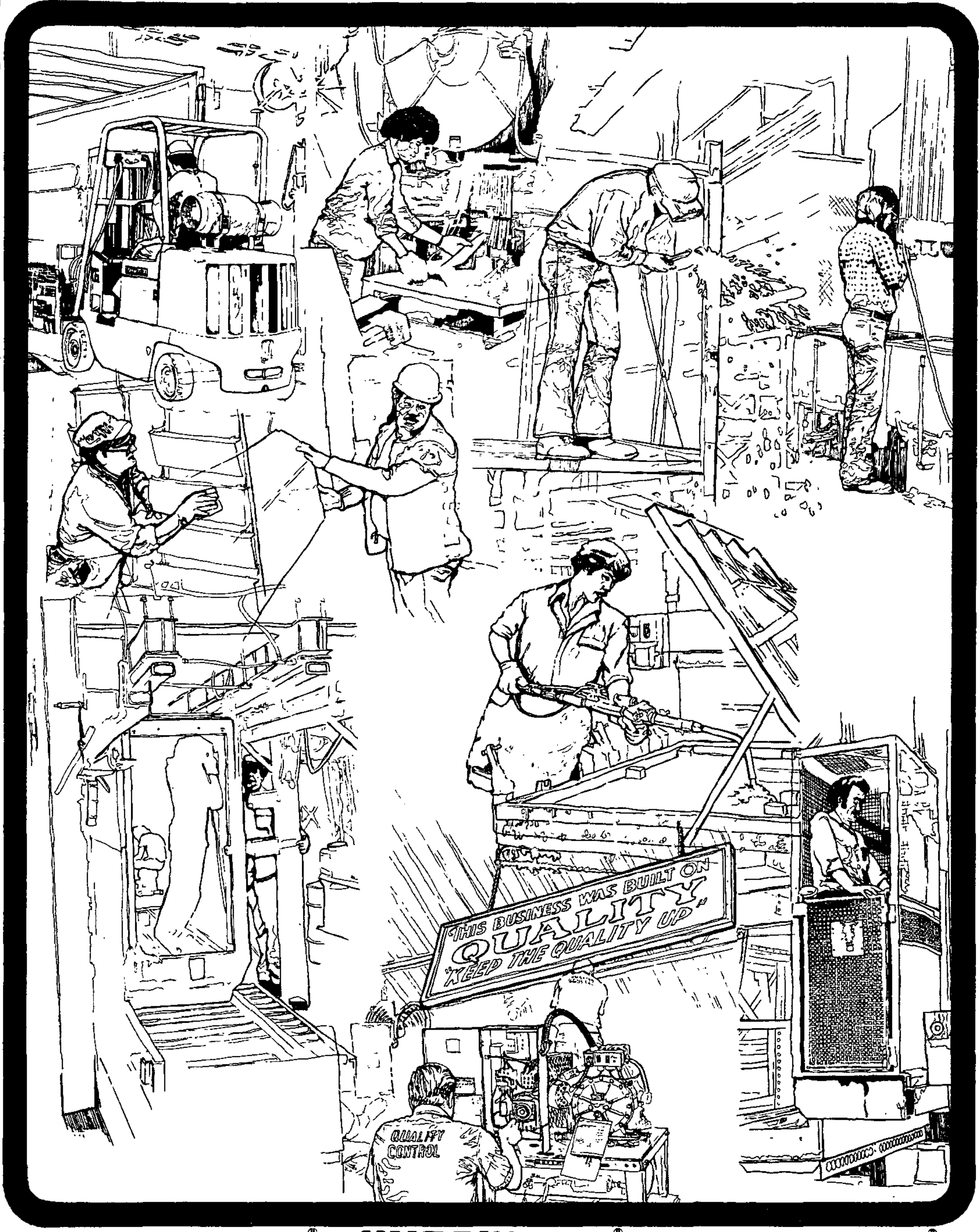


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VBS, VBL, VBK, VBT

REFRIGERATED
DELICATESSEN
MERCHANDISERS

INSTALLATION / SERVICE INSTRUCTIONS

ENG. NO. 250990H
February, 1989
Supersedes #250990G
Dated March, 1988
Section 2

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REVISION CHANGES ("H")

1. R-502 standard, page 8
2. Control adjustments changes, pages 11 and 12
3. Parts List, page 19

SECTION 1GENERAL INFORMATIONMODEL DESCRIPTION

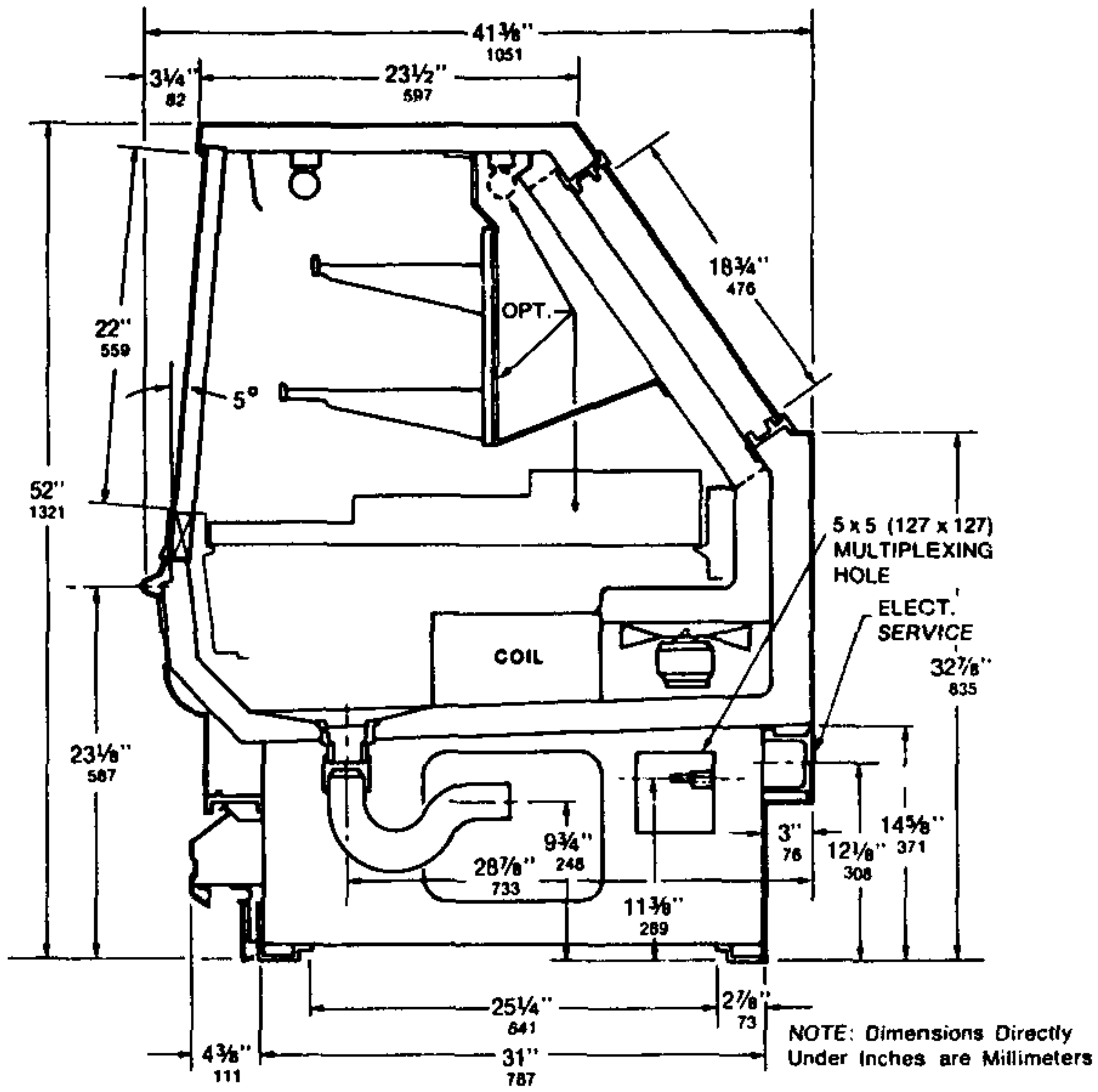
These refrigerated merchandisers, with their full length "VU-MOR" glass enclosed fronts, are designed specifically for delicatessen service departments. The following table provides a brief description of each model. All models are available in either 8' or 12' lengths.

MODEL	DESCRIPTION
VBS	HAS 22" WIDE FRONT GLASS
VBL	HAS 25" WIDE FRONT GLASS
VBK	HAS 29" WIDE FRONT GLASS
GBT	HAS 25" WIDE FRONT GLASS AND GLASS TOP LEDGE

