

Forma® POWERFREEZE™

Ultra Low Temperature Freezer

Operating and Maintenance Manual

Manual Number 7000840 Rev. 1



Analyze • Detect • Measure • Control™

Thermo
ELECTRON CORPORATION

Forma® PowerFREEZE™

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1	23014	11/29/05	Changed circuit breaker (revised parts list) for 120V units	aks
--	--	6/14/05	Updated contact information	aks
0	--	9/29/04	Modified 89002416-d for Forma brand	aks
Revision	ECN/ECR	Date	Description	By

Packing List

- (1) POWERFREEZE freezer
- (1) Operating and maintenance manual 7000840
- (1) Ice scraper 86000542
- (1) Fuse 26387029
- (1) 9 point connector adapter 86001821
- (2) Door keys
- (2) Anti-skid pads for leveling feet 85241913
- (1) 17/19 spanner (wrench) for leveling feet 26178039
- (1) Door opening limiter 51245425
- (1) 8/10 spanner (wrench) for door opening limiter 26178026
- (1) Back spacers 85230074



Caution Read this instruction manual. Failure to read, understand and follow the instructions in this manual may result in damage to the unit, injury to operating personnel, and poor equipment performance. ▲

Caution All internal adjustments and maintenance must be performed by qualified service personnel. ▲

Important Refer to the serial tag on the back of this manual. ▲

Note The material in this manual is for information purposes only. The contents and the product it describes are subject to change without notice. Thermo Electron Corporation makes no representations or warranties with respect to this manual. In no event shall Thermo be held liable for any damages, direct or incidental, arising out of or related to the use of this manual. ▲



Important operating and/or maintenance instructions. Read the accompanying text carefully. ▲



Potential electrical hazards. Only qualified persons should perform procedures associated with this symbol. ▲



Equipment being maintained or serviced must be turned off and locked off to prevent possible injury. ▲



Hot surface(s) present which may cause burns to unprotected skin, or to materials which may be damaged by elevated temperatures. ▲

- ✓ Always use proper protective equipment (clothing, gloves, goggles, etc.) ▲
- ✓ Always dissipate extreme cold or heat and wear protective clothing. ▲
- ✓ Always follow good hygiene practices. ▲
- ✓ Each individual is responsible for his or her own safety. ▲

Warranty

The Warranty Period starts two weeks from the date your equipment is shipped from our facility. This allows for shipping time so the warranty will go into effect at approximately the same time your equipment is delivered. The warranty protection extends to any subsequent owner during the warranty period.

During the first two years of the warranty period, component parts proven to be non-conforming in materials or workmanship will be repaired or replaced at Thermo's expense, labor included. The freezer has an additional two year warranty on the compressors, parts only, F.O.B. factory. Installation and calibration is not covered by this warranty agreement. The Technical Services Department must be contacted for warranty determination and direction prior to any work being performed. Expendable items, i.e., glass, filters, pilot lights, light bulbs and door gaskets are excluded from this warranty.

Replacement or repair of component parts or equipment under this warranty shall not extend the warranty to either the equipment or to the component part beyond the original two year warranty period. The Technical Services Department must give prior approval for the return of any components or equipment.

THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER WRITTEN, ORAL, OR IMPLIED. NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE SHALL APPLY. Thermo shall not be liable for any indirect or consequential damages including, without limitation, damages relating to lost profits or loss of products.

Your local Thermo Sales Office is ready to help with comprehensive site preparation information before your equipment arrives. Printed instruction manuals carefully detail equipment installation, operation, and preventive maintenance.

If equipment service is required, please call your Technical Services Department at 1.888.213.1790 (USA and Canada) or 1.740.373.4189. We're ready to answer your questions on equipment warranty, operation, maintenance, service, and special applications. Outside the USA contact your local distributor for warranty information.

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Section 1 Use and Function

POWERFREEZE™ ULT Freezers are designed to freeze samples from ambient temperature and to maintain them at a temperature as low as -86°C. At -70°C, the metabolism of most biological samples is virtually stopped.

These samples can be stored several months or years without altering their properties.

