

Model 700 Series -70°C Deep Freezer

Thermo-Scientific Forma 700 Series offers reliable performance and no-frills functionality. These basic -86°C chest freezers feature an information centre with programmable controls, temperature display, and an optional chart recorder or datalogger built into the base. Sublids for holding temperature are standard.



Section 1 Installation and Start-Up

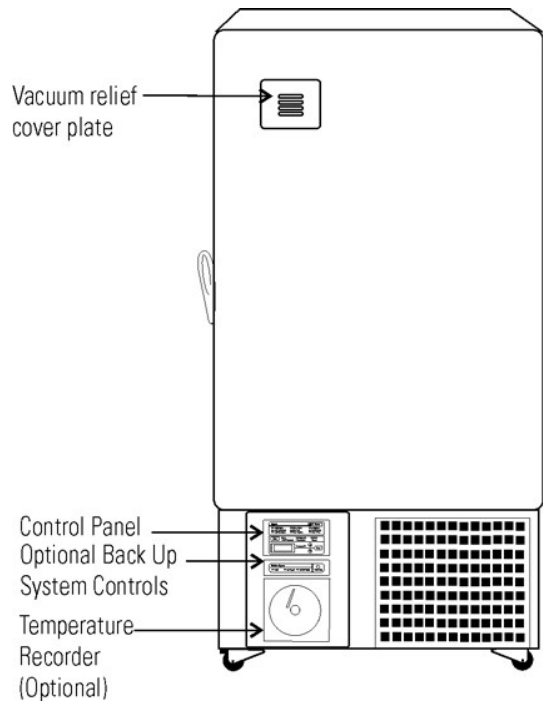


Figure 1-1

- Control Panel - keypad, displays and indicators.
- BUS (Optional Back Up System) panel.
- Optional temperature recorder - 7 day, one pen or Datalogger.
- Vacuum relief port cover plate

Figure 1-1. Front View

Figure 1-2

- Remote alarm contacts.
- Power Inlet for power cord connection.
- Optional BUS connections for probe and solenoid.
- Power Switch (mains disconnect).

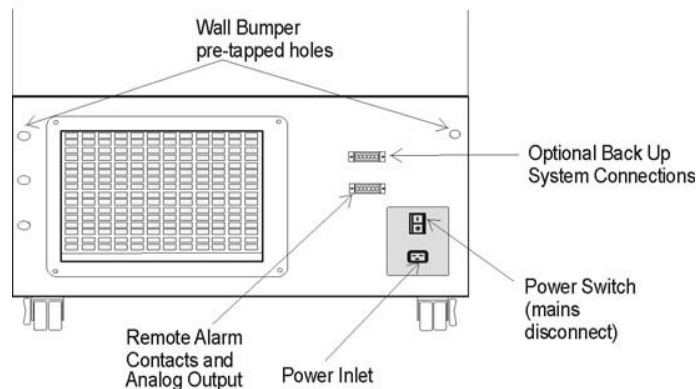


Figure 1-2. Rear View

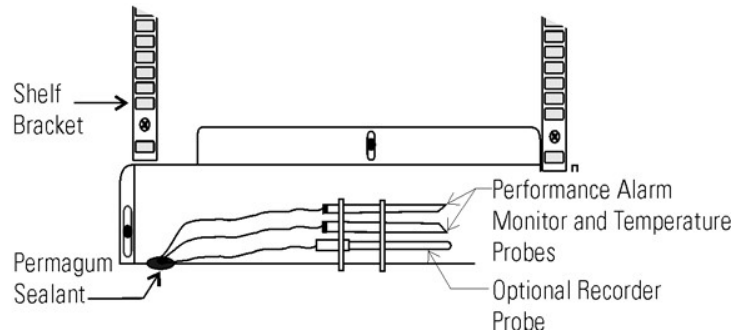


Figure 1-3. Chamber Probe

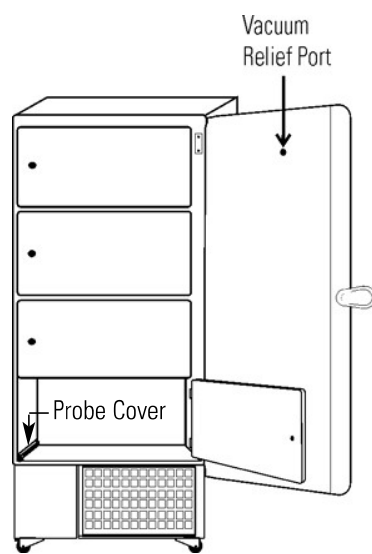


Figure 1-4. Vacuum Relief and Probe Cover Location

Figures 1-3 and 1-4

- Vacuum relief port - pressure equalization port.
- Probe cover - houses control, optional recorder, datalogger or 1535 alarm probes.

