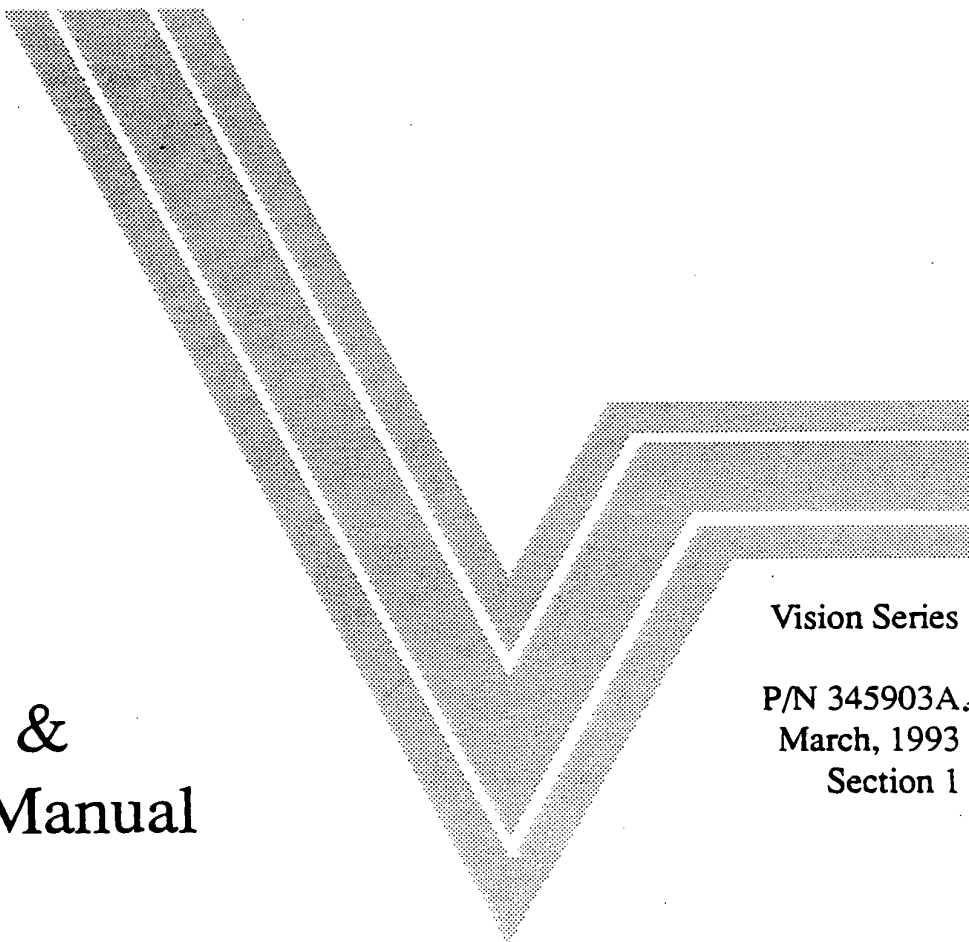




HUSSmann®

NM1 & NM1G

Single Deck Meat
Merchandisers



Installation &
Operation Manual

Vision Series

P/N 345903A.
March, 1993
Section 1

Update to Instructions

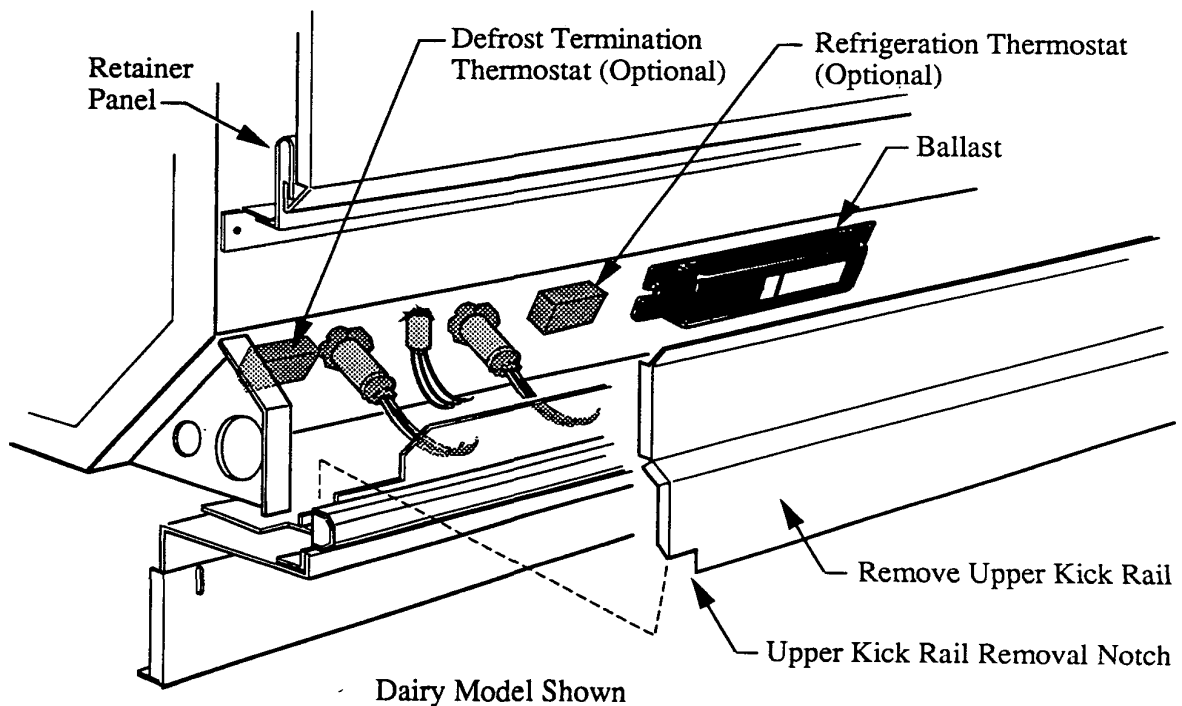
Instruction P/N: 345901, 348045, 352946, 345913, 345911 and 358027

The design of the upper kick rail has been changed. Please follow the instructions below.

REMOVING UPPER KICK RAIL

Remove the upper kick rail by pushing in and up to free it from the bumper area. If kick rail is difficult to remove, carefully slide a small slotted screw driver between the bumper and the kick rail. Insert screw driver in the removal notch (located at each end) and lift the kick rail up. Once the bottom is free, lower the upper kick rail out from behind the front panel.

To install, slide the upper kick rail into retainer behind front panel. Position the lower edge of the kick rail behind the bumper and in front of the adjustable bracket.



