



# Operating Instructions

Ultra-Low Temperature Freezer

## MDF-DU900VC

## MDF-DU900V Series



MDF-DU900V

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

See page 60 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.

## **WARNING**















**As with any equipment that uses CO<sub>2</sub> 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.**

For the State of California, USA Only:

















This product contains a CR Coin Cell Lithium Battery which contains Perchlorate Material – special handling may apply. See [www.dtsc.ca.gov/hazardouswaste/perchlorate](http://www.dtsc.ca.gov/hazardouswaste/perchlorate).

# 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.

# **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.
-  **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.
-  **Do not touch the condenser directly** when the filter is removed for cleaning. This may cause injury by hot surface.

# 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.
-  **Never touch the storage items with wet hands.** Touching with the wet hands may cause frostbite.



# 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<br>Location of Danger   | Warning/Caution Label   | Description of Danger  |
|-----------------|--|-------------------------|--|
| Personal injury | <b>Frostbite and frost</b><br>Interior       |                         | Frostbite and frost caution label.   |
| Sample damage   | <b>Chamber temperature</b><br>Interior       |                         | Forgets to close a door and latch.   |
| Sample damage   | <b>Chamber temperature</b><br>Interior       |                         | Rise in temperature is prevented.  |
| Personal injury | <b>Negative pressure release</b><br>Interior |                         | Door cannot open.  |
| Personal injury | <b>Bruise or fracture</b><br>Exterior        | MDF-DU900VC-PA Only<br> | When the casters are raised from the surface of the floor, the unit is secured. If they are left touching the floor, the unit may inadvertently move out of position when its door is opened or closed. It may cause injury. |

# 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.  |

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# ENVIRONMENTAL CONDITIONS

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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);

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# INTENDED USE AND PRECAUTIONS

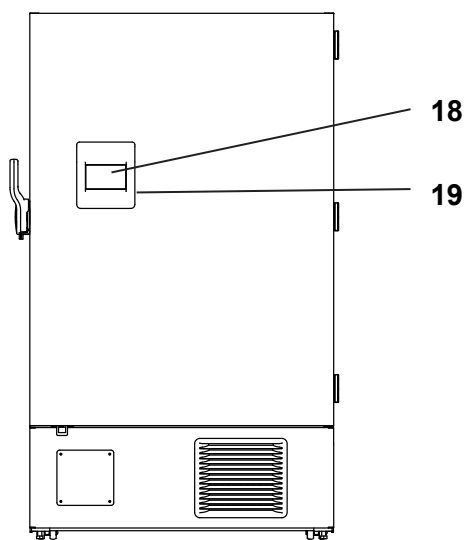
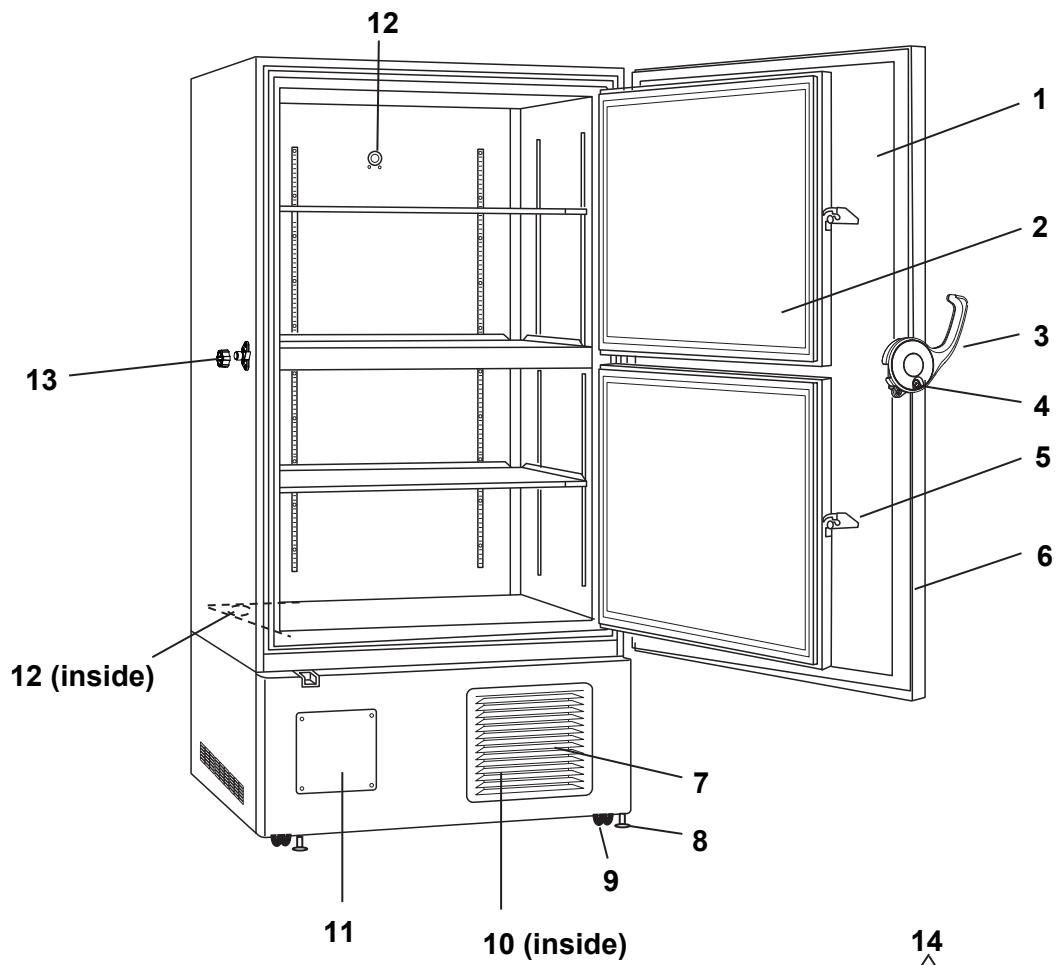
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This equipment is designed for low temperature storage of biomedical samples.

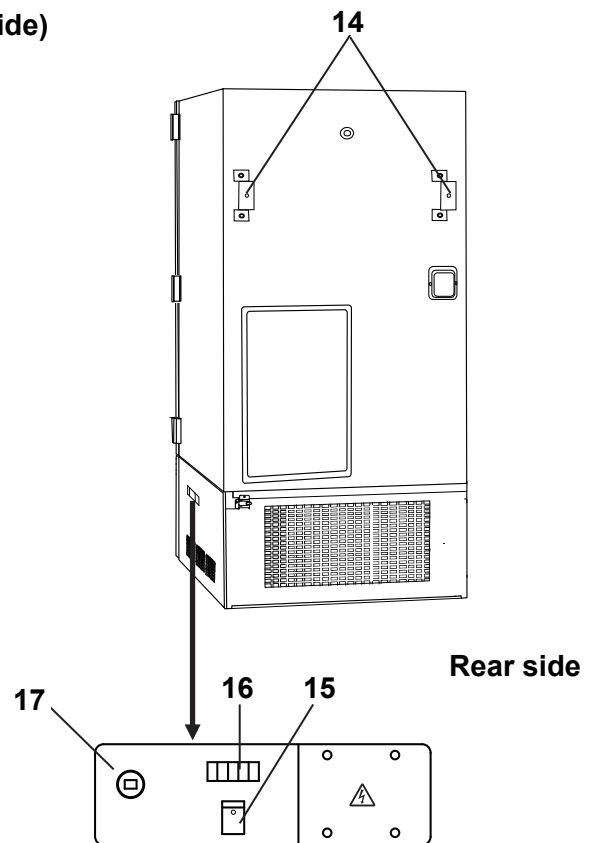
- The effective storage period depends on the sample condition and storage temperature. It is necessary to determine the storage temperature and period suitable for the purpose.

# FREEZER COMPONENTS

## Unit



Front side



Rear side

# FREEZER COMPONENTS

- 1. Outer door:** To open the door, grip the outer door latch. When closing, lock the outer door latch completely.
  - 2. Inner door:** The operation of the inner door should be quick to minimize the temperature rise in chamber. Lock the inner door latch completely when the inner door is closed. The inner door is removable for cleaning or defrosting. See page 51.
  - 3. Outer door latch:** Always lock the outer door latch when the outer door is closed. A padlock is also available.
  - 4. Keyhole:** Turn clockwise to 180° with a key and the outer door is securely locked.
  - 5. Inner door latch:** Always lock the inner door latch when the inner door is closed.
  - 6. Magnetic door gasket:** This provides a tight door seal and prevents cold air leak. Keep clean.
  - 7. Air intake vent (grille):** Do not block this vent to keep the proper cooling performance.
  - 8. Leveling feet:** These are screw bolts used to install and fix the unit. Adjust the height of the leveling feet by turning the screw bolts until 2 front casters are away from the floor.
  - 9. Caster:** 4 casters are provided to facilitate moving of the cabinet. For the installation, adjust the leveling foot so that the front 2 casters cannot contact with the floor.
  - 10. Condenser filter (behind the grille):** This filter prevents the dust from accumulating on the condenser. The dusty condenser filter may cause failure of refrigerating device. Clean the condenser filter once a month. See page 50.
  - 11. Space for temperature recorder:** A temperature recorder (optional component) can be attached here. See page 56.
  - 12. Access port (rear and bottom):** This is used for leading a cable and sensor of a measuring equipment, or nozzle of backup cooling kit to chamber.  
✧ Replace the cap and insulation after using the access port. Improper replacement may cause poor cooling or condensation around the outside of access port.
  - 13. Air intake port:** Used for open the outer door immediately after closing the outer door. See page 14.
  - 14. Fixture (on back side):** 2 fixtures are provided as spacers between the cabinet and wall and also serve as hooks to fix the unit. See page 16.
  - 15. Battery switch:** This is a switch for a battery for power failure alarm. Normally, turn on this switch. Be sure to turn off this switch if the freezer is not in operating for the long period (over one month).
  - 16. Remote alarm terminal:** This is used to notice an alarm condition of the unit to remote location. See page 13.
  - 17. Power switch:** This is for turning ON/OFF the power to the unit.
  - 18. LCD touch panel:** See page 11~12.
  - 19. USB port:** Insert USB memory to export operations and alarms log. See page 35~42.
- Note:** It is impossible to use USB memory which is required password input.

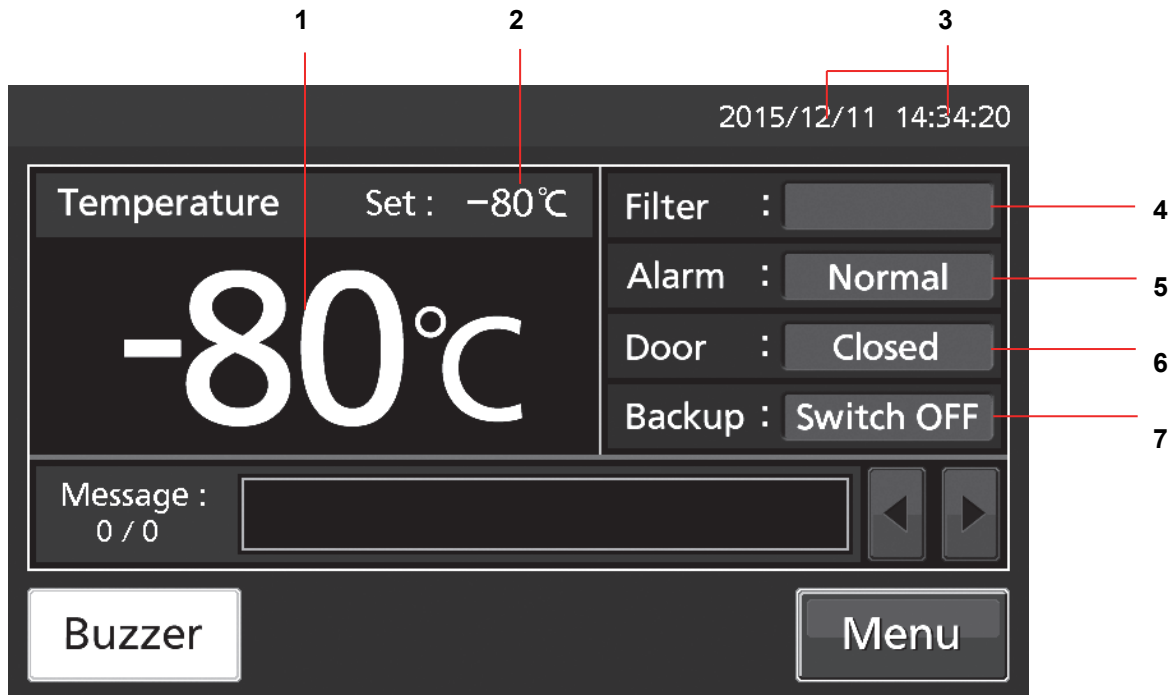
**Note:**

3 shelves are packaged at the bottom of the chamber. Set the shelves on the shelf stoppers at the standard location firmly. The upward edge should be upside.  
Refer to page 57 for the attachment of shelf stopper when changing the location of shelf stopper.

# 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 43 for details.

**4. Filter alarm indicator:** This indicator is lit when the excessive dust is accumulated on the condenser filter. When this indicator is lit, clean the condenser filter following the procedure on page 50.