Figure 1-5

- Battery mounting bracket(s)
- Battery power switch (freezer and BUS)
- Freezer battery
- Optional BUS battery
- Freezer filter location

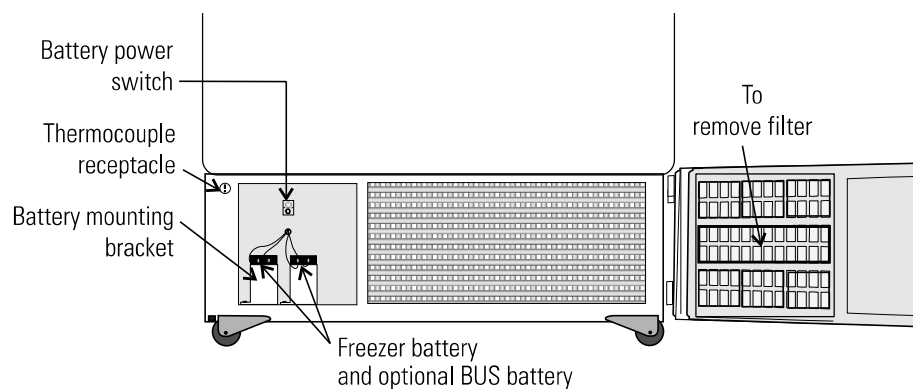


Figure 1-5. Battery(s) Location and Switch

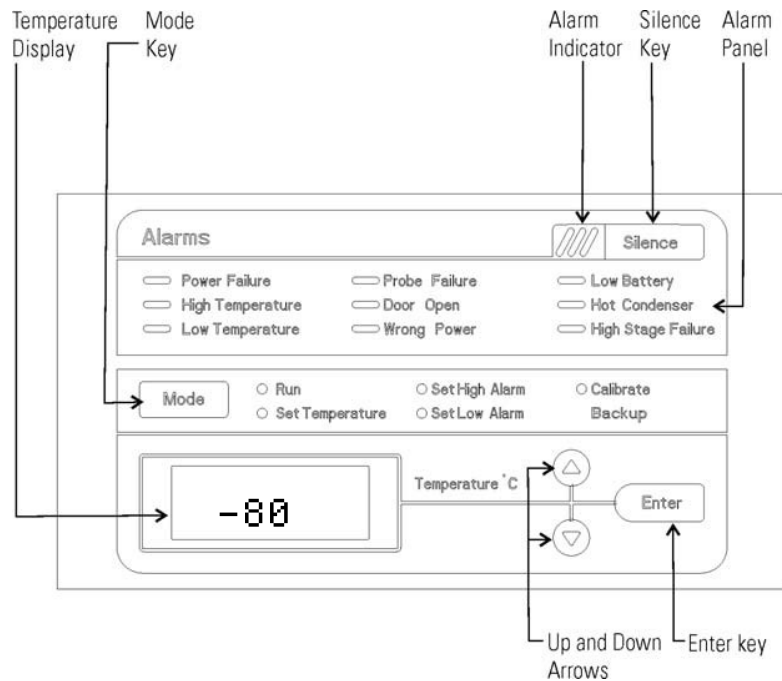


Figure 1-6. Control Panel

Control Panel Keys, Displays/Indicators

Refer to Figure 1-6 for the items indicated.

- **Temperature Display** - Displays temperature in degrees Celsius.
- **Mode Select Switch** - Used to select Run, Set Temperature, Set High Alarm, Set Low Alarm, Calibrate, Backup.
- **Alarm Indicator** - Light pulses on/off during an alarm condition of the cabinet.
- **Silence** - Silences the audible alarm.
- **Alarm Panel** - indicates the current alarm condition.
- **Up and Down Arrows** - Increases or decreases values, toggles between choices.
- **Enter** - Stores the value into memory.

