



Refrigerators,
Refrigerator-Freezers and Freezers
Operator's Manual

Table of Contents

Safety Information	3
Alert Signals	3
Intended Use Statement	4
Explosion-Proof Refrigerators and Freezers.....	5
Overview	5
Flammable Materials Storage Refrigerators and Freezers.....	6
Overview	6
General Purpose Laboratory Refrigerators and Freezers	7
Overview	7
Unpacking and Installation	8
Shipping Carton	8
Unpacking	8
Location.....	8
Clearance.....	8
Electrical.....	9
Be Advised	9
Sealing Killark Box Conduit to Help Protect Against Explosions	10
Operation	13
Environmental Operating Conditions	13
Start-Up Procedure	13
Restart Procedure	13
How to Save Energy	14
Safety Tips	14
Material Compatibility.....	15
Troubleshooting	16
Maintenance.....	17
Cleaning of Units.....	17
Interior/Exterior and Door Gaskets	17
Condenser.....	17
Manual Defrost Procedure	18
Replacement Parts.....	19
Ordering Procedures	20
Warranty.....	21

Safety Information

Thank you for selecting Thermo Scientific products for your equipment needs. These instructions contain important operating and safety information. The user must carefully read and understand these instructions before using the unit. Your unit has been designed to optimize function, reliability, safety and ease of use. It is the user's responsibility to install the unit in conformance with local electrical codes.

Alert Signals

I	ON	
0	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	DANGER	Indicates an immediately hazardous situation, which if not avoided, will result in death or serious injury.
 Warning	WARNING	Indicates an immediately hazardous situation, which if not avoided, will result in death or serious injury.
 Caution	CAUTION	(Without Safety Alert Symbol) indicates a situation that may result in property damage.
(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 Statement

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.

Explosion-Proof Refrigerators and Freezers

Overview

Conventional refrigerators and freezers are not only unsuitable for storing flammable materials; they can create potential hazards in a facility. Such units have several components in their electrical and refrigeration systems that can trigger explosions of flammable air-vapor mixtures inside the unit or from the immediate surrounding area.

Explosion-proof refrigerators and freezers are designed for use in Class I areas where groups C and D flammable vapors are likely to be present all or a significant portion of the time in the environment external to the cabinet. Classified areas are designated by the Authority having Jurisdiction (AHJ). In addition, each unit has wiring, splices, thermostats, relays and compressor motors safely housed within an explosion-proof enclosure.

High impact poly styrene Plastic. Each unit is insulated throughout for energy-efficient operation. These units will prevent potentially destructive explosions in any facility by meeting the standards established by Underwriters' Laboratory, Inc., OSHA, and National Fire Protection Association for storage of hazardous materials. They also meet National Fire Protection Standards as found in Articles 500-501 and provide total protection while storing reagents at or below ambient temperature.

Flammable Materials Storage Refrigerators and Freezers

Overview

These units will prevent potentially destructive explosions in any facility by meeting the standards established by Underwriters' Laboratory, Inc., OSHA and National Fire Protection Association for storage of hazardous materials. They also are designed to comply with National Fire Protection Association Standards Nos. 45 and 99, as well as 29CFR1910.307. Flammable Materials Storage Refrigerators/Freezers are manufactured for safe, cold storage of volatile materials.

Flammable Material Storage (FMS) Refrigerators/Freezers will prevent an explosion from occurring inside the unit. These units have no internal electrical components that could trigger an explosion of hazardous materials inside the unit. They are NOT designed for use in Class I, Groups C and D environments. For these locations use an Explosion-Proof Refrigerator.

These units are ideal for storing ethyl ether, acetone, alcohol, benzene, butane, gasoline, hexane, lacquer solvent vapors, naphtha, along with many other potentially hazardous materials. All cabinets have heavy-gauge steel construction with a durable exterior finish of epoxy enamel. A well-insulated cabinet and tight sealing magnetic door prevent air leaks along with helping to lower operating costs. The interior is made of high impact polystyrene plastic

General-Purpose Laboratory Refrigerators/Freezers

Overview

These are general-purpose units available in all refrigerator, all freezer and combination refrigerator/freezer models. These units are intended for basic laboratory use only. Storage of high-value, life science materials or clinical biological may require alarm, monitoring, back-up and temperature performance features. The need to add these features should be determined by your industrial hygienist or safety officer. These units are not suitable for corrosive environments.

