buzzer key	COM.-N.C.	Close	Open	Close (Return to normal)
	COM.-N.O.	Open	Close	Open (Return to normal)

Use a twisted sealed wire for the connection.

Type; UL 2343, UL 2448, UL 2464, UL2552, UL2623.

Length: 30 m max.

INSTALLATION

Installation site

To operate this unit properly and to obtain maximum performance, install the unit in a location with the following conditions:

■ **A location not subjected to direct sunlight**

Do not install the unit under direct sunlight. Installation in a location subjected to direct sunlight cannot obtain the intended performance.

■ **A location with adequate ventilation**

Leave at least 10 cm around the unit for ventilation. Poor ventilation will result in a reduction of the performance and consequently the failure.

■ **A location away from heat generating sources**

Avoid installing the unit near heat-emitting appliances such as a heater or a boiler etc. Heat can decrease the intended performance of the unit.

■ **A location with little temperature change**

Install the unit under stable ambient temperature. The allowable ambient temperature is between +5 °C and +30 °C.

■ **A location with a sturdy and level floor**

Always install the unit on a sturdy and level floor. The uneven floor or tilted installation may cause failure or injury. Install the unit in stable condition to avoid the vibration or noise. Unstable condition may cause vibration or noise.

WARNING

Install the unit on a sturdy floor. If the floor is not strong enough or the installation site is not adequate, this may result in injury from the unit falling or tipping over.

Select a level and sturdy floor for installation. This precaution will prevent the unit from tipping. Improper installation may result in water spillage or injury from the unit tipping over.

■ **A location not prone to high humidity**

Install the unit in the ambient of 80 %R.H. or less humidity. Installation under high humidity may cause current leakage or electric shock.

WARNING

Do not use the unit outdoors. Current leakage or electric shock may result if the unit is exposed to rain water.

Never install the unit in a humid place or a place where it is likely to be splashed by water. Deterioration of the insulation may result which could cause current leakage or electric shock.

■ **A location without flammable or corrosive gas**

Never install the unit in a location where it will be exposed to inflammable or corrosive gas. This may cause explosion or fire or may result in the current leakage or electric shock by the corrosion of the electrical components.

INSTALLATION

■ A location without corrosive substance

Never install the unit in a location where corrosive substance such as sulfur-contained compound may generate (ex. near a sink). The corrosion of copper pipe of the cooling circuit may result in the failure of the unit.

■ A location without the possibility of anything fall

Avoid installing the unit in the location where anything can fall down onto the unit. This may cause the breakdown or failure of the unit.

Installation

1. Remove the packaging materials and tapes

Remove all transportation packaging materials and tapes. Open the doors and ventilate the unit. If the outside panels are dirty, clean them with a diluted neutral dishwashing detergent (Undiluted detergent can damage the plastic components. For the dilution, refer to the instruction of the detergent). After the cleaning with the diluted detergent, always wipe it off with a wet cloth. Then wipe off the panels with a dry cloth.

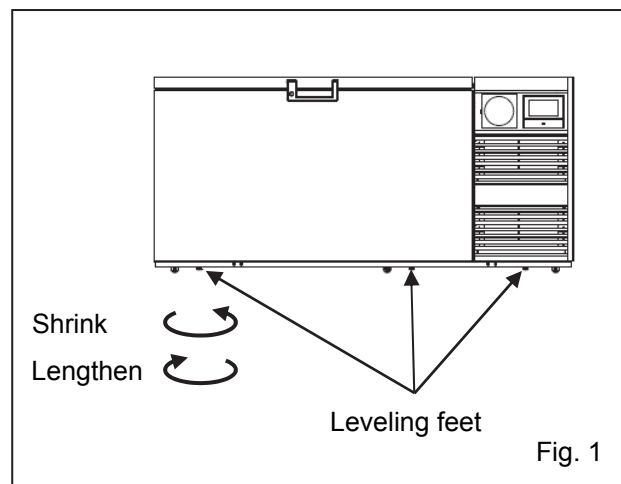
Note: Remove the cable tie banding the power supply cord. Prolonged banding may cause the corrosion of the cord coating.

2. Adjust the leveling feet

It is possible to adjust the length of the leveling feet by turning them (Fig.1). Lengthen the leveling feet until the casters are lifted from the floor, and let 3 leveling feet support the front side of this unit. After that, adjust 3 leveling feet to steady this unit.

3. Fix the unit

Two fixtures are attached to the rear of the frame. Fix the frame to the wall with these fixtures and rope or chain.



4. Installation branch circuit breaker

This unit is to be connected to a dedicated circuit protected by branch circuit breaker. Contact our sales representative or agent.

⚠ WARNING

Use a power supply outlet with ground (earth) to prevent electric shock. If the power supply outlet is not grounded, it is necessary to install a ground by qualified engineers.

Never ground the unit through a gas pipe, water main, telephone line or lightning rod. Such grounding may cause electric shock in the case of an incomplete circuit.

START-UP OF UNIT

Follow the procedures for the initial and consequent operations of the unit.

1. Make sure that both of the power switch and the battery switch for power failure alarm are OFF (factory setting is OFF).

Note: When the power switch is ON and the battery switch for power failure alarm is ON, the power failure alarm is activated (refer to page 46).

2. (When an optional backup cooling kit MDF-UB5 is installed) Turn OFF the backup power switch.

3. Before putting some contents to cryopreserve into the chamber, connect the power supply cord to the outlet.

4. Turn ON the power switch to start operation of the unit.

5. Turn ON the battery switch for power failure alarm.

Note: When the battery switch for power failure alarm is OFF, "Err09: Battery Switch is OFF." is displayed in the message display field. By turning ON the battery switch for power failure alarm, this message disappears.

6. Set the chamber temperature and the high/low alarm (refer to page 21~22).

Note: Keep the ambient temperature between 5 °C to 30 °C. The chamber temperature may not reach set temperature when the ambient temperature is higher than 30 °C.

7. Make sure that chamber temperature is cooled to the set temperature.

8. Do the alarm test. Make sure that the buzzer sounds by pressing Buzzer key for 5 seconds. Press Buzzer key again to stop the buzzer and the alarm test finishes.

9. (When an optional backup cooling kit MDF-UB5 is installed) After the chamber temperature reaches the set temperature, turn ON the backup power switch.

Note: When operating this unit for the first time or after not using it for an extended period of time, it is required 3 days (72 hours) operation of unit before using the backup cooling kit. The capacity of internal battery for backup cooling kit may be less or flat by electric discharge.

10. (When an optional backup cooling kit MDF-UB5 is installed) Set the injection set temperature of the backup cooling kit by adjusting the temperature setting knob.

11. Put the contents to cryopreserve into the chamber.

Note:

- Do not put a large amount of contents to cryopreserve at a time. Put little by little to prevent rapid rise of the chamber temperature.
- Do not put a large amount of warm contents to cryopreserve. The rise of the chamber temperature may have a bad influence on the contents in the unit.
- This unit is designed only for low temperature storage of medical/biotechnology samples (ex. cells) or reagents. Do not use for the purpose other than above (ex. freezing of regenerating agent).
- In case some optional inventory racks are in the chamber, be careful not to drop inventory rack when pulling out it.

START-UP OF UNIT

Operation during power failure

When the battery switch for power failure is ON, during a power failure the behavior of this unit is as follows.

- The power failure alarm is activated (refer to page 46).

Press Buzzer key to silence the buzzer of the power failure alarm. In case the ring back is turned ON, buzzer sounds again when a power failure still continues after ring back set time passed (refer to page 28).

- LCD touch panel is turn OFF (refer to page 46).

By touching the LCD touch panel, it lights in the set brightness for 5 seconds.

- The High/Low Alarm is ready to activate during a power failure (refer to page 21~22 and 46).

(While the LCD touch panel is lighting after touching) The message of the High/Low Alarm is displayed in the message display field, and “Alarm” (or “Warning”) is displayed alternately in normal characters and reverse video in the alarm display. The buzzer and the remote alarm (although it is of the power failure alarm) are already activated.

- The clock function does not stop.

- Operation log data and alarm log data during a power failure is saved.

Note: When the capacity of the battery for power failure alarm is flat during a power failure, subsequent operation log data and alarm log data is not saved.

Operation after recovery from power failure

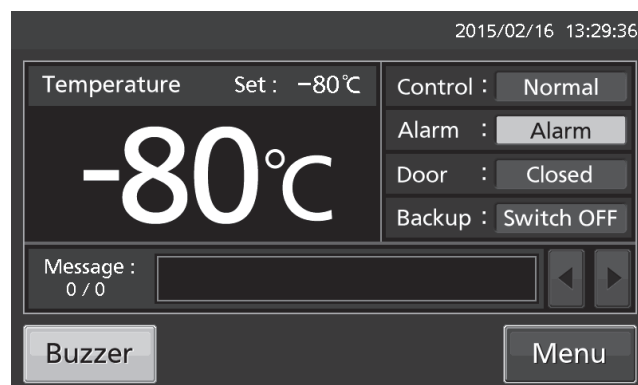
The set value is memorized by nonvolatile memory. Accordingly, the chamber resumes the operation with setting before power failure.

Note:

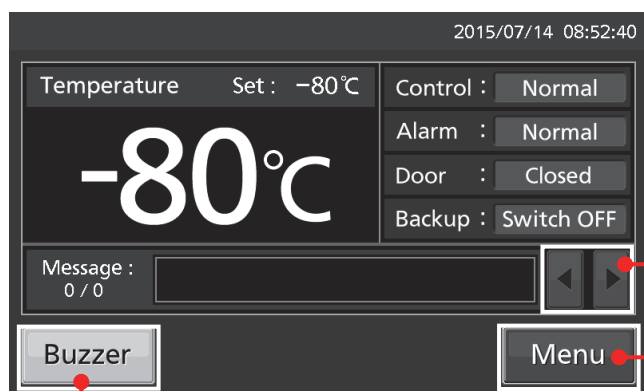
- It may take up to 1 minute until the LCD touch panel lights after recovery from power failure.
- All products start at the same time as the recovery from the power failure, so that, the temporary voltage drop may have a bad influence on the starting of this unit. To prevent this situation, set the appropriate compressor delay time of this unit (refer to page 23).

Although the power failure alarm is canceled at the recovery of the power failure, in order to remind that power failure had happened, buzzer is sounding and “Alarm” is displayed alternately in normal characters and reverse video in the alarm display (refer to page 48). By pressing Buzzer key, the alarm display returns to “Normal” and the buzzer stops.

Note: It is possible to confirm the past alarms in the “Displaying alarm log” (refer to page 37~38).



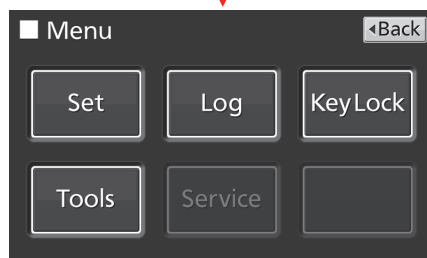
BASIC OPERATION ON LCD TOUCH PANEL



◆ Message select key:
(Operate) Changing some messages

◆ Buzzer key: (Operate) Silencing the buzzer
(Alarm is not canceled except for some alarms; page 48)

● Operation from Menu key



Menu screen		Page
◆ Set	Temp. Setting screen (Setting) Temp., High Alarm, Low Alarm	21~22
◆ Log	Log screen <ul style="list-style-type: none"> ◆ Chart <ul style="list-style-type: none"> Chart screen <ul style="list-style-type: none"> ◆ Actual Temp. (Display) Chamber temp. log graph (can be exported) 31~33 ◆ Door Opening (Display) Door opening log graph (can be exported) 31~33 ◆ Data Export <ul style="list-style-type: none"> Export screen <ul style="list-style-type: none"> ◆ Actual Temp. (Export) Chamber temperature log 34~36 ◆ Door Opening (Export) Door opening log 34~36 ◆ Setting (Setting) Log interval, Unique ID 30~31 ◆ Alarm (Display) Alarm log (can be exported) 37~38 ◆ Alarm Export (Export) Alarm log 39~41 	
◆ Key Lock	Key Lock screen (Setting) Key lock ON/OFF, password	24~26
◆ Tools	Tools screen <ul style="list-style-type: none"> ◆ Operation Setting (Setting) Eco operation ON/OFF, comp. delay time 22~23 ◆ Alarm Setting (Setting) Alarm delay, ring back, remote alarm etc 27~29 ◆ DAQ Setting Do not press (It is not possible to set.) ◆ Date & Time (Setting) Date, time 42 ◆ Brightness/Sleep (Setting) Brightness, sleep ON/OFF etc 43~44 	

BASIC PARAMETERS

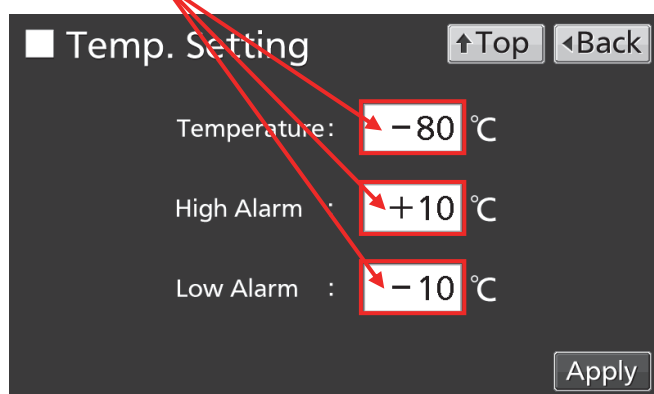
How to input numerical value and alphanumeric character

On each screen in the LCD touch panel, it may be necessary to input numerical value or alphanumeric characters.