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IMPORTANT

KEEP IN STORE FOR FUTURE REFERENCE

Quality that sets industry standards

This merchandiser conforms to the
Commercial Refrigeration Manufacturer's 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

Meat & Deli

REPLACEMENT PARTS LIST

Item	Part Number	Description
1.	0058698	Fan Motor, Evaporator 120V, 6W, CW GE #KSM51ECG3264
2.	0142780	Fan Blade, 8 foot embossing toward motor Morrill #FV800 CW 25S
	0141070	Fan Blade, 12 foot embossing toward motor Morrill #FV800 CW 20S
3.	0058250	Anti-Sweat Heater, 8 foot Rear Rail, 120V, 0.75A, 160Ω
	0058251	Anti-Sweat Heater, 12 foot Rear Rail, 120V, 1.0A, 120Ω
4.	0100936	Fan Thermostat, Gas Defrost Only Thermo Disk 14T-31
5.	0113625	Refrigeration Thermostat Penn #A19GD-21
6.	0311588	Defrost Termination Thermostat TI #20425F
7.	0131434	Defrost Heater, 8 foot 208V, 5.2 A, 40Ω
	0131435	Defrost Heater, 12 foot 208V, 7.8A, 27Ω

GENERAL INFORMATION

1-1

MODEL DESCRIPTIONS

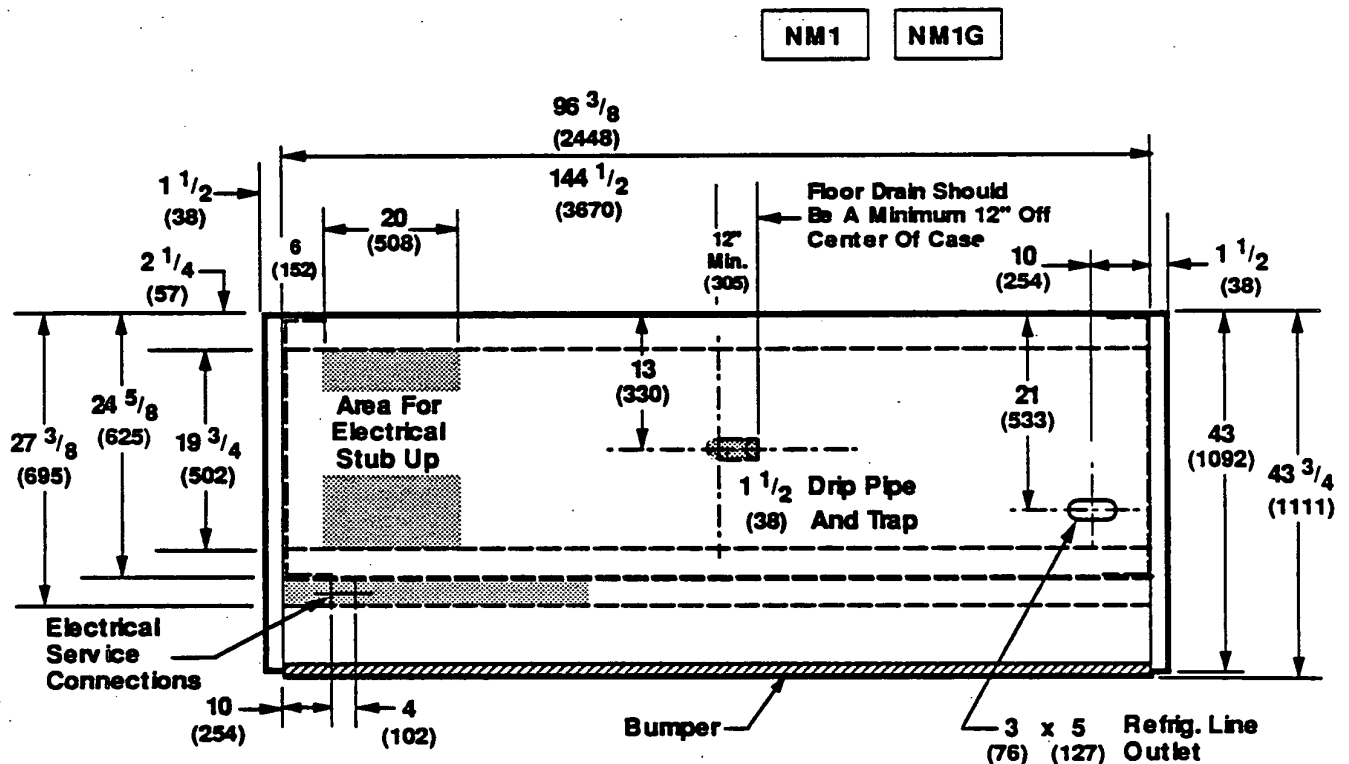
This instruction covers the merchandisers listed below. Basic design features are listed to the right of each merchandiser.

NM1 Single Deck Meat
NM1G Single Deck Meat,
front glass

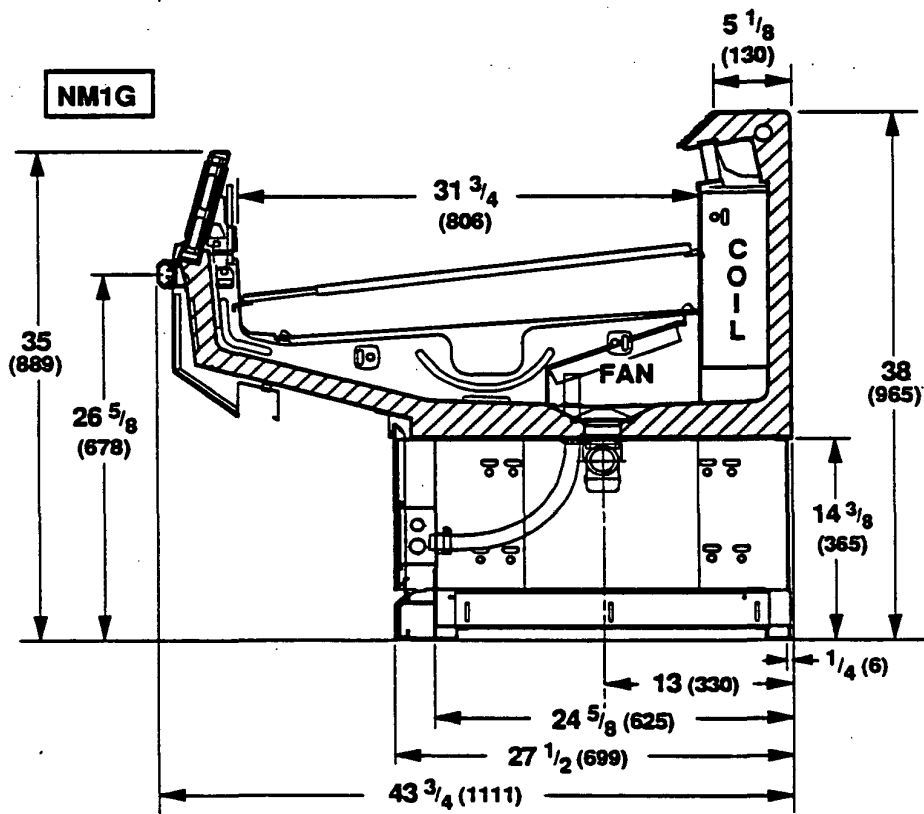
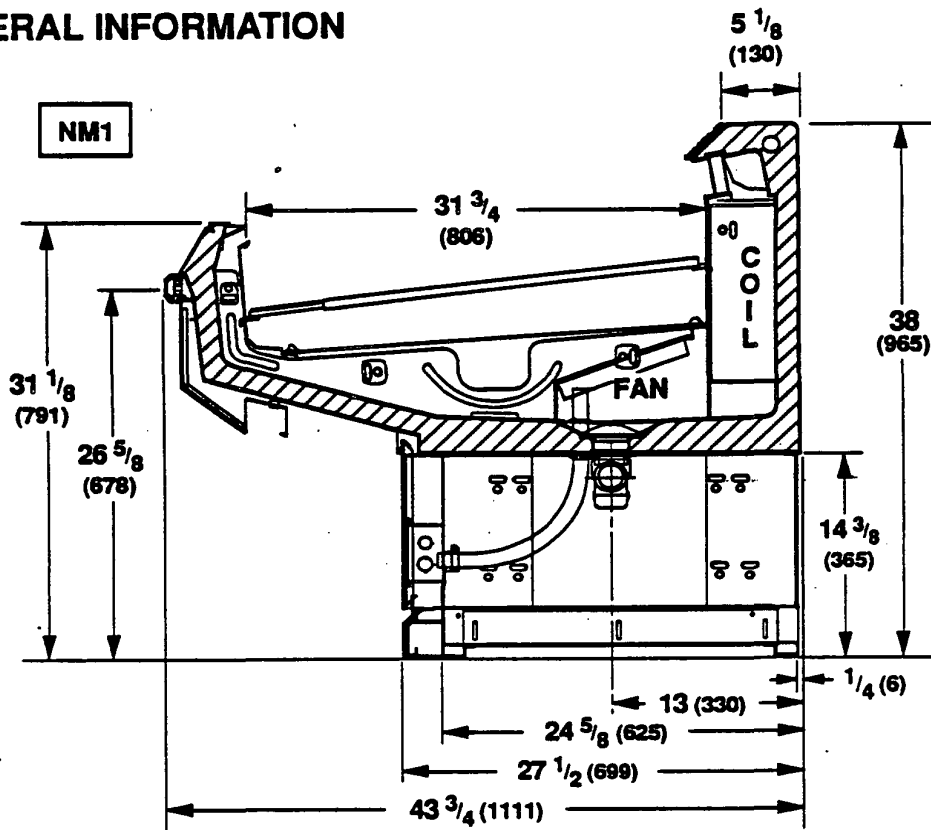
APPLICATION