**5. Alarm display:** Refer to page 47~48 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:** Refer to page 47

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

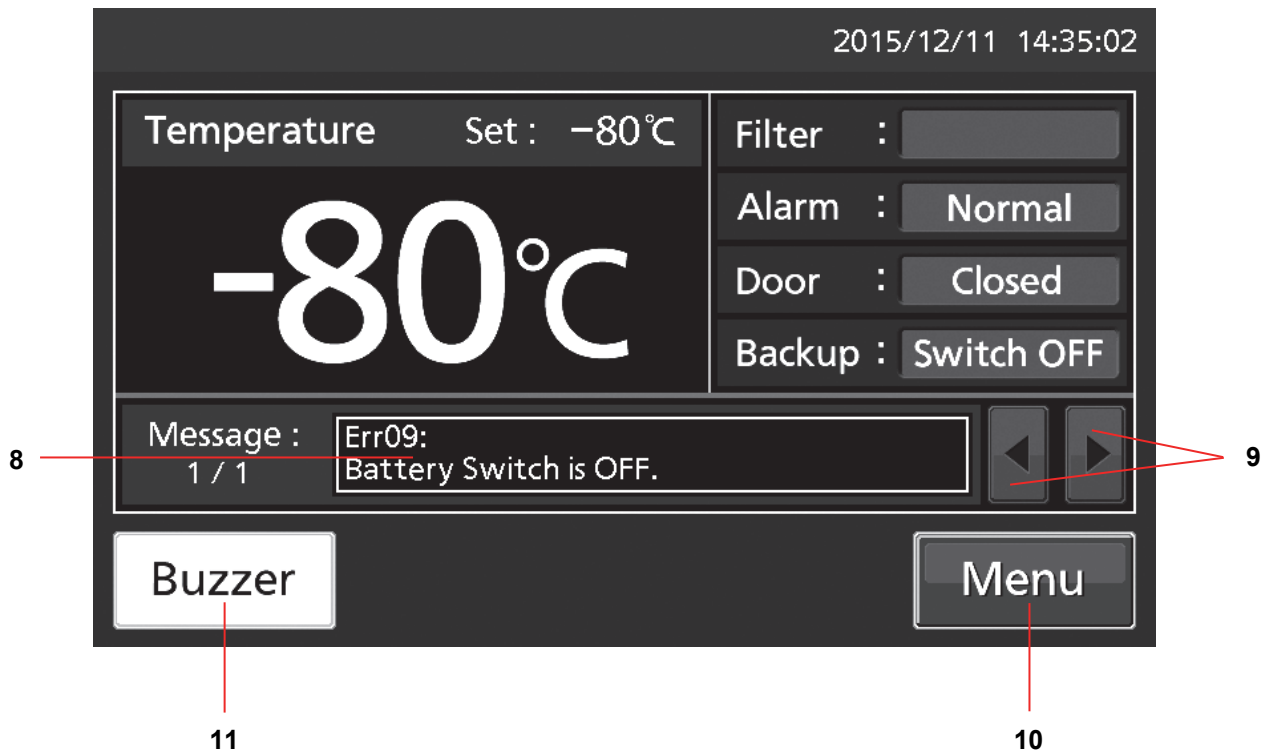
Close: "Closed" is displayed.

**7. Backup display:** (It is displayed only when an optional backup cooling kit MDF-UB6B is installed) ON/OFF of the backup power switch is displayed (refer to page 58).

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 46~48.

**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 19.

**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 29 and 49.

# Remote alarm terminal

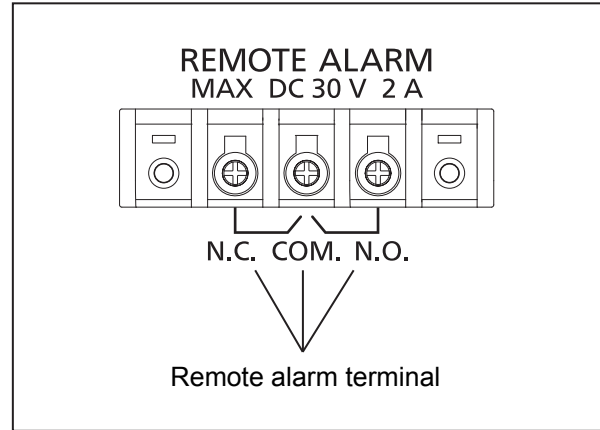
The alarm of this unit can be informed at a remote location from this unit by connecting the external alarm device to the remote alarm terminals. For the type and behavior of remote alarm output, refer to page 47~48.

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 showed in Table.1.

**Note:**

- In the door alarm, the remote alarm does not work [page 47]
- It is recommended to use standard signal and interface cables with a maximum length of 30 meters.



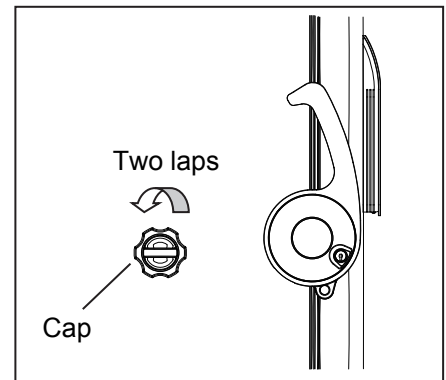
**Table 1 The behavior of the remote alarm when pressing Buzzer key**

| Remote Alarm setting<br>(Refer to page 28~30) | Connecting terminal | Normal condition | Abnormal condition<br>(Including in the cases of power outage and of where the power plug is pulled out.) |                                 |
|---|---------------------|------------------|---|---------------------------------|
|   |                     |                  | When pressing Buzzer key  |                                 |
| ON:<br>Non-interlock with Buzzer key          | COM.-N.C.           | Close            | Open  | Open (Maintain in abnormality)  |
|   | COM.-N.O.           | Open             | Close   | Close (Maintain in abnormality) |
| OFF:<br>Interlock with Buzzer key             | COM.-N.C.           | Close            | Open  | Close (Return to normal)        |
|   | COM.-N.O.           | Open             | Close   | Open (Return to normal)         |

# AIR INTAKE PORT

Opening the outer door immediately after closing it, may make feel heavy. The cause is the pressure difference between inside and outside the unit that caused by contraction of the chamber air which cooled down rapidly. When the outer door is closed and opened soon, the outer door is easy to open with the following process.

1. Turn the cap on the left side counterclockwise about two laps. (Or remove the cap.)
2. Allow about twenty seconds before open the outer door.
3. Close (or replace) the cap when the door operation is completed.



The outer door may not open in the above method when there are frost and ice in the air intake port. In that case, remove the cap and check the frost inside the air intake port. Remove the frost inside the air intake port with the enclosed "stick for air intake port cleaning" when the excessive frost is built in the air intake port. Clean the air intake port every month even when there is no frost in the air intake port. Refer to page 52 for the cleaning.

## CAUTION

For removing the frost in the air intake port, do not use a tool with sharp edge such as a knife or a screw driver.

Replace the cap when the air intake port is not used. Improper replacement may cause rise of chamber temperature or condensation around the air intake port.

# 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.

■ **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.

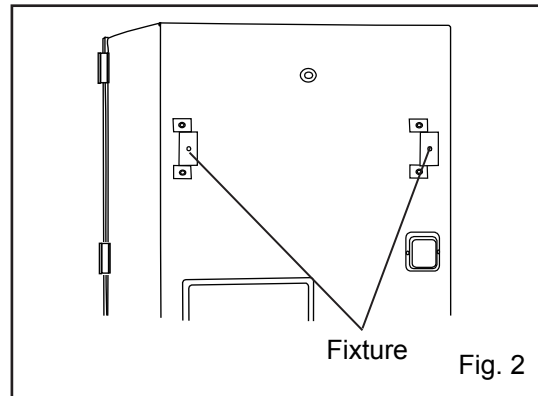
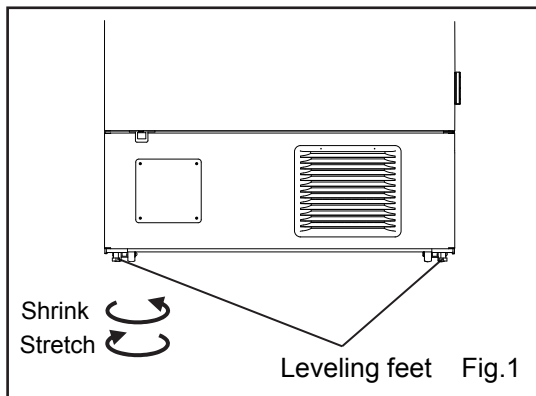
**Note:** Remove the cable tie banding the power supply cord. Prolonged banding may cause the corrosion of the cord coating.

## 2. Adjust the leveling feet

Stretch the leveling feet by rotating them as shown in Fig. 1 to contact them to the floor. Ensure the unit is installed horizontally.

## 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. (Fig. 2)



## 4. Setting the shelves

3 shelves are packaged at the bottom of the chamber. Set the shelves on the shelf stoppers at the standard location firmly. The upward edge should be upside.

## 5. Ground (earth)

The ground (earth) is for preventing the electric shock in the case of unexpected deterioration of the electrical insulation. Always ground the unit at the time of installation.

## 6. 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

Use the following procedure to start trial operation or actual operation 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 47).

2. (When an optional backup cooling kit MDF-UB6B 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 22~23).

**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-UB6B 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-UB6B 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.
- 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 47).

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 29).

- LCD touch panel is turn OFF (refer to page 47).

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 22~23 and 47).

An alarm message is displayed on the message display field. 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

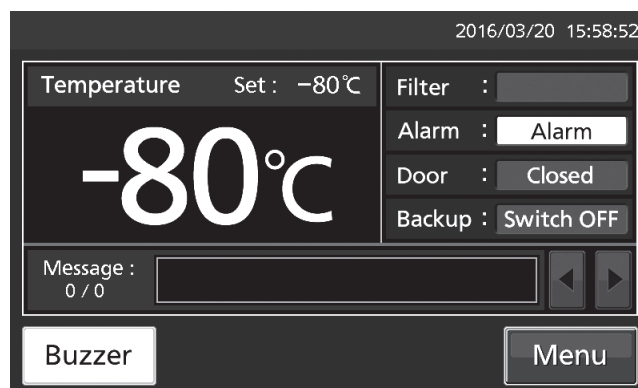
The set value is memorized by nonvolatile memory. Accordingly, the chamber resumes the operation with setting before power failure.

**Note:**

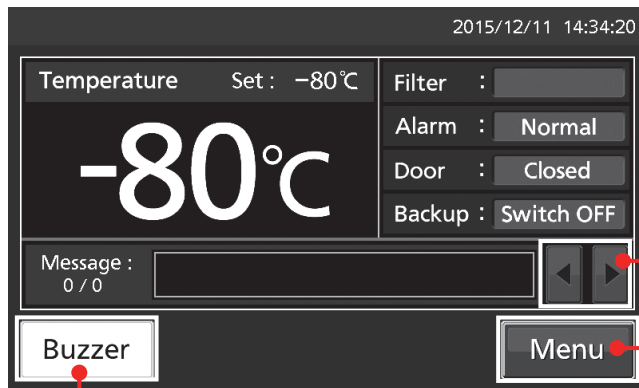
- It may take up to 1 minute until the LCD touch panel lights after recovery from power failure.
- All products start at the same time as the recovery from the power failure, so that, the temporary voltage drop may have a bad influence on the starting of this unit. To prevent this situation, set the appropriate compressor delay time of this unit (refer to page 24).

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 49). 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 38~39).



