



Isotemp[®] Explosion-Proof Refrigerators and Freezers

MODEL

Exp. Refrigerator : 13-986-153 (20EREEFSA)

Exp. Freezer : 13-986-150 (20EFEEFSA)

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Safety Information

Your satisfaction and safety are important to Fisher Scientific and a complete understanding of this unit is necessary to attain these objectives.

As the ultimate user of this apparatus, it is your responsibility to understand its proper function and operational characteristics. This instruction manual should be thoroughly read and all operators given adequate training before attempting to place this unit in service. Awareness of the stated cautions and warnings, and compliance with recommended operating parameters – together with maintenance requirements – are important for safe and satisfactory operation. The unit should be used for its intended application; alterations or modifications will void the Warranty.

This apparatus is designed for use in Class I, II or III locations as defined by the National Electrical Code, unless otherwise noted.

Alert Signals

	ON	
	OFF	
	Safety Alert	Important operating instructions. To reduce the risk of injury or poor performance of the unit read the user manual before putting the equipment into operation.
	DANGER	Indicates an immediately hazardous situation, which if not avoided, will result in death or serious injury.
	WARNING	Indicates an immediately hazardous situation, which if not avoided, will result in death or serious injury.
	CAUTION	Indicates an immediately hazardous situation, which if not avoided, may result in minor to moderate injury.
(No Symbol)	CAUTION	(Without Safety Alert Symbol) indicates a situation that may result in property damage.
	Shock Hazard	Use of this equipment involves power supplies which convert line voltage to low voltage power. Do not modify or use power supplies other than OEM equipment. Connection of the power supply may require a properly grounded receptacle. Potential for electrical shock or equipment damage exists if precautions are not followed.
	Frost bite/ Low Temperature	Avoid contact with cold freezer surfaces potential for cold burns or skin sticking to cold surfaces.



DANGER RISK OF CHILD ENTRAPMENT Before you throw away your old refrigerator or freezer:

- Take off doors.
- Leave the shelves in the place so that children may not easily climb inside.



If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Intended Use

The Refrigerators/Freezers described in this manual are for professional use only. These products are intended for use in research for the storage of samples or inventory in the following temperature ranges:

Refrigerators +1°C to +12°C
Freezers -12°C to -20°C



WARNING

Only Explosion Proof Units or Flammable Material Storage Units are to be used for the storage of flammable inventory/samples.

These are not considered medical devices and have therefore not been registered with a medical device regulatory body (e.g. FDA): that is, it has not been evaluated for the storage of samples for diagnostic use or for samples to be re-introduced to the body.

NOTE: Do not store corrosive materials in these units. Any damage which occurs due to storage of corrosives will not be covered under warranty claims.

Corrosive Materials Requiring Refrigerated or Frozen Storage

- Only use models rated as Corrosion Resistant.
- Corrosion Resistant does not mean Corrosion Proof – Care in storage is still required.
- Store only corrosive reagents/samples which truly need reduced temperature storage.
- Flammable corrosive materials require Flammable Material Storage or Explosion Proof models labeled for the storage of corrosives.
- Containers must be wiped clean of moisture and chemical residue before being introduced into the unit and upon return from use.
- Containers must be sealed with either vinyl tape or Parafilm®.
- Reagents/samples which release HX (X= F, Cl, Br, I) on contact with moisture (e.g. Acyl halides, Organosilyl halides etc.) are particularly damaging to metals.
- Volatile amines will react with HX depositing salts which will lead to corrosion of metal surfaces.
- Volatile organic acids can exacerbate metal surfaces already compromised, be sure these are securely sealed.
- Refrigerated compartments are cool or cold areas but they are not to dry seal your reagents and samples.
- Bleach solutions release chlorine gas which can react with other volatiles in the cooling chamber or directly attacks metal surfaces.
- Periodically clean the interiors, clean up spills or leaking containers.
- Failure to take precautionary actions may lead to damage not covered by warranty claims.

Parafilm® is a registered trademark of Bemis Company, Oshkosh, WI.

Explosion-Proof Refrigerators and Freezers

Overview

Conventional refrigerators and freezers are not suitable for storing flammable materials. Such units have components in their electrical and refrigeration systems that can trigger explosions of flammable air-vapor mixtures inside the unit and/or in the immediate surrounding area.