These medium temperature merchandisers are designed for displaying fresh packaged 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.

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



1-2 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 merchandiser as close as possible to its permanent location and then remove all packaging. Check for damage before discarding packaging. Remove all separately packed accessories such as kits and shelves. 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.

WARNING

Do NOT remove shipping braces until the merchandisers are properly anchored to the floor. These merchandisers are top heavy and could tip over causing serious injury.

Merchandisers must be braced before removing the lag bolts.

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

Like other open merchandisers, these 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.

To prevent sweating on the exterior surfaces of merchandisers, there must be A MINIMUM CLEARANCE OF 4 INCHES between the merchandisers and other fixtures or walls.

2-2 INSTALLATION

LEVELING

Merchandisers must be installed level to ensure proper operation of the refrigeration system and to ensure 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: BEGIN LINEUP LEVELING FROM THE HIGHEST POINT OF THE STORE FLOOR.

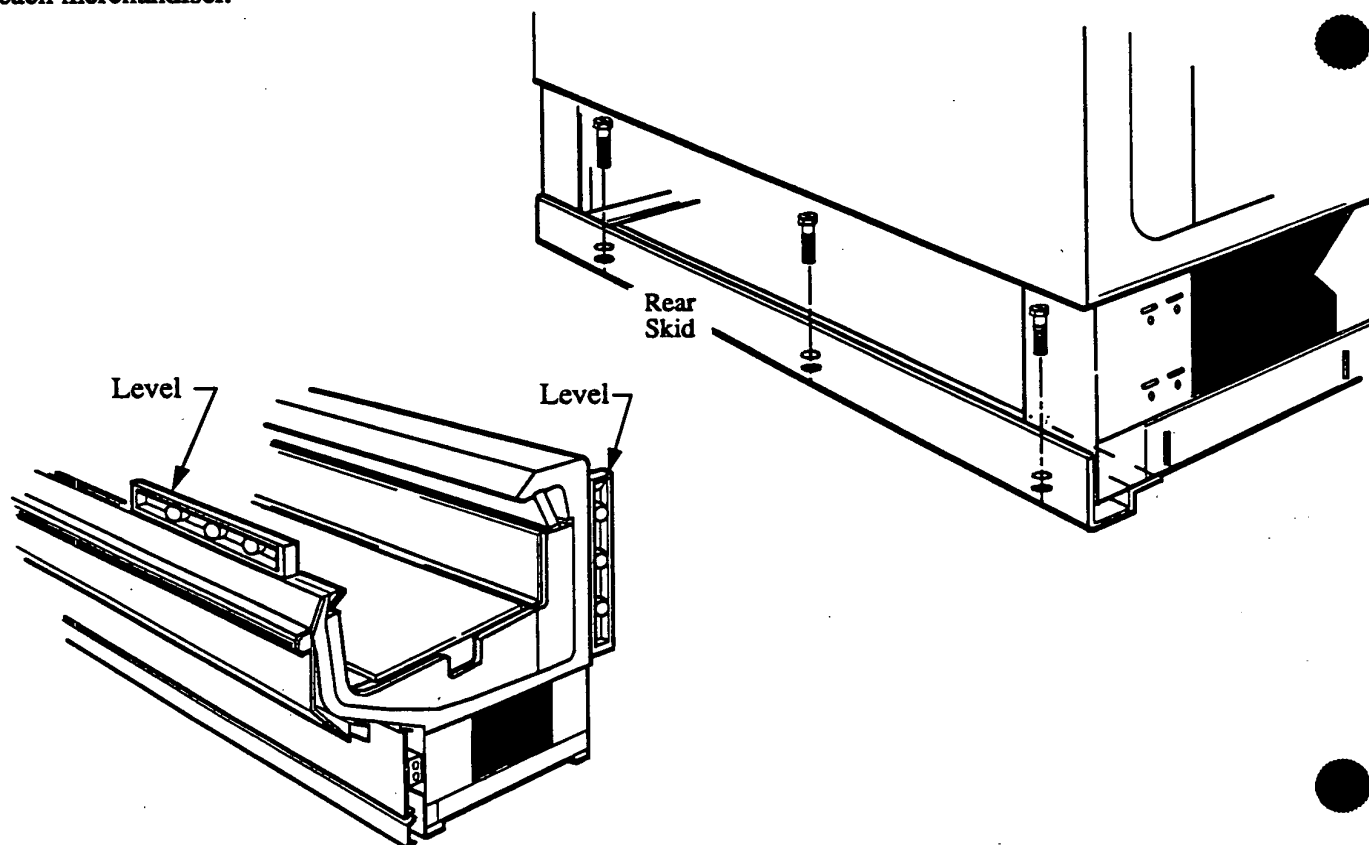
JOINING

Sectional construction means that two or more merchandisers may be joined in line yielding one long continuous display requiring only one pair of ends. Joint kits and instructions are shipped with each merchandiser.

ANCHORING

Because of the merchandisers' forward projection, they must be anchored to the floor to prevent them from tipping forward. Each merchandiser should be lagged to the floor through its rear skid. Anchors should be placed approximately eight (8) to twelve (12) inches from each end and in the center of the rear skid. Some merchandisers have $\frac{1}{2}$ inch holes in the rear skid for this purpose.

Once the merchandisers are properly anchored, remove shipping braces.