Unpacking and Installation

Shipping Carton

This should be inspected upon delivery. When received, carefully examine for any shipping damage before unpacking. If damage is discovered, the delivering carrier should both specify and sign for the damage on your copy of the delivery receipt.

Open the carton carefully making certain that all parts are accounted for before packaging materials are discarded. After unpacking, if damage is found, promptly report it to the carrier and request a damage inspection promptly.

IMPORTANT: Failure to request an inspection of damage within a few days after receipt of shipment absolves the carrier from any liability for damage. You must call for a damage inspection promptly.

Unpacking

Use the list below when unpacking to verify that the complete unit has been received. Do not discard packing materials until all is accounted for.

The following items are included in the shipment:
Refrigerator/Freezer
Operation Manual

Location

Locate your unit in the most convenient place and near a grounded electric outlet. If units are placed on a counter-top, the front should be 3 inches or more back from the edge to avoid accidental tipping of the unit. If possible, locate your unit out of direct sunlight and away from heat sources such as a radiator, stove or heat duct.

Clearance

Position the unit so that there is at least 3 inches clearance on the top, 1 inch at the back, and 0.5 inches on each side. It is recommended that even more space be left at the back of the unit in case maintenance is required.

INSTALLATION



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.



Warning

Explosion-proof units do not come with line cords. They require rigid conduit to be run directly in order to seal off the fitting on thermostat housing. This should be done by a licensed electrician and follow all local electrical codes. If any questions pertaining to electrical safety arise, please refer to article 501 of the National Electrical Code.



WARNING: UNLESS UNIT IS SPECIFICALLY DESIGNED FOR COMBUSTIBLE OR FLAMMABLE ATMOSPHERES DO NOT USE IN THE PRESENCE OF FLAMMABLE OR COMBUSTIBLE MATERIALS OR EXPLOSIVE GASES. DO NOT USE IN THE PRESENCE OF PRESSURIZED OR SEALED CONTAINERS— FIRE OR EXPLOSION MAY RESULT CAUSING DEATH.



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.



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.



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.

Electrical

Flammable Material Storage and General Purpose units must be connected to a grounded outlet matching the name plate 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.

The unit should always be connected to a dedicated power source.

Be Advised

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.

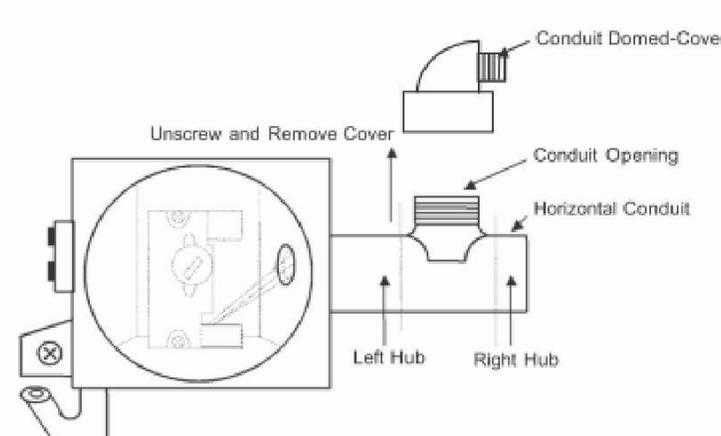
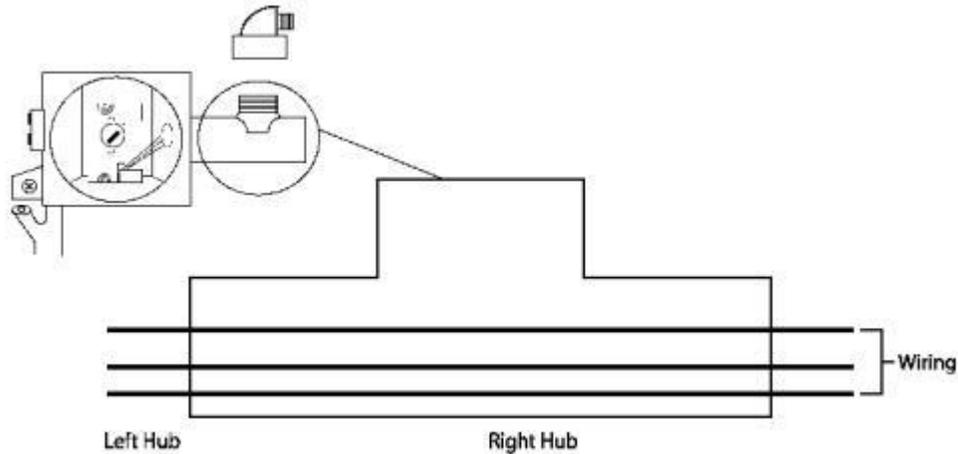


