

# Installation and Operation Manual

## Thermo Scientific Harris® DLT, SLT, and ELT Ultra-Low Temperature Freezers



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## 1 Safety Considerations



**WARNING!** Do not modify or change system components. Replacement parts must be O.E.M. exact replacement equipment. Modification or use of the equipment in a manner other than expressly intended may cause death or serious injury. This includes use of user-supplied components and materials not specifically designed for the unit. Reconfiguring the controller may cause death or serious injury.

The manufacturer shall not be liable for any damages, including incidental and/or consequential damages, regardless of the legal theory asserted, including negligence and/or strict liability.

Before using, user shall determine the suitability and integrity of the product for the intended use and that the unit has not been altered in any way. User assumes all risk and liability whatsoever therewith.



**WARNING!** For personal safety and trouble-free operation, this unit must be properly grounded before it is used. Failure to ground the equipment may cause personal injury or damage to the equipment. Always conform to the National Electrical Code and local codes. Do not connect unit to already overloaded power lines.



**WARNING!** Disconnect unit from main power before attempting any maintenance to equipment or controls.



**WARNING!** This freezer operates at extremely low temperatures. Do not work inside the cabinet without proper covering for your hands and arms. Even brief exposure at ultra-low temperatures can damage your skin.

## 2 General Recommendations

The refrigeration system is designed to maintain ultra-low temperatures with safety in a +32°C (90°F) ambient environment, **only** when the freezer is used for storage.



**WARNING!** 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. Attempting to utilize this freezer improperly may jeopardize user product safety or cause undue stress or damage to the refrigeration compressors.

Avoid opening the door for extended time periods since chamber temperature air will escape rapidly. Room air, which is higher in humidity, replacing chamber air may cause frost to develop in the chamber more rapidly.

## 2.1 Initial Operation and Loading

After reading and completing the Safety Considerations, Pre-Installation, Installation, and Operation sections of this manual, turn the Key Switch to the POWER ON position and adjust the temperature setpoint if necessary.

The setpoint should be no warmer than -50°C for two-stage freezers or -10°C for single-stage freezers. **Allow the freezer to operate at the desired temperature for a minimum of 12 hours before loading.**

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 setpoint before loading the next shelf. Repeat this process until the freezer is fully loaded.



**CAUTION!** Failure to follow these procedures or overloading the unit may cause undue stress on the compressors or jeopardize user product safety.

## 3 Pre-Installation

### 3.1 Unpacking

*At delivery, examine the exterior for physical damage while the carrier's representative is present. If exterior damage is present, carefully unpack and inspect the unit and all accessories for damage.*

*If there is no exterior damage, unpack and inspect the equipment within five days of delivery. If you find any damage, keep the packing materials and immediately report the damage to the carrier. Do not return goods without written authorization. When submitting a claim for shipping damage, request that the carrier inspect the shipping container and equipment.*

**Note:** Do not discard the sublimators from chest-style units. The sublimators are necessary to maintain correct temperature, moisture control, and economy of operation. Upright models do not include sublimators because they have built-in ABS plastic inner doors.

## 4 Installation

Do not exceed the electrical and temperature ratings printed on the dataplate located on the lower left side of the unit.



**CAUTION!** Improper operation of the equipment could result in dangerous conditions. To preclude hazard and minimize risk, follow all instructions and operate within the design limits noted on the dataplate.

### 4.1 Location

Install the unit in a level area free from vibration with a minimum of six inches of space on the sides, rear, and top. Refer to Section 4.4 for further instructions on leveling cabinets. Allow enough clearance so that door or lid can swing open at least 90 degrees.

Do not position the equipment in direct sunlight or near heating diffusers, radiators, or other sources of heat. The ambient temperature range at the location must be 59 to 90°F (15 to 32°C).



**CAUTION!** To allow for proper air flow, a minimum of six inches of clearance space is required behind the freezer.

### 4.2 Wiring

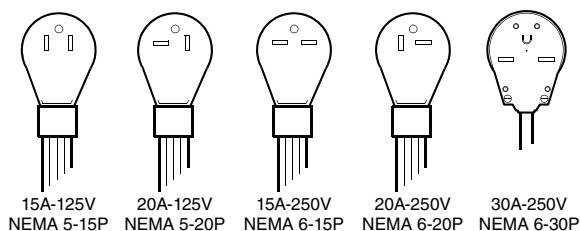


**CAUTION!** Connect the equipment to the correct power source. Incorrect voltage can result in severe damage to the equipment.



**DANGER!** For personal safety and trouble-free operation, this unit must be properly grounded before it is used. Failure to ground the equipment may cause personal injury or damage to the equipment. Always conform to the National Electrical Code and local codes. Do not connect the unit to overloaded power lines.

Your freezer is equipped with one of five NEMA style plugs (refer to Figure 1). These plugs meet UL requirements.



**Figure 1. NEMA Style Plugs**

Always connect the freezer to a dedicated (separate) circuit. Each freezer is equipped with a service cord and plug designed to connect it to a power outlet which delivers the correct voltage. Supply voltage must be within +10%, -5% of the freezer rated voltage.



**CAUTION!** Never cut the grounding prong from the service cord plug. If the prong is removed, the warranty is invalidated.

### 4.3 Voltage Safeguard

Freezers are equipped with a standard built-in Voltage Safeguard circuit to detect and adjust low line voltage.

The Voltage Safeguard helps protect electrical equipment from damage by boosting low voltage automatically. On Harris DLT and SLT models a panel light flashes to indicate when deficient line voltage is being corrected (see Figure 3 on page 4).

### 4.4 Leveling

The unit must be level both front to back and side to side.

To level chest models, leave the casters in place and shim the low wheel(s) with strips of sheet metal cut at least 1/2 in. wider than the caster.

Upright models have adjustable leveling feet which are located adjacent to the front casters.

### 4.5 Door Operation (Upright Models)

Upright freezer models are equipped with a special handle cam assembly which provides ease in opening and closing operations.

#### 4.5.1 Locking the Door

1. Close the freezer door and place the handle in a vertical position.
2. Insert the key horizontally into the lock.
3. Push the key and lock assembly into the handle approximately 0.25 inch and turn the key clockwise 90 degrees.
4. Continue to depress the key and turn it counterclockwise back to the starting position. The lock assembly should remain depressed inside the handle.
5. Remove the key.

#### 4.5.2 Unlocking the Door

1. Insert the key horizontally into the lock.
2. Turn the key 90 degrees clockwise. The lock assembly automatically springs out until its face is outside the outer handle casting).
3. Turn the key back to horizontal (counterclockwise 90 degrees) and remove the key.