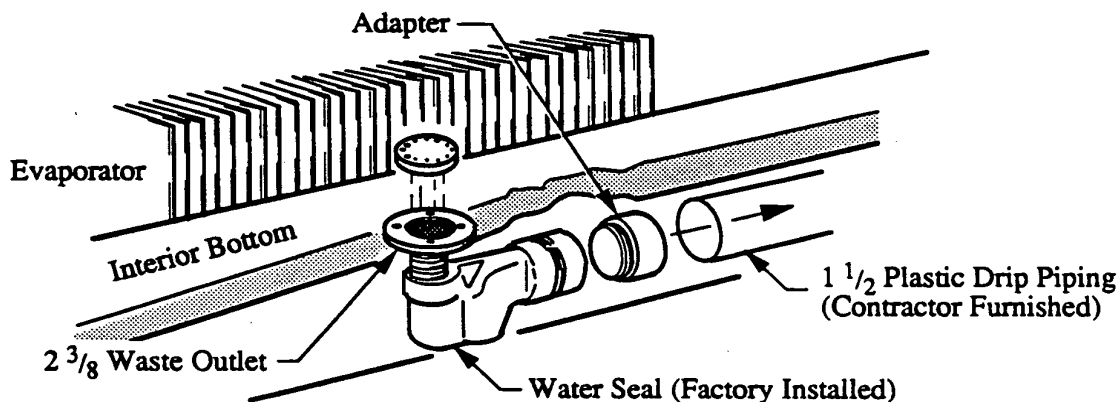
WASTE OUTLET AND WATER SEAL

The waste outlet is located at the center of each merchandiser allowing drip piping to be run under the fixture lengthwise, to the front or the rear. A 1 1/2 inch water seal is factory installed on each merchandiser.

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 below when installing drip pipes to ensure 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. Store plumbing system floor drains should be at least 12 inches off center of merchandiser to allow use of the "water seal" pipe section.
3. Pitch the drip piping in the direction of flow. There should be a minimum pitch of 1/8 inch 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.



2-4 INSTALLATION

INSTALLING SPLASHGUARDS

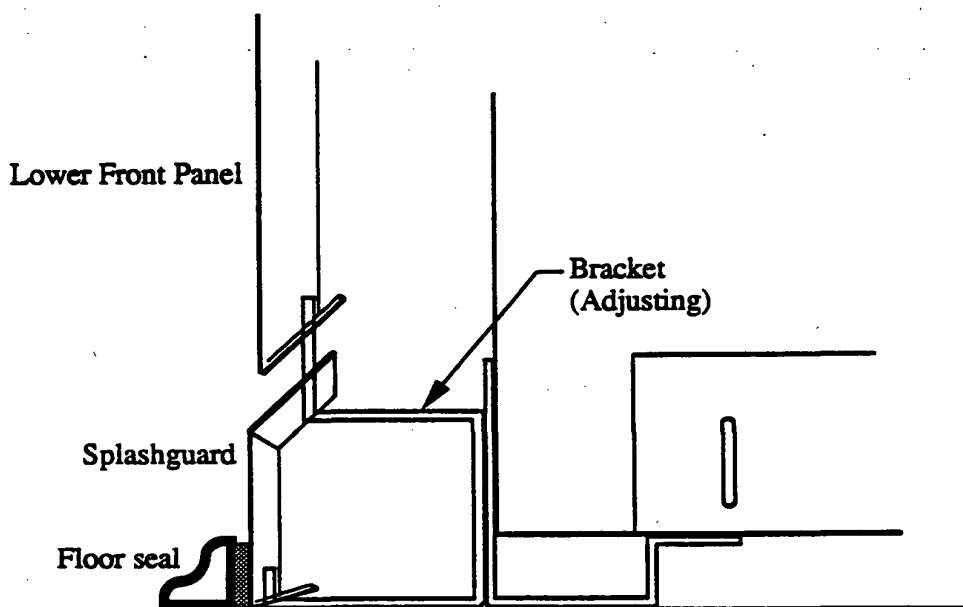
The splashguard and lower front panel are shipped inside each merchandiser. AFTER merchandisers have been leveled and joined, and all drip piping, electrical and refrigeration work has been completed, install the splashguards. The leveling brackets have a maximum extension of $\frac{3}{4}$ inch for uneven floors. After adjusting brackets flush with the floor, align slots in splashguard with leveling brackets and drop in place. Position lower front panel UP BEHIND THE FRONT PANEL FIRST, then down over the brackets.

SEALING SPLASHGUARDS TO FLOOR

IF REQUIRED by local sanitation codes or if desired by the customer, the splashguards 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 ensure 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.



REFRIGERANT

The correct type of refrigerant will be stamped on each merchandiser's serial plate which is located on the left-hand end of the interior back panel.

REFRIGERANT PIPING

Connection Sizes

Liquid Line	3/8 inches OD
Suction Line	7/8 inches OD

Connection Location

The refrigerant line connections are at the right-hand end of the merchandiser (as viewed from the front) beneath the display pans.

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

Multiplexing

Piping of merchandisers operating on the same refrigeration system may be run from merchandiser to merchandiser through the end frame saddles provided for this purpose. **DO NOT RUN REFRIGERANT LINES THROUGH MERCHANDISERS THAT ARE NOT ON THE SAME REFRIGERATION SYSTEM** as this may result in poor refrigeration control and compressor failure.

NOTE: If Gas defrost is used, 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.

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 either the Hussmann Conventional or 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

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.

With OTHER Than Gas Defrost

The suction and liquid lines should be clamped or taped together and insulated for a minimum of 30 feet from the merchandiser.

With EITHER of Above

Additional insulation for the balance of the liquid and suction lines is recommended wherever condensation drippage is objectionable or the lines are exposed to ambient conditions.

3-2 REFRIGERATION

TEV AND DISTRIBUTOR - Sporlan Nomenclature

R-22			
Feet	TEV	Distributors	
		Gas*	All Other
8	BFVE AC	N/A	N/A
12	BFVE AC	D116-3 ¹ / ₄ - ¹ / ₃	D115-3 ¹ / ₄ - ¹ / ₃
R-502			
Feet	TEV	Distributors	
		Gas*	All Other
8	BFRE AC	N/A	N/A
12	BFRE AC	D116-3 ¹ / ₄ - ¹ / ₂	D115-3 ¹ / ₄ - ¹ / ₂

* 8 foot merchandisers are equipped with a "T" bypass which allows liquid refrigerant condensed in the coil during defrost to backflow into the liquid line.

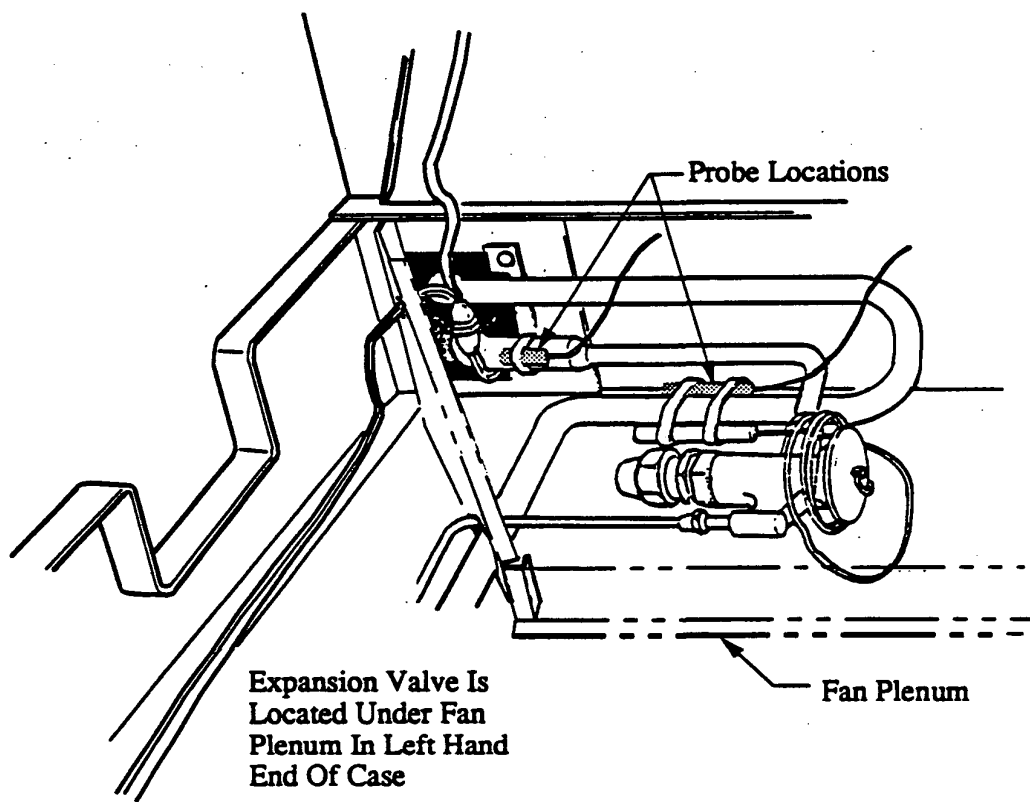
* 12 foot merchandiser distributors are provided with a special ³/₈ inch side outlet port that allows the liquid condensed in the coil during defrost to bypass the expansion valve and flow into the liquid line.