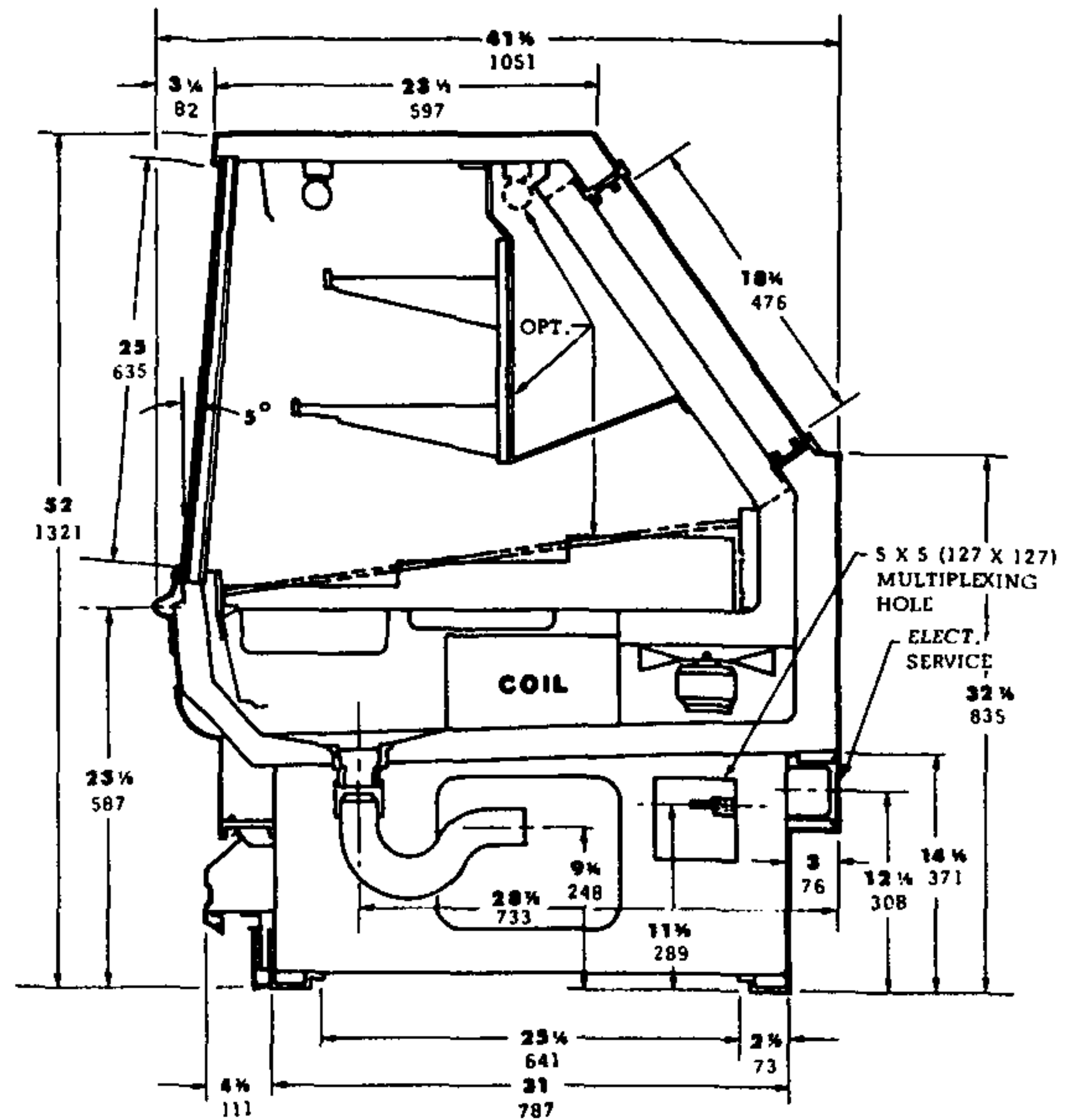
APPLICATION

These refrigerated merchandisers have been designed for use only in air conditioned stores where temperature and humidity are maintained at or below 75°F and 55% relative humidity.

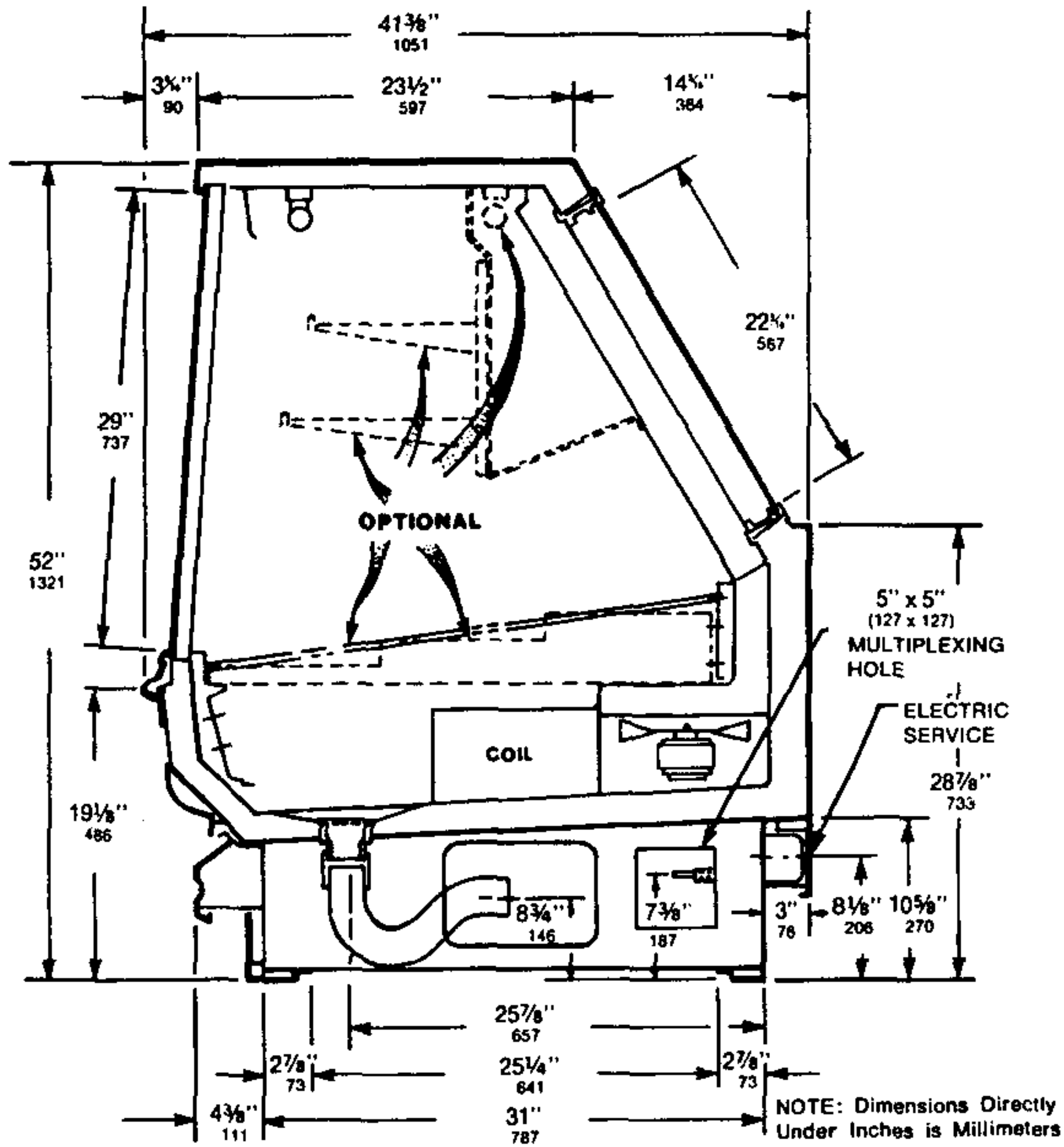
Product temperature should always be maintained at a constant and proper temperature. This means that from the time the product is received, through storage, preparation and display, the temperature of the product must be controlled to maximize the life of the product.



