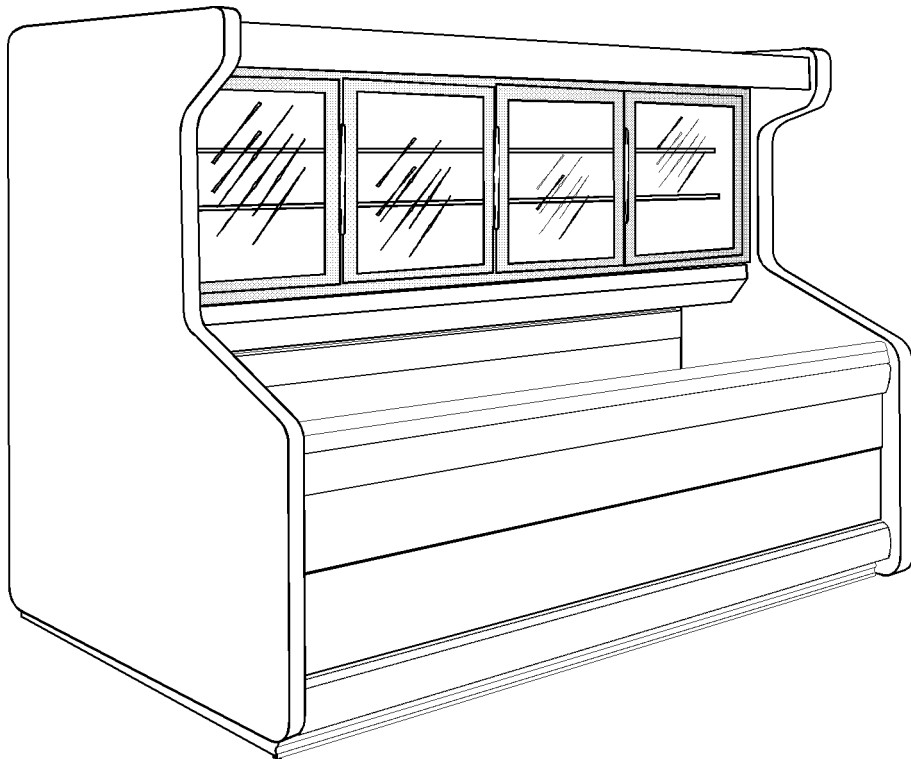


TYLER ^{1series} Advantage

Installation & Service Manual



N2TG

COMBINATION MERCHANDISER

Frozen Food or Ice Cream Glass Door/Open Well Cases

This manual has been designed to be used in conjunction with the General (UL/NSF) Installation & Service Manual.

Save the Instructions in Both Manuals for Future Reference!!

This merchandiser conforms to the American National Standard Institute & NSF International Health and Sanitation standard ANSI/NSF 7 - 1999.

PRINTED IN U.S.A.	Specifications subject to change without notice.	REPLACES EDITION	ISSUE DATE	2/01	PART NO.	9037166	REV.
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CONTENTS

	<u>Page</u>
Specifications	
N2TG Specification Sheets	4
Line Sizing Requirements (See General-UL/NSF I&S Manual)	
Pre-installation Responsibilities (See General-UL/NSF I&S Manual)	
Installation Procedures	
Carpentry Procedures	6
Case Line-Up	6
Trim Installation/Alignment	8
Plumbing Procedures (See General-UL/NSF I&S Manual)	
Refrigeration Procedures	9
N2TG Upper Case Application Requirements	9
Electrical Procedures	9
Electrical Considerations	9
Defrost Information	10
Defrost Control Charts	10
Installation Procedure Check Lists . (See Gen.-UL/NSF I&S Man.)	
Wiring Diagrams	10
N2FGU Upper Case Circuits with Electric Defrost (208V)	11
N2FGU Upper Case Circuits with Gas Defrost (208V)	12
N2NGU Upper Case Circuits (208V)	13
N2FL/N2CL Lower Case Circuits with Electric Defrost (208V)	14
N2FL/N2CL Lower Case Circuits with Gas Defrost (208V)	15
N2TG Case Lighting Circuits	16
Cleaning and Sanitation (See General-UL/NSF I&S Manual)	
Component Removal & Installation Instructions for Cleaning .	17
Shelves and Shelf Brackets (Upper Case)	17
Bottom Trays	17
Front Air Ducts	17
Rear Duct Panels	17
Discharge Air Honeycomb	17
NSF Product Thermometer	17
Top Duct (Upper Case)	18
Front Cladding	18

	<u>Page</u>
Service Instructions	
Preventive Maintenance (See General-UL/NSF I&S Manual)	
Light Servicing	19
Ballast and Lighting Locations	19
Lamp Replacement	20
Electronic Ballast Replacement (Prism Lighting)	21
Upper Case Door Servicing	22
Door Removal	22
Reversing Door Hardware	23
Reversing Frame Hardware	24
Door Handle Replacement	24
Door and Mullion Heater Replacement	25
Door Installation	26
Case Defrost & Drain Pan Heater Replacement	27
Upper Case Electric Defrost Heater	27
Lower Case Electric Defrost Heater	27
Lower Case Drain Heater	28
Fan Locations and Access	28
Fan Blade and Motor Replacement (See Gen.-UL/NSF I&S Man.)	
Anti-Sweat Replacement	29
Deflector Panel & Discharge Air Grid Anti-Sweat	29
Upper Front Cladding Anti-Sweat	29
Optional Sensor Locations and Access	30
Parts Information	
Operational Parts List	30
Cladding and Trim Parts List	32
TYLER Warranty (See General-UL/NSF I&S Manual)	