EXPANSION VALVE ADJUSTMENT

Expansion valves must be adjusted to fully feed the evaporator. Before attempting to adjust valves, make sure the evaporator is either clear or only lightly covered with frost, and that the merchandiser 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 (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 3–5°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.



3-4 REFRIGERATION

CONTROL SETTINGS

Conventional Single Compressor

Measure Discharge Temperature
at the center of the case
at the discharge honeycomb.

Merchandise temperature may be controlled by the condensing unit's low pressure control or by a thermostat with a 3–5°F differential. The thermostat will be wired to control the compressor motor contactor. A THERMOSTAT IS PREFERRED ON INDOOR UNITS AND REQUIRED ON OUTDOOR UNITS. If used, low pressure control must cut-out refrigeration at listed discharge air temperatures.

Standard Off Time defrost is time terminated. Optional Electric defrost is temperature terminated at 48°F. The defrost termination thermostats for all the merchandisers on one compressor are wired in series. 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, and has fan cycling thermostat. The defrost frequency and lengths listed may require adjustment for specific store conditions. Factors include:

- Store temperature and humidity
- Low head pressure
- Long refrigerant line runs
- Seasonal changes
- Merchandise temperature lower than recommended

When practical, defrost when store is closed.

Low pressure control settings are applicable to outdoor condenser units where ambient does not fall below 0°F.

Refrigeration Data		
	Meat	Deli
Discharge Air °F	22	30
Evaporator °F	17	25
Fan Cycling CI/CO		
Gas Defrost ONLY °F	28/38	28/38
Defrost Data		
Frequency Hrs	12	12
<u>Electric</u>		
Temp Term °F	48	48
Failsafe Min	46	70
<u>Gas</u>		
Duration Min	14	14
<u>Offtime</u>		
Duration Min	70	70
When Thermostat Controls Temperature		
Low Pres Backup Control (PSIG)		
	CI/CO	CI/CO
R-22	33/23	41/31
R-502	41/31	50/40

Parallel Compressor Rack

Measure Discharge Temperature
at the center of the case
at the discharge honeycomb.

Merchandise temperature may be controlled by a thermostat or a CDA. The CDA sensor will be mounted in the same location as a thermostat sensing bulb. The CDA valve and control board will be mounted on the rack.

Standard Off Time defrost is time terminated. Optional Gas Defrost is time terminated, and has fan cycling thermostat. The defrost frequency and lengths listed may require adjustment for specific store conditions.

Factors include:

- Store temperature and humidity
- Low head pressure
- Long refrigerant line runs
- Seasonal changes
- Merchandise temperature lower than recommended

Stagger defrosts to maintain stable compressor loading and sufficient defrost gas. When practical, defrost when store is closed.

The defrost termination thermostats for all the merchandisers on one branch are wired in series.

Refrigeration Data

	Meat	Deli
Discharge Air °F	22	30
Evaporator °F	17	25
Fan Cycling CI/CO		
Gas ONLY °F	28/38	28/38

Defrost Data

Frequency Hrs	12	12
<u>Electric</u>		
Temp Term °F	48	48
Failsafe Min	46	70
<u>Gas</u>		
Duration Min	14	14
<u>Offtime</u>		
Duration Min	70	70

3-6 REFRIGERATION

REFRIGERATION THERMOSTAT

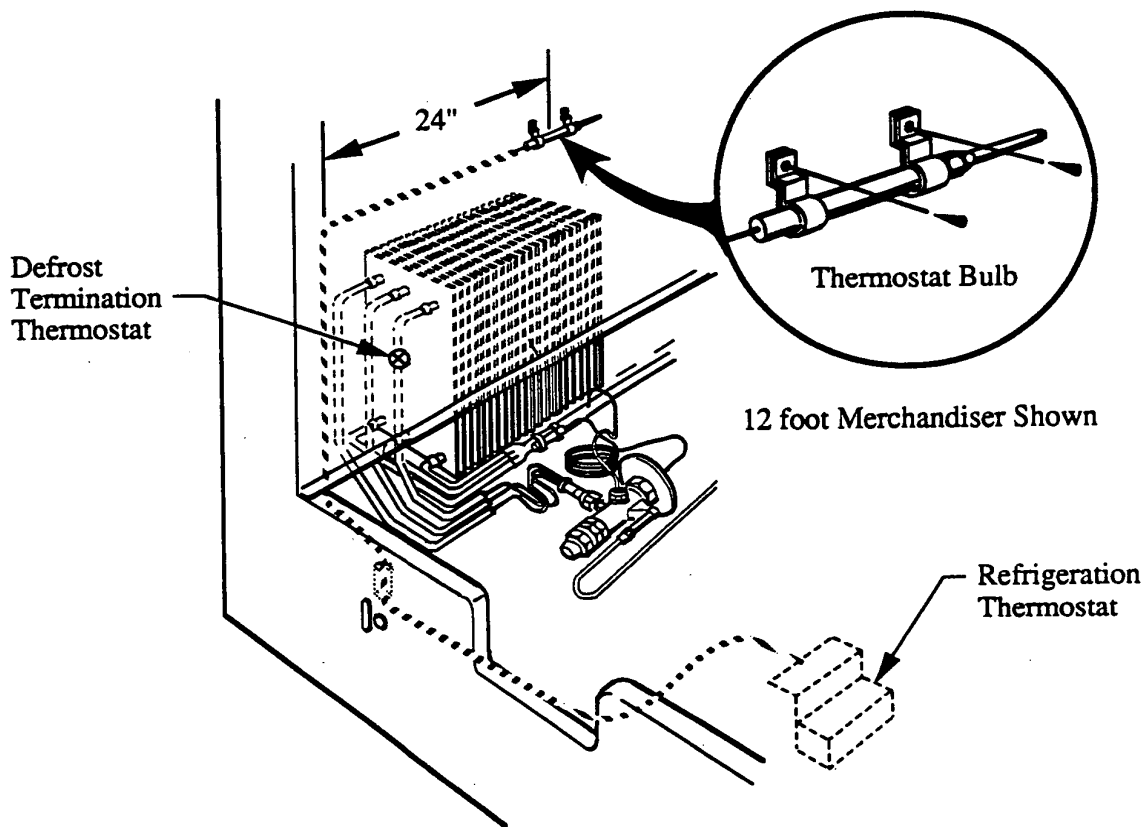
Factory installation of optional thermostat is shown below. The thermostat body is located behind the splashguard at the left end of the merchandisers. The bulb is located above the coil approximately 24 inches from the left end of the merchandisers.

