



**HUSSMANN**<sup>®</sup>

**NVB, NVG, NVS**

VuMor Fresh Meat, Delicatessen  
and Seafood Merchandisers



**Installation &  
Operation Manual**

Vision Series

P/N 345905A.  
October, 1992  
Section 2

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## IMPORTANT KEEP IN STORE FOR FUTURE REFERENCE

*Quality that sets industry standards*

This merchandiser conforms to the  
Commercial Refrigerator Manufacturers Association  
Health and Sanitation Standard  
CRS-S1-86

**HUSSMANN®**

12999 St. Charles Rock Road • Bridgeton, MO 63044 USA • (314) 291-2000 • FAX (314) 298-4767

VuMor Meat, Deli & Seafood

**REPLACEMENT PARTS LIST**

<b>Part</b>	
<b>Item Number</b>	<b>Description</b>
1. 0047000	Fan Motor, Evaporator 120V, 9W, CW GE #KSM51ECG3799
2. 0124150	Fan Blade embossing toward motor Morrill #FV800 CW 30S
3. 0147080	Ballast 2 lamps GE #6G1022G49
4. 0147082	Ballast 1 lamp GE #6G1063
5. 0020725	Fluorescent Lamp F40T12 CWX
6. 0113625	Refrigeration Thermostat Penn #A19GD-21
7. BFV AC	Thermal Expansion Valve R-22 Sporlan Nomenclature
BFR AC	Thermal Expansion Valve R-502 Sporlan Nomenclature

# GENERAL INFORMATION

## MODEL DESCRIPTIONS

This instruction covers the merchandisers listed below. These merchandisers have full length "VuMor" glass enclosed fronts and are designed specifically for fresh meat, fish and/or delicatessen service departments. They are available in three front glass widths; 22" (A), 25" (B) and 29" (C). Basic design features are listed to the right of each case.

- NVBA VuMor Deli, rear service, blower coil, 22" high front glass, 3 display levels
- NVBB VuMor Deli, rear service, blower coil, 25" high front glass, 3 display levels
- NVBC VuMor Deli, rear service, blower coil, 29" high front glass, 3 display levels
- NVGA VuMor Meat & Deli, rear service, gravity coil, 22" high front glass, 2 display levels
- NVGB VuMor Meat & Deli, rear service, gravity coil, 25" high front glass, 2 display levels
- NVGC VuMor Meat & Deli, rear service, gravity coil, 29" high front glass, 2 display levels

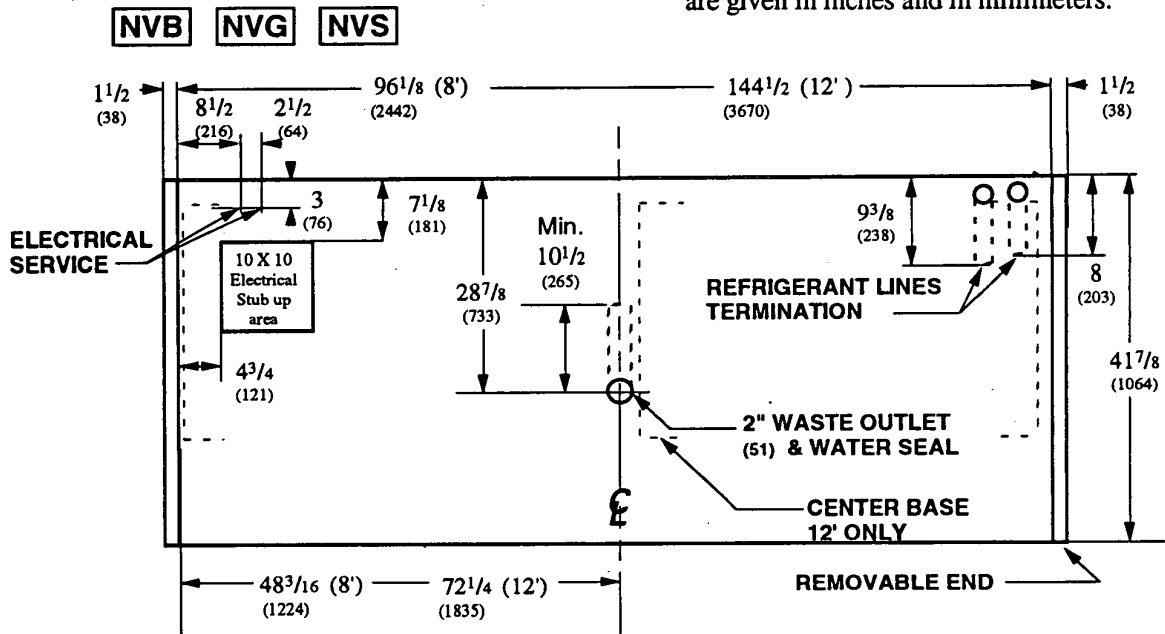
- NVSA Non-Refrigerated, VuMor Seafood, rear service, ice pan only, 22" high front glass, 1 display level
- NVSB Non-Refrigerated, VuMor Seafood, rear service, ice pan only, 25" high front glass, 1 display level
- NVSC Non-Refrigerated, VuMor Seafood, rear service, ice pan only, 29" high front glass, 1 display level

## APPLICATION

These refrigerated merchandisers are designed for displaying fresh meat or delicatessen products in air conditioned stores where temperature and humidity are maintained at or below 75°F dry bulb temperature and 55% relative humidity.

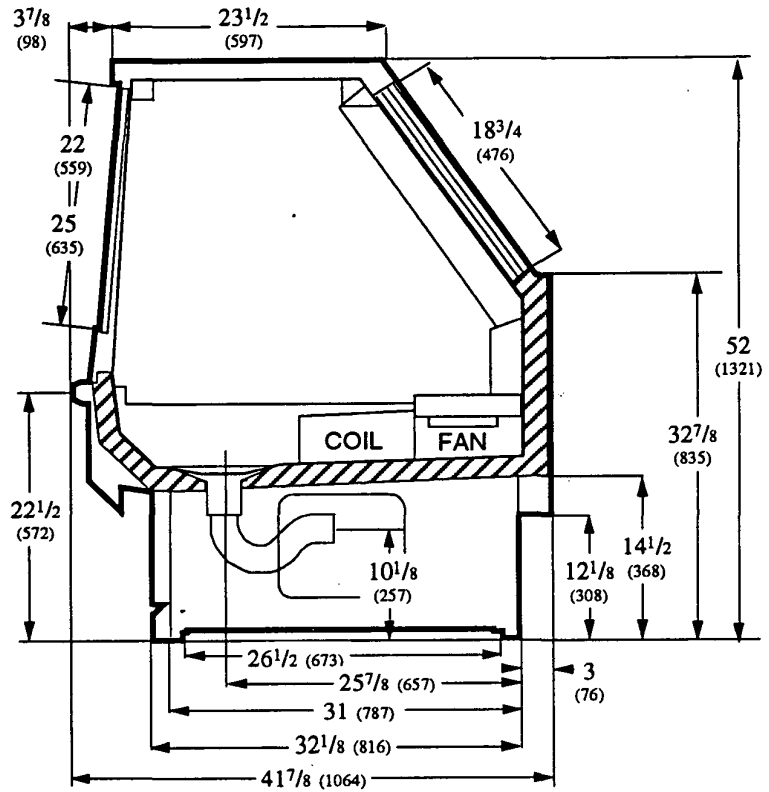
Product temperature should always be maintained at a constant and proper temperature. This means that from the time the product is received, through storage, preparation and display, the temperature of the product must be controlled to maximize the life of the product.