The Authority having Jurisdiction (AHJ) determines if work areas are designated as a hazardous location with respect to the presence of flammable gases or vapors. Such locations are defined in (National Fire Protection Agency) NFPA 70 Articles 500-501 and OSHA 29 CFR1910.307. Some of these classified areas are expected to experience concentrations of flammable gases and/or vapors at or above their lower flammability limits for extended periods of time.

The construction of our explosion-proof units has been evaluated by Underwriters Laboratories (UL) are suitable for use in classified areas requiring Class I, Groups C and D* protected equipment. The electrical components such as thermostats, wiring, splices, relays and compressor motors on explosion-proof units are safely housed within explosion-proof enclosures and conduit. Compressor surface temperatures have been evaluated and determined to remain below the flash point of materials found in Class I, Groups C and D.

All models have heavy-gauge, rigid, steel construction with a durable enamel finish. Interiors have epoxy coated steel construction. Each unit is insulated throughout for energy-efficient operation.

These units are ideal for storing ethyl ether, acetone, alcohol, benzene, gasoline, hexane, lacquer solvent vapors, naphtha, along with many other potentially hazardous materials.



WARNING: For FMS and EXP units where flammable materials are stored in the cooling chamber, the cooling chamber is considered a Class I Div1 or Class I Zone 1 hazardous location. Any monitoring devices placed in the cooling chamber must have an intrinsically safe rating from an appropriate certification body, such as UL, CSA, FM etc. (this includes battery or solar powered devices).

Thermocouples for building monitoring systems must be wired through an electrical barrier designed to provide isolation against voltage and current spikes, which could cause a spark resulting in fire or explosion. It is the end user's responsibility to meet these requirements. Thermo Fisher Scientific cannot assist with the selection of devices, recommend, approve or design any device or monitoring circuit.

* The notation Class 1, Groups C and D is an accepted abbreviation for Class I, Div 1, Groups C and D; Class I Zone 1 Group IIB.

EXPLOSION-PROOF REFRIGERATORS AND FREEZERS

MODEL 13-986-153
34" Wide, Refrigerator

Features:

- Overall 21 Cu. ft.
- Four shelves (non-adjustable)
- Manual defrost
- Epoxy coated steel interior
- White color

MODEL 13-986-150
34" Wide, Freezer

Features:

- Overall 21 Cu. ft.
- Four shelves (non-adjustable)
- Manual defrost
- Epoxy coated steel interior
- White color

Model	Total Vol. Cu. Ft.	Exterior Dimensions H x W x D inches
13-986-153	21	73.25" X 34" X 35.81" (186.1 X 86.4 X 91.0 cm)
13-986-150	21	73.25" X 34" X 35.81" (186.1 X 86.4 X 91.0 cm)

Model	Electrical Characteristics Volts/Hz, Amps	Temp. Range ° C (° F)
13-986-153	115/60, 5.0	1° to 12° (34° to 54°)
13-986-150	115/60, 5.0	12° to -20° (-4° to 10°)

NOTE: Amps listed are at normal run mode, starting amps may be higher.

Unpacking

Save all packing material if apparatus is received damaged. This merchandise was carefully packed and thoroughly inspected before leaving our factory.

Responsibility for its safe delivery was assumed by the carrier upon acceptance of the shipment; therefore, claims for loss or damage sustained in transit must be made upon the carrier by the recipient as follows:

Visible Loss or Damage

Note any external evidence of loss or damage on the freight bill, or express receipt, and have it signed by the carrier's agent. Failure to adequately describe such external evidence of loss or damage may result in the carrier's refusing to honor your damage claim. The form required to file such a claim will be supplied by the carrier.

Concealed Loss or Damage

Concealed loss or damage refers to loss or damage which does not become apparent until the merchandise has been unpacked and inspected. Should either occur, make a written request for the carrier's agent within 15 days of the delivery date; then file a claim with the carrier since the damage is the carrier's responsibility.

If you follow the above instructions carefully, we will guarantee our full support of your claim to be compensated for loss from concealed damage.