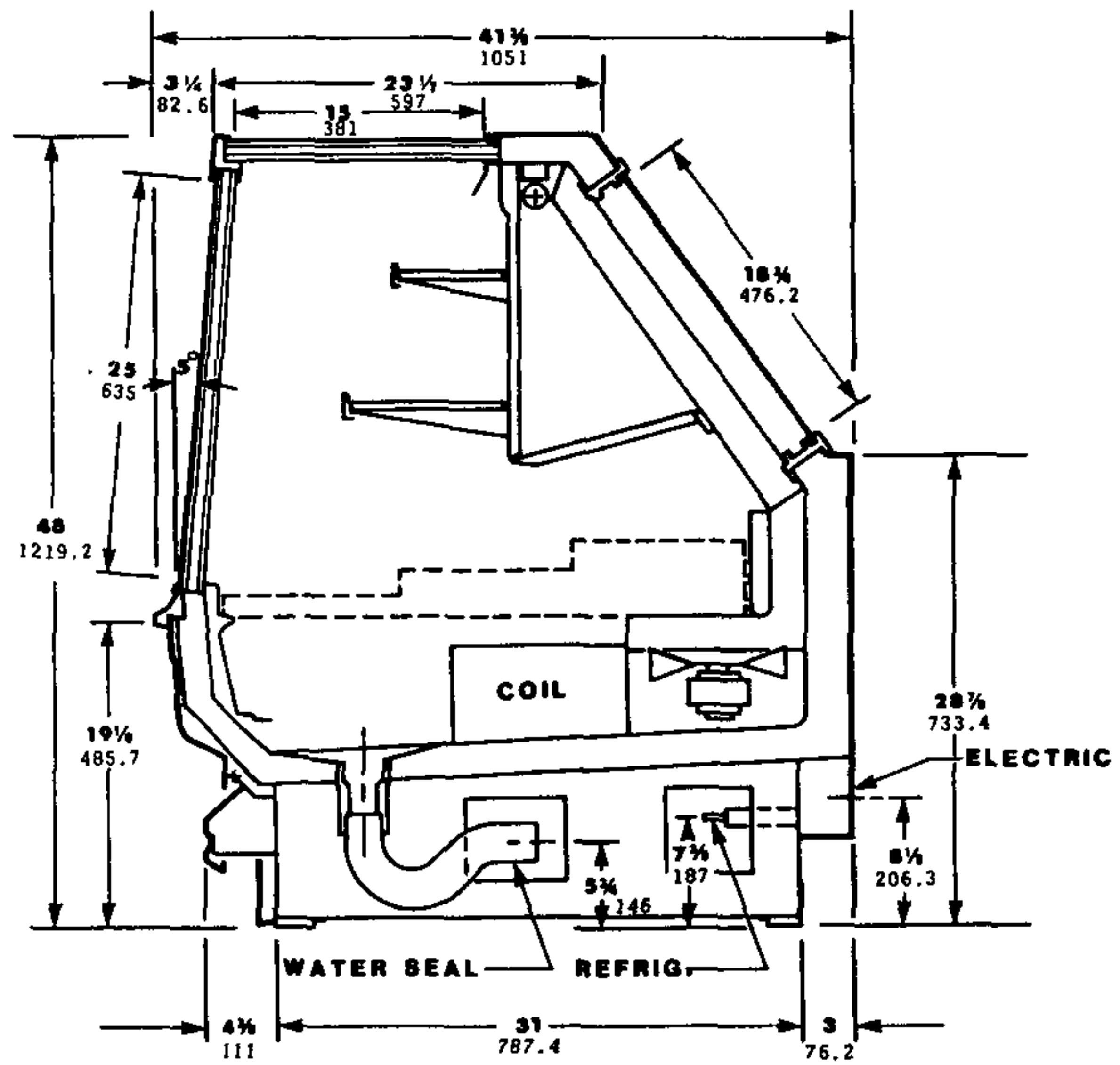
VBS



VBL

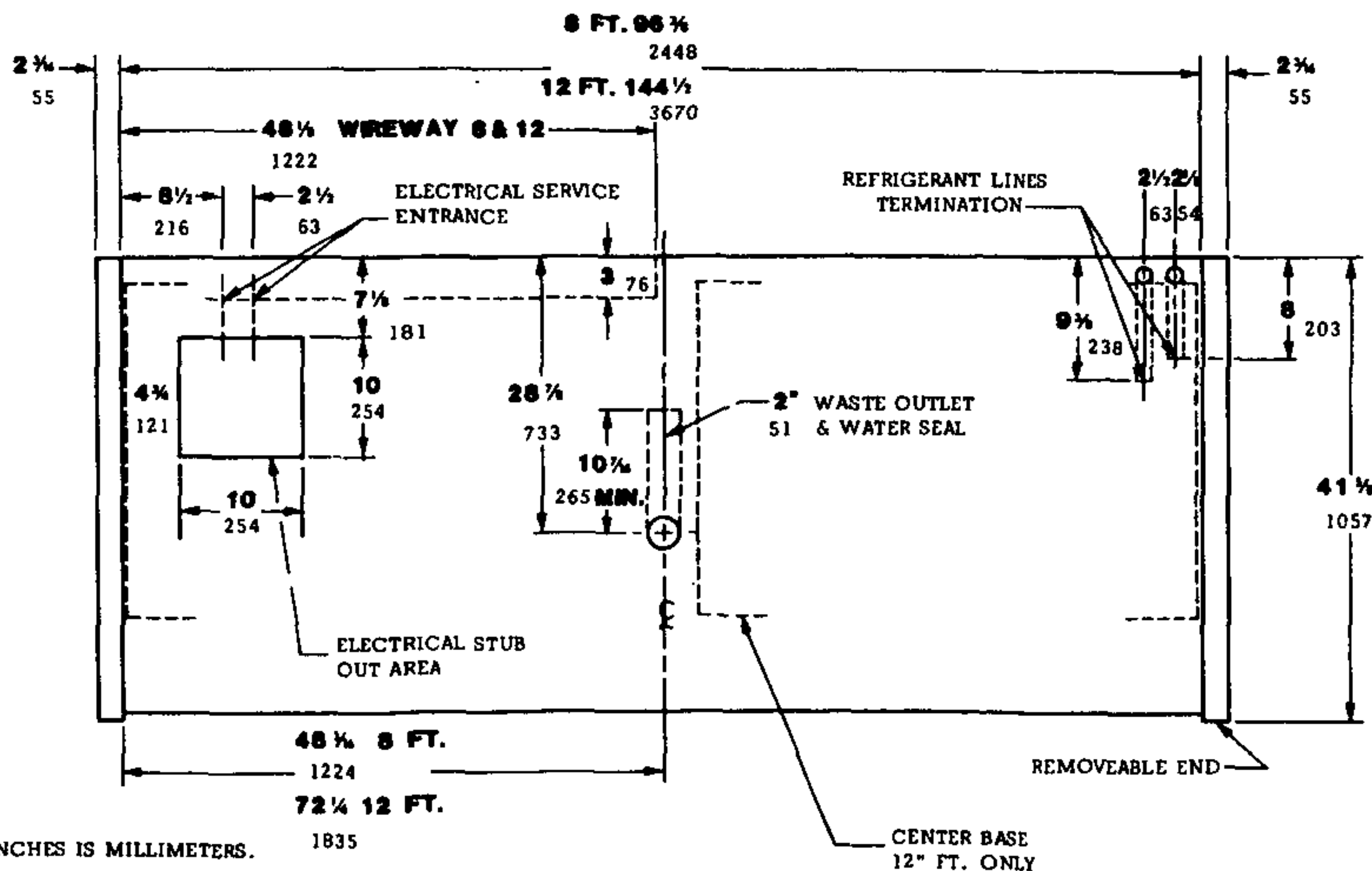


VBK



VBT

PLAN VIEW



NOTE: DIMENSIONS DIRECTLY UNDER INCHES IS MILLIMETERS.

SECTION 2

INSTALLATION

SHIPPING DAMAGE

All equipment should be thoroughly examined for shipping damage before and when unloading.

This equipment has been carefully inspected at our factory and the carrier has assumed responsibility for safe arrival. If damaged, either apparent or concealed, claim must be made to the carrier.

APPARENT LOSS OR DAMAGE

If there is an obvious loss or damage, it must be noted on the freight bill or express receipt and signed by the carrier's agent, otherwise, carrier may refuse claim. The carrier will supply necessary claim forms.

CONCEALED LOSS OR DAMAGE

When loss or damage is not apparent until after equipment is uncrated, a claim for concealed damage is made. Upon discovering damage, make request in writing to carrier for inspection within 15 days and retain all packing. The carrier will supply inspection report and required claim forms.

SHIPPING BRACES

Move the fixture as close as possible to its permanent location and then remove all packaging and shipping braces. Remove all separately packed accessories such as kits, shelves, etc..

LOCATION

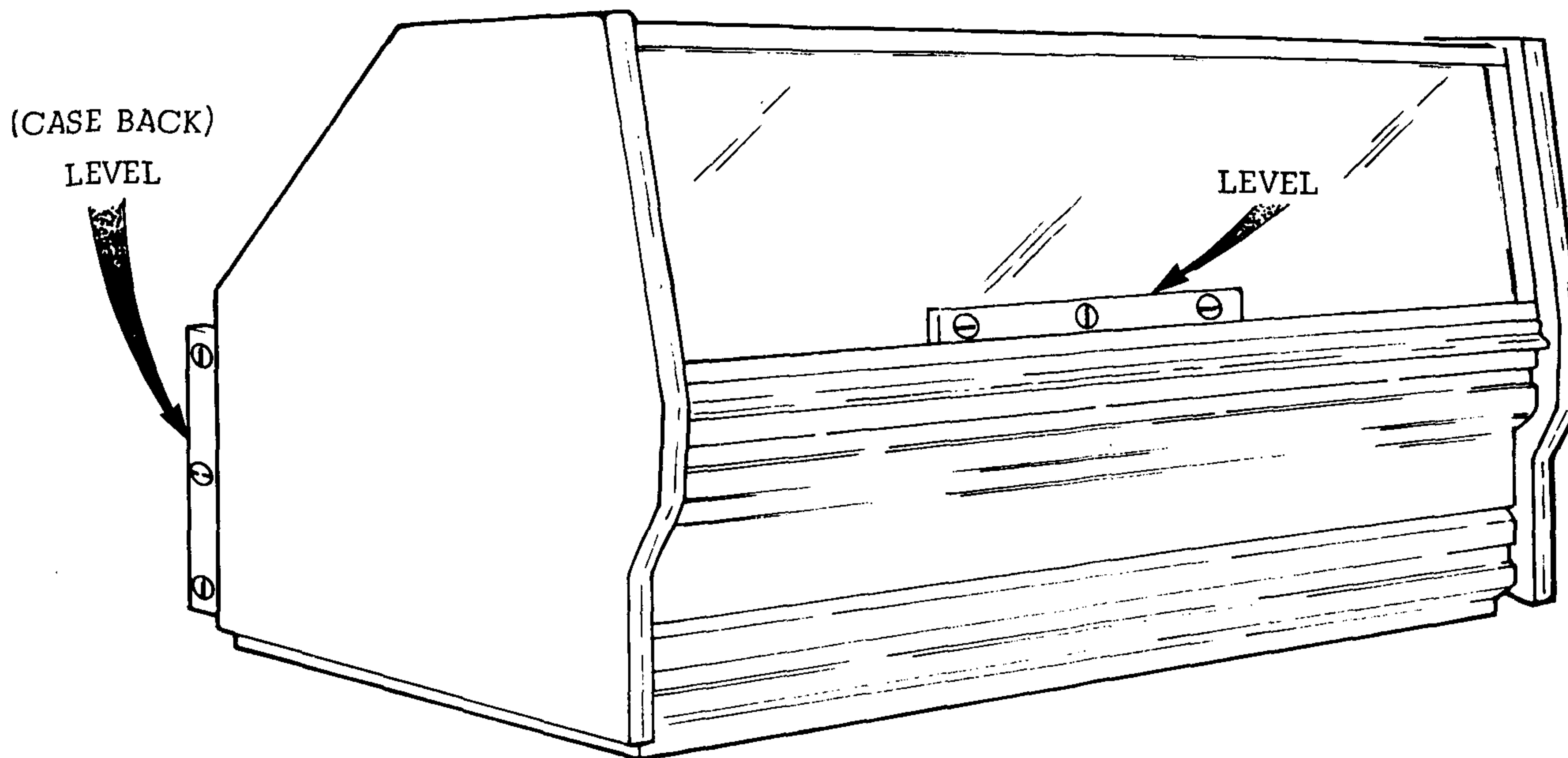
This refrigerator, like all other refrigerators, is sensitive to air disturbances. Air currents passing around the refrigerator will seriously impair its performance. Do not allow air conditioning, electric fans, open doors or windows, etc. to create air currents around this refrigerator.

LEVELING

This refrigerator must be installed level to insure proper operation of the refrigeration system and drainage of defrost water. Use a carpenter's level as shown in the following illustration when leveling. Leveling shims have been provided, if needed.

ANCHORING

These refrigerators do not require anchoring.



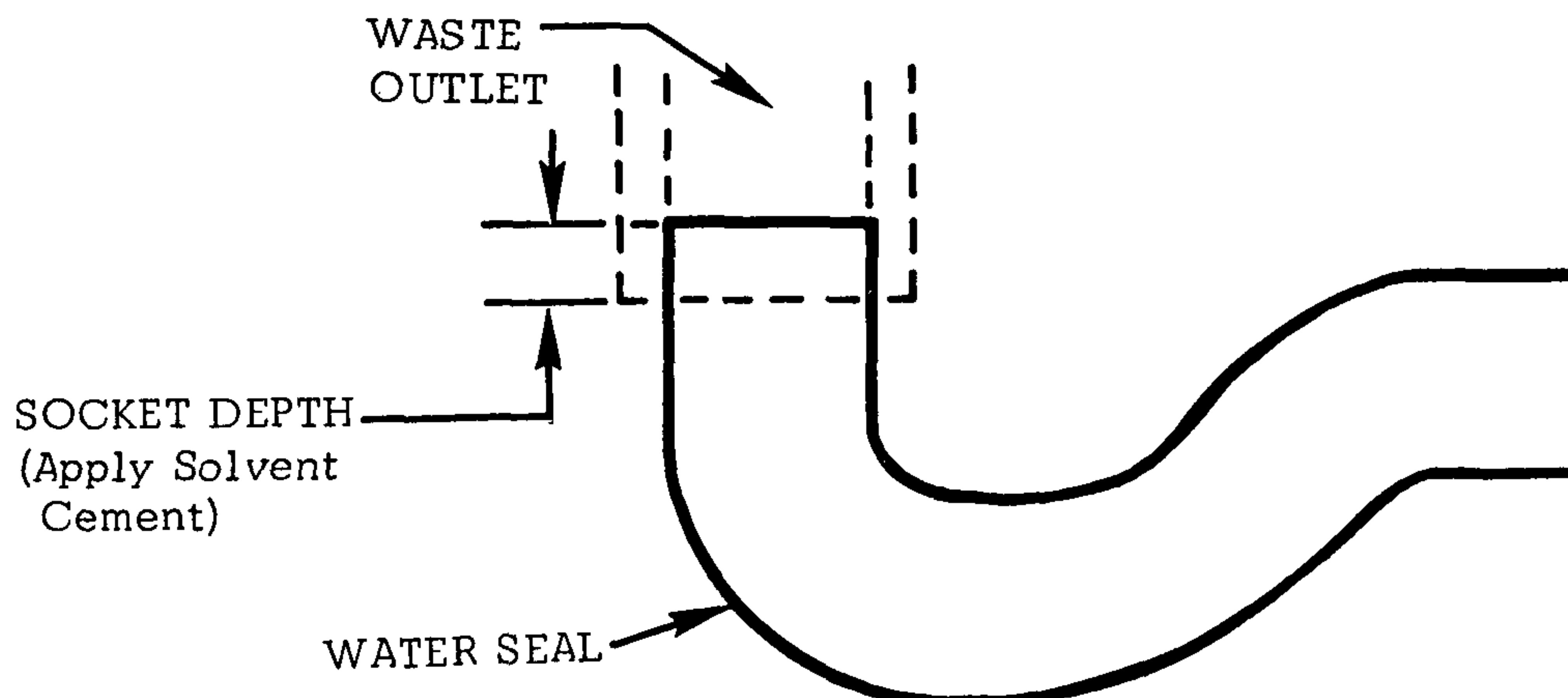
JOINING

This refrigerator is of sectional construction, which means that two or more of these refrigerators may be joined in line yielding one long continuous display that requires only one pair of end assemblies.