- When inputting numerical value

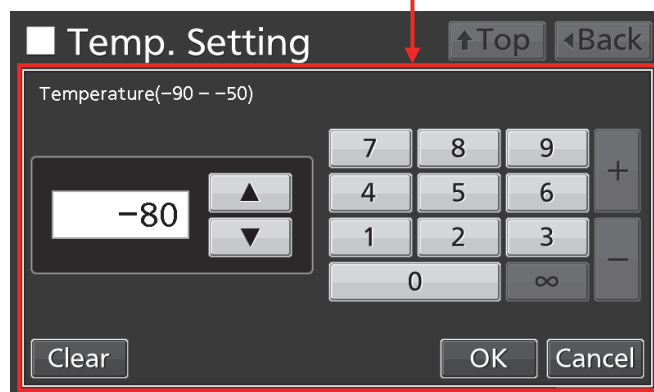
1. By pressing numeric input box, numeric input window is displayed.

Numeric input box



2. Press Numeric key or Up/Down key to input numerical value, and press OK key.

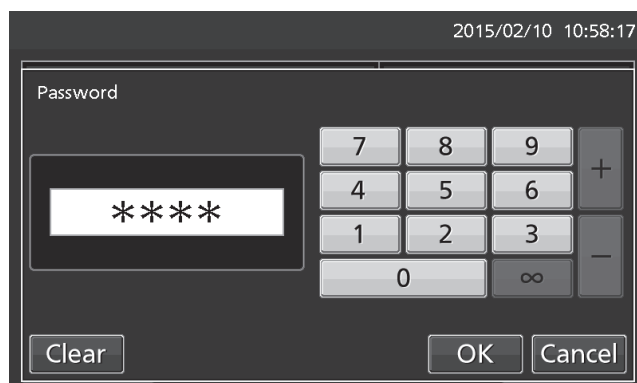
Numeric input window



- Key description

- Numeric key (0~9): Input numerical value.
- Up/Down key (▲/▼): Increases or decreases the numerical value displayed in the numeric input box.
- Clear key: Deletes the numerical value displayed on the numeric input box.
- Cancel key: Stops inputting on the numeric input box and closes the input window.

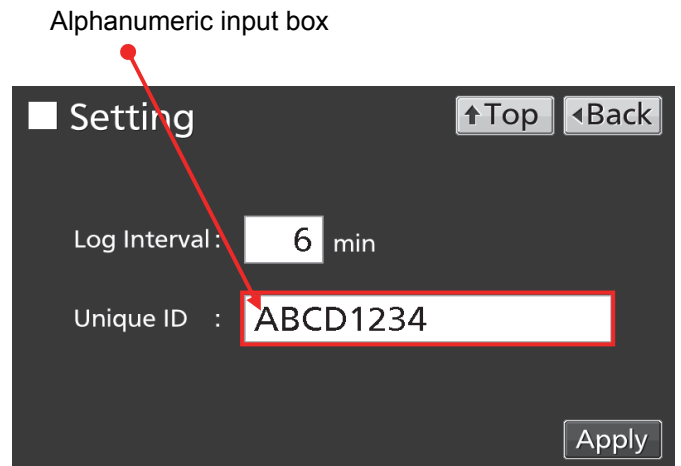
Note: Up/Down key may not be displayed.



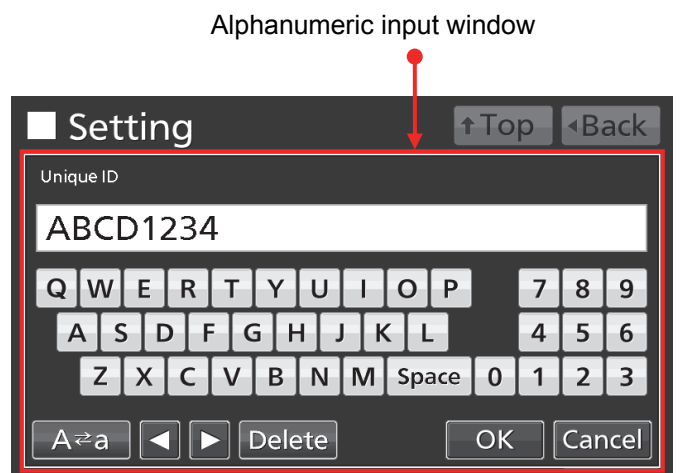
BASIC PARAMETERS

- When inputting alphanumeric characters

1. By pressing alphanumeric input box, alphanumeric input window is displayed.



2. Press alphabetic key and numeric key to input alphanumeric characters, and press OK key.



- Key description

- Alphabetic key (A~Z, Space): Input alphabetic characters or spaces.
- Numeric key (0~9): Input numerical values.
- UC/LC key (A↔a): Change UC/LC of alphabetic key.
- Left/Right key (◀/▶): Move the cursor to left/right.
- Delete key: Delete an alphanumeric character on the left side of the cursor.
- Cancel key: Stops inputting on the alphanumeric input box and closes the alphanumeric input window.

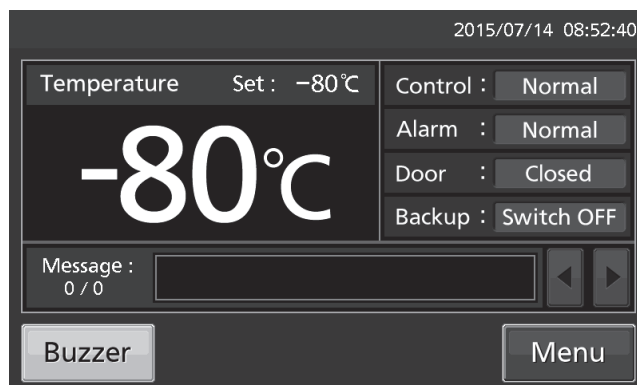
Note: While the alphanumeric input window is open, it is not possible to operate Top key and Back key.

BASIC PARAMETERS

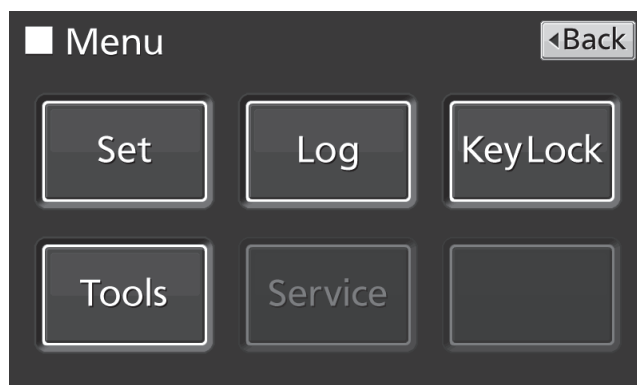
Setting Temperature, High Alarm and Low Alarm

Set the Temperature, High Alarm and Low Alarm for normal operation according to the following procedure. The unit automatically starts operation using these settings after power-on.

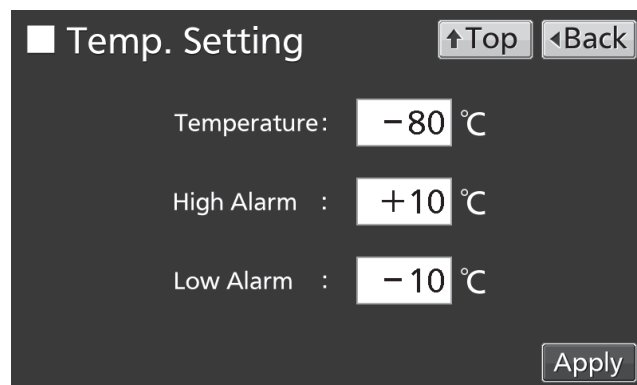
1. Press Menu key to lead the Menu screen.



2. Press Set key to lead the Temp. Setting screen.



3. Input each parameter. Press Apply key to save the input value. The display returns to the Menu screen.



- Each parameter setting

- Temperature: Set value of chamber temperature.

Settable range: -50 °C~-90 °C, Control range: -50 °C~-86 °C, factory setting: -80 °C.

- High Alarm: When the chamber temperature exceeds the High Alarm set temperature (= the set temperature + the set value of High Alarm)*, the High Alarm is activated.

Settable range: +5 °C~+40 °C, factory setting: +10 °C.

- Low Alarm: When the chamber temperature falls below the Low Alarm set temperature (= the set temperature - the set value of Low Alarm)*, the Low Alarm is activated.

Settable range: -5 °C~-40 °C, factory setting: -10 °C.

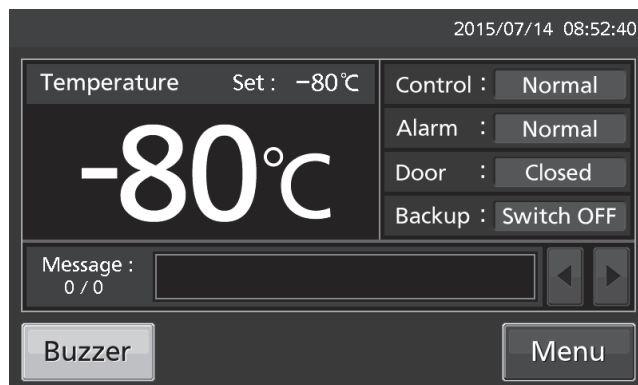
BASIC PARAMETERS

* The current chamber temperature is the value rounded off below a decimal point, so the High/Low Alarm may be activated when the value of the current chamber temperature is equal to the High/Low Alarm set temperature.

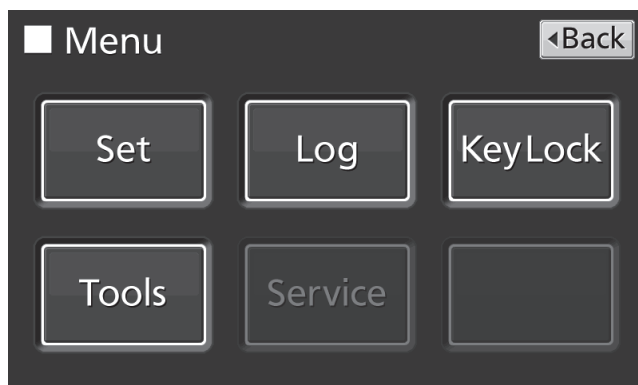
4. On the Menu screen, press Back key to return to the Top screen.

Setting operation control mode

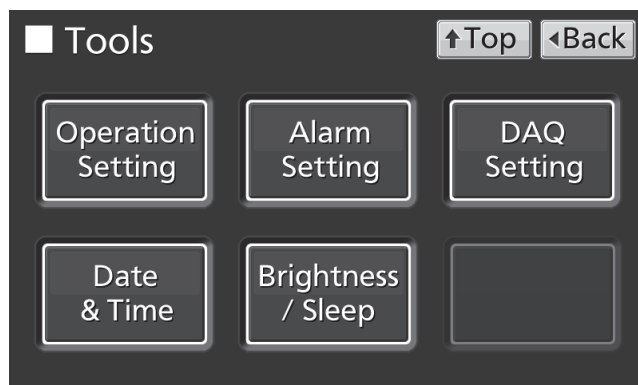
1. Press Menu key to lead the Menu screen.



2. Press Tools key to lead the Tools screen.



3. Press Operation Setting key to lead the Operation Setting screen.



BASIC PARAMETERS

4. Input each parameter. Press Apply key to save the input value and setup. The display returns to the Tools screen.

■ Operation Setting ↑Top ◀Back

Control : NORMAL

Compressor Delay: 10 min

Apply

- Each setting

- Control:

Choose the operation control mode between the NORMAL (normal control) or the ECO (eco control). By holding the Control slide key and sliding it right, operation control mode is changed to ECO. Factory setting: NORMAL.

- Compressor Delay:

The time from turning ON this unit until starting its compressor. This unit is required a large electric power at the moment its compressor starts. When some units are in a same room, set so as to be shifted to each other the compressor delay times, to prevent the simultaneous start of all compressors after power failure. Settable range: 3 minutes~15 minutes, factory setting: 3 minutes.

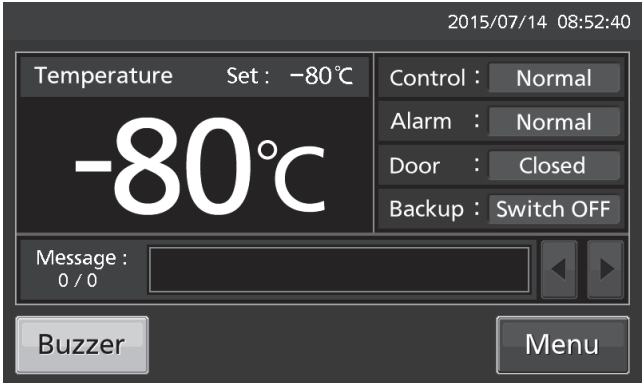
Note: This unit has two compressor A and B. The compressor whose cumulative operating time is shorter than the other one, starts first, after 1 minute the other starts.

5. Press Top key to return to the Top screen.

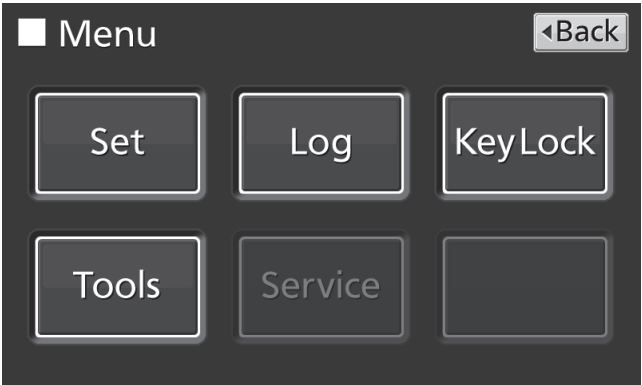
BASIC PARAMETERS

Setting key lock

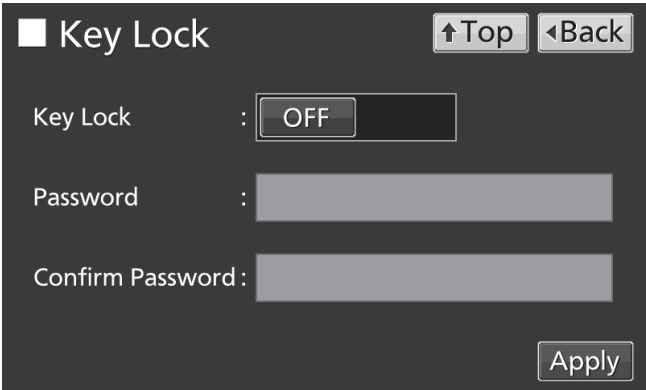
1. Press Menu key to lead the Menu screen.