**NOTE:** Plan view and cross section measurements are given in inches and in millimeters.

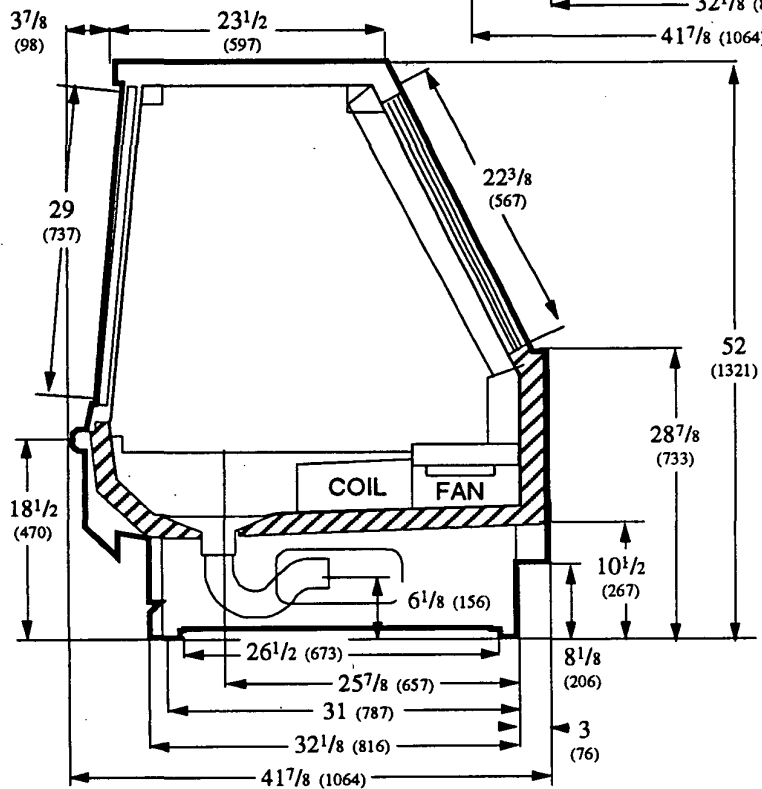


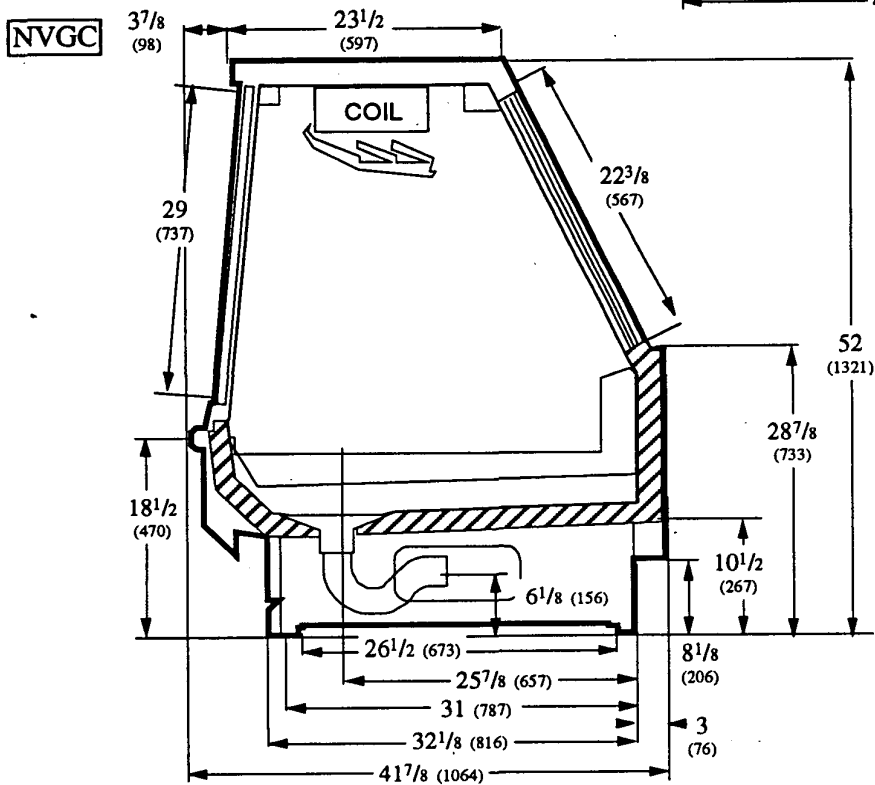
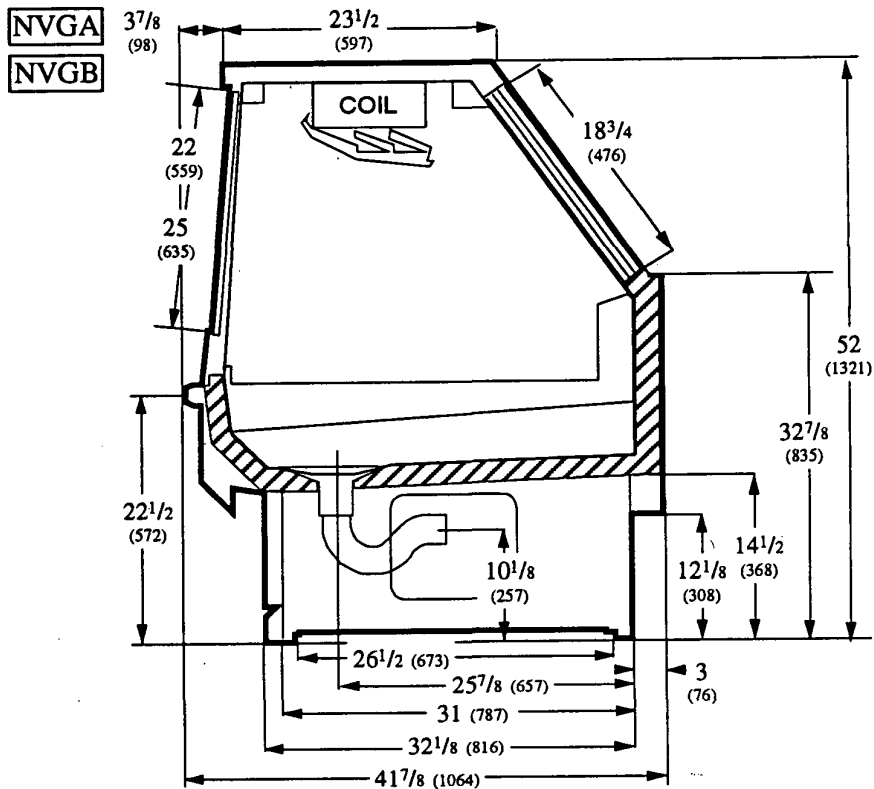
GENERAL INFORMATION