General Presentation

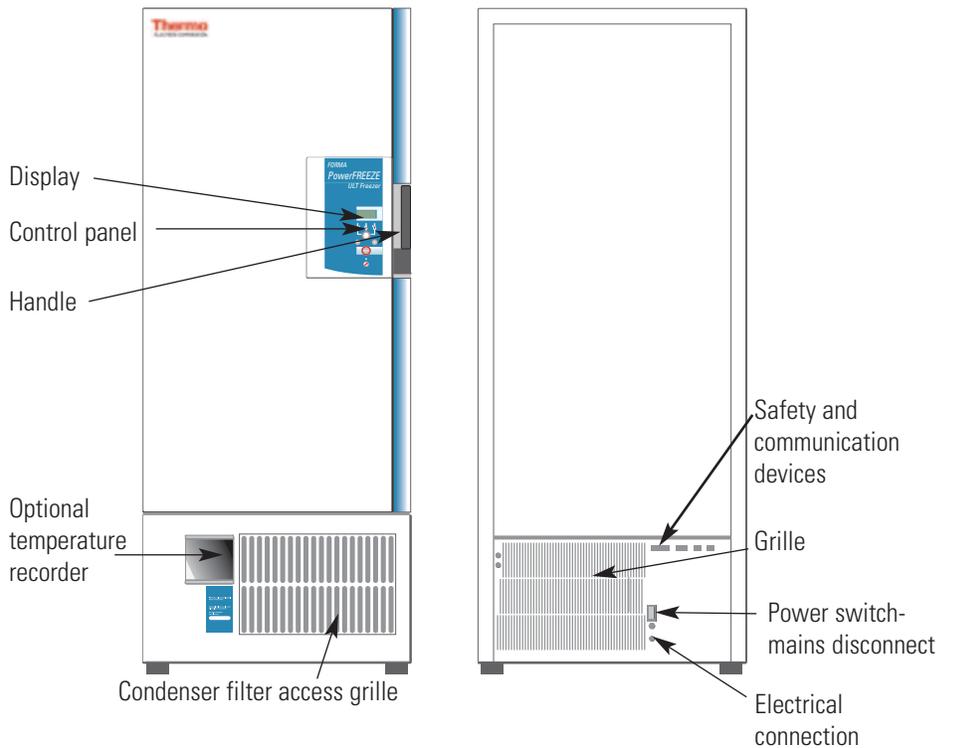


Figure 1-1. Location of Main Components

General Description

The Forma POWERFREEZE freezers are designed to optimize thermal transfer from the sample to guarantee their optimal storage conditions. The POWERFREEZE design is a unique combination of a freezing system and storage system which places a cooling coil in the top of each compartment.

Freezing System

The freezing system contains:

- Material: anodized aluminum (upper plate)
- Concept: plain upper plate, perforated bottom plate
- Cooling coils inserted in the sandwich shelf

Storing System

The storing system contains:

- 4 independent compartments closed by 4 insulated inner doors
- Material: painted steel; insulation: polyurethane, thickness 0.39 inches (10 mm)
- Magnetic closing system and “easy opening” knob

Insulation

The insulation construction consists of the following material:

- Concept: 5 blocks of polyurethane 0%CFC; thickness 4.7 inches (120 mm)

Inner Chamber

The inner chamber has the following characteristics:

- Stainless steel
- Access for CO₂ back-up injection
- Access for probe of 7-day recorder or extra monitoring sensor.

Outer Door

- Single outer door.
- Insulation thickness: 3.5 inches (90 mm)
- Insulation material: Polyurethane
- Door opening limiter located on the top left of the door. The freezer is delivered without door opening limiter installed. After unpacking unit, install door opening limiter to avoid damaging door hinges.

Chamber Gasket

- Two lip, easily changed chamber gasket
- Material: high flexibility silicone

Outer Body

- Material: powder coated painted steel

Handle

- Low-force single-handed operation handle
- Lock and keys (2)

Casters

- 4 rotating casters
- 2 leveling feet with anti-skid pads to prevent freezer from moving

Options and Accessories

Options and accessories for the POWERFREEZE ULT freezer include storage systems, CO₂ backup and seven day chart recorder.

Storage Systems

The following table gives the dimensions, the catalog numbers and the capacity of the freezer for each type of rack.

Table 1-1. Rack Specifications

Part No.	Description	Dimensions (inches)			
		W x H x F-B	840/841	842/843	844/845
920015	Standard rack for 2" boxes, no boxes	5.3 x 10.875 x 16.5	16		
820015	Standard rack for 2" boxes, with boxes	5.3 x 10.875 x 16.5	16		
920018	Standard rack for 2" boxes, no boxes	5.3 x 10.875 x 22		16	
820018	Standard rack for 2" boxes, with boxes	5.3 x 10.875 x 22		16	
920198	Standard rack for 2" boxes, no boxes	5.3 x 10.875 x 28			16
820198	Standard rack for 2" boxes, with boxes	5.3 x 10.875 x 28			16
920009	Standard rack for 3" boxes, no boxes	5.3 x 10.875 x 16.5	16		
820009	Standard rack for 3" boxes, with boxes	5.3 x 10.875 x 16.5	16		
920017	Standard rack for 3" boxes, no boxes	5.3 x 10.875 x 22		16	
820017	Standard rack for 3" boxes, with boxes	5.3 x 10.875 x 22		16	
920197	Standard rack for 3" boxes, no boxes	5.3 x 10.875 x 28			16
820197	Standard rack for 3" boxes, with boxes	5.3 x 10.875 x 28			16
920094	Drawer-style rack for 2" boxes, no boxes	5.5 x 11.9 x 16.6	12		
820094	Drawer-style rack for 2" boxes, with boxes	5.5 x 11.9 x 16.6	12		
920096	Drawer-style rack for 2" boxes, no boxes	5.5 x 11.9 x 22		12	
820096	Drawer-style rack for 2" boxes, with boxes	5.5 x 11.9 x 22		12	
920090	Drawer-style rack for 2" boxes, no boxes	5.5 x 11.8 x 26.3			16
820090	Drawer-style rack for 2" boxes, with boxes	5.5 x 11.8 x 26.3			16
920095	Drawer-style rack for 3" boxes, no boxes	5.5 x 11.9 x 16.6	12		
820095	Drawer-style rack for 3" boxes, with boxes	5.5 x 11.9 x 16.6	12		
920097	Drawer-style rack for 3" boxes, no boxes	5.5 x 11.9 x 22		12	
820097	Drawer-style rack for 3" boxes, with boxes	5.5 x 11.9 x 22		12	
920091	Drawer-style rack for 3" boxes, no boxes	5.5 x 11.8 x 25.8			16
820091	Drawer-style rack for 3" boxes, with boxes	5.5 x 11.8 x 25.8			16
830012	Multi-drawer rack	11.2 x 11.5 x 11	1 per shelf	1 per shelf	1 per shelf
830030	Storage container	7 x 5.3 x 18.1		24	24
830032	Storage container	7 x 5.3 x 22.6			24
820030	30 position deepwell microplate rack	5.3 x 9.5 x 22		16	16
820036	36 position deepwell microplate rack	5.3 x 12 x 22		16	16
820066	66 position microplate rack	5.3 x 9.6 x 22		16	16
820002	2" cardboard box				
820003	3" cardboard box				
820064	64 cell divider				
820081	81 cell divider				
820100	100 cell divider				

CO₂ Backup System

CO₂ back-up (Part Number 195814 Qualified Installation 115V, 195815 Qualified Installation 208V)

The CO₂ back-up system is designed to maintain the sample temperature below -60°C for several hours by injecting CO₂ into the freezer chamber. The CO₂ back-up must be installed by qualified personnel.