2. Press Key Lock key to lead the Key Lock screen.



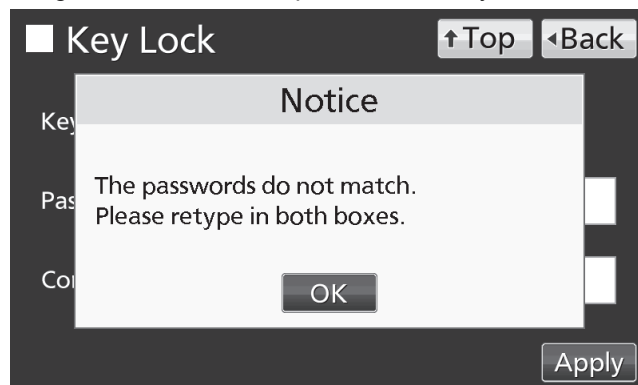
3. On the Key Lock screen, it is possible to set each setting of key lock (refer to next page). Press Apply key to change key lock ON and to save the password. The display returns to the Menu screen.



BASIC PARAMETERS

- Each setting of key lock
- Key Lock: By holding Key Lock slide key and sliding it to the right, Key Lock turns to ON.
- Password: The number (Max. 6 digits) inputted here are registered the release password of Key Lock.
- Confirm Password:

To prevent erroneous input, input the same password as Password input box. When inputting different password, Notice dialog box is displayed. Press OK key and input the correct password.

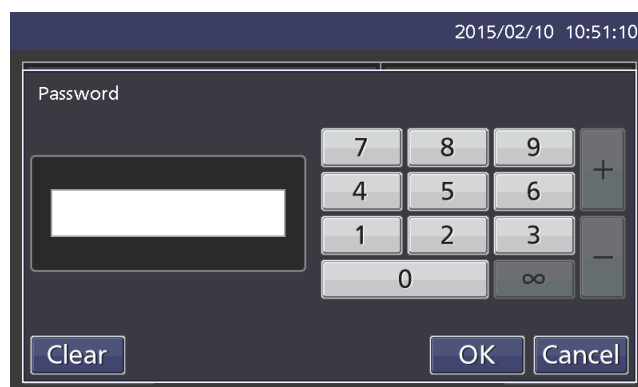


Note: Manage the release password of Key Lock properly.

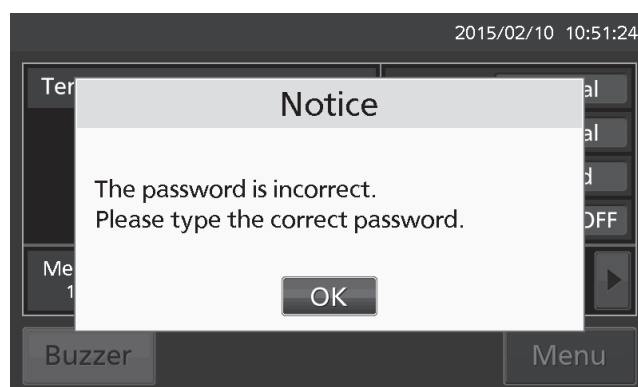
4. On the Menu screen, press Back key to return to the Top screen.

• Operation for Keylock-ON

- When pressing Menu key, Password input box is displayed, and input of the release password of Key Lock is required.



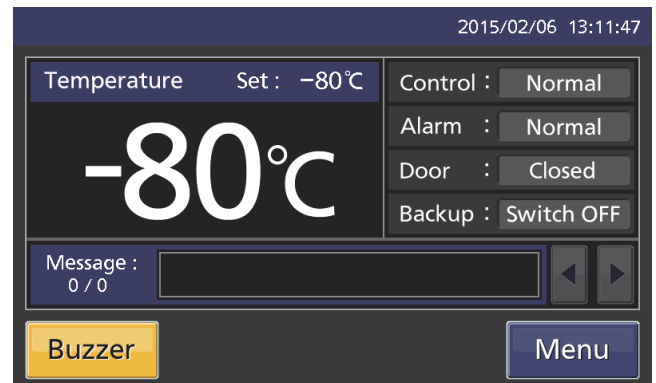
- When the inputted password is incorrect, Notice dialog box is displayed. Press OK key, and then input the correct password.



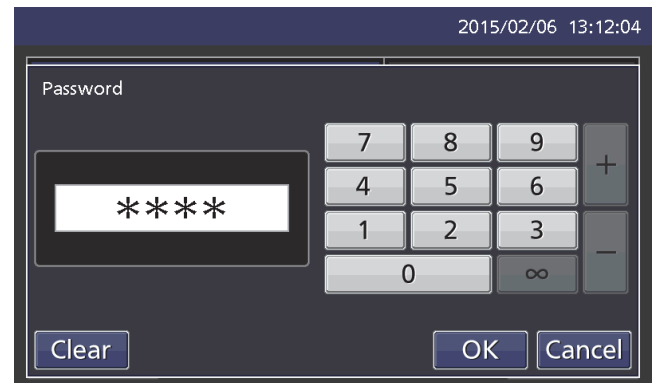
BASIC PARAMETERS

Removing key lock

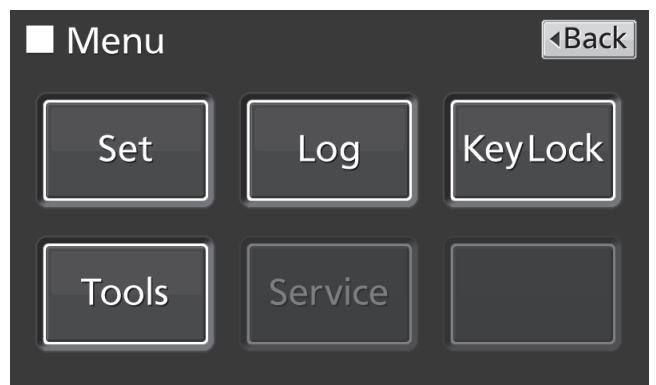
1. By pressing Menu key, the Password input window is displayed.



2. On Password input box, input the set release password of Key Lock, and press OK key to lead the Menu screen.

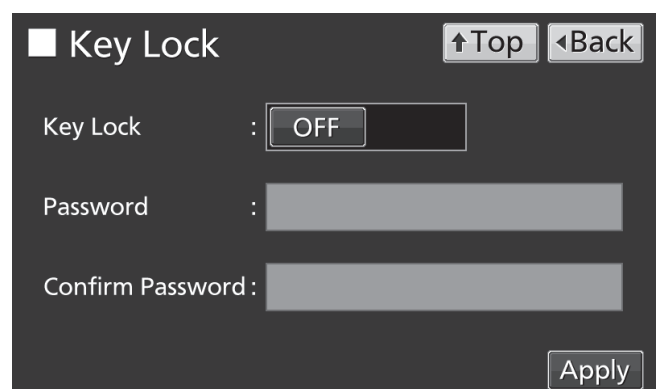


3. Press Key Lock key to lead the Key Lock screen.



4. On the Key Lock screen, by holding Key Lock slide key and sliding to the left, change to OFF. Press Apply key to turn the key lock OFF. The display returns to the Menu screen.

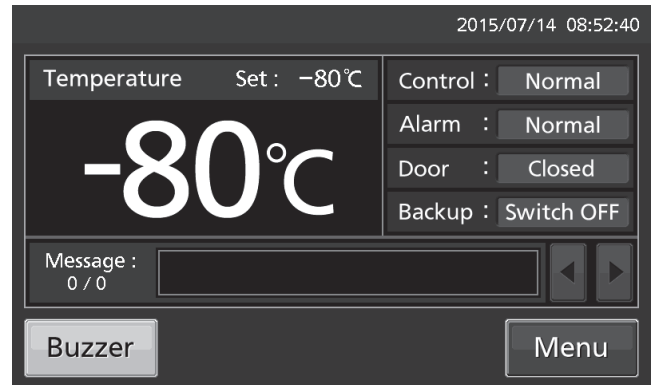
Note: The release password of key Lock is deleted.



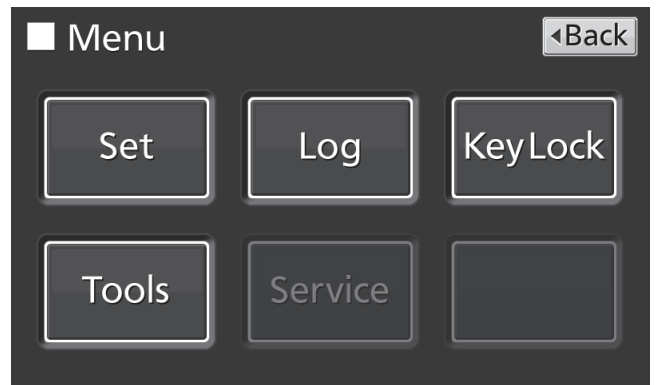
5. On the Menu screen, press Back key to return to the Top screen.

ALARM PARAMETERS

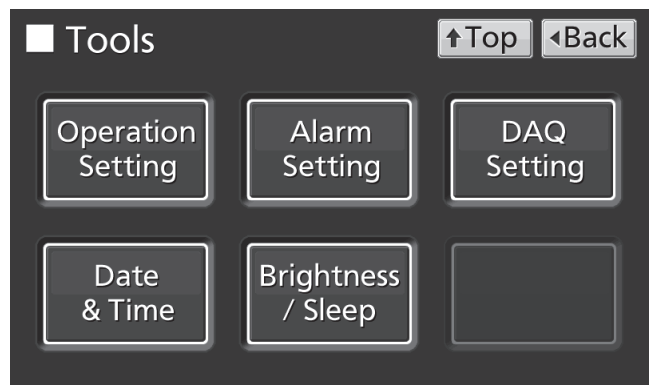
1. Press Menu key to lead the Menu screen.



2. Press Tools key to lead the Tools screen.



3. Press Alarm Setting key to lead the Alarm Setting screen.



ALARM PARAMETERS

4. On the Alarm Setting screen, it is possible to set each setting. Press Apply key to save the input value and setup. The display returns to the Tools screen.

■ Alarm Setting ↑Top ←Back

Alarm Delay : 15 min

Door Delay : 2 min

Ring Back : [ON] 30 min

Remote Alarm : [ON]

Apply

- Each setting

- Alarm Delay:

The function is that when the unit is in the alarm state of High Alarm or Low Alarm, the alarm buzzer will sound after the alarm delay set time passed.

Settable range: 0 minute~15 minutes, factory setting: 15 minutes.

Note: When the unit is recovered from the alarm state within the alarm delay time, the buzzer does not sound after the elapse of the alarm delay.

- Door Delay:

The function is that when the unit is in the alarm state of door, the alarm buzzer will sound after the alarm delay set time passed. Settable range: 0 minute~15 minutes, factory setting: 2 minutes.

Note: When the unit is recovered from the alarm state within the door alarm delay time, the buzzer does not sound after the elapse of the door alarm delay.

- Ring Back:

The function is that the alarm buzzer sounds again when the alarm state still continues after the ring back set time passed even though the alarm buzzer was stopped by pressing Buzzer key. By holding and sliding Ring Back slide key to the right, the Ring Back is turned to ON.

Settable range: 1 minute~99 minutes, factory setting: 30 minutes.

Note: At Door alarm, the alarm is not re-activated because the alarm itself is deactivated by pressing Buzzer key (refer to page 48).

- Remote Alarm:

The function is that the remote alarm is continued even though the buzzer is stopped by pressing Buzzer key. By holding and sliding Remote Alarm slide key to the right, the Ring Back is turned to ON (not in conjunction with Buzzer key). Factory setting: ON.

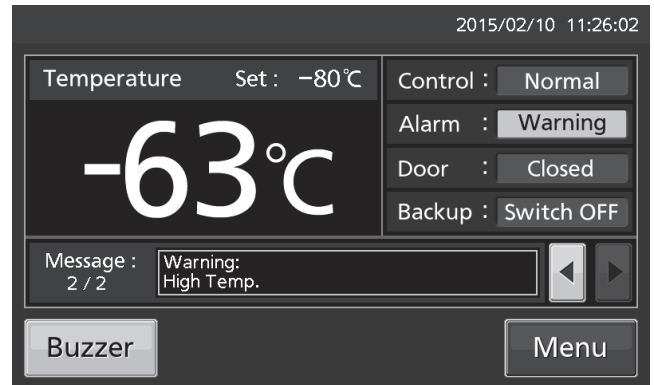
5. Press Top key to return to the Top screen.

ALARM PARAMETERS

- At the alarm state

- While the unit's alarm is being activated and the buzzer is being sounding, the buzzer is silenced by pressing Buzzer key. For the behavior at the time of pressing Buzzer key and the re-activation of alarm, under each setting condition, refer to Table 4-5 on page 48.

Resolve the cause of the alarm in reference to page 46~47 because the alarm itself is not deactivated by pressing Buzzer key except for some alarms.



OPERATION/ALARM LOG

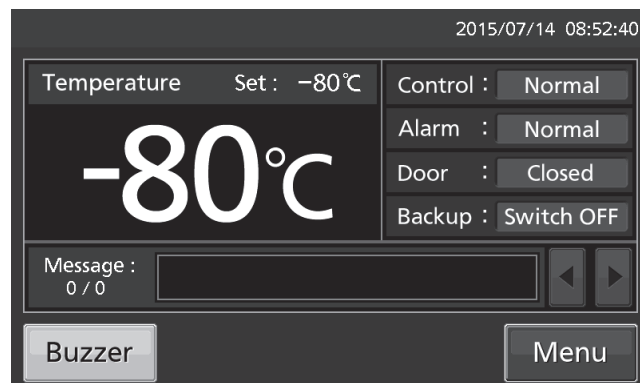
Setting log interval

The unit is equipped with a function of saving operation log data (chamber temperature and open/close state of door).