DO NOT – FOR ANY REASON – RETURN THIS UNIT WITHOUT FIRST OBTAINING AUTHORIZATION.

Installation

Electrical

**CAUTION**

DO NOT REMOVE, under any circumstance, the grounding prongs from the 3-prong power cord supplied with all units.

**CAUTION**

DO NOT USE electrical extension cords that may result in voltage loss and possible hazardous operation.

Flammable Material Storage and General Purpose units must be connected to a grounded outlet matching the nameplate and /or the information furnished in this manual. If you are not sure about the outlet, you should contact a qualified electrician for assistance. Explosion-Proof units must be hardwired by a qualified electrician.

Explosion-Proof unit should always be connected to a dedicated power source.

Be Advised

**CAUTION**

STORAGE BY USER OF ANY MATERIALS IN THE PRODUCT THAT MAY CAUSE A DETERIORATION OF THE PRODUCT SHALL BE DEEMED TO CONSTITUTE ABNORMAL AND IMPROPER USAGE OF THE PRODUCT FOR PURPOSES OF THIS WARRANTY.

**CAUTION**

BEFORE CONNECTING THE FINAL POWER SUPPLY, CHECK THE ELECTRICAL CHARACTERISTICS OF THE UNIT NAMEPLATE TO SEE THAT IT IS IN AGREEMENT WITH THE POWER SUPPLIED. IN ADDITION, POWER SHOULD BE WIRED TO THE UNIT ACCORDING TO THE ELECTRICAL SCHEMATIC AND ALL APPLICABLE CODES. ONLY QUALIFIED ELECTRICIANS SHOULD WORK ON THE ELECTRICAL PORTION OF ANY UNIT INSTALLATION.

**WARNING**

RISK OF CHILD ENTRAPMENT Before you discard your old refrigerator or freezer:

- Remove door(s).
- Leave the shelves in place so that children may not easily climb inside.

Explosion-Proof Refrigerator and Freezer Installation

IMPORTANT: PLEASE READ CAREFULLY

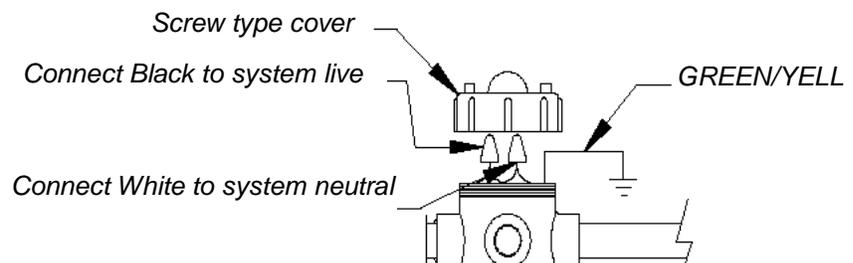
This unit is for free standing installation only. The appropriate materials and wiring methods must be used in order to comply with current NFPA No. 70 NEC. for Class I, Group C and Group D; Class I Zone 1 Group IIB Hazardous Locations and Local Codes.

Determine the total amount of current presently being used by other apparatus connected to the circuit that will be used by this unit. It is critical that this added current must not exceed the rating of the fuse or circuit breaker in use. The Explosion-Proof Refrigerator/Freezer is supplied with a special junction box located on the top rear of the unit.

The National Electrical Code (NEC) must be referred to for proper fusing and service conductor size and type. Power to the unit must be supplied using permanent wire connections, as a line cord is not provided.

The service conductors should be connected to the three conductors inside the junction box by a qualified electrician.

The refrigerator/freezer must be connected to a single phase system with ground. The circuit live is connected to the refrigerator/freezer black while the white connects to the system neutral and green/yellow conductor is grounded.



After all connections are made, carefully fold up the conductors inside the junction box and thread the lid onto it.

Electric Connection Check Points

- Have proper connections been made at the junction box?
- Is the junction box lid fastened tightly to the junction box?
- Are all wire connections secure?
- Are the service conductor sizes adequate to carry rated load?
- Is the unit properly grounded?
- Is the unit connected to a properly fused branch circuit?