The following Frozen Food, Ice Cream and Normal Temp Combination Merchandiser models are covered in this manual:

MODEL	DESCRIPTION
N2TG	8' & 12' COMBINATION FROZEN FOOD/ICE CREAM MERCHANDISER
N2FGU	8' & 12' GLASS DOOR FROZEN FOOD/ICE CREAM UPPER MERCHANDISER
N2NGU	8' & 12' GLASS DOOR NORMAL TEMP UPPER MERCHANDISER
N2FL	8' & 12' OPEN WELL FROZEN FOOD LOWER MERCHANDISER
N2CL	8' & 12' OPEN WELL ICE CREAM LOWER MERCHANDISER

SPECIFICATIONS

N2TG Combination Merchandiser Specification Sheets

MODEL	N2FGU (UPPER)		N2NGU (UPPER)	N2FL (LOWER)	N2CL (LOWER)
USAGE	FROZEN FOOD	ICE CREAM	MED TEMP	FROZEN FOOD	ICE CREAM
CAPACITY (BTUH/FT)	385	424	325	410	470
EVAPORATOR**	-15F	-20F	+20F	-20F	-30F
ENTER AIR°	-4F	-9F	+30F	-14F	-20F

* Evaporator temperature is defined as the saturated suction temperature leaving the case.

NOTE: COMPRESSOR SIZING SHOULD ALLOW FOR SUCTION LINE PRESSURE DROP.

THE ABOVE RATINGS ARE FOR COMPRESSOR SELECTION ONLY. FOR ENERGY CALCULATION DATA REFER TO THE ENERGY SECTION. FOR COMPRESSOR SIZING INFORMATION REFER TO THE "GOLD" SECTION & FOR LINE SIZING INFORMATION REFER TO THE "BUFF" SECTION OF THE TYLER SPECIFICATION GUIDE.

UPPER CASE WITH 208 VOLT DEFROST (AMPS)												
FT	8	12	16	20	24	28	32	36	40	44	48	52
FF/IC 1 PH	TG-30 7.7	TG-30 11.5	TG-30 15.4	TG-30 19.2	TG-30 23.0	TG-40 26.9	TG-40 30.8	TG-50 34.6	TG-50 42.2	N/A	N/A	N/A
FF/IC 1 PH	N/A	N/A	TG-30 13.3	TG-30 16.6	TG-30 19.9	TG-30 16.6	TG-30 19.9	TG-30 19.9	TG-30 23.3	TG-40 26.6	TG-40 29.9	TG-50 33.3
LOWER CASE WITH 208 VOLT DEFROST (AMPS)												
FF 1 PH	TG-30 7.7	TG-30 11.5	TG-30 15.4	TG-30 19.2	TG-30 23.0	TG-40 27.0	TG-40 30.7	TG-50 34.5	TG-50 38.4	N/A	N/A	N/A
FF 3 PH	N/A	N/A	TG-30 13.3	TG-30 16.6	TG-30 19.9	TG-30 16.6	TG-30 19.9	TG-30 19.9	TG-30 23.3	TG-40 26.6	TG-40 29.9	TG-50 33.6
IC 1 PH	TG-30 16.5	TG-40 24.6	TG-40 33.0	TG-40 41.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
IC 3 PH	N/A	N/A	TG-40 28.6	TG-50 35.6	TG-50 42.6	TG-50 35.6	TG-50 42.6	TG-50 42.6	TG-50-50 35.6/35.6	TG-50-50 42.6/35.6	TG-50-50 42.6/42.6	TG-50-50 42.6/35.6
CASE-TO-CASE SUCTION LINE SUB-FEED BRANCH LINE SIZING												
R404A UPPER	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"
R404A LOWER	7/8"	7/8"	7/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"

DEFROST CONTROL				BACKUP PRESSURE SETTINGS**			EPR SETTINGS***	
PER DAY	MODE	TIME	TERM.		CUT IN	CUT OUT	R22	R404A
1	ELECT - FF	60 MIN.	50F	FF	18-22# @ R22	8-11# @ R22	11#	18#
2	(UPPER) - IC	60 MIN.	50F	IC	15-20# @ R22	4-8# @ R22	8#	14#
1	TIME OFF - MED	60 MIN.	---	MED	63# @ R22	29-38# @ R22	38#	---
1	ELECT - FF	36 MIN.	50F	FF	15-20# @ R22	4-8# @ R22	8#	14#
1	(LOWER) - IC	36 MIN.	50F	IC	12-18# @ R22	1-5# @ R22	3#	8#
2	HOT GAS - FF	18-20 MIN.	55F*	FF	23# @ R404A	14# @ R404A	11#	18#
2	(UPPER) - IC	20-25 MIN.	55F*	IC	19# @ R404A	9# @ R404A	8#	14#
2-3	HOT GAS - FF	16-22 MIN.	55F*	FF	22-30# @ R404A	9-14# @ R404A	8#	14#
2-3	(LOWER) - IC	16-20 MIN.	55F*	IC	15-22# @ R404A	5-10# @ R404A	3#	8#

* If an Electronic Sensor is used for termination, it should be set at 70°F termination temperature.