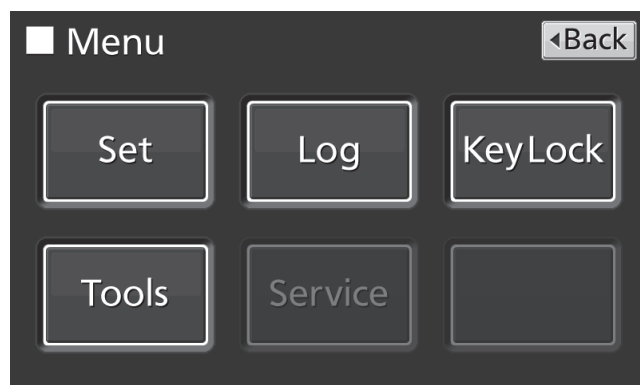
Note: When the battery switch for power failure alarm is ON, operation log is saved during a power failure.

Use the following procedure to set the log interval (interval of acquiring the operation log).

1. Press Menu key to lead the Menu screen.



2. Press Log key to lead the Log screen.



3. Press Setting key to lead the Setting screen.



OPERATION/ALARM LOG

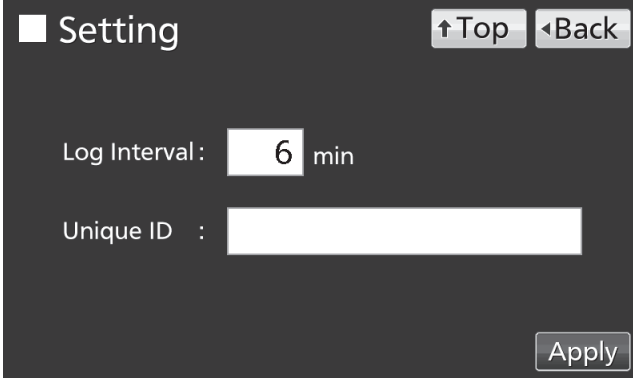
4. On the Setting screen, input Log Interval. Press Apply key to save the input value. The display returns to the Log screen.

Settable range: 2 minutes~30 minutes.

Factory setting: 6 minutes.

Note: Only an even number can be inputted. When inputting an odd number and when pressing OK key in the numeric input window, it changes to an even number which is 1 smaller than that.

Note: It is possible to register 8-digit alphanumeric characters as the Unique ID. Refer to page 36.

The image shows a 'Setting' screen with a dark background. At the top left is a square icon, and at the top right are '↑Top' and '◀Back' buttons. The main content area has 'Log Interval : 6 min' where '6' is in a white input box. Below it is 'Unique ID :' followed by a long white input field. At the bottom right is an 'Apply' button.

Note: Relation between log interval and the estimated amount of data that can be saved

Log interval=2 minutes: Approx. 46 days

Log interval=6 minutes: Approx. 135 days

Log interval=30 minutes: Approx. 664 days

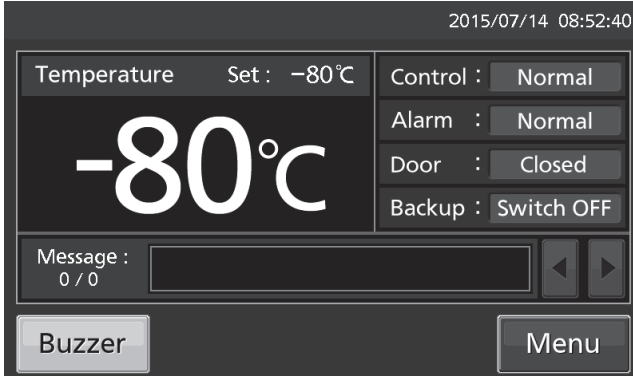
When saving data more than the above, and the data is overwritten and the old data is deleted.

5. Press Top key to return to the Top screen.

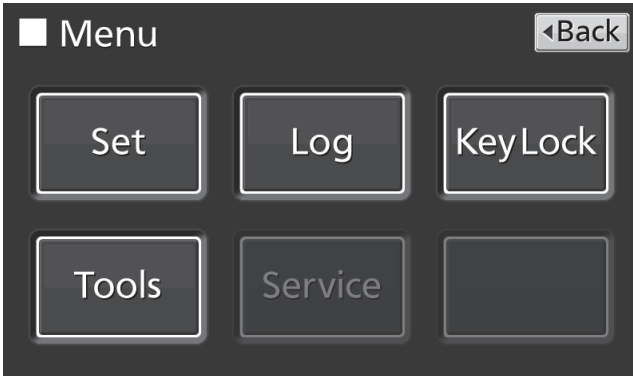
Displaying operation log

Operation log saved in the freezer can be displayed graphically on the LCD touch panel.

1. Press Menu key to lead the Menu screen.

The image shows a main status screen with a dark background. At the top right is the date and time '2015/07/14 08:52:40'. The screen is divided into sections: 'Temperature Set : -80°C' with a large '-80°C' display; 'Control : Normal', 'Alarm : Normal', 'Door : Closed', and 'Backup : Switch OFF'; a 'Message : 0 / 0' section with a text input field and navigation arrows; and at the bottom, 'Buzzer' and 'Menu' buttons.

2. Press Log key to lead the Log screen.

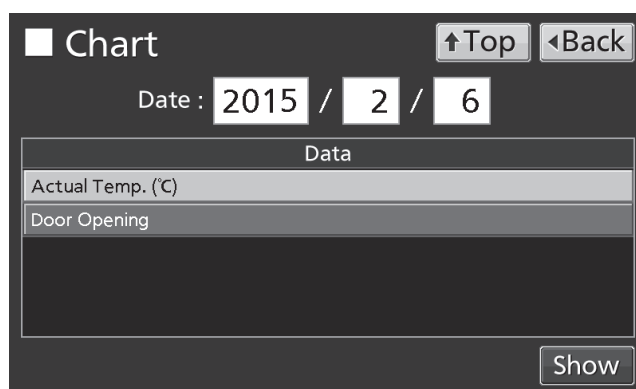
The image shows a 'Menu' screen with a dark background. At the top left is a square icon, and at the top right is a '◀Back' button. The screen displays six large buttons in a 2x3 grid: 'Set', 'Log', 'KeyLock' in the top row, and 'Tools', 'Service', and an empty button in the bottom row.

OPERATION/ALARM LOG

3. Press Chart key to lead the Chart screen.

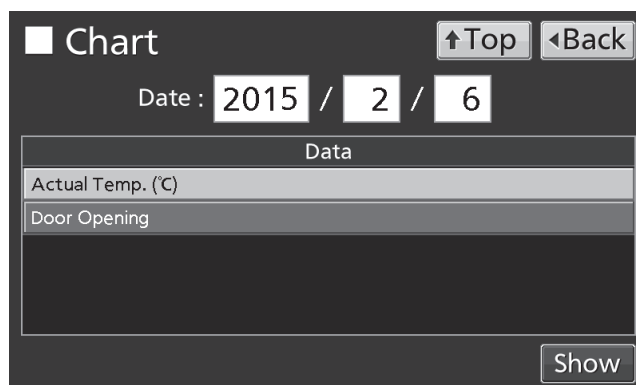


4. On the Chart screen, input the date (year / month / day) of the operation log you want to display graphically.



5. On the Chart screen, by pressing Show key after pressing the item you want to display graphically, the graph of each operation log is displayed.

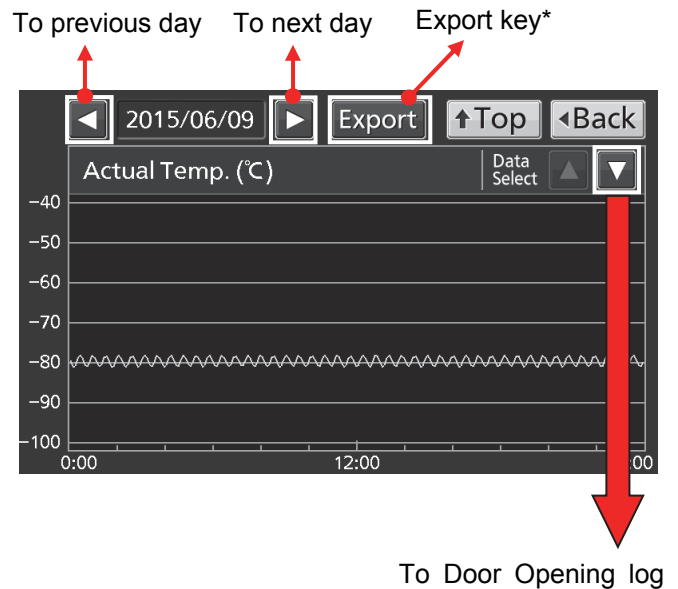
- Actual Temp.:
Chamber temperature log graph
(Go to procedure 6)
- Door Opening:
Open/close state of door log graph
(Go to procedure 7)



OPERATION/ALARM LOG

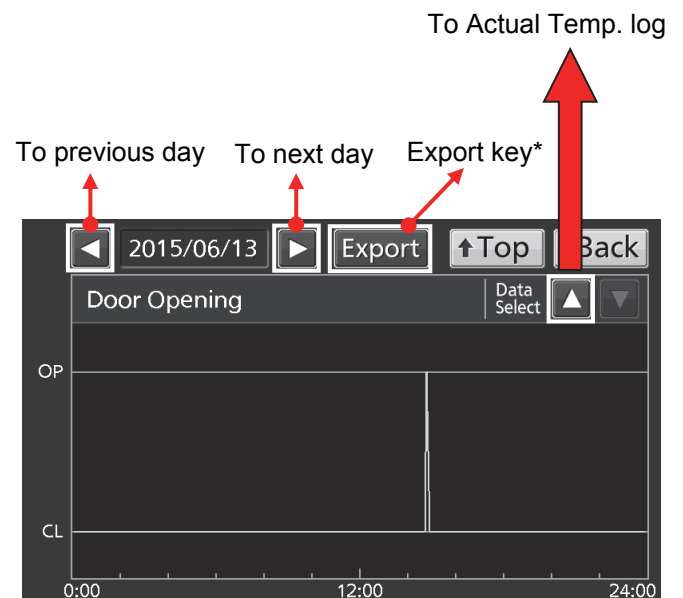
6. Actual Temp. log graph is displayed.

- Press Back key to return to the Chart screen.
- Top key to return to the Top screen.



7. Door Opening log graph is displayed.

- Press Back key to return to the Chart screen.
- Press Top key to return to the Top screen.



*When exporting operation log data, without pressing the Export key, follow the procedure on page 34~36. When pressing Export key by mistake, press the Back key to return to the previous screen.

Note: The error of about 1 minute may be observed during a month. Refer to page 42 for the procedure of setting time.

OPERATION/ALARM LOG

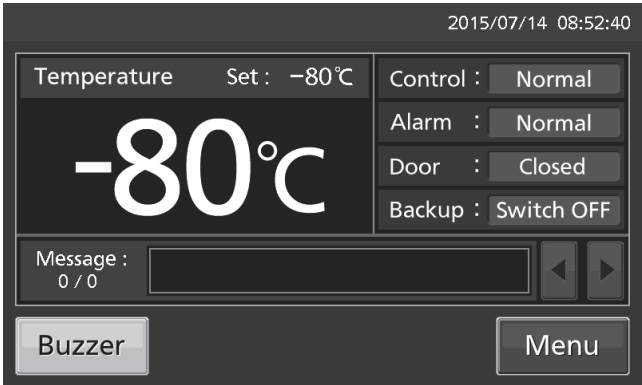
Exporting operation log

Operation log data saved in the freezer can be exported in CSV format to the USB memory inserted into the USB port.

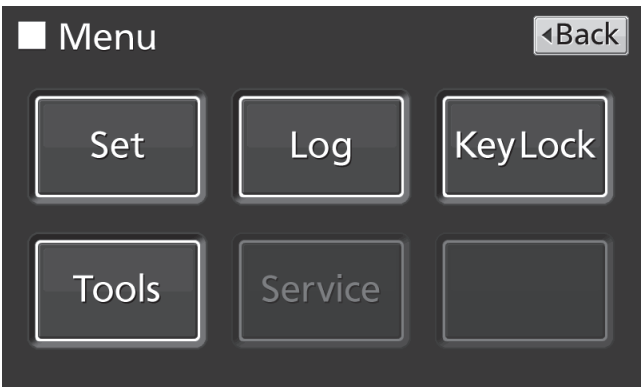
1. Insert the USB memory into the USB port.

Note: It is not possible to use a USB memory with security functions that requires entering password.