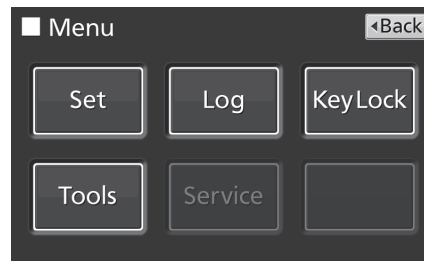
# BASIC OPERATION ON LCD TOUCH PANEL



◆ Message select key:  
(Operate) Changing some messages

◆ Buzzer key: (Operate) Silencing the buzzer  
(Alarm is not canceled except for some alarms; page 49)

● Operation from Menu key



## Menu screen

Page

|            |   |                        |           |   |   |
|------------|---|------------------------|-----------|---|---|
| ◆ Set      | → | ■ Temp. Setting screen | (Setting) | Temp., High Alarm, Low Alarm              | 22~23   |
| ◆ Log      | → | ■ Log screen           |           |   |   |
|            |   | ◆ Chart                | →         | ■ Chart screen                            |   |
|            |   |                        |           | ◆ Actual Temp.                            | (Display) Chamber temp. log graph (can be exported) 32~34 |
|            |   |                        |           | ◆ Door Opening                            | (Display) Door opening log graph (can be exported) 32~34  |
|            |   | ◆ Data Export          | →         | ■ Export screen                           |   |
|            |   |                        |           | ◆ Actual Temp.                            | (Export) Chamber temperature log 35~37                    |
|            |   |                        |           | ◆ Door Opening                            | (Export) Door opening log 35~37                           |
|            |   | ◆ Setting              |           | (Setting) Log interval, Unique ID         | 31~32   |
|            |   | ◆ Alarm                |           | (Display) Alarm log (can be exported)     | 38~39   |
|            |   | ◆ Alarm Export         |           | (Export) Alarm log                        | 40~42   |
| ◆ Key Lock | → | ■ Key Lock screen      | (Setting) | Key lock ON/OFF, password                 | 25~27   |
| ◆ Tools    | → | ■ Tools screen         |           |   |   |
|            |   | ◆ Operation Setting    | (Setting) | Comp. delay time                          | 23~24   |
|            |   | ◆ Alarm Setting        | (Setting) | Alarm delay, ring back, remote alarm etc. | 28~30   |
|            |   | ◆ DAQ Setting          |           | Do not press (It is not possible to set.) |   |
|            |   | ◆ Date & Time          | (Setting) | Date, time                                | 43  |
|            |   | ◆ Brightness/Sleep     | (Setting) | Brightness, sleep ON/OFF etc.             | 44~45   |

# BASIC PARAMETERS

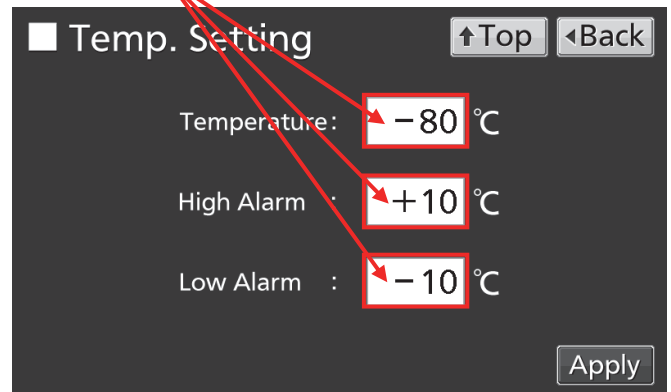
## How to input numerical value and alphanumeric character

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

●When inputting numerical value

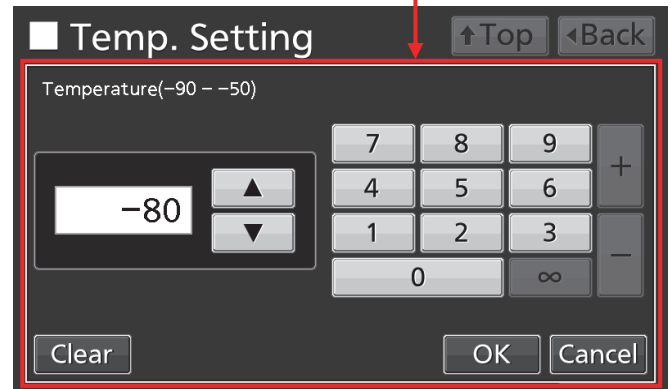
1. By pressing numeric input box, numeric input window is displayed.

Numeric input box



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

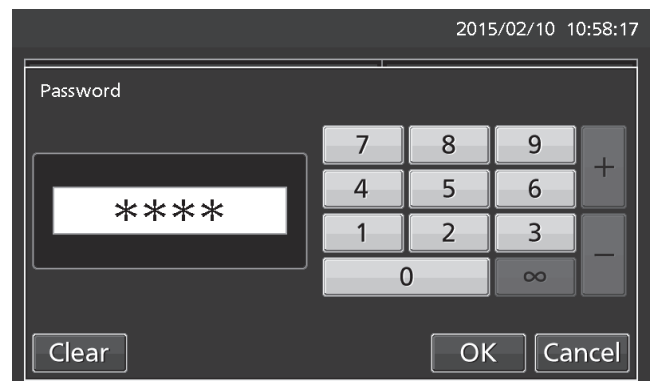
Numeric input window



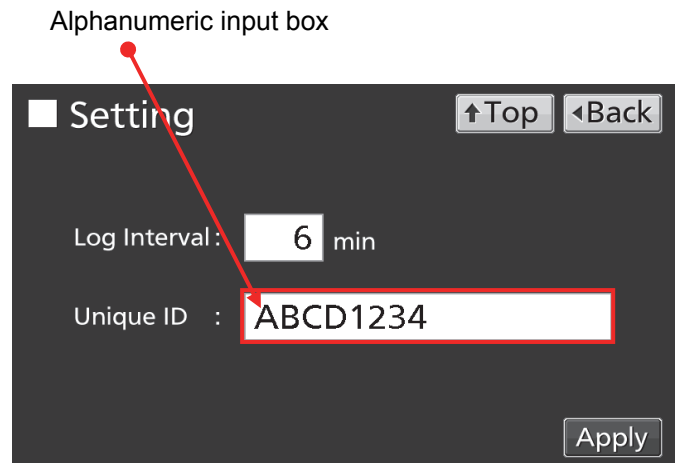
●Key description

- 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.

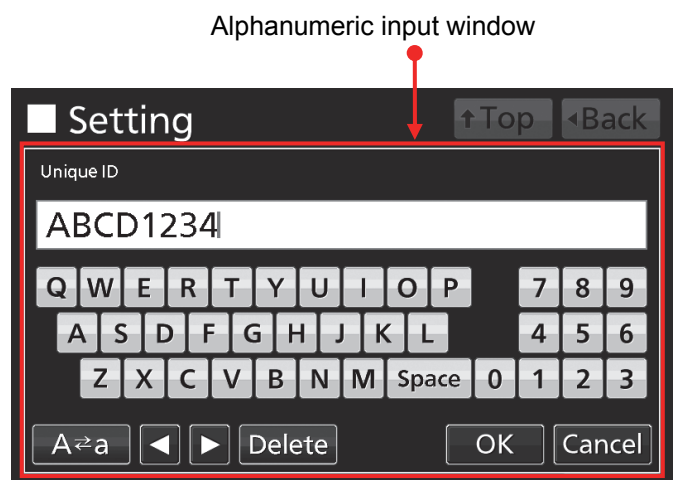
**Note:** Up/Down key may not be displayed.



- 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.

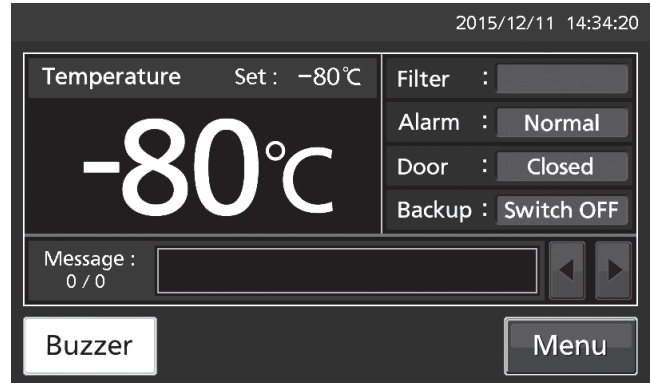
**Note:** While the alphanumeric input window is open, it is not possible to operate Top key and Back key.

# BASIC PARAMETERS

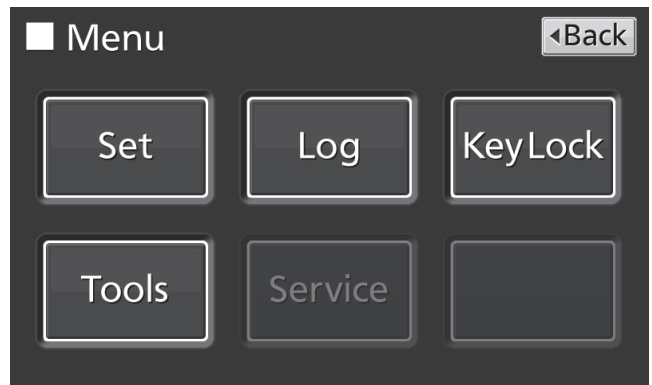
## Setting Temperature, High Alarm and Low Alarm

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.

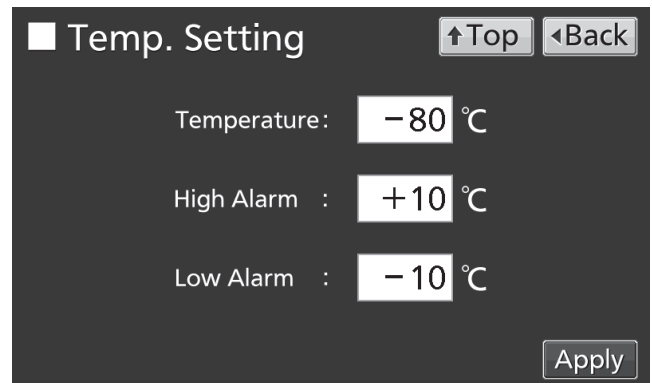
1. Press Menu key to lead the Menu screen.



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.

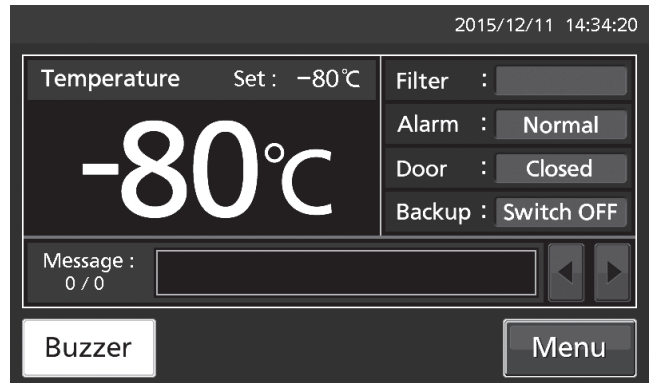


\* The current chamber temperature is the value rounded off below a decimal point, so the High/Low Alarm may be activated when the value of the current chamber temperature is equal to the High/Low Alarm set temperature.

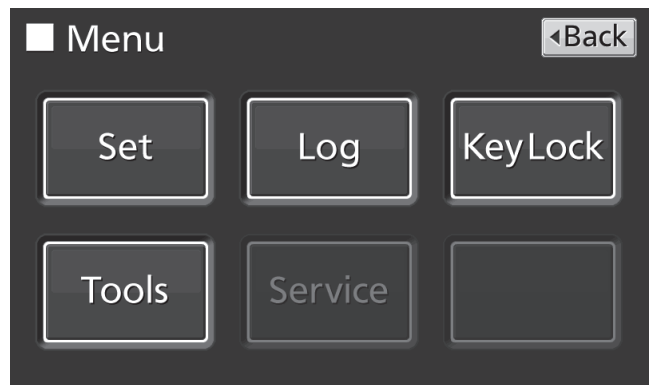
4. On the Menu screen, press Back key to return to the Top screen.

## Setting operation control mode

1. Press Menu key to lead the Menu screen.



2. Press Tools key to lead the Tools screen.

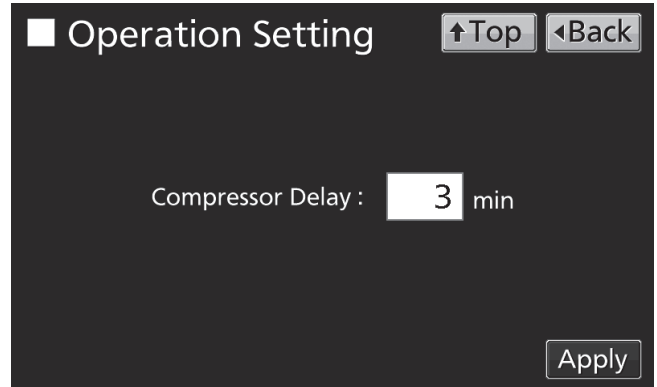


3. Press Operation Setting key to lead the Operation Setting screen.



# BASIC PARAMETERS

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



- Each setting

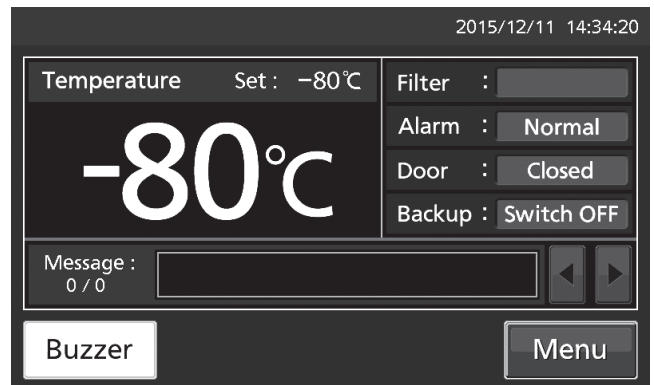
- Compressor Delay:

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.

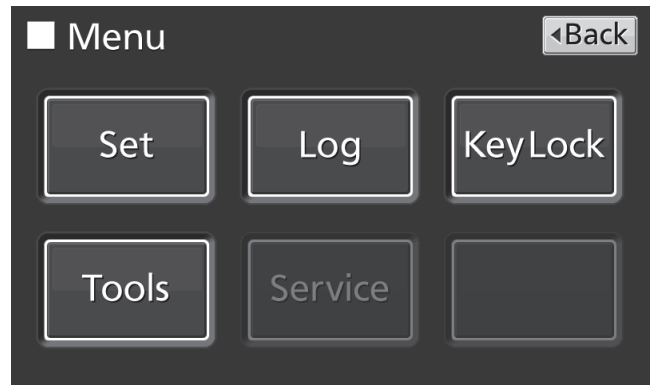
5. Press Top key to return to the Top screen.