How to Seal Killark® Box Conduit with Fiber and Sealing Compound to Help Protect Against Explosions (Explosion-Proof Units Only):

The purpose of the procedure that follows is to build fiber rope dams on the left and right hubs of the horizontal conduit. The fiber rope dams will surround conduit wiring that is housed inside the horizontal conduit. When both the left and right fiber rope dams have been pressed into place, sealing compound is poured between the two and forms into an airtight plug.

All of this is done in order to prevent the very real threat of gas entering the Killark box and a resulting serious explosion. After the unit wires have been pulled through the horizontal conduit the following procedure is required:

- Turn power off at the circuit breaker before proceeding.
- Place a small amount of sealing compound granules, enclosed, into a clean mixing vessel. Add small amounts of water while stirring until a thick paste is formed, then carefully continue adding smaller amounts of water until a thick gravy consistency is achieved—NOT WATERY. Discard any material that becomes too stiff to use. Never attempt to restore workability by stirring in more water.
- Locate silver Killark box, back/top-center of unit.
- Unscrew conduit domed-cover.

Note: KILLARK ® is a registered trademark of Hubbell Incorporated, Shelton, CT, USA.

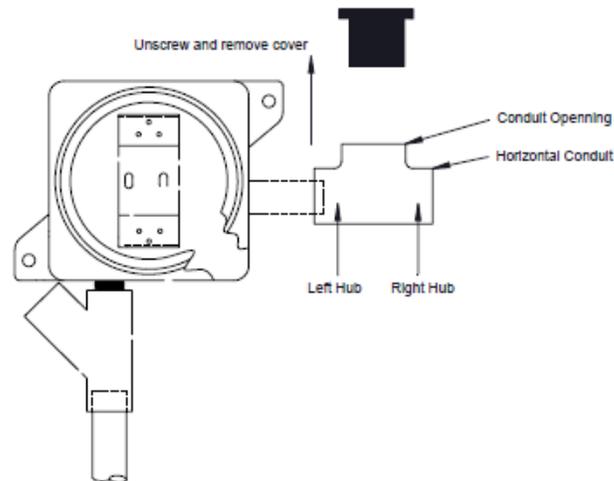


Figure 1: Sealing the Killark Box

INSTALLATION

Note: Wires must be kept separated as shown in the diagrams.

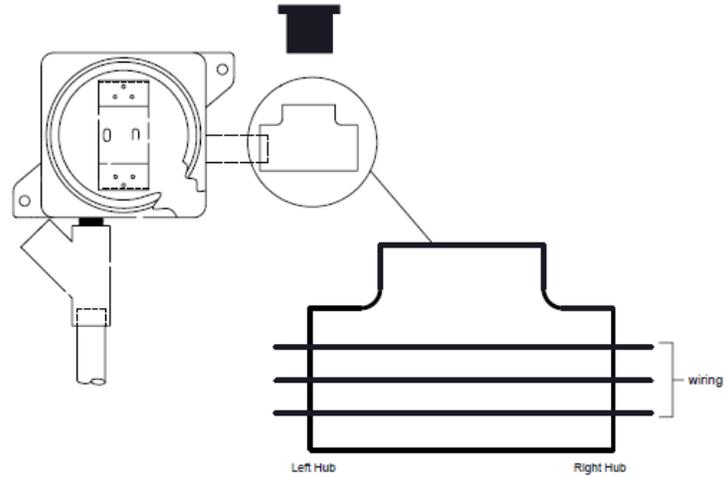
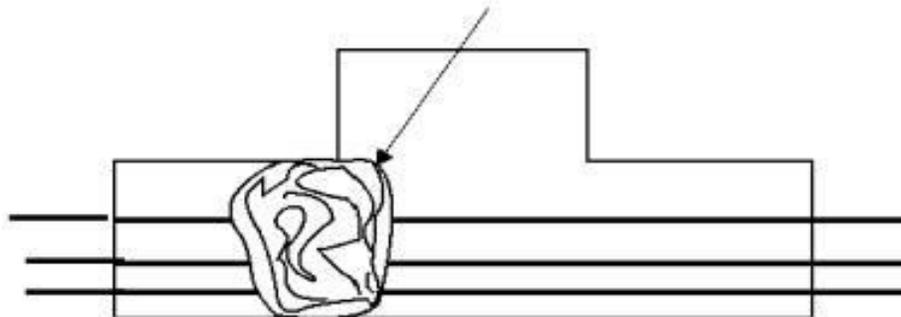
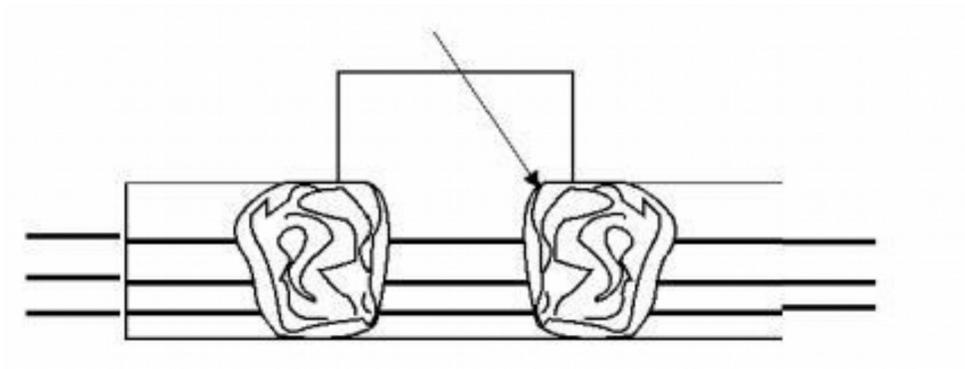


