

Instruction Manual

Fisher Scientific
Explosion Proof Refrigerator
13-986-116

Flammable Material Storage Refrigerator
13-986-111

Service Division (Repairs): 1-800-395-5442

Technical Support: 1-800-926-0505

Customer Service: 1-800-766-7000

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Introduction

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.



WARNING: As a routine laboratory precaution, always wear safety glasses when working with this apparatus.

This product is not intended, nor can it be used, as a sterile or patient connected device. In addition, this apparatus is not designed for use in Class I, II or III locations as defined by the National Electrical Code, unless otherwise noted.

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

Applications

Explosion-Proof Refrigerator/Freezers and Flammable Material Storage (**FMS**) Refrigerator/Freezers have distinct features. Understanding the proper application for each is necessary to assure safe operation.

Explosion-Proof Frig/Freezer

The Explosion-Proof Refrigerator/Freezer (13-986-116) has been designed to store volatile or flammable materials and can be used in hazardous locations containing explosive atmospheres. These units are also suitable for storing such volatile materials as ethyl ether, hexane, naphtha, methyl, ethyl ketone, acetone, benzol, butane, gasoline, alcohols, cyclopropane, lacquers, solvents, fuels, pharmaceuticals, and anesthetics.

Explosion-Proof Refrigerators (**13-986-116**) comply with the following:

- A. UL listed, Commercial Refrigerator/Freezer for hazardous locations, control number 3R25.
- B. Suitable for use in Hazardous Locations; Operating Temperature Code T5, Class 1, groups C & D.
- C. Occupational Safety and Health Standards, Federal Registry 6/27/74; 29CFR 1910.307.\

NOTE: This instrument can also be used in non-hazardous areas, where you wish to refrigerate volatile or flammable materials.

FMS Frig/Freezer

The FMS refrigerator/freezer (**13-986-111**) has been designed to provide maximum protection for storing and refrigerating volatile or flammable materials.

When used in a ventilated laboratory, non-hazardous area, this product complies with the following code, Federal Agency Standard and Listing.

- A. National Fire Protection Association Code 45456C-1973.
- B. UL listed, Special Purpose Refrigerator, Control No. 8P62.



WARNING: THIS PRODUCT IS NOT APPROVED TO BE USED IN HAZARDOUS LOCATIONS CONTAINING EXPLOSIVE ATMOSPHERES.

Installation

For proper installation follow the instructions below:

Leveling the Unit

Adjustable legs at the front corners of the refrigerator should be adjusted so that the refrigerator is firmly positioned on the floor and the front is raised just enough that the door closes easily when opened halfway. Turn leveling legs clockwise to raise and counterclockwise to lower, see Fig. 1.

Explosion-Proof Refrigerator Installation.

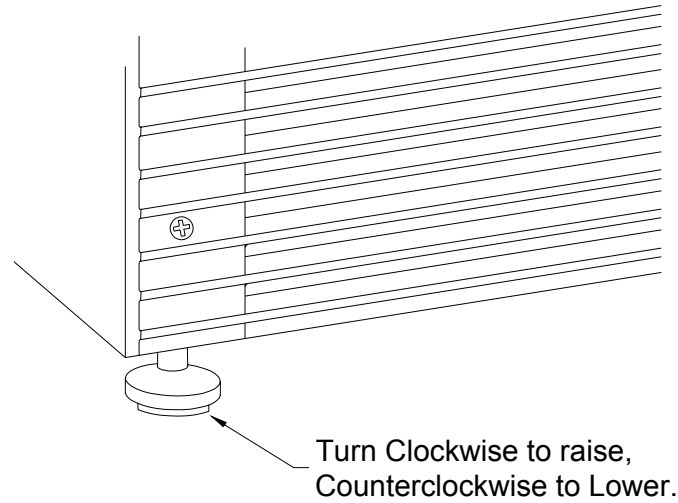


Fig. 1



WARNING: If the unit is tilted in excess of 30 degrees, level the unit, then wait 12 hours before applying power.