WASTE OUTLET AND WATER SEAL

The waste outlet is located at the center of the refrigerator. A 2" ID plastic water seal has been shipped with each refrigerator, to which field supplied drip piping is to be installed. The water seal is to be field installed and oriented in the desired direction.

PVC/DWV solvent cement is recommended for drip pipe installation. Follow the manufacturer's instructions.



INSTALLING DRIP PIPING

Poorly or improperly installed drip piping can seriously interfere with the operation of this refrigerator and result in costly maintenance and product losses. Please follow the recommendations listed below when installing drip piping to insure a proper installation.

- A. Never use pipe for drip piping that is smaller than the diameter of the pipe or waste outlet supplied with the refrigerator.
- B. Never use two water seals in series in any one run of drip piping. Double water seals will act as an air lock and prevent draining.
- C. Provide as much downhill slope (fall) as possible, 1/8" per foot is preferred. Plastic piping must be supported to maintain the slope and prevent sag.
- D. Avoid long runs of drip piping. Long runs make it impossible to provide the necessary slope.
- E. Provide a suitable air break between the flood rim of the floor drain and the outlet of the drip piping.
- F. Prevent drip pipes from freezing.

INSTALLING SPLASHGUARD

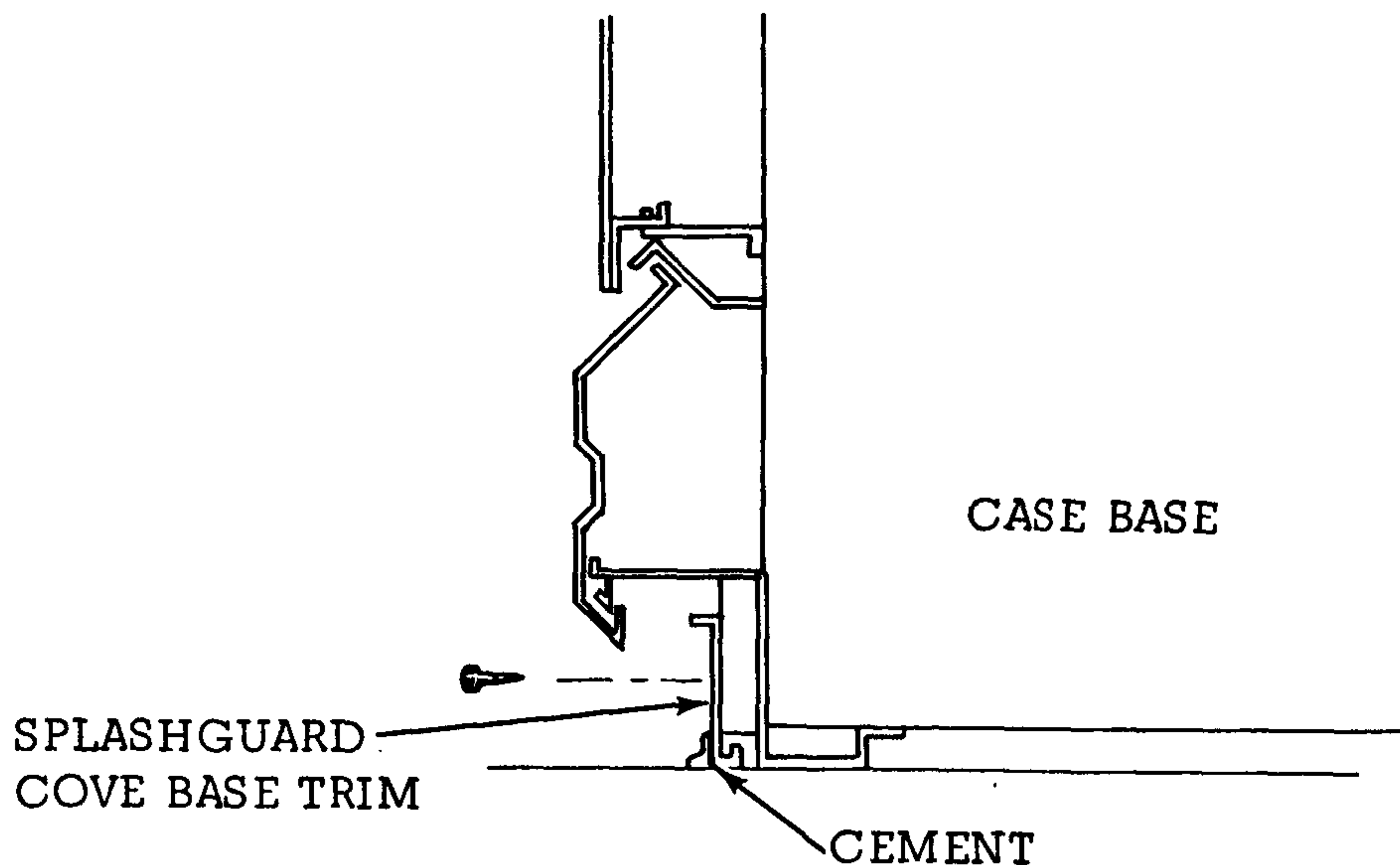
After cases have been leveled and joined and refrigeration and waste piping work completed, install the splashguards (shipped inside of refrigerators). Fasten along the top edge with #8X1/2 sheet metal screws as shown below.

SEALING SPLASHGUARDS TO FLOOR

If required by local sanitation codes or if the customer desires, the splashguards may be sealed to the floor using a vinyl cove base trim. The size of the trim needed will depend on how much the floor is out of level.

To install the trim to the splashguard:

- A. Remove all dirt, wax and grease from the area of the splashguard where adhesion will be necessary. This is to insure a good and secure installation.
- B. Apply a good adhesive to the trim and allow proper drying time according to the directions supplied with the product.
- C. Install the trim to the splashguard so that it is lying flush with the floor.



SECTION 3**REFRIGERATION****REFRIGERANT**

These refrigerators will be equipped for operation on R-502 refrigerant unless otherwise specified on the factory order. The correct type of refrigerant will be stamped on the refrigerators serial plate located at the left hand end on the exterior back.

REFRIGERANT PIPING

LINE SIZES: Liquid Line 3/8" OD
 Suction Line 7/8" OD

OUTLET LOCATION

The refrigerant line outlet is located beneath the refrigerator, at the right hand end, as viewed from the front.

LINE SIZING

Refrigerant lines should be sized as shown on the refrigeration legend that is furnished for the store (not furnished by Hussmann). If a legend has not been furnished, refer to the Hussmann Application Engineering Manual for guidance.

OIL TRAPS

"P" traps (oil traps) must be installed at the base of all suction line vertical risers.

PRESSURE DROP

Pressure drop can rob the system of capacity. To keep the pressure drop to a minimum, keep the refrigerant line run as short as possible using a minimum number of elbows. Where elbows are required, use long radius elbows only.

INSULATION

For refrigerators with Off-Time defrost, the suction and liquid lines should be clamped or taped together and insulated for a minimum of 30 ft. from the refrigerator. Additional insulation for the balance of the lines is recommended wherever condensation drippage is objectionable.

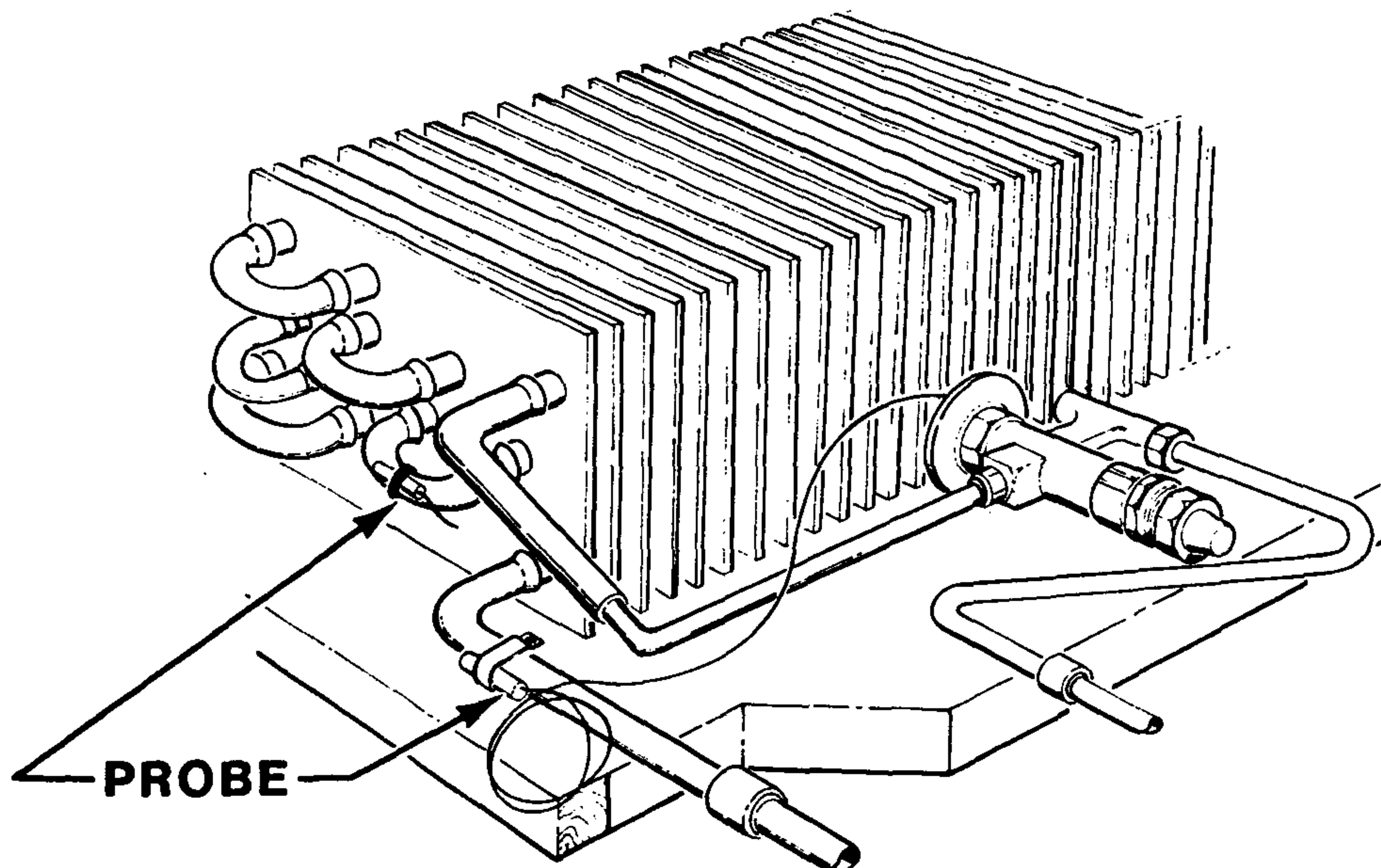
REFRIGERATION PARTS LIST (Sporlan Nomenclature)

