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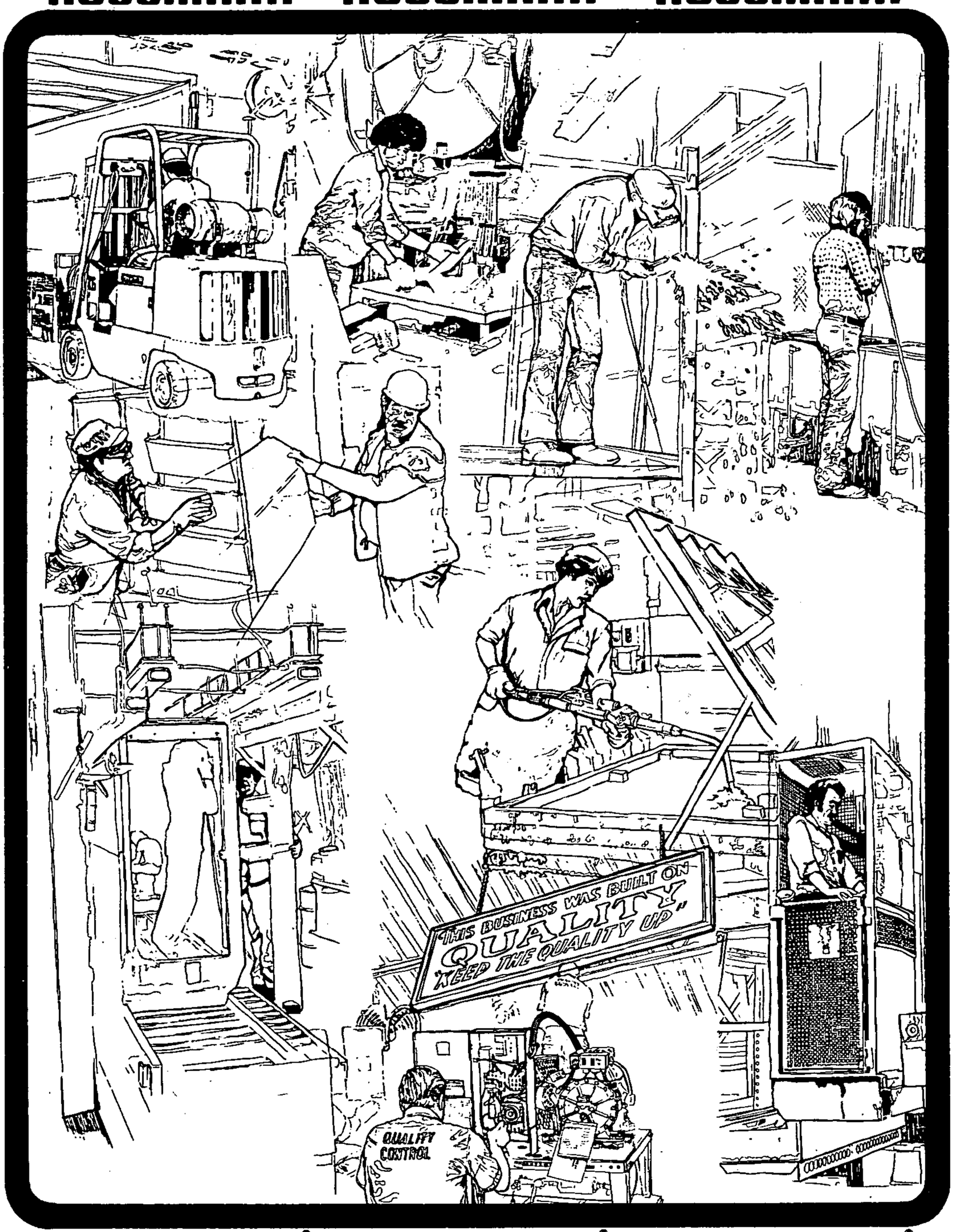
HUSSMANN®

CORPORATION



RHFA - RHCA
RHFH - RHCH

FROZEN FOOD AND ICE CREAM
REACH-IN REFRIGERATED MERCHANDISERS

INSTALLATION / SERVICE INSTRUCTIONS

ENG. NO. 311433G

September, 1986
Supersedes #311433F
Dated April, 1986
Section 6

Eng. #311433

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Eng. #311433

WARRANTY

REVISION CHANGES ("G")

1. Balanced Port Valves, page 10

IMPORTANT
KEEP IN STORE FOR FUTURE REFERENCE

Quality that sets industry standards.

THIS REFRIGERATOR CONFORMS TO THE
COMMERICAL REFRIGERATOR MANUFACTURER'S ASSOCIATION
HEALTH AND SANITATION STANDARD
CRS-S1-78

HUSSMANN CORPORATION • 12999 St. Charles Rock Rd. • Bridgeton, Mo. 63044 • (314) 291-2000

An **IC Industries** Company

SECTION 1
GENERAL INFORMATION

MODEL DESCRIPTION

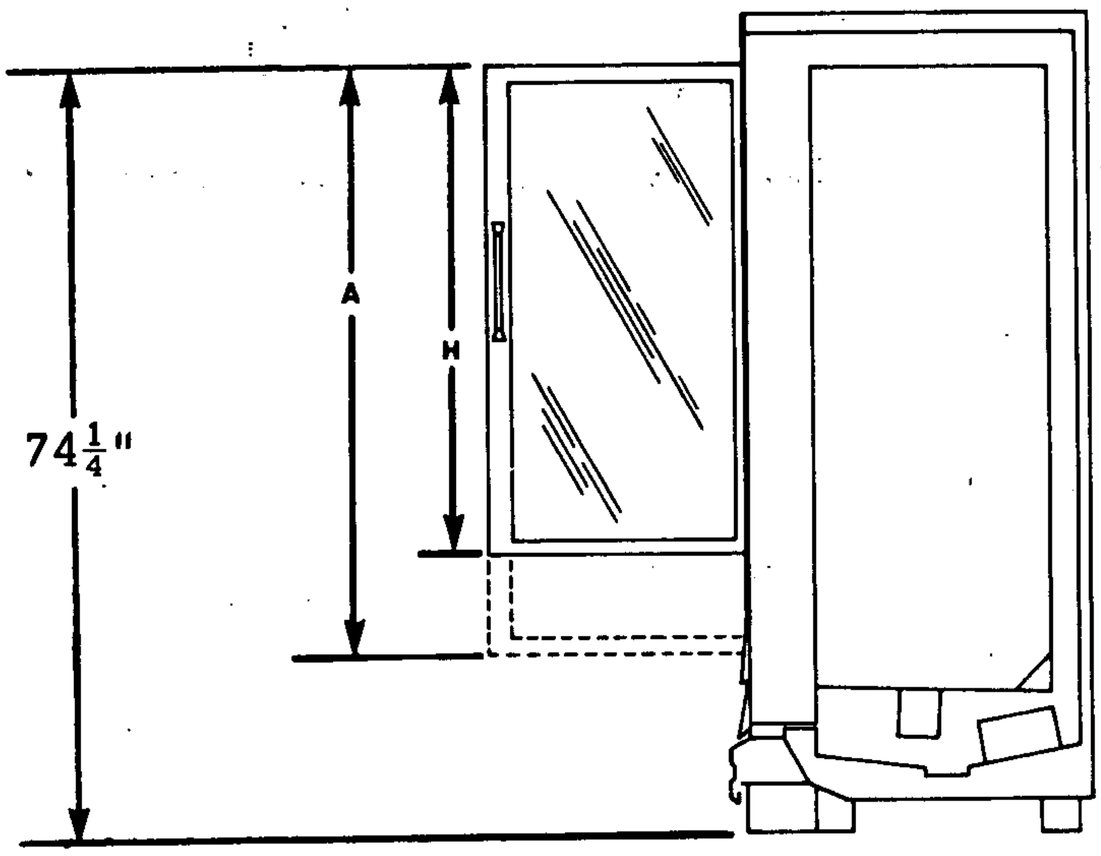
The RHFA, RHFH, RHCA and RHCH models are refrigerated reach-in merchandisers designed for low temperature applications to display frozen food or ice cream products. Each model is available in four different sizes: 2-door, 3-door, 4-door and 5-door.

The following table lists the models available and a brief description of each.

MODEL	DESCRIPTION
RHCA-2 RHCH-2	2 Door Ice Cream Merchandiser
RHCA-3 RHCH-3	3 Door Ice Cream Merchandiser
RHCA-4 RHCH-4	4 Door Ice Cream Merchandiser
RHCA-5 RHCH-5	5 Door Ice Cream Merchandiser
RHFA-2 RHFH-2	2 Door Frozen Food Merchandiser
RHFA-3 RHFH-3	3 Door Frozen Food Merchandiser
RHFA-4 RHFH-4	4 Door Frozen Food Merchandiser
RHFA-5 RHFH-5	5 Door Frozen Food Merchandiser

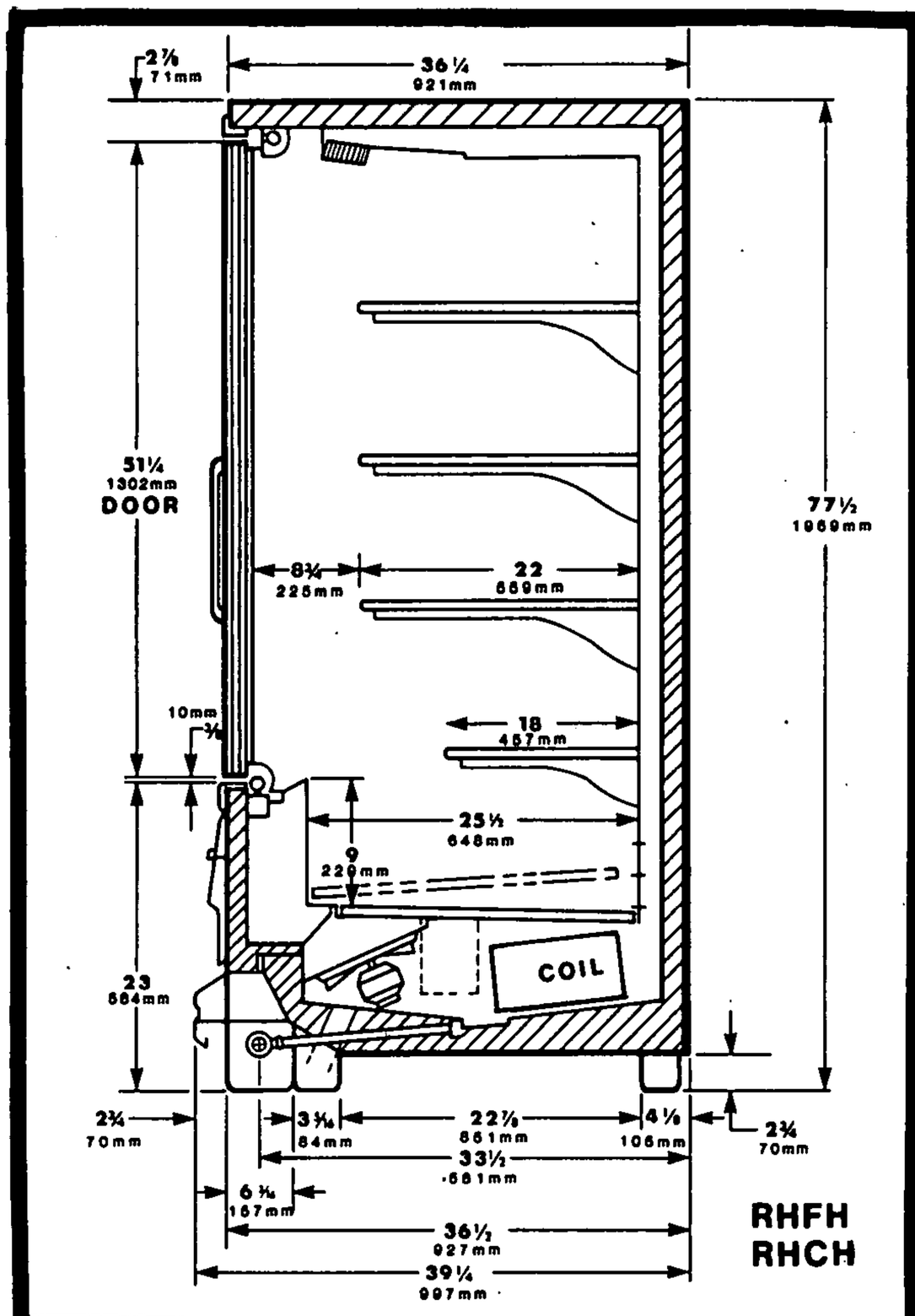
NOTE: The letter 'A' or 'H' after the basic model nomenclature signifies the length of the door.

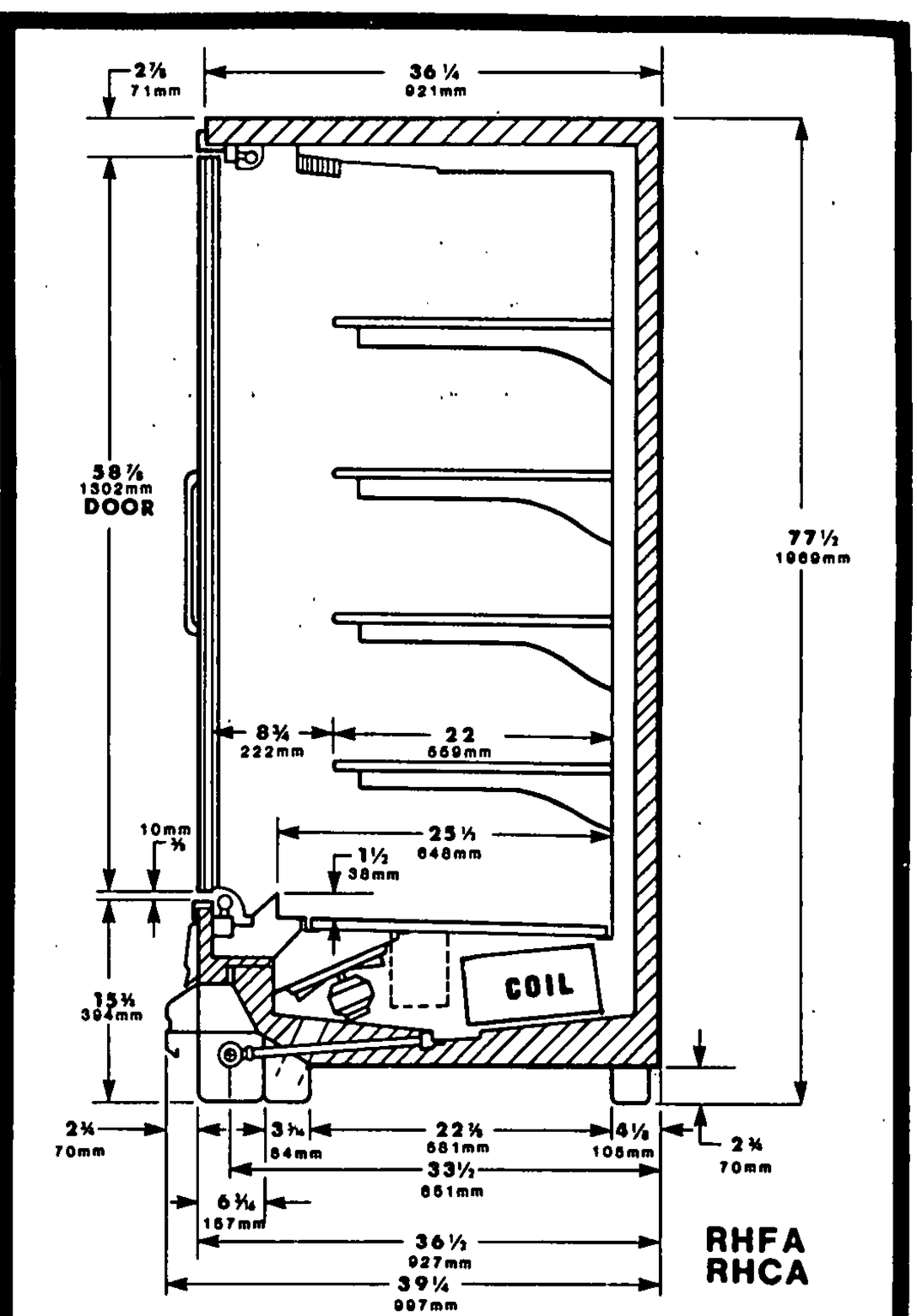
EXAMPLE: RHCA - 59"
RHCH - 51"