#### 4.5.3 Opening the Door

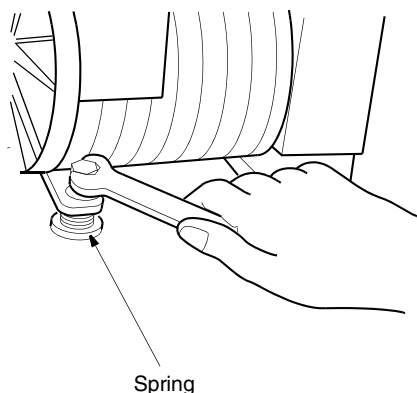
1. The door must be unlocked (the face of the lock is flush with the outer handle casting and not indented into the casting).
2. Grab the upper handle on the front of the freezer and pull it toward you while rotating it 90 degrees until the handle rests on the built-in stop.
3. Use the vertical door handle mounted on the left front corner of the door to pull the freezer door fully open.

#### 4.6 Compressor Mounts

Some Harris DLTs are shipped with the compressor mounts secured. The springs under the compressor mounting feet are fully compressed by hold-down nuts for shipping. **These nuts must be loosened before the unit is put into operation** (refer to Figure 2).

To loosen the compressor mount springs, complete the following steps:

1. Remove the end panel on the right side of the machine compartment to expose the compressor.
2. Use a 3/4 in. box end or socket wrench with ratcheting handle and a 4 in. extension to loosen the nuts on the compressor mounts (refer to Figure 2). Loosen the nuts until the clearance between the bottom of the nut and the top of the mounting foot is 1/8 in.
3. Inspect the area under each mounting foot for spacer clips. Any clips must be removed before compressor operation.



**Figure 2. Compressor Mount Springs**

**Note:** Some of the Harris DLT freezers require loosening the compressor bolts. This is not necessary for all models.

#### 4.7 Pressure Equalization Port

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. Without a pressure equalization mechanism, it can take several minutes before the door can easily be reopened.

All upright models feature a port that provides vacuum relief after door openings.

The pressure equalization port is located in the bottom left side of the storage chamber. Although the port is designed to self-defrost, excessive frost accumulation in the bottom of the chamber could eventually restrict air flow. Therefore you should periodically inspect the port and brush away any loose frost using a stiff nylon brush.



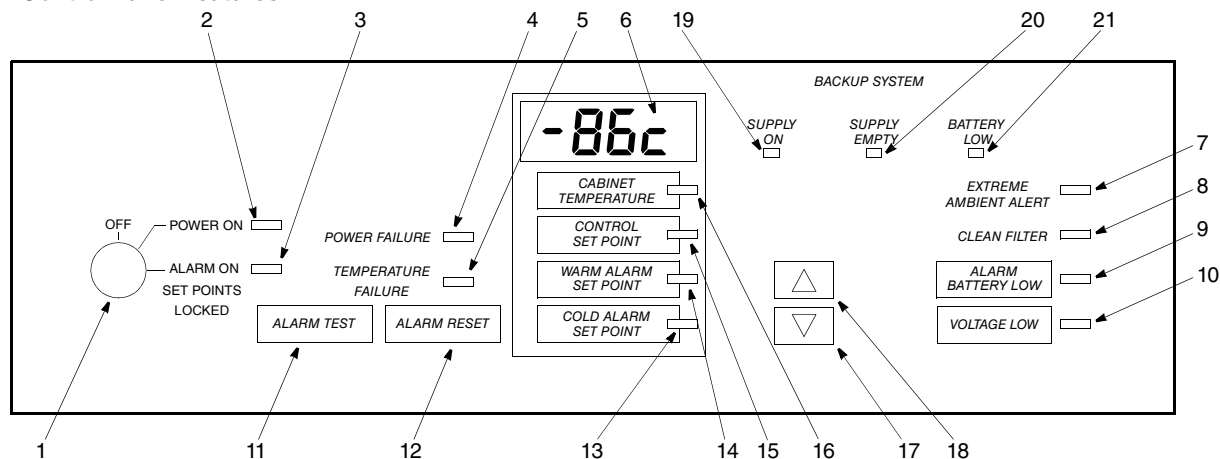
**WARNING!** To ensure proper operation, be sure not to obstruct the port. Push any storage racks near the port all the way to the rear of the cabinet.



**WARNING!** When the freezer is in operation, avoid touching the lower left side of the cabinet exterior near the "hot surface" warning label. The port can get hot immediately after it is activated.

## 5 Operation (Harris DLT and SLT Freezers)

### 5.1 Control Panel Features



**Figure 3. Harris DLT and SLT Control Panel with Optional Backup System**

Before the initial start up, take some time to become familiar with the controls on your freezer. Figure 3 illustrates the Harris DLT and SLT Chest and Upright Freezer control panel.

**Note:** Figure 3 shows all possible functions. These functions vary depending on the model and options. You may not have all of the functions on your equipment. Harris DLT and SLT models include the Set Points Locked feature and the Extreme Ambient Alert indicator light (8). The CO<sub>2</sub> or LN<sub>2</sub> Backup System lights (20, 21, 22) represent status indicators for a built-in CO<sub>2</sub> or LN<sub>2</sub> backup system, which is optional on Harris DLT and SLT models.

1. Three position keyed Power On Switch.
2. Power On Indicator. This indicator lights when power is connected to the freezer.
3. Alarm On/Set Points Locked Indicator. This indicator lights when the alarm is activated. Also indicates that Set Points are locked.
4. Power Failure Indicator. This indicator lights when there is a power failure to the freezer (refer to Section 8 on page 10).
5. Temperature Failure Indicator. This indicator lights when the freezer temperature deviates either above or below the alarm temperature settings.
6. Digital Temperature Display Window. This window displays chamber temperature, alarm values, etc. depending on the operating status of the freezer and the procedure being performed.
7. Extreme Ambient Alert. This indicator lights when the ambient temperature has exceeded the upper limit of the recommended operating range. If the Extreme Ambient Alert is activated, the ambient environment needs to be improved for proper function of the freezer.
8. Clean Filter Indicator. This indicator lights when the air cooled condenser filter is dirty (refer to Section 8 on page 10).
9. Alarm Battery Low Indicator. This indicator lights when the charge on the alarm battery is low. Press this button to display the percent of full battery charge in the digital display window.
10. Voltage Low Indicator. This indicator lights when incoming line voltage to the freezer is low. Press this pad to display the current line voltage in the digital display window.
11. Alarm Test Pad. Press this pad to start an alarm test (refer to Section 5.2.5 on page 6).
12. Alarm Reset Pad. Press this pad to reset *slowly* blinking indicators. Slowly blinking indicators (the Silent Witness feature) denote that the condition *has* occurred but is now within the given operating parameters. This pad is also depressed to temporarily silence the audible alarm (refer to Section 5.2.4 on page 5).
13. Cold Alarm Set Point. Press this pad to set the cold alarm (refer to Section 5.2.3 on page 5).
14. Warm Alarm Set Point. Press this pad to set the warm alarm (refer to Section 5.2.3 on page 5).
15. Control Set Point. Press this pad to set the cabinet temperature (refer to Section 5.2.2 on page 5).
16. Cabinet Temperature Indicator. This indicator lights when the temperature display window is showing the cabinet temperature (refer to Section 5.2.1 on page 5).
17. Decrement Pad (▽). Use this pad to decrease temperature values.
18. Increment Pad (△). Use this pad to increase temperature values.
19. Backup System Supply On Indicator.
20. Backup System Empty Indicator.
21. Backup System Battery Low Indicator.