Important, please read carefully.



BEFORE ANY ELECTRICAL CONNECTIONS ARE MADE, BE SURE THERE IS NO EXPLOSIVE CONCENTRATIONS IN THE AREA.

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 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 not exceed the rating of the fuse or circuit breaker in use.



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.

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

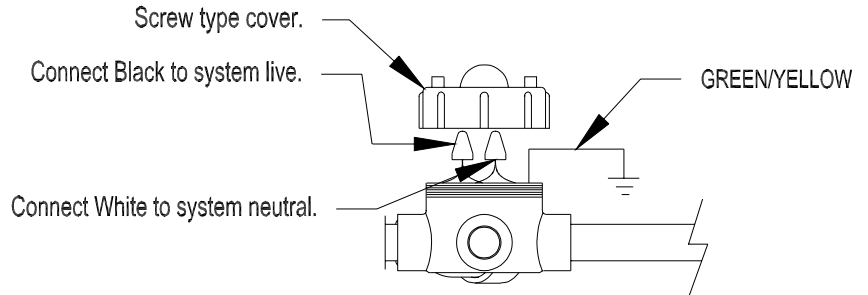


Fig. 2

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?

FMS Refrigerator/Freezer Installation

The power cord on this instrument is equipped with a grounded NEMA 5-15P plug, which must be mated with a NEMA 5-15R grounded receptacle.



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

The power cord of the FMS frig/freezer is equipped with a 3-prong grounding plug NEMA 5-15P, which mates with a 3-prong grounded receptacle, NEMA 5-15R. The customer should have the wall receptacle and circuit checked by a qualified electrician to verify the receptacle is grounded.

Where a 2-prong receptacle is encountered, it is the responsibility of the customer to have it replaced with a properly grounded 3-prong receptacle.

Loading Procedures



WARNING: Do not under any circumstances, cut or remove the ground prong from the power cord. **DO NOT USE A 2-PRONG PLUG ADAPTOR.**

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 not exceed the rating of the fuse or circuit breaker in use.



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

There is no mechanical air circulating system within this unit. Therefore, if minimum temperature variation is desired, allow clearance between each item for adequate gravity convection air circulation.



CAUTION: The aluminum evaporator and other portions of these units should not be exposed to the corrosive effects of acidic or caustic materials.

Extreme care must be exercised if such materials are stored within to prevent voiding the warranty.



WARNING: Under no circumstances should anyone open the door of this refrigerator or freezer cabinet while in the vicinity of a lit cigarette or a glowing or heated object. The vapor pressure of chemicals is greatly reduced with refrigeration, however vapors may still be present which could ignite in the presence of heated objects.



WARNING: Do no store edible items with chemicals.

Container Requirements

The National Fire Protection Association (N.F.P.A.), Codes 45 and 56C, lists the following requirements for containers and defines flammable or combustible liquids as follows:

Liquids shall be used from and stored in approved containers conforming to the following:

NFPA 45
Maximum Allowable Size of Container

Flammable Liquid Class

Container Type	Class 1A	Class 1B	Class 1C
Glass	1 pint	1 quart	1 gallon
Metal or approved plastic	2 gallons	5 gallons	5 gallons
Safety Cans	2 gallons	5 gallons	5 gallons

Combustible Liquid Class

Container Type	Class II	Class III
Glass	1 gallon	5 gallons
Metal or approved plastic	5 gallons	5 gallons
Safety Cans	5 gallons	5 gallons

Flammable liquid shall mean a liquid having a flash point below 100°F (37.8°C) and having a vapor pressure not exceeding 40 lbs. per square inch. (absolute) at 100°F (37.8°C) and shall be known as Class I liquid.

Combustible liquid shall mean a liquid having a flash point above 100°F (37.8°C).

NFPA 45 prohibits storage of more than 2 gallons of Class I or Class II liquids in safety cans in "instruction labs".