MODEL	TYPE OF DEFROST	REFRIGERANT	BALANCED PORT EXPANSION VALVE
ALL 8' MODELS	Off Time	R-502 R-22 R-12	BFR A C BFV A C BFF A C
ALL 12' MODELS	Off Time	R-502 R-22 R-12	BFR A C BFV A C BFF A C

EXPANSION VALVE ADJUSTMENT

Expansion valve must be adjusted to fully feed the evaporator. Before attempting to adjust the valve, make sure the evaporator is either clean or only lightly covered with frost, and that the fixture is within 10°F of its expected operating temperature. Adjust the expansion valve as follows:

Attach two sensing probes (either thermocouple or thermistor types) to the evaporator, one under the clamp holding the expansion valve sensing bulb and the other securely taped to one of the return bends two thirds of the way through the evaporator circuit (see illustration). Some "hunting" of the expansion valve is normal. The valve should be adjusted so that during the hunting the greatest difference between the two probes is 3° to 5°F. Remove valve stem cover and turn valve stem counter-clockwise to decrease temperature difference between the probes. To increase temperature of probes, turn valve stem clockwise. With this adjustment, during a portion of the hunting the temperature differences between the two probes may be less than 3°F, or at times as low as 0°F. Make adjustments of no more than one half turn of the valve stem at a time and wait for at least fifteen minutes before rechecking probe temperature and making further adjustments. Replace and tighten cover over valve stem.





CONTROLS AND ADJUSTMENTS

The objective of the controls and settings shown in this section is to maximize the shelf life of the deli products. Failure to follow these instructions will increase the rate of spoilage due to discoloration and drying of the product.

Product temperature should be maintained at a constant proper temperature from the time it is received, through storage, preparation and display. Therefore, proper temperature in the storage cooler and minimum time in the preparation area is essential to maximize the shelf life of these perishables.


-CONVENTIONAL MULTIPLEXING-


REFRIGERATION CONTROL 					DEFROST CONTROL			
PRODUCT TEMPERATURE	THERMOSTAT CUT-OUT (At Bulb)	REFRIGERANT	LOW PRESSURE CONTROL		EVAPORATOR PRESSURE REGULATOR	FREQUENCY	FAILSAFE (Length)	PRESSURE TERMINATION
			CUT OUT	CUT IN				
36°F	22°F	R-502	33 psig	63 psig	61 psig	One Every 24 Hours	60 min.	83 psig

 Refrigeration temperature must be controlled by a combination of an evaporator pressure regulator valve and a thermostat. The thermostat must control the compressor motor contactor, have a differential of 3° to 5°F and have its sensing bulb installed in the discharge air leaving the evaporator.

2. Adjust the refrigeration thermostat to control the temperature slightly below the EPR setting to protect the product at times of reduced loads (lights off, lower ambients. etc.)
3. Set low pressure control as shown. The low pressure control does not control temperature.
4. Set EPR to control evaporator pressure as indicated.
5. Defrosts are time initiated and pressure terminated; time terminated for outdoor units. The defrost timer on outdoor units must be a time terminated type and control a liquid line solenoid for pumpdown prior to defrost only. The failsafe then becomes the defrost length and must be increased 4 minutes to compensate for the pumpdown period.

-MIXED MULTIPLEXING-

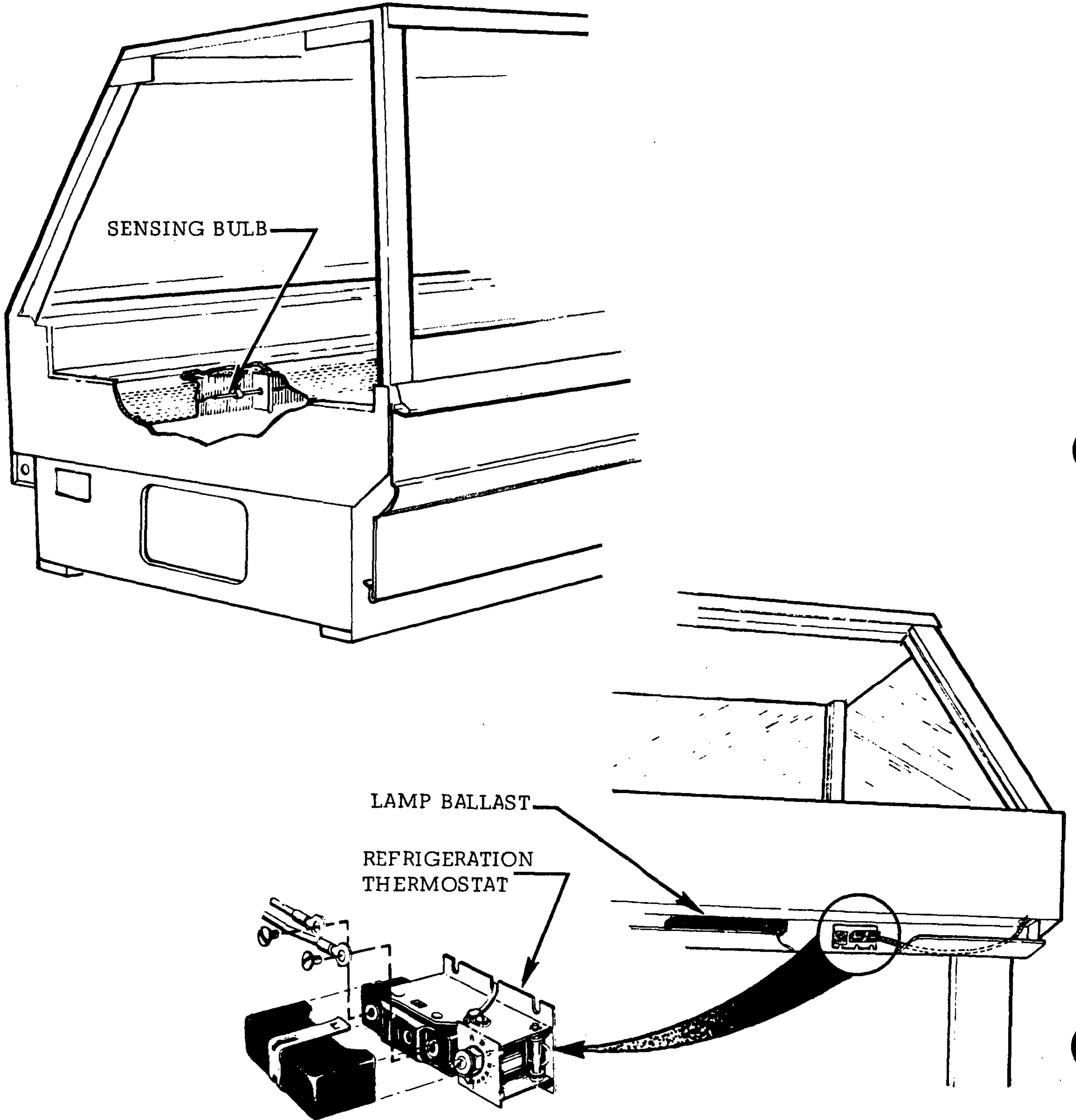
REFRIGERATION CONTROL 				DEFROST CONTROL	
PRODUCT TEMPERATURE	THERMOSTAT CUT-OUT (At Bulb)	REFRIGERANT	EVAPORATOR PRESSURE REGULATOR	FREQUENCY	LENGTH
					Off Time
36°F	22°F	R-502	58 psig	One Every 24 Hours	60 min.

 Refrigeration temperature must be controlled by a combination of an evaporator pressure regulator valve and a thermostat. The thermostat must have a differential of 3° to 5°F, have its sensing bulb installed in the discharge air leaving the evaporator and it must control a liquid line solenoid valve located at the refrigerator, not at the compressor.

- 2 Adjust the refrigeration thermostat to control the temperature slightly below the EPR setting to protect the product at times of reduced loads (lights off, lower ambients, etc.)
- 3 Set EPR to control evaporator pressure as indicated.
- 4 All defrost are time initiated and time terminated.

REFRIGERATION THERMOSTAT

When factory installed, the refrigeration thermostat will be located as shown below. Field installed thermostats should be installed in like manner with the sensing bulb routed through the electrical wiring conduit and secured to the grille in front of the coil.