Figure 2: Horizontal Conduit, Cutaway

- Insert fiber rope material down into horizontal conduit opening. Pressing down firmly, work the material into the left hub and—most importantly—being sure the material **COMPLETELY SURROUNDS THE WIRING**, from the top to the bottom, completely blocking this end of the horizontal conduit.



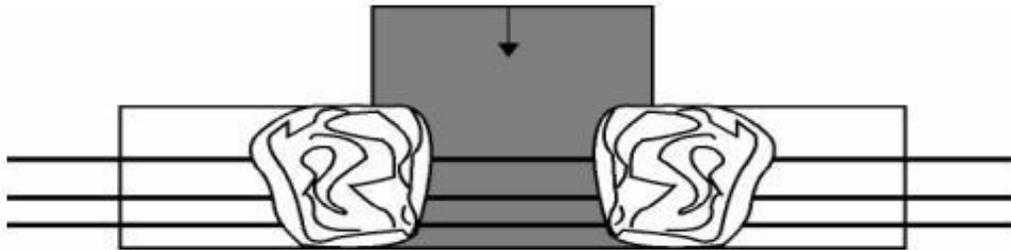
- Insert fiber rope material down into horizontal conduit opening. Pressing down firmly, work the material into the right hub and—most importantly—being sure the material **COMPLETELY SURROUNDS THE WIRING**, from the top to the bottom, completely blocking this end of the horizontal conduit.



INSTALLATION

- Pour sealing compound down in between the two fiber rope dams filling the remaining space. Pour slowly, being careful not to trap air bubbles. Immediately wipe off any spilled sealing compound.
- Screw conduit domed-cover back onto conduit opening.

NOTE: INITIAL SETUP OF SEALING COMPOUND WILL OCCUR IN APPROXIMATELY 30 MINUTES HOWEVER, THE SEALING COMPOUND REQUIRES A MINIMUM OF 8 HOURS ABOVE 32°F TO DEVELOP SUFFICIENT STRENGTH TO WITHSTAND EXPLOSIONS.



Note: Wires must be kept separated as shown in the diagram before addition of the sealing compound.

Selecting a Location

Choose a location for the refrigerator/freezer that will provide a clearance of 4 in. at the top, 8 in. at the rear and 3 in. at each side.

Appropriate electrical power must be available. Locate the refrigerator/freezer within eight feet of the power outlet so that no extension cord is required. Attach the refrigerator/freezer to the facility's electrical supply as directed by the National Electrical Code Article 440.

Leveling the Unit

This refrigerator/freezer must be level in order to provide adequate condensate drainage as well as proper door alignment and operation. The refrigerator/freezer should be in its final operating location and set so that it is firmly positioned on the floor.