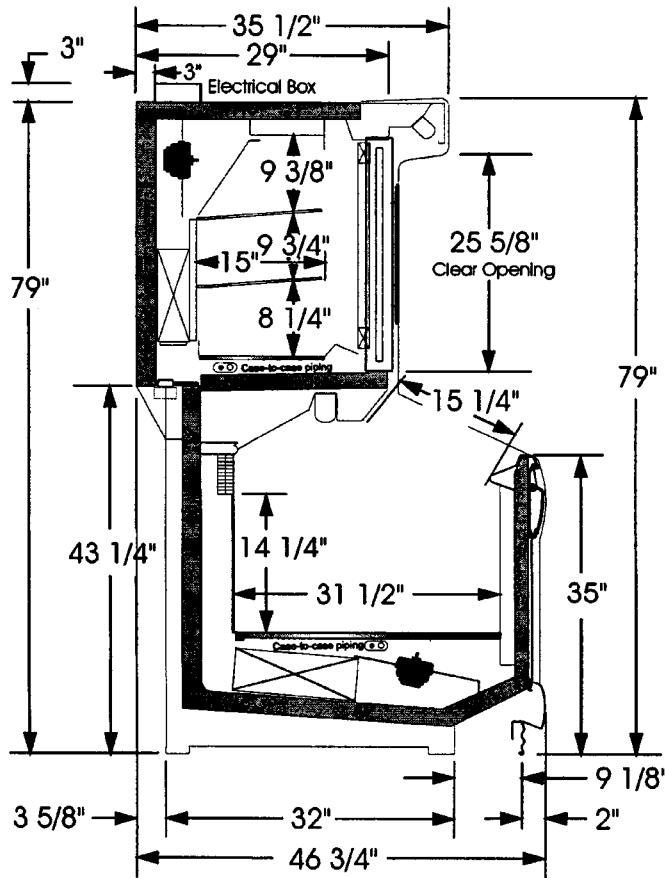
** Used with Electronic Thermostat and EPR Control. *** Set EPR to give this pressure at the case.

CASE BTUH REQUIREMENTS are calculated to produce approximately the indicated performance with absolute maximum operating ambient limits of 75F & 55RH.

The information contained herein is based on technical data and tests which we believe to be reliable and is intended for use by persons having technical skill, at their own discretion and risk. Since conditions of use are outside Tyler's control, we can assume no liability for results obtained or damages incurred through the applications of the data presented. SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

N2TG Combination Merchandiser

208V CASE CIRCUITS: In addition to the 208V Defrost Circuit, there is a separate 120V circuit for fans, lights and anti-sweat heaters in the upper and lower cases. Lighting for whole case comes from the upper case.



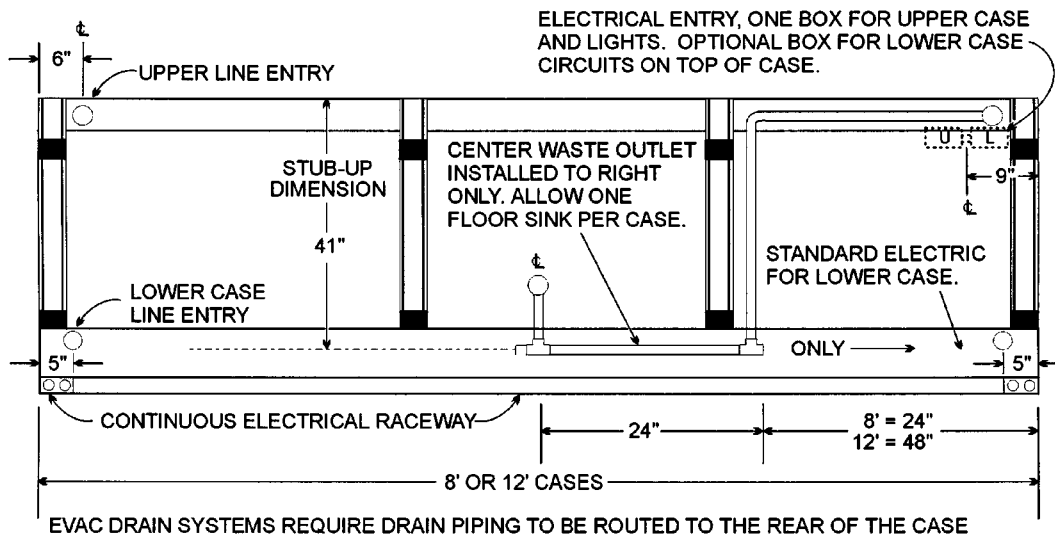
120 VOLT ELECTRICAL DATA (AMPS)				
CASE SIZE (FT)	STD. FANS (ELEC/GAS)	ES FANS (ELEC/GAS)	ANTI-SWEAT (FF/IC)	ANTI-SWEAT (MED)
UPPER SECTION				
8	1.0	----	3.2	2.1
12	1.5	----	4.7	3.0
LOWER SECTION				
8	1.0 / 3.1	0.7 / 2.8	3.5	----
12	1.5 / 4.2	1.1 / 3.8	4.9	----