NVBA  
NVBB

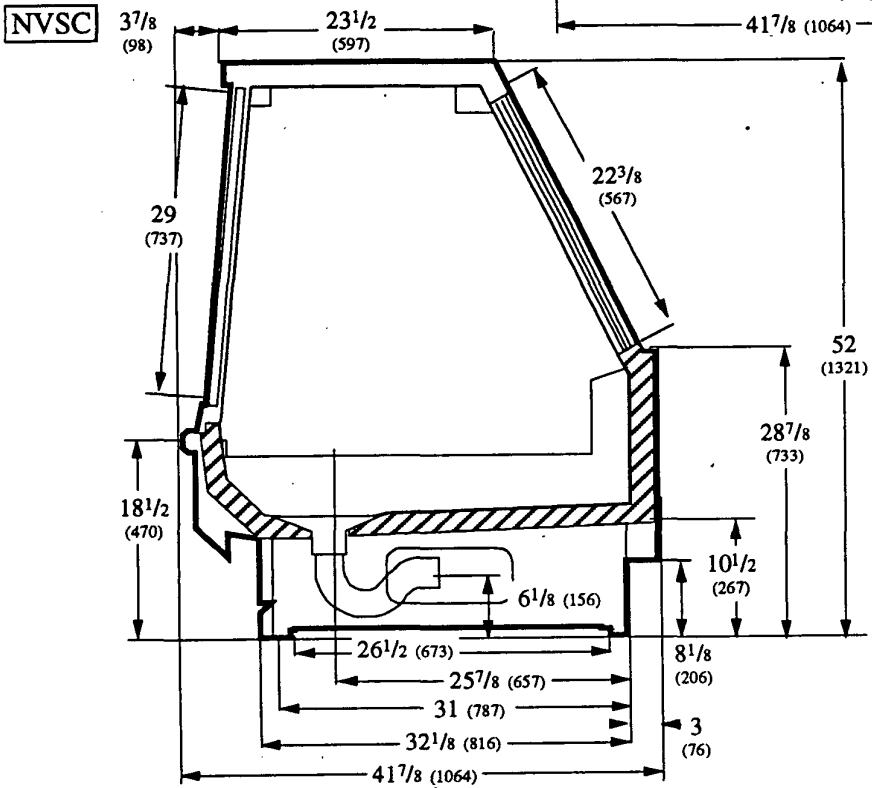
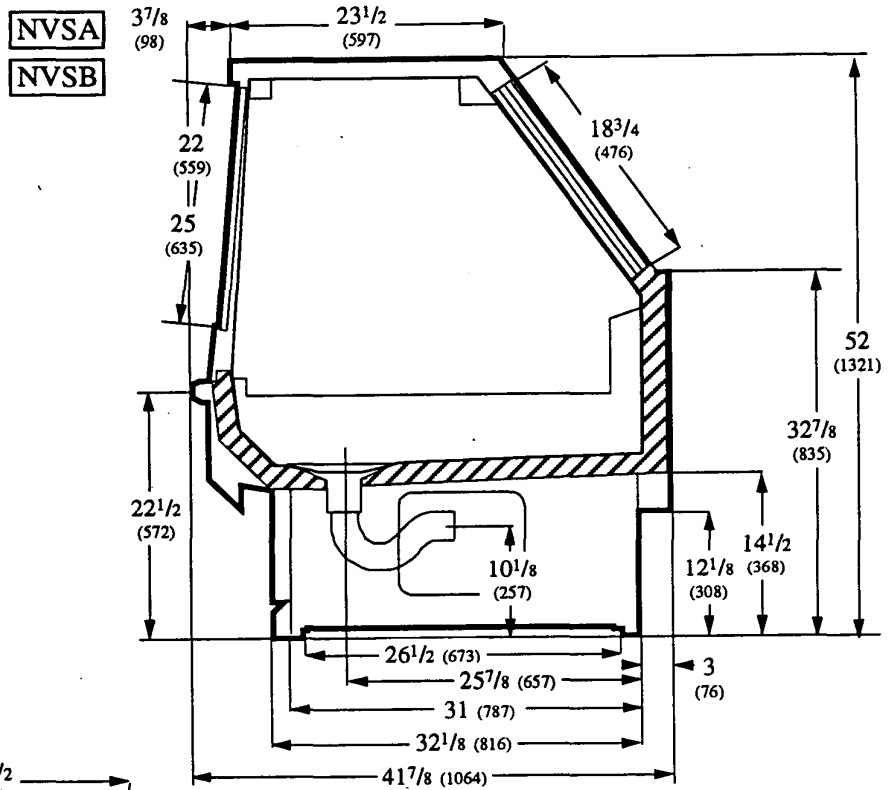


NVBC





GENERAL INFORMATION



**SHIPPING DAMAGE**

All equipment should be thoroughly examined for shipping damage before and during 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 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 (Not All Merchandisers)**

Move the fixture as close as possible to its permanent location and then remove all packaging and shipping braces. Check for damage before discarding packaging. Remove all separately packed accessories. Remove and discard the shipping screws at each end of the fan plenum. The plenum is hinged for easy access to the area beneath the evaporator.

**EXTERIOR LOADING**

Do NOT walk on top of merchandisers or damage to the merchandisers and serious personal injury could occur. They are not structurally designed to support excessive external loading such as the weight of a person.

**LOCATION**

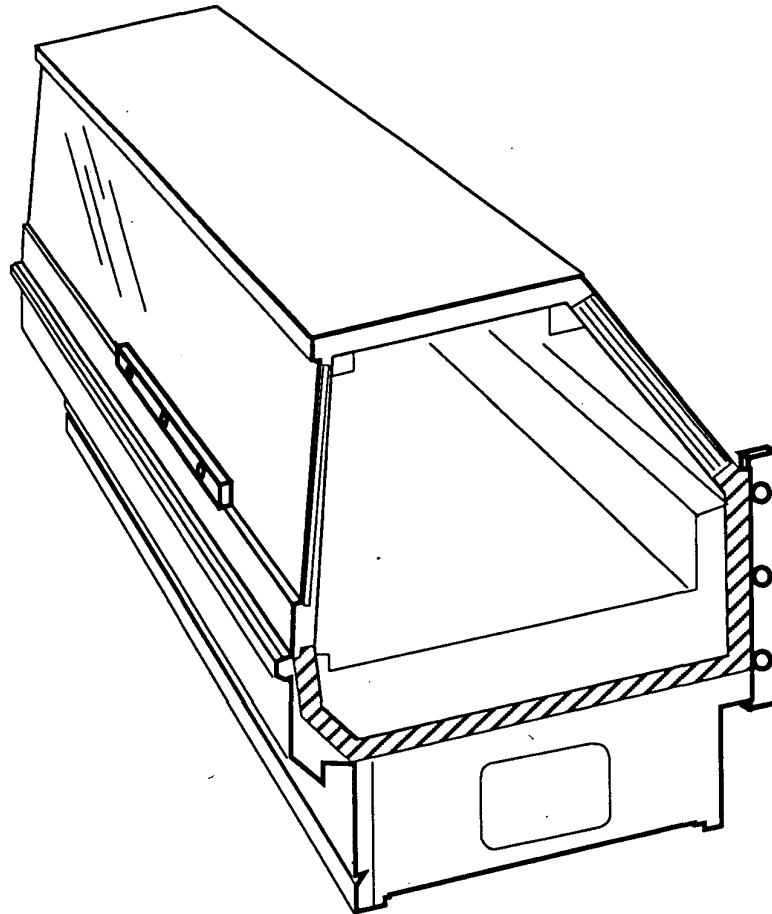
Merchandisers are sensitive to air disturbances. Air currents passing around the merchandisers will seriously impair their operation. Do NOT allow air conditioning, electric fans, open doors or windows, etc. to create air currents around merchandisers.