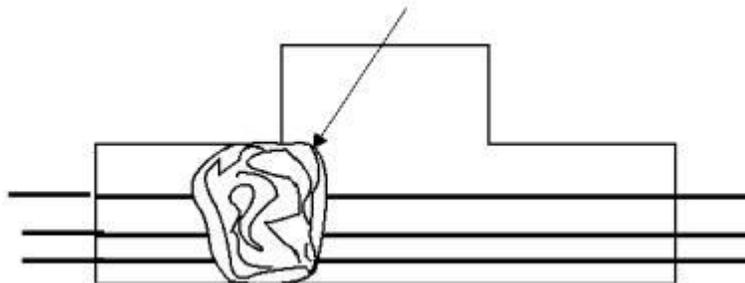
Figure 1: Sealing the Killark Box

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

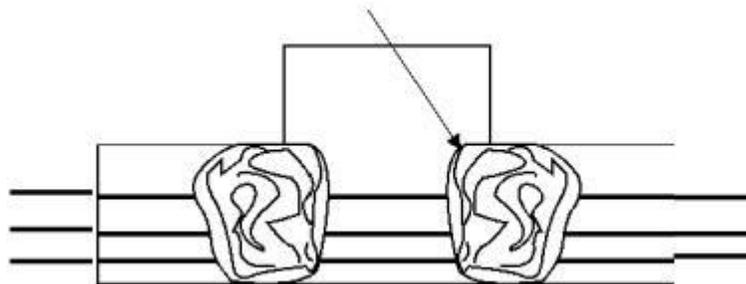
Figure 2: Horizontal Conduit, Cutaway



- 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 SURROUNDNS THE WIRING, from the top to the bottom, completely blocking this end of the horizontal conduit.



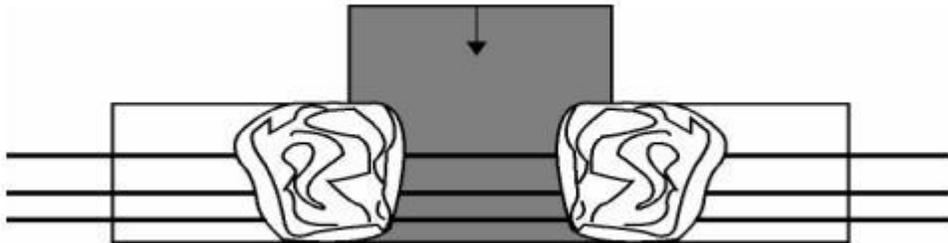
- Insert fiber rope material down into horizontal conduit opening. Pressing down firmly, work the material into the right hub and most importantly being sure the material COMPLETELY SURROUNDS THE WIRING, from the top to the bottom, completely blocking this end of the horizontal conduit.



- 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 diagrams, before adding the sealing compound.

Operation

Environmental Operating Conditions

POLLUTION DEGREE*:	2
INSTALLATION CATEGORY*:	II
ALTITUDE:	2000 Meters MSL (Mean Sea Level)
HUMIDITY:	80% maximum, non-condensing
ELECTRICAL SUPPLY:	115V/60Hz or 230V/50Hz
VOLTAGE TOLERANCE:	±10% of normal rated line
TEMPERATURE:	15°C to 32°C
PRODUCT USAGE:	This product is intended for use indoors only

**Refer to IEC 664-1*

Start-Up Procedure

Rotate the control knob clockwise to lower the temperature and counter-clockwise to raise it.