# Setting key lock

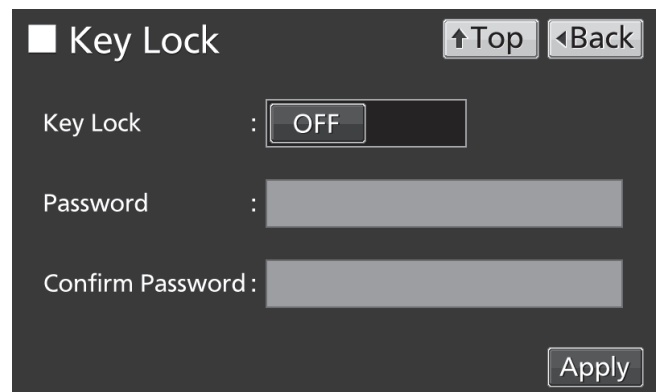
1. Press Menu key to lead the Menu screen.



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



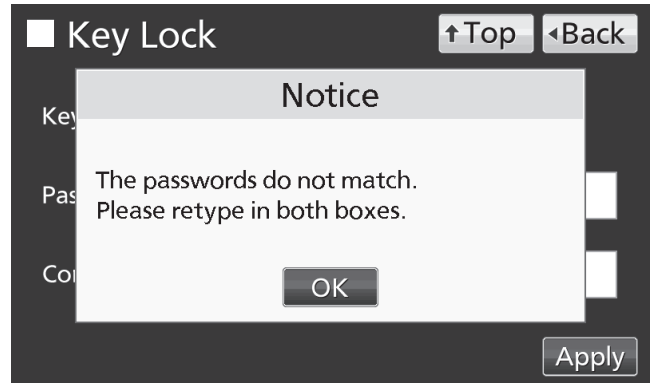
3. On the Key Lock screen, it is possible to set each setting of key lock (refer to next page). Press Apply key to change key lock ON and to save the password. The display returns to the Menu screen.



# 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.

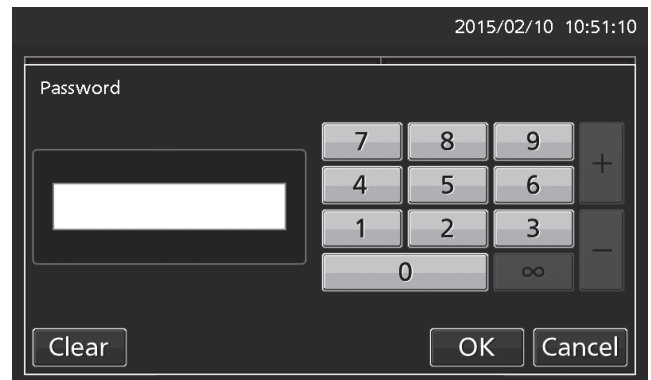


**Note:** Manage the release password of Key Lock properly.

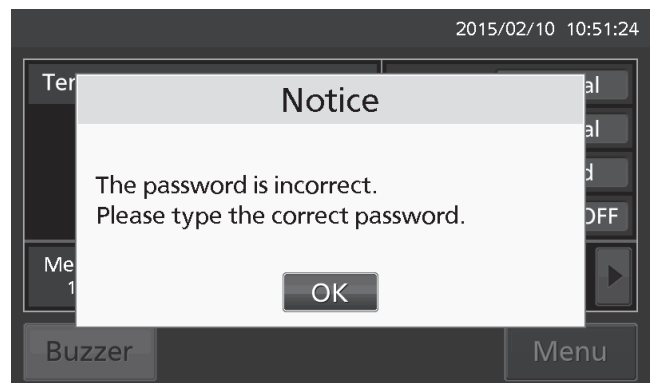
4. On the Menu screen, press Back key to return to the Top screen.

## • Operation for Keylock-ON

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

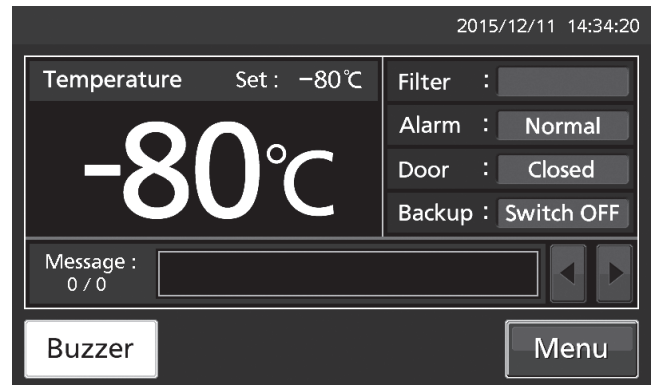


• When the inputted password is incorrect, Notice dialog box is displayed. Press OK key, and then input the correct password.

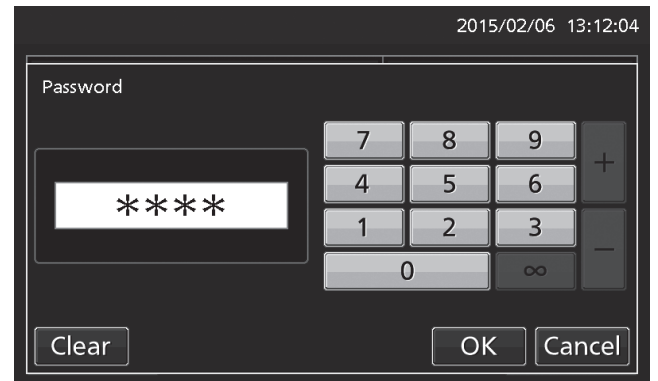


# Removing key lock

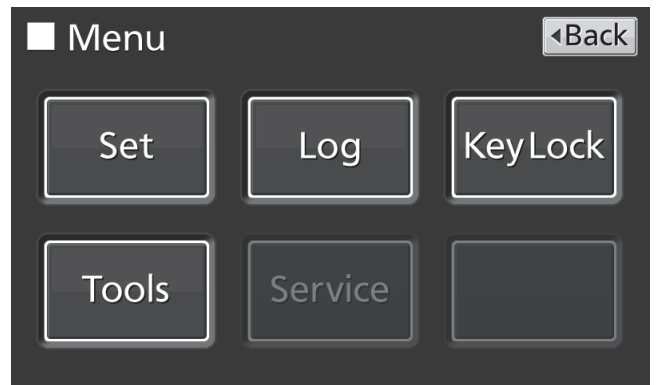
1. By pressing Menu key, the Password input window is displayed.



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

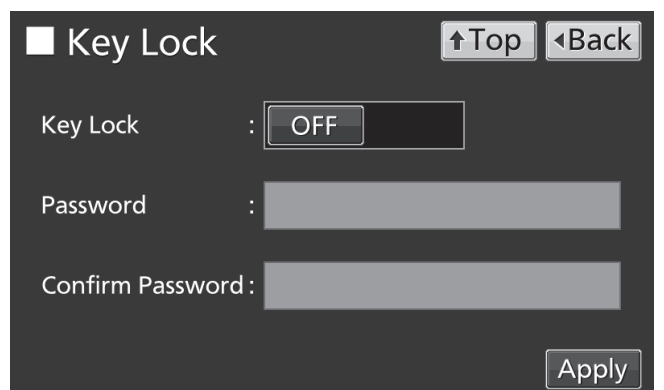


3. Press Key Lock key to lead the Key Lock screen.



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.

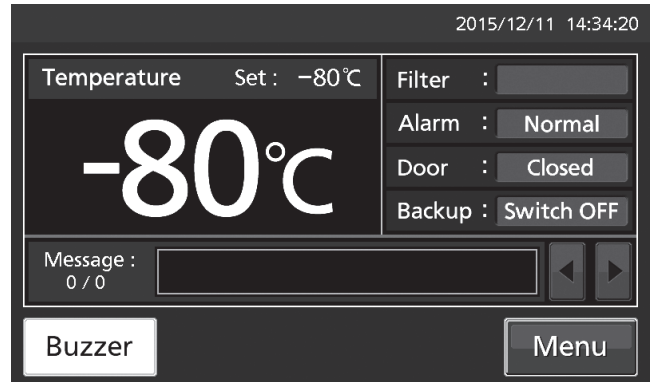
**Note:** The release password of key Lock is deleted.



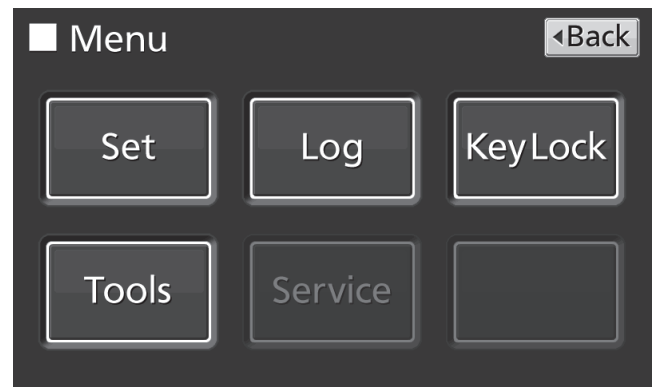
5. On the Menu screen, press Back key to return to the Top screen.

# ALARM PARAMETERS

1. Press Menu key to lead the Menu screen.



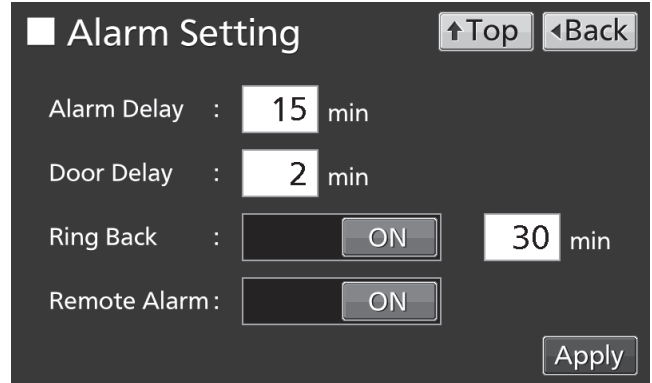
2. Press Tools key to lead the Tools screen.



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



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.



- 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 49).

- 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.

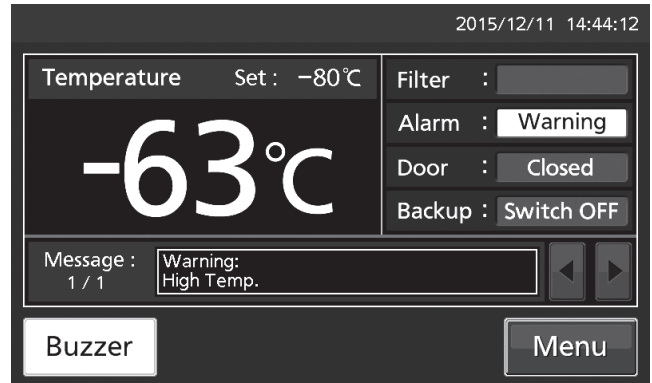
5. Press Top key to return to the Top screen.

# 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 49.

Resolve the cause of the alarm in reference to page 47~48 because the alarm itself is not deactivated by pressing Buzzer key except for some alarms.





# OPERATION/ALARM LOG

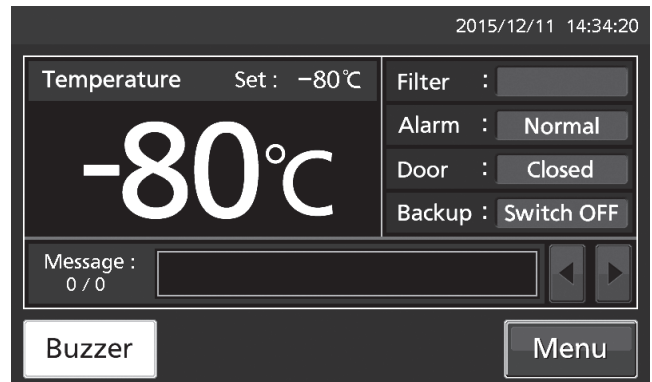
## Setting log interval

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

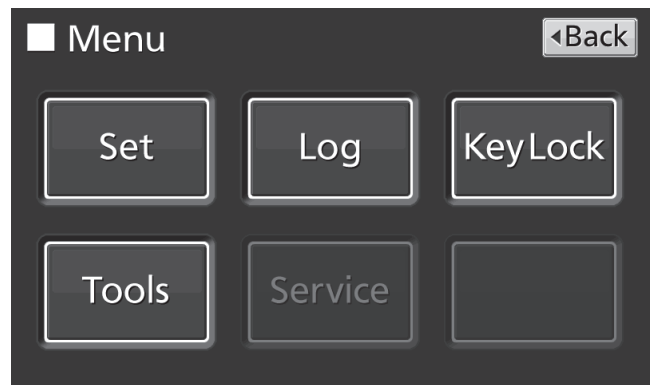
**Note:** When the battery switch for power failure alarm is ON, operation log is saved during a power failure.

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 37.



**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

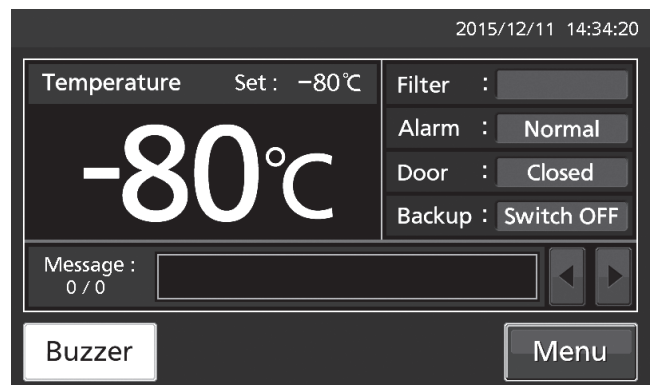
When saving data more than the above, and the data is overwritten and the old data is delated.