The following indicators are available only when the freezer is equipped with the optional backup system (refer to Section 6.4 on page 7).



## 5.2 Start Up

Refer to Section 5.1 and Figure 3 on page 4 as you complete the following procedures.

### 5.2.1 Turning the Power On

To start up the Harris DLT and SLT Series Freezers, complete the following steps:

1. Plug the freezer into the power outlet (refer to Section 4.2 on page 2).
2. Turn the key switch to the POWER ON position. The Power On LED and the Cabinet Temperature LED illuminate.

**Note:** *The audible alarm function is not active at this time. Refer to Section 5.2.3 for information about setting the alarms. In addition, the Set Points will not be locked in this key position.*

### 5.2.2 Setting the Cabinet Temperature

To set the cabinet temperature, complete the following steps:

1. Press and hold the Control Set Point pad.
2. The Control set point LED lights and the Cabinet Temperature LED goes out.
3. Press and hold  $\triangle$  to increase the temperature or  $\nabla$  to decrease the temperature. The digital display scrolls through temperature settings.
4. Release both pads when the digital temperature display window shows the correct set point value.

**Note:** *If no keys are pressed within ten seconds, the temperature display reverts to the cabinet temperature.*

### 5.2.3 Setting the Alarms

To set the cold alarm, complete the following steps:

1. Confirm that the key switch is at the Power On position (Set Points not locked).
2. Press and hold the Cold Alarm Set Point pad. The LED next to this pad lights. The temperature display shows the Cold Alarm value.
3. Press and hold  $\triangle$  or  $\nabla$  to adjust the Cold Alarm Set Point.
4. Release both pads when the digital temperature display window shows the correct set point value.

To set the warm alarm, complete the following steps:

1. Confirm that the key switch is at the Power On position (Set Points not locked).
2. Press and hold the Warm Alarm Set Point pad. The LED next to this pad lights. The temperature display shows the Warm Alarm value.
3. Press and hold  $\triangle$  or  $\nabla$  to adjust the Warm Alarm Set Point.
4. Release both pads when the digital temperature display window shows the correct set point value.

When the cabinet temperature drops below the Warm Alarm setting, turn the key switch to ALARM ON. The freezer is ready to operate.

**Note:** *If a power failure occurs, the POWER ON light goes out. After 30 seconds the POWER FAILURE light and the digital temperature display flash simultaneously.*



**WARNING!** You must turn the three-position key switch to the ALARM ON/SET POINTS locked position to activate the audible alarm and place it in security operation.

### 5.2.4 Alarm Reset & Status Lights (Harris DLT and SLT Freezers)

The Silent Witness alarm reset feature ensures user acknowledgment of the occurrence of certain alarm conditions. This provides greater monitoring power by alerting the user if an alarm condition has occurred during periods when the freezer must be left unattended. The alarm conditions that activate this feature are:

- Temperature Failure-Warm Alarm
- Temperature Failure-Cold Alarm
- Voltage Low
- Power Failure
- Extreme Ambient Alert

During any of these alarm conditions, the corresponding indicator will flash quickly, approximately 90 times per minute. If the alarm condition then disappears, the flash rate will decrease to approximately 15 times per minute. Unless the condition reoccurs, the indicator will then continue to flash at this rate until the Alarm Reset button is pressed. Once this has occurred, the indicator will no longer be lit.

In the case of TEMPERATURE FAILURE-WARM ALARM and TEMPERATURE FAILURE-COLD ALARM, if these conditions have occurred but are now within the given limits, the two indicators will alternately flash (180° out of phase). In addition, for these two temperature failures, the highest temperature and lowest temperature, respectively, during the error condition will be saved. Before you reset after temperature failure, you can view the temperature extreme by pressing the Cabinet Temperature pad simultaneously with either the Warm Alarm Set Point pad or the Cold Alarm Set Point pad.

*Once the Alarm Reset button is depressed, the extreme temperature value is reset to the current cabinet temperature.*

### 5.2.5 Alarm Test (Harris DLT and SLT Freezers)

To test the cold and warm alarms, complete the following steps:

1. Press and hold the Alarm Test pad. The digital temperature display indicates rising temperature. When the temperature reaches the warm alarm value, the alarm sounds.

**Note:** *The temperature of the refrigerated space does not change during this procedure. Only the sensor is heated.*

2. Release the Alarm Test pad, the sensor and display return to cabinet temperature in a few minutes.

You can press the Alarm Reset pad to silence the alarm but the alarm will ring back in five to seven minutes. You can silence the alarm in this manner as many times as necessary until the sensor cools below the warm alarm temperature. The alarm quits automatically when the sensor cools below the warm alarm value.

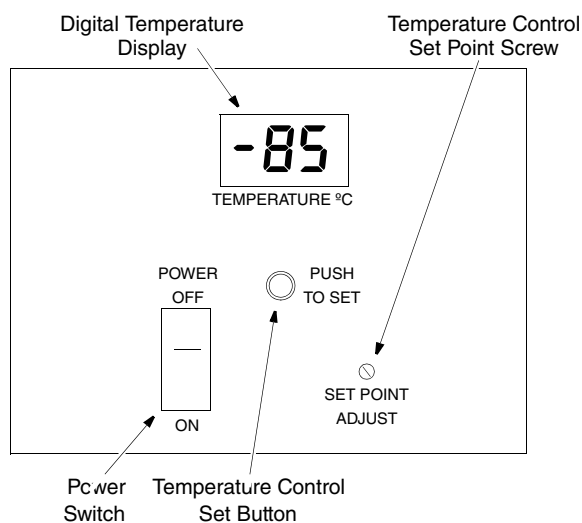
**Note:** *There is a limit on the alarm test feature. The alarm test will not commence if the warm alarm set point is more than 15 degrees warmer than the operating temperature set point.*

## 6 Backup System (Optional)

When you purchase a built-in CO<sub>2</sub> or LN<sub>2</sub> optional backup system for the freezer, the backup system control panel is located behind a hinged panel adjacent to the grill (refer to Figure 4).