Wiring

General purpose units use 15 or 20 amp power cords. They are rated for 115 volts, AC, 60 Hz. Do not use extension cords, and always use a three prong grounded wall outlet. Figure 3 shows standard NE service cord plugs and wall outlets used for our refrigerators and freezers.

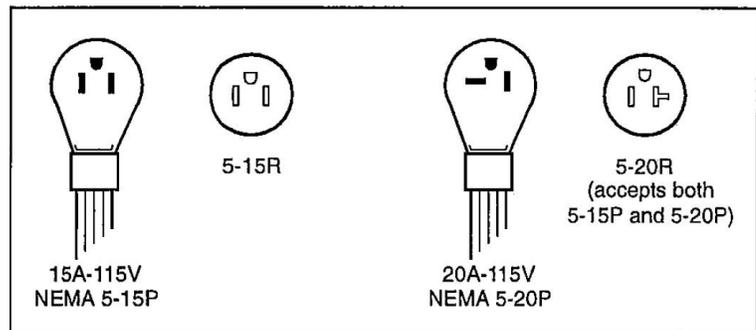


Figure 3. NEMA Plugs and Receptacles

Shelves

For 20ER:

Shipped inside each cabinet are four shelves, one shelf is a sheet metal shelf & others are wired shelves that are fixed.

For 20EF:

Shipped inside each cabinet are four fixed wire shelves which also serve as part of evaporator coils.



CAUTION

Be sure the voltage supplied to the refrigerator/freezer is equal to that specified on the data plate.



WARNING

For personal safety, this unit must be properly grounded before use.

Electrical Connection

Determine the total amount of current presently being used by other apparatus connected to the circuit that will be used by this refrigerator. It is critical that this added current demand and other equipment on this circuit not exceed the rating of the fuse or circuit breaker in use.

The frequency and nominal voltage requirements for the unit are specified on the data plate, which is located on the door's exterior. Only supply this unit with an electrical source that meets these requirements. Low line voltage is often the cause of service complaints. With the unit running, check that the line voltage is within $\pm 10\%$ of that specified on the data plate.

Door Seal

To check the door seal, complete the steps

1. Open the door.
2. Insert a strip of paper (a couple of inches wide) between the door gasket and the cabinet flange and close the door.
3. Slowly pull the paper strip from the outside. You should feel some resistance.
4. Repeat this test at 4 inch intervals around the door. If the door does not seal properly, replace the gasket.

Safety Tips



- After a unit is in operation, do not touch the cold surfaces, particularly when hands are damp. Skin may adhere to the cold surfaces.

We recommend handling samples by wearing gloves to avoid frost bite.



- Never disconnect your unit by pulling on the power cord. Always grip the plug securely and pull straight out from the outlet.



- Do not use a power cord that shows cracks or abrasions. Have a qualified electrician repair or replace damaged cords immediately.

Operation

Temperature Control

To adjust the interior temperature down, simply turn the thermostat knob clockwise.

Condensate Disposal

For EF models

The condensate drain is at the centre rear of the interior floor. The condensate drain tube is connected to this drain and is attached to the left front bottom of the unit behind the front sheet metal. Unhook and place the drain tube into a suitable pan and remove the drain plug. Turn the power to the unit to the off position (O) and allow the unit to defrost.

For ER models

Equipped with a drain pan that collects condensate during manual defrost. This drain pan takes advantage of the heat generated by the compressor to evaporate condensate water, so there is no need to empty the pan during each defrost cycle.

Material Compatibility

The interior cabinet of this unit is constructed of epoxy-coated steel. Care must be exercised when determining which chemicals may be stored in the refrigerator and freezer sections and which type of storage materials should be employed.

ABS Plastic deteriorates when exposed to, but not limited to, the following:

Aliphatic Hydrocarbons; Aromatic Hydrocarbons; Fully and Partially Halogenated Hydrocarbons; Alcohols Monohydric; Phenols; Ketones; Esters; Ethers; Organic Acids (concentrates and dilute); and Concentrated Oxidizing Acids. This information is taken from Plastics Edition 8 Thermoplastics and Thermosets published by D.A.T.A. and The International Plastics Selector, Inc. Cordura Companies 9889 Willow Creek Road P.O. Box 26637 San Diego, California 92126.