To check chamber temperature, place a dial thermometer on a shelf in the center of the chamber. Initially, rotate the temperature control knob to an arbitrary setting. Allow approximately 2 hours for the temperature to initially stabilize. Check the temperature and compare with the dial setting.

Adjust dial further to reach the desired operating temperature. After chamber initially stabilizes, allow 1/2 to 1 hour for the chamber temperature to stabilize after subsequent temperature adjustments.

Because the markings on the dial do not indicate specific temperatures, use them AS REFERENCE POINTS ONLY for any future setting of the temperature.

Restart Procedure

If unit is unplugged or turned off, allow 3 minutes before restarting or plugging it back in. If there is a power interruption for 24 hours, keep the door closed to keep the samples frozen.

How to Save Energy

- Be sure to follow location suggestions as mentioned in the previous INSTALLATION section.
- Wipe moisture from glassware or other materials before placing them in a unit.
- Don't overcrowd the unit. Too many items can increase electrical energy demand in order to keep everything cool.
- Close the door as soon as possible in hot, humid weather.
- Make certain that the door is closed tightly.
- As soon as frost has accumulated to 1/4", defrost.
- Keep containers covered, when possible, to reduce moisture buildup.
- Set operating temperature no colder than necessary for the items being refrigerated.

Safety Tips



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



- 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.

Material Compatibility

The interior cabinet of this unit is constructed of High impact polystyrene. 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.

HIPS(High Impact Poly styrene) Plastic deteriorates when exposed to, but not limited to the following:

Amines(Aromatic), Aldehydes (Aromatic , Aliphatic), Ketones (Aromatic , Aliphatic), esters (Aromatic , Aliphatic), Ethers (Aromatic , Aliphatic), Hydrocarbons (Aromatic, Halogenated)

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

In the event that your unit is not operating properly, check the following before calling for service assistance—this may save you the cost of unnecessary service calls.

Symptom	Possible Cause of Problem
Unit not operating.	Make certain that the unit is connected to a grounded outlet. Make certain that temperature control knob is ON. Check that circuit breaker is not tripped or fuse is not blown
Unit runs continuously	Make certain that there is no heavy frost accumulation. If there is, defrost unit. Look at condenser to see if there is layer of dust or lint. Clean if required with a dry brush or vacuum. A leak around the door gasket will allow cold air to escape. This causes unit to work harder than necessary to maintain cold temperatures. Re-seat or replace the gasket if worn. If you have temperature set too cold, this may cause unit to run continuously. Check optimum running temperature. Is the ambient air over 43°C (109°F), or the units located close to heat sources? If possible, move to a different location.
Noise problems.	This can be caused by contents of unit being set too close and rattling against each other. Rearrange contents as needed. Hissing or gurgling noise is caused by refrigerating fluid circulating and is normal. Noise can result if unit is not level on floor. Check with level.

Maintenance



Note

Make no attempt to service or repair product under warranty before consulting your dealer. After the warranty period, such consultation is still advised, especially when the repair may be technically sophisticated or difficult. If assistance is needed beyond what the distributor can provide, please call Customer Service at 800.438.4851. No merchandise should be returned directly to the factory without obtaining a Return Materials Authorization (RMA) number from Customer Service.



Disconnect plug from electrical outlet before attempting any maintenance or repair of this unit. Any internal adjustments or repairs must be performed by a qualified service representative.

Cleaning of Units

- Disconnect power cord from its outlet.
- Set the temperature control to the OFF position.
- The unit designs permit easy and rapid cleaning and should not take more than a few minutes. Remember to wear protective gloves to prevent frost bite, especially when removing items from freezer units.
- Do not use abrasive scouring powders, waxes, solvents, furniture polish, undiluted detergents or cleansers containing petroleum products on the surfaces of units.

Interior/Exterior and Door Gaskets

A solution of mild soap and water can be used for cleaning the interior, exterior and door gaskets with a soft, clean cloth. Rinse with clean water and dry thoroughly before reconnecting and turning on the unit.