2. Press Menu key to lead the Menu screen.



3. Press Log key to lead the Log screen.



4. Press Data Export key to lead the Export screen.



OPERATION/ALARM LOG

5. On the Export screen, select the time period you want to export.

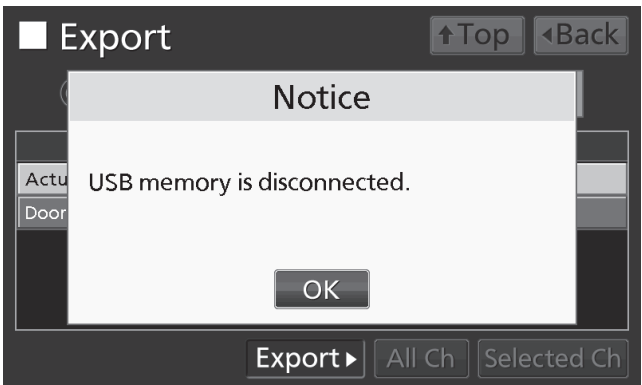
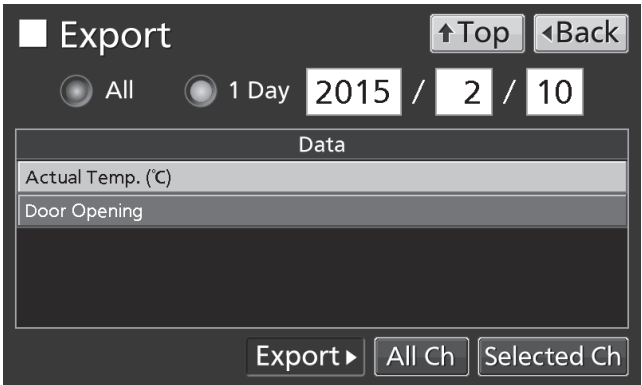
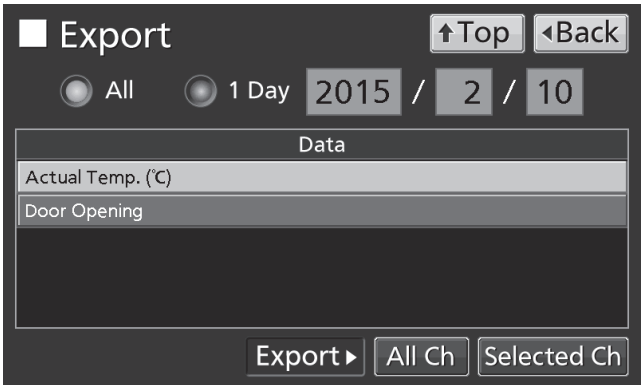
- To export the saved operation log data over the entire period, press All radio button.
- To export the operation log data of a specified date, press 1 Day radio button and input the date (year / month / day) of the operation log data you want to export.

Note: The error of about 1 minute may be observed during a month. Refer to page 42 for the procedure of setting time.

6. On the Export screen, select the type of operation log data you want to export.

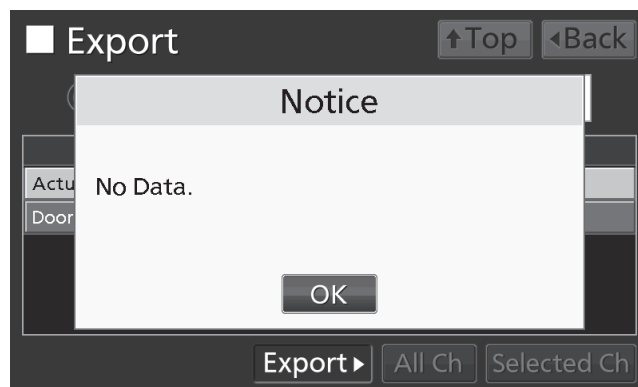
- To export all types of operation log data, press All Ch key.
- To export only operation log data you want to export, select operation log data you want to export, and then press Selected Ch key.
- Actual Temp.: Chamber temperature log data
- Door Opening: Open/close state of outer door log data

Note: When no USB memory is inserted into the USB port, Notice dialog box is displayed. Press OK key, and then insert a USB memory into the USB port.



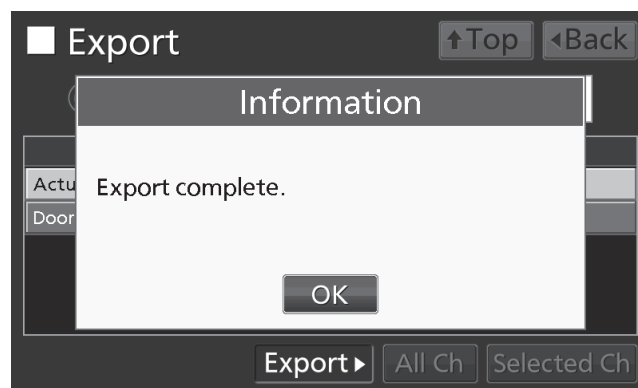
OPERATION/ALARM LOG

Note: When the specified operation log data does not exist, Notice dialog box is displayed. Press OK key, and then re-specified according to procedure 4 and 5.



7. When the export is complete, Information dialog box is displayed. Press OK key.

Note: Even after the export of operation log data is complete, operation log data saved in the unit are not deleted.



8. Remove the USB memory from the USB port.

Note:

- The log folder is created in the USB memory, and the exported file is saved in it in CSV format. The exported file name is in date (8 digits) - type of data format.

(e.g.) When exporting all types of data using All (from Oct. 1st, 2015 to Jan. 1st, 2016):

20151001-20160101_AllCh.csv

20151001-20160101_Door.csv

(e.g.) When exporting Actual Temp. using 1 Day (Jan. 1st, 2016):

20160101_Temp.csv

- On the beginning of the exported file, product name ("MDF-DC500VX" or "MDF-DC700VX") is written. However when the Unique ID is registered (refer to page 31), product name and Unique ID (8-digit) are written.

(e.g.) When "RoomA001" is set as the Unique ID of MDF-DC500VX:

MDF-DC500VX, RoomA001

9. Press Top key to return to the Top screen.

OPERATION/ALARM LOG

Displaying alarm log

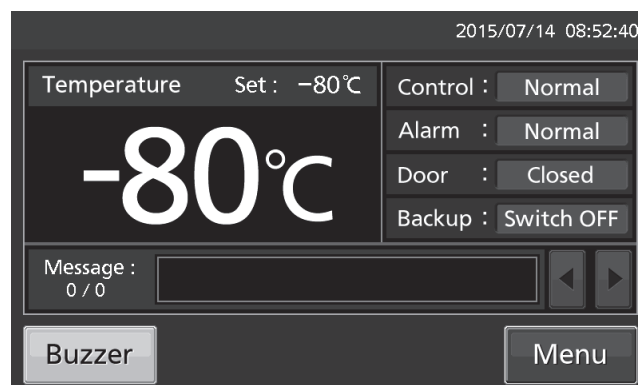
The unit is equipped with a function of saving alarm log data (Max. 256 logs).

Note:

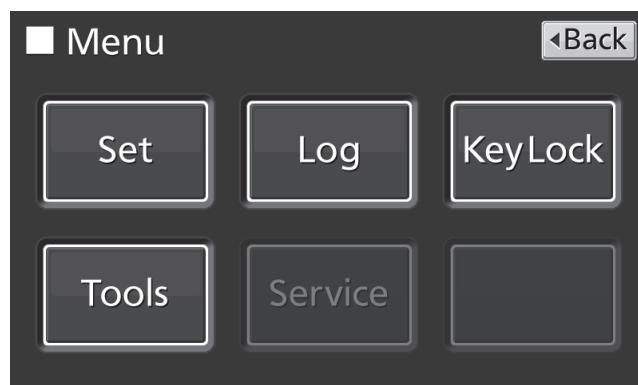
- When saving alarm logs more than 257, the oldest alarm log is deleted, and then overwritten.
- When the battery switch for power failure alarm is ON, operation log is saved during a power failure.

Alarm log saved in the freezer can be displayed graphically on the LCD touch panel.

1. Press Menu key to lead the Menu screen.



2. Press Log key to lead the Log screen.



3. Press Alarm key to lead the Alarm screen.

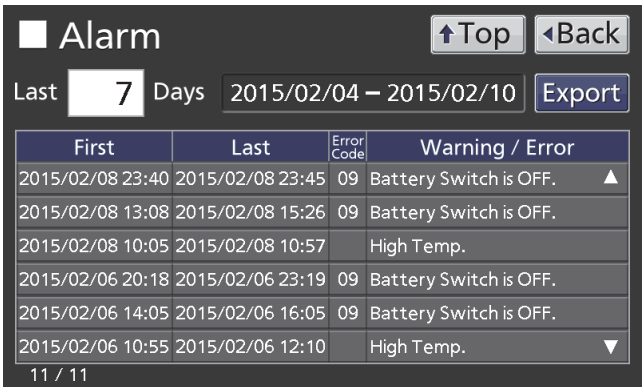


OPERATION/ALARM LOG

4. On the Alarm screen, the newest 7 days' alarm logs (containing that day) are displayed.

Note: When the number of applicable alarm log is 6 or more, by pressing the top (▲) or the bottom (▼) log, the log table currently displayed scrolls and hidden alarm logs can be seen.

- Press Back key to return to the Log screen.
- Press Top key to return to the Top screen.

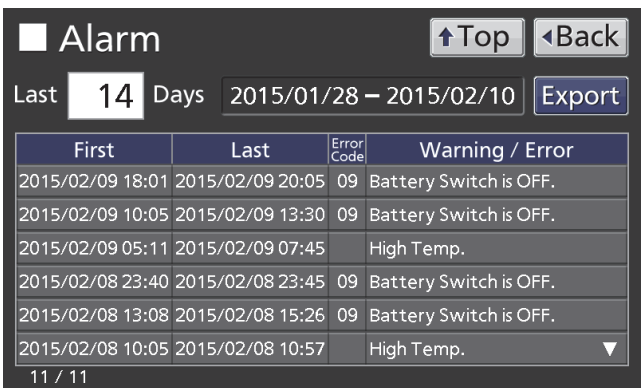


5. On the Alarm screen, by inputting days into the Last XX Days input box, alarm logs for specified days (containing that day) are displayed.

Settable range: 1 day~45 days.

Note: The error of about 1 minute may be observed during 1 month. Refer to page 42 for the procedure of setting time.

- Press Back key to return to the Log screen.
- Press Top key to return to the Top screen.

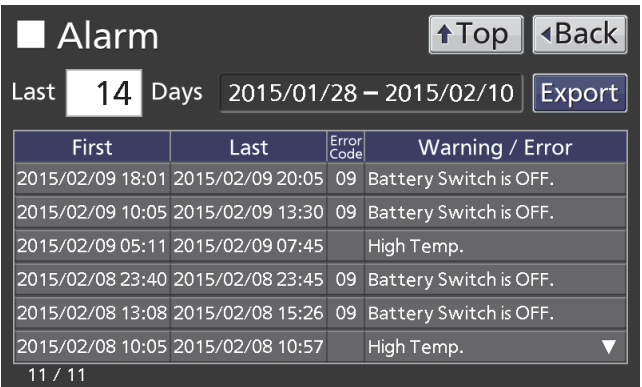


• On the Alarm screen of procedure 4 or 5, alarm log data can be exported in CSV format to the USB memory inserted into the USB port.

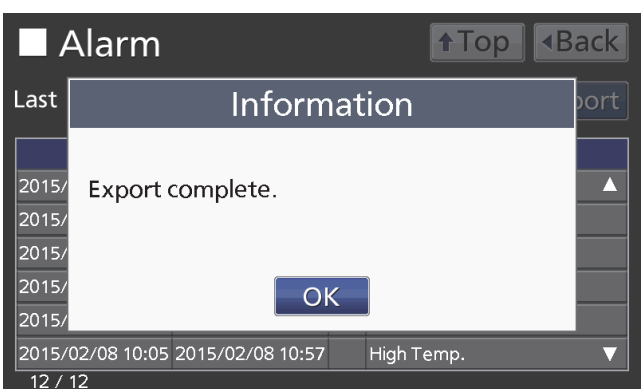
6. Insert the USB memory into the USB port.

Note: It is not possible to use a USB memory with security functions that requires entering password.

7. Press Export key.



8. When the export is complete, Information dialog box is displayed. Press OK key. Refer to page 40 and 41 for the details about abnormal export or exported file name.



9. Press Top key to return to the Top screen.

OPERATION/ALARM LOG

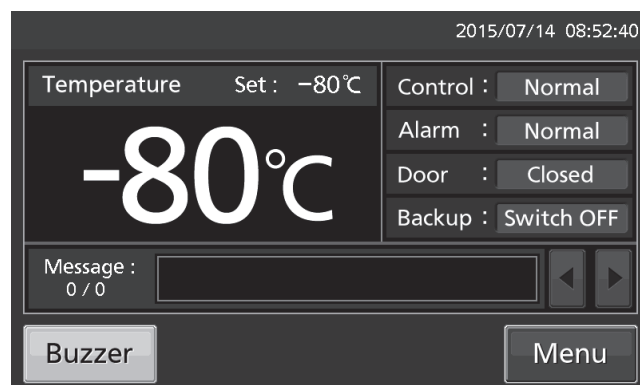
Exporting alarm log

It is possible to export saved alarm log data to a USB memory inserted in the USB port by CSV format.

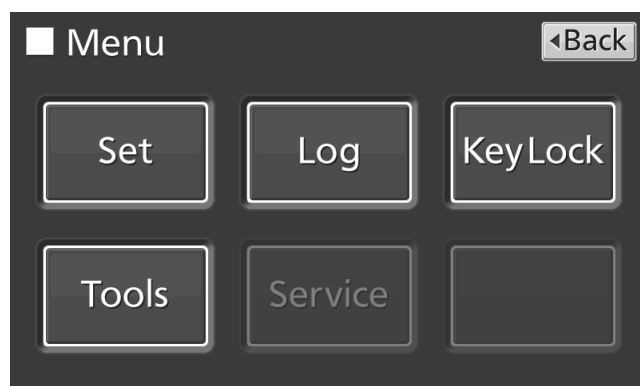
1. Insert a USB memory in the USB port.

Note: It is not possible to use a USB memory with security functions that requires entering password.

2. Press Menu key to lead the Menu screen.



3. Press Log key to lead the Log screen.



4. Press Alarm Export key to lead Alarm Export screen.



OPERATION/ALARM LOG

5. On the Alarm Export screen, select the period to export.

- To export the saved alarm log data over the entire period, press All radio button.
- To export the alarm log data for the specified days (The newest period containing that day), press Last XX Days radio button and input days. Settable range: 1 day~45 days.

Note: The error of about 1 minute may be observed during 1 month. Refer to page 42 for the procedure of setting time.