SECTION 4

ELECTRICAL

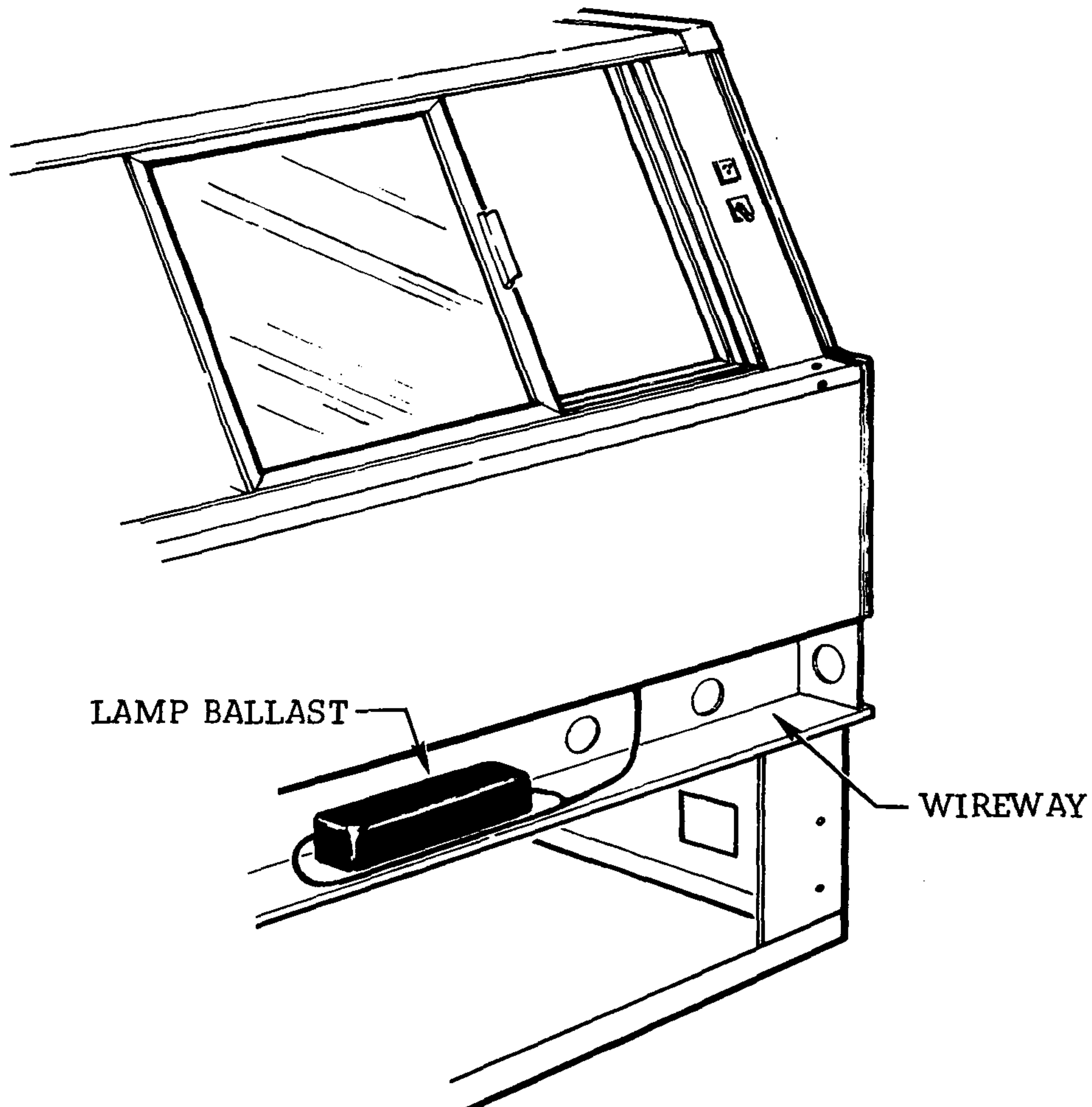
CONNECTIONS

All connections for the refrigerators electrical circuits are to be made in the wireway located as shown below.

WIRING IDENTIFICATION

All electrical circuits will be identified by color coded plastic bands which correspond to those listed in the following table.

WIRING COLOR CODE	
LEADS FOR ALL ELECTRICAL CIRCUITS ARE IDENTIFIED BY A COLORED PLASTIC BAND: NEUTRAL WIRE FOR EACH CIRCUIT HAS EITHER WHITE INSULATION OR A WHITE PLASTIC SLEEVE IN ADDITION TO THE COLOR BAND.	
PINK	REFRIG. THERMOSTAT LOW TEMP
LIGHT BLUE	REFRIG. THERMOSTAT NORM. TEMP.
DARK BLUE	DEFROST TERM. THERMOSTAT
PURPLE	ANTI-SWEAT HEATERS
BROWN	FAN MOTORS
GREEN*	GROUND
ORANGE OR TAN	LIGHTS
MAROON	RECEPTACLES
YELLOW	DEFROST HEATERS, 120V
RED*	DEFROST HEATERS, 208V
* EITHER COLORED SLEEVE OR COLORED INSULATION	
ELECTRICIAN NOTE: CASE MUST BE GROUNDED	



SERIAL PLATE AMPERAGES

Serial Plate amperes are the amperage figures that are stamped on the refrigerator's Serial Plate. All field wiring must be sized to the Serial Plate amperages, however, the actual amps may be less than that specified.

AMPERAGES

MODEL	120 VOLT, 60 HZ CIRCUITS			
	FANS △ ₁	LIGHTS		RECEPTACLES △ ₄
		STANDARD △ ₂	OPTIONAL △ ₃	
All 8'	0.7	0.8	1.6	15.0
All 12'	1.4	1.3	2.9	15.0

△₁ The fan circuit should be on a different circuit than that for the lights. This is to avoid accidentally turning the fans off when store lighting is turned off.

△₂ STANDARD lighting is one full row of fluorescent lamps in the top, front of the refrigerator.

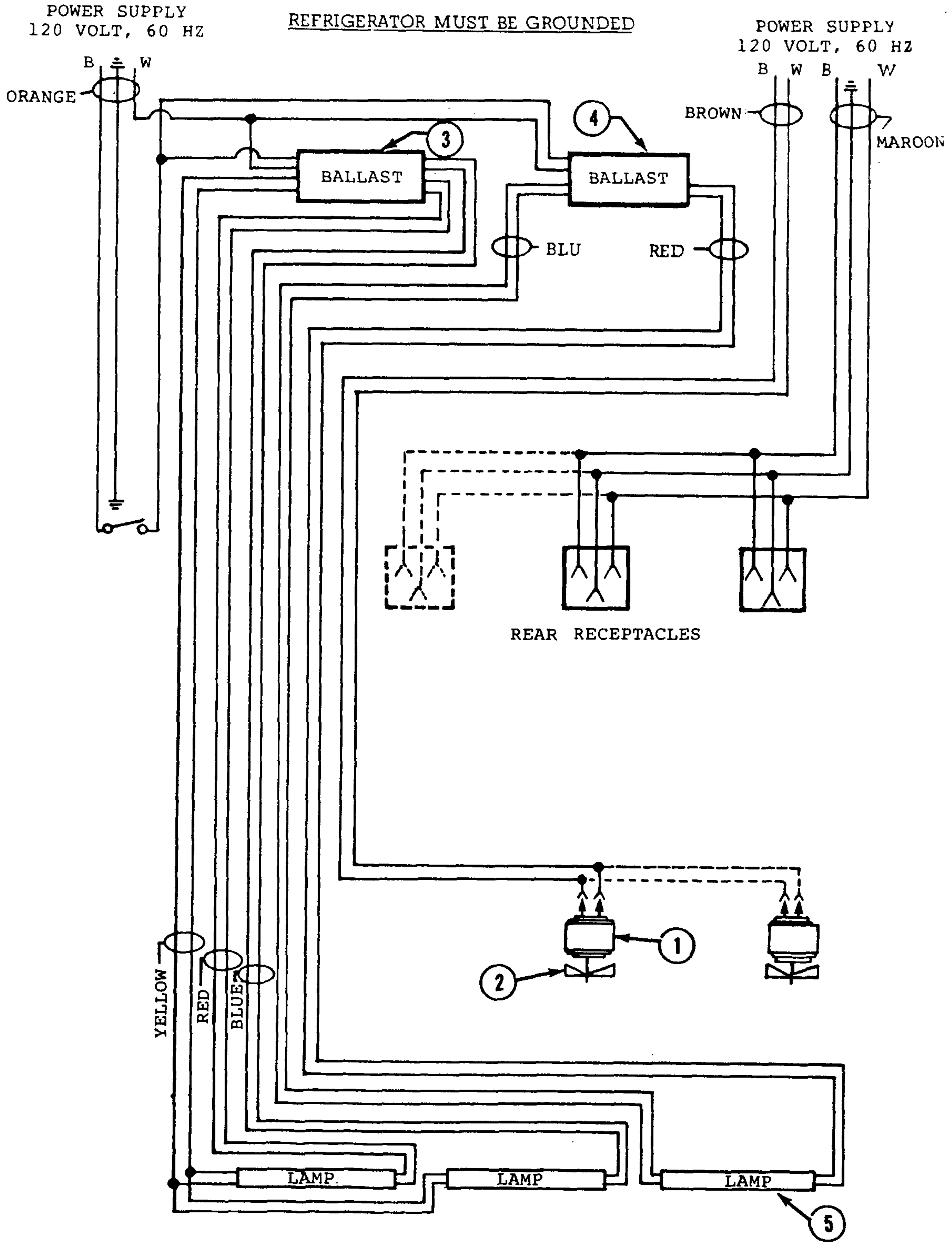
△₃ This OPTIONAL light amperage column applies when the refrigerator has both the standard lighting and the rear lighting.

△₄ The receptacles located on the lower rear of this refrigerator are intended for small lighted displays and scales, not for large motors or other high wattage appliances.

5 In addition to the circuits described above, the following will also require control wiring from the refrigerator to the condensing unit when installed. See wiring diagrams in this section.

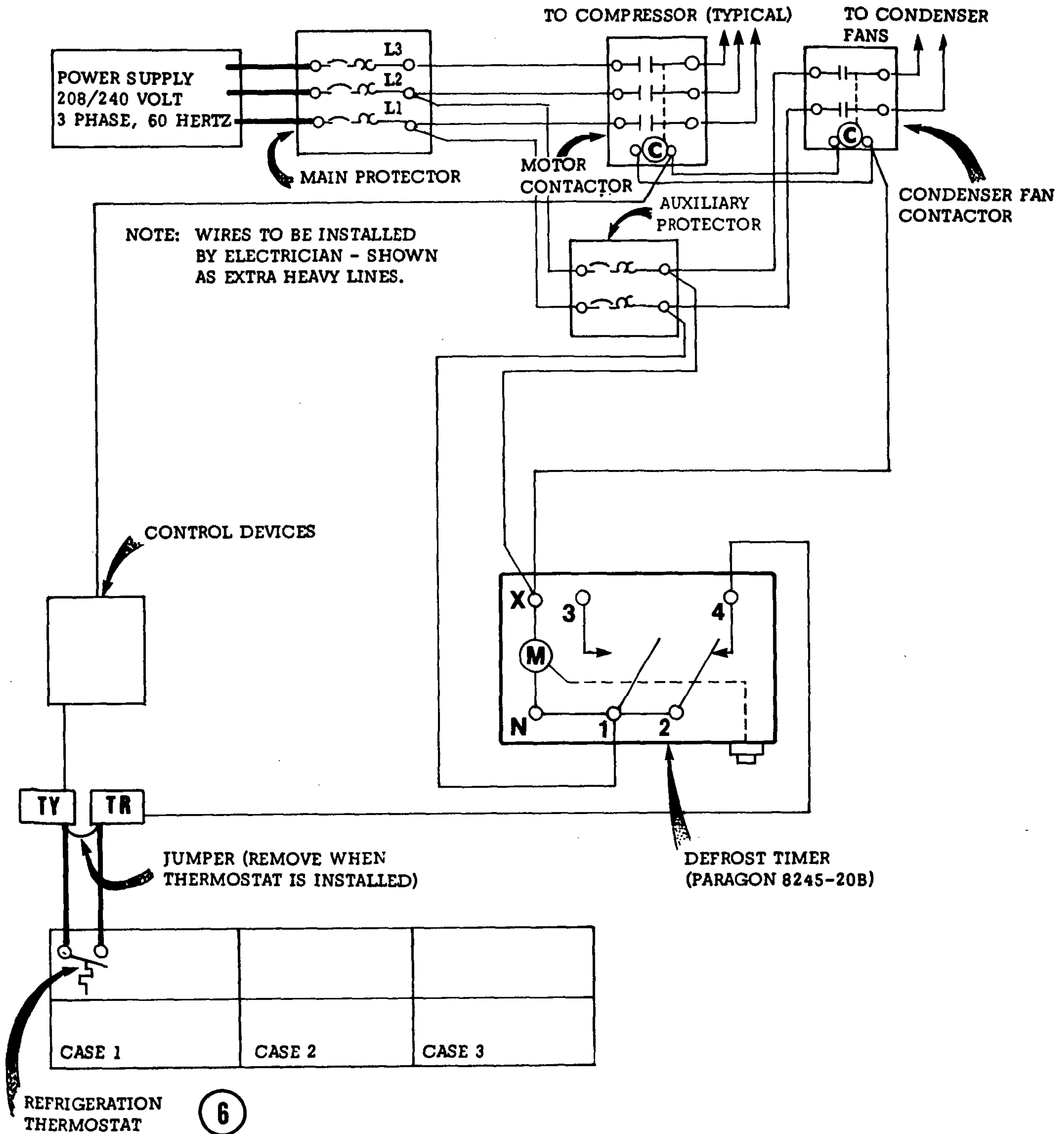
REFRIGERATION THERMOSTAT: when this optional item is installed, it will need to be wired to the condensing unit control panel.