Keypad Operation

The Model 700 Series freezer has five basic modes which allow freezer setup and operation. Press the Mode key to scroll through the mode selections.

Up Arrow: Increases or toggles the parameter value.

Enter: Must press Enter key to save to memory all changed values.

Down Arrow: Decreases or toggles the parameter value.

Silence Key: Press to silence the audible alarm. See Section 3 for alarm ringback times.

Freezer Start-Up

With the freezer properly installed and connected to power, system set points can be entered. The following set points can be entered in Settings mode: control temperature, high temperature alarm set point, low temperature alarm set point, and (optional) BUS set point. Default settings are shown in the table below.

Control Set Point	-80°C
High Temperature Alarm	-70°C
Low temperature alarm	-90°C
Optional BUS Set Point	-60°C

Caution: If the set point is changed and the low temperature and high temperature alarms are set 10° from the set point, the alarm set points will adjust automatically to maintain a distance of at least 10° from set point.

Set the Operating Temperature

All Model 700 Series freezers have an operating temperature range of -50°C to -86°C, depending on ambient temperature. The freezer is shipped from the factory with a temperature set point of -80°C. To change the operating temperature set point:

1. Press the Mode key until the Set Temperature indicator lights.
2. Press the up/down arrow key until the desired temperature set point is displayed.
3. Press Enter to save the set point.
4. Press the Mode key until the Run indicator lights for Run mode. If no keys are pressed, the freezer will automatically return to RUN mode after 5 minutes.

Set the High Temperature Alarm

The high temperature alarm will activate an audible/visual warning when the freezer chamber temperature has reached or exceeded the high temperature alarm set point. To set the high temperature alarm set point:

1. Press the Mode key until the Set High Alarm indicator lights.
2. Press the up or down arrow key until the desired high temperature alarm set point is displayed.
3. Press Enter to save the setting. Press the Mode key until the Run indicator lights for Run mode

Set the Low Temperature Alarm

The low temperature alarm will activate an audible/visual warning when the freezer chamber temperature has reached or decreased below the low temperature alarm set point. To set the low temperature alarm set point:

1. Press the Mode key until the Set Low Alarm indicator lights.
2. Press the up or down arrow key until the desired low temperature alarm set point is displayed.
3. Press Enter to save the setting.
4. Press the Mode key until the Run indicator lights for Run mode

If no control keys are pressed, the freezer will automatically return to RUN mode after 5 minutes.

Note The low alarm set point must be set at least 5°C from the control set point. ▲

Run Mode

Run mode is the default mode for the freezer. This mode will display the cabinet temperature on the temperature display under normal operating conditions. In addition, Run mode allows display of the high stage heat exchange temperature.

This information is scrolled by pressing the up or down arrow keys. The display will return to the operating temperature in 10 seconds if no keys are pressed.

Section 2 Calibrate

Once the freezer has stabilized, the control probe may need to be calibrated. Calibration frequency is dependent on use, ambient conditions and accuracy required. A good laboratory practice would require at least an annual calibration check. On new installations, all parameters should be checked after the stabilization period.

Caution Before making any calibration or adjustments to the unit, it is imperative that all reference instruments be properly calibrated. ▲

Calibrate the Control Probe

Plug a type T thermocouple reader into the receptacle located inside the lower door (Figure 1-5). Compare the control temperature set point to the temperature of the measuring device.

1. Press the Mode key until the Calibrate indicator lights.
2. Press up/down arrow to match the display to calibrated instrument.
3. Press Enter to store calibration.
4. Press the Mode key to return to Run mode.

Temperature Stabilization Periods

Startup - Allow 12 hours for the temperature in the cabinet to stabilize before proceeding.

Already Operating - Allow at least 2 hours after the display reaches set point for temperature to stabilize before proceeding.

Note During calibration, the temperature display is not available. ▲

If no keys are pressed for approximately five minutes while in Calibrate mode, the system will reset to Run mode.