Recorder

7-day temperature recorder (Stock Number 201276 Qualified Installation, 201277 Factory Installed)

Available for the POWERFREEZE is a 7-day temperature recorder with independent probe. The temperature recorder must be installed by qualified personnel.

Replacement recorder chart paper can be purchased from Thermo Electron. Order stock number 17020 - 6 inch, 7 day, -100°C to +38°C circular chart paper.

Replacement pens are also available. Order stock number 245231 - Short length red fiber tip pen and 245232 - Medium length blue fiber tip pen.

Section 2 Installation

Due to the weight of the freezer, all lifting and transporting must be done by trained personnel using proper handling equipment that complies with current regulations.

The freezer must be supported from underneath. If it has to be transported without its pallet, for example on a staircase, professional handling is required.

Unpacking

1. Remove the straps and the cling film. Remove the plank located on the top of the freezer. Unscrew the nuts and remove the side bar by tilting the machine slightly.
2. Place the plank sideways in contact with the pallet and in line with the wheels of the machine. Remove the freezer from the pallet by rolling it down the plank.

Note Two people are needed for this operation. ▲

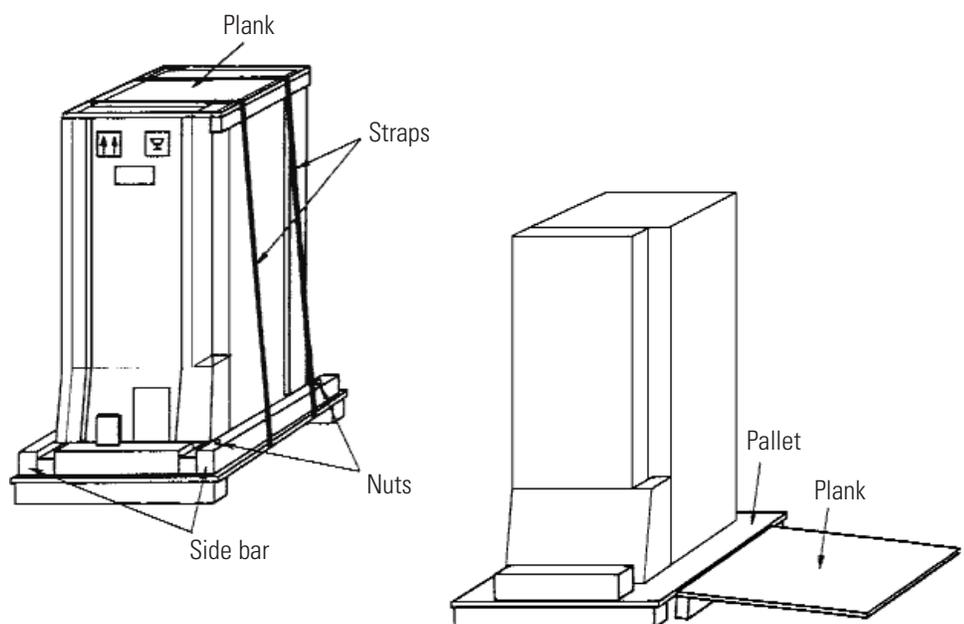


Figure 2-1. Unpacking

Back Spacer Installation

Install the back spacers as shown below to allow proper air circulation at the back of the freezer when positioned against a wall.

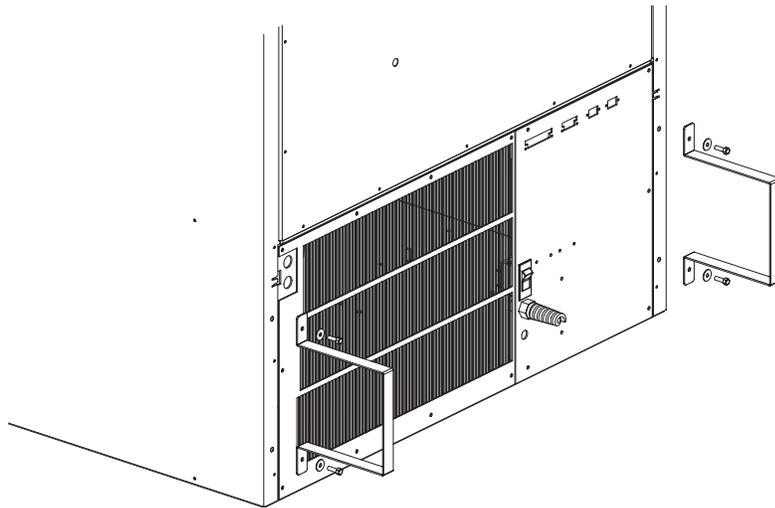


Figure 2-2. Back Spacers Installed

Installation

1. Never transport the freezer on its side.
2. Check that no accessories or printed material are left in the packaging.
3. Install the freezer in a suitable environment :
 - a. To ensure proper ventilation of the refrigeration system and guarantee correct functioning of the freezer, it is extremely important not to place any object within 8 inches of the front, back or side ventilation grilles (see Back Spacer Installation).
 - b. The room should be well ventilated and include mechanical air exhaust if the optional CO₂ back-up is in use. The environment must be non-corrosive and the floor must be level.
4. Check that the mains voltage corresponds to the freezer's voltage.
5. After locating the instrument, install non-skid pads.