WIRING DIAGRAM
VBS, VBL, VBK, VBT



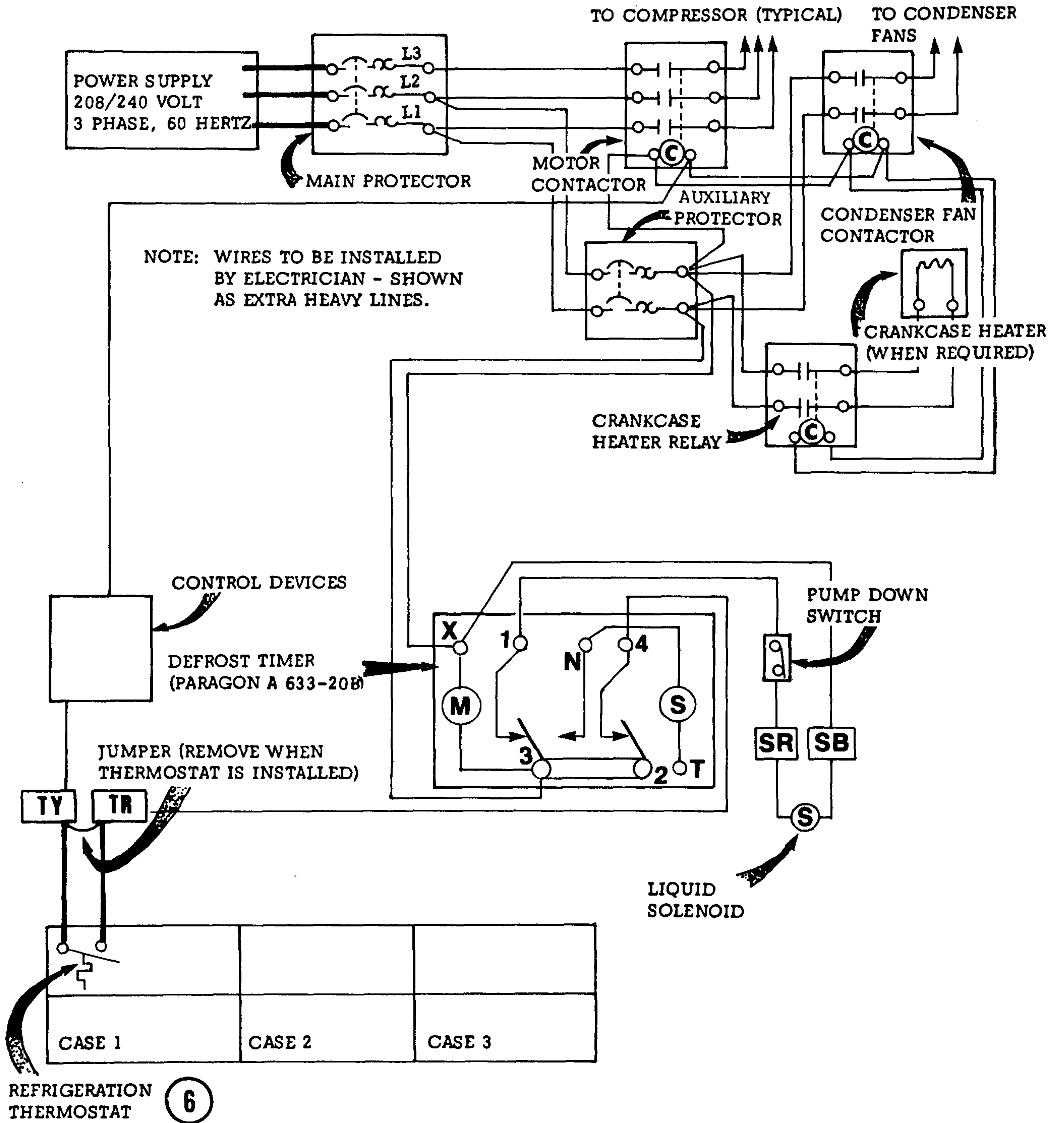
REFRIGERATOR MUST BE GROUNDED

CONVENTIONAL MULTIPLEXING - INDOOR TYPE UNIT
CONDENSING UNIT & CONTROL PANEL WIRING DIAGRAM



WARNING
REFRIGERATOR MUST BE GROUNDED

CONVENTIONAL MULTIPLEXING - OUTDOOR TYPE UNIT
CONDENSING UNIT & CONTROL PANEL WIRING DIAGRAM



WARNING
REFRIGERATOR MUST BE GROUNDED

REPLACEMENT PARTS LIST

ITEM NO.	PART NUMBER	DESCRIPTION
1.	047000	Fan Motor, 9W, CW, 120V Emerson, FA33HXDL-164 GE#KSM51ECG3734 Morrill SPB8HBEV16
2.	124150	Fan blade, raised embossed side toward motor, Morrill #FV800CW30S
3.	147080	Ballast, 2 lamp GE #8G1022G49
4.	147082	Ballast, 1 lamp Advance #HM140
5.	020725	Fluorescent lamp F40T12/CWX
6.	113625	Refrigeration Thermostat, Option Penn #A19ADG-21

SECTION 5USER INFORMATION

These refrigerated display merchandisers have been designed to provide maximum protection, essential for fresh meat and delicatessen products to retain their freshness and color. To realize the best results of this equipment and achieve the maximum product shelf life, a few simple procedures should be followed.

STOCKING

Improper temperature and lighting will cause serious product loss. Discoloration, dehydration, and spoilage can be controlled with the proper use of the equipment and handling of the product. To achieve the protection required always:

- ... operate the cooler at a constant 28° to 34°F temperature.
- ... control processing room temperature at 55°F or lower.
- ... restrict processing time to avoid damaging temperature rise to the product.
- ... keep the air in and around the deli area free of gas foreign to clean air, or food will rapidly deteriorate. Poorly vented space heaters are a common cause of carbon monoxide gas.
- ... maintain the display merchandisers temperature controls as outlined in the refrigeration section of this instruction.
- ... allow display merchandiser to operate for at least six hours before stocking any product.
- ... keep slotted openings near the bottom of the front glass free of any obstruction. These openings are for refrigerated air circulation and any restriction will cause a rise in temperature.
- ... close the service doors. Refrigeration performance will be seriously affected if left open for prolonged periods of time.
- ... avoid the use of supplemental flood or spot lighting. Display light intensity has been designed for maximum visibility and product life. The use of high output fluorescent lamps (HO and VHO) will shorten the shelf life of the product, if used in these merchandisers.
- ... completely cover the product each night at closing with clean butcher paper. Make sure the paper is in direct contact with the product.
- ... rotate product displayed on any mezzanine shelves that may be installed in the merchandisers. The temperature will be slightly higher on these shelves and the product life will be shorter.

CLEANING

Essential for any deli department is an established and regulated cleaning procedure. The discoloration which causes deli items to lose their eye appeal and drastically shorten their shelf life is caused by bacteria which will thrive in a deli department. Soap and hot water are not enough to kill this bacteria. A sanitizing solution must be included with each cleaning process to eliminate this bacteria.

Every surface in the deli department must be cleaned and sanitized regularly.

Items that are in non-refrigerated areas and come in contact with the product must be cleaned daily. This includes items such as knives, scales, tables, trays, preparation room floors, etc..

Other items that require a weekly cleaning are coolers, walls and the display refrigerator.

HOW TO CLEAN

The EXTERIOR surfaces must be cleaned with a mild detergent and warm water to protect and maintain the attractive finish. Never use abrasive cleaners or scouring pads.

The INTERIOR may be cleaned with most domestic detergents, ammonia based cleaners and sanitizing solutions.

CAUTION

DO NOT USE HOT WATER ON COLD GLASS SURFACES. THIS CAN CAUSE THE GLASS TO SHATTER AND COULD RESULT IN PERSONAL INJURY. ALLOW GLASS FRONTS, ENDS, AND SERVICE DOORS TO WARM BEFORE APPLYING HOT WATER.

TO CLEAN:

- A. Remove all product from the display area.
- B. Thoroughly clean all surfaces with soap and hot water. (Excluding Cold Glass).
- C. Rinse with hot water, but do not flood.
- D. Apply the sanitizing solution according to the manufacturer's directions.
- E. Dry completely before resuming operation.

-CLEANING PRECAUTIONS-

WHEN CLEANING, DO NOT USE A HOSE WITH HIGH WATER PRESSURE AND NEVER INTRODUCE WATER FASTER THAN THE WASTE OUTLET CAN CARRY IT AWAY.

SOME CLEANING AND SANITIZING SOLUTIONS CONTAIN A MINERAL OIL BASE WHICH WILL DISSOLVE THE BUTYL SEALANTS USED IN THIS REFRIGERATOR, THESE SHOULD NOT BE USED.

LOAD LIMITS

The recommended load limit for the product displayed within these cases should not exceed 100 pounds per lineal foot. If this limitation is exceeded, distortion and possible structural damage to these cases could occur.

ELECTRIC SERVICE RECEPTACLES

The receptacles located on the exterior back of these cases are intended for scales and lighted displays. They are not intended or suitable for large motors that are found in meat and delicatessen departments.