120 VOLT LIGHTING DATA (AMPS)	
CASE SIZE (FT)	UPPER CASE LIGHTING
8	4.5
12	5.1

STUB-UP NOTE:

One floor drain can serve up to two cases per drain. One electrical stub-up can serve a number of cases depending on the circuits required - utilizing the continuous wire raceway(s) on the front of the cases. One refrigeration stub-up can serve several or all cases on a line-up with case-to-case piping.

FLOOR PLAN FOR COMBINATION CASE



INSTALLATION PROCEDURES

Carpentry Procedures

Case Line-Up

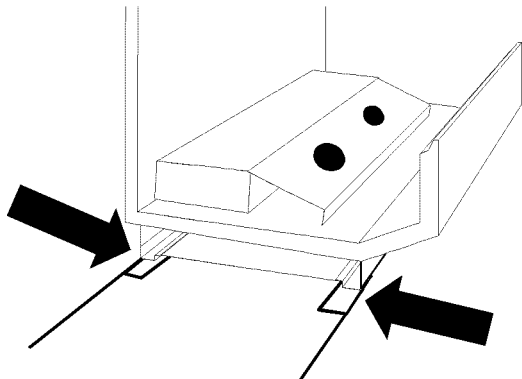
Before starting the case line-up, see "Refrigeration Procedures" in this manual, review the store layout floorplans and survey the areas where case line-ups are going to be installed.

WARNING

These cases are very heavy and require two or more people to move and/or position them. Improper handling of these cases could result in personal injury.

NOTE

Allow at least 3" of air space between the top back of these cases and store walls or other cases to minimize possible condensation problems. Forced ventilation might be necessary in some situations.



1. Snap chalk lines where the front and rear base rails of the cases are to be located for the entire line-up.

NOTE

Front and rear edges of base rails should always be used to line-up cases. 6" shims allow adjoining ends of cases to be shimmed together.

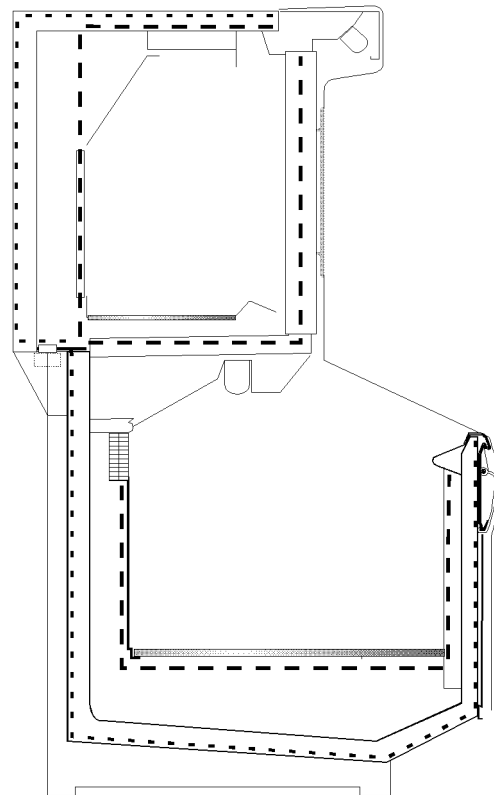
2. Locate highest point on chalk lines as a reference for determining the number of shims to be placed under the case base rails. Position first case at highest point on the chalk lines and shim case supports as required. Check leveling at hand rails and top of case and back of case.

CAUTION

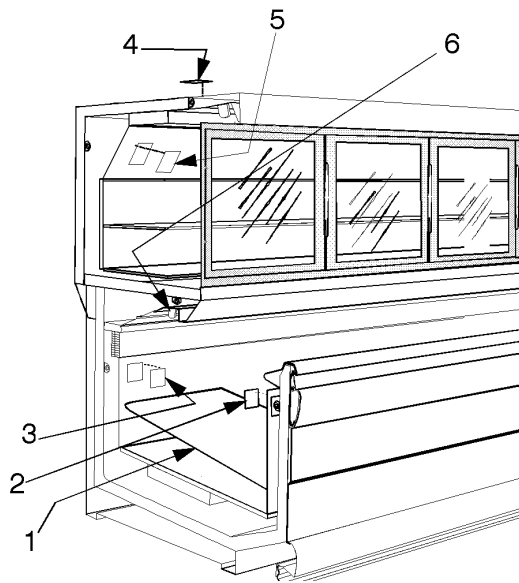
Shipping braces should only be removed from case ends that are to be joined. This protects the cases from possible damage during the line-up procedure.