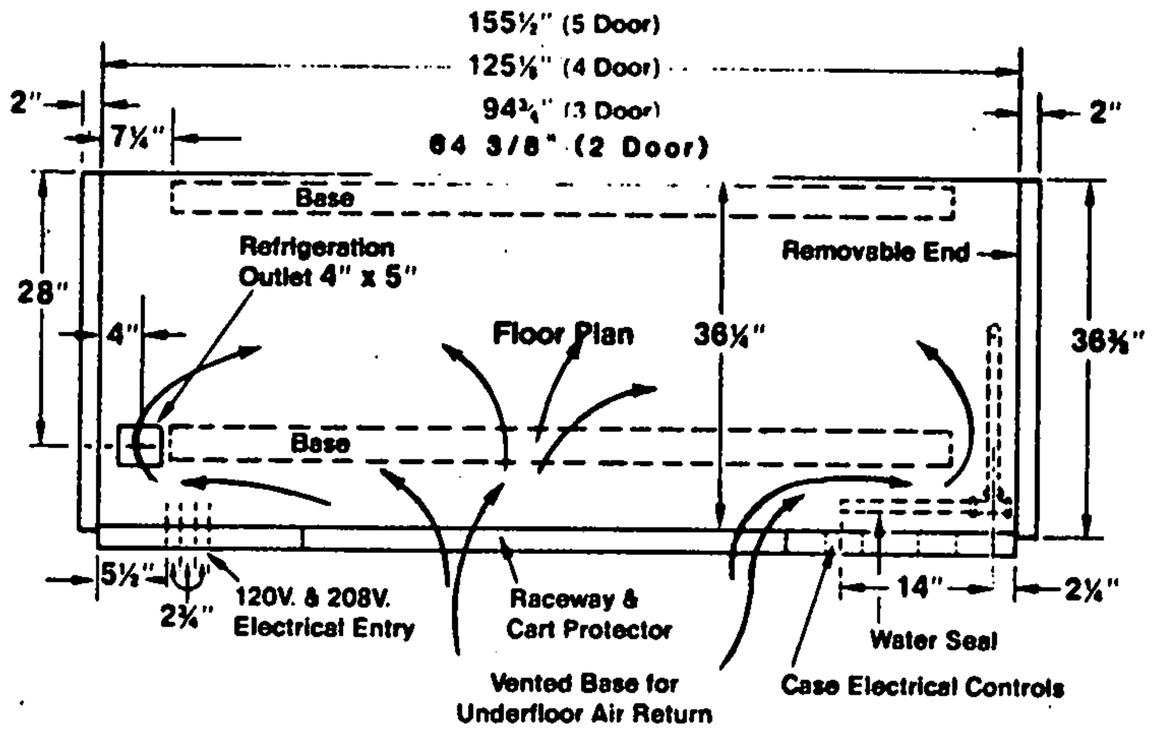
APPLICATION

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. DO NOT USE THE RHFA AND RHFH MODELS FOR ICE CREAM DISPLAY. They have been designed for frozen food applications only.


2⅞
71mm
36¼
921mm
51¼
1302mm
DOOR
77½
1969mm
8¾
225mm
22
559mm
10mm
⅜
18
457mm
25½
648mm
9
229mm
COIL
23
584mm
2¾
70mm
3⅜
84mm
22⅛
561mm
4⅛
105mm
2¾
70mm
33½
851mm
6¼
157mm
36½
927mm
39¼
997mm
RHFH
RHCH


2⅞
71mm
36¼
921mm
58⅞
1502mm
DOOR
77½
1969mm
8¾
222mm
22
559mm
10mm
⅜
25½
648mm
1½
38mm
COIL
15⅜
394mm
2¾
70mm
3⅜
84mm
22⅛
561mm
4⅛
105mm
2¾
70mm
33½
851mm
6¼
157mm
36½
927mm
39¼
997mm
RHFA
RHCA

PLAN VIEW


155½" (5 Door)
125⅛" (4 Door)
94¼" (3 Door)
64 3/8" (2 Door)
2"
7¼"
2"
Base
Refrigeration
Outlet 4" x 5"
Removable End
28"
4"
Floor Plan
36¼"
36⅜"
Base
5½"
2¾"
120V. & 208V.
Electrical Entry
Raceway &
Cart Protector
14"
2¼"
Water Seal
Vented Base for
Underfloor Air Return
Case Electrical Controls

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.

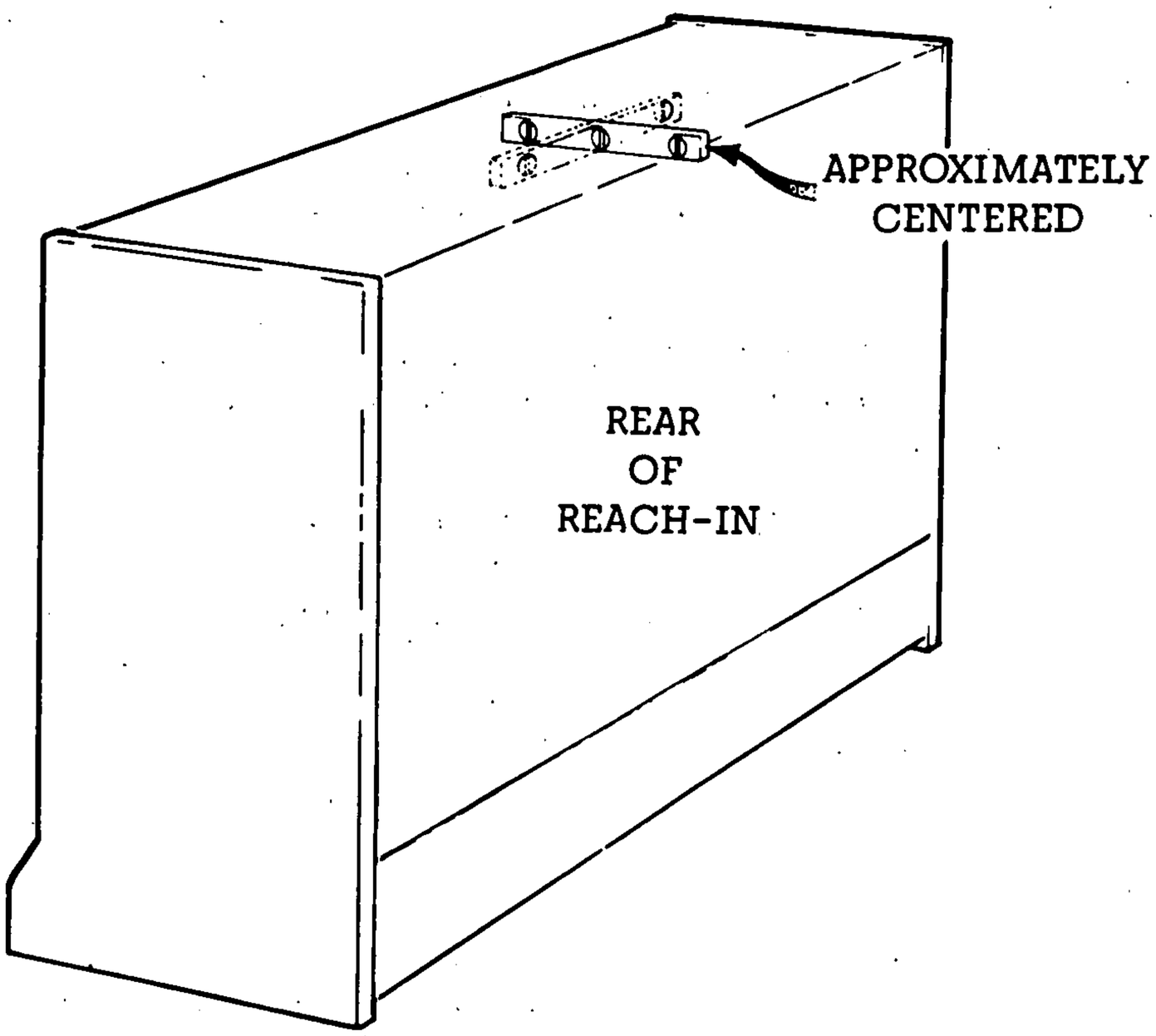
LOCATION

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

To prevent sweating on the exterior surfaces of this refrigerator there must be a minimum clearance of 4" between the back and/or ends of this refrigerator and any adjacent wall, shelving, coolers or another fixture.

LEVELING

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



EXTERIOR LOADING

CAUTION: THE TOPS OF THESE REFRIGERATORS ARE NOT DESIGNED TO SUPPORT EXCESSIVE EXTERNAL LOADING SUCH AS THE WEIGHT OF A PERSON. DO NOT WALK ON THESE REFRIGERATORS OR DAMAGE AND SERIOUS PERSONAL INJURY COULD OCCUR.

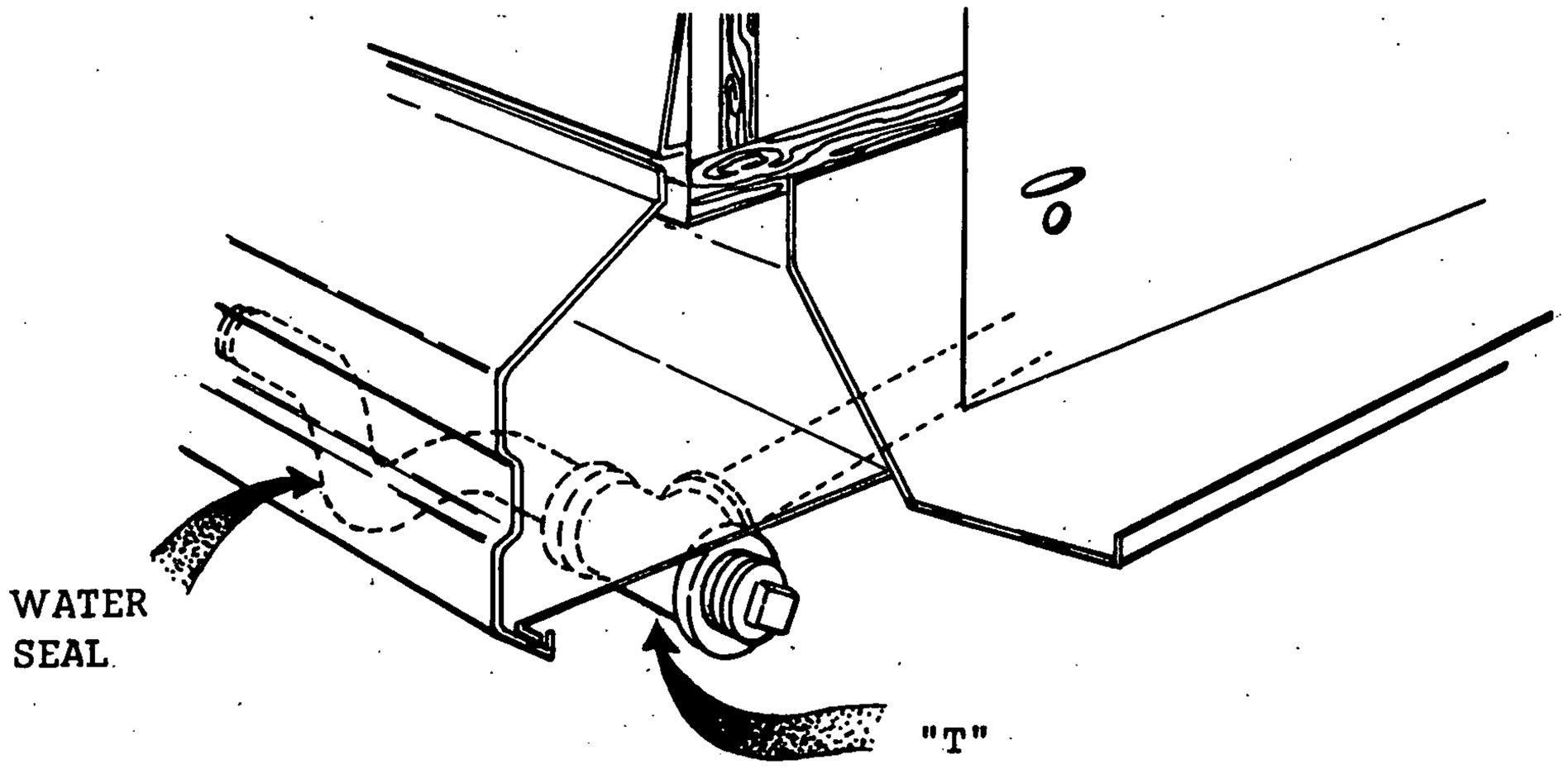
JOINING

These refrigerators are of sectional construction; two or more may be joined in line to give one long continuous display with one pair of end assemblies. To join like fixtures, a joint kit is required. To join unlike fixture models or fixtures of different temperature applications, a 2" partition kit is required. To join fixtures of like temperature application, but on different defrost cycles, a plexiglass partition kit is required. Instructions are provided in each kit.

ALL JOINTS MUST BE AIR-TIGHT TO PREVENT FORMATION OF ICE OR CONDENSATION

WASTE OUTLET AND WATER SEAL

The waste outlet is located at the right hand end of the refrigerator. A one inch water seal, "T" and plug are factory installed on each refrigerator as shown below, however, the plug and water seal may be reversed if desired. The water seal MUST be used as part of the drip piping to prevent AIR LEAKAGE into the refrigerator and affecting performance. All other parts required to install drip pipes, other than those shown are to be supplied by the installer.



INSTALLING DRIP PIPING

Poorly or improperly installed drip piping can seriously affect the operation of this refrigerator and result in costly maintenance and product losses. Please follow the following recommendations when installing drip piping to insure 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. This will lead to problems of locking water flow and prevent draining.

C. Provide as much downhill slope (fall) as possible; 1/8" per foot is preferred. However, the water seal must be level for it to function properly. Plastic piping must be supported to maintain the slope and prevent sag.

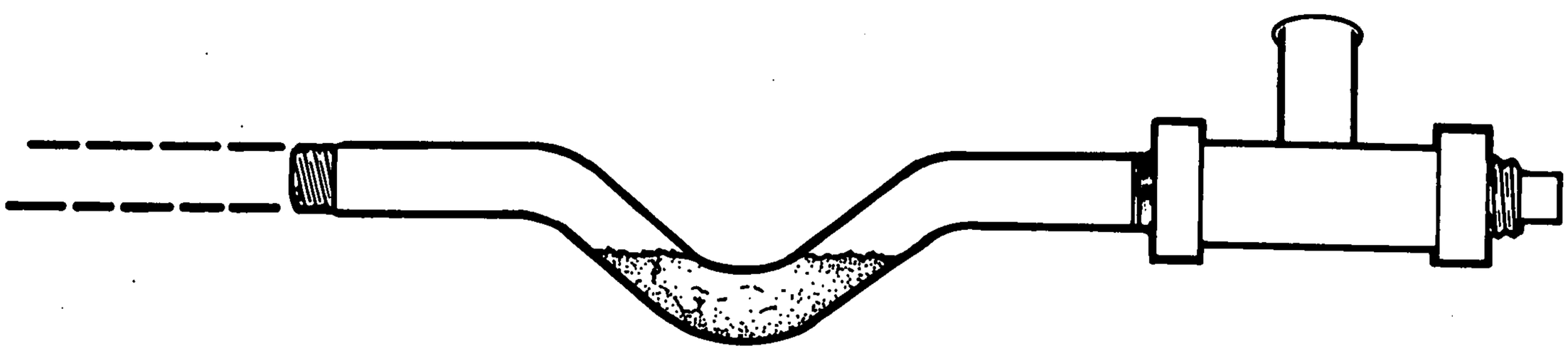
D. Avoid long runs of drip piping. Long runs make it impossible to provide the necessary slope.

E. Provide a suitable air break between the flood rim of the floor drain and the outlet of the drip pipe.

F. Prevent drip pipes from freezing:

1. Do not install drip pipes in contact with uninsulated suction lines. Suction lines should be well insulated.

2. If drip pipes are located in a cold dead air space, between refrigerators or walls and refrigerators, provide some means to prevent freezing.



THE WATER SEAL MUST BE LEVEL TO BE EFFECTIVE

The residual defrost water in the water seal is a barrier that will prevent air movement through the drip piping. An improperly installed water seal will not form this barrier thus allowing air to enter into the refrigerator which creates condensation and frost.