**Note:** *Always purchase the cylinders which are equipped with siphon tubes for withdrawing liquid from the bottom of the cylinder. CO<sub>2</sub> cylinders must be kept at room temperature to function properly. LN<sub>2</sub> bottles are functional at any reasonable temperature.*

Use the panel below to set the backup initiation temperature, usually 10 to 15°C warmer than the operating set point.



**Figure 4. Control Panel for Optional Built-In Backup System**

**Note:** *Harris ELT Series units and DLT chest models use free-standing, field installed Backup Systems.*

### 6.1 CO<sub>2</sub> and LN<sub>2</sub> Precautions

Observe the following precautions when using liquid CO<sub>2</sub> and LN<sub>2</sub> backup systems.



**WARNING!** If a CO<sub>2</sub> or LN<sub>2</sub> cylinder falls and a valve is knocked off, the cylinder becomes a deadly and completely unguided missile. Transport the cylinders in a handtruck or cart with secure chain ties for the cylinder. After cylinders are connected to the equipment, securely attach them with chains to a solid, stationary object such as a building column.



**WARNING!** CO<sub>2</sub> and LN<sub>2</sub> liquids are non-poisonous but are very cold and will burn unprotected skin. Always wear protective eyewear and clothing when changing cylinders or working on the piping systems attached to an active source of liquid refrigerant.



**WARNING!** The gases produced by evaporation of CO<sub>2</sub> or LN<sub>2</sub> are non-poisonous but displace the oxygen in a confined space and can cause asphyxiation. **Do not store the cylinders in subsurface or enclosed areas.**



**CAUTION!** When closing the cylinder valve, make sure that the injection solenoid is energized to allow all the liquid to bleed off instead of being trapped in the supply tubing. Failure to do this results in activation of the pressure relief device, which could damage the freezer and requires replacing if it is activated.



**CAUTION!** For chest and upright models ordered with factory installed built-in backup systems, the flow of liquid CO<sub>2</sub> or LN<sub>2</sub> will be discontinued if the door or lid is opened during operation of the backup system. For units operated with free-standing, field installed type backup system, the flow of liquid CO<sub>2</sub> or LN<sub>2</sub> will be discontinued upon door or lid opening **only** if the switch provided with the free-standing package is installed on the freezer.

### 6.2 Installation

Field installed systems are supplied with complete installation and operating instructions. If your system is factory installed, the freezer is shipped with a coiled length of tubing to connect the freezer to the bottles:

- 3/8 in. OD copper tubing for connection to the CO<sub>2</sub> supply.
- 5/8 in. OD copper tubing covered with Armaflex™ insulating tubing for connection to the LN<sub>2</sub> supply.

Straighten the coiled tubing and connect one end to the labeled connection on the freezer and the other end to the supply bottle or building supply fitting.

### 6.3 Operation

To activate the optional backup system, complete the following steps:

1. Push the Power Switch to the ON position. The digital temperature display window shows the current cabinet temperature.
2. Press and hold the Push to Set button to display the set point temperature in the digital temperature display window.
3. Use a small screwdriver to rotate the Set Point Adjust screw until the correct backup operating temperature shows in the display window. The recommended set point is 10 to 15°C above normal cabinet temperature.

**Note:** *The temperature shown in the display window is accurate to  $\pm 1^{\circ}\text{C}$ .*

The backup system can run for about eight hours on battery power.



**WARNING!** You must push the Power Switch to the ON position in order to activate the backup system.

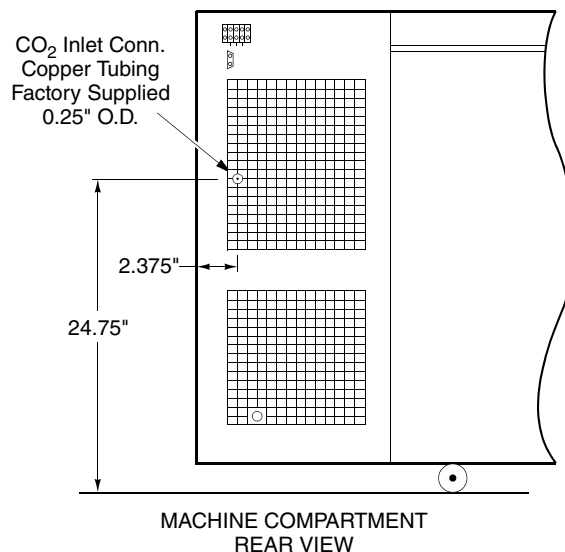
### 6.4 System Status Lights

In addition to the backup control system, the built-in backup system includes main control panel system status lights. These lights are only available when the backup system is installed.

- The Supply On Indicator lights when the backup system is operating on battery power.
- The Backup System Battery Low Indicator lights when the backup system battery charge is low. The built-in battery charger recharges the battery to full charge when power is restored to the system.

**Note:** *Since rechargeable batteries degrade over time, the battery should be replaced after approximately three years.*

- The Backup System Empty Indicator lights when the standby CO<sub>2</sub> or LN<sub>2</sub> bottle is empty.