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

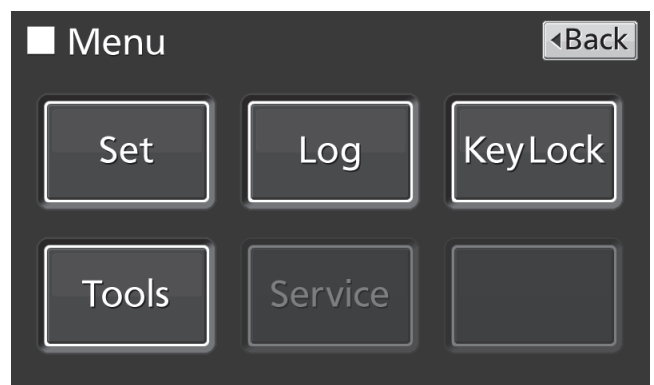
## Displaying operation log

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

1. Press Menu key to lead the Menu screen.



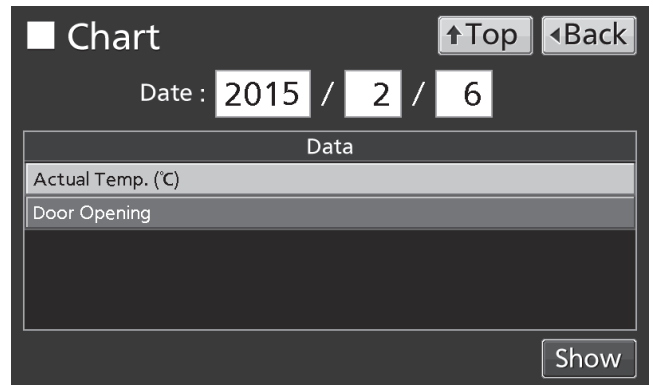
2. Press Log key to lead the Log screen.



3. Press Chart key to lead the Chart screen.

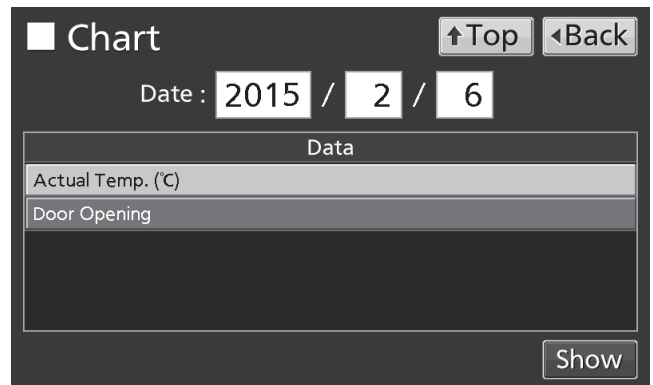


4. On the Chart screen, input the date (year / month / day) of the operation log you want to display graphically.



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.

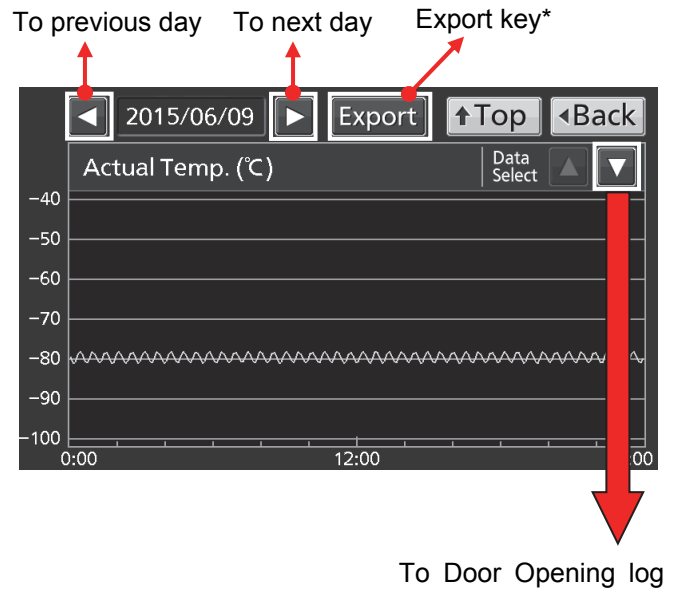
- Actual Temp.:  
Chamber temperature log graph  
(Go to procedure 6)
- Door Opening:  
Open/close state of door log graph  
(Go to procedure 7)



# OPERATION/ALARM LOG

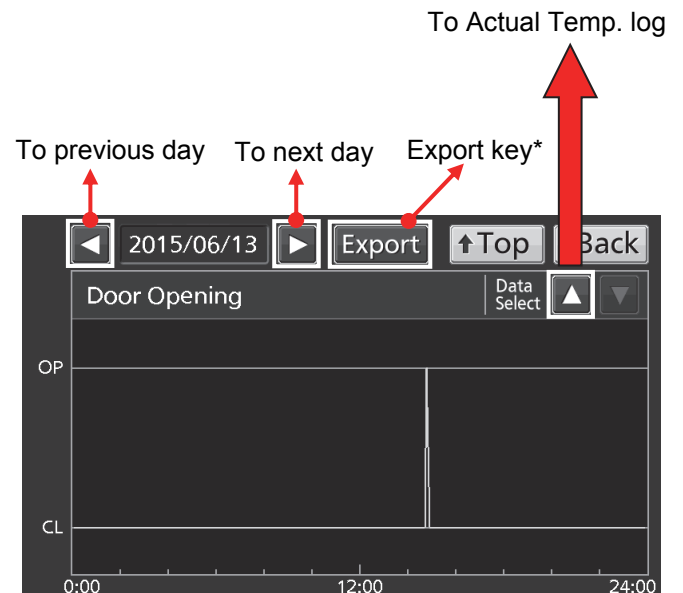
6. Actual Temp. log graph is displayed.

- Press Back key to return to the Chart screen.
- Press 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 35~37. 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 43 for the procedure of setting time.

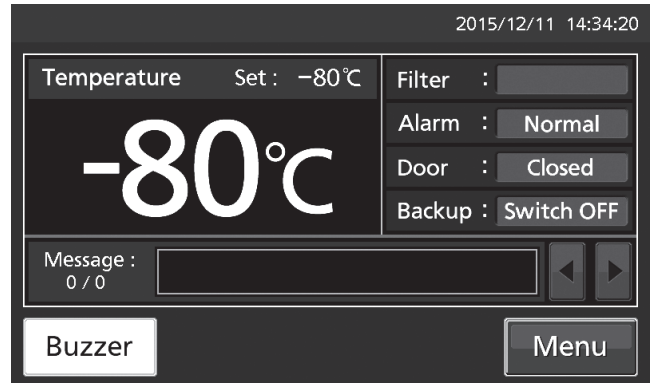
# Exporting operation log

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

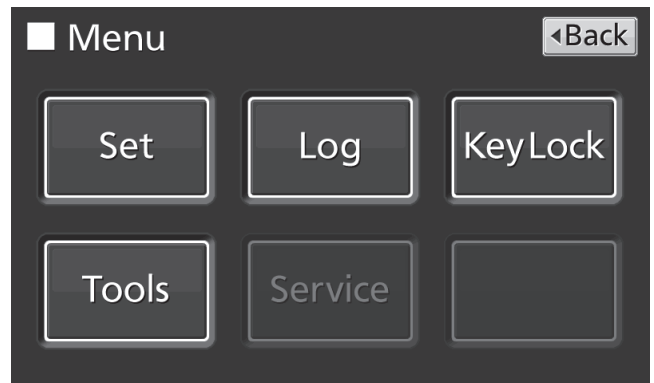
1. Insert the USB memory into the USB port.

**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.

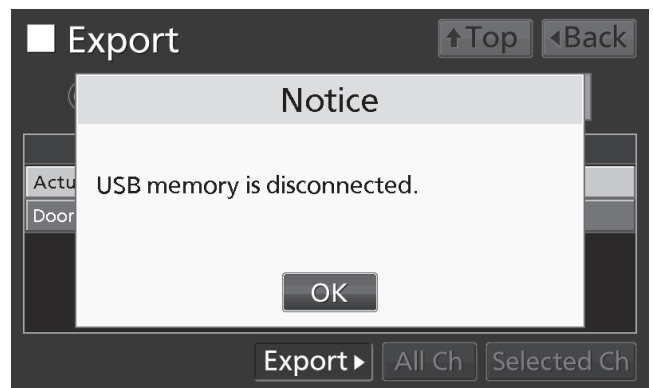
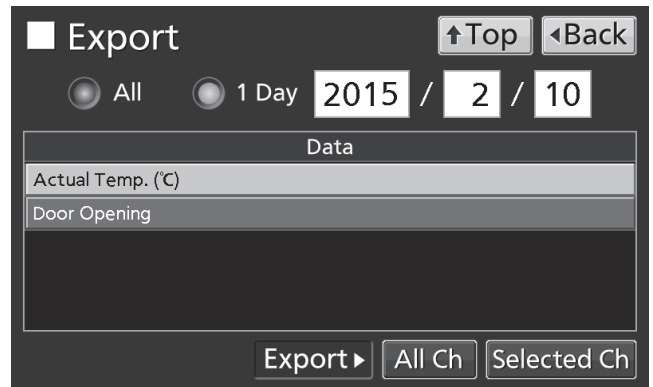
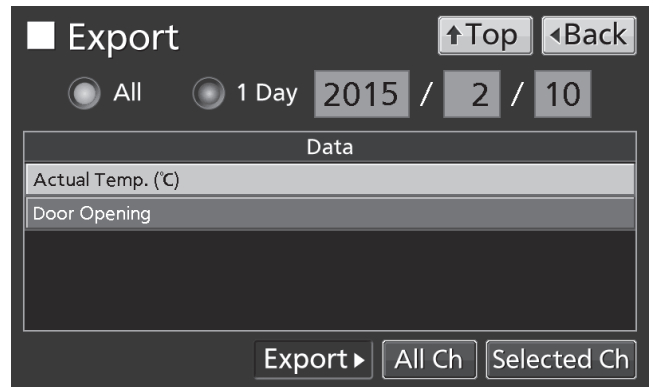
- To export the saved operation log data over the entire period, press All radio button.
- To export the operation log data of a specified date, press 1 Day radio button and input the date (year / month / day) of the operation log data you want to export.

**Note:** The error of about 1 minute may be observed during a month. Refer to page 43 for the procedure of setting time.

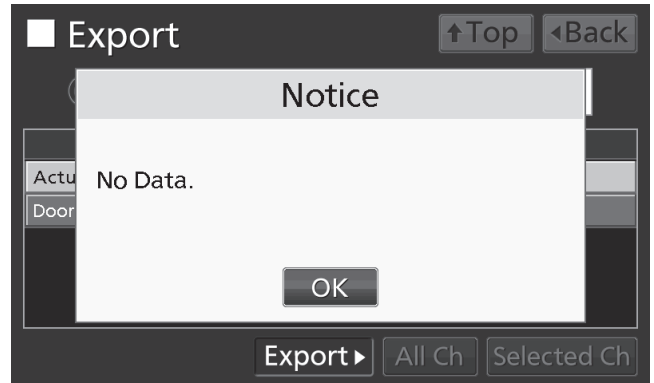
6. On the Export screen, select the type of operation log data you want to export.

- 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.

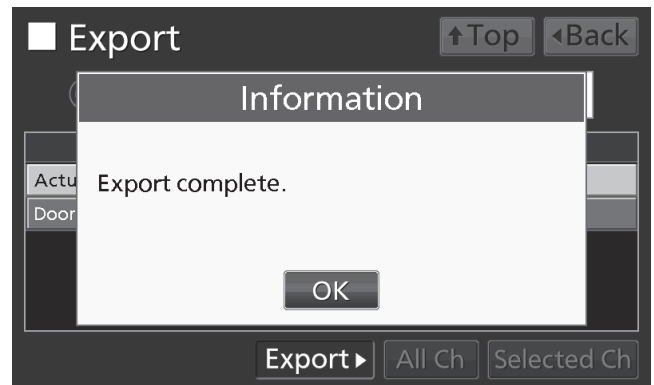


**Note:** When the specified operation log data does not exist, Notice dialog box is displayed. Press OK key, and then re-specified according to procedure 4 and 5.



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-DU900V") is written. However when the Unique ID is registered (refer to page 32), product name and Unique ID (8-digit) are written.

(e.g.) When "RoomA001" is set as the Unique ID of MDF-DU900V:

MDF-DU900V, RoomA001

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

# OPERATION/ALARM LOG

## Displaying alarm log

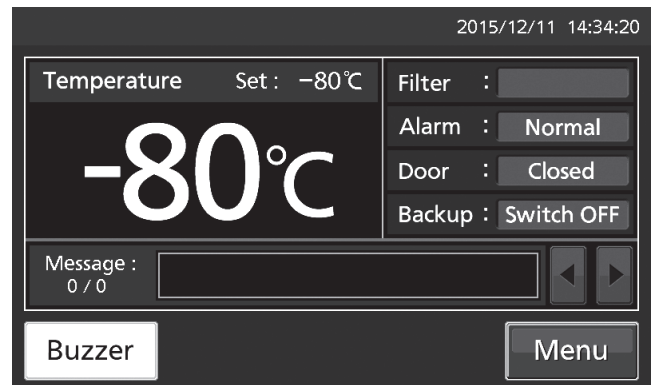
The unit is equipped with a function of saving alarm log data (Max. 256 logs).