Door Opening Limiter

To install the door opening limiter:

1. Align the holes of two plastic washers and two spacers with those on the body of the freezer and the door.
2. Position the limiter as shown in Figure 2-3 and secure in place with the two bolts and washers, using the box spanner (wrench).
3. Check that the limiter slides easily.

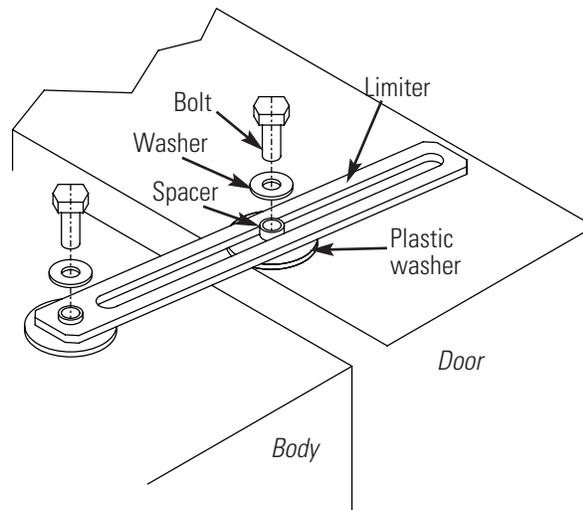


Figure 2-3. Door Opening Limiter

Positioning the Leveling Feet

There are two leveling feet located at the front of the freezer.

1. Unscrew the leveling feet.
2. Place an anti-skid pad beneath each one (2 anti-skid pads are provided).
3. Using the 19 mm spanner provided with the freezer, continue to unscrew the leveling feet until the front of the freezer is lifted about one millimeter.
4. Check the stability of the freezer by opening the door, then watching it close. Adjust the height of the feet accordingly.

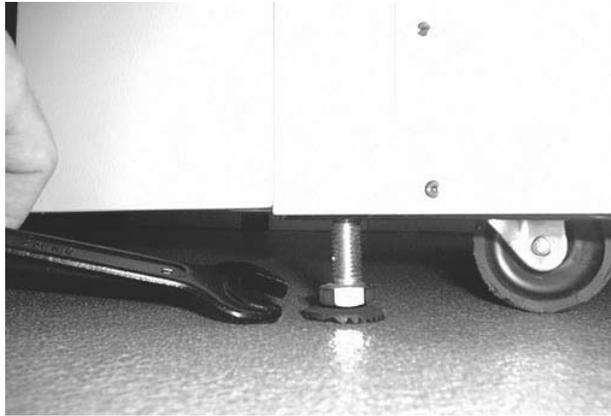


Figure 2-4. Leveling Feet

Optional Recorder Connection

If the freezer has an optional 7-day recorder, a power cable must be connected before use. To connect power to the recorder:

1. Disconnect power to the freezer.
2. Open the condenser filter access grille located at the lower front of the freezer (see Figure 1-1).
3. Locate the cable extending from the recorder and connect to the cable secured to the bottom of the compressor compartment (mate-n-lock connection).
4. Replace the front grille.

Installing Chart Paper

1. Open the glass door of the recorder and press button #3 until the pen begins to move outward.
2. Unscrew the knob at the center of the chart and remove the paper.
3. Install the new chart paper, position the paper to the correct time line and replace the knob.
4. Remove the cap from the felt pen and press button #3.

Changing the Recorder Range

The chart recorder contains eight temperature ranges and is factory-programmed for the freezer.

1. Press and hold button #3 for one second, then let the pen move off the chart paper.
2. Press and hold for five seconds either button #1 or button #2.
3. Release the button and the green LED will begin to flash. Count the number of flashes to determine the present program setting.
4. To change the program setting, press the left or right arrows to increase or decrease the count.
5. When the desired program number is flashing, press button #3 to bring the pen arm back onto the chart. Recording will begin in the new program.

Table 2-1. Chart Recorder Program Ranges

Program	From	To
1	-40	30°C
2	0	60°C
3	-100	38°C
4	-5	50°C
5	0	100°C
6	-100	200°C
7	-115	50°C
8	-10	70°C

Calibrate Chart Recorder

The recorder must be in service for 24 hours before performing the following calibration procedure.

1. Place an accurate thermometer in the chamber next to the recorder probe.
2. Temperature probes for the recorder are located in the left front corner of the freezer chamber (Figure 2-6).