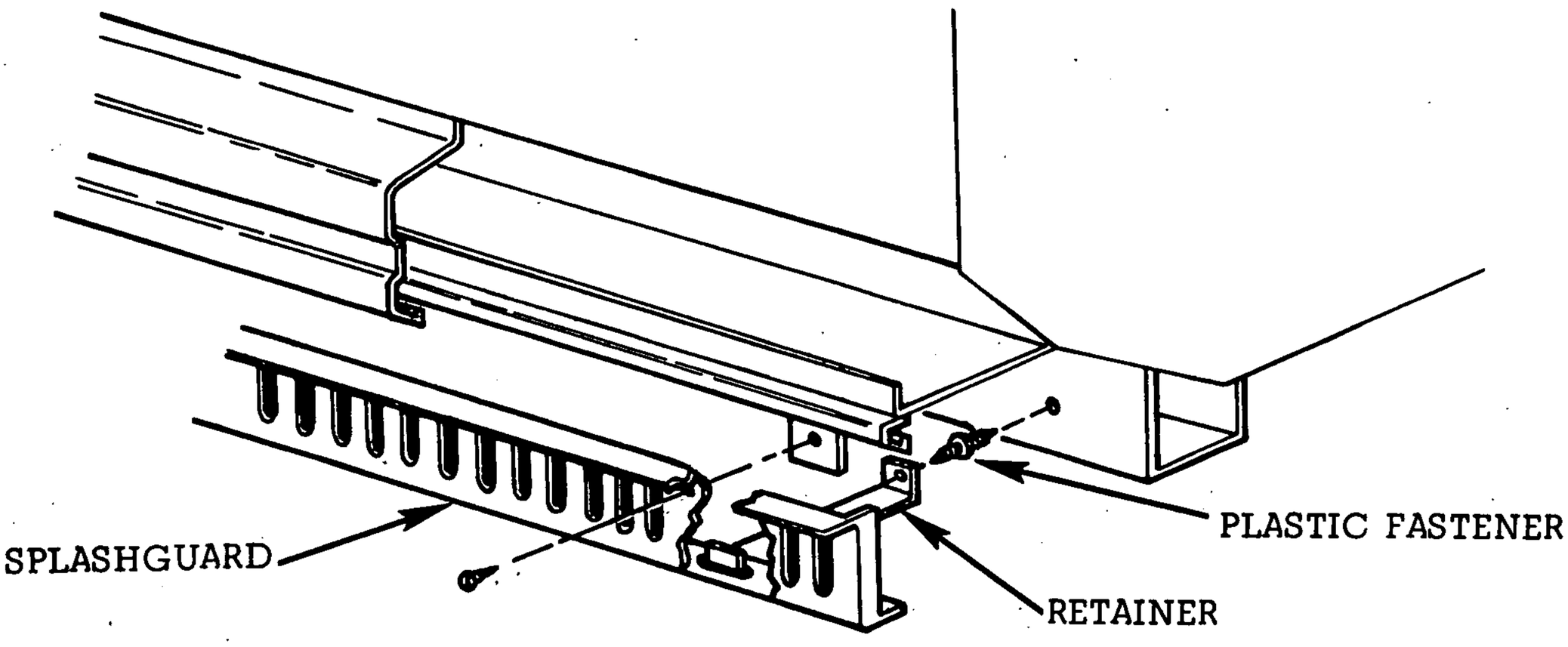
SPLASHGUARDS

Each refrigerator has been supplied with a splashguard with which to finish the installation of the refrigerator to the floor for an attractive appearance. After all other installation work has been finished, install the splashguard as follows:

1. Press the plastic fasteners into the retainers and then into the prelocated holes in the base rail.

2. Lift the splashguard under the raceway and onto the retainers.

3. Fasten the splashguard to the factory installed brackets using #8X1/2" Truss Head Sheet Metal Screws.



SEALING SPLASHGUARDS

If required by local sanitary codes or if otherwise desired, the splashguards may be sealed to the floor using any cove based trim that the installer desires. The size will depend on how much the floor is out of level. When installing the cove base trim:

A. To insure a good and secure installation, remove all dirt, grease, wax or other contaminates from the area of the splashguard where the trim will be bonded.

B. Apply a good contact cement to the cove base trim and the splashguard if necessary, following the manufacturers directions.

C. Press the cove base trim to the splashguard so that it is flush with the store's floor.

SECTION 3
REFRIGERATION

REFRIGERANT

These refrigerator's 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 refrigerator's serial plate located at the left hand end on the interior top liner.

REFRIGERANT PIPING

LINE SIZES:	Liquid Line	3/8" O D
	Suction Line (2, 3 & 4 Door)	7/8" O D
	Suction Line (5 Door)	1 1/8" O D

OUTLET LOCATION
The refrigerant line outlet is located at the left hand end of the refrigerator as viewed from the front beneath the display pans.

After connections have been made, seal this outlet thoroughly both on the inside and the outside. We recommend using an aerosol dispensed urethane type of insulation.

MULTIPLEXING
Piping of refrigerators operating on the same refrigeration system may be run from refrigerator to refrigerator through the end frame saddles provided for this purpose. DO NOT RUN REFRIGERANT LINES THROUGH REFRIGERATORS THAT ARE NOT ON THE SAME REFRIGERATION SYSTEM or poor refrigeration control and compressor failure can occur.

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 other than KOOLGAS defrost: the suction and liquid lines should be clamped or taped together and insulated for a minimum of 30' from the refrigerator; for refrigerators with KOOLGAS defrost, the suction and liquid lines should not contact each other and should be insulated separately for a minimum of 30' from the refrigerator. Additional insulation for the balance of the liquid and suction lines is recommended wherever condensation drippage is objectionable.

<u>REFRIGERANT PARTS LIST (Sporlan Nomenclature)</u>

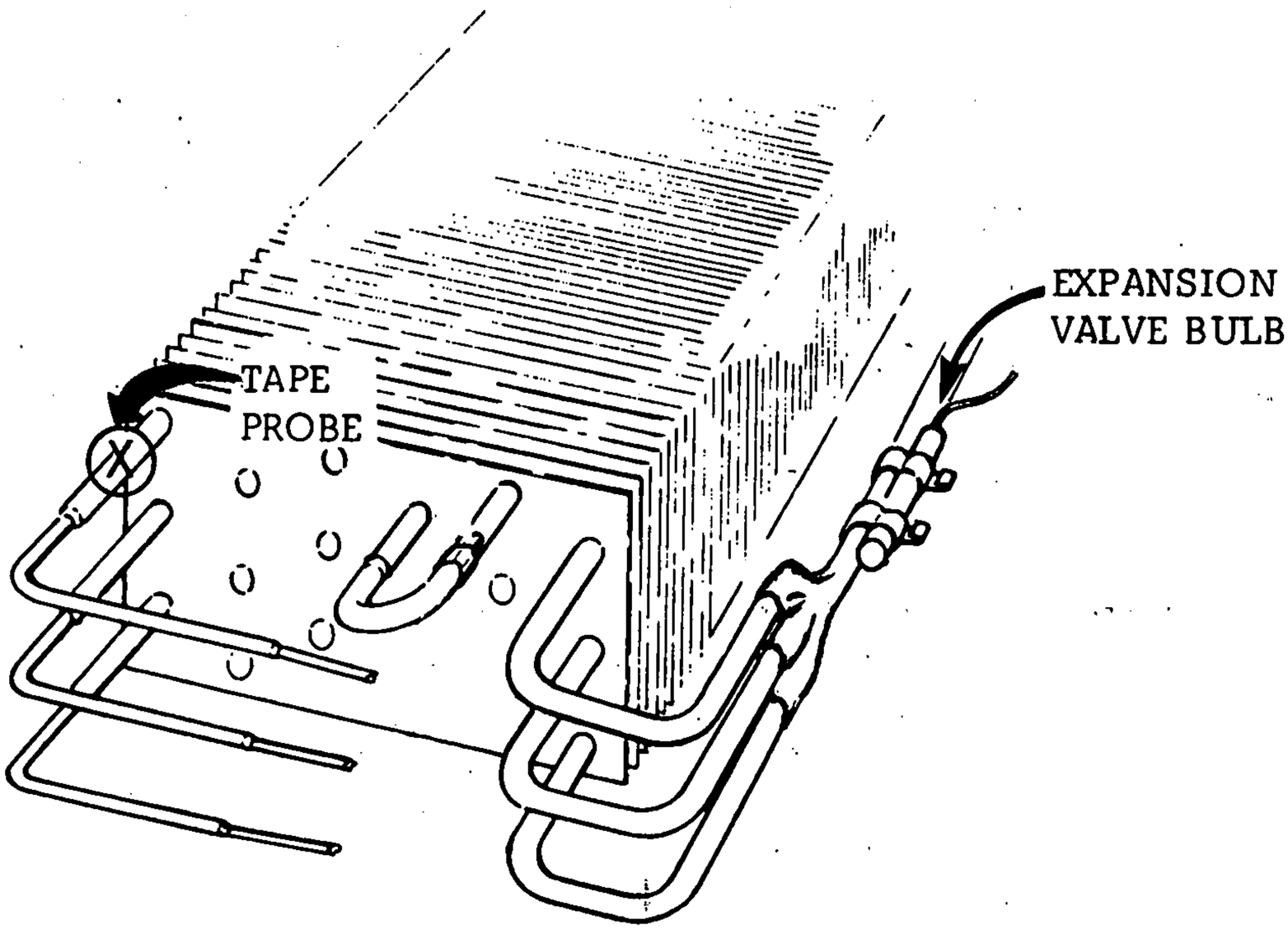
MODEL	TYPE OF DEFROST	REFRIGERANT	EXPANSION VALVE	DISTRIBUTOR
ALL 2 Door, 3 Door and 4 Door	Electric	R-12	BFFE-A-Z	D115-3-$\frac{1}{4}$-1$\frac{1}{2}$
		R-22	BFVE-A-Z	D115-3-$\frac{1}{4}$-1
		R-502	BFRE-A-Z	D115-3-$\frac{1}{4}$-1$\frac{1}{2}$
	Koolgas	R-12	BFFE-A-Z	*D116-3-$\frac{1}{4}$-1$\frac{1}{2}$
		R-22	BFVE-A-Z	*D116-3-$\frac{1}{4}$-1
		R-502	BFRE-A-Z	*D116-3-$\frac{1}{4}$-1$\frac{1}{2}$
ALL 5 Door	Electric	R-12	BFFE-A-Z	D115-3-$\frac{1}{4}$-1$\frac{1}{2}$
		R-22	BFVE-A-Z	D115-3-$\frac{1}{4}$-1
		R-502	BFRE-A-Z	D115-3-$\frac{1}{4}$-1$\frac{1}{2}$
	Koolgas	R-12	BFFE-A-Z	*D116-3-$\frac{1}{4}$-1$\frac{1}{2}$
		R-22	BFVE-A-Z	*D116-3-$\frac{1}{4}$-1
		R-502	BFRE-A-Z	*D116-3-$\frac{1}{4}$-1$\frac{1}{2}$

* These refrigerant distributors are provided with a special 3/8" side outlet port which allows the liquid condensed in the coil during defrost to bypass the expansion valve and flow into the liquid line.

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 clear of 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 the inset line (see illustration below). 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°F to 5°F. Remove valve stem cover and turn valve stem counter-clockwise to decrease temperature difference between the probes. To increase temperature difference 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 - CONVENTIONAL MULTIPLEXING

Refrigeration temperature may be controlled by either the condensing units low pressure control or by a refrigeration thermostat (One per condensing unit). Thermostatic control is preferred since it will provide a more constant year around control of temperature .When the optional refrigeration thermostat is factory installed, it will be located in the electrical raceway at the right hand end of the case and with its sensing bulb fastened behind a removable panel as shown on page 14.

Defrosts are time initiated and temperature terminated. Each refrigerator will have electric defrost heaters and a defrost termination thermostat. The thermostat is factory installed on a return bend of the evaporator. It is a non-adjustable, single pole, double throw type thermostat.

APPLICATION	REFRIGERATION CONTROLS						DEFROST CONTROLS		
	DISCHARGE AIR TEMPERATURE (1)	REFRIGERANT	LOW PRESSURE CONTROL				Defrost Frequency	Temperature Termination (4)	Failsafe (5)
			When (2) Pressure Control controls temperature		When (3) Thermostat controls temperature				
			Cut-Out	Cut-In	Cut - Out	Cut-In			
Frozen Food	-5°F	R-502	15 psig	26 psig	5 psig	26 psig	One At 2 AM	48°F	60 min.
Ice Cream	-12°F	R-502	10 psig	21 psig	5 psig	21 psig			36 min.

(1) Discharge air temperature is to be measured by attaching a service thermometer to the discharge honeycomb at the center of the case.

(2) When the low pressure control is used to control the refrigeration temperature, set the cut-out of the control to stop the compressor at the discharge air temperature shown above.

(3) When a refrigeration thermostat is used to control the refrigeration temperature, set the pressure control as shown then adjust the thermostat to stop the compressor at the discharge air temperature shown above. Outdoor condensing units: Refrigeration temperature must be controlled by a refrigeration thermostat.

(4) Defrost is terminated by a factory installed defrost termination thermostat.
If more than one refrigerator is connected to the same condensing unit, the defrost termination thermostat of each refrigerator must be wired in series to the condensing unit defrost timer.

(5) The failsafe setting must not control the length of the defrost. This is especially important when less than 208 volts are supplied to the defrost heaters or when heavy shopping demands have created excess frost on the evaporator. Defrost must be terminated by the defrost termination thermostat.
The defrost timer of outdoor condensing units must control a liquid line solenoid for pump-down prior to defrost only. The failsafe setting for outdoor units must be increased 4 minutes to compensate for the pump-down period.

CONTROLS AND ADJUSTMENTS - MIXED MULTIPLEXING

Refrigeration temperature may be controlled by either a refrigeration thermostat or a CDA valve (Close on Drop in Air temperature) . Both of these controls are optional items and may be ordered factory installed.

The optional refrigeration thermostat is the same as that for conventional multiplexing. The optional CDA valve will have its sensor installed in the same location as the refrigeration thermostat bulb. The valve itself will be installed at the condensing unit. Further information on the CDA valve concerning wiring, adjusting and servicing can be found in the Instruction manual furnished with the condensing unit.

Standard defrost is electric defrost, the same as that for conventional multiplexing. and is time initiated and temperature terminated.

KOOLGAS defrost is optional and will be time initiated and time terminated.

APPLICATION	REFRIGERATION CONTROL	DEFROST CONTROL			
			ELECTRIC DEFROST (2)		KOOLGAS DEFROST
	Discharge Air Temperature (1)	DEFROST FREQUENCY	Temperature Termination (3)	Failsafe (4)	Length of Defrost (5)
Frozen Food	-5°F	One At 2 AM	48°F	60 min.	14 min.
Ice Cream	-12°F		48°F	36 min.	

(1) Discharge air temperature is to be measured by attaching a service thermometer to the discharge honeycomb at the center of the case. Adjust the refrigeration control (refrigeration thermostat or CDA valve) to maintain the temperature shown above.

(2) Standard defrost is electric defrost and it is time initiated and temperature terminated.

(3) Defrost is terminated by a factory installed defrost termination thermostat. All like refrigerators connected to the same condensing unit must have their defrost termination thermostats wired in series.

(4) The failsafe setting must not control the length of the defrost. This is especially important when less than 208 volts are supplied to the defrost heaters or when heavy shopping demands have created excess frost on the evaporator. Defrost must be terminated by the defrost termination thermostat.

(5) KOOLGAS defrost is time initiated and time terminated. The defrost lengths listed above are based upon laboratory testing but operation under actual store conditions may require that they be lengthened to accomplish a thorough defrost. Some of the store conditions that can contribute to a longer defrost are: low head pressure, long runs of refrigerant lines, store ambient, refrigerator temperature operating lower than that recommended, seasonal ambient changes, etc.

Each system shown on the store legend must have 'staggered' defrosts to maintain stable compressor loading and sufficient supply of defrost gas.

DEFROST SEQUENCE - ELECTRIC DEFROST

When the condensing unit defrost timer initiates a defrost period:

1. The compressor will stop and the defrost heaters will be energized. For outdoor condensing units, this is preceded by a four minute pump down.
   ICE CREAM REFRIGERATORS ONLY: The energizing of the defrost heaters also energizes the evaporator fan relay, opening its contacts and immediately stopping the fans at the beginning of defrost.
2. After a short period of time, the rise in temperature at the evaporator will cause the contacts of the thermostats for the anti-sweat heaters and fans to open (at approximately 25°F), turning these items off, ICE CREAM REFRIGERATORS have their fans turned off at the beginning of defrost.

When the defrost termination thermostat terminates the defrost period:

1. The compressor will start and the defrost heaters will be turned off. For outdoor condensing units, the compressor will start when the low pressure builds up to the controls cut-in pressure.
   ICE CREAM REFRIGERATORS ONLY: When power to the defrost heaters is broken, the evaporator fan relay is simultaneously de-energized. This closes the relay contacts to the evaporator fan circuit. However, the fans will remain off until the fan and anti-sweat heater thermostat contacts close.
2. After a short period of time, the drop in temperature at the evaporator will cause the contacts of the thermostats for the anti-sweat heaters and fans to close (at approximately +5°F) turning these items back on.