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 raceway and to the rack control panel. Leads are tagged in the raceway.

DEFROST TERMINATION THERMOSTAT

This optional disc type thermostat is located as shown below.



CONNECTIONS

All wiring must be in compliance with NEC and local codes. All electrical connections are to be made in the electrical raceway behind the splashguard on the left-hand end of the merchandiser. See Page 6-3 for instructions on removing lower front panel.

IDENTIFICATION OF WIRING

Leads for all electrical circuits are identified by colored plastic bands. These bands correspond to the "color code sticker" (shown below) located inside the merchandiser's raceway.

WIRING COLOR CODE

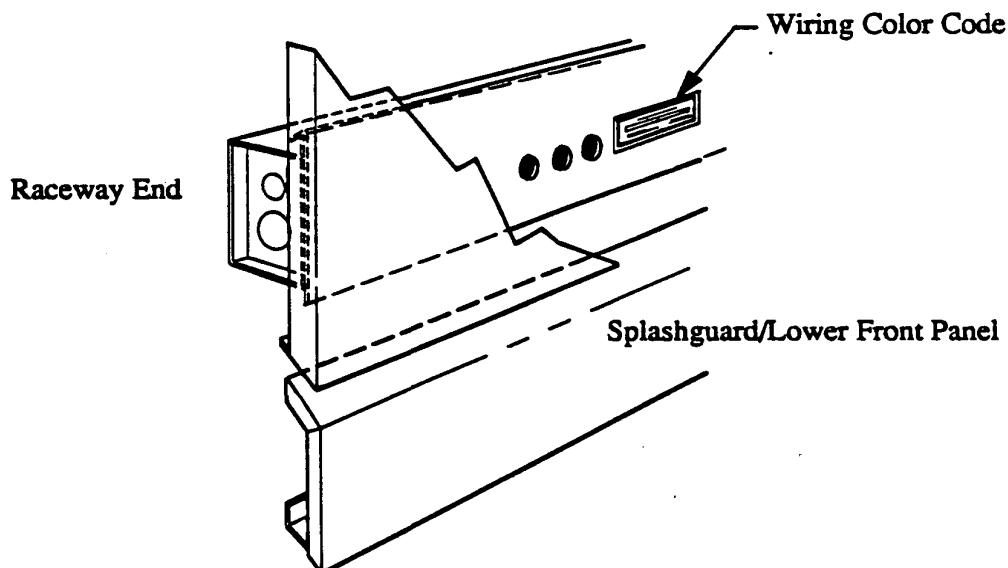
Leads for all electrical circuits are identified by a colored plastic band: neutral wire for each circuit has either White insulation or a White plastic sleeve in addition to the color band.

PINKREFRIG. THERMOSTAT LOW TEMP.
 LIGHT BLUE...REFRIG. THERMOSTAT NORM TEMP.
 DARK BLUE ..DEFROST TERM. THERMOSTAT
 PURPLE.....ANTI-SWEAT HEATERS
 BROWNFAN MOTORS
 GREEN*GROUND

ORANGE OR
 TANLIGHTS
 MAROON...RECEPTACLES
 YELLOW....DEFROST HEATERS, 120V
 RED*DEFROST HEATERS, 208V

*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

Model	120V 1PH 60Hz				208V 1PH 60Hz Optional Defrost Heater
	Fans	Anti-sweat			
		Option	Heaters	Option	
Meat and Deli	(1)	(2)	(3)	(4)	
8 foot	0.6	—	0.8	—	5.2
12 foot	1.2	—	1.0	—	7.8

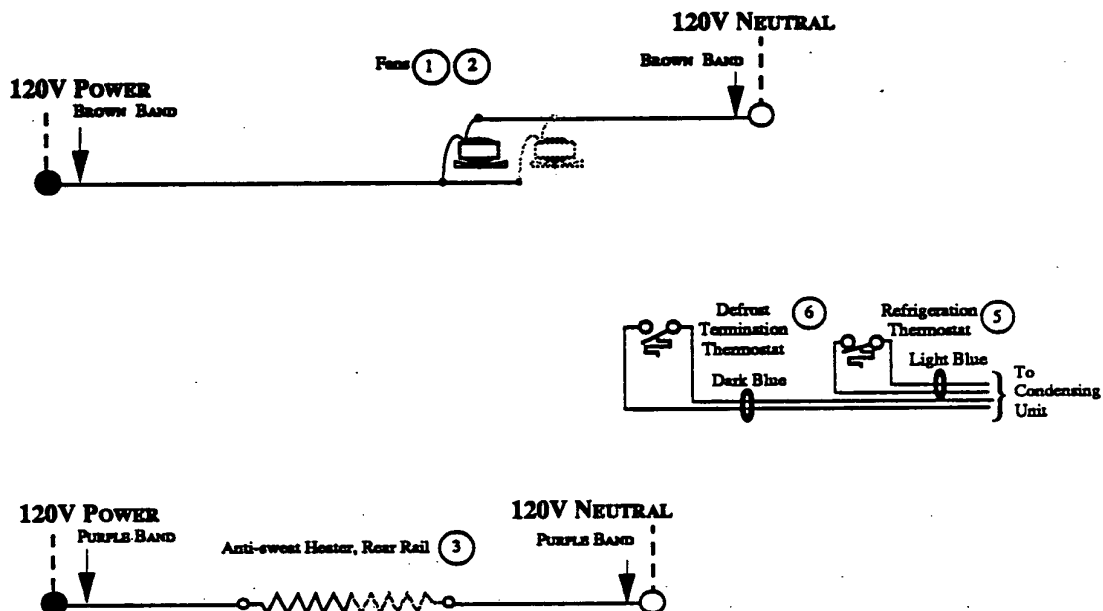
(1) Fans and anti-sweat heaters should be on a separate circuit from the lights to avoid turning them off with the store lights

(2) N/A

(3) All anti-sweat heaters can be cycled off by connecting them to an energy saving controller. The circuit will be tagged in the raceway as a cyclical anti-sweat heater. They may be run parallel to the fan circuit for continuous duty.

(4) N/A

NM1 & NM1G - Fan and Heater Circuits - Offtime Defrost (standard)



WARNING

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

NOTES:

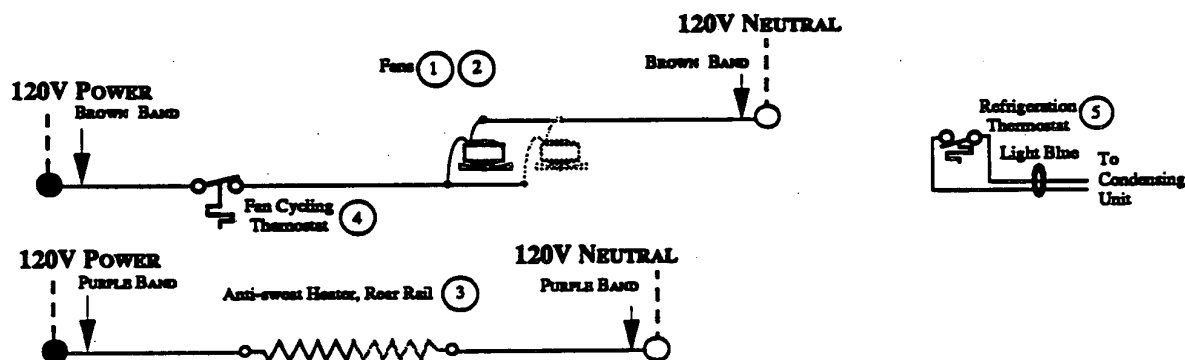
Schematic shows both standard and optional components. Not all components will be on each merchandiser. Check store legend for specifics. Broken line indicates field wiring. Grayed components in 12 foot models only.