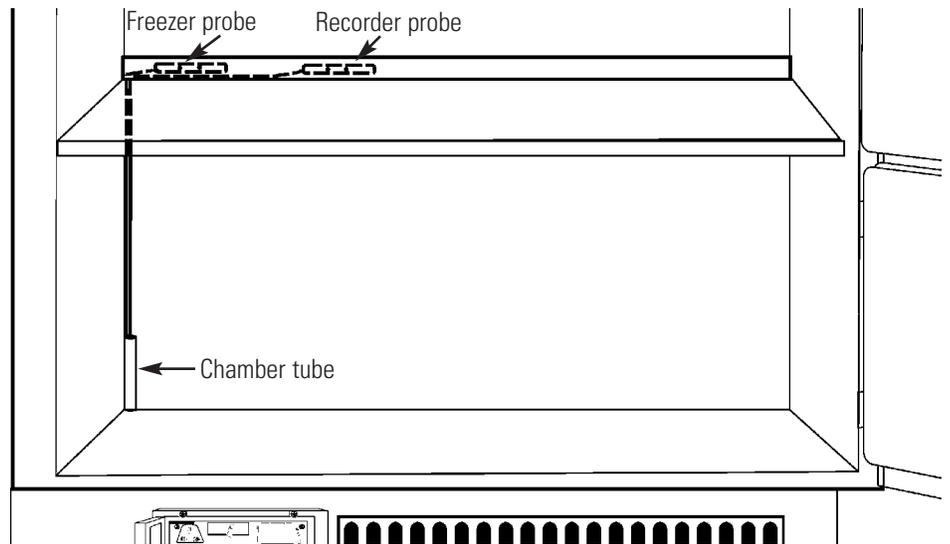


Figure 2-6. Recorder Probe Placement

3. After about three minutes, compare the thermometer reading with the chart recorder reading.
4. If an adjustment is necessary, press the #1 button to move the pen to the left or the #2 to move the pen to the right. The button must be held about five seconds before the pen begins to move. Release the button when the pen position matches the thermometer.

Note The felt-tip pen on the recorder requires periodic replacement. Usually the ink will appear to fade before replacement becomes necessary. Additional pen tips may be purchased. ▲

Power Connection

See the serial tag on the side of the unit for electrical specifications. The freezer should be operated on a dedicated grounded service. Check the voltage rating on the serial tag of the unit and compare it with the outlet voltage.

Warning For personal safety, this apparatus must be properly grounded. ▲

The power cord provided on this unit is equipped with a three-prong plug which mates with a standard three prong grounding wall receptacle to minimize the possibility of electric shock hazard. The wall receptacle and circuit should be checked by a qualified electrician to ensure that the receptacle can provide adequate current and is properly grounded.

Where a standard two-prong wall receptacle is encountered, it is the personal responsibility and obligation of the user to have it replaced with a properly grounded three-prong wall receptacle. Do not under any circumstances cut or remove the third (ground) prong from the power cord. Do not use a two-prong adapter plug.

Note Colors of wires in mains cable: black 1 = Line , white 2 = Neutral, Earth/Ground = yellow; green. ▲

Start-Up

Before turning on the freezer, install the fuse located at the back of the freezer.

Turn on the freezer by activating the power switch located in the back of the unit. On start-up of the freezer, the display shows the chamber temperature and the visual and audible alarms are activated. During temperature stabilization, the audible alarm may be temporarily silenced by pressing the mute key.

During the cooling procedure, the freezer displays the chamber temperature.

It takes about 6 hours to cool down the freezer from +20°C to -80°C.

Environmental Conditions

The freezer is designed to operate safely under the following conditions :

- Indoor use
- Temperature from 5°C to 40°C
- Maximum relative humidity of 80% for temperature up to 31°C, decreasing linearly to 50% relative humidity at 40°C
- Maximum altitude of 2000 m
- Voltage fluctuations of $\pm 10\%$
- Overvoltage category II
- Pollution degree 2

Maximum performance is assured across the ambient temperature range of 18°C to 25°C and maximum relative humidity of 70%.

Section 3 Specifications

Freezing system	POWERFREEZE™
Temperature control	Digital electronics
Programming range	-65°C to -86°C
Minimal temperature	-86°C
Temperature control	±3.0°C
Temperature uniformity	±5°C in 250 ml bottles with fluid

Model 840/842/844

Electrical	208 V 60 Hz, Range: 208 - 240 V, 4.3 Amp, 850 W
Breaker Requirements	15 Amp, Dedicated Circuit, Time Delay Breaker
Plug	NEMA 6-15P Plug

Model 841/843/845

Electrical	115 V 60 Hz, Range: 108 - 130 V, 8.5 Amp, 850 W
Breaker Requirements	20 Amp, Dedicated Circuit, Time Delay Breaker
Plug	NEMA 5-20P Plug

Power Card Fuse	F1	100 mAmp	5-20 mm
Battery Card Fuse	F1	100 mAmp	5-20 mm
Rear Panel Fuse	F2	500 mAmp	5-20 mm

	Model 840/841	842/843	844/845
External Dimensions	H* x W x D (inches)		
	78.4 x 31.4 x 31.1	78.4 x 31.4 x 36.6	78.4 x 33.3 x 42.0
	(millimeters)		
	1990 x 798 x 790	1990 x 798 x 929	1990 x 845 x 1068
	Weight net/packed (lbs)		
	529/573	573/617	639/694
	(kilograms)		
	240/260	260/280	290/315
	*Without door opening limiter		

	Model 840/841	842/843	844/845
Inner Dimensions/ Capacities	Inner Compartment		
	H x W x D (inches)		
	12.1 x 21.7 x 16.9	12.1 x 21.7 x 22.4	12.1 x 23.5 x 27.9
	(millimeters)		
	308 x 550 x 430	308 x 550 x 568	308 x 597 x 707

	Model 840/841	842/843	844/845
Chamber Dimensions	H x W x D (inches)		
	51.2 x 21.7 x 18.1	51.2 x 21.7 x 23.5	51.2 x 23.5 x 29.0
	(millimeters)		
	1300 x 552 x 459	1300 x 552 x 598	1300 x 597 x 737
	Nominal capacity (cubic feet)		
	11.6	15.2	20.2
	Nominal capacity (liters)		
	329	429	572

	Model 840/841	842/843	844/845
Packaging Dimensions	H x W x D (inches)		
	87.4 x 37.0 x 37.0	87.4 x 37.0 x 42.5	87.4 x 39.0 x 48.0
	(millimeters)		
	2220 x 940 x 940	2220 x 940 x 1080	2220 x 990 x 1220

Section 4 Operating Principles

The cooling system consists of 2 refrigeration systems put in cascade. The second stage fluid is evaporated in the chamber, using the heat from the chamber. The heat is then transferred to the first refrigeration system at the heat exchanger. The heat transferred to the first system is then transferred to the outside environment at the condenser.