DEFROST SEQUENCE - KOOLGAS DEFROST

When the defrost timer initiates a defrost period:

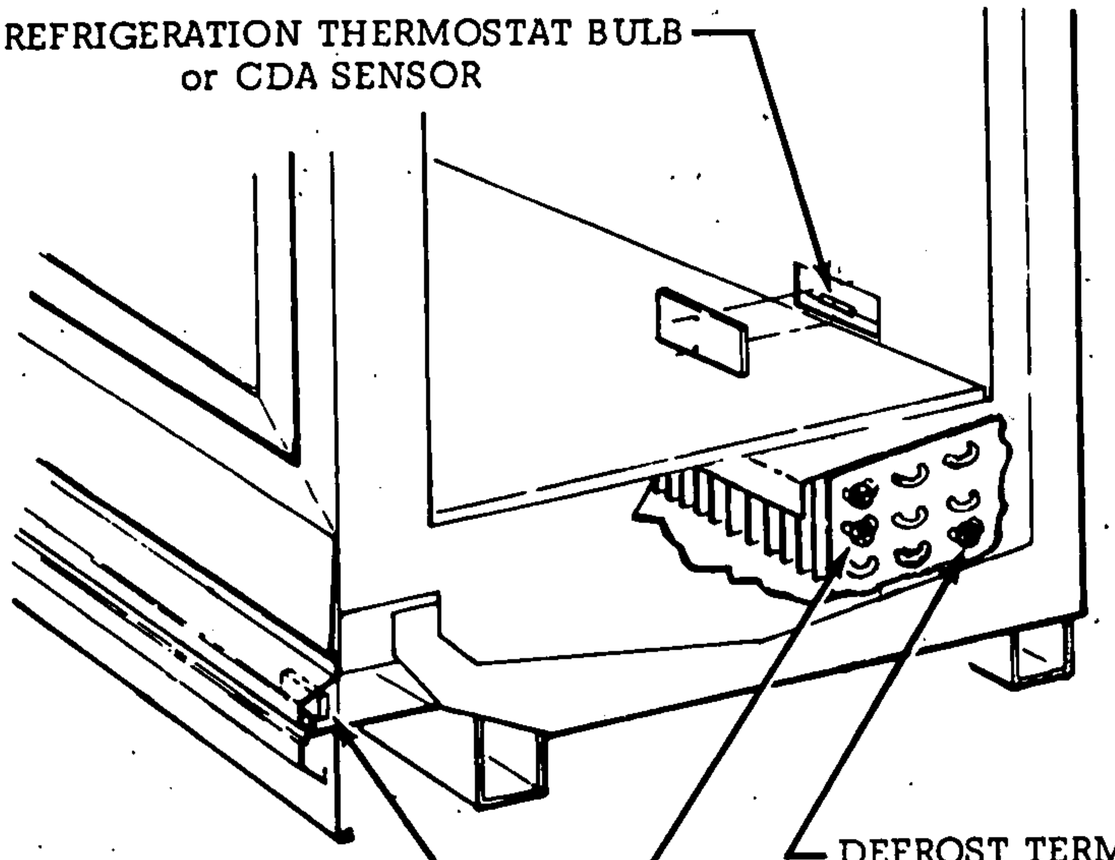
1. Defrost vapor enters the evaporator.
2. After a short period of time, the rise in temperature at the evaporator will cause the contacts of the thermostats for the anti-sweat heaters and fans to open (at approximately +25°F) turning these items off.
   Ice cream refrigerators with KOOLGAS defrost will not have an evaporator fan relay.

When the defrost timer terminates the defrost period:

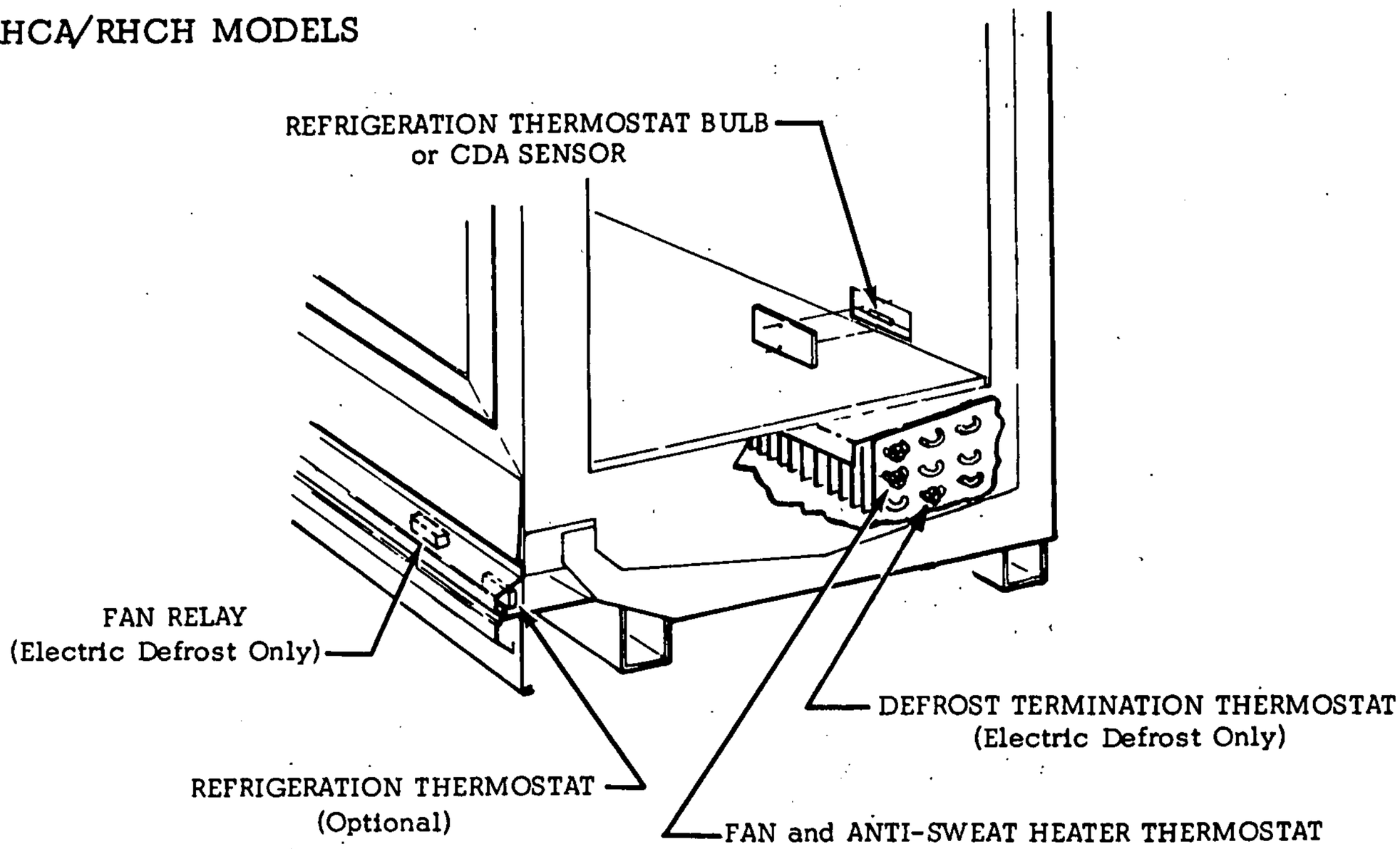
1. Refrigeration will resume.
2. After a short period of time, the drop in temperature at the evaporator will cause the contacts of the thermostats for the anti-sweat heaters and fans to close (at approximately +5°F) turning these items back on.

REFRIGERATION and DEFROST CONTROL LOCATIONS

RHFA/RHFH MODELS



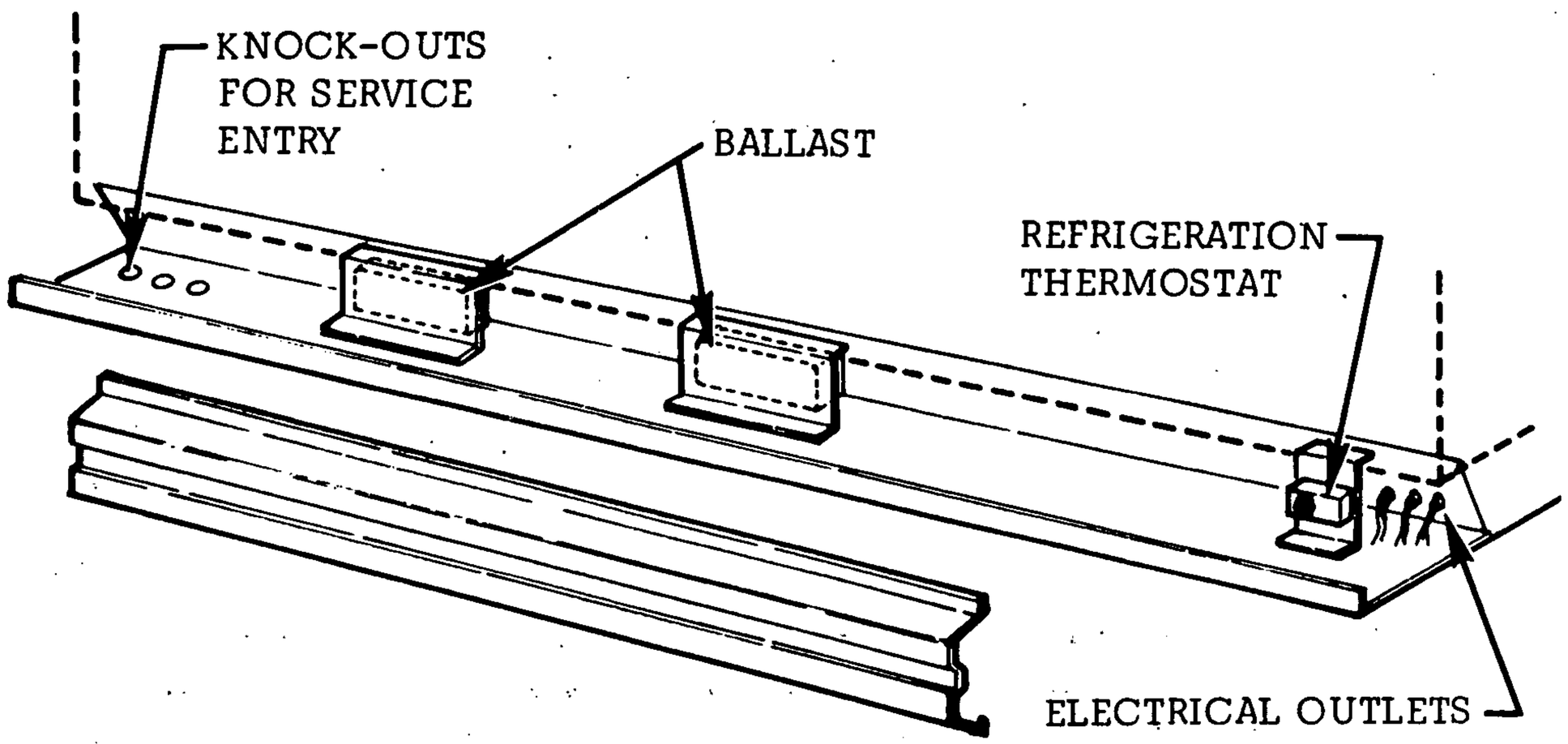
RHCA/RHCH MODELS



SECTION 4
ELECTRICAL

CONNECTIONS

All electrical connections are to be made in the electrical wire-way behind the kickrail at the right-hand end (facing front). For entrance to the wire-way, knockouts have been provided at the left-hand end of the raceway on the underside. (see illustration below.) **After all electrical work is finished, make certain the electrical outlets are sealed. These outlets were sealed at the factory on the inside and outside of the case with a plyable sealant.**



IDENTIFICATION OF WIRING

Leads for all electrical circuits are identified by colored plastic bands which correspond to the "color code sticker" located inside of the case wire-way. This sticker is shown below.

COLOR CODE

PINK	- refrigeration thermostat, low temperature	ORANGE or TAN	- lights
LIGHT BLUE	- refrigeration thermostat, normal temperature	MAROON	- receptacles
DARK BLUE	- defrost termination thermostat	YELLOW	- defrost heaters, 120v
PURPLE	- anti-sweat heaters	RED *	- defrost heaters, 208v
BROWN	- fan motors		
GREEN *	- ground		

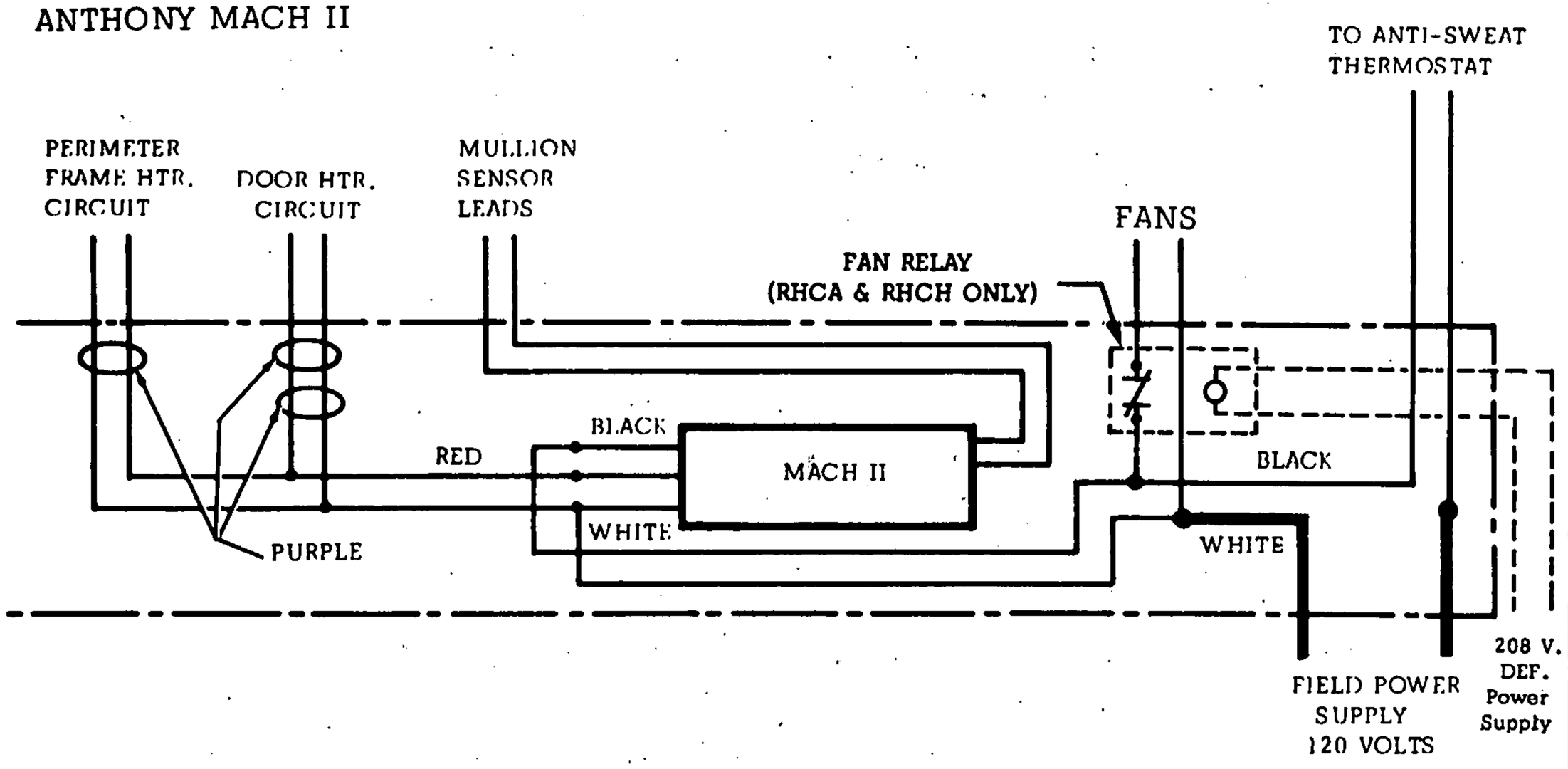
*either colored band or colored insulation

The neutral wire for each circuit has either white insulation or a white plastic sleeve.