CIRCLED NUMBERS = PARTS LIST ITEM NUMBERS

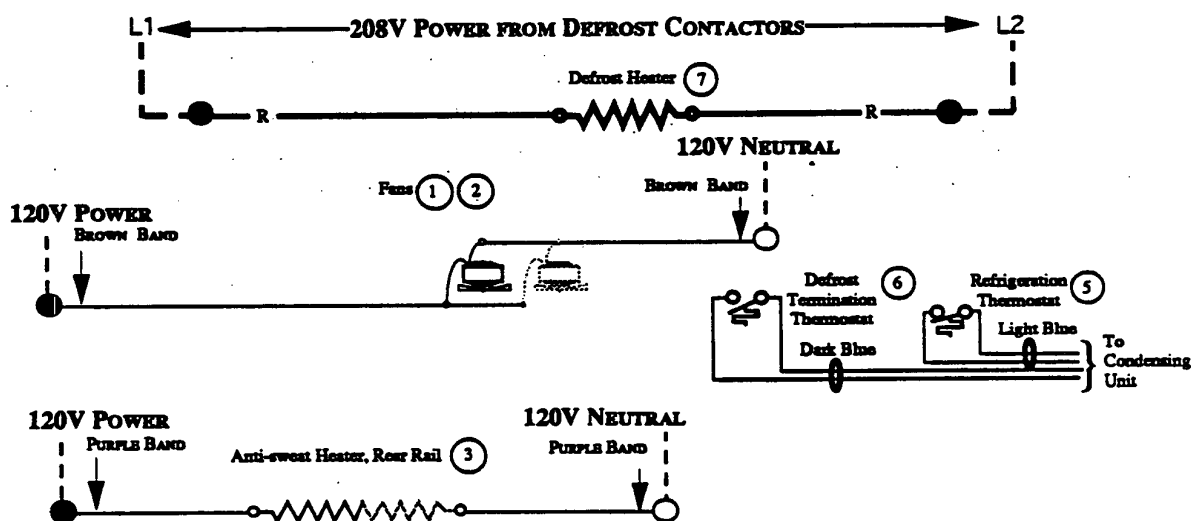
● = 120V POWER ○ = 120V NEUTRAL

4-4 ELECTRICAL

NM1 & NM1G - Fan and Heater Circuits - Gas Defrost (optional)



NM1 & NM1G - Fan and Heater Circuits - Electric Defrost (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. Broken line indicates field wiring. Grayed components in 12 foot models only.

CIRCLED NUMBERS = PARTS LIST ITEM NUMBERS

R = Red

● = 120V POWER ○ = 120V NEUTRAL

CARE AND CLEANING

Long life and satisfactory performance of any equipment is dependent upon the care it receives. To ensure long life, proper sanitation and minimum maintenance costs, these merchandisers should be thoroughly cleaned, all debris removed and the interiors washed down, weekly.

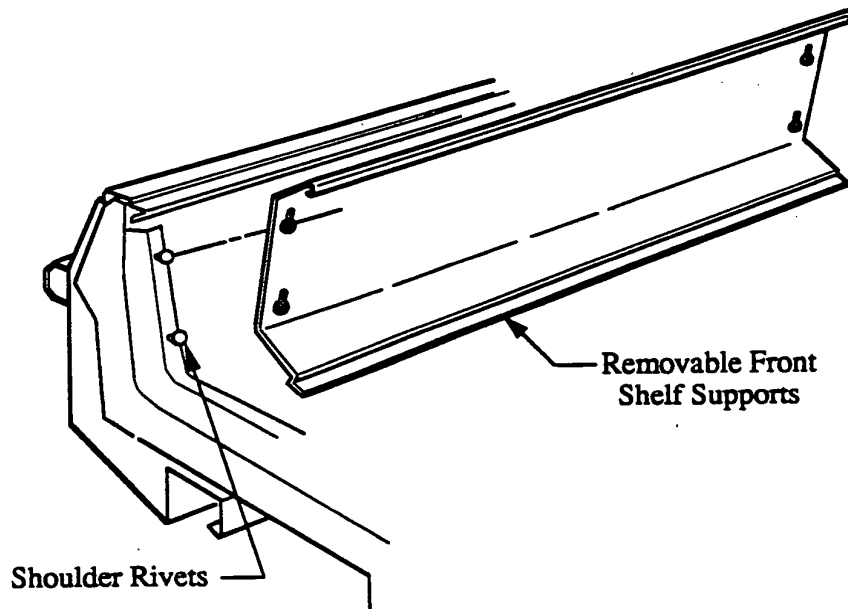
To facilitate quick and complete cleaning, these merchandisers have been designed with a removable front shelf support. The entire support is removable, in four foot sections, without the need for tools. Simply lift each section up and off the shoulder rivets located at both ends of each section (see illustration below).

To facilitate cleaning, the fan plenum is hinged for easy access to the area beneath the evaporator. **THE PLENUM IS FASTENED DOWN FOR SHIPPING PURPOSES WITH A SCREW AT EACH END. IF THESE HAVE NOT BEEN REMOVED, DO SO AND DISCARD.** After cleaning be sure the plenum is properly lowered into position.

CAUTION: SHUT FAN OFF DURING CLEANING PROCESS.

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.**



5-2 USER INFORMATION

Interior Surfaces

The interior surfaces may be cleaned with most domestic detergents, ammonia based cleaners and sanitizing solutions with no harm to the surface.

Do NOT Use:

- Mineral oil based solutions, as these will dissolve the butyl sealants used in constructing the merchandisers.

- Abrasive cleansers and scouring pads, as these will mar the finish.

DO:

- Remove the product and all loose debris to avoid clogging the waste outlet.

- Thoroughly clean all surfaces 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 merchandisers to dry before resuming operation.

NOTE: Be sure plenum is properly lowered into position after cleaning or product loss will result due to improper refrigeration.

SHELVES

Display shelves may be adjusted for shallow displays or volume displays for bulky items.

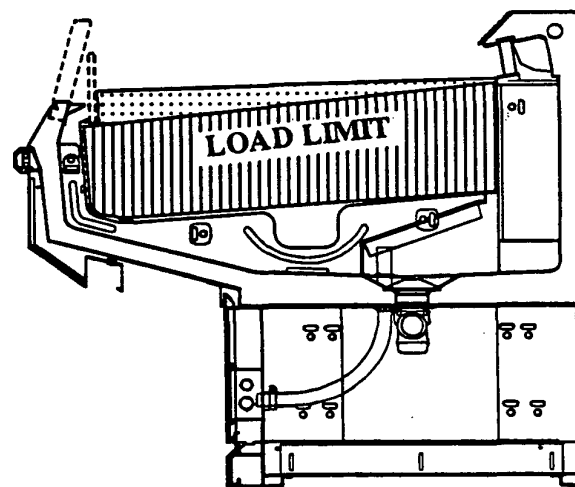
DISPLAY LIGHTING

Both the temperature and the rate of discoloration of fresh red, cured, smoked and table ready meats increases with higher light intensity and is affected differently by the various types of lighting present. If a shelf life of more than 2 or 3 days is expected, the total light intensity from all light sources should be limited to a maximum of 100 footcandles at the product level, including no more than 30 footcandles of incandescent lamps.