The cooling fluids are R 507 for the 1st stage and R 508 + R 290 for the 2nd stage.

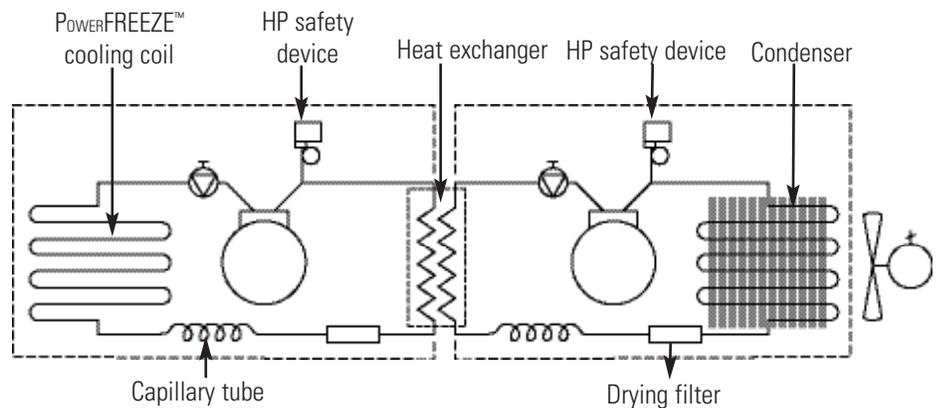


Figure 4-1. Refrigeration Diagram

Section 5 Instructions for Use

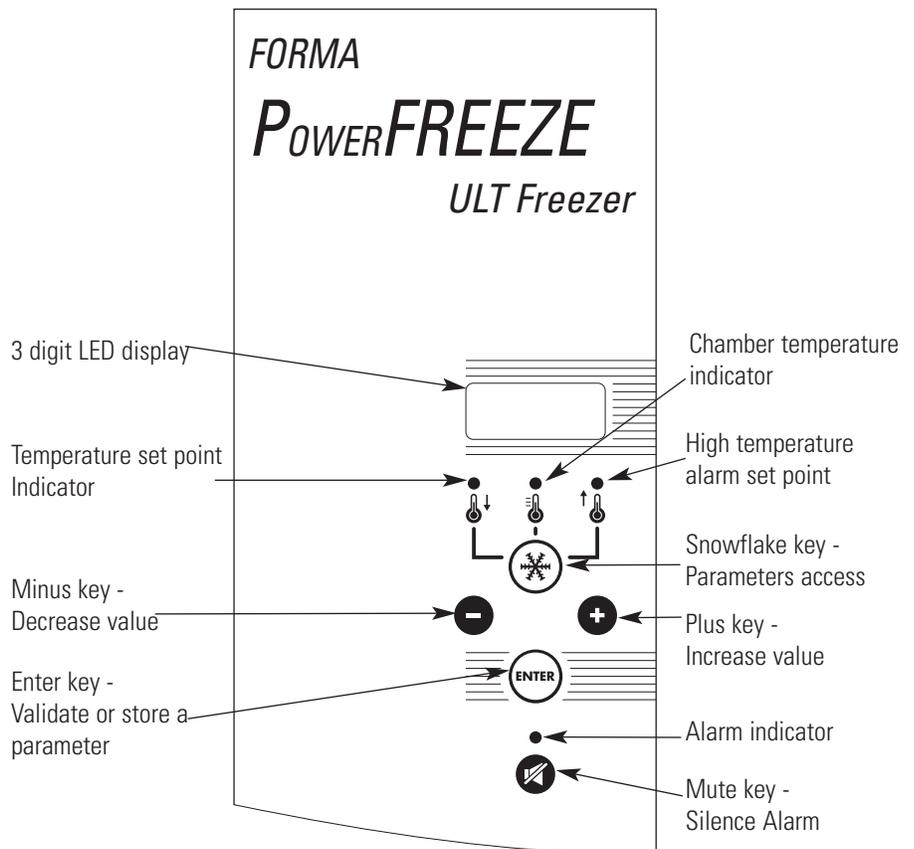


Figure 5-1. Control Panel

The three digit LED display provides the following information under normal operating conditions:

- Measured chamber temperature (1°C increments)
- Set point temperature (1°C increments)
- High temperature alarm set point (1°C increments) adjustable between 5°C and 25°C above set point.

By accessing the service menu, the display will provide the following:

- Heat exchanger temperature
- Alarm code
- EPROM version
- Number of operating hours : (hundreds)
- Number of operating hours : (thousands)
- Door alarm detection menu
- Temperature test menu
- Rinse selection (Oil warming cycle)

The snowflake key is used to change the display to show temperature set point, actual chamber temperature, and high temperature alarm set point. An indicator for each temperature is located directly below the display.

The plus and minus keys are used to increase or decrease the value of the temperature set point or the high temperature alarm set point.

The enter key is used to validate or store a temperature setting.

The mute key is used to silence the audible alarm. A visual alarm indicator is located directly above the mute key.

Temperature Setpoint

The freezer is factory preset at -80°C.

To modify the temperature set point :

1. Press the ⊗ key until the left orange LED lights up. The display shows the current temperature set point.
2. Adjust the temperature set point using ⊕ or ⊖ .
3. Validate the temperature set point by pressing Enter.

