

## Purpose

The purpose of this SOP is to provide instructions in the proper operation and maintenance of the unit.

## Methods

1. Setting Temperature Set Points
  - A. Press the Setting (gear) icon on the Main Toolbar.
  - B. Press the Freezer Settings icon (the freezer at the top of the circle).
  - C. Parameters may be adjusted by pressing the value displayed. Left and right arrows will appear when you press a field as will a check mark icon to confirm changes.
  - D. Press the back arrow at the bottom right to return to the previous screen.
  - E. The minimum value is -50°C; maximum is -86°C.
2. Initial Loading
  - A. Allow the freezer to operate at the desired temperature for a minimum of 12 hours before loading
  - B. Load the freezer one shelf at a time, beginning with the top shelf. After loading each shelf, allow the freezer to recover to the desired set point before loading the next shelf. Repeat this process until the freezer is fully loaded.
3. General Usage
  - A. Install the unit in a level area free from vibration with a minimum of 8 inches of space on the top and sides, and 6 inches in back.
  - B. This unit is not a “rapid freeze” device. Freezing large quantities of liquid, or high-water content items will temporarily increase the chamber temperature and will cause the compressors to operate for a prolonged time period.
  - C. Avoid opening the door for extended time periods since chamber temperature air will escape rapidly.
  - D. Keep the inner doors closed as much as possible. When room air, which is higher in humidity, replaces chamber air, frost will develop in the chamber more rapidly.
  - E. To open the door, grasp the latch handle and pull it toward you until the latch disengages from the cabinets strike.
  - F. Keep pulling by the latch handle to open the main door.
  - G. To close the door, grasp the latch handle and pull it toward yourself, rotating the latch into the open position.
  - H. Move the freezer door into the closed position and gently push the handles away from you, making sure that the latch engages fully with the cabinet strike.
  - I. Keep applying gentle pressure to the latch handle until the latch is securely in the closed position.
  - J. Insert the key and rotate counterclockwise to lock.

## Features

1. Pressure Equalization Port
  - A. When an upright ultra-low temperature freezer door is opened, room temperature air rushes into the storage compartment. When the door is closed, the fixed volume of air is cooled rapidly. Pressure drops below atmospheric pressure, resulting in a substantial vacuum. Re-entry into the cabinet is impossible until internal pressures are returned to atmospheric pressure. In extreme cases, it can take several hours before the door can be easily reopened.
2. Alarm System
  - A. The color of the heart at the top indicates the health of the freezer:
    - I. Red indicates a serious alarm condition
    - II. Yellow indicates a noteworthy condition (open door, there have been alarms)
    - III. Blue indicates a normal condition
    - IV. A blinking heart indicates an active alarm or error condition
    - V. If the heart is red or yellow, press the heart icon to bring up the health status screen
  - B. When an audible alarm is sounding, view the event log to see what is causing the alarm. Press the bell icon on the lower right to silence it.
  - C. When (X) appears in place of the bell, press this icon to acknowledge a past event. The heart icon will change color from yellow to blue.
  - D. The alarm will be sent when the freezer reaches the low or high set points.
3. Event Log
  - A. Press the book-and-pen icon to display the Event Log Screen
  - B. This screen displays up to 2 weeks of recent events, with date and time stamps for each event.
  - C. A single event can be viewed by pressing on a single row.

## Maintenance

1. Pressure Equalization Port
  - A. The pressure equalization port is located in the door behind the eye-level panel on the front of the freezer. Although the port is designed to self-defrost, excessive frost accumulation on the inner door could eventually restrict air flow. Periodically inspect the inner door and brush away any loose frost using a stiff nylon brush.
2. Changing Chart Paper
  - A. Locate the pressure sensitive buttons at the front, upper left of the recorder panel.
  - B. Press and hold the Change Chart button (#3) for 1 second. The pen will move off the scale.

- C. Unscrew the center nut, remove the old chart paper, and install new chart paper. Carefully align the day and time with the reference mark (a small groove on the left side of the recorder panel).
  - D. Replace the center nut and hand tighten. Press the Charge Chart button again to resume temperature recording.
- 3. Cleaning the Condenser
  - A. Clean the condenser every 6 months. Additional cleaning may be required if the laboratory area is dusty.
  - B. Pull the grill open or slide it to the right depending on the model
  - C. Remove both filters.
  - D. Vacuum the condenser
  - E. Replace the filters and close the grill.
- 4. Cleaning the Condenser Filters
  - A. There are 2 condenser filters: a main filter and a lower filter for extra air flow into the condenser.
  - B. Clean the condenser filters every 2-3 months.
  - C. Pull the grill open or slide it to the right depending on the model.
  - D. Shake the filter to remove loose dust, rinse the filter in clean water, shake the excess water from the filter, and replace the filter.
  - E. Close the grill.
- 5. Gasket Maintenance
  - A. Check the gaskets around the door every 2-3 months for punctures or tears. Leaks are indicated by a streak of frost that forms at the point of gasket failure.
  - B. Keep the door gaskets clean and frost free by wiping gently with a soft cloth.
- 6. Defrosting the Freezer
  - A. Defrost the freezer once a year or whenever the ice buildup exceeds 3/8".
  - B. Remove all products and place in another cabinet.
  - C. Turn off the freezer.
  - D. Open the outer door and all inner doors.
  - E. Let the freezer stand with doors open for at least 24 hours.
  - F. Dispose of the ice and wipe out any water standing in the bottom of the cabinet.
  - G. If there is freezer odor, wash the interior with a solution of baking soda and warm water. Clean the exterior with any common household cleaning agent.
  - H. Close the doors, restart the freezer, and reload, following the instructions under Methods, Initial Loading (2).
- 7. Alarm Battery Maintenance
  - A. Check the battery every 12 months. If the voltage is 12.7 or greater, reset the automatic notification for 1 year. If less than 12.7, replace the battery and reset the notification.

## **Documentation**

Maintain the following records:

1. Document the cleaning schedule.
2. Maintain a current list of the research personnel and the numbers to be called in the event a freezer goes into alarm. Post the list on the freezer.