**Note:**

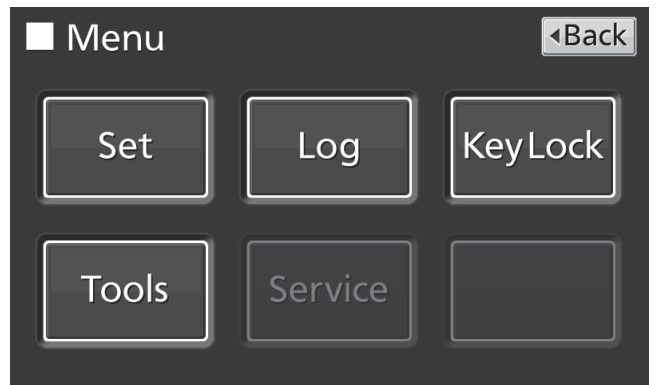
- When saving alarm logs more than 257, the oldest alarm log is deleted, and then overwritten.
- When the battery switch for power failure alarm is ON, operation log is saved during a power failure.

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.

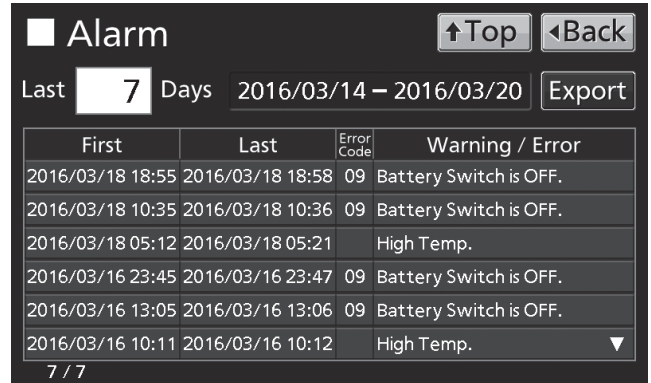




4. On the Alarm screen, the newest 7 days' alarm logs (containing that day) are displayed.

**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.

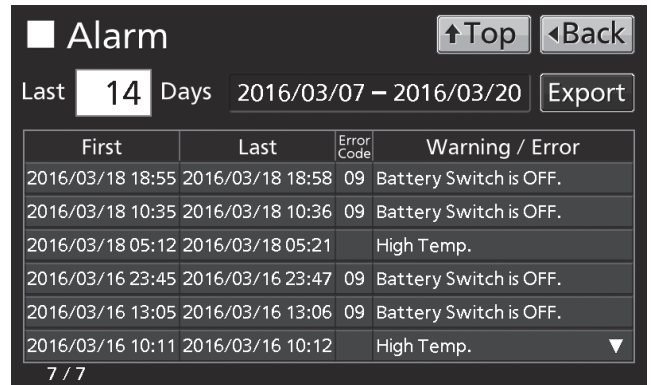


5. On the Alarm screen, by inputting days into the Last XX Days input box, alarm logs for specified days (containing that day) are displayed.

Settable range: 1 day~45 days.

**Note:** The error of about 1 minute may be observed during 1 month. Refer to page 43 for the procedure of setting time.

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

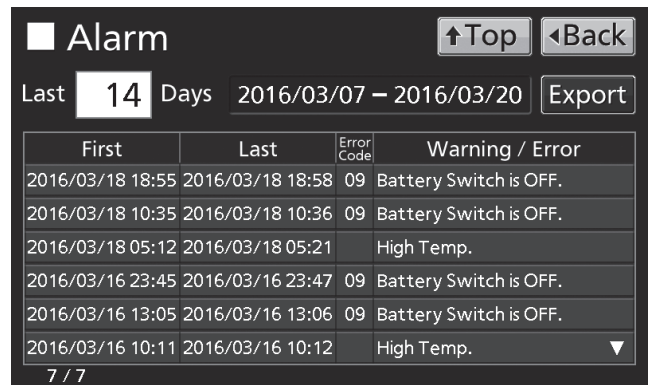


• On the Alarm screen of procedure 4 or 5, alarm log data can be exported in CSV format to the USB memory inserted into the USB port.

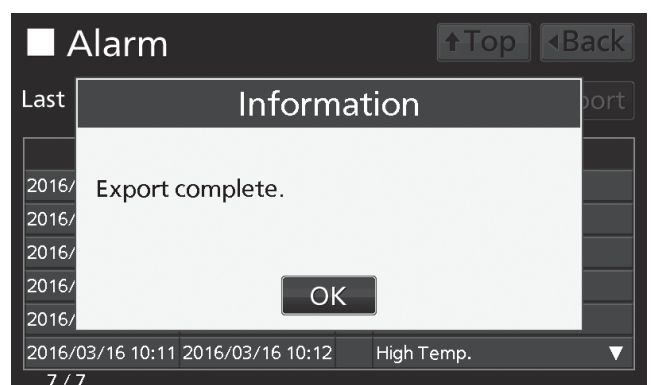
6. Insert the USB memory into the USB port.

**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 41 and 42 for the details about abnormal export or exported file name.



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

# OPERATION/ALARM LOG

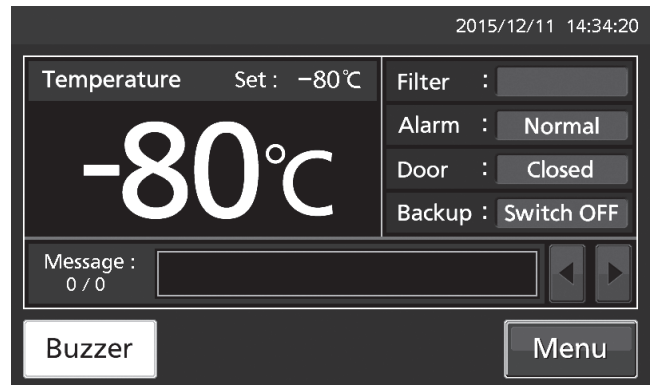
## Exporting alarm log

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

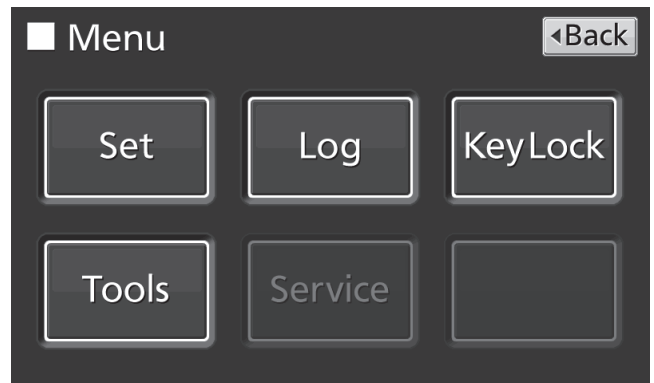
1. Insert a USB memory in the USB port.

**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.

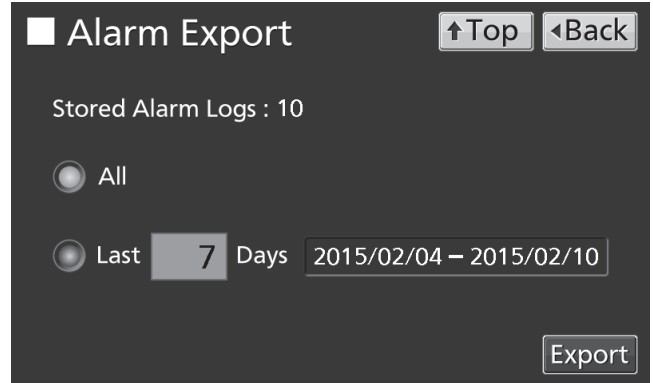


5. On the Alarm Export screen, select the period to export.

- 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.

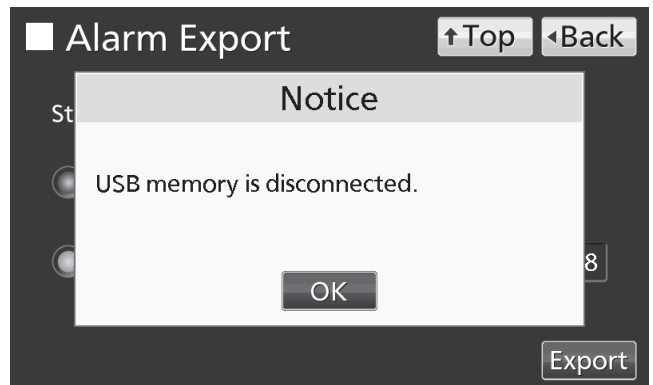
**Note:** The error of about 1 minute may be observed during 1 month. Refer to page 43 for the procedure of setting time.

6. Press Export key.

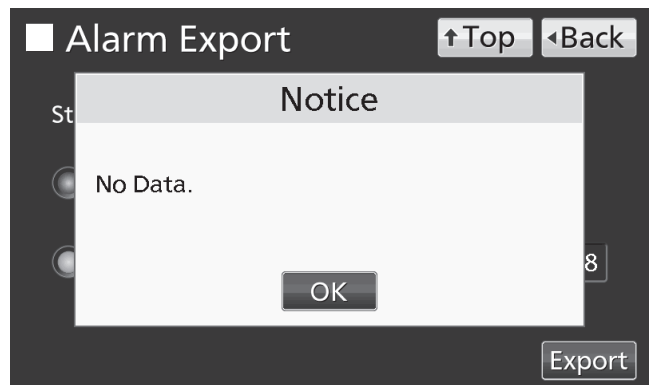


**Note:**

- 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.



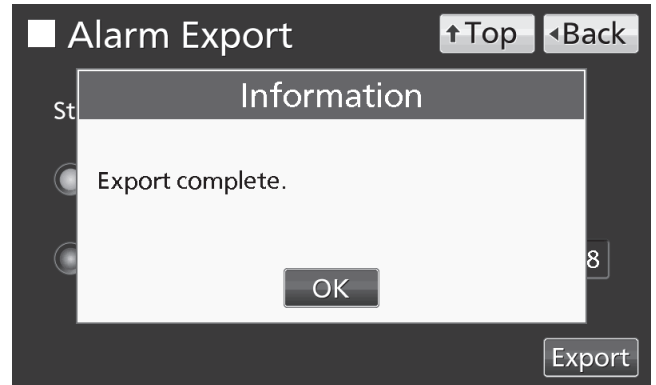
- When alarm log data does not exist in the specified days, Notice dialog box is displayed. Press OK key and specify days again as shown in the procedure 5.



# 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;

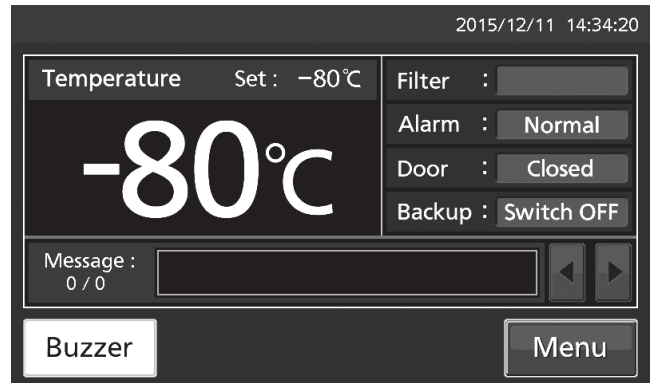
20160101-20160107\_AlarmLog.csv

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

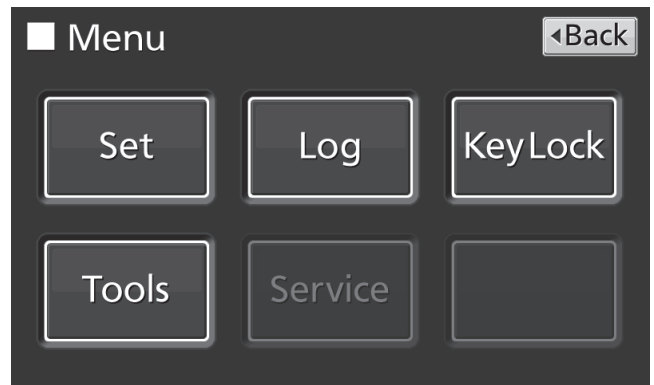
# OTHER PARAMETERS

## Setting date and time

1. Press Menu key to lead the Menu screen.



2. Press Tools key to lead the Tools screen.



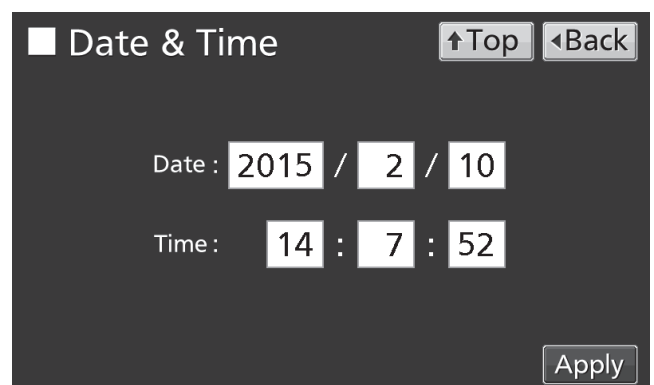
3. Press Date & Time key to lead the Date & Time screen.