High Temperature Setpoint

The high temperature alarm is factory set at 10°C above the temperature setpoint. The high temperature alarm can be adjusted from 5°C to 25°C above setpoint.

To modify the high temperature alarm set point:

1. Press the \otimes key until the right orange LED lights up. The display shows the current temperature alarm threshold.
2. Adjust the temperature alarm threshold using \oplus or \ominus .
3. Validate the high temperature alarm set point by pressing Enter.

Fault Detection

POWERFREEZE freezers give an alarm signal in the following situations:

Alarm condition	Alarm code
Open door > 45 seconds	1
Actual temperature exceeds alarm value	2
Temperature sensor error	3
Exchanger temperature sensor error	4
Probe on condenser switched on	5
Loss of electrical power	6

Alarm conditions and corresponding codes follow. Each alarm condition has its combination of indicators :

- Alarm 1 (door open)
- Alarm LED is flashing, audible alarm is activated
- Dry contact and remote alarm socket can be activated or non-activated depending on the choice of the user (see Service Menu).

Alarm 2 (high temp alarm)

- Alarm LED is flashing, audible alarm is activated
- Dry contact and remote socket are closed

Alarm 3 (temp sensor)

- Alarm LED is flashing, audible alarm is activated
- Dry contact and 12V alarm output socket are closed
- Display is showing “- - -” instead of real temperature value

Alarm 4 (exchanger sensor)

- No audible or visible indicator
- The second group starts after a factory preset delay

Alarm 5 (condenser sensor)

- The alarm LED is continuously ON, audible alarm is activated
- Dry contact and 12V alarm output are closed

Alarm 6 (no power)

- Display is blinking (to extend battery life) and the audible alarm starts just after the power outage

During an alarm condition, check the alarm code in the service menu by pressing simultaneously  and .

When the display shows alternatively ECH/temperature of the heat exchanger, press Enter. The display will show the alarm code.

1. If alarm 1 or 2 is displayed, verify the freezer door is closed.
2. If alarm 3 or 4 is displayed, contact your service technician.
3. If alarm 5 is displayed :
 - a. Check to ensure that the filter is not clogged. If the filter is clogged, clean it.
 - b. Check that the condenser fan is not damaged or has an incorrect speed.
 - c. Verify the ambient temperature is not above 32°C.

4. If alarm 6 is displayed, your samples can be maintained below -60°C if your freezer is equipped with a CO_2 back-up.

To mute the audible alarm, press the \blacktriangledown key.

When no alarm condition exists, it is possible to check both visual and audible alarms by pressing the mute key. \blacktriangle

After pressing \blacktriangledown , the alarm will be reactivated if:

- More than one hour has passed since \blacktriangledown was last pressed.
- The alarm condition has disappeared and another alarm condition appears.

Communication Devices

POWERFREEZE freezers are fitted with dry contact and remote alarm connections.

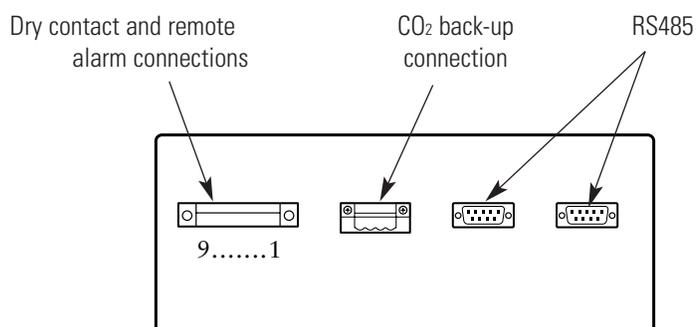


Figure 5-2. Alarm Connection Locations on Freezer Back

The freezer has 3 types of connections (see Figure 5-3) :

1. One dry contact (Pin 7, 8, 9) closed between pin 7 and 8 in case of fault condition or loss of electrical power.
2. A 12 V outlet (Pin 5) closed in case of fault condition. This output can be used to connect a visual or audible signal
3. A dry contact linked with a 12 V outlet for connection to a dialer. This contact is closed between Pin 1 and Pin 2 in case of a fault.

Instruments connected to the 12 V outlets must not exceed 2 A.

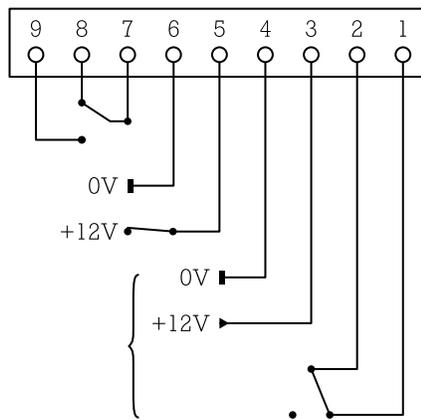


Figure 5-3. Alarm Connection Diagram

The 3 outlets give a signal if any of the following conditions occur:

- Power failure (this alarm is powered by the rechargeable battery)
- Open door after 45 seconds
- High temperature alarm
- Probe short-circuit

The door opening detection can be disconnected from remote alarms (see Service Menu).

Service Menu

To access the service menu, press simultaneously \blacktriangledown + \otimes . The display shows alternatively ECH /-38°C (for example, temperature of the heat exchanger).

To gain access to the RS 485 parameters :

1. Press \otimes : the display shows identification number of the freezer.
2. Press \oplus or \ominus to scroll through available identification numbers (1 to 32).
3. Press Enter to validate new identification number.

Other parameters of the service menu are accessible when the display is showing alternatively ECH/ temperature of the heat exchanger.