6. Press Export key.

The screenshot shows the 'Alarm Export' screen. At the top right are '↑Top' and '◀Back' buttons. Below the title, it says 'Stored Alarm Logs : 10'. There are two radio buttons: 'All' (selected) and 'Last 7 Days'. To the right of 'Last 7 Days' is a date range '2015/02/04 - 2015/02/10'. At the bottom right is an 'Export' button.

The screenshot shows the 'Alarm Export' screen. At the top right are '↑Top' and '◀Back' buttons. Below the title, it says 'Stored Alarm Logs : 10'. There are two radio buttons: 'All' and 'Last 14 Days' (selected). To the right of 'Last 14 Days' is a date range '2015/01/28 - 2015/02/10'. At the bottom right is an 'Export' button.

Note:

- When USB memory is not inserted in the USB port, Notice dialog box is displayed. Press OK key and insert an USB memory into the USB port.

The screenshot shows a 'Notice' dialog box overlaid on the 'Alarm Export' screen. The dialog box has a title bar 'Notice' and contains the text 'USB memory is disconnected.' At the bottom of the dialog box is an 'OK' button. The 'Export' button from the background screen is still visible at the bottom right.

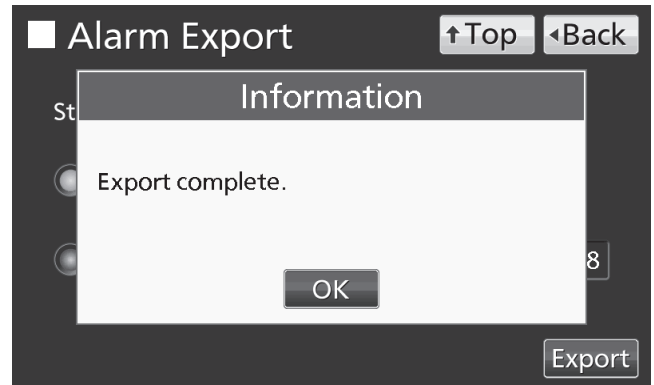
- When alarm log data does not exist in the specified days, Notice dialog box is displayed. Press OK key and specify days again as shown in the procedure 5.

The screenshot shows a 'Notice' dialog box overlaid on the 'Alarm Export' screen. The dialog box has a title bar 'Notice' and contains the text 'No Data.' At the bottom of the dialog box is an 'OK' button. The 'Export' button from the background screen is still visible at the bottom right.

OPERATION/ALARM LOG

7. Even after completion the export of alarm log data, Information dialog box is displayed. Press OK key.

Note: After completing the export of alarm log data, alarm log data saved at unit is not deleted.



8. Remove a USB memory from the USB port.

Note: A log folder is created in a USB memory, and an exported data file is saved in the log folder by CSV format.

Exported file name; The first date during exported period (8 digits) + the last date (8 digits) + AlarmLog

Example) When exporting alarm log data for 7 days on January 7, 2016;

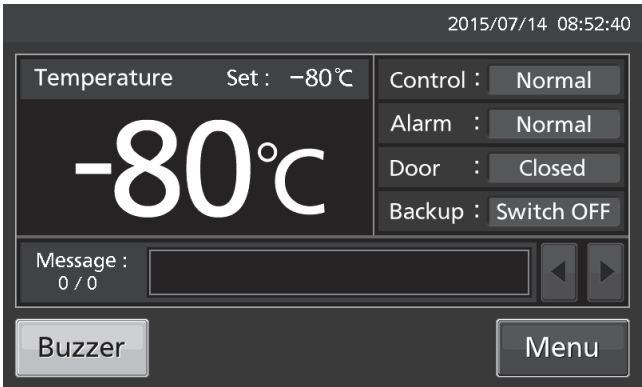
20160101-20160107_AlarmLog.csv

9. Press Top key to return to the Top screen.

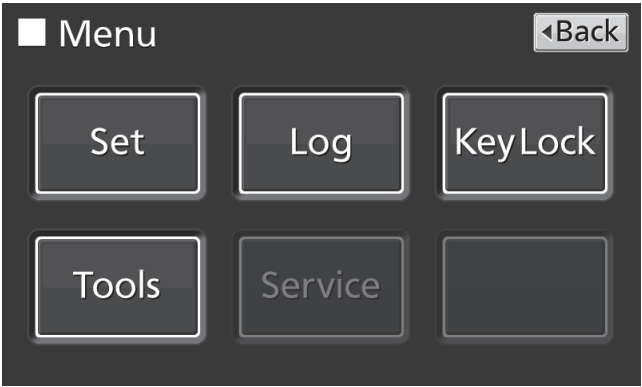
OTHER PARAMETERS

Setting date and time

1. Press Menu key to lead the Menu screen.



2. Press Tools key to lead the Tools screen.



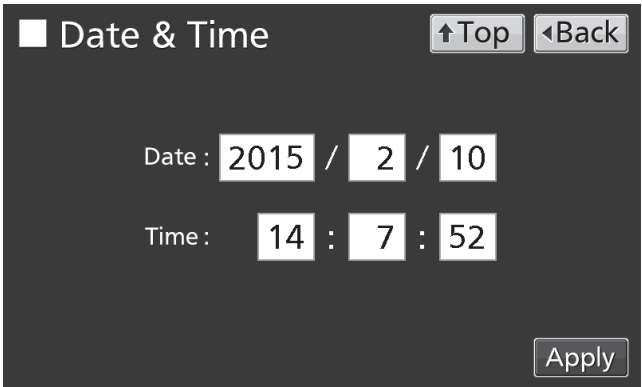
3. Press Date & Time key to lead the Date & Time screen.



4. On the Date & Time screen, input the present date and time. Press Apply key to save the input value. The display returns to the Tools screen.

Note:

- 24-hour clock.
- It is recommended to set the time periodically since the error of about 1 minute may be observed during a month.

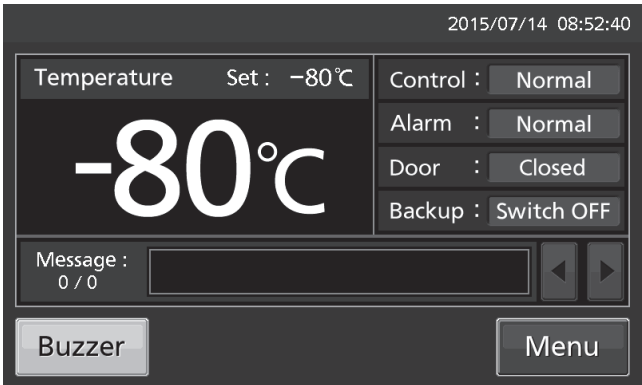


5. Press Top key to return to the Top screen.

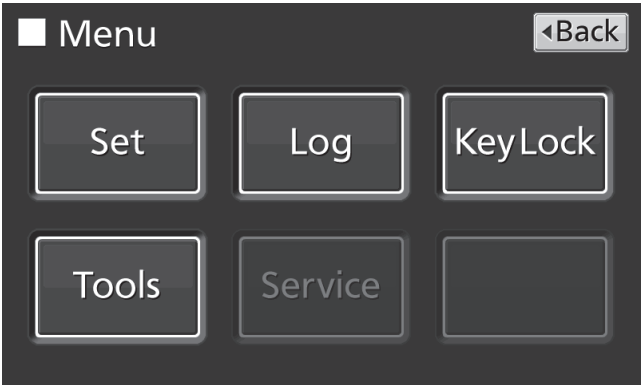
OTHER PARAMETERS

Setting brightness and sleep

1. Press Menu key to lead the Menu screen.



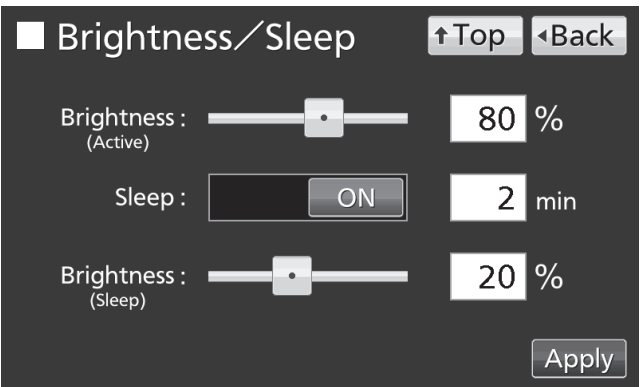
2. Press Tools key to lead the Tools screen.



3. Press Brightness/Sleep key to lead the Brightness/Sleep screen.



4. On the Brightness/Sleep screen, each setting of brightness and sleep is available. Press Apply key to save the input value and setup. The display returns to the Tools screen.



OTHER PARAMETERS

- Each setting

- Brightness(Active):

Brightness of LCD touch panel of the usual state. Adjust Brightness(Active) slide bar or input set value into the Brightness(Active) input box. Settable range: 50~100, factory setting: 80.

- Sleep:

The function is that the brightness of LCD touch panel is lowered to save electricity, when there is no key operation during set time.

By holding the Sleep slide key and sliding it right, the Sleep function is turned to ON. Input the set value of time to change the Sleep state. Settable range: 1 minute~5 minutes, factory setting: 2 minutes.

Note: It is not possible to operate any key in the Sleep state. By touching the LCD touch panel, the Sleep state is released and the LCD touch panel returns to the usual state. Under this condition, key operations are available.

- Brightness(Sleep):

Brightness of LCD touch panel of the Sleep state. Adjust Brightness(Sleep) slide bar or input set value into the Brightness(Sleep) input box. Settable range: 0~50, factory setting: 20.

5. Press Top key to return to the Top screen.

OPERATION MONITOR SYSTEM

This unit has the operation monitor system. It is the function to detect and inform some hard operating conditions that leaving the unit operating may cause a failure. The table 2 shows the information of the operation monitor system.

Table 2 Information of the operation monitor system

Information	Status	Message display field	If this status continues	Remedy
Abnormal ambient temperature	When the ambient temp. is over approx. 35 °C or lower than approx. 0 °C.	Status1: Ambient Temp Abnormal.	The cooling performance and/or the durability of the refrigerating circuit may get worse.	Recheck air-conditioning of installed site. * The message disappears when the ambient temp. returns to within allowable range. (approx. 0 °C~35 °C)
Overload operation	When the chamber temp. does not reach the set temp. for approx. 5 days or more.	Status3: Cooling Circuits Overload.		(1) Do not put a large amount of contents to cryopreserve at a time. (2) Reduce the opening frequency of the door. (3) Make sure that there is no leak around the door or the inner lid. (4) Set the chamber temp. to -80 °C or higher. * The message disappears when the chamber temp. reaches the set temp. after resolving the overload operation by the above remedy.

Note:

- The operation monitor system is not the alarm function. Buzzer, remote alarm and safety operation are not activated.
- “Status 2” does not exist.
- When the above remedy results in the following situations, contact our sales representative or agent.
 - The message does not disappear.
 - The message is displayed repeatedly.
 - Other situations.

ALARMS, SAFETY, AND SELF-DIAGNOSIS

This unit has the alarms, safety functions, and self-diagnostic functions of the table 3.

Table 3 Alarms and safety function list

Alarm & safety	Situation	LCD touch panel		Buzzer	Remote alarm
		Message display field	Other		
High Alarm	If the chamber temperature exceeds the set temp. + the set value of High Alarm. (Settable range: +5 °C~+40 °C)	Warning: High Temp. (After alarm delay time has elapsed.)	<ul style="list-style-type: none"> • Alarm display (During alarm delay) "Alarm" is displayed alternately in normal characters and reverse video (After alarm delay) 	Intermittent tone (After alarm delay time has elapsed.)	ON (After alarm delay time has elapsed.)
Low Alarm	If the chamber temperature falls below the set temp. - the set value of Low Alarm. (Settable range: -5 °C~40 °C)	Warning: Low Temp. (After alarm delay time has elapsed.)	<ul style="list-style-type: none"> "Warning" is displayed alternately in normal characters and reverse video • Present temperature display field Present temperature blinks. 		
Power failure alarm	The battery switch for power failure alarm is ON, and under any of the following conditions. <ul style="list-style-type: none"> • During a power failure • Power switch is OFF • Power supply cord is disconnected. 	Warning: Power Failure	<ul style="list-style-type: none"> • LCD touch panel Turned OFF. By touching the LCD touch panel, it lights in the set brightness for 5 seconds. 	Intermittent tone	ON
Door alarm	When door is open.	----	<ul style="list-style-type: none"> • Door display "Open" is displayed alternately in normal characters and reverse video 	Intermittent tone (After door delay time has elapsed.)	----
Auto-return	On screens other than the Top screen, there is no key operation for approx. 90 s. (When the sleep function is ON) After sleep function is turned ON, there is no alarm/error and key operation for approx. 90 s.	-----	(Return to the "Top screen".)	-----	-----
Battery for power failure alarm replacement	When the cumulative operating time exceeds about 3 years.	Warning: Exchange a Main Battery.	-----	-----	-----
Battery for backup cooling kit replacement	When about 3 years passed after installing backup cooling kit.	Warning: Exchange a Backup Battery.	-----	-----	-----

Note:

- Settable range of the alarm delay time: 0 minute~15 minutes (refer to page 28).
- After turning ON the unit to start operation, only the first time, alarm delay is activated until the chamber temperature is cooled to the High Alarm set temperature or less (Namely, the alarm display does not change to "Warning", buzzer does not sound and remote alarm is not activated).
- Settable range of the door delay time: 0 minute~15 minutes (refer to page 28).
- The battery for power failure alarm and for backup cooling kit are articles for consumption. It is recommended that both batteries will be replaced about every 3 years. Contact our sales representative or agent at the time of replacement of the battery.