**Figure 5. Location of CO<sub>2</sub> Connection Site, Chest Models Only**

Table 1. Backup System Flow Rates

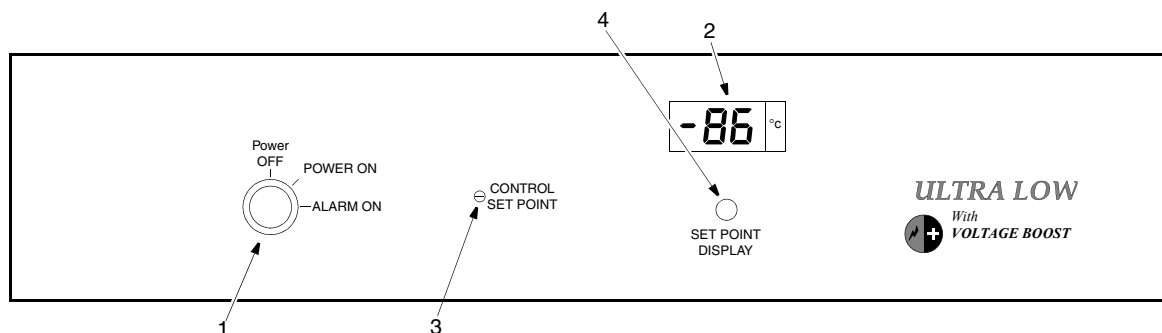
Center Air Temperature		Lbs/hr @ 75°F Ambient Temperature (Flow Rate)		
		-50°C	-60°C	-70°C
<b>Liquid CO<sub>2</sub></b>				
<b>Chest Freezers</b>				
3 ft <sup>3</sup>	Empty	2.83	2.96	3.1
	1/2 Full	2.4	2.7	3.1
	Full	1.8	2.1	2.4
7 ft <sup>3</sup>	Empty	4.1	4.7	5.5
	1/2 Full	3.5	4.0	4.6
	Full	2.6	3.0	3.5
10 ft <sup>3</sup>	Empty	4.9	5.6	6.6
	1/2 Full	4.2	4.8	5.5
	Full	3.1	3.6	4.1
14 ft <sup>3</sup>	Empty	5.6	6.5	7.5
	1/2 Full	4.8	5.5	6.3
	Full	3.5	4.2	4.8
17 ft <sup>3</sup>	Empty	6.5	7.5	8.7
	1/2 Full	5.5	6.3	7.3
	Full	4.1	4.8	5.5
20 ft <sup>3</sup>	Empty	7.3	8.4	9.8
	1/2 Full	6.2	7.1	8.2
	Full	4.6	5.4	6.2
<b>Upright Freezers</b>				
13 ft <sup>3</sup>	Empty	7.4	8.5	9.7
	1/2 Full	6.5	7.4	8.3
	Full	5.1	5.9	6.7
17 ft <sup>3</sup>	Empty	8.3	9.5	10.9
	1/2 Full	7.3	8.3	9.3
	Full	5.8	6.6	7.5
21 ft <sup>3</sup>	Empty	8.9	10.2	11.7
	1/2 Full	7.8	8.9	10.0
	Full	6.2	7.1	8.1
25 ft <sup>3</sup>	Empty	9.5	10.9	12.5
	1/2 Full	8.3	9.5	10.7
	Full	6.6	7.6	8.7

Center Air Temperature		Lbs/hr @ 75°F Ambient Temperature (Flow Rate)		
		-60°C	-70°C	-80°C
<b>Liquid LN<sub>2</sub></b>				
<b>Chest Freezers</b>				
3 ft <sup>3</sup>	Empty	2.7	3.1	3.5
	1/2 Full	2.2	2.6	2.9
	Full	1.7	1.9	2.2
7 ft <sup>3</sup>	Empty	3.9	4.5	4.1
	1/2 Full	3.3	3.8	4.3
	Full	2.5	2.8	3.2
10 ft <sup>3</sup>	Empty	4.7	5.4	6.1
	1/2 Full	4.0	4.5	5.1
	Full	3.0	3.4	3.8
14 ft <sup>3</sup>	Empty	5.4	6.2	7.0
	1/2 Full	4.5	5.2	5.9
	Full	3.4	3.9	4.4
17 ft <sup>3</sup>	Empty	6.2	7.1	8.1
	1/2 Full	5.3	6.0	6.8
	Full	3.9	4.4	5.1
20 ft <sup>3</sup>	Empty	7.0	8.0	9.1
	1/2 Full	5.9	6.7	7.6
	Full	4.4	5.0	5.7
<b>Upright Freezers</b>				
13 ft <sup>3</sup>	Empty	7.0	7.9	8.9
	1/2 Full	6.1	6.8	7.6
	Full	4.8	5.4	6.1
17 ft <sup>3</sup>	Empty	7.7	8.7	9.8
	1/2 Full	6.7	7.5	8.4
	Full	5.3	5.9	6.7
21 ft <sup>3</sup>	Empty	8.4	9.5	10.7
	1/2 Full	7.3	8.2	9.2
	Full	5.8	6.5	7.3
25 ft <sup>3</sup>	Empty	9.1	10.3	11.6
	1/2 Full	7.9	8.9	10.0
	Full	6.3	7.1	7.9

## 7 Operation (ELT Freezers)

### 7.1 Control Panel Features

Before the initial start up, take some time to become familiar with the controls on your freezer. Figure 6 illustrates the Harris ELT Series Chest and Upright Freezer control panel.



**Figure 6. Harris ELT Series Control Panel**

1. Keyed Power On/Alarm On switch.
2. LED digital temperature display.
3. Recessed temperature control set point adjustment.
4. Temperature set point adjust button.

### 7.2 Start Up

Refer to Figure 6 as you complete the following procedures.

#### 7.2.1 Turning the Power On

To start up the Harris ELT Series Freezer, complete the following steps:

1. Plug the freezer into the power outlet (refer to Section 4.2 on page 2).
2. Turn the key switch to the POWER ON position. The digital temperature display shows the cabinet temperature.

**Note:** *The alarm function is not active at this time.*

#### 7.2.2 Setting the Cabinet Temperature

To set the cabinet temperature, complete the following steps:

1. Insert a small screwdriver into the slotted screw labeled Control Set Point and simultaneously press and hold the Set Point Display button. The temperature display changes to read the existing set point value.
2. Turn the set point screw (clockwise for a colder setting and counterclockwise for a warmer setting) until the desired set point shows in the digital temperature display.
3. Release the Set Point Display button. The digital temperature display returns to the cabinet temperature.

#### 7.2.3 Alarm

The Harris ELT's Alarm is operated by the freezer electronic control system. The alarm is preset at the factory with a cold set point:

- For units designed to operate at -75°C and -85°C, the alarm set point is approximately 90% of the freezer temperature set point. For example, if the freezer set point is -80°C, the alarm set point is -72°C.
- For units designed to operate at -50°C and warmer, the alarm set point is 80% of the freezer temperature set point. For example, if the freezer set point is -40°C, the alarm set point is -32°C.

To activate the alarm, wait until the freezer reaches operating temperature and turn the key switch to the ALARM ON position.



**WARNING!** You must turn the three-position key switch to the ALARM ON position to activate the alarm and place it in operation.

## 8 Maintenance and Troubleshooting



**WARNING!** Unauthorized repair of your freezer will invalidate your warranty. Contact Technical Service at 1-800-438-4851 for additional information.



**CAUTION!** Maintenance should only be performed by trained personnel.

### 8.1 Condenser Maintenance

#### 8.1.1 Cleaning the Condenser

Clean the condenser at least every six months; more often if the laboratory area is extremely dust prone.

To clean the condenser, complete the following steps:

1. Pull the grill open.
2. Remove the filter. Check the fans. If a fan is not operating, contact an Authorized Service Company immediately.
3. Vacuum the condenser.
4. Replace the filter and close the grill.

#### 8.1.2 Cleaning the Condenser Filter

Clean the condenser filter every two or three months.

1. Pull the grill open.
2. Remove the filter.
3. Shake the filter to remove loose dust, rinse the filter in clean water, shake the excess water from the filter, and replace the filter.
4. Close the grill.

### 8.2 Gasket Maintenance

Periodically check the gaskets around the door or lid for punctures or tears. Leaks are indicated by a streak of frost which forms at the point of gasket failure. Make sure that the cabinet is level (refer to Section 4.4 on page 2 for leveling information).