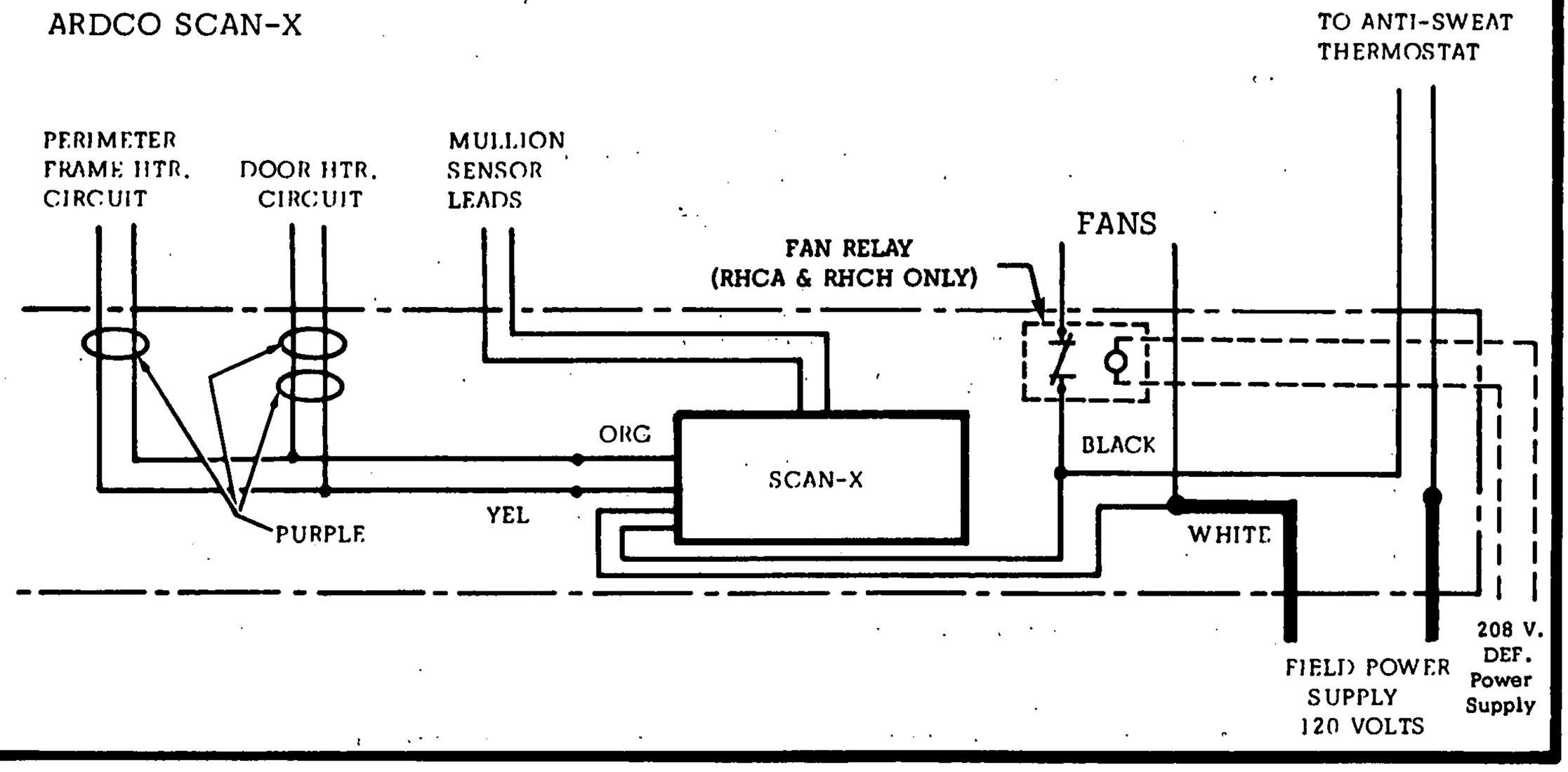
ANTHONY MACH II OR ARDCO SCAN-X

When ordered, these energy control systems will be factory installed and wired into the frame and door anti-sweat heater circuit as shown in the following wiring diagrams. For further information and servicing, refer to the instruction manual furnished with the control.

ANTHONY MACH II



ARDCO SCAN-X

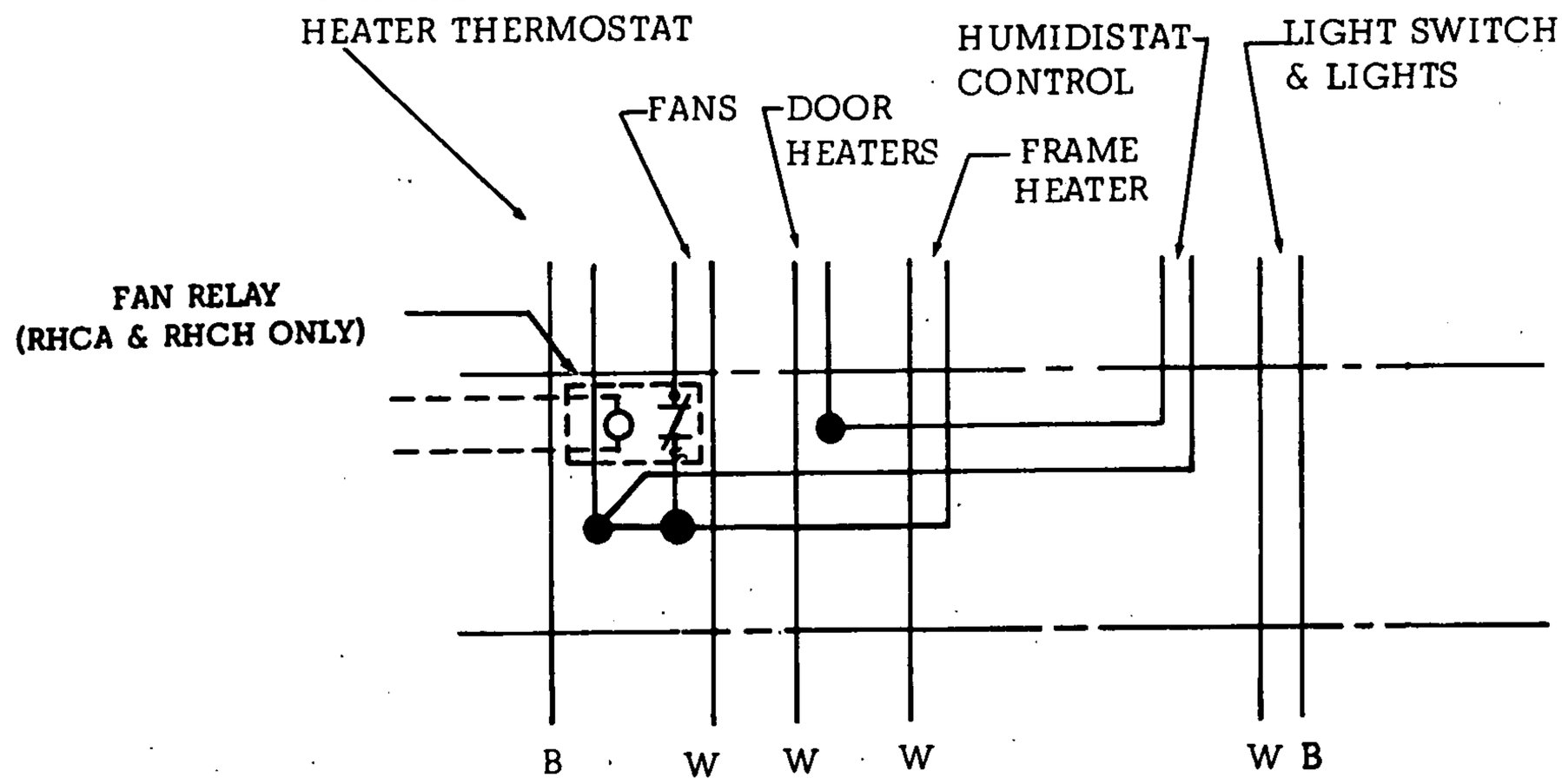


LIGHT SWITCH

The light switch is located inside and above the door opening at the right hand end.

HUMIDISTAT CONTROL

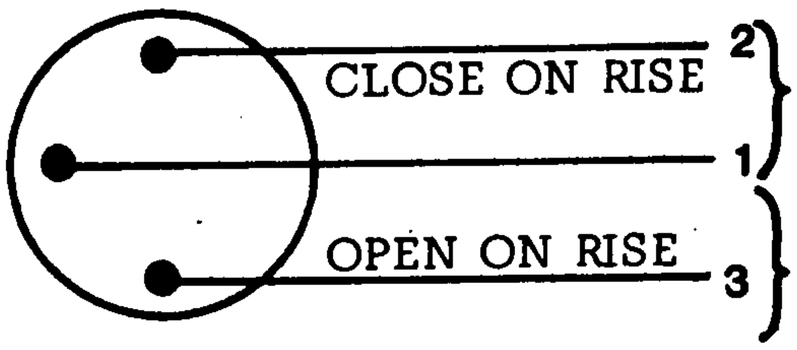
When ordered, a Humidistat Control is factory installed on the exterior top in the right rear corner. The Humidistat Control is factory set to cycle off the door anti-sweat heaters when store humidity conditions are below 35 percent. Electrical power to the Humidistat is controlled by the fan and anti-sweat thermostat. See below.



NOTE: FOR FIELD INSTALLATION OF THE HUMIDISTAT, EITHER SINGLE OR MULTIPLE APPLICATION, REFER TO HUSSMANN HUMIDISTAT CONTROL KIT INSTRUCTION.

ELECTRICIAN

THE DEFROST TERMINATION OR SAFETY THERMOSTAT IS SINGLE POLE, DOUBLE THROW. THE UNUSED LEAD MUST BE CAPPED.



USED WITH TEMPERATURE TERMINATION DEFROST TIMER.

USED WHEN DEFROST TIMER IS NOT TEMPERATURE TERMINATION TYPE.

SERIAL PLATE AMPERAGES

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

AMPERAGES (DOMESTIC)

MODEL	120 VOLT, 60 HERTZ CIRCUITS		208 VOLT, 60 HZ
	FAN and ANTI-SWEAT HEATERS (1)	LIGHTS	DEFROST HEATERS (Single Phase) (2)
RHFA-2 RHFA-3 RHFH-3	5.6 8.3 7.5	1.6	5.9
RHFA-4 RHFH-4	11.0 10.0	3.2	11.8
RHFA-5 RHFH-5	13.7 12.5	3.3	14.7
RHCA-2 RHCA-3 RHCH-3	7.4 11.0 10.2	1.6	11.8
RHCA-4 RHCH-4	14.6 13.6	3.2	23.6
RHCA-5 RHCH-5	18.2 17.0	3.3	29.4

NOTES:

(1) The fan and anti-sweat heater circuit should be wired on a separate circuit than that for the lights. This is to avoid accidentally turning the fans and anti-sweat heaters off when store lighting is turned off.

(2) Electric defrost ONLY. Not required for KOOLGAS defrost.

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

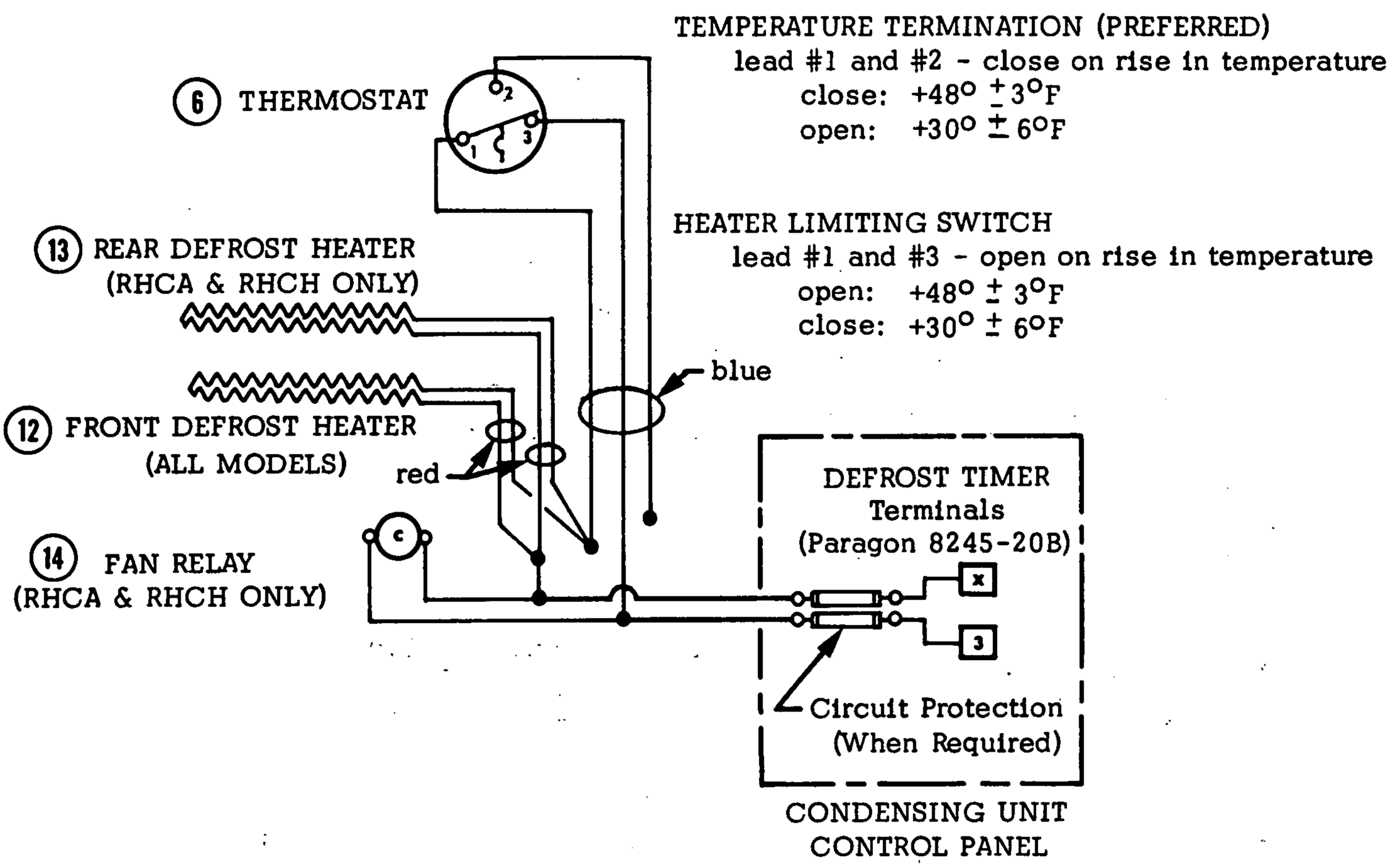
DEFROST TERMINATION THERMOSTAT: This thermostat is standard in all refrigerators with Electric Defrost ONLY. It must be wired in series with those in all like refrigerators that are on the same system and wired to a temperature termination type defrost timer. See following page for alternate method of wiring.

REFRIGERATION THERMOSTAT or CDA SENSOR: Both of these are optional refrigeration controls that need to be wired to the condensing unit control panel when they are installed in the refrigerator.

An alternate method to the preferred temperature termination method of wiring the defrost heaters and termination thermostat is shown below. This alternate method of wiring should only be used when the condensing unit defrost timer is not a temperature termination type.

The defrost heaters and termination thermostat are wired in series to the defrost timer as shown: leads #1 and #3 are used; lead #2 must be capped. The thermostat then becomes a defrost heater limit switch, allowing the heaters to remain on only until the temperature at the evaporator reaches the specific temperature to open the contacts of the thermostat and turn the heaters off.

The failsafe setting will then become the defrost length.