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## 2-2 INSTALLATION



### LEVELING

Merchandisers must be installed level to ensure proper operation of the refrigeration system and proper drainage of defrost water. Use a carpenter's level as shown when leveling merchandisers. Leveling shims or wedges are provided with each merchandiser for use if needed. **NOTE:** To avoid removing concrete flooring, begin lineup leveling from the highest point of the store floor.

### JOINING

Merchandisers are of sectional construction which means that two or more may be joined in line yielding one long continuous display requiring only one pair of ends.

### ANCHORING

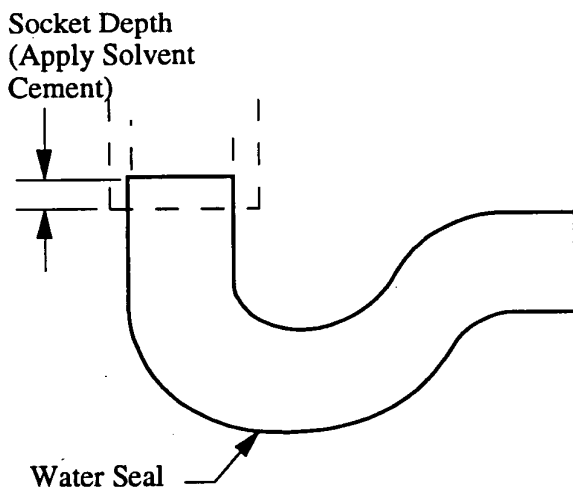
Merchandisers do NOT require anchoring.

## WASTE OUTLET HOOKUP

The waste outlet is located at the center of each fixture allowing drip piping to be run under the fixture lengthwise, to the front or the rear.

A 2" water seal is supplied with each fixture. The water seal must be installed to prevent air leakage and insect entrance into the fixture. See illustration.

**NOTE:** PVC-DWV solvent cement is recommended. Follow the manufacturer's instructions.



## INSTALLING DRIP PIPING

Poorly or improperly installed drip pipes can seriously interfere with the merchandiser's operation, and result in costly maintenance and product losses. Please follow the recommendations listed when installing drip pipes to insure proper installation.

1. Never use drip piping smaller than the nominal diameter of the pipe or water seal supplied with the merchandiser.
2. When connecting drip piping, the "water seal" must be used as part of the drip piping to prevent air leakage or insect entrance. Never use two water seals in series in any one drip pipe. Double water seals in series will cause an air lock and prevent draining.
3. Pitch the drip piping in the direction of flow. There should be a minimum pitch of 1/8" per foot.
4. Avoid long runs of drip piping. Long runs make it impossible to provide the pitch necessary for good drainage.
5. Provide a suitable air break between flood rim of the floor drain and outlet of drip pipe.
6. Prevent drip pipes from freezing:
  - A. Do NOT install drip pipes in contact with uninsulated suction lines. Suction lines should be insulated with a nonabsorbent insulation material.
  - B. Where drip pipes are located in dead air spaces, such as between merchandisers or between a merchandiser and a store wall, provide means to prevent freezing.

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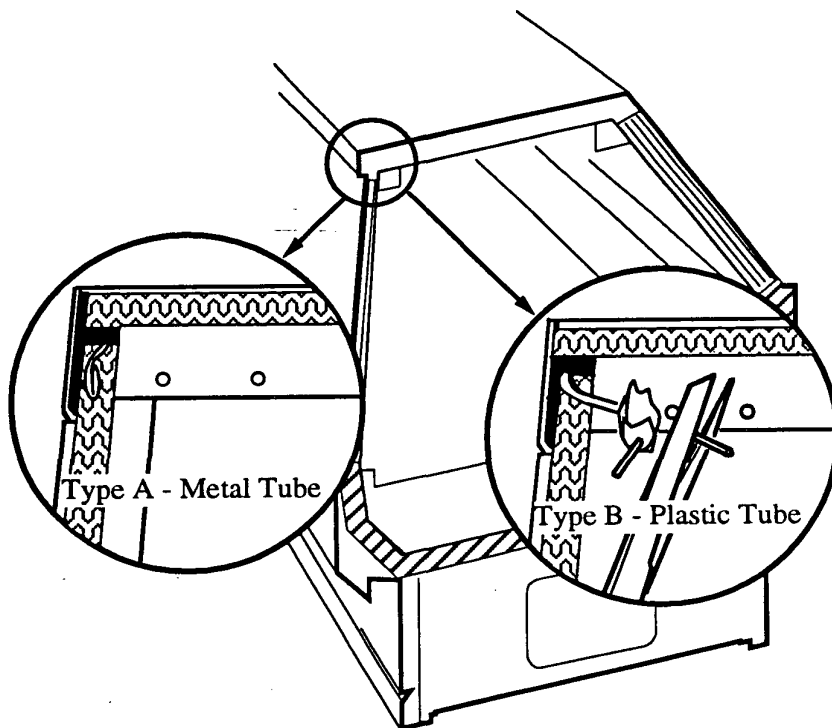
## 2-4 INSTALLATION

### MULTIGLASS ASSEMBLIES

The front multiglass assembly and top service doors are equipped with "In Transit" breather tubes. Breather tubes **MUST** be sealed at time of installation, before joining or installing ends.

Type A—Cut off metal tubing 1 1/2" from wood frame, crimp end, fold over as shown to assure complete closure and bend flush with wood.

Type B—Cut off surplus plastic tube with scissor or knife. Use heat to permanently seal end.



## INSTALLING SPLASHGUARD

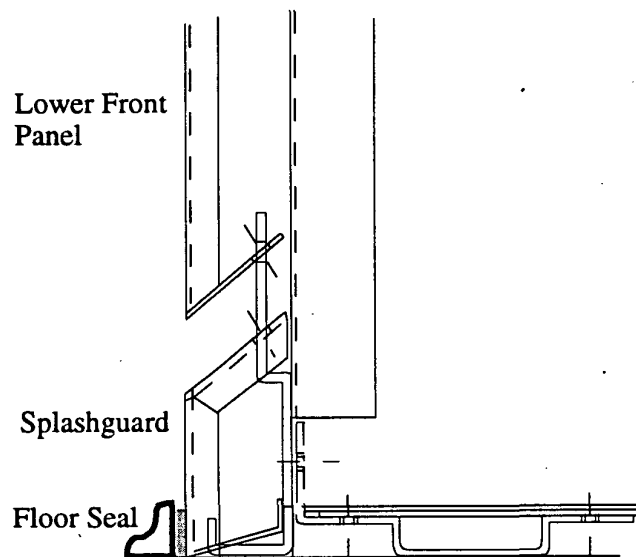
The splashguard/lower front panel assembly is shipped inside each merchandiser. After merchandisers have been leveled and joined, and all drip piping, electrical and refrigeration work has been completed, install the splashguard. The leveling brackets have a maximum extension of 3/4 inch for uneven floors. After adjusting brackets flush with the floor, align the slots in the splashguard with the leveling brackets and drop into place.