1. Press Enter. The display shows the alarm code.
2. Press Enter. The display shows the EPROM version.
3. Press Enter. The display shows the hundreds of operating hours.
4. Press Enter. The display shows the thousands of operating hours.
5. Press Enter. The display shows alternatively DaD (for Door Ajar Detection)/yes.

If the display shows YES, the door ajar detection is connected to the dry contact and the remote alarm socket. If the display shows NO, the door alarm is disconnected from the dry contact and the remote alarm socket. To set YES or NO, press \oplus or \ominus key.

6. Press Enter. The display shows alternatively TsT/current test temperature. At that time, the setpoint will be automatically changed to -95°C. This menu is used during production to test the lowest temperature reached by the freezer during Quality Control Procedures. This setpoint must not be stored. You must press Enter or \otimes .

Caution Don't press \blacktriangledown at this time as the setpoint of -95°C will be automatically stored. ▲

7. Press Enter. The display shows alternatively rin(for rinse)/no. If display shows YES, a rinse procedure is scheduled every 8 hours. The rinse operation performs an oil warming cycle and is required for this freezer.

Section 6 Precautions

Power should be supplied only by an independent circuit and through a circuit breaker to the freezer. Do not use a common power supply with other electrical appliances.

Warning Use gloves to handle frozen samples inside the freezer. Unprotected hands may get serious frost injuries. ▲

Caution All servicing on the cooling system must be carried out by a service engineer qualified to service cascade refrigerant systems. ▲

Cleaning

The POWERFREEZE includes:

- An anodized aluminum plate for the top of the shelf
- A perforated aluminum plate for the bottom of the shelf
- An aluminum cooling coil inserted between

To ensure maximum performance of the freezer, POWERFREEZE has to remain clean. As soon as dirt appears on the aluminum:

1. Wash the aluminum parts with a warm water and soap mixture, using a nylon brush or sponge.
2. Rinse all parts with clean water.
3. Dry with a drying cloth.

Note The use of corrosive chemical substances derived from sodium hydroxide or potassium hydroxide is totally prohibited. The use of electrical devices inside the freezer chamber is totally prohibited. ▲

Discarding

The freezer cooling circuit contains flammable fluids. When discarding, the instrument must be given to a specialized company with qualified personnel.

Section 7 Service and Preventive Maintenance

This section covers service and preventive maintenance procedures.

Cleaning the Condenser Filter

All heat removed from the chamber to maintain samples at -80°C is evacuated through the condenser. To provide maximum heat removal, the condenser has to remain perfectly clean. An air filter is installed to protect the condenser. To maintain efficient ventilation of the condenser, the filter must be kept clean.

The POWERFREEZE has direct access to the condenser filter. To clean the filter:

1. Open the ventilation grille located at the bottom of the unit as shown in Figure 7-1.
2. Pull the filter out (secured by springs).
3. Clean the filter with warm water.
4. Dry the filter properly before putting it back in place. (Meanwhile, place a spare filter in the grille to protect the condenser, part number 86001847).
5. Write the next cleaning date on the label located next to the filter.

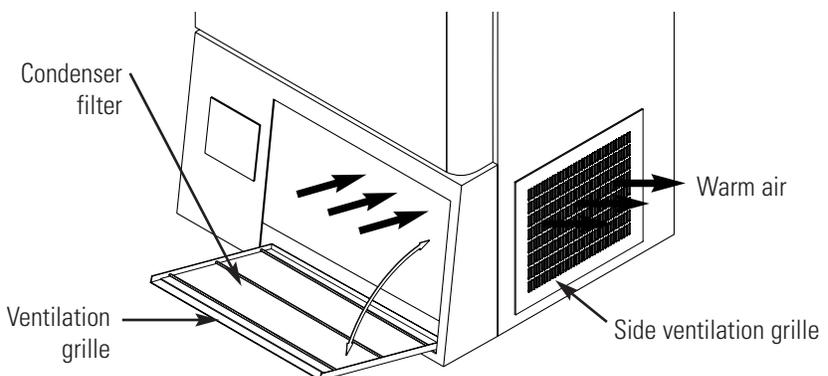


Figure 7-1. Condenser Filter Access

Section 7

Service and Preventive Maintenance

Door Seal Defrosting

To maintain the door seal, remove any frost accumulated on the door gasket. A poor seal can result in an increase of frost inside the chamber and difficulty maintaining the chamber at the desired temperature.

Chamber Cleaning

Clean the walls of the chamber with a surface disinfectant (70% alcohol, 2% glutaraldehyde). Avoid chlorinated solutions which might damage the interior of the freezer.

See Section 6 for information about cleaning aluminum parts.

Fuse Replacement

Fuse replacement should be performed by a qualified service technician who will diagnose the fault before replacing any fuses.

Spare Parts

Stock Number	Description
3183014	CAJ2432ZSE compressor 60 Hz 1st stage
3182985	CAJ2432Z compressor 60 Hz 2nd stage
3182906	Starting box 60 Hz 1st stage/2nd stage
3182874	Fan 60 Hz
3182185	Drying filter
3182296	Chamber temperature sensor (PT100)
3181943	Door switch
3181463	Condenser temperature sensor
3172686	Triac
3182082	Circuit breaker (230V units)
3185206	Circuit breaker 20 Amp (120V units)
3181466	Power pcb 208 V-60 Hz
3181471	CPU pcb
3181462	Battery pcb 231198
3168137	Condenser filter kit
3181931	Armaflex tape
3184900	Power card/Battery fuse
3172452	Rear panel fuse

Thermo Electron Corporation
Laboratory Equipment Division
401 Millcreek Road
Marietta, Ohio 45750
USA
800.848.3080

www.thermo.com
email: services.controlenv@thermo.com