ALARMS, SAFETY, AND SELF-DIAGNOSIS

Table 3 Alarms & safety function list

Alarm & safety	Situation	LCD touch panel		Buzzer	Remote alarm	Safety operation
		Message display field	Alarm display			
Sensor abnormality	If the thermal sensor is disconnected.	Err01: Temperature Sensor Open.	"Warning" is displayed alternately in normal characters and reverse video.	Intermittent tone	ON	Unit is continuous running.
	If the thermal sensor is short-circuited.	Err02: Temperature Sensor Short.	" "			
	If the condenser sensor A is disconnected.	Err03: Condenser Sensor 'A' Open.	" "	"	"	-----
	If the condenser sensor A is short circuited.	Err04: Condenser Sensor 'A' Short.	" "			
	If the condenser sensor B is disconnected.	Err05: Condenser Sensor 'B' Open.	" "	"	"	-----
	If the condenser sensor B is short-circuited.	Err06: Condenser Sensor 'B' Short.	" "			
	If the ambient tem. sensor is disconnected.	Err07: Ambient Temp Sensor Open.	" "	"	"	-----
	If the ambient tem. sensor is short-circuited.	Err08: Ambient Temp Sensor Short.	" "			
Battery switch check	When the battery switch for power failure alarm is OFF.	Err09: Battery Switch is OFF.	-----	-----	-----	-----
Condenser A temp. abnormality	When the fan motor for cooling the compressor fails.	Err20: Condenser 'A' Temp Abnormal.	"Warning" is displayed alternately in normal characters and reverse video	Intermittent tone	ON	Compressor A OFF
Condenser B temp. abnormality	When the ambient temperature exceeds the usable environmental condition, etc.	Err21: Condenser 'B' Temp Abnormal.				Compressor B OFF
Communication error	When communication between LCD touch panel and control substrate is died out or unstable.	Err56: Communication Failure.	-----	-----	-----	-----
Cooling circuit abnormality (Self-diagnosis time: 2 a.m.~6 a.m.)	The performance of the cooling circuit "A" gets worse.	Warning: Cooling Circuit 'A' Abnormal	"Warning" is displayed alternately in normal characters and reverse video.	Intermittent tone	ON	-----
	The performance of the cooling circuit "B" gets worse.	Warning: Cooling Circuit 'B' Abnormal				

●When "disconnecting/short-circuit of the thermal sensor" and "condenser temp. abnormality" are activated at the same time, safety operation of compressor OFF is prioritized.

(Ex.) When "disconnecting of the thermal sensor" and "condenser A temp. abnormality" are activated at the same time;

Compressor A: OFF

Compressor B: Continuous running

●The self-diagnosis time of "cooling circuit abnormality" cannot be changed. Depending on the operating environment and condition, self-diagnosis time may be shifted or this function may not perform.

ALARMS, SAFETY, AND SELF-DIAGNOSIS

- Table 4~5 show the behavior of the alarm (buzzer) and Ring Back function when pressing Buzzer key.

Table 4 In the cases of other than the door alarm.

Remote Alarm setting	Ring Back setting	Buzzer from unit		Remote Alarm	
		When pressing Buzzer key	When the Ring Back set time passes	When pressing Buzzer key	When the Ring Back set time passes
ON: Non-interlock with Buzzer key	ON	OFF (Alarm is not canceled)	ON	ON	ON (Under continuation)
	OFF		OFF		
OFF: Interlock with Buzzer key	ON		ON	OFF (Alarm is not canceled)	ON
	OFF		OFF		OFF

Note: Resolve the cause of the alarm in reference to page 46~47 because the alarm itself is not deactivated by pressing Buzzer key.

Table 5 In the cases of the door alarm.

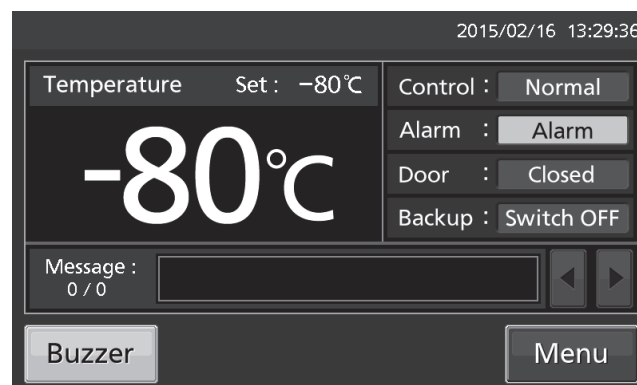
Remote Alarm setting	Ring Back setting	Buzzer from unit		Remote Alarm setting
		When pressing Buzzer key	When the Ring Back set time passes	
ON: Non-interlock with Buzzer key	ON	OFF (Alarm is canceled)	OFF (Alarm is already canceled)	OFF
	OFF			
OFF: Interlock with Buzzer key	ON			
	OFF			

- Table 6 shows the situation after being canceled the High/Low Alarm and recovery from a power failure with no operation.

Table 6 The situation after being canceled the High/Low Alarm and recovery from a power failure with no operation

Canceled alarm	LCD touch panel		Buzzer	Remote alarm	Safety operation
	Message display field	Alarm display			
High Alarm Low Alarm	----	"Alarm" is displayed alternately in normal characters and reverse video	Intermittent tone	----	----
Power failure alarm	----	"Alarm" is displayed alternately in normal characters and reverse video	Intermittent tone	----	----

Note: By pressing Buzzer key, the alarm display returns to "Normal" and buzzer stops.



ROUTINE MAINTENANCE

WARNING

Always disconnect the power supply to the unit prior to any repair or maintenance of the unit in order to prevent electric shock or injury.

Ensure you do not inhale or consume medication or aerosols from around the unit at the time of maintenance. These may be harmful to your health.

Cleaning of cabinet

- Clean the unit once a month. Regular cleaning keeps the unit looking new.
- Use a dry cloth to wipe off small amounts of dirt on the outside and inside of the unit and all accessories. If the outside panels are dirty, clean them with a diluted neutral dishwashing detergent (Undiluted detergent can damage the plastic components. For the dilution, refer to the instruction of the detergent). After the cleaning with the diluted detergent, always wipe it off with a wet cloth. Then wipe off the cabinet or accessories with a dry cloth.
- Never pour water onto or into the unit. Doing so can damage the electric insulation and cause failure.
- The compressor and other mechanical parts are completely sealed. This unit requires absolutely no lubrication.

Note: Always replace the inner accessories removed for the cleaning to keep the intended performance.

ROUTINE MAINTENANCE

Defrosting of chamber

After long term use of this unit, the frost is built on the inside wall of the chamber and inner lid. The excessive frost possibly make some gap between the cabinet and door gasket, which may cause poor cooling. Remove the frost.

- For defrosting a light frost around the inner lid.

Remove the frost on the inner door with a scraper enclosed with the unit.

Note: For removing the frost, do not use a tool with sharp edge such as a knife or a screw driver.

- For defrosting a heavy frost.

1. (When an optional backup cooling kit MDF-UB5 is installed) Turn OFF the backup power switch.
2. Turn OFF the battery switch for power failure alarm.
3. Take out and transfer all the contents to another freezer or a container which is refrigerated by liquid carbon dioxide or dry ice.
4. Turn OFF the power switch of the unit.
5. Remove the inner lids, and leave the unit as it is.
6. The water accumulated on the bottom of the chamber should be wiped up with a dry cloth.
7. After cleaning the chamber, start up the unit according to the procedure on page 16.
8. Turn ON the battery switch for power failure alarm.
9. Make sure that the chamber is sufficiently cooled. After that, put back the contents to cryopreserve into the chamber.
10. (When an optional backup cooling kit MDF-UB5 is installed) Turn ON the backup power switch.

CALIBRATION

During running operation, the following service works must be performed;

- Perform temperature calibration at least once a year.

For the temperature calibration, contact our sales representative or agent.

REPLACEMENT OF WEAR-OUT PARTS

Replacing the battery for power failure alarm

Replace the battery for power failure alarm every about 3 years. Contact our sales representative or agent for the replacement of battery when “Warning: Exchange a Main Battery.” is displayed in the message display field.

- ✧The replacement of the battery for power failure alarm is a paid service.
- ✧The alarm function (message display, sound of buzzer and remote alarm) will not operate when the battery for power failure alarm is flat.
- ✧“Warning: Power Failure.” is displayed and the buzzer sounds by the battery for power failure alarm. The regular replacement of the battery for power failure alarm is important to prevent the rise of chamber temperature in the case of unexpected situation.



WARNING

The replacement of the battery for power failure alarm should be executed by a qualified engineer or service personnel only. ➤ The replacement of the battery for power failure alarm involves the risk of electric shock.

«Important» The used battery is a recyclable precious resource. Do not dispose of the battery. Always follow the procedure for recycling.

Replacing the battery for backup cooling kit

Replace the battery for backup cooling kit every about 3 years. Contact our sales representative or agent for the replacement of battery when “Warning: Exchange a Backup Battery.” is displayed in the message display field.

- ✧The replacement of the battery for backup cooling kit is a paid service.
- ✧The backup cooling kit will not operate when the battery for backup cooling kit is flat.
- ✧When the chamber temperature rises, the backup cooling kit is activated by the battery for backup cooling kit even during a power failure. The regular replacement of the battery for backup cooling kit is important to prevent the rise of chamber temperature in the case of unexpected situation.



WARNING

The replacement of the battery for backup cooling kit should be executed by a qualified engineer or service personnel only. ➤ The replacement of the battery for backup cooling kit involves the risk of electric shock.

«Important» The used battery is a recyclable precious resource. Do not dispose of the battery. Always follow the procedure for recycling.

TROUBLESHOOTING

If the unit malfunctions, check out the following before calling for service.

Malfunction	Check/Remedy
The unit does not operate at all when turning ON the power switch.	<ul style="list-style-type: none"> ■ The unit is not connected to the power supply. ■ During a power failure. ■ The circuit breaker is activated.
The compressor does not operate at all when turning ON the power switch. (LCD touch panel is turned ON)	<ul style="list-style-type: none"> ■ The capacity of power supply is not sufficient. When the capacity of power supply is not sufficient to start the compressor, compressor may not start.
An alarm is activated.	<ul style="list-style-type: none"> ■ A little before, the value of the chamber temperature has been changed significantly. ■ The door had been left open for a long time. ■ Some warm contents are put into the chamber. <p>*In the above cases, the alarm is canceled with no operation.</p>
The cooling is poor.	<ul style="list-style-type: none"> ■ A large amount of warm contents are put into the chamber. ■ A large amount of frost is built on the inside wall of the chamber. ■ The door is often opened. ■ The set value of the chamber temperature is lower than -86 °C. The temperature settable range is between -50 °C~-90 °C. However, the temperature control range is between -50 °C~-86 °C. ■ The ambient temperature is higher than 30 °C. The allowable ambient temperature is between 5 °C~30 °C. ■ The unit is in the direct sunlight. ■ There is no more than 10 cm clearance around the unit. ■ The grille or the exhaust air bent is blocked by something. ■ The unit is not installed horizontally. ■ The inner lids are not installed.
The outside of the unit is wet with dew.	In case of sultriness or bad location, the exterior of the unit may be wet with dew. Under a high humidity environment, the cold exterior of the unit condenses the moisture in the air, so that it is not malfunction. Wipe the dew with a dry cloth.
Noisy in motor sound or flowing liquid.	On the characteristics of the cooling circuit, the sound of motor or flowing refrigerant may be heard during operation. Especially a few hours after starting operation, the sound of compressor or flowing refrigerant may be loud, however it is a normal operation.

Note:

- If the malfunction is not eliminated after checking the above items, or the malfunction is not shown in the above table, contact our sales representative or agent.
- Keep an electric product which emits an electromagnetic wave away from this unit. A noise from an electromagnetic wave may cause malfunction to this unit.

DISPOSAL OF UNIT

Before disposing the unit with biohazardous danger, decontaminate the unit to the extent possible by the user.

WARNING

If the unit is to be stored unused in an unsupervised area for an extended period **ensure that children do not have access and doors cannot be closed completely.**

The disposal of the unit should be accomplished by appropriate personnel. Always remove doors to prevent accidents such as suffocation.

Recycle of battery



Pb

- Label indication is obliged to comply with Japanese battery regulation.



- Label indication is obliged to comply with Taiwanese battery regulation.

DISPOSAL OF UNIT

(English)

Disposal of Old Equipment and Batteries

Only for European Union and countries with recycling systems



These symbols on the products, packaging, and/or accompanying documents mean that used electrical and electronic products and batteries must not be mixed with general household waste.

For proper treatment, recovery and recycling of old products and used batteries, please take them to applicable collection points in accordance with your national legislation.

By disposing of them correctly, you will help to save valuable resources and prevent any potential negative effects on human health and the environment.

For more information about collection and recycling, please contact your local municipality.



Penalties may be applicable for incorrect disposal of this waste, in accordance with national legislation.

Note for the battery symbol (bottom symbol):

This symbol might be used in combination with a chemical symbol. In this case it complies with the requirement set by the Directive for the chemical involved.

Pb

(German)

Entsorgung von Altgeräten und Batterien

Nur für die Europäische Union und Länder mit Recyclingsystemen



Dieses Symbol, auf den Produkten, der Verpackung und/oder den Begleitdokumenten, bedeutet, dass gebrauchte elektrische und elektronische Produkte sowie Batterien nicht in den allgemeinen Hausmüll gegeben werden dürfen.

Bitte führen Sie alte Produkte und verbrauchte Batterien zur Behandlung, Aufarbeitung bzw. zum Recycling gemäß den gesetzlichen Bestimmungen den zuständigen Sammelpunkten zu. Endnutzer sind in Deutschland gesetzlich zur Rückgabe von Altbatterien an einer geeigneten Annahmestelle verpflichtet. Batterien können im Handelsgeschäft unentgeltlich zurückgegeben werden.

Indem Sie diese Produkte und Batterien ordnungsgemäß entsorgen, helfen Sie dabei, wertvolle Ressourcen zu schützen und eventuelle negative Auswirkungen auf die menschliche Gesundheit und die Umwelt zu vermeiden.

Für mehr Informationen zu Sammlung und Recycling, wenden Sie sich bitte an Ihren örtlichen Abfallentsorgungsdienstleister.

Gemäß Landesvorschriften können wegen nicht ordnungsgemäßer Entsorgung dieses Abfalls Strafge­lder verhängt werden.