## SEALING SPLASHGUARD TO FLOOR

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

To install the trim to the splashguard:

1. 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.
2. Apply a good contact cement to the trim and allow proper drying time according to the directions supplied with the cement.
3. Install the trim to the splashguard so that it is lying flush with the floor.



**Notes:**

### REFRIGERANT

The correct type of refrigerant will be stamped on the merchandiser's serial plate located on the left-hand end of the exterior back.

### REFRIGERANT PIPING

#### Connection Sizes

Liquid Line	3/8" OD
Suction Line NVB models	7/8" OD
NVG models	5/8" OD

#### Connection Location

The refrigerant line connections is located beneath the merchandiser on the right-hand end as viewed from the front.

After connections have been made, seal this outlet thoroughly. Seal both the inside and the outside. We recommend using an expanding polyurethane foam insulation.

#### Line Sizing

Refrigerant lines should be sized as shown on the refrigeration legend that is furnished for the store. If a legend has not been furnished, refer to the *Husmann Custom Conventional Application Manual* or the *Systems Application 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 merchandisers with OFFTIME defrost, the suction and liquid lines should be clamped or taped together and insulated for a minimum of 30 feet from the merchandiser. For merchandisers with GAS defrost, the suction and liquid lines should NOT contact each other and should be insulated separately for a minimum of 30 feet from the merchandiser. Additional insulation for the balance of the suction line is recommended wherever condensation drippage is objectionable.

**NOTE:** For a lineup of two or more merchandisers using GAS defrost, the liquid line will need to be increased two sizes larger inside the merchandiser area. This is necessary to ensure even liquid drainage from all evaporators during defrost.

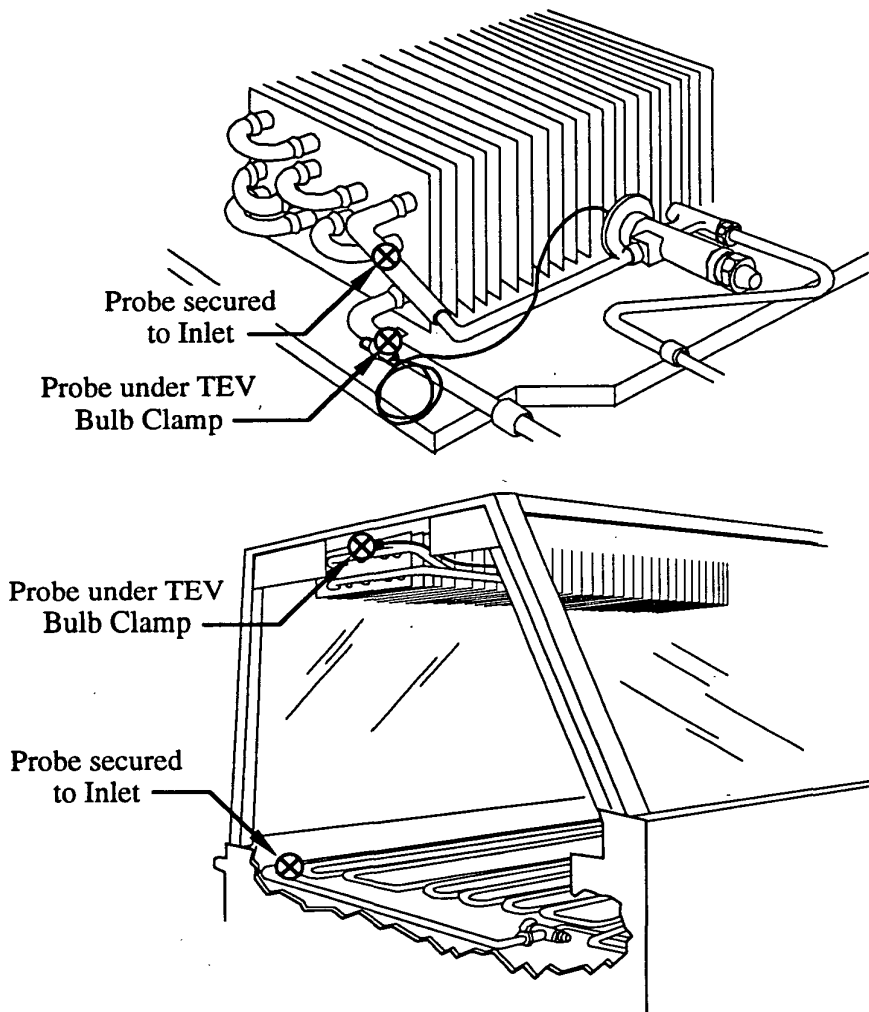
## 3-2 REFRIGERATION

### EXPANSION VALVE ADJUSTMENT

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

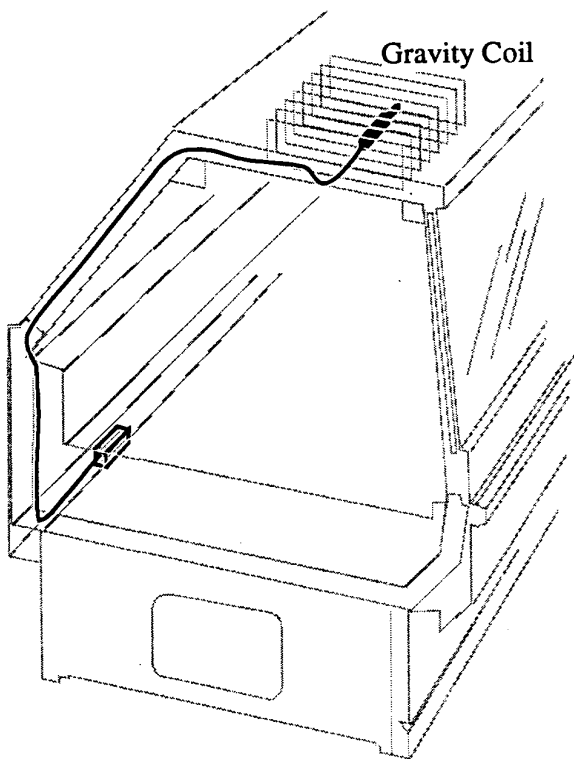
Attach two (2) sensing probes (either thermocouple or thermistor) to the evaporator. One under the clamp holding the expansion valve bulb and the other securely taped to the coil inlet line.

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 3–5°F. With this adjustment, during a portion of the hunting the temperature difference between the probes will be less than 3°F (at times as low as 0°F). Make adjustments of no more than 1/4 turn for Balanced Port TEV and 1/2 turn for "G" Body TEV at a time. Wait for at least 15 minutes before rechecking the probe temperature and making further adjustments.