Keep the lid and door gaskets clean and frost free by wiping gently with a soft cloth.

### 8.3 Defrosting the Freezer

Defrost the freezer once a year or whenever the ice buildup exceeds 3/8".

To defrost, complete the following steps:

1. Remove all products and place in another cabinet.
2. Turn off the freezer.
3. Open the outer door and all inner doors.
4. Let the freezer stand with doors open for at least 24 hours. This allows both the interior and foamed refrigerant system to warm to room temperature.
5. Dispose of the ice and wipe out any water standing in the bottom of the cabinet.
6. 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 wax.
7. Close the doors, restart the freezer and reload, following the instructions in Section 2.1 on page 1.

### 8.4 Alarm Battery Maintenance

Have a technician check the condition of the alarm battery at least once a year.

To replace the alarm battery, complete the following steps:

1. Remove the front grill. The alarm battery is located directly behind the grill. The terminals are the "push on" type.
2. Grasp the terminal with pliers and work it gently back and forth while pulling it off. The fittings are tight.
3. Remove the battery and put the new battery in place.

**Note:** *You may have to cut a strip of silicone rubber in order to remove the battery.*

4. Connect the battery terminals and replace the front grill.

### 8.5 Troubleshooting Procedures



**WARNING!** Troubleshooting procedures involve working with high voltages which can cause injury or death. Troubleshooting should only be performed by trained personnel.

**Table 2. Troubleshooting Procedures**

Problem	Solution
Clean Filter indicator is on.	Condenser filter is dirty. Refer to Section 8.1.2.
Alarm Battery Low indicator is on.	Alarm battery is low on charge. Have a technician check the alarm battery. Refer to Section 8.4.
Voltage Low indicator is on.	Line voltage is low and the freezer has activated the Voltage boost system to compensate. Call an electronics technician to check the power supply.

## 9 Optional Equipment

The following equipment is available for some freezer models either as factory-installed or as field-installed options. Refer to the Accessories section on page 11 for more information on these and other options, including inventory racks and storage boxes.

For additional information, contact your representative or Customer Sales at 1-800-221-4201.

### 9.1 Backup Protection Devices

Liquid Nitrogen and Liquid CO<sub>2</sub> systems are available to protect your product in case of a prolonged power failure. These systems are powered by a rechargeable battery with a built-in automatic charger. Refer to Section 6.1 on page 6 for additional information.

#### 9.1.1 Liquid Nitrogen (LN<sub>2</sub>)

This system uses portable and locally refillable bottles. These containers keep the liquid at low temperature and pressure by continually venting a small amount of gaseous N<sub>2</sub>. You must check the liquid level indicator daily to assure an adequate emergency supply.

#### 9.1.2 Liquid CO<sub>2</sub>

This system uses portable and locally refillable bottles that are not vented and have a virtually unlimited standby life unless they develop a leak. These containers hold liquid at room temperature and high pressure. Several bottles can be connected together, increasing the effective length of standby refrigeration.

The coldest center air temperature achievable with CO<sub>2</sub> backup is -70° C. For colder temperatures, use LN<sub>2</sub>.

### 9.2 Circular Chart Recorder

Chart recorders can be factory or field installed. If your freezer does not have a recorder, you can order one for panel, wall, or freestanding mounting.

### 9.3 Remote Alarm

The remote alarm terminals on the back of the freezer are connected to freezer internal dry contacts. You can connect a remote alarm package with a separate 24 volt power supply.

## 10 Accessories

**Note:** For accessories and options not described herein, or for special modifications, contact Sales.

### Inventory Rack Capacity Chart for all Freezers

Rack Catalog No. (Rack Quantity) Box Size in.	Cubic Foot Capacity											
	1	3.1	4.5	6.8	10.3	13.7	17.1	20.5	13.4	17.2	20.2	24.4
<b>For Chest Freezers</b>												
5972, Full Rack, (7) 2 in. boxes	—	9	12	—	—	—	—	—	—	—	—	—
5973, Full Rack, (5) 3 in. boxes	—	9	12	—	—	—	—	—	—	—	—	—
5978, Full Rack, (11) 2 in. boxes	—	—	—	12	18	24	30	36	—	—	—	—
6096, Full Rack, (8) 3 in. boxes	—	—	—	12	18	24	30	36	—	—	—	—
6230, Half Rack, (6) 2 in. boxes	—	—	—	24	36	48	60	72	—	—	—	—
6231, Half Rack, (4) 3 in. boxes	—	—	—	24	36	48	60	72	—	—	—	—
<b>For Upright Freezers</b>												
6112-1, (12) 2 in. or (9) 3 in. boxes	—	—	—	—	—	—	—	—	20	—	—	—
6113-1, (16) 2 in. or (12) 3 in. boxes	—	—	—	—	—	—	—	—	—	20	25	30

### Inventory Component Description, Ultra-Low Temperature Freezers

Description	Catalog No.
<b>For All Models</b>	
<b>Fiberboard boxes and grid dividers are packaged in lots of one dozen</b>	
Fiberboard box, 5-1/4 in. square x 2 in. high, one dozen.	<b>5954</b>
Fiberboard box, 5-1/4 in. square x 3 in. high, one dozen.	<b>5956</b>
Grid divider, fiberboard, 100 cell, 7/16 in., holds 100 12 mm vials, one dozen.	<b>5958</b>
Grid divider, fiberboard, 49 cell, 5/8 in., holds 49 16 mm vials, one dozen.	<b>5959</b>
Grid divider, fiberboard, 64 cell, 9/16 in., holds 64 14 mm vials, one dozen.	<b>5960</b>
Grid divider, fiberboard, 81 cell, 1/2 in., holds 81 13 mm vials, one dozen.	<b>6212</b>
Stainless steel box, 5-1/4 in. square x 2 in. high, each.	<b>5955</b>
Stainless steel box, 5-1/4 in. square x 3 in. high, each.	<b>5957</b>
Stainless steel box cover, each.	<b>5953</b>
<b>For Chest Models</b>	
Single full rack, holds (7) 2 in. boxes, for 3.1 and 4.5 cu.ft chest models only.	<b>5972</b>
Single full rack, holds (5) 3 in. boxes, for 3.1 and 4.5 cu.ft chest models only.	<b>5973</b>
Single full rack, holds (11) 2 in. boxes, for all chest models except 3.1 and 4.5 cu.ft.	<b>5978</b>
Single full rack, holds (8) 3 in. boxes, for all chest models except 3.1 and 4.5 cu.ft.	<b>6096</b>
Single full rack, holds (8) plasma boxes, for 3 cu.ft chest model.	<b>6097</b>
Single full rack, holds (13) plasma boxes, for all chest models except 3.1 and 4.5 cu.ft.	<b>6098</b>
Single split rack, holds (6) 2 in. boxes, for all chest models except 3.1 and 4.5 cu.ft.	<b>6230</b>
Single split rack, holds (4) 3 in. boxes, for all chest models except 3.1 and 4.5 cu.ft.	<b>6231</b>
Basket/Rail Kit, for 6.8 cu.ft chest freezers.	<b>6217</b>
Basket/Rail Kit, for 10.3 cu.ft chest freezers.	<b>6218</b>
Basket/Rail Kit, for 13.7 cu.ft chest freezers.	<b>6190</b>
Basket/Rail Kit, for 17.1 cu.ft chest freezers.	<b>6191</b>
Basket/Rail Kit, for 20.5 cu.ft chest freezers.	<b>6192</b>