STOCKING

Product should NOT be placed in merchandisers until all refrigeration controls have been adjusted and merchandisers are at proper operating temperature.

At no time should merchandisers be stocked beyond the load limits indicated on the ends of the merchandiser as shown in the illustration below. Air discharge and return flues must remain open and free of obstruction at all times to provide proper refrigeration and air curtain performance.



Dotted line indicates glass front and glass front load limit.

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.

FAN LOCATION

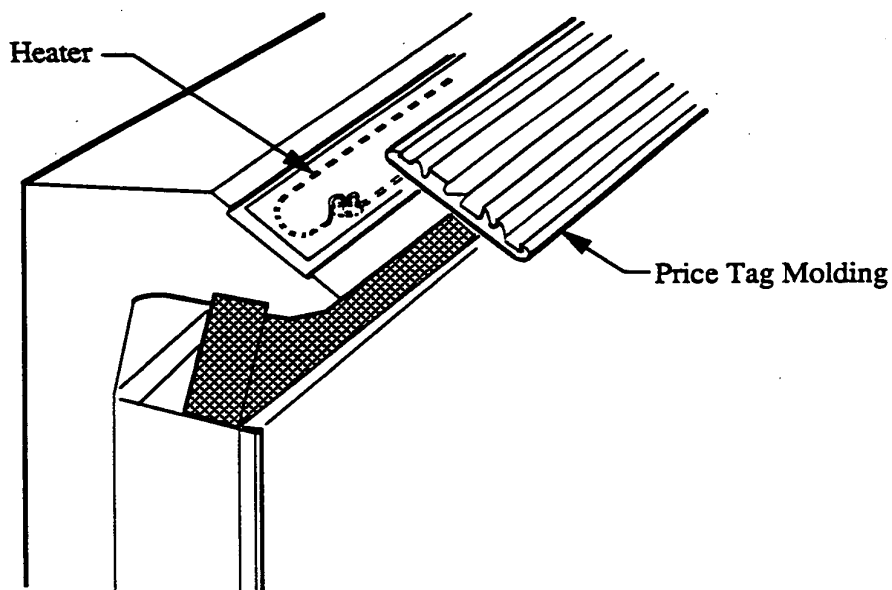
The evaporator fans are located at the center of the front of these cases directly beneath the display pan. Always replace the fan blades with the raised embossing toward the motor.

ANTI-SWEAT HEATER**Location**

The heater is located directly below the Price Tag Molding (PTM).

Replacement

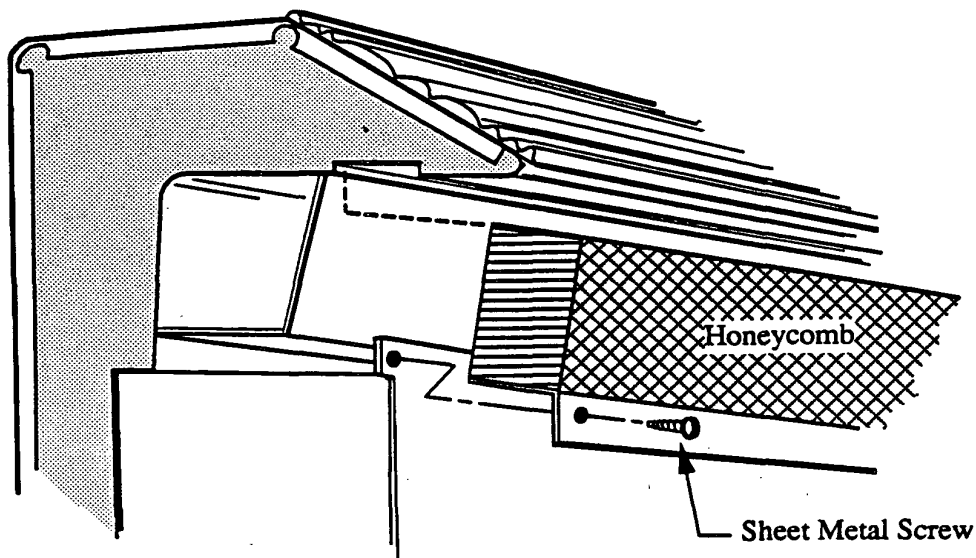
1. Remove screws holding PTM and lift molding from merchandiser.
2. Disconnect heater at its supply harness and replace.
3. Install parts in reverse.



CLEANING HONEYCOMB ASSEMBLIES

Honeycombs should be cleaned every six months. Dirty honeycombs will cause merchandisers to perform poorly. Soap and water may be used if all water is removed from the honeycomb cells before replacing. Be careful not to damage the honeycombs.

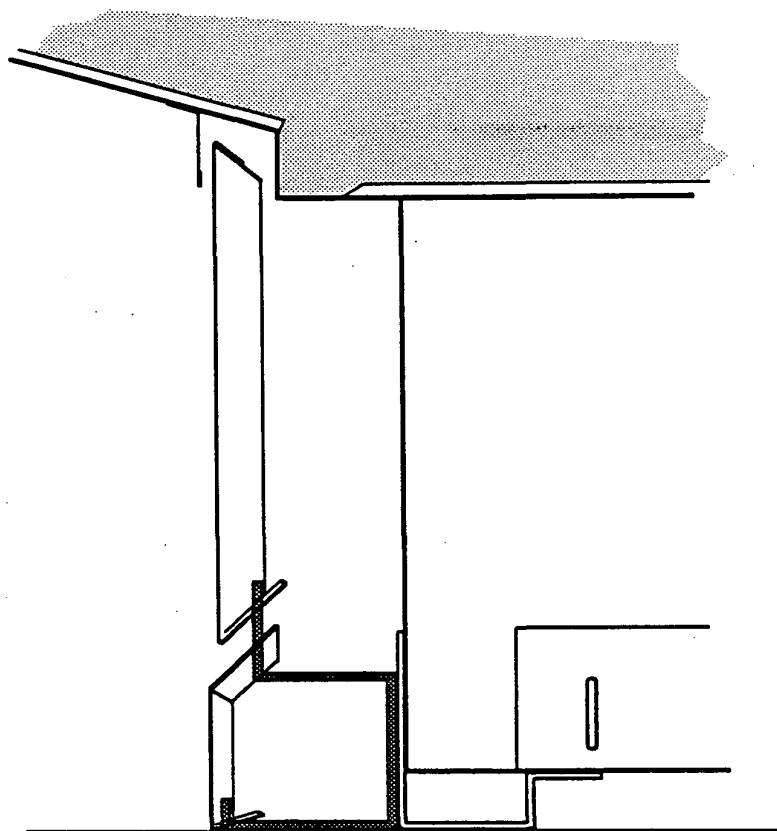
1. Remove the sheet metal screws along the bottom of the honeycomb assembly.
2. Holding the honeycomb sections in place, back off the retainer from the honeycomb.
3. Clean and dry the honeycomb.
4. After cleaning replace in reverse order of removal.



LOWER FRONT PANEL REMOVAL

Remove lower front panel by lifting up, then pulling out and away from the support brackets. Lift the panel from behind the retaining bracket.

To install, reverse procedure.



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
Phone: 1-800-645-3413
Fax: 1-800-645-3414

X-Ergon
1570 E. Northgate
P.O. Box 2102
Irving, TX 75062
Phone: 1-800-527-9916

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

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.