SHELVES

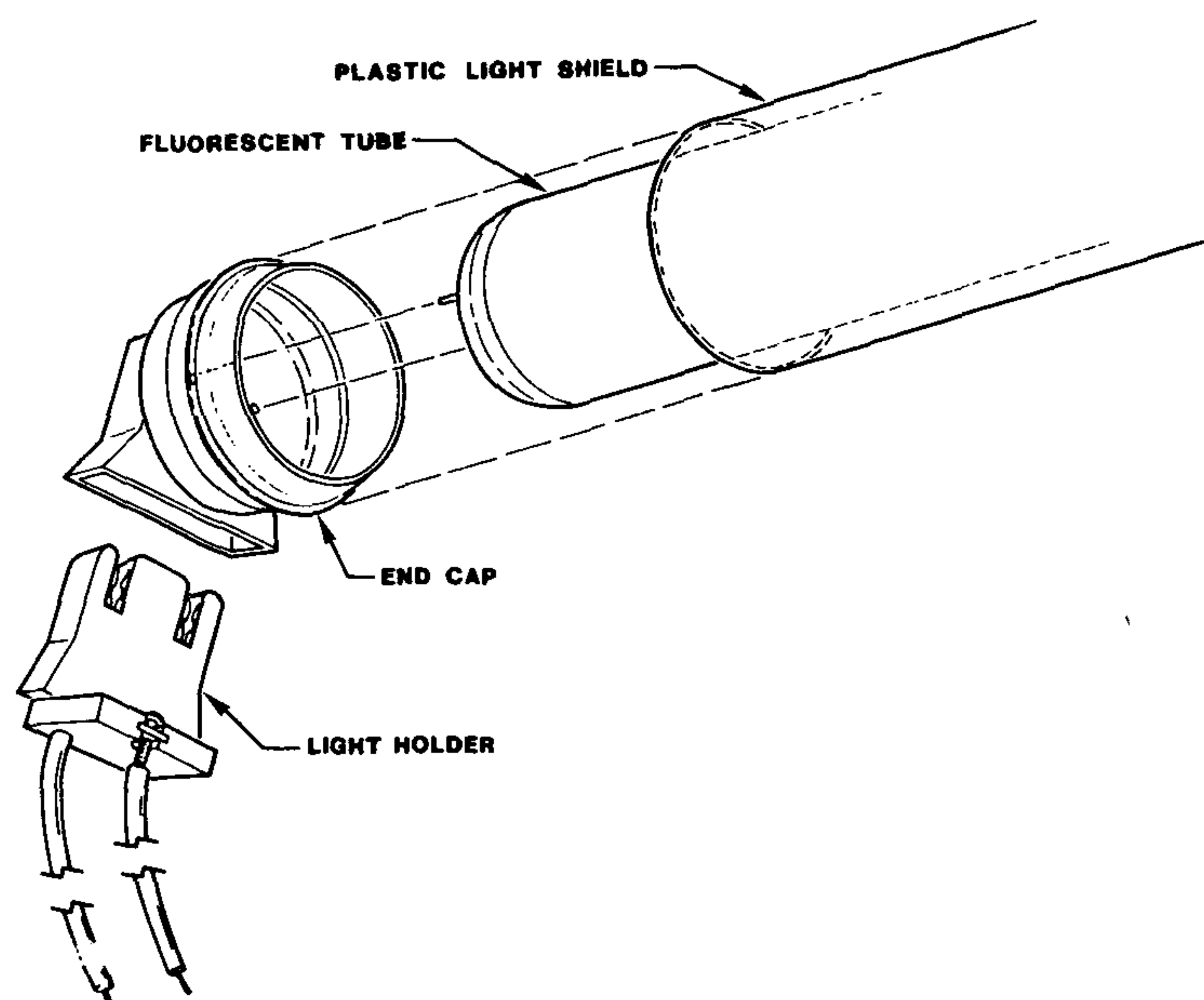
A wide selection of scale stands, wrapping boards, salad pan racks, step displays and wire shelves are available as optional equipment. For more detailed information, see Hussmann sales literature.

When full length wire display shelves are used in the 8' cases, a 16 inch wide shelf must be installed in the center of the case. If step display racks are used in combination with shelves, install the 16 inch shelf immediately adjacent to the step display rack. The 16 inch shelf will not fit at the ends of the case.

REPLACING FLUORESCENT LAMPS

Fluorescent lamps are furnished with moisture resistant lamp holders, shield and end caps. Whenever a fluorescent lamp is replaced be certain to re-install the lamp shield and end caps over the fluorescent lamp.

THE TRADITIONAL METHOD OF TWISTING THE LAMP TO REMOVE IT AND AFTER IT IS INSTALLED IS NO LONGER NECESSARY. TO REMOVE A LAMP: SIMPLY PUSH THE LAMP AWAY FROM THE LAMP HOLDER. TO INSTALL: ALIGN THE END CAPS OVER THE LAMP HOLDERS AND GENTLY PRESS ON, A SLIGHT SNAP WILL BE FELT AS THE LAMP IS SEATED.

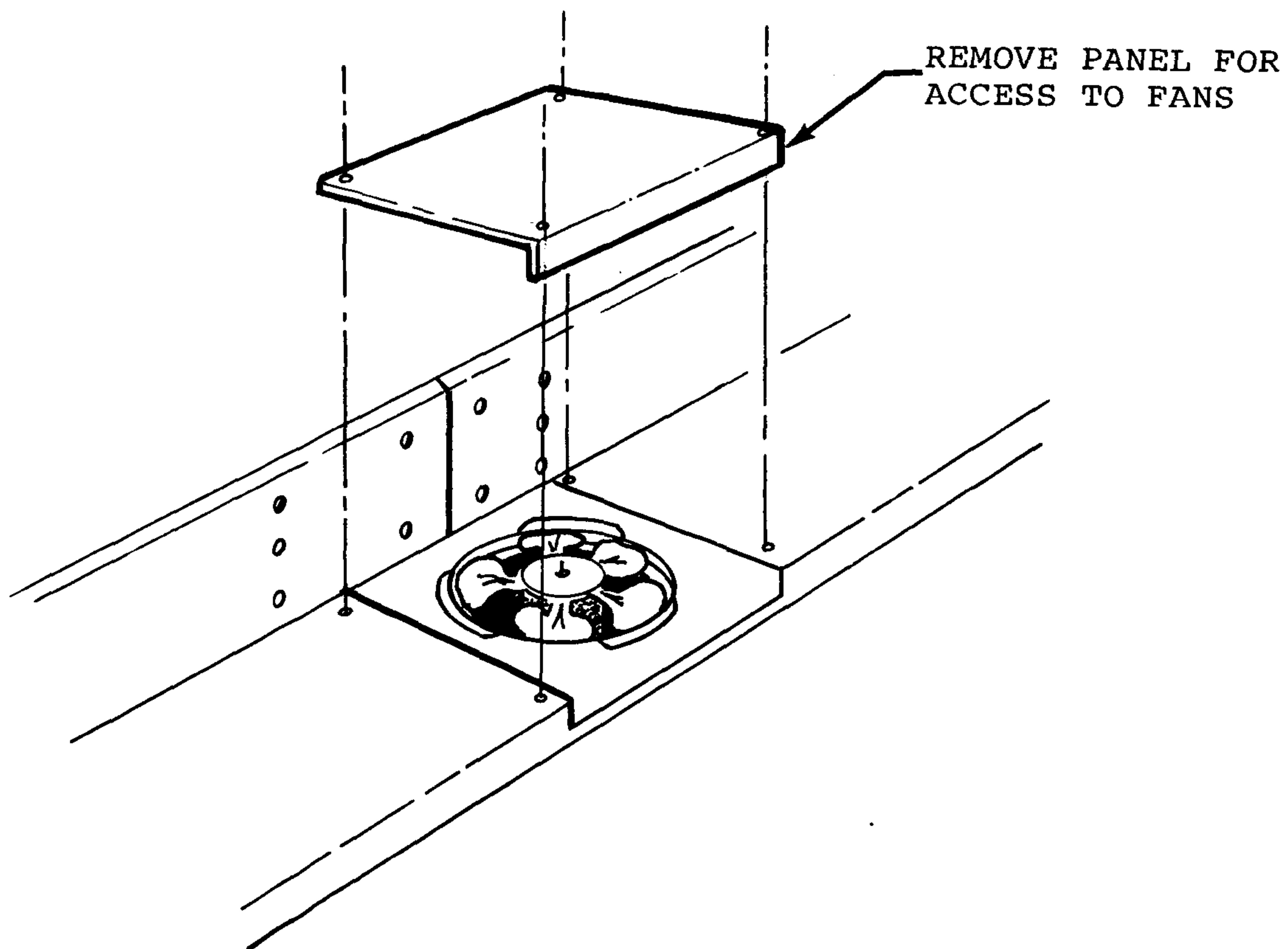


SECTION 6SERVICE TIPS-WARNING-

ALWAYS DISCONNECT THE ELECTRICAL POWER AT THE MAIN DISCONNECT WHEN SERVICING OR REPLACING ANY ELECTRICAL COMPONENT OF THIS REFRIGERATOR. THIS INCLUDES, BUT IS NOT LIMITED TO SUCH ITEMS AS THE FANS, HEATERS, THERMOSTATS AND FLUORESCENT LAMPS.

EVAPORATOR FANS

The evaporator fans are located at the center front of these refrigerators. Should the fans or blades ever need servicing, ALWAYS REPLACE THE FAN BLADES WITH THE RAISED EMBOSSED SIDE OF THE BLADE INSTALLED TOWARD THE MOTOR.



REPAIRING ALUMINUM COIL

The aluminum coils used in Hussmann merchandisers may be easily repaired in the field. Materials are available from local refrigeration wholesalers.

Hussmann recommends the following solders and technique:

Solders

Aladdin Welding Products Inc.
P.O. Box 7188
1300 Burton St.
Grand Rapids, MI 49507
(616) 243-2531

X-Ergon
1570 E. Northgate
P.O. Box 2102
Irving, TX 75062
(800) 527-9916

Technique

1. Locate Leak.
2. Remove all pressure.
3. Brush area UNDER HEAT.
4. Use Prestolite torch only. Number 6 tip.
5. Maintain separate set of stainless steel brushes and use only on aluminum.
6. Tin surface around area.
7. Brush tinned surface UNDER HEAT, thoroughly filling the open pores around leak.
8. Repair leak. Let Aluminum melt solder, NOT the torch.
9. Don't repair for looks. Go for thickness.
10. Perform a leak check.
11. Wash with water.
12. Cover with a good flexible sealant.

NOTE:

Hussmann Aluminum melts at1125° F
 Aladdin 3-in-1 rod at732° F
 X-Ergon Acid core at455° F
 Factory Solder at aluminum
 to copper transitions855° F