Condenser

With forced-fan vented units, remove the screws that mount the grill to the unit. Pull temperature control knobs straight out. This will expose condenser for cleaning.



Caution

Do not use any sharp instrument, blade or scraper to remove ice and frost on refrigerator surfaces because of the very real danger of puncturing the cooling coil.



Caution

Do not use any electrical device to defrost the unit. When frost accumulates to 1/4" or more, the operating efficiency of the unit will be affected.

Manual Defrost Procedure

Use the following procedure to defrost manually:

- Rotate the temperature control knob to the OFF setting.
- Disconnect the power cord from its outlet.
- Remove contents of unit. If practical, wrap contents in paper and then in a heavy blanket to maintain temperature of items, especially those removed from a freezer. Wear protective gloves to prevent frostbite when handling cold items.
- Open door and allow free circulation of ambient air.
- To speed the process, place pan of warm water inside the chamber.
- Wipe out the interior.
- Replace contents.
- Reconnect power cord to outlet and set temperature control to desired operating temperature.

Replacement Parts

To obtain replacement parts information and pricing, please call the Customer Service Department at 800.438.4851 and have the unit's model, serial and code numbers available. This information is located on data plates on the rear of the unit.

Ordering Procedures

Please refer to the Specification Plate for the complete model number, serial number and series number when requesting service, replacement parts or in any correspondence concerning this unit.

All parts listed herein may be ordered from the dealer from whom you purchased this unit or can be obtained promptly from the factory. When service or replacement parts are needed we ask that you check first with your dealer. If the dealer cannot handle your request, then contact our Customer Service Department at 800-438-4851.

Prior to returning any materials, please contact our Customer Service Department for a "Return Materials Authorization" number (RMA). Material returned without an RMA number will be refused.

13 Month Limited Warranty for United States and Canada

This Thermo Scientific product is warranted to be free of defects in materials and workmanship for 13 months from the first to occur of (i) the date the product is sold by the manufacturer or (ii) the date the product is purchased by the original retail customer (the "Commencement Date"). Except as expressly stated above, the MANUFACTURER MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED, WITH RESPECT TO THE PRODUCTS AND EXPRESSLY DISCLAIMS ANY AND ALL WARRANTIES, INCLUDING BUT NOT LIMITED TO, WARRANTIES OF DESIGN, MERCHANT ABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

An authorized representative of the manufacturer must perform all warranty inspections. In the event of a defect covered by the warranty, we shall, as our sole obligation and exclusive remedy, provide free replacement parts to remedy the defective product. In addition, for products sold within the continental United States or Canada, the manufacturer shall provide free labor to repair the products with the replacement parts.

The warranty provided hereunder shall be null and void and without further force or effect if there is any (i) repair made to the product by a party other than the manufacturer or its duly authorized service representative, (ii) misuse (including use inconsistent with written operating instructions for the product), mishandling, contamination, overheating, modification or alteration of the product by any customer or third party or (iii) use of replacement parts that are obtained from a party who is not an authorized dealer of Thermo Scientific products.

Heating elements, because of their susceptibility to overheating and contamination, must be returned to the factory and if, upon inspection, it is concluded that failure is due to factors other than excessive high temperature or contamination, the manufacturer will provide warranty replacement. As a condition to the return of any product, or any constituent part thereof, to the factory, it shall be sent prepaid and a prior written authorization from the manufacturer assigning a Return Materials Number to the product or part shall be obtained.

IN NO EVENT SHALL THE MANUFACTURER BE LIABLE TO ANY PARTY FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, OR FOR ANY DAMAGES RESULTING FROM LOSS OF USE OR PROFITS, ANTICIPATED OR OTHERWISE, ARISING OUT OF OR IN CONNECTION WITH THE SALE, USE OR PERFORMANCE OF ANY PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, TORT (INCLUDING NEGLIGENCE), ANY THEORY OF STRICT LIABILITY OR REGULATORY ACTION.

For the name of the authorized Thermo Scientific product dealer nearest you or any additional information, contact us.

www.thermofisher.com 1-866-9-THERMO