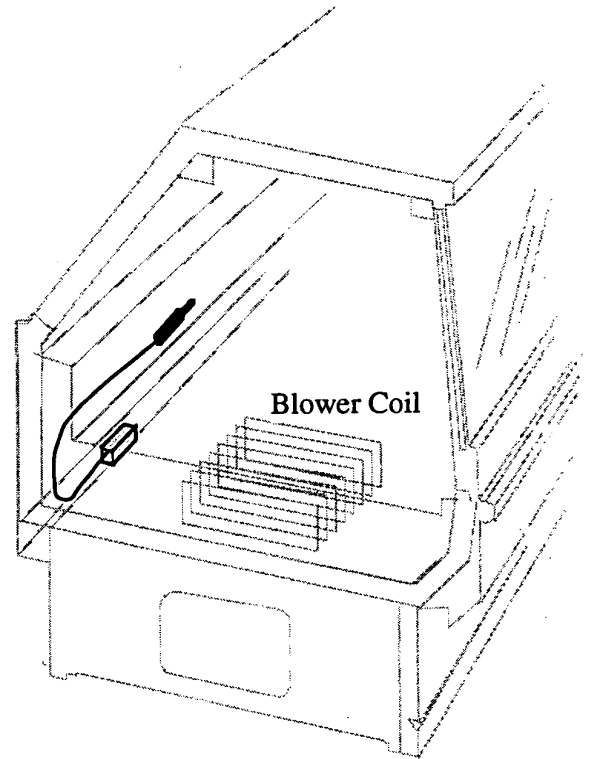
### REFRIGERATION THERMOSTAT

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 on the NVB models and below the coil on the NVG models.



### CDA SENSOR

Factory installed optional CDA sensor is located where the thermostat bulb would normally be located. Its leads will be routed through the electrical wireway and to the rack control panel. Leads are tagged in the wireway.





## 3-4 REFRIGERATION

### Conventional Single Compressor

#### NVB

Measure Discharge Temperature at the center of the moire openings found below and in front of the bottom sliding door track.

#### NVG

Measure Discharge Temperature 1 inch below the gravity coil at the center of the merchandiser.

Merchandiser temperature must be controlled by a combination of EPR Valve (primary control) and a thermostat (secondary control) with a 3–5°F differential. The thermostat will be wired to control the compressor motor contactor.

Standard Defrost is Off Time. Indoor condenser units may use pressure or time termination. Outdoor condenser units use time termination. On outdoor units the defrost timer will control a liquid line solenoid beginning a defrost pumpdown 4 minutes before defrost.

Optional GAS Defrost is time terminated.

Refrigeration Data		
Merchandiser Application	Fresh Meat	Deli
Discharge Air °F	36	
Evaporator °F	22	
Thermostat °F	22	
Defrost Data		
Frequency Hrs	24	
<u>Electric</u>		
Temp Term °F	NA	
Failsafe Min	NA	
<u>Gas</u>		
Duration Min	10	
<u>Offtime</u>		
Duration Min	110	
<u>Offtime w/ Pressure Termination</u>		
PSIG		
R-22	76	
R-502	89	
Failsafe Min	110	
When Thermostat Controls Temperature		
Low Pres Backup Control (PSIG)		
	Fresh Meat, Deli	
	Cut-Out	Cut-In
R-22	25	52
R-502	32	63

## Parallel Compressor Rack

### NVB

Measure Discharge Temperature  
at the center of the moire openings  
found below and in front of  
the bottom sliding door track.

### NVG

Measure Discharge Temperature  
1 inch below the gravity coil  
at the center of the  
merchandiser.

Merchandiser temperature must be controlled by a combination of EPR Valve (primary control) and a thermostat (secondary control) with a 3–5°F differential. The thermostat will be wired to the liquid line solenoid valve at the merchandiser.

Both standard Off Time and Optional GAS defrosts are time terminated.

Refrigeration Data	
Merchandiser Application	Fresh Meat Deli
Discharge Air °F	36
Evaporator °F	22
Thermostat °F	22
Defrost Data	
Frequency Hrs	24
<u>Electric</u>	
Temp Term °F	NA
Failsafe Min	NA
<u>Gas</u>	
Duration Min	10
<u>Offtime</u>	
Duration Min	110

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3-6

## REFRIGERATION

Notes:

# ELECTRICAL

## CONNECTIONS

All wiring must be in compliance with NEC and local codes. All connections for the merchandisers' electrical circuits are to be made in the wireway located as shown below.

## IDENTIFICATION OF WIRING

Leads for all electrical circuits are identified by colored plastic bands. These bands correspond to the *Wiring Color Code* (shown below) located inside the merchandiser wireway.

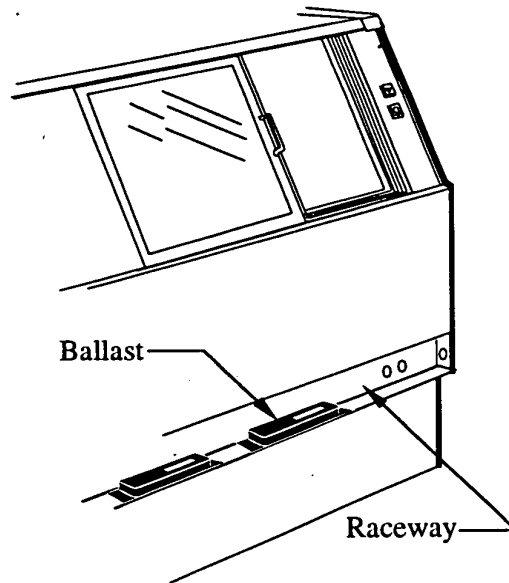
### WIRING COLOR CODE

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.	ORANGE OR	
LIGHT BLUE ..	REFRIG. THERMOSTAT NORM TEMP.	TAN .....	LIGHTS
DARK BLUE ..	DEFROST TERM. THERMOSTAT	MAROON...	RECEPTACLES
PURPLE.....	ANTI-SWEAT HEATERS	YELLOW ....	DEFROST HEATERS, 120V
BROWN .....	FAN MOTORS	RED* .....	DEFROST HEATERS, 208V
GREEN* .....	GROUND		

\*EITHER COLORED SLEEVE OR COLORED INSULATION

**ELECTRICIAN NOTE: CASE MUST BE GROUNDED**



## 4-2 ELECTRICAL

### FIELD WIRING

Field wiring must be sized for component amperes stamped on the serial plate. Actual ampere draw may be less than specified. Field wiring from the refrigeration control panel to the merchandisers is required for optional defrost termination thermostats and for optional

refrigeration thermostats or CDA Sensors. When multiple merchandisers are on the same defrost circuit the defrost termination thermostats are wired in series. Most component amperes are listed below, always check the serial plate.

**Serial Plate Amperages**

120V 1PH 60Hz						
Models	Fans	Lights			Receptacles	
	(1)	Standard (2)	option (3)	option (4)	option (5)	(6)
NVB						
8'	0.7	0.8	1.6	3.4	4.2	15.0
12'	1.4	1.3	2.4	5.2	6.5	15.0
NVG						
8'	—	0.8	1.6	3.4	4.2	15.0
12'	—	1.3	2.4	5.2	6.5	15.0
NVS						
8'	—	0.8	1.6	—	—	15.0
12'	—	1.3	2.4	—	—	15.0

(1) Fans should be on a separate circuit from the lights to avoid turning them off with the store lights. NVG and NVS models do not have fans.

**Each column applies to light configurations listed below: NOTE: Standard case has no shelf receptacles.**

(2) One row of fluorescent; no shelf lights.

(3) One row fluorescent front lights and one row fluorescent rear lights; no shelf lights.

(4) One row fluorescent front lights and full complement of shelf lights.