Description	Catalog No.
<b>For Upright Models</b>	
Adjustable single stack, holds (12) 2 in. or (9) 3 in. boxes, for 13.4 cu.ft upright models.	<b>6112-1</b>
Adjustable single stack, holds (16) 2 in. or (12) 3 in. boxes, for 17.2, 20.2, and 24.4 cu.ft upright models.	<b>6113-1</b>
Solid stainless steel shelf:	
for 13.4 cu.ft upright models only.	<b>6667</b>
for 17.2 cu.ft upright models only.	<b>6668</b>
for 20.2 cu.ft upright models only.	<b>6669</b>
for 24.4 cu.ft upright models only.	<b>6670</b>

### Inventory Components, Blood Bank Red Cell and Plasma Freezers

Description	Catalog No.
Plasma Rack, single, holds (13) plasma boxes, for all chest models.	<b>6098</b>
Plasma Rack, single, holds (12) plasma boxes, for 13.4 cu.ft upright models.	<b>6110-1</b>
Plasma Rack, single, holds (16) plasma boxes, for 17.2 and 20.2 cu.ft upright models.	<b>6111-1</b>
Red cell press.	<b>6225</b>

### Blood Bank Freezer Inventory Capacity

Rack Catalog No. and Description <sup>a</sup>	Freezers Cu.ft/Total Capacity				
	Chest			Upright	
	6.8 Cu.ft	13.7 Cu.ft	20.5 Cu.ft	13.4 Cu.ft	20.2 Cu.ft
6225, Red Cell Press.	92	204	334	200	—
6098, Plasma Rack, 13 Box Capacity.	12	24	36	—	—
6110-1, Plasma Rack, 12 Box Capacity.	—	—	—	20	—
6111-1, Plasma Rack, 16 Box Capacity.	—	—	—	—	25

<sup>a</sup> Example: A 13.7 cu.ft plasma chest freezer holds 24 total Catalog No. 6098 Plasma Racks.



### Temperature Recorders

All six inch recorders use pressure-sensitive chart paper (1 box @ 50 charts included); no inking is required.

Description	Catalog No.
Temperature recorder, 6 in. circular chart, seven-day drive, panel mounted, for 40°C to -95°C. Not available for Harris Classic chest models, which use 6383-6. Factory installed.	<b>6183-6</b>
Temperature recorder, 6 in. circular chart, seven-day drive, for -120°C, -140°C, and -150°C models only, panel mounted. Factory installed.	<b>6183-5</b>
Temperature recorder, 6 in. circular chart, seven-day drive, free-standing, for all freezers -40°C to -90°C. Customer installed.	<b>6383-6</b>
Temperature recorder, 6 in. circular chart, seven-day drive, free-standing, for -95°C, -120°C, -140°C, and -150°C models only. Customer installed.	<b>6383-5</b>

### Chart Paper

Description	Catalog No.
<b>For Mechanical Recorders:</b>	
Chart paper, package of 50, 6 in., seven-day recorder, -150°C to +20°C.	<b>6186</b>
Chart paper, package of 50, for 6 in., seven-day recorder, -115°C to +50°C.	<b>6185</b>
Chart paper, package of 50, for 4 in., seven-day recorder only, 0°C to -100°C.	<b>6596</b>
<b>For Electronic Recorders:</b>	
Chart paper, package of 50, for 6 in., seven-day recorder, -115°C to +50°C.	<b>6185</b>

### Special Voltages

Standard voltages are listed under *Voltage* in Specification Charts associated with each product category. Standard voltages are available at no charge; alternative voltages may be available at an extra charge. All voltages must be specified when ordering. Contact Sales for more information.

### Electronic Backup Systems

**CO<sub>2</sub> Backup System.** Choose built-in or free-standing. Injects liquid CO<sub>2</sub> into cabinet when cabinet temperature warms to pre-set level. Automatic shut-off on door or lid opening. Adjustable CO<sub>2</sub> set point in 1°C increments to -75°C with digital display and actual cabinet temperature at the push of a button. Indicator lights when system is activated. System is powered by continually recharged battery. Includes all hardware except CO<sub>2</sub> cylinder.

Description	Catalog No.
CO <sub>2</sub> Backup, built-in, panel mounted, factory installed. Harris DLT and SLT freezers only. Low battery indicator lights when battery needs replacing. Empty cylinder indicator lights when cylinder is exhausted.	<b>6594</b>
CO <sub>2</sub> Backup, free-standing, field installed. Specify freezer model number and voltage when ordering.	<b>6593</b>

**LN<sub>2</sub> Backup System.** Choose built-in or free-standing. Injects liquid nitrogen into cabinet when cabinet temperature warms to pre-set level. Automatic shut-off on door or lid opening. Adjustable LN<sub>2</sub> set point in 1°C increments to -150°C with digital display and actual cabinet temperature at the push of a button. Indicator lights when system is activated. System is powered by continually recharged battery. Includes all hardware except low-pressure liquid nitrogen cylinder.

Description	Catalog No.
LN <sub>2</sub> Backup, built-in, panel mounted, factory installed. Harris DLT and SLT freezers only. Low battery indicator lights when battery needs replacing. Empty cylinder indicator lights when cylinder is exhausted.	<b>6595</b>
LN <sub>2</sub> Backup, free-standing, field installed. Specify freezer model number and voltage when ordering.	<b>6214</b>

### Surge Protection

**Surge Protector.** Provides protection against external electrical spikes (temporary high voltage condition). Built-in surge protection is optional on all freezers models; free-standing surge protection is also optional on all models.