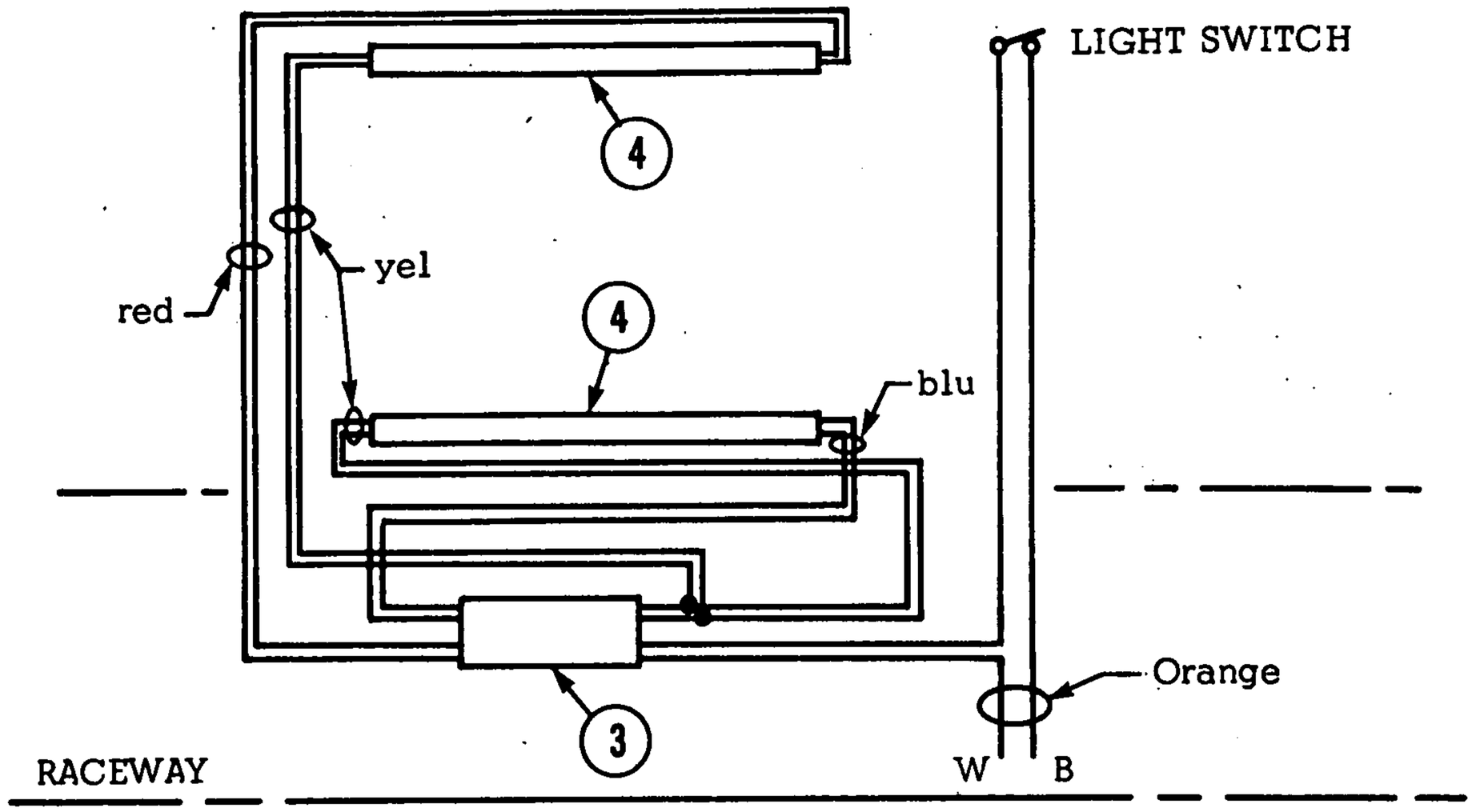


TEMPERATURE TERMINATION (PREFERRED)
lead #1 and #2 - close on rise in temperature
close: +48° ± 3°F
open: +30° ± 6°F

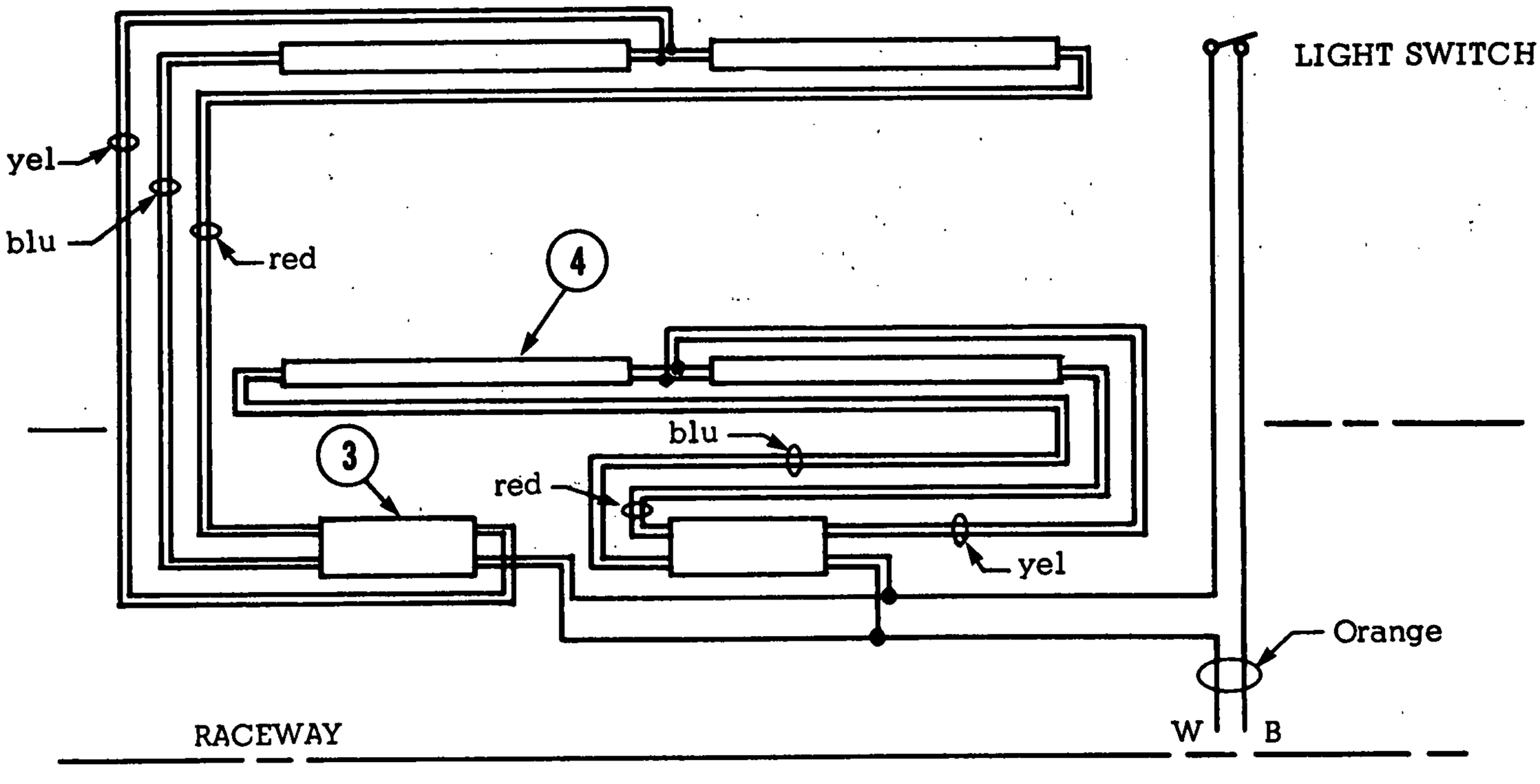
HEATER LIMITING SWITCH
lead #1 and #3 - open on rise in temperature
open: +48° ± 3°F
close: +30° ± 6°F

LIGHT CIRCUIT
(120 Volt, 60 Hz)

2 & 3 DOOR MODELS



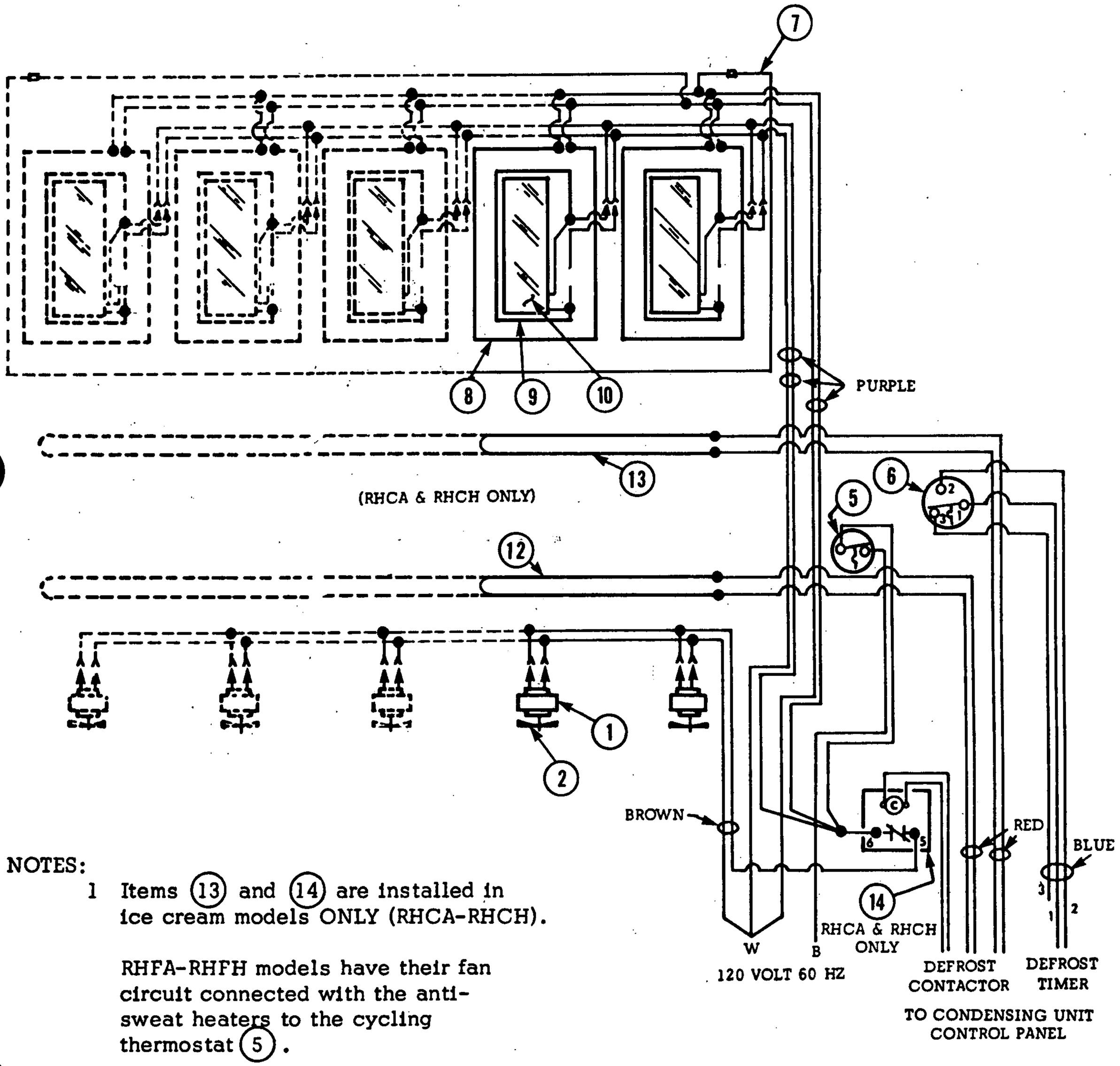
4 and 5 DOOR MODELS



CAUTION
REFRIGERATORS MUST BE GROUNDED

WIRING DIAGRAM
RHFA-RHFH-RHCA-RHCH
(Ardco Doors and Frame)

CAUTION
REFRIGERATOR MUST BE GROUNDED



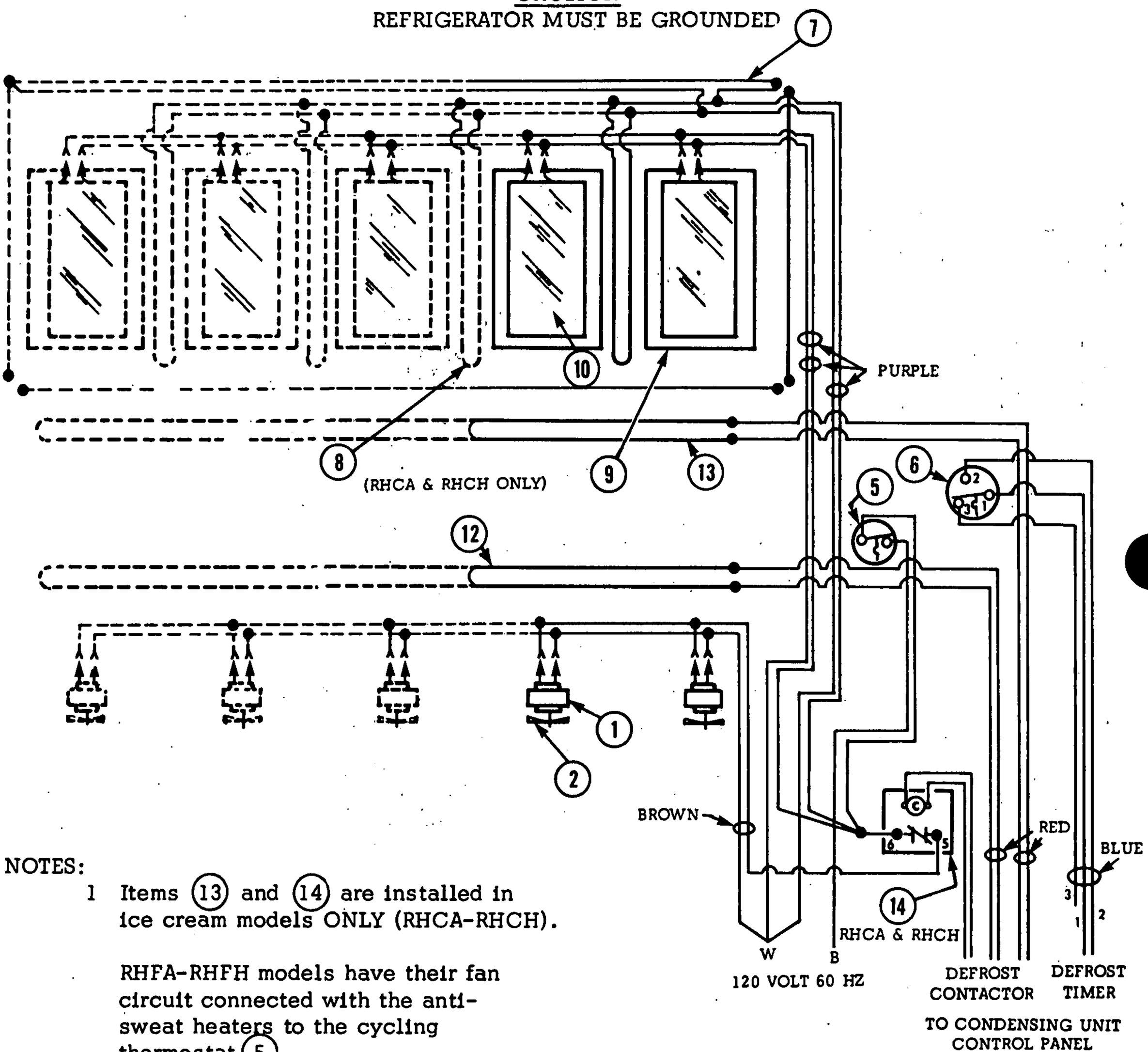
NOTES:

1 Items (13) and (14) are installed in ice cream models ONLY (RHCA-RHCH).

RHFA-RHFH models have their fan circuit connected with the anti-sweat heaters to the cycling thermostat (5).

2 Items (6), (12), (13), (14) are not installed in refrigerators with KOOLGAS defrost.

WIRING DIAGRAM
RHFA-RHFH-RHCA-RHCH
(Anthony Doors and Frame)



NOTES:

1 Items (13) and (14) are installed in ice cream models ONLY (RHCA-RHCH).

RHFA-RHFH models have their fan circuit connected with the anti-sweat heaters to the cycling thermostat (5).

2 Items (6), (12), (13), (14) are not installed in refrigerators with KOOLGAS defrost.

3 The perimeter frame heaters (7) are four individual heaters wired parallel with each other and the frame mullion heaters (8).

ELECTRICAL REPLACEMENT PARTS

ITEM NO.	PART NO.	DESCREIPTION
1	047000	Fan Motor-RHFA & RHFH 9W CW 120V GE #5KSP51CL 160H
	045781	Fan Motor-RHCA & RHCH 30W CW 120V. GE #5KSP51GL 295HS
2	124150	Fan Blade-RHFA & RHFH 8" 30° Morrill #FV800 CW 30S embossing installed toward motor
	135659	Fan Blade-RHCA & RHCH 8" 50° Torin #JU850-6 embossing installed toward motor
3	137843	Ballast-(All 3 door models) Advance #RS2S110TP
	147091	Ballast-(All 2, 4 & 5 door models) Advance #RC2S85TP
4	254418	Fluorescent Lamp-(All 3 door models) F84T12CW HO
	119500	Flourescent Lamp-(All 2 & 4 door models) F60T12CW HO
	137847	Fluorescent Lamp-(All 5 door models) F72T12CW HO
5	119696	Cycling Thermostat-(fans,anti-sweat heaters) T.I. #20420L28-229-89 SPST (opens $+20^{o} \pm 6^{o}F$ close $+5^{o} \pm 6^{o}F$)
6	311192	Defrost Termination Thermostat-(Electric Defrost ONLY) SPDT (#1 & #2 = open $+30^{o} \pm 6^{o}F$ close $+48^{o} \pm 3^{o}F$)
7	See Note A	Frame Perimeter Anti-Sweat Heater
8	See Note A	Frame Mullion Anti-Sweat Heater
9	See Note A	Door Frame Anti-Sweat Heater
10	See Note A	Clear Glass Anti-Sweat Heater