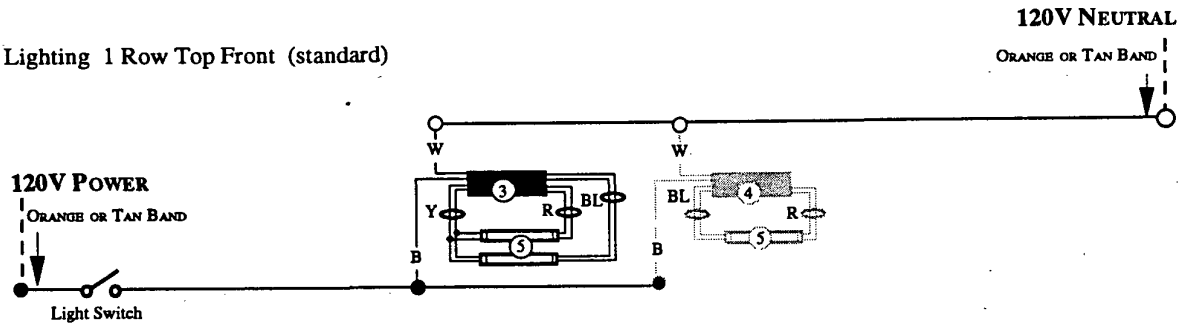
(5) One row fluorescent front lights, one row fluorescent rear lights and full complement of shelf lights.

(6) The merchandiser's electrical service receptacles are intended for small lighted displays and scales, not for large motors or other high wattage appliances.

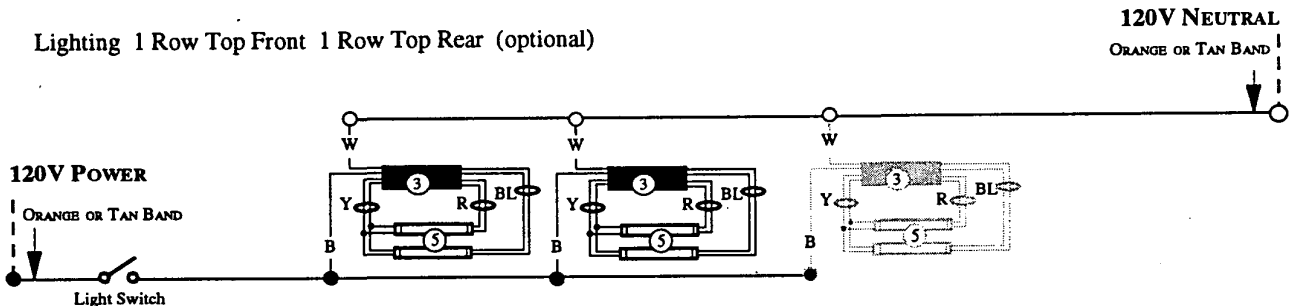
# Light Circuits -NVB, NVG, NVS

CIRCLED NUMBERS = PARTS LIST ITEM NUMBERS

Lighting 1 Row Top Front (standard)



Lighting 1 Row Top Front 1 Row Top Rear (optional)



## WARNING

All components must have mechanical ground, and the merchandiser must be grounded.

### Notes:

Schematic shows both standard and optional components. Not all components will be on each merchandiser. Check store legend for specifics.

Optional shelf lighting uses one single light ballast per shelf.

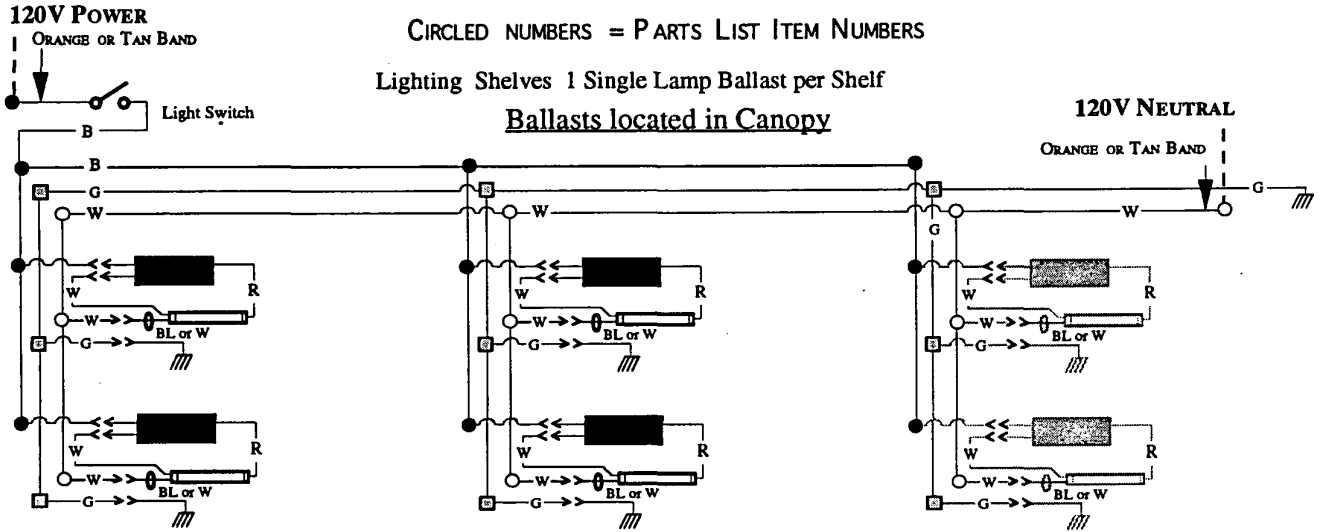
Grayed components in 12' models only.

R = Red OR = Orange Y = Yellow BL = Blue B = Black BR = Brown W = White

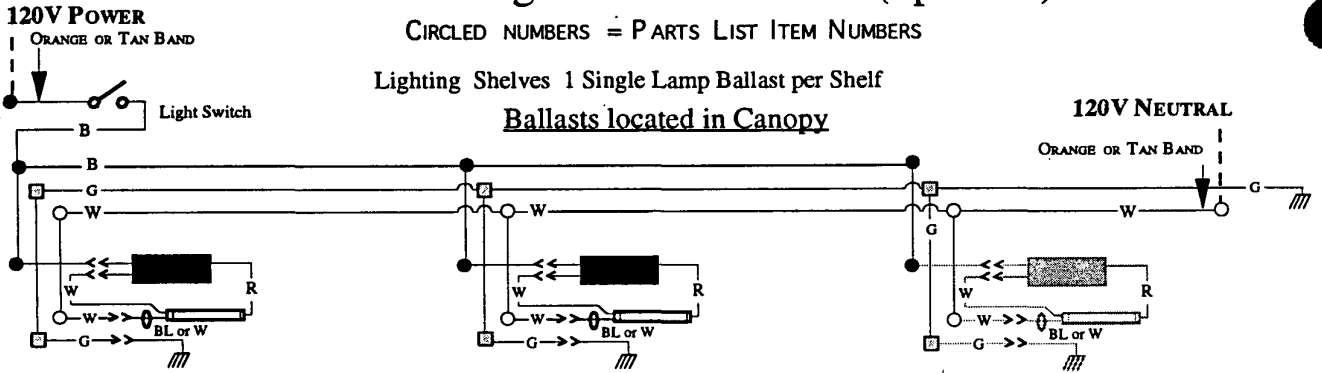
● = 120V POWER ○ = 120V NEUTRAL

4-4 ELECTRICAL

## Mezzanine Shelf Light Circuits - NVB (optional)



## Mezzanine Shelf Light Circuits - NVG (optional)



### WARNING

All components must have mechanical ground, and the merchandiser must be grounded.