Description	Catalog No.
Free-standing, for all freezer models. Field installed by qualified electrician or factory authorized service center. Specify freezer model number and voltage when ordering.	<b>6402</b>

### Remote Alarm/Monitoring

Description	Catalog No.
<b>Standard Remote Alarm.</b> Provides audible and visual signal in the event of temperature rise or power failure. Adaptable to telephone switchboard. Can be located up to 1/3 mile (1760 ft/536 m) from freezer. Must be used with factory installed electronic alarm system and connected to normally-open or normally-closed remote alarm contacts. Wire not included. Specify freezer model number and voltage when ordering.	<b>5612</b>
<b>Deluxe Electronic Remote Alarm System.</b> User programmable to sound alarm in the event of temperature rise or power failure. Can dial up to four telephone numbers to advise of alarm condition across any telephone system which accepts pulse dialing. One system can monitor up to four individual freezers or up to three groups of freezers. Contact manufacturer for detailed specifications.	<b>6224</b>

### RS-232 Data Port and Software

Description	Catalog No.
For use with Harris DLT and SLT models only. Monitors freezer set point, high and low limit set points and power supply. Advises of temperature deviation, voltage boost on, surge intercept, low alarm battery, and clean filter functions. Auto status report adjustable in increments of 5 seconds to 2 hours.	<b>6405</b>

### Extended Warranty Options

**Note:** In addition to the standard 12-Month full warranty on the complete product (USA and Canada), an additional four-year protection on compressor and compressor parts can be supplied. This additional coverage must be purchased at the time of original product purchase.

Under this contract, the manufacturer agrees to furnish a compressor FOB our factory to replace one which has been determined to be defective by the manufacturer or a factory authorized Service Agency.

**Note:** *Extended 4-Year Compressor Parts Warranties are standard on Harris SLT Freezers. These Extended Warranty Options apply to Harris DLT and ELT products only.*

Operating Temperature	Catalog No.
-40°C	6077
-50°C	
-75°C	6078
-80°C and -86°C	
-120°C	6079
-140°C	6221
-150°C	

Description	Catalog No.
Extended 12-Month Comprehensive Coverage, for all models, provides additional 12-month warranty coverage, parts and labor. Contact Sales for details.	<b>6613</b>

### Interior Options

Description	Catalog No.
<b>Chest Freezer Interiors</b>	
Stainless steel interior, 3.1 cu.ft chest.	<b>6121</b>
Stainless steel interior, 4.5 cu.ft chest.	<b>6646</b>
Stainless steel interior, 6.8 cu.ft chest.	<b>6122</b>
Stainless steel interior, 10.3 cu.ft chest.	<b>6123</b>
Stainless steel interior, 13.7 cu.ft chest.	<b>6124</b>
Stainless steel interior, 17.1 cu.ft chest.	<b>6125</b>
Stainless steel interior, 20.5 cu.ft chest.	<b>6126</b>
<b>Upright Freezer Interiors</b>	
Stainless steel interior, 13.4 cu.ft upright.	<b>6179</b>
Stainless steel interior, 17.2 cu.ft upright.	<b>6180</b>
Stainless steel interior, 20.2 cu.ft upright.	<b>6181</b>
Stainless steel interior, 24.4 cu.ft upright.	<b>6645</b>

### Miscellaneous Ultra-Low Temperature Freezer Options

Description	Catalog No.
Additional freezer porthole, 1 in. diameter.	<b>6105</b>
Inside delivery (price quoted by region). Contact Sales if you have special delivery and/or installation requirements. Through the network of factory authorized service centers, testing can be arranged prior to delivery and installation within your facility.	<b>6095</b>

## WEEE Compliance

**WEEE Compliance.** This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96EC. It is marked with the following symbol. Thermo Fisher Scientific has contracted with one or more recycling/disposal companies in each EU Member State, and this product should be disposed of or recycled through them. Further information on our compliance with these Directives, the recyclers in your country, and information on Thermo Scientific products which may assist the detection of substances subject to the RoHS Directive are available at [www.thermo.com/](http://www.thermo.com/)

### Great Britain



**WEEE Konformität.** Dieses Produkt muss die EU Waste Electrical & Electronic Equipment (WEEE) Richtlinie 2002/96EC erfüllen. Das Produkt ist durch folgendes Symbol gekennzeichnet. Thermo Fisher Scientific hat Vereinbarungen getroffen mit Verwertungs-/Entsorgungsanlagen in allen EU-Mitgliederstaaten und dieses Produkt muss durch diese Firmen verwertet oder entsorgt werden. Mehr Informationen über die Einhaltung dieser Anweisungen durch Thermo Scientific, die Verwerter und Hinweise die Ihnen nützlich sein können, die Thermo Fisher Scientific Produkte zu identifizieren, die unter diese RoHS. Anweisung fallen, finden Sie unter [www.thermo.com/](http://www.thermo.com/)

### Deutschland



**Conformità WEEE.** Questo prodotto deve rispondere alla direttiva dell'Unione Europea 2002/96EC in merito ai Rifiuti degli Apparecchi Elettrici ed Elettronici (WEEE). È marcato col seguente simbolo. Thermo Fischer Scientific ha stipulato contratti con una o diverse società di riciclaggio/smaltimento in ognuno degli Stati Membri Europei. Questo prodotto verrà smaltito o riciclato tramite queste medesime. Ulteriori informazioni sulla conformità di Thermo Fisher Scientific con queste Direttive, l'elenco delle ditte di riciclaggio nel Vostro paese e informazioni sui prodotti Thermo Scientific che possono essere utili alla rilevazione di sostanze soggette alla Direttiva RoHS sono disponibili sul sito [www.thermo.com/](http://www.thermo.com/)

### Italia



**Conformité WEEE.** Ce produit doit être conforme à la directive euro-péenne (2002/96EC) des Déchets d'Equipements Electriques et Electroniques (DEEE). Il est marqué par le symbole suivant. Thermo Fisher Scientific s'est associé avec une ou plusieurs compagnies de recyclage dans chaque état membre de l'union européenne et ce produit devrait être collecté ou recyclé par celles-ci. Davantage d'informations sur la conformité de Thermo Fisher Scientific à ces directives, les recycleurs dans votre pays et les informations sur les produits Thermo Fisher Scientific qui peuvent aider la détection des substances sujettes à la directive RoHS sont disponibles sur [www.thermo.com/](http://www.thermo.com/)

### France



## Important

For your future reference and when contacting the factory, please have the following information readily available:

Model Number: \_\_\_\_\_

Serial Number: \_\_\_\_\_

Date Purchased: \_\_\_\_\_

The above information can be found on the dataplate attached to the equipment. If available, please provide the date purchased, the source of purchase (manufacturer or specific agent/rep organization), and purchase order number.

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### IF YOU NEED ASSISTANCE:

#### SALES DIVISION

Phone: 828/658-2711  
800/221-4201

FAX: 828/658-0383

#### LABORATORY PARTS and SERVICE

Phone: 800/438-4851

FAX: 828/658-2576

#### TECHNICAL SUPPORT

Phone: 800/438-4851

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