NFPA 56C
Maximum Allowable Size of Container

Flammable Liquid Class

Container Type	Class 1A	Class 1B	Class 1C
Glass or approved plastic (1)	1 pint (2)	1 quart (3)	1 gallon
Safety Cans	1 gallon	2 gallons	2 gallons

Combustible Liquid Class

Container Type	Class II	Class III
Glass or approved plastic	1 gallon	1 gallon
Safety Cans	2 gallons	2 gallons

- (1) Gravity feed containers not permitted.
- (2) Containers sized at 500ml may be alternately used.
- (3) Containers sized at 1 liter may be alternately used.

Flammable liquid shall mean any liquid having a flash point below 140°F and having a vapor pressure not exceeding 40 pounds per square inch (absolute) at 100°F.

Combustible liquids shall mean any liquid having a flash point at or above 140°F (60°C) shall be known as Class III liquids.

Class I liquids shall include those having a flash point below 100°F and may be subdivided as follows:

- a. Class 1A shall include those having flash points below 73°F and having a boiling point below 100°F.
- b. Class 1B shall include those having flash points below 73°F and having a boiling point at or above 100°F.
- c. Class 1C shall include those having flash points at or above 73°F and below 100°F.
- d. Class II liquids shall include those having flash points at or above 100°F and below 140°F.
- e. Combustible liquids shall mean any liquid having a flash point at or above 140°F (60°C), and shall be known as Class III liquids. Class IIIA shall include those having flash points at or above 140°F (60°C) and below 200°F (93.4°C). Class IIIB shall include those having flash points at or above 200°F (93.4°C).

The volatility of liquids is increased when artificially heated to temperature equal to or higher than their flash points. When so heated, Class II or Class III liquids shall be subject to the applicable requirements for Class I or II liquids.*

Under both codes, it is permissible to store Class 1A and 1B flammable liquids in glass containers of not more than one gallon capacity if the required liquid purity would be affected by storage in metal containers or if the liquid would cause excessive corrosion of the metal container.

* Reproduced by permission from the standard, "Laboratories in Health Related Institution," (NFPA 56C), Copyright 1973 and "Laboratories Using Chemicals," (NFPA 45), Copyright 1975, National Fire Protection Association, Boston, MA 02210.

Operation

The refrigerator and freezer sections of the unit each have a separate access door. The freezer section is located in the upper section of the unit.

The refrigerator/freezer is energized through a thermostat on the top of the unit. The thermostat dial on the Explosion-Proof model, can be accessed by removing two screws on the front of the dial cover.



WARNING: Never open the screw type cover to gain access to the thermostat in order to change temperature settings or perform any kind of service unless electrical power to the unit has been turned OFF and the surrounding area has been cleared of combustible vapors. See Fig. 2.

The graduated thermostat dial on these units is not meant to be a direct indicator of operating temperatures. Also, reference settings and resultant temperatures may vary slightly from unit to unit, and it may be necessary to make slight adjustments when seasonal or drastic changes occur in ambient conditions.

The following reference setting and associated temperatures are offered only as a guideline.

Explosion-Proof Refrigerator/Freezer

<u>Dial Setting</u>	<u>Chamber Temp</u>
7	4.5°C
4	7.0°C
1	16.0°C

FMS Refrigerator/Freezer

<u>Dial Setting</u>	<u>Chamber Temp</u>
0	1.0°C
5	5.0°C
10	10.0°C

Maintenance

At colder settings in humid atmospheres or after prolonged use, it may become necessary to defrost the unit. Defrost the unit when any frost becomes ¼" to ½" thick. Defrosting may become necessary more often if doors are opened more frequently or the unit is operating in a high humidity condition.

Defrosting

To defrost the unit, remove the contents from the refrigerator/freezer and adjust the temperature control full *clockwise* for the Explosion-Proof Refrigerator and *counter clockwise* for the FMS Refrigerator. Allow the unit several hours to completely defrost. While the refrigerator is defrosting, water will collect in the base of the unit. Sponge up the water as it collects in the bottom compartment.

Cleaning

Also, place a folded towel at the front of the compartment to soak up water that would otherwise run down the front of the refrigerator.