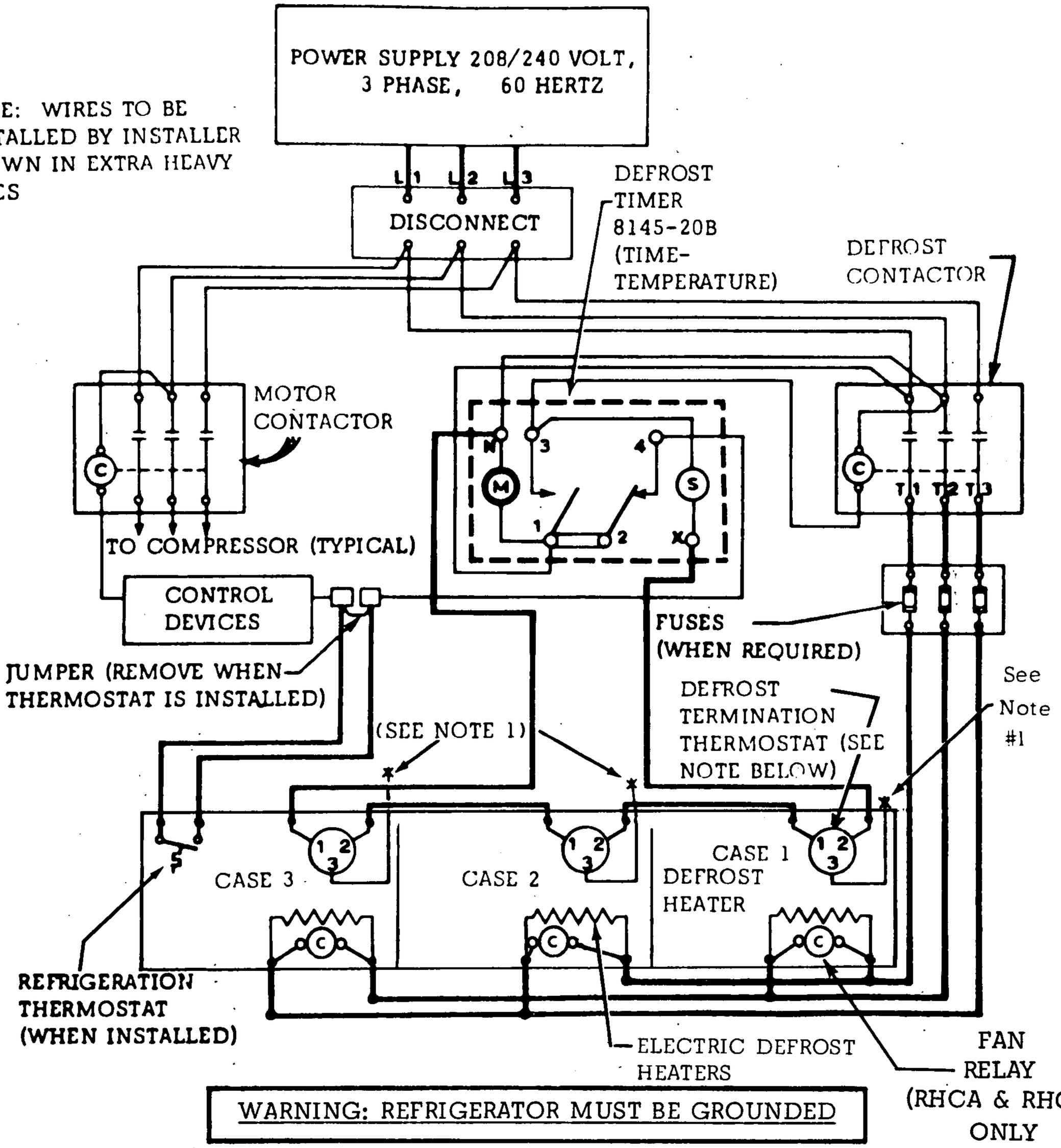
ITEM NO.	PART NO.	DESCRIPTION
	329574	Defrost Heater-(All 2 door models w/electric defrost) 5.9 amps , 208V.
12	310631	Defrost Heater-(All 3 door models w/electric defrost) 8.6 amps , 208V.
	310632	Defrost Heater-(All 4 door models w/electric defrost) 11.8 amps , 208V.
	310633	Defrost Heater-(All 5 door models w/electric defrost) 14.7 amps , 208V.
	329575	Defrost Heater-(All RHCA 2 door models w/electric defrost) 5.9 amps , 208V.
13	311179	Defrost Heater-(All RHCA & RHCH 3 door models w/electric defrost) 8.6 amps , 208V.
	311180	Defrost Heater-(All RHCA & RHCH 4 door models w/electric defrost) 11.8 amps , 208V.
	311181	Defrost Heater-(All RHCA & RHCH 5 door models w/electric defrost) 14.7 amps , 208V.
14	142500	Relay-(All RHCA & RHCH models w/electric defrost) Essex RBM #184-20302-206
15	113625	Refrigeration Thermostat-Optional Penn #A19AGD-21

NOTES:

A For replacement parts of these items, refer to the door/frame manufacturers service manual.

B The item numbers of this parts list correspond to the numbers shown on the preceding wiring diagrams.

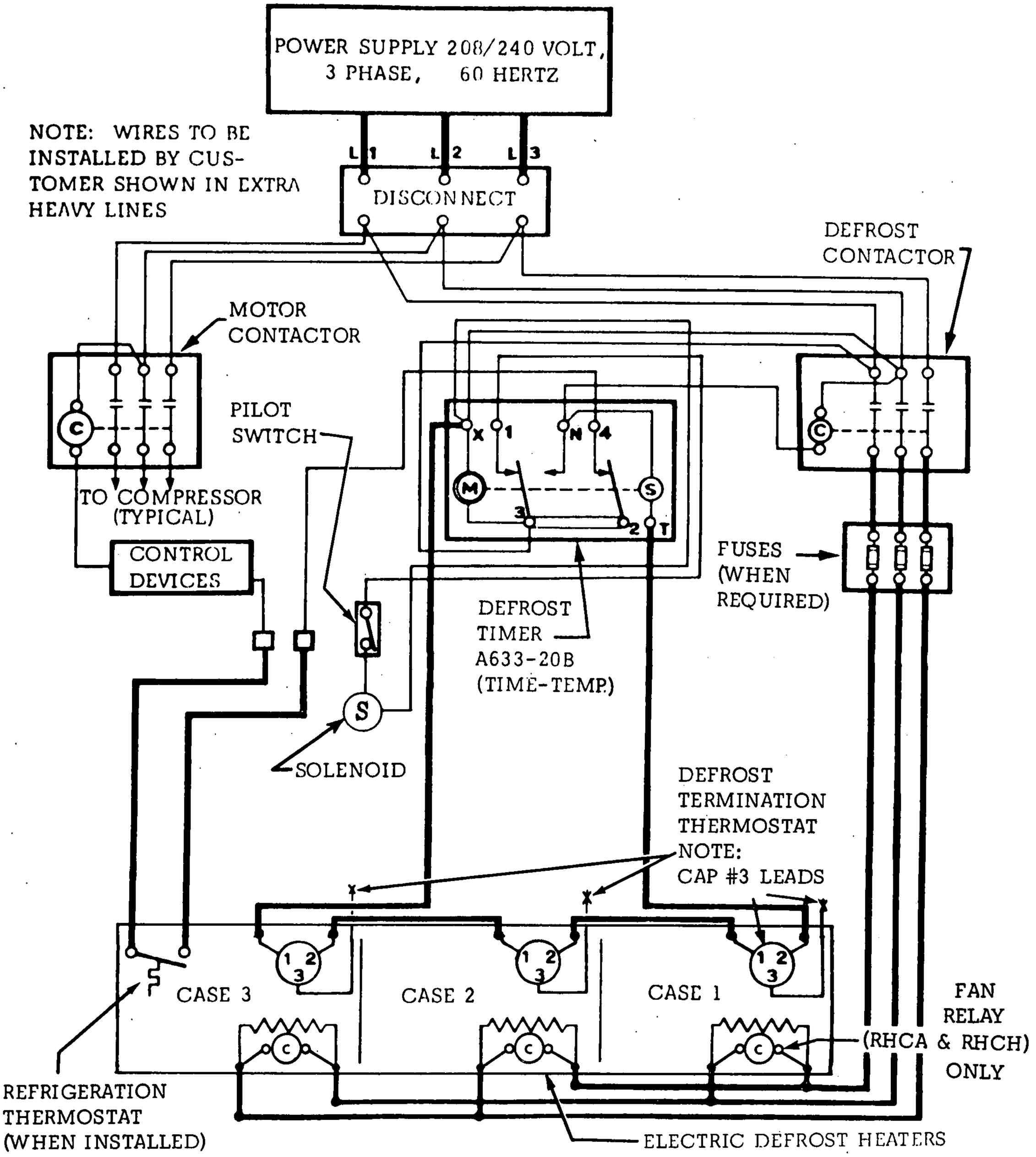
TYPICAL 208/240 VOLT CONDENSING UNIT CIRCUIT DIAGRAM FOR INDOOR UNITS WITH TIME INITIATED-TEMPERATURE TERMINATED-ELECTRIC DEFROST (WHEN DEFROST CONTACTOR IS INSTALLED)



NOTE 1: Cap #3 Leads.

NOTE 2: Defrost Termination Thermostat:
When multiplexing on one System, wire defrost thermostats in series.

TYPICAL 208/240 VOLT CONDENSING UNIT CIRCUIT DIAGRAM FOR OUTDOOR UNITS WITH TIME INITIATED-TEMPERATURE TERMINATED-ELECTRIC DEFROST (WHEN DEFROST CONTACTOR IS INSTALLED)



WARNING: REFRIGERATOR MUST BE GROUNDED

SECTION 5
USER'S INFORMATION

STOCKING AND STOCK ROTATION

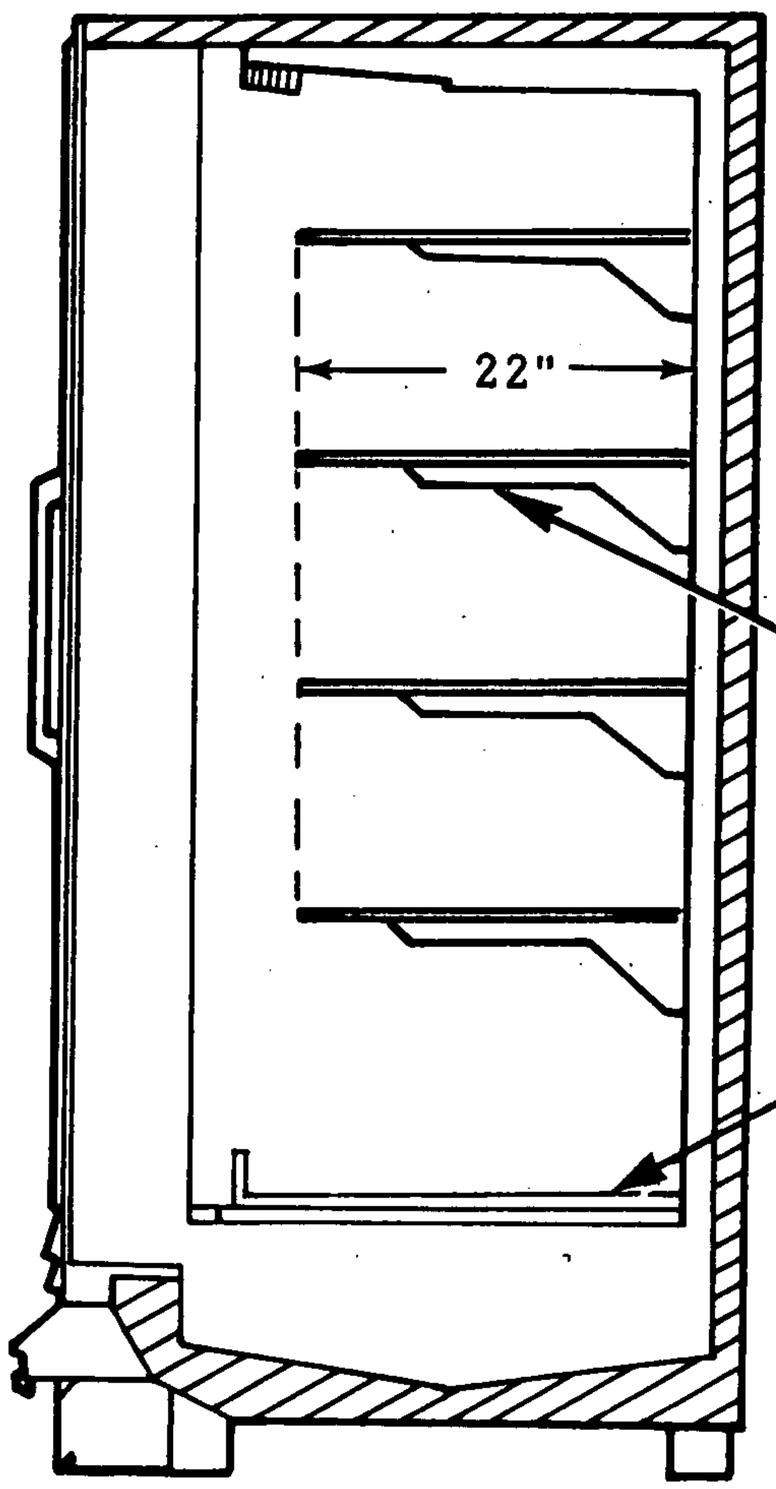
Merchandise should not be placed in these refrigerators for at least six hours after being put into operation. All shelves and lower deck of these models are intended to display the product.

The following illustrations show the type and placement of the optional shelves that are available for each model type. The adjustable shelves may be placed and adjusted in 1" increments. We suggest a 12" spacing for most applications. The telescoping shelves that are supplied with the RHCH and RHFH models have three possible horizontal positions or they may be installed in an inclined position. ALL SHELVES ARE DESIGNED FOR A MAXIMUM LOAD OF 200 LBS. PER SHELF.

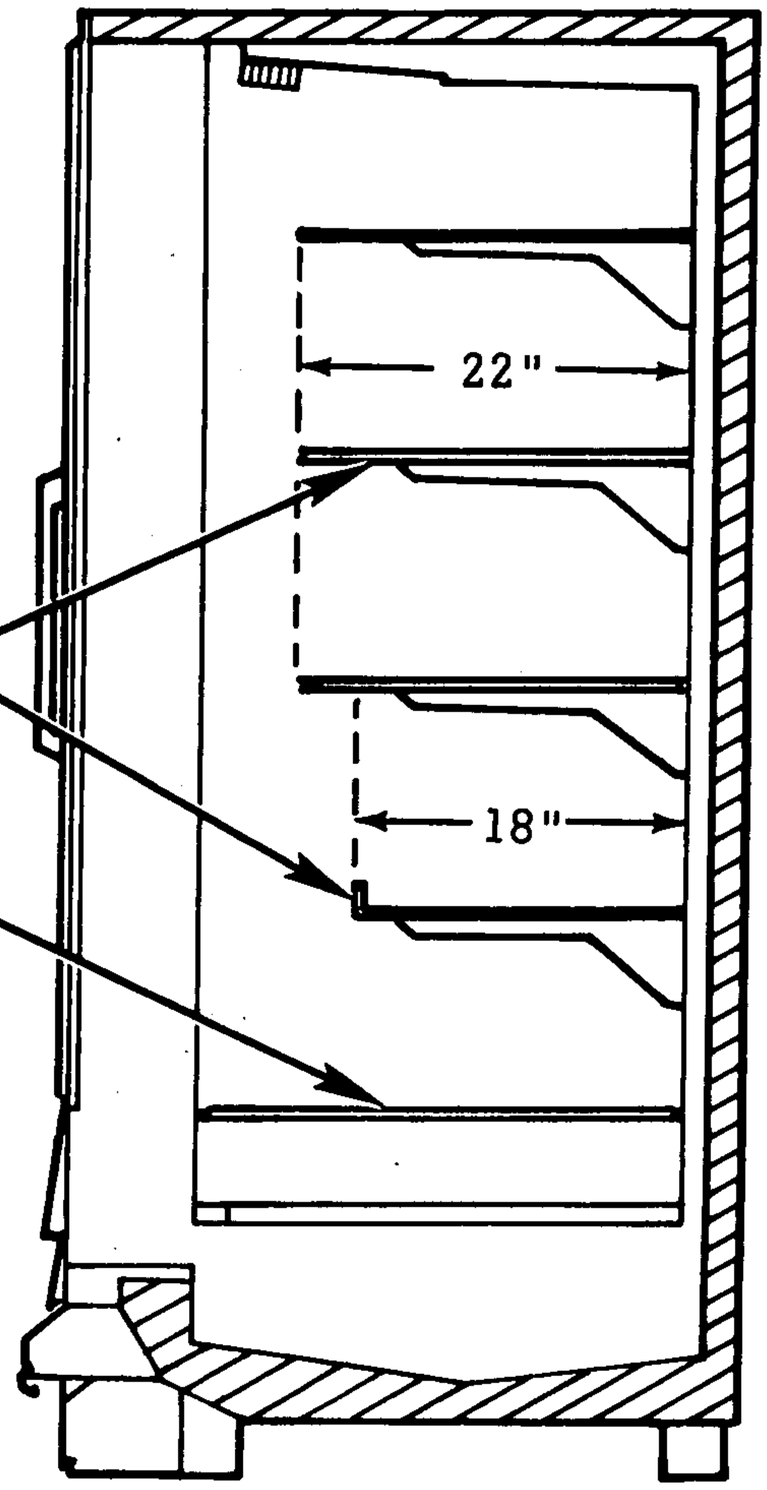
Since frozen food and ice-cream are perishable, the display should be rotated. Each time an item is restocked, the last few packages at the rear should be moved to the very front. This will prevent pockets of unrotated food.