NOTE

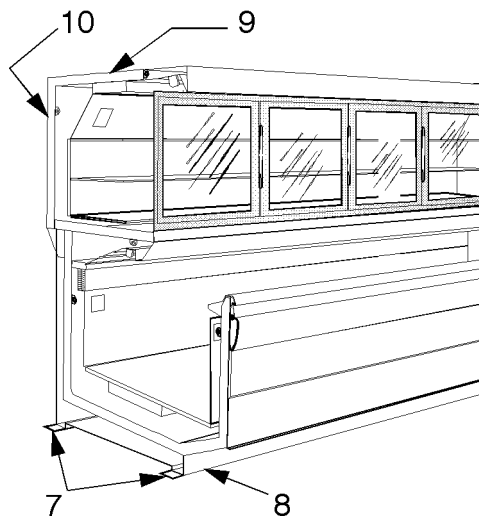
A foam gasket is factory installed on one end of the case. This gasket fits into a groove on the adjoining case when cases are pulled together. Do not depend on the foam gasket alone to make a good seal!



3. Apply two heavy beads of caulking compound from the Filler Kit to the end of case at dotted (. . .) and dashed (- - -) lines. Proper caulking provides good case refrigeration and sanitation.



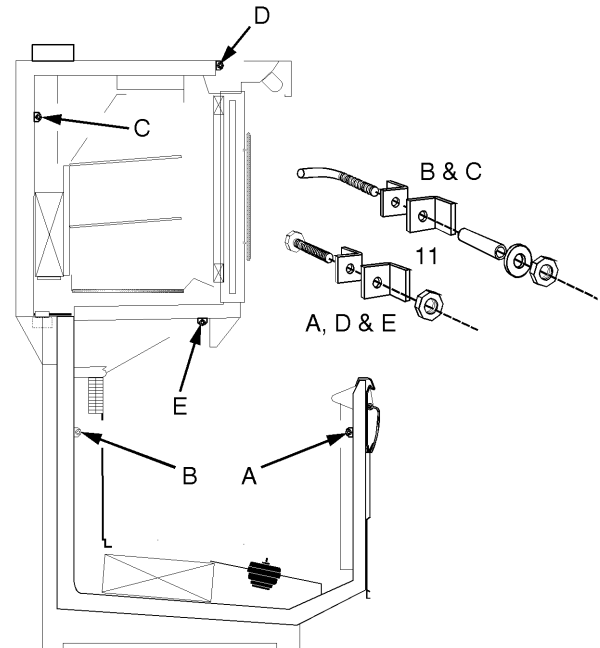
4. Remove the following parts from the adjoining ends of both cases. The bottom tray (1), front pull-up access cover (2) and rear pull-up access cover (3) from the lower case. The top pull-up access cover (4), top rear pull-up access cover (5) and lower the bottom light channel (6) from the upper case.



5. Push cases tightly together making sure the pull-ups are aligned.
6. Add shims (7), as required, under the adjoining case base rails (8). Check leveling at top of case (9), and back of case (10).

CAUTION

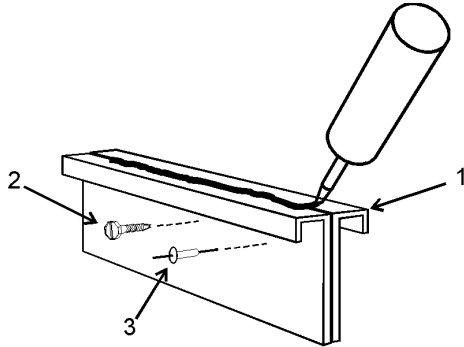
Do not drill or use other holes through the case end for pull-ups. This may deform the case end and could cause joint leaks and/or poor refrigeration.



7. Position all pull-up bolts and mounting hardware (11) at pull-up locations A, B, C, D, and E. Do not tighten any pull-up hardware until all of it has been installed. Tighten all pull-up hardware equally starting at point A and finishing at point E. **Do not overtighten.**
8. Install the bottom light channel (6) and top rear and top pull-up access covers (5 & 4) on the upper case. Install the rear and front pull-up access covers (3 & 2), and bottom tray (1) on the lower case.
9. Remove shipping tape from fluorescent lamps.

Trim Installation/Alignment

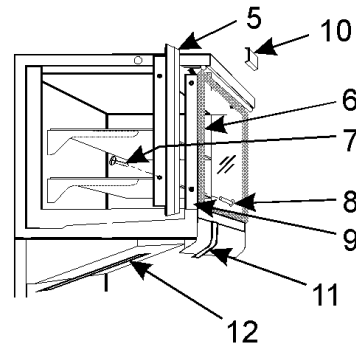
Horizontal & Vertical Joint Trim Installation



1. Apply bead of caulking compound from the Filler Kit to the top of each horizontal joint (1). If gap at horizontal joint is too large, pull together with sheet metal screws (2) or pop-rivets (3).