Hinweis für das Batteriesymbol (Symbol unten):

Dieses Symbol kann in Kombination mit einem chemischen Symbol abgebildet sein. In diesem Fall erfolgt dieses auf Grund der Anforderungen derjenigen Richtlinien, die für die betreffende Chemikalie erlassen wurden.

Pb

DISPOSAL OF UNIT

(French)

L'élimination des équipements et des batteries usagés

Applicable uniquement dans les pays membres de l'Union européenne et les pays disposant de systèmes de recyclage.



Apposé sur le produit lui-même, sur son emballage, ou figurant dans la documentation qui l'accompagne, ce pictogramme indique que les piles, appareils électriques et électroniques usagés, doivent être séparées des ordures ménagères.



Afin de permettre le traitement, la valorisation et le recyclage adéquats des piles et des appareils usagés, veuillez les porter à l'un des points de collecte prévus, conformément à la législation nationale en vigueur.

En les éliminant conformément à la réglementation en vigueur, vous contribuez à éviter le gaspillage de ressources précieuses ainsi qu'à protéger la santé humaine et l'environnement.

Pour de plus amples renseignements sur la collecte et le recyclage, veuillez vous renseigner auprès des collectivités locales.



Le non-respect de la réglementation relative à l'élimination des déchets est passible d'une peine d'amende.

Note relative au pictogramme à apposer sur les piles (pictogramme du bas) :

Si ce pictogramme est combiné avec un symbole chimique, il répond également aux exigences posées par la Directive relative au produit chimique concerné.

Pb

(Spanish)

Eliminación de Aparatos Viejos y de Pilas y Baterías

Solamente para la Unión Europea y países con sistemas de reciclado.



Estos símbolos en los productos, su embalaje o en los documentos que los acompañen significan que los productos eléctricos y electrónicos y pilas y baterías usadas no deben mezclarse con los residuos domésticos.



Para el adecuado tratamiento, recuperación y reciclaje de los productos viejos y pilas y baterías usadas llévelos a los puntos de recogida de acuerdo con su legislación nacional. En España, los usuarios están obligados a entregar las pilas en los correspondientes puntos de recogida. En cualquier caso, la entrega por los usuarios será sin coste alguno para éstos. El coste de la gestión medioambiental de los residuos de pilas, acumuladores y baterías está incluido en el precio de venta.

Si los elimina correctamente ayudará a preservar valiosos recursos y evitará potenciales efectos negativos sobre la salud de las personas y sobre el medio ambiente.

Para más información sobre la recogida u reciclaje, por favor contacte con su ayuntamiento.

Puede haber sanciones por una incorrecta eliminación de este residuo, de acuerdo con la legislación nacional.



Nota para el símbolo de pilas y baterías (símbolo debajo):

Este símbolo puede usarse en combinación con el símbolo químico. En este caso, cumple con los requisitos de la Directiva del producto químico indicado.

Pb

DISPOSAL OF UNIT

(Portuguese)

Eliminação de Equipamentos Usados e Baterias

Apenas para a União Europeia e países com sistemas de reciclagem



Estes símbolos nos produtos, embalagens, e/ou documentos que os acompanham indicam que os produtos elétricos e eletrónicos e as baterias usados não podem ser misturados com os resíduos urbanos indiferenciados.



Para um tratamento adequado, reutilização e reciclagem de produtos e baterias usados, solicitamos que os coloque em pontos de recolha próprios, em conformidade com a respetiva legislação nacional.

Ao eliminar estes produtos corretamente estará a ajudar a poupar recursos valiosos e a prevenir quaisquer potenciais efeitos negativos sobre o ambiente e a saúde humana.

Para mais informações acerca da recolha e reciclagem, por favor contacte a sua autarquia local.

De acordo com a legislação nacional podem ser aplicadas contraordenações pela eliminação incorreta destes resíduos.



Pb

Nota para o símbolo da bateria (símbolo na parte inferior):

Este símbolo pode ser utilizado conjuntamente com um símbolo químico. Neste caso estará em conformidade com o estabelecido na Diretiva referente aos produtos químicos em causa.

(Italian)

Smaltimento di vecchie apparecchiature e batterie usate

Solo per Unione Europea e Nazioni con sistemi di raccolta e smaltimento



Questi simboli sui prodotti, sull'imballaggio e/o sulle documentazioni o manuali accompagnanti i prodotti indicano che i prodotti elettrici, elettronici e le batterie usate non devono essere buttati nei rifiuti domestici generici.



Per un trattamento adeguato, recupero e riciclaggio di vecchi prodotti e batterie usate vi invitiamo a portarli negli appositi punti di raccolta secondo la legislazione vigente nel vostro paese.

Con uno smaltimento corretto, contribuirete a salvare importanti risorse e ad evitare i potenziali effetti negativi sulla salute umana e sull'ambiente.

Per ulteriori informazioni su raccolta e riciclaggio, vi invitiamo a contattare il vostro comune.

Lo smaltimento non corretto di questi rifiuti potrebbe comportare sanzioni in accordo con la legislazione nazionale.



Pb

Note per il simbolo batterie (simbolo sotto):

Questo simbolo può essere usato in combinazione con un simbolo chimico. In questo caso è conforme ai requisiti indicati dalla Direttiva per il prodotto chimico in questione.

DISPOSAL OF UNIT

(Dutch)

Het ontdoen van oude apparatuur en batterijen.

Enkel voor de Europese Unie en landen met recycle systemen.



Deze symbolen op de producten, verpakkingen en/of begeleidende documenten betekenen dat gebruikte elektrische en elektronische producten en batterijen niet samen mogen worden weggegooid met de rest van het huishoudelijk afval.



Voor een juiste verwerking, hergebruik en recycling van oude producten en batterijen, gelieve deze in te leveren bij de desbetreffende inleverpunten in overeenstemming met uw nationale wetgeving.

Door ze op de juiste wijze weg te gooien, helpt u mee met het besparen van kostbare hulpbronnen en voorkomt u potentiële negatieve effecten op de volksgezondheid en het milieu.

Voor meer informatie over inzameling en recycling kunt u contact opnemen met uw plaatselijke gemeente.

Afhankelijk van uw nationale wetgeving kunnen er boetes worden opgelegd bij het onjuist weggooien van dit soort afval.



Pb

Let op: het batterij symbool (Onderstaand symbool).

Dit symbool kan in combinatie met een chemisch symbool gebruikt worden. In dit geval volstaan de eisen, die zijn vastgesteld in de richtlijnen van de desbetreffende chemische stof.

(Swedish)

Avfallshantering av produkter och batterier

Endast för Europeiska Unionen och länder med återvinningssystem



Dessa symboler på produkter, förpackningar och/eller medföljande dokument betyder att förbrukade elektriska och elektroniska produkter och batterier inte får blandas med vanliga hushållssopor.



För att gamla produkter och använda batterier ska hanteras och återvinnas på rätt sätt ska dom lämnas till passande uppsamlingsställe i enlighet med nationella bestämmelser.

Genom att ta göra det korrekt hjälper du till att spara värdefulla resurser och förhindrar eventuella negativa effekter på människors hälsa och på miljön.

För mer information om insamling och återvinning kontakta din kommun.



Pb

Olämplig avfallshantering kan beläggas med böter i enlighet med nationella bestämmelser.

Notering till batterisymbolen (nedanför):

Denna symbol kan användas i kombination med en kemisk symbol. I detta fall uppfyller den de krav som tälls i direktivet för den aktuella kemikalien.

TEMPERATURE RECORDER (OPTION)

The chamber temperature can be recorded and checked by installing an optional temperature recorder MTR-85H or MTR-G85C.

✧Contact our sales representative or agent for the purchase of temperature recorder.

Main specifications of temperature recorder		
	MTR-85H	MTR-G85C
Recording range	-100 °C~+50 °C	-100 °C~+40 °C
Feed speed of recorder chart	2-month/batch	1-day/1 turn, 7-day/1 turn 32-day/1 turn changeable
Record chart	Strip type	Circular type
Power source	Dry cell	Supplied from the unit

✧For the installation of temperature recorder MTR-85H, an optional recorder fixing MDF-S3085 is necessary.

BACKUP COOLING KIT (OPTION)

By installing an optional backup cooling kit MDF-UB5 and a liquid CO₂ cylinder, liquid CO₂ injection into the chamber prevent to rise the chamber temperature for a few hours, even when this unit stops operation by a power failure and so on.

✧Contact our sales representative or agent for the purchase of backup cooling kit.

WARNING

As with any equipment that uses CO₂ gas, there is a likelihood of oxygen depletion in the vicinity of the equipment. It is important that you assess the work site to endure there is suitable and sufficient ventilation. If restricted ventilation is suspected, then other methods of ensuring a safe environment must be considered. These may include atmosphere monitoring and warning devices.

The injection set temperature of the backup cooling kit can be set by the temperature setting knob (refer to page 10). Since the control method of injection is ON/OFF type, the actual injection temperature deviates from the injection set temperature.

Note:

- Set the injection set temperature of the backup cooling kit to 10 °C higher than the set temperature. Otherwise, continuous injection of liquid CO₂ may reduce the retention time of liquid CO₂ cylinder.
- When the injection set temperature of the backup cooling kit is -70 °C;
ON: -65 °C~-67 °C, OFF: -74 °C~-75 °C.

The behavior of the backup cooling kit

Backup power switch (Page 10)	Backup display (Page 11)	Condition of the backup cooling kit	Chamber temperature	Liquid CO ₂
ON	Switch ON	Ready to inject	Less than the injection set temperature of the backup cooling kit.	Does not inject
			The injection set temperature of the backup cooling kit or higher.	Injects
OFF	Switch OFF	Not ready to inject (Not ready to activate the backup test switch)	Less than the injection set temperature of the backup cooling kit.	Does not inject
			The injection set temperature of the backup cooling kit or higher.	

SPECIFICATIONS

Product name	Ultra-Low Temperature Freezer MDF-DC500VX	Ultra-Low Temperature Freezer MDF-DC700VX
Medical purpose	Storage of cells, organs, DNAs, plasma.	
External dimensions	W2010 mm x D845 mm x H1070 mm	W2300 mm x D845 mm x H1070 mm
Internal dimensions	W1190 mm x D640 mm x H756 mm	W1480 mm x D640 mm x H756 mm
Effective capacity	575 L	715 L
Exterior	Painted steel	
Interior	Stainless steel	
Outer door	Painted steel	
Inner lid	3 pieces (Styrofoam)	
Access port	Inner diameter: 17 mm, On the back side	
Insulation	Rigid polyurethane foamed-in place + Vacuum insulation panel (only in the front)	
Compressor	A compressor; Hermetic type, Output; 1100 W B compressor; Hermetic type, Output; 1100 W	
Evaporator	(Both A and B) Tube on sheet type	
Condenser	(Both A and B) Finless tube type	
Refrigerant	(Both A and B) HFC mixed refrigerant	
Temperature controller	Microcomputer control system	
Temperature display	LCD Digital display	
Thermal sensor	Platinum resistance (Pt 1000 Ω)	
Alarm	High Alarm, Low Alarm, Power failure alarm, Door alarm, Remote alarm	
Remote alarm contact	Allowable contact capacity: DC 30 V, 2 A	
Battery	Lead storage battery, DC 6 V, 7200 mAh, Auto-recharge	
Weight	328 kg	358 kg
Accessories	2 keys, 1 scraper	
Optional component	Temperature recorder (MTR-85H, MTR-G85C) Recorder fixing (MDF-S3085; MTR-85H) Backup cooling kit (MDF-UB5); For Liquid CO ₂ Inventory rack (IR-213C, IR-309C) Interface board (MTR-L03)*; For LAN Interface board (MTR-480)*; For RS-232C/RS-485	

* For the data acquisition system MTR-5000 user only. Contact our sales representative or agent for purchase.

Note:

- Design or specifications will be subject to change without notice.
- Refer to the updated catalog when ordering an optional component.

PERFORMANCE

Product name	Ultra-Low Temperature Freezer MDF-DC500VX	Ultra-Low Temperature Freezer MDF-DC700VX
Model number	MDF-DC500VX-PE	MDF-DC700VX-PE
Cooling performance	-86 °C at the center of the chamber (ambient temperature; 30 °C, no load)*	
Temperature settable range	-50 °C to -90 °C	
Temperature control range	-50 °C to -86 °C (ambient temperature; 30 °C, no load)	
Rated voltage	AC 230 V/240 V	
Rated frequency	50 Hz	
Rated power consumption	1070 W/1120 W	1070 W/1130 W
Noise level	52 dB [A] (background noise; 20 dB)	
Maximum pressure	2850 kPa	3150 kPa

* Maximum cooling performance.

The chamber temperature can be reached at -86 °C at ambient temperature 30 °C with no load.

Note:

- Specifications will be subject to change without notice.
- The unit with CE mark complies with EU directives.

CAUTION

**Please fill in this form before servicing.
Hand over this form to the service engineer to keep for his and your safety.**

Safety check sheet

1. Freezer contents :

Risk of infection: ☐Yes ☐No
Risk of toxicity: ☐Yes ☐No
Risk from radioactive sources: ☐Yes ☐No

(List all potentially hazardous materials that have been stored in this unit.)

Notes :

2. Contamination of the unit

Unit interior

No contamination ☐Yes ☐No
Decontaminated ☐Yes ☐No
Contaminated ☐Yes ☐No

Others:

3. Instructions for safe repair/maintenance/disposal of the unit

a) The unit is safe to work on ☐Yes ☐No
b) There is some danger (see below) ☐Yes ☐No

Procedure to be adhered to in order to reduce safety risk indicated in b) below.

Date :

Signature :

Address, Division :

Telephone :

Product name: Ultra-low temperature freezer	Model: MDF-	Serial number:	Date of installation:
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Please decontaminate the unit yourself before calling the service engineer.

Original Operating Instructions

< EU countries only >



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