Section 3 Alarms

The Model 700 Series freezer alarms are displayed on the freezer control panel. When an alarm is active, the indicator next to the alarm description lights and an audible alarm sounds. Press the Silence key to disable the audible alarm for the ringback period. The visual alarm will continue until the freezer returns to a normal condition. The alarms are momentary alarms only. When an alarm condition occurs and then returns to normal, the freezer automatically clears the alarm condition.

Description	Delay	Ringback	Relay
Power Failure	1 min.	15 min.	Yes
High Temperature Alarm	1 min.	15 min.	Yes
Low Temperature Alarm	1 min.	15 min.	Yes
Probe Failure	1 min.	15 min.	No
Door Open	1 min.	15 min.	No
Wrong Power	0 min.	none	Yes
Low Battery*	1 min.	12 hours	No
Hot Condenser	1 min.	none	No
High Stage Failure	0 min.	15 min.	Yes

All alarm delays and ringback times are ± 30 seconds.

** The automatic battery test runs 12 hours after initial start-up, then every 12 hours thereafter.*

Wrong Power

The Wrong Power alarm occurs when incorrect voltage is applied to the freezer. If a 230V freezer is connected to a 120V power source or a 120V freezer is connected to a 230V power source, the electronics will detect that the "Wrong Power" has been applied. Under this condition, the fans and compressors will not turn on and an audible and visual alarm will occur. This alarm may also occur if the battery switch is turned to Standby mode (⏻) prior to applying power to the freezer. The audible and visual alarms will remain until the freezer is connected to the correct power source. The audible alarm cannot be silenced under this condition.

High Stage System Failure

The "high stage system failure" condition is created when the high stage compressor and fans run for 30 minutes and are not capable of cooling the interstage heat exchanger to the proper temperature. Under this condition, the high stage compressor and fans turn off after 30 minutes and an audible and visual alarm occur. The audible alarm can be silenced and will ringback every 15 minutes.

Probe Failure Alarm

The microprocessor in Model 700 Series freezers continually scans all probes including the control probe, heat exchanger probe and condenser probe to ensure that they are operating properly. Should an error be detected, the "Probe Failure" alarm will occur as shown in the table above. If an error is detected with the control probe, the high and low stage compressors will run continuously. As a result, the cabinet temperature will decrease until it reaches the lowest temperature that the refrigeration system can maintain. If an error is detected with the heat exchanger probe, the freezer will cycle properly at its temperature set point using a 5 minute step start between the high and low stage compressors. If an error is detected with the condenser probe, there is no impact on the performance of the freezer; however, the hot condenser alarm may also occur. Contact the Technical Services department (1-888-213-1790) or your local distributor.

Voltage Compensation Alarm

In addition to the alarms listed above, another condition detected by the controls will result in an audible and visual alarm. If the freezer is compensating for high or low line voltage, the system will measure the compensated AC voltage. If the voltage is incorrect, the unit will stop attempting to compensate, and the compressor will run on direct line voltage. Under this condition, there will be a visual and audible alarm that can be silenced with a ringback period of fifteen minutes. This alarm condition is unlikely to occur, and as such, there is no LED alarm indicator for this condition.

Precautions

1. Use this appliance only for its intended purpose as described in this use and care guide.
2. This freezer must be properly installed in accordance with the installation instructions before it is used. See grounding instructions in the installation section.
3. Never unplug your freezer by pulling on the power cord. Always grasp the plug firmly and pull straight out from the outlet.
4. Repair or replace immediately, all electric service cords that have become frayed or otherwise damaged. Do not use a cord that shows cracks or abrasion damage along its length, the plug, or the connector end.
5. Unplug your freezer before cleaning or before making any repairs. Note: If for any reason this product requires service, we strongly recommend that a certified technician performs the service.
6. Do not use any electrical device or any sharp instrument in defrosting your freezer.7. If your old freezer is not being used, we recommend that you remove the doors. This will reduce the possibility of danger to children.
8. After your freezer is in operation, do not touch the cold surfaces in the freezer compartment, particularly when hands are damp or wet. Skin may adhere to these extremely cold surfaces.
9. Do not leave food in this scientific deep freezer.
10. Do not use metal or any sharp object for removing the freeze ice as it can damage to surface of the freezer.