NOTE

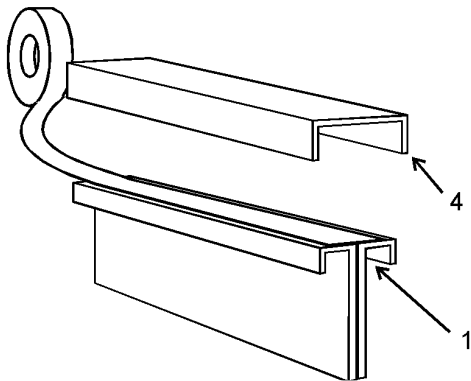
If additional sealing is preferred, 2" wide duct tape can be applied to the top of the internal bottom joint between cases. The tape will be covered by the horizontal joint trim. Duct tape is not furnished.



3. Position vertical joint trim (5) in front upper case line-up joint (6) and secure with two screws (7) and screw nuts (8) through adjoining upper case door frames (9).
4. Install canopy joint trim (10), top front cladding joint trim (11) and cover well joint trim (12) with mounting hardware.

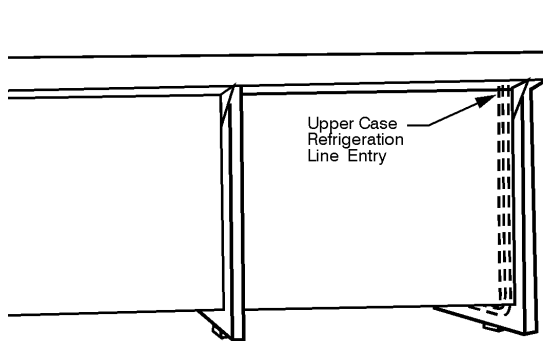
NOTE

See "General-UL/NSF I&S Manual" for bumper, color band, raceway cover and kickplate installation instructions.



2. Apply sealer to horizontal joint trim (4) and install joint trim (4) on the horizontal joint (1).

Refrigeration Procedures



The upper case requires the installation of refrigeration lines from the refrigeration stub-ups on the rear of the case to the front of the lower case.

NOTE

See "General-UL/NSF I&S Manual" for all other refrigeration procedure information.

N2TG Upper Case Application Requirements

Temperature Control Strategy

- A suction stop EPR valve is the preferred method for maintaining temperature control on parallel compressor system applications.
- When using a thermostat and liquid line solenoid for temperature control, the maximum line-up length that may be controlled is 24 feet.
- The discharge air temperature shall be maintained between -3°F to -5°F for frozen food applications and between -10°F to -12°F for ice cream applications.

Temperature Sensor Locations

- The sensor used for temperature control shall be located in the discharge air.
- If a case controller is used, the sensor used for defrost termination MUST be insulated and located where the standard defrost termination klixon is located. If a case controller is used and the case is defrosted using electric heaters, the defrost termination klixon must be replaced with a 70°F fail safe klixon. This meets the safety requirements.

Defrost Control Strategy

- High door openings loads associated with high food product sales may require two defrost periods per 24 hour period.
- Pumping down the refrigeration circuit at the beginning of the defrost period is not recommended.

Electrical Procedures

Electrical Considerations

CAUTION

Make sure all electrical connections are tight. This prevents burning of electrical terminals and/or premature component failure.

NOTE

An electrical box on top of the case houses the electrical wiring for the upper case and case lighting. All other electrical wiring and components can be found in the raceway at the bottom of the lower case. All raceway covers will be shipped loose.

Case Fan Circuits

All fan circuits are to be supplied by an uninterruptible, protected 120V circuit. At case start-up, the upper case fans will not come on until the fan delay thermostat on the coil senses 20°F. After the upper case has been running, the fan operation is interrupted by the defrost relay whenever the defrost cycle is initiated. The defrost relay activates the defrost and drain pan heaters at the same time it shuts off the fans. After defrost, the defrost and drain heaters will shut off and refrigeration will resume.

NOTE

The upper case fans will not restart until the coil temperature reaches 20°F at the fan delay thermostat.

The lower case fan circuit is not cycled, except when equipped for gas defrost. On gas defrost cases the fan circuit is controlled by a 50/30 klixon.

NOTE

With gas defrost, the fans will not start until the coil temperature reaches 20°F at the fan delay thermostat.

Fluorescent Lamp Circuit

The standard case lighting system is T-8 electronic lamps. The standard lighting is 1-row of canopy lights, Prism lighting behind doors, and 1-row of horizontal lights above the lower well.

CAUTION

The light switch should be left off if refrigeration is turned off for periods longer than normal defrosting times. This prevents possible distortion and/or damage to non-metal parts from lighting heat.

Anti-Sweat Circuit

Upper cases have anti-sweat heaters in and around the doors. Lower cases have four anti-sweat heaters. All anti-sweat heaters are wired directly to the main power supply so they can operate at all times.