When stocking, the doors should not be kept open longer than necessary or high temperature, frost and high energy consumption will occur.

RHFA-RHCA



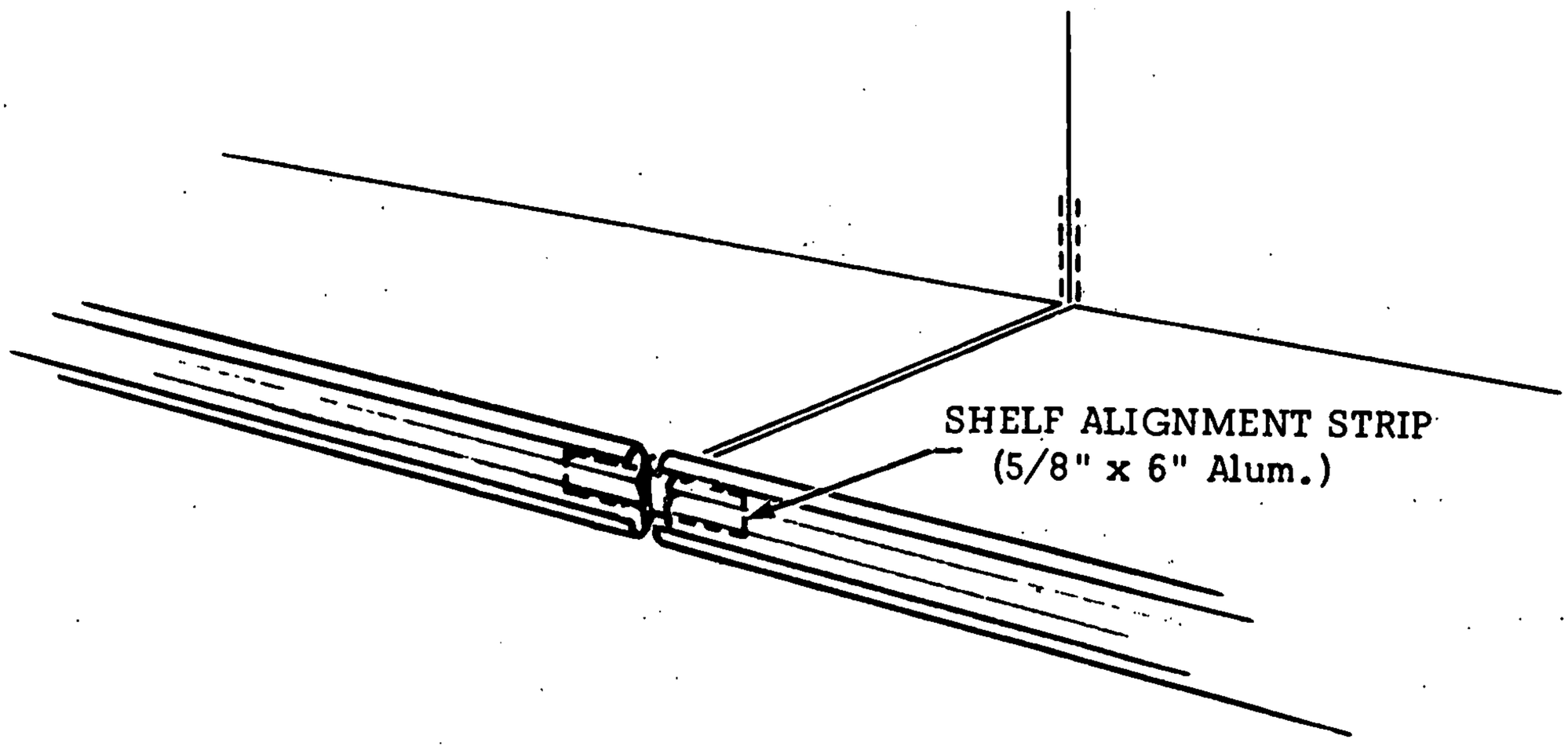
RHFH-RHCH



SHELF ALIGNMENT

Taped to one of the shelves of this refrigerator is a small plastic bag containing shelf alignment strips. These items are designed to enhance the appearance of the shelves by aligning the front edge of each shelf with that of an adjacent shelf. When installing the shelves, insert one of these strips into the narrow slot behind the front edge of each shelf. After all shelves have been installed, slide the strip across the shelf joint where two shelves are adjacent to lock them together.

Some styles of PTM's are pop riveted to the shelf. In these instances, it will be necessary to cut the alignment strips before inserting them into the shelf.



CARE AND CLEANING

To insure good sanitation, long life and minimum maintenance these models should be thoroughly cleaned and washed at least every three months. Remove debris caused by broken packages , torn wrappers, etc. before washing since foreign matter can clog the drip pipe.

To preserve the finish, use warm water and a mild detergent to wash the interior and exterior surfaces. DO NOT USE ABRASIVE CLEANERS OR STEEL WOOL SCOURING PADS AS THESE WILL MAR THE FINISH.

When cleaning, do not use a hose with high water pressure and never introduce water into the refrigerator faster than the drip pipe can carry it away.

SECTION 6
SERVICING 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 FANS, HEATERS, THERMOSTATS AND FLUORESCENT LAMPS.

LAMPS BALLAST

The lamp ballast for this refrigerator are located in the electrical raceway behind the lower kickrails, see page 15. To gain access to the ballast:

1. Remove the screws along the top of the lower kickrail.
2. Pull top of kickrail out and down to remove.
3. Service or replace ballasts as required and replace all items as they were originally installed.

FLUORESCENT LAMPS

The fluorescent lamps of this case are enclosed in tough, durable, plastic lamp shields to insure maximum brightness and protection against lamp breakage. To remove the shield and gain access to the fluorescent lamps:

1. Press top, leading edge of the shield toward the lamp and then push shield toward back of the case.
2. Lift shield away from the light fixture flanges which captivates the shield.
3. When installing the shield be certain that the shield is fully captive as it was originally installed.

DOORS AND FRAMES

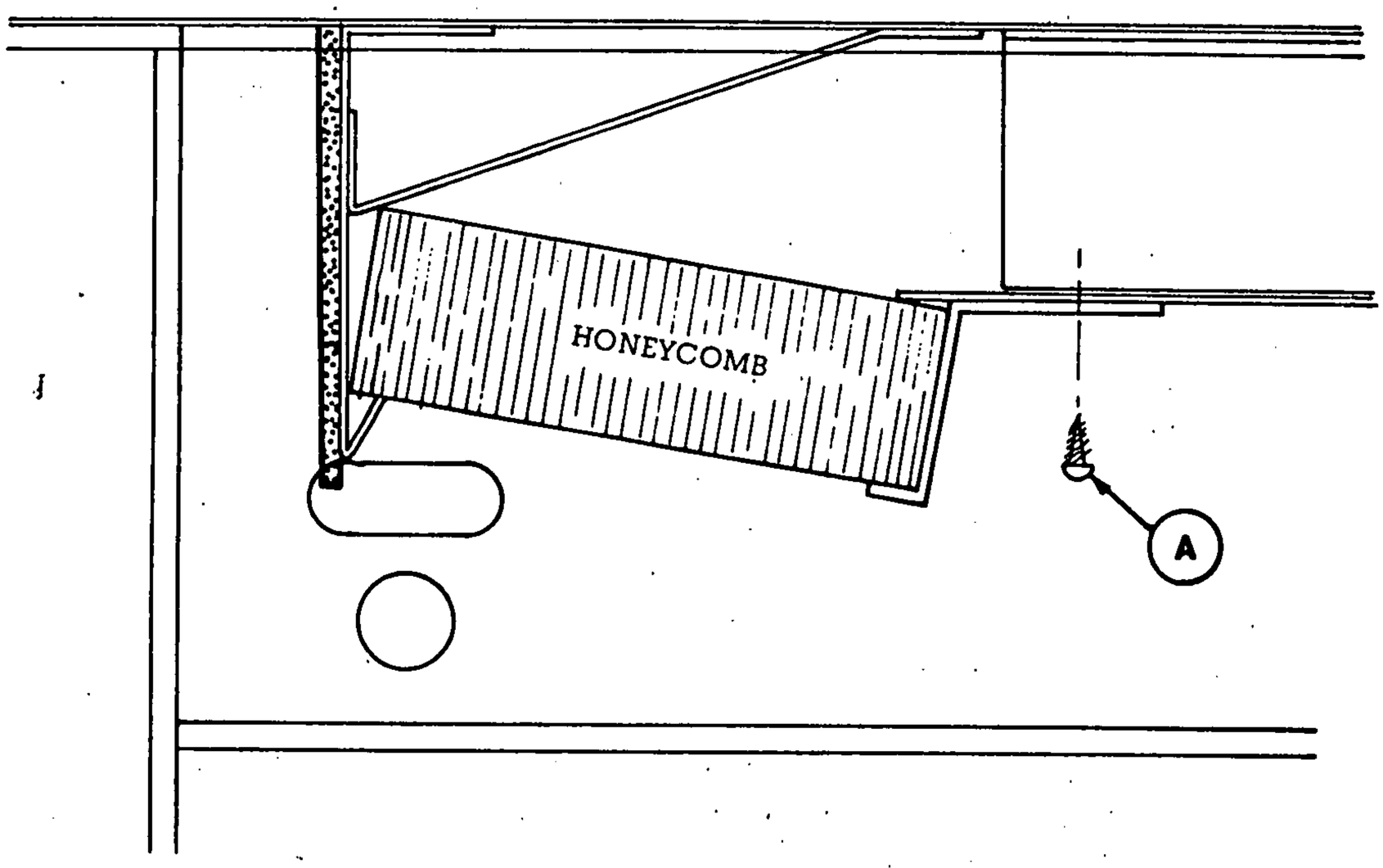
For all information concerning the doors and frames of this refrigerator refer to the Door Manufacturers service manual (Anthony or Ardco).

A copy of this manual is furnished with each refrigerator. This manual contains door adjustment information, servicing tips and replacement parts list for all hardware and heater items that are installed in this refrigerator.

REMOVAL AND CLEANING OF DISCHARGE HONEYCOMB

The discharge honeycomb should be periodically inspected and cleaned when needed, this should occur approximately only once or twice a year. The honeycomb is rigidly constructed but it can be damaged if abused. To remove the honeycomb and clean:

1. Remove the screws along the rear retainer of the honeycomb.
2. Lower the rear end of the honeycomb and remove from the case.
3. Clean or replace honeycomb.
4. Install honeycomb in reverse order of removal.



FAN MOTOR AND BLADES

Should it ever be necessary to remove or replace the fan motors and fan blades of this refrigerator be certain that when installed, the raised embossing side of the fan blade is installed toward the motor.

DEFROST HEATERS

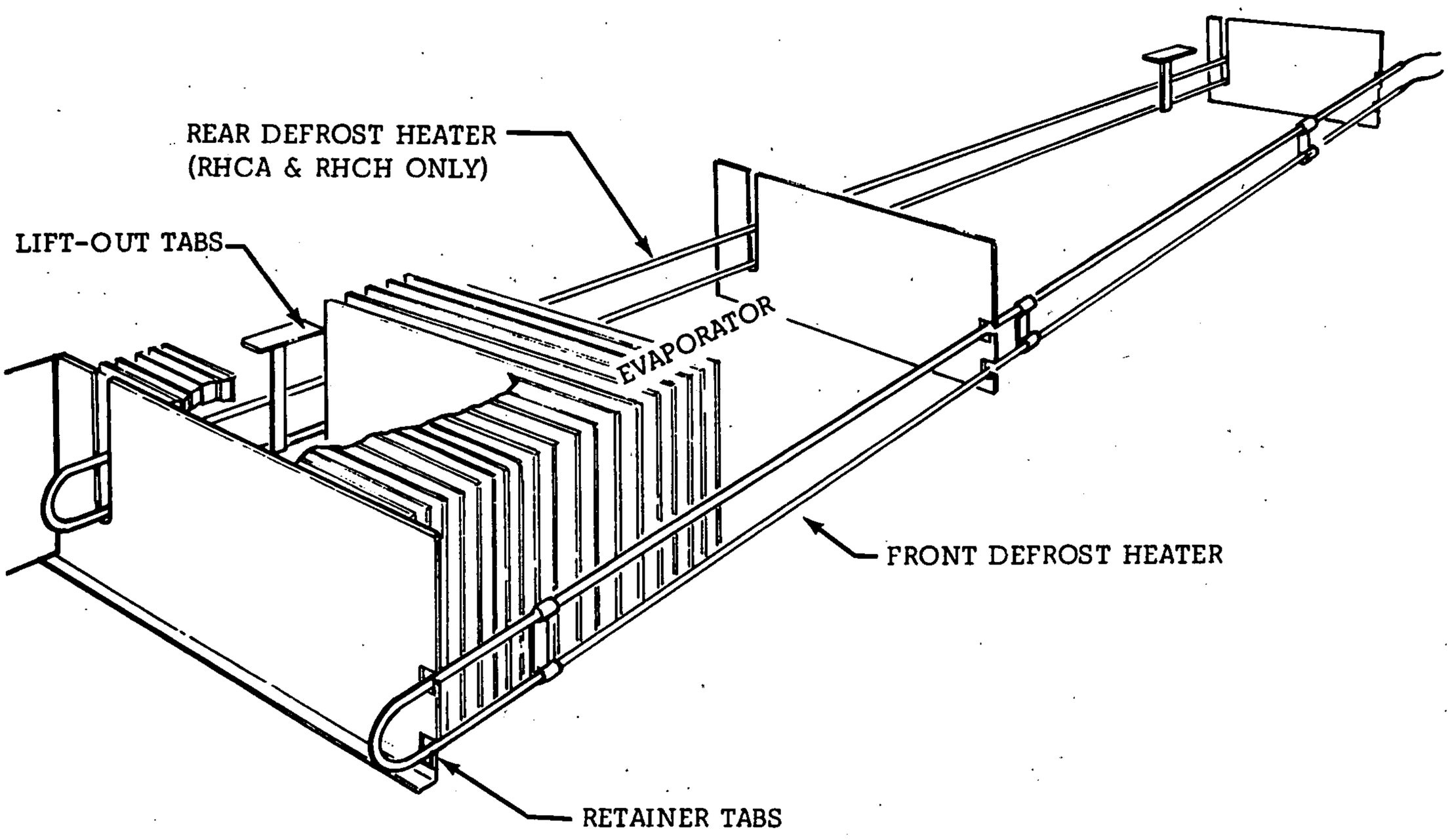
The electric defrost heaters are installed in a vertical position directly in front of the evaporator. The RHCA and RHCH models will also have a defrost heater behind the evaporator. To remove these heaters:

1. DISCONNECT POWER

2. Front defrost heater:
   a. Bend the retainer tabs slightly.
   b. Lift and remove heater from bracket.

3. Rear defrost heater (RHCA and RHCH only)
   a. Grasp the lift-out tabs resting on top of evaporator.
   b. Lift and remove heater from bracket.

4. Replace heaters in reverse order of removal.



REPAIRING ALUMINUM COIL

The aluminum coils used in Hussmann refrigerated cases may be easily repaired in the field. Materials for repair are found at refrigeration wholesalers.

Hussmann recommends the following solders and techniques:

1. Zinc based 720°F solder. This solder makes a strong durable repair and is also cathodic protection, preventing corrosion of the tubing near the repair. This does not need a coating over the solder area. It may be 95% to 98% zinc with the remainder aluminum. Solders in this group are made by:

   Platt Brothers
   Box 1030
   Waterbury, CT
   (203) 753-4194

   New Products, Inc.
   269 Freeman Street
   Brooklyn, NY 11222

   Mathiessen and Hegler Zinc Company
   Lasalle, IL

   Three major differences between soldering aluminum and copper must be followed for best results. a. The heat must be applied on the opposite side of the tube from the solder. b. While keeping the solder molten, wire brush under the solder pool. c. Move the flame back and forth along the tube to prevent melting the tube.

2. Solders with lower melting point (600°F or less). Solders that contain metals other than the zinc and aluminum combination above will require a protective coating. This coating must be flexible to withstand defrosts. Windshield sealant by 3M, sold in auto parts stores, is one good material.

3. Solder/flux the same technique may be used with all these solder/flux systems. Heat from the back side of the tube, keep rubbing the solder on the fluxed repair area until it melts. Continue heating carefully until the solder flows, wetting the tube. Wash flux off with very hot water, dry, coat with windshield sealant. Use two coats and extend coat at least 1" each way from the solder to be sure of good coverage.

Some solder manufacturers are:

#505 Solder and #505 Flux:	Allweld Alloys 2027 Laura Avenue Huntington Park, Ca (213) 583-9004
Alu-Sol 45D Multicore Solder:	Multicore Solders Westbury, CT 11590 (516) 334-7450
Strongset #509 (5) and 509 Flux:	All-State Welding Alloys Co. Toronto, Canada
Eutector-Alutin 51-S Solder and Alutin 51 Flux:	Eutectic Corporation 40-45 172 nd Street Flushing, NY