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.

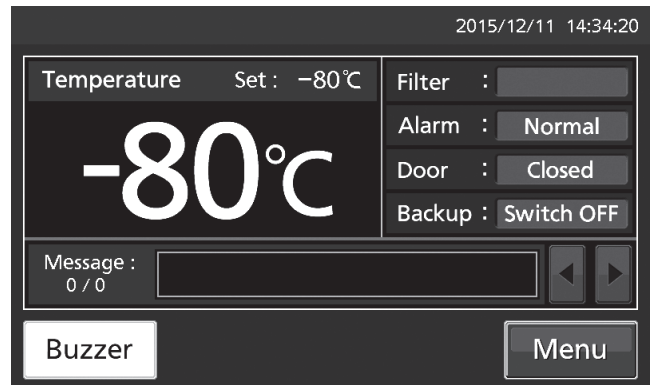


5. Press Top key to return to the Top screen.

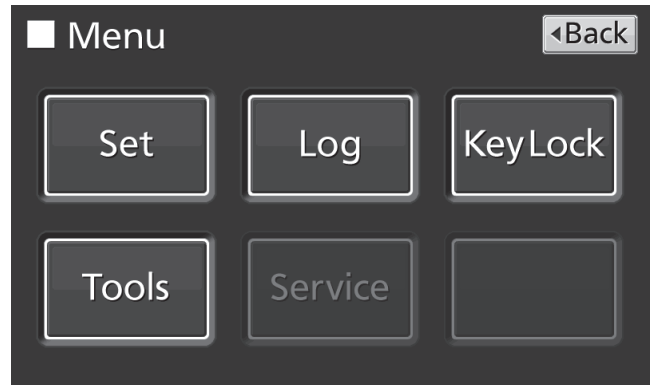
# OTHER PARAMETERS

## Setting brightness and sleep

1. Press Menu key to lead the Menu screen.



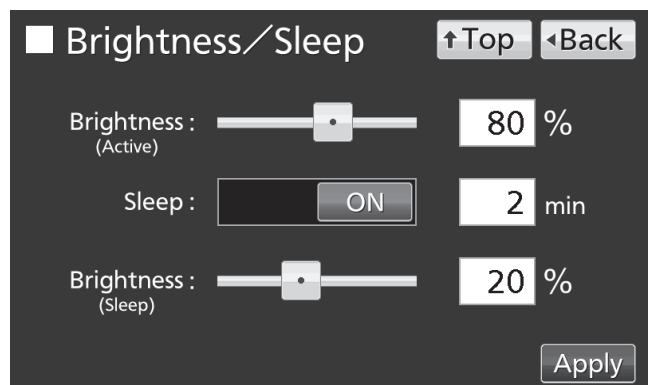
2. Press Tools key to lead the Tools screen.



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.



■ 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:<br>Ambient Temp Abnormal.     | The cooling performance and/or the durability of the refrigerating circuit may get worse. | Recheck air-conditioning of installed site.<br>* 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:<br>Cooling Circuits Overload. |   | (1) Do not put a large amount of contents to cryopreserve at a time.<br>(2) Reduce the opening frequency of the door.<br>(3) Make sure that there is no leak around the door or the inner lid.<br>(4) Set the chamber temp. to -80 °C or higher.<br>* 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.<br>(Settable range: +5 °C~+40 °C)  | Warning:<br>High Temp.<br>(After alarm delay time has elapsed.) | • <b>Alarm display</b><br>(During alarm delay)<br>"Alarm" is displayed alternately in normal characters and reverse video<br>(After alarm delay)<br>"Warning" is displayed alternately in normal characters and reverse video<br>• <b>Present temperature display field</b><br>Present temperature blinks. | Intermittent tone<br>(After alarm delay time has elapsed.) | ON<br>(After alarm delay time has elapsed.) |
| Low Alarm                                   | If the chamber temperature falls below the set temp. - the set value of Low Alarm.<br>(Settable range: -5 °C~-40 °C)   | Warning:<br>Low Temp.<br>(After alarm delay time has elapsed.)  |  |  |   |
| Power failure alarm                         | The battery switch for power failure alarm is ON, and under any of the following conditions.<br>• During a power failure<br>• Power switch is OFF<br>• Power supply cord is disconnected.                              | Warning:<br>Power Failure                                       | • <b>LCD touch panel</b><br>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.   | —   | • <b>Door display</b><br>"Open" is displayed alternately in normal characters and reverse video  | Intermittent tone<br>(After door delay time has elapsed.)  | —   |
| Filter alarm                                | When the excessive dust is accumulated on the condenser filter.  | —   | • <b>Filter alarm indicator</b><br>Indicator is lit (orange).  | Intermittent tone  | —   |
| Auto-return                                 | On screens other than the Top screen, there is no key operation for approx. 90 s.<br>(When the sleep function is ON)<br>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:<br>Exchange a Main Battery.                            | —  | —  | —   |
| Battery for backup cooling kit replacement  | When about 3 years passed after installing backup cooling kit.   | Warning:<br>Exchange a Backup Battery.                          | —  | —  | —   |

**Note:**

- Settable range of the alarm delay time: 0 minute~15 minutes (refer to page 29).
- 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 29).
- 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:<br>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:<br>Temperature Sensor Short.  |  |                   |              | —                           |
|                             | If the cascade sensor is disconnected.  | Err03:<br>Cascade Sensor Open.       |  |                   |              | —                           |
|                             | If the cascade sensor is short circuited.   | Err04:<br>Cascade Sensor Short.      |  |                   |              | —                           |
|                             | If the filter sensor is disconnected.   | Err05:<br>Filter Sensor Open.        |  |                   |              | —                           |
|                             | If the filter sensor is short-circuited.  | Err06:<br>Filter Sensor Short.       |  |                   |              | —                           |
|                             | If the ambient tem. sensor is disconnected.   | Err07:<br>Ambient Temp Sensor Open.  |  |                   |              | —                           |
|                             | If the ambient tem. sensor is short-circuited.  | Err08:<br>Ambient Temp Sensor Short. |  |                   |              | —                           |
| Battery switch check        | When the battery switch for power failure alarm is OFF.   | Err09:<br>Battery Switch is OFF.     | —  | —                 | —            | —                           |
| Condenser temp. abnormality | When the fan motor for cooling the compressor fails.<br>When the ambient temperature exceeds the usable environmental condition, etc. | Err10:<br>Condenser Temp Abnormal.   | "Warning" is displayed alternately in normal characters and reverse video  | Intermittent tone | ON           | Compressor OFF              |
| Communication error         | When communication between LCD touch panel and control substrate is died out or unstable.   | Err56:<br>Communication Failure.     | —  | —                 | —            | —                           |

●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.

- 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<br>(Alarm is not canceled) | ON                                 | ON                          | ON<br>(Under continuation)         |
|                                   | OFF               |                                | OFF                                |                             |                                    |
| OFF: Interlock with Buzzer key    | ON                |                                | ON                                 | OFF (Alarm is not canceled) |                                    |
|                                   | OFF               |                                | OFF                                |                             |                                    |

**Note:** Resolve the cause of the alarm in reference to page 47~48 because the alarm itself is not deactivated by pressing Buzzer key.

**Table 5 In the cases of the door alarm.**

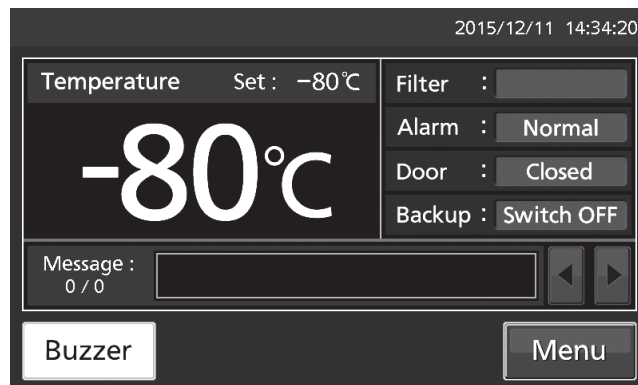
| Remote Alarm setting              | Ring Back setting | Buzzer from unit           |                                    | Remote Alarm setting |
|-----------------------------------|-------------------|----------------------------|------------------------------------|----------------------|
|                                   |                   | When pressing Buzzer key   | When the Ring Back set time passes |                      |
| ON: Non-interlock with Buzzer key | ON                | OFF<br>(Alarm is canceled) | OFF<br>(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<br>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.

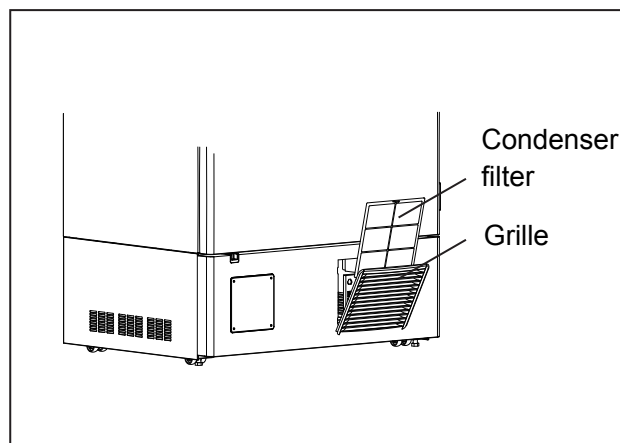
**Note:** Always replace the inner accessories removed for the cleaning to keep the intended performance.

## Cleaning of condenser filter

This unit is provided with the filter alarm indicator on the LCD touch panel. Clean the condenser filter when this indicator is lit. Clean the condenser filter once a month even if the filter alarm indicator is not on. A dusty condenser filter may cause shorter compressor life as well as the poor cooling.

Clean the condenser filter by the procedure below.

1. Open the grille by pulling it to you as shown in the figure.
2. Take out the condenser filter.
3. Wash the condenser filter with water.
4. Replace the condenser filter and the grille. (Set the handle of the condenser filter at the front.)
5. Check that the filter alarm indicator is off in the event the filter alarm indicator was ON.



## **⚠ WARNING**

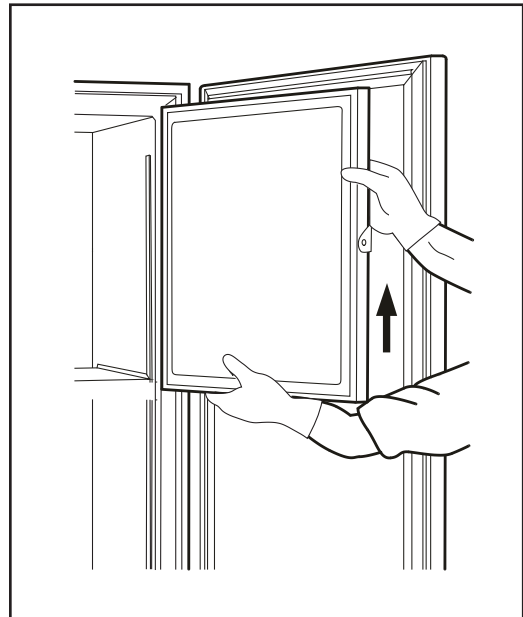
Do not touch the condenser directly when the filter is removed for cleaning. This may cause injury by hot surface.

## Defrosting of chamber

The frost is built at the upper portion of the chamber and inner door. The excessive frost possibly make some gap between the cabinet and the magnetic door gasket, which may cause poor cooling. Remove the frost on the inner door with a scraper enclosed with the unit. Following shows the procedure for removing the chamber frost.

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

1. Turn off the backup cooling kit if it is installed.
2. Take out and transfer all the contents to another freezer or a container which is refrigerated by liquid carbon dioxide or dry ice.
3. Turn off the power switch and battery switch of the freezer.
4. Open the outer door and inner door. Remove the inner door by lifting up as shown in the figure.
5. Leave the freezer 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 and inner door, replace the inner door and start up the unit according to the procedure on page 17.
8. Put back the articles into the sufficiently cooled freezer compartment.
9. Turn on the backup cooling kit if it is installed.



### **WARNING**

**Always mount and/or remove the inner door by two people.** The work by oneself may cause injury from falling.

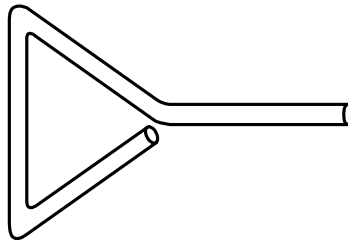
Always wear gloves when mounting and/or removing the inner door to prevent injury.

# ROUTINE MAINTENANCE

## Cleaning of air intake port

To open the outer door, the cap on the left side is turned counterclockwise to take the air. Therefore, the frost is easy to be settled around the air intake port or in it. Clean the air intake port depending on the conditions below:

| Condition  | Remedy  |
|--|---|
| When the frost and ice can be seen in the air intake port.                         | Remove the frost and ice with the stick for air intake port cleaning. |
| The outer door cannot be opened even if the cap on the air intake port is removed. | Remove the frost and ice with the stick for air intake port cleaning. |
| The frost and ice are built in the chamber.  | Remove the frost and ice with the enclosed scraper.                   |



Stick for air intake port cleaning (Accessory)

### CAUTION

For removing the frost in the air intake port, do not use a tool with sharp edge such as a knife or a screw driver.