Defrost Information

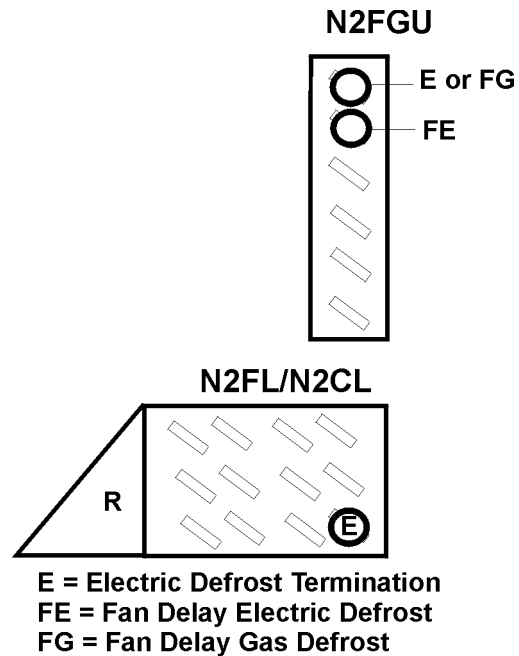
See "General-UL/NSF I&S Manual" for operational descriptions for each type of defrost control.

Defrost Control Charts

N2TG Defrost Option Settings

Defrost Type	Defrosts Per Day	Defrost Duration (Min)	Term. Temp.
N2FGU (UPPER)			
Electric (FF)	1	60	50°F
Electric (IC)	2	60	50°F
Gas (FF)	2	18-20	55°F
Gas (IC)	2	20-25	55°F
Off Time (MT)	1	60	-----
N2FL/N2CL (LOWER)			
Electric (FF)	1	36	50°F
Electric (IC)	1	36	50°F
Gas (FF)	2-3	16-22	55°F
Gas (IC)	2-3	16-20	55°F

All klixons are located on the right end of the evaporator coil. The diagram shows the location for each defrost type that uses a klixon.



NOTE

The termination thermostats for gas defrost are located next to the bypass check valves.

CAUTION

If electronic sensors are used in place of the klixons, the sensors must be located in the same location as the klixons for that defrost type. Any other locations will effect the refrigeration efficiency of the case.