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.

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.

Surfaces should be rinsed and dried carefully and thoroughly.



CAUTION: Do not use sharp or pointed instruments as a scraper. Damage to the evaporator may occur.

CAUTION: Do not use any type of abrasive such as steel wool or fluids such as gasoline, naphtha, or paint thinner that could be harmful to plastic materials, door gasket and/or painted surface.

The exterior of the cabinet should be cleaned occasionally with a damp cloth of mild detergent and water. Do not use an abrasive or harsh detergent on these surfaces.

Clean door gaskets with mild suds, rinse with clear water and wipe dry.

Cleaning Behind the Unit



Always disconnect power to the unit when moving the refrigerator to clean behind it.

Place a hard surfaced strip under the front legs to prevent damage to the floor covering. Carefully move the unit straight out. If necessary, vacuum the wire and tube condenser on the back of the refrigerator.

Cleaning the Defrost Pan

The defrost water pan, located on the top of the compressor at the rear of the refrigerator, should be cleaned at least once a year. Simply empty and wipe clean with a damp cloth. **DO NOT REMOVE THE PAN.**

After cleaning, move the refrigerator back into position, reconnect power to the unit, and turn the thermostat knob to the desired setting.

Troubleshooting

If the refrigerator is not operating properly, it may be a minor problem that is easily corrected. A few things to check are as follows:

A. Does not run, be sure that:

- 1. Thermostat knob is positioned to cool refrigerator.
- 2. Power is connected to unit.
- 3. Circuit breaker or fuse has not been blown.

B. Runs continuously:

- A. If the unit gets too cold from continuous running, turn the control knob to a warmer setting. Clockwise for Explosion-Proof refrigerators and counter clockwise for FMS refrigerators.
- B. If constant running does not cool cabinet adequately, check for heavy frost build-up on the refrigeration coil.

C. Noise:

The refrigerator/freezer has been designed for operation at a minimum noise level. All mechanical refrigerators make some noise, but this does not necessarily indicate trouble. Hissing, gurgling and churning noises (low level) are caused by the circulation of refrigerating gases within the system and are normal.

D. Clicking Sound:

In case the compressor overheats, a safety device will shut of the motor, thereby preventing damage. This safety device, a thermal protector, functions to prevent damage to the motor windings in case of overload, overheating or improper power supply. A clicking sound occurring about every 20 seconds, indicates that the thermal protector is functioning. If this happens, turn the unit off and turn off the power supply to the unit. The problem causing this action must be corrected before the unit is put back into service.

E. Low Voltage:

In certain areas the voltage may be subject to fluctuation. Low voltage is one of the major causes of refrigeration failure. Low or fluctuating voltage may be the result of overloaded power lines or inadequate wiring. This condition may be noticed only during certain periods; and should it occur, we recommend contacting the local power company and/or a electrician.

F. Insufficient Cooling:

<u>Cause</u>	<u>Remedy</u>
Unit frosted	Defrost
Thermostat set at warm setting	Change thermostat to colder setting.
Condenser coil is dirty	Clean with vacuum

NOTE: If the above actions do not correct the problem, contact Fisher Service @ 1-800-395-5442.

Technical Specifications

Temperature Range..... 39 to 55.4°F (4 to 13°C)

Capacity

Net storage volume –Frig..... 11Ft³ (311 liters)
Freezer 2.4 Ft³ (68 liters)

Construction

Exterior Enameled Steel
Interior ABS Plastic
Insulation Foamed Polyurethane
Door Gasket Magnetic Soft Vinyl
Shelves (3) Steel Wire
New Weight 143 lbs. (65 kg)

Refrigerant

R134A, Charge 7.2 oz.

NOTE: Product specifications are those in effect at the time of this publication. Fisher Scientific reserves the right to make additions, deletions or changes in the product line without notice.

Part No. 102569 Rev A
Isotemp Laboratory Freezers
Published: 2/2002

Fisher Scientific Co.
2000 Park Lane
Pittsburgh, PA 15275-112