Notes:

Schematic shows both standard and optional components. Not all components will be on each merchandiser. Check store legend for specifics.

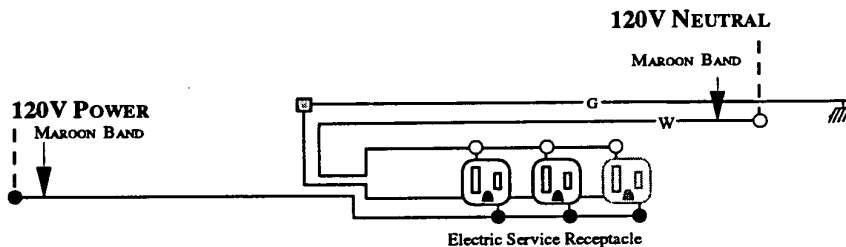
Optional shelf lighting uses one single light ballast per shelf.

Grayed components in 12' models only.

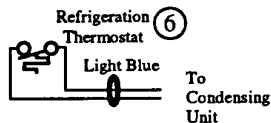
R = Red OR = Orange Y = Yellow BL = Blue B = Black BR = Brown W = White

● = 120V POWER ○ = 120V NEUTRAL □ = GROUND

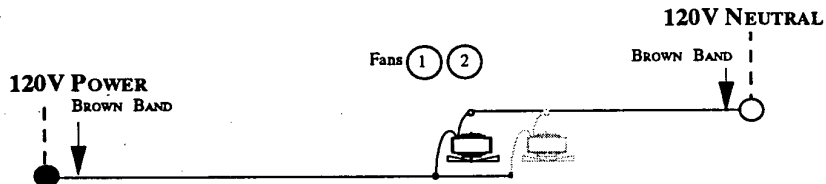
### Receptacle Circuit NVB, NVG, NVS



### Thermostat Circuit NVB, NVG



### NVB Fan Circuit - Offtime Defrost (standard)



### WARNING

All components must have mechanical ground, and the merchandiser must be grounded.

**Notes:**

Schematic shows both standard and optional components. Not all components will be on each merchandiser. Check store legend for specifics.

Grayed components in 12' models only. Broken line indicates field wiring.

CIRCLED NUMBERS = PARTS LIST ITEM NUMBERS

R = Red

● = 120V POWER    ○ = 120V NEUTRAL    □ = GROUND



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4-6

**ELECTRICAL**

### CARE AND CLEANING

Essential for any meat/deli department is an established and regulated cleaning procedure. The discoloration that causes meat/deli items to lose their eye appeal and drastically shorten their shelf life is caused by bacteria. Soap and hot water are not enough to kill this bacteria. **A sanitizing solution must be included with each cleaning process to extend shelf life of product.**

Every surface in the meat/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 and preparation room floors.

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

#### Exterior Surfaces

The exterior surfaces must be cleaned with a mild detergent and warm water to protect and maintain their attractive finish. **Never use abrasive cleansers or scouring pads.**

#### Interior Surfaces

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

#### Do NOT Use:

- Mineral oil based solutions, as these will dissolve the butyl sealants used in the construction of the merchandisers.
- Abrasive cleansers and scouring pads, as these will mar the finish.

### WARNING

**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.**

#### DO:

- Remove the product and all loose debris to avoid clogging the waste outlet.
- Thoroughly clean all surfaces (Excluding Cold Glass) with soap and hot water. **Do NOT use steam or high water pressure hoses to wash the interior. These will destroy the merchandisers' sealing causing leaks and poor performance.**
- Rinse with hot water, but do NOT flood. **Never introduce water faster than the waste outlet can remove it.**
- Allow the merchandisers to dry before resuming operation.
- When cleaning lighted shelves, wipe down with a damp sponge or cloth so that water does not enter the light channel. **Do NOT use a hose or submerge shelves in water.**

### ELECTRICAL 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.

### 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.

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## 5-2 USER INFORMATION

### SHELVES

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

### STOCKING

These refrigerated display merchandisers have been designed to provide maximum protection, essential for fresh meat, fish 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.

- Operate the cooler at a constant 28–34°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 (NVB models only).

- Close the service doors. Refrigeration performance will be seriously affected if the doors are 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 product shelf life.

- Completely cover the product each night at closing with clean butcher paper. Make sure the paper is in direct contact with the product.

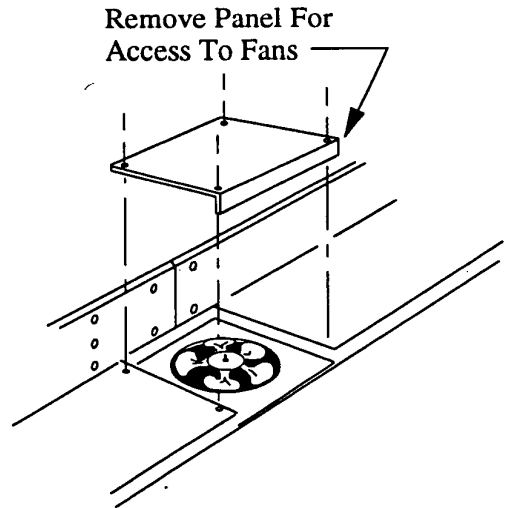
- Rotate product displayed on any mezzanine shelves that may be installed in the merchandisers. The temperature will be slightly higher on these shelves and the product life will be shorter.

**WARNING**

Always disconnect the electrical power at the main disconnect when servicing or replacing any electrical component. This includes, but is not limited to such items as fans, heaters, thermostats and lights.

**REPLACING FAN MOTORS AND BLADES  
(NVB Models Only)**

Should it ever be necessary to service or replace the fan motors or blades be certain that the fan blades are re-installed correctly. Always replace the fan blades with the raised embossed side of the blade installed toward the motor.



**REPLACING FLUORESCENT LAMPS**

Fluorescent lamps are furnished with moisture resistant lamp holders, shields and end caps. Whenever a fluorescent lamp is replaced be certain to reinstall the lamp shields and end caps.

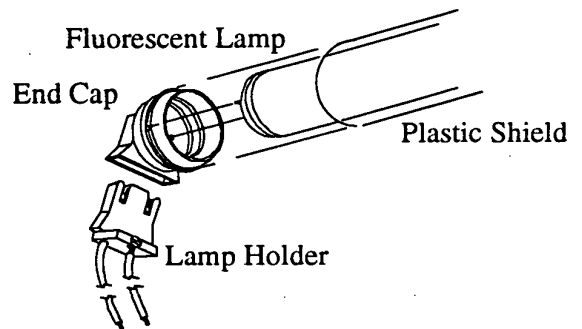
**NOTE:** Do NOT twist the lamp.

**Remove Lamp**

To remove a lamp, simply push the lamp away from the lamp holder.

**Install Lamp**

To install a lamp, align the end caps over the lamp holders and press gently. A slight snap will be felt as the lamp is seated.



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6-2      **SERVICE**

**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

**NOTE:**

Hussmann aluminum melts at .....1125° F  
Aladdin 3-in-1 rod at .....732° F  
X-Ergon Acid core at .....455° F  
Factory Solder at aluminum  
to copper transitions .....855° F  
Return Bend Fittings.....855° F

**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.