Troubleshooting

This table is intended to assist in resolving user-correctable Refrigerator/Freezer problems by relating symptoms to their likely causes. If service beyond the scope of this table is required, contact your nearest Fisher Scientific Service Office.

<u>Symptom</u>	<u>Probable Cause</u>	<u>Action</u>
Does Not Run	Unit Unplugged	Plug in Unit
	Blown fuse or tripped circuit breaker	Check fuse or circuit breaker at breaker box
Runs Continuously	Frost buildup on refrigeration coils	Defrost unit
Clicking Sound	The compressor is equipped with a thermal protector. This device shuts off the compressor when it becomes too hot. A clicking sound occurring about every 30 seconds indicates this protector is working	Disconnect power. Allow refrigeration system time to equalize, then try again. If problem persists, call for service
Insufficient Cooling	Thermostat set too high	Reduce thermostat setting
	Unit frosted	Defrost unit

Maintenance

**CAUTION**

When servicing the unit, disconnect from the electrical power source.

Cabinet Cleaning

The cabinet interior should be cleaned frequently. Any spilled liquid should be wiped off immediately since stains resulting from some spills could be permanent if not quickly removed. The most convenient time to clean the interior is after defrosting.

The exterior of the cabinet should be cleaned occasionally. A mild detergent and lukewarm water or solution of bicarbonate of soda (1 tablespoon per gallon of water) is recommended for cleaning the interior and exterior of the cabinet. All surfaces should be rinsed and thoroughly dried.

Condenser

The condenser coil is located behind the sides and top exterior panel. These surfaces may be warm to the touch. This is necessary to the operation of the refrigeration equipment and is normal.

Warranty

Laboratory instruments and equipment manufactured by Fisher Scientific Company L.L.C. – Laboratory Equipment Division (hereinafter called “the Company”) are warranted only as stated below.

Subject to the exceptions and upon the conditions specified below, the Company agrees, at its election, to correct by repair, by replacement, or by credit to the purchaser, any defect of materials or workmanship which develops within one year (13 months for refrigerator and freezer products) from the date of purchase by the original purchaser by the Company or by an authorized dealer of the Company provided that investigation or factory inspection by the Company discloses that such defect developed under normal and proper use

The exceptions and conditions mentioned above are the following:

- a. The Company makes no warranty concerning components or accessories not manufactured by it, such as tubes, batteries, etc. However, in the event of the failure of any component or accessory not manufactured by the Company, the Company will give reasonable assistance to the purchaser in obtaining from the respective manufacturer whatever adjustment is reasonable in the light of the manufacturer's own warranty.
- b. The Company shall be released from all obligations under its warranty in the event repairs or modifications are made by persons other than its own service personnel or authorized dealer personnel unless such repairs by others are made with the written consent of the Company.
- c. **THE COMPANY MAKES NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, EITHER IN FACT OR BY OPERATION OF LAW,... STATUTORY OR OTHERWISE.**
- d. The above warranty and the above obligations to repair, replace, or credit are complete and exclusive and the Company expressly disclaims liability for lost profits or for special, indirect, incidental, consequential, or exemplary damages of any nature whether attributable to contract, warranty, negligence, strict liability, or otherwise even if the Company has been advised of the possibility of such damages.
- e. Representations and warranties made by any person, including dealers and representatives of the Company, which are inconsistent or in conflict with the foregoing warranty shall not be binding upon the Company unless reduced to writing and signed by an officer of the Company.

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 Thermo Fisher Scientific 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/

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 Fisher Scientific, die Verwerter und Hinweise die Ihnen nützlich sein können, die Thermo Scientific Produkte zu identifizieren, die unter diese RoHS. Anweisung fallen, finden Sie unter www.thermo.com/

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 Fisher 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/

Conformité WEEE. Ce produit doit être conforme à la directive européenne (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 Scientific qui peuvent aider la détection des substances sujettes à la directive RoHS sont disponibles sur www.thermo.com/

Great Britain



Deutschland



Italian



French