# 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 about every 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 about every 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"> <li><input type="checkbox"/> The unit is not connected to the power supply.</li> <li><input type="checkbox"/> During a power failure.</li> <li><input type="checkbox"/> The circuit breaker is activated.</li> </ul>   |
| The compressor does not operate at all when turning ON the power switch.<br>(LCD touch panel is turned ON) | <ul style="list-style-type: none"> <li><input type="checkbox"/> 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.</li> </ul>   |
| An alarm is activated.   | <ul style="list-style-type: none"> <li><input type="checkbox"/> A little before, the value of the chamber temperature has been changed significantly.</li> <li><input type="checkbox"/> The door had been left open for a long time.</li> <li><input type="checkbox"/> Some warm contents are put into the chamber.</li> </ul> <p>*In the above cases, the alarm is canceled with no operation.</p>   |
| The cooling is poor.   | <ul style="list-style-type: none"> <li><input type="checkbox"/> A large amount of warm contents are put into the chamber.</li> <li><input type="checkbox"/> A large amount of frost is built on the inside wall of the chamber.</li> <li><input type="checkbox"/> The door is often opened.</li> <li><input type="checkbox"/> 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.</li> <li><input type="checkbox"/> The ambient temperature is higher than 30 °C. The allowable ambient temperature is between 5 °C~30 °C.</li> <li><input type="checkbox"/> The unit is in the direct sunlight.</li> <li><input type="checkbox"/> There is no more than 10 cm clearance around the unit.</li> <li><input type="checkbox"/> The grille or the exhaust air bent is blocked by something.</li> <li><input type="checkbox"/> The unit is not installed horizontally.</li> </ul> |
| The outside of the unit is wet with dew.   | <p>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.</p>   |
| Noisy in motor sound or flowing liquid.  | <p>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.</p>   |

**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

(Only for USA and CANADA)

A sealed lead acid battery that is recyclable powers the product you have purchased. At the end of its useful life, under various state and local laws, it is illegal to dispose of this battery into your municipal waste stream. Please call 1-800-SAV-LEAD for information on how to recycle this battery.

L'appareil que vous vous êtes procuré est alimenté par une batterie au plomb étanche. Après la fin de la vie utile de la batterie, en vertu de diverses réglementations gouvernementales et locales, il est illégal de l'éliminer avec les déchets domestiques ordinaires. Pour des renseignements sur le recyclage de la batterie, veuillez composer le 1-800-SAV-LEAD.



Pb

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



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

(Apenas para a Brasil)



CHUMBO

### **Baterias de chumbo – ácido:**

#### **Atenção sobre a bateria:**

- Após o uso, a bateria deverá ser devolvida à rede de assistência técnica ou revendedores para ser encaminhada ao fabricante ou importador. (Resolução CONAMA ns° 401)
- **Riscos a saúde:** O contato com os componentes químicos internos desta bateria pode causar danos a saúde.
- **Riscos ao meio-ambiente:** A destinação final inadequada pode poluir águas e solo.
- **Composição básica:** Chumbo, ácido sulfúrico diluído e plástico.

# 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,<br>7-day/1 turn<br>32-day/1 turn<br>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 and recorder sensor cover MTR-DU700SF is necessary.

⇨For the installation of temperature recorder MTR-G85C, an optional recorder sensor cover MTR-DU700SF is necessary.

# SMALL INNER DOOR (OPTION)

For MDF-DU900V, the small inner door (MDF-9ID) is available as an optional component. The small inner door is suitable for standard shelf location.

For the installation, contact our sales representative or agent.

**Note:**

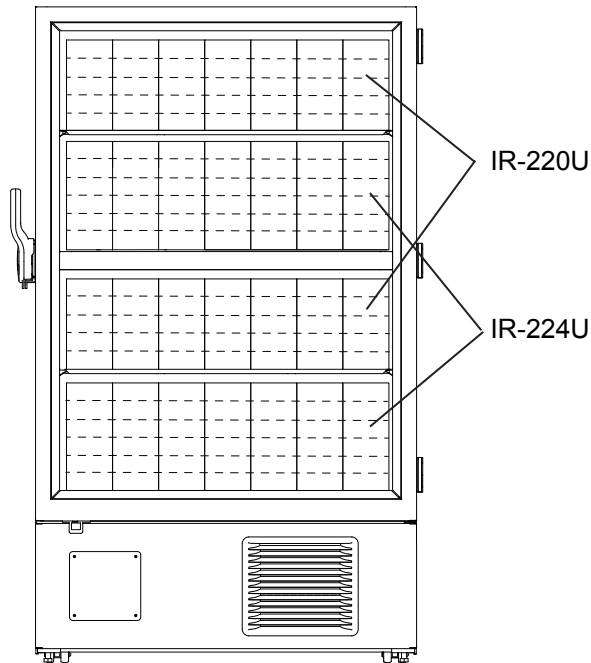
The cooling performance on the page 60 cannot be obtained when the small inner door (MDF-9ID) is installed.

Cooling performance : -82°C at the center of the chamber (ambient temperature; 30°C, no load)

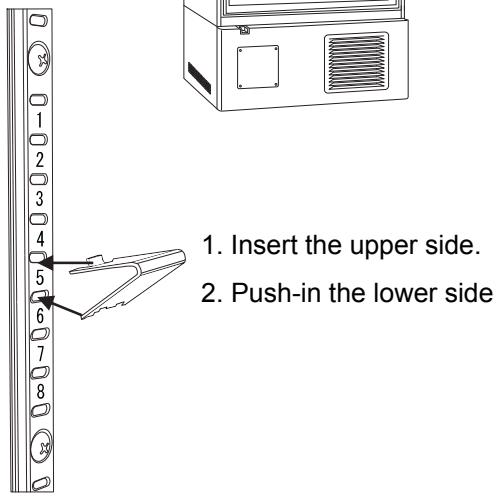
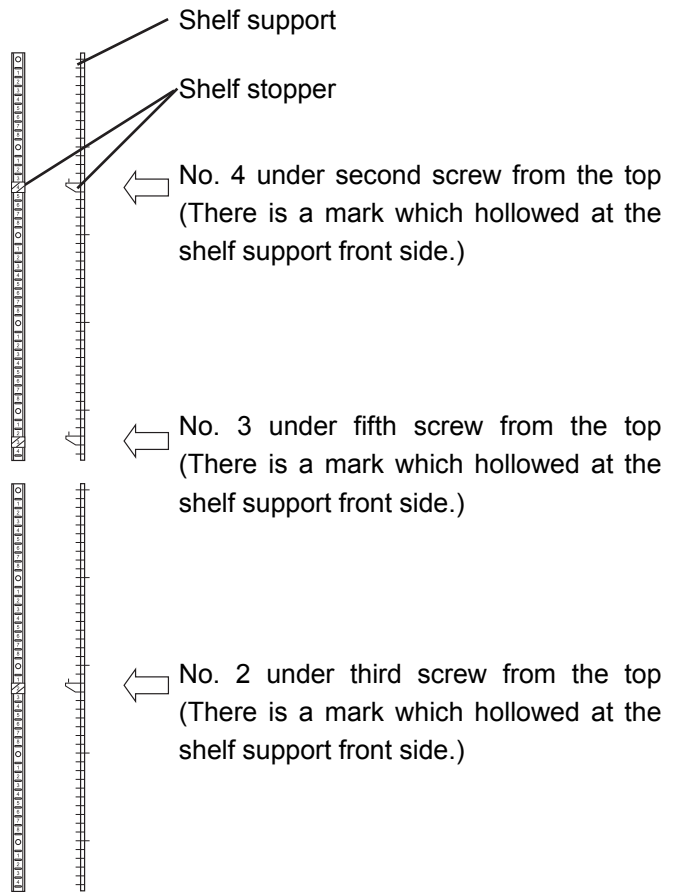
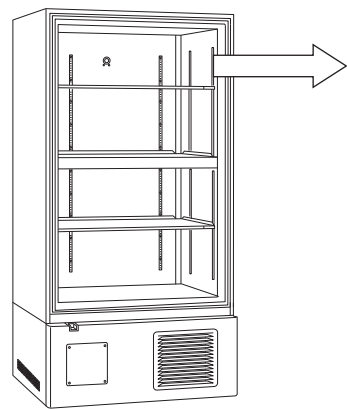
An optional inventory rack IR-224U cannot be used when the small inner door is installed.

# INVENTORY RACK (OPTION)

The optional inventory racks (IR-220U, IR-224U) are useful to store the precious materials in the chamber effectively. When the racks are used, it is necessary to adjust the height of the shelves. Set the shelf stopper as shown in the figure below.



**NOTE:**  
Only inventory rack IR-220U can be applied when the independent inner door (MDF-9ID) is installed.



<Attachment of shelf stopper>

## WARNING

Fix the shelf supports and shelves securely. And store the inventory racks securely. Incomplete installation may cause injury or damage.

# BACKUP COOLING KIT (OPTION)

By installing an optional backup cooling kit MDF-UB6B and a liquid CO<sub>2</sub> cylinder, liquid CO<sub>2</sub> 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 CO<sub>2</sub> 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.**

The injection set temperature of the backup cooling kit can be set by the temperature setting knob. 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 CO<sub>2</sub> may reduce the retention time of liquid CO<sub>2</sub> 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 | Backup display (Page 11) | Condition of the backup cooling kit                                | Chamber temperature  | Liquid CO <sub>2</sub> |
|---------------------|--------------------------|--|--|------------------------|
| 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<br>MDF-DU900V  | Ultra-Low Temperature Freezer<br>MDF-DU900VC |
|------------------------|--|--|
| Model number           | MDF-DU900V-PB  | MDF-DU900VC-PA                               |
| External dimensions    | W1150 mm x D870 mm x H1990 mm  |  |
| Internal dimensions    | W1010 mm x D600 mm x H1400 mm  |  |
| Effective capacity     | 845 L  |  |
| Exterior               | Painted steel  |  |
| Interior               | Painted steel  |  |
| Outer door             | Painted steel  |  |
| Inner door             | ABS resin panel with stainless frame, 2 doors  |  |
| Shelf                  | Stainless steel, 3 shelves (adjustable)<br>Inner dimension; W988 mm x D533 mm<br>Load; 50 kg/shelf   |  |
| Access port            | Inner diameter: 17 mm, 2 locations (back, bottom)  |  |
| Insulation             | Vacuum insulation panel + Rigid polyurethane foamed-in place   |  |
| Compressor             | High stage side; Hermetic type, Output; 1100 W<br>Low stage side; Hermetic type, Output; 1100 W  |  |
| Evaporator             | High stage side; Cascade type, Low stage side; Tube on sheet type  |  |
| Condenser              | High stage side; Fin and tube type, Low stage side; Shell and tube type  |  |
| Refrigerant            | High stage side; R-404A, Low stage side; R-508A  |  |
| 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, Filter alarm   |  |
| Remote alarm contact   | Allowable contact capacity: DC 30 V, 2 A *1  |  |
| Battery                | Lead storage battery, DC 6 V, 7200 mAh, Auto-recharge  |  |
| Weight                 | 376 kg   | 382 kg                                       |
| Voltage booster        | None   | Built-in                                     |
| Accessories            | 2 keys, 1 scraper, 1 stick for air intake port cleaning  |  |
| Optional component     | Temperature recorder (MTR-85H, MTR-G85C)<br>Recorder sensor cover (MTR-DU700SF)<br>Recorder fixing (MDF-S3085; MTR-85H)<br>Backup cooling kit (MDF-UB6B); For Liquid CO <sub>2</sub><br>Inventory rack (IR-224U, IR-220U)<br>Small inner door (MDF-9ID)<br>Interface board (MTR-L03) *1, *2; For LAN<br>Interface board (MTR-480) *1, *2; For RS-232C/RS-485 |  |

\*1: It is recommended to use standard signal and interface cables with a maximum length of 30 meters.

\*2: 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<br>MDF-DU900V                                |
| Model number                 | MDF-DU900V-PB  |
| 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 220 V   |
| Rated frequency              | 50 Hz  |
| Rated power consumption      | 1020 W   |
| Noise level                  | 52 dB [A] (background noise; 20 dB)  |
| Maximum pressure             | 2900 kPa   |
| Usable environment condition | Temperature; 5 °C to 30 °C Humidity; equal or less than 80 %R.H.           |

|                              |  |
|------------------------------|--|
| Product name                 | Ultra-Low Temperature Freezer<br>MDF-DU900VC                               |
| Model number                 | MDF-DU900VC-PA   |
| 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 220 V   |
| Rated frequency              | 60 Hz  |
| Rated power consumption      | 1130 W   |
| Noise level                  | 52 dB [A] (background noise; 20 dB)  |
| Maximum pressure             | 2900 kPa   |
| Usable environment condition | Temperature; 5 °C to 30 °C Humidity; equal or less than 80 %R.H.           |

\* 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.

## 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:

Please decontaminate the unit yourself before calling the service engineer.

# PHC Corporation

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