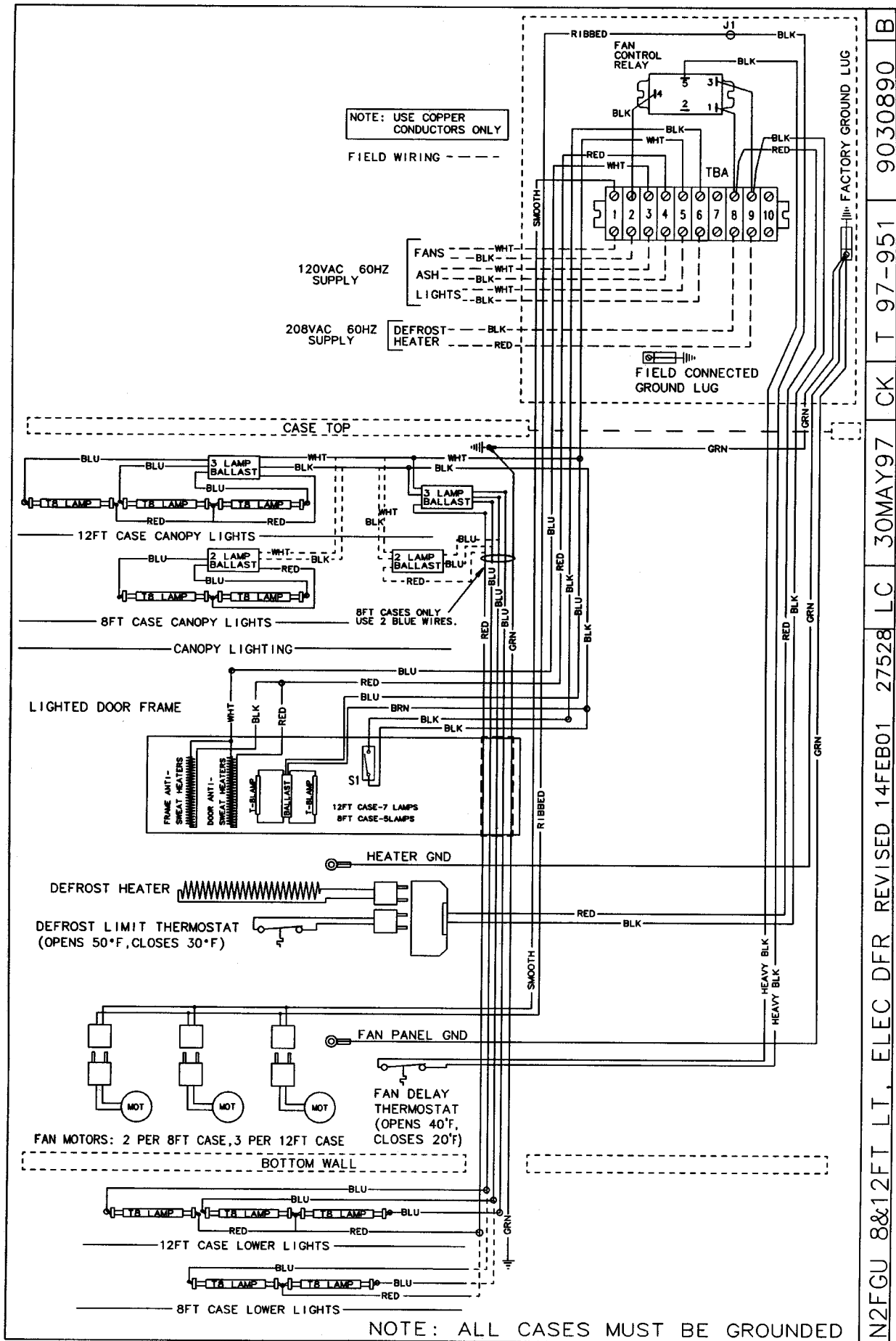
WIRING DIAGRAMS

ELECTRICIAN NOTE - OVERCURRENT PROTECTION

120V circuits should be protected by 15 or 20 Amp devices per the requirements noted on the cabinet nameplate or the National Electrical Code, Canadian Electrical Code - Part 1, Section 28. 208V defrost circuits employ No. 12 AWG field wire leads for field connections. On remote cases intended for end to end line-ups, bonding for ground may rely upon the pull-up bolts.

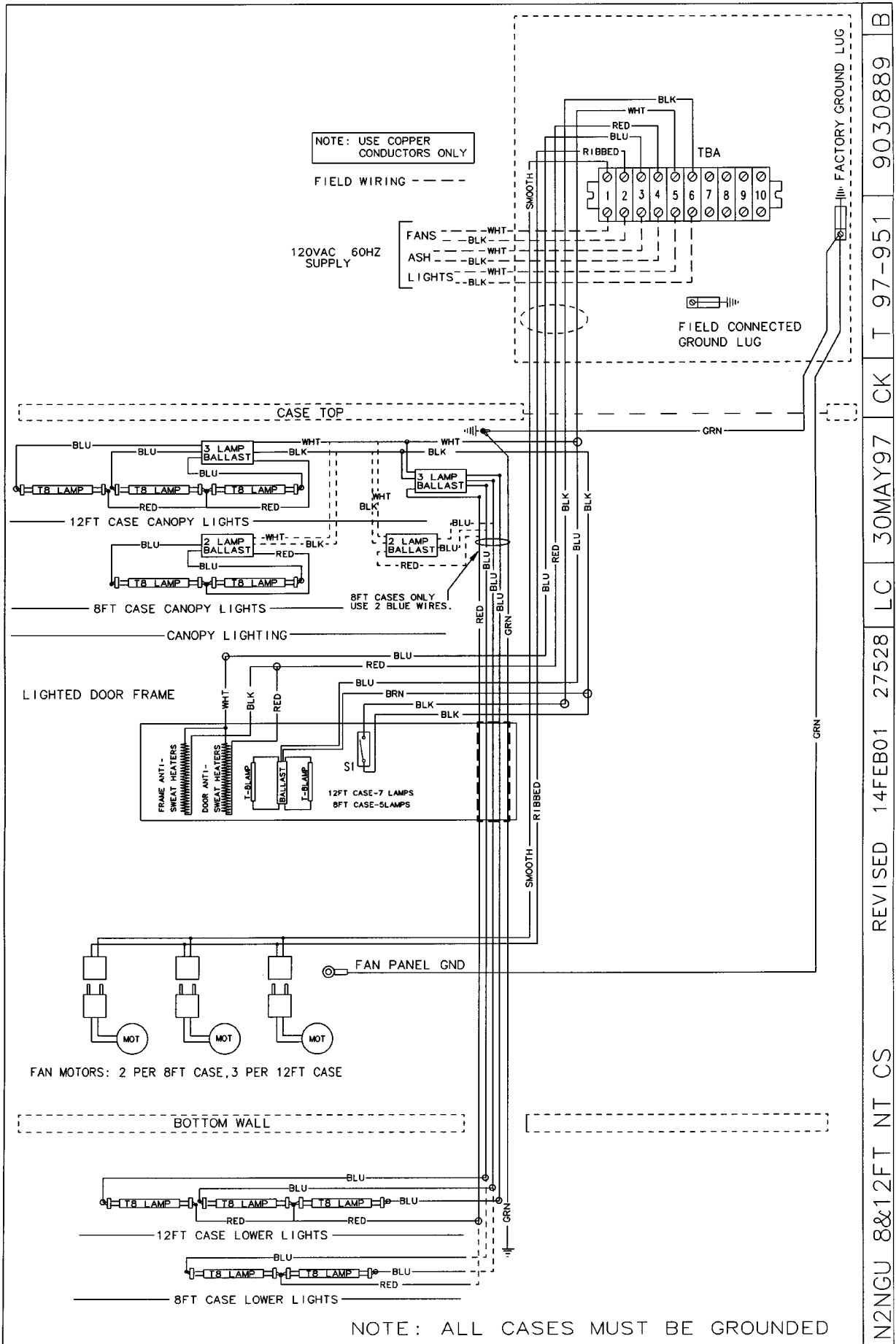
The wiring diagrams on the following pages 11 thru 16 will cover the N2TG upper and lower case circuits and lighting circuits.

N2FGU Upper Case Circuits with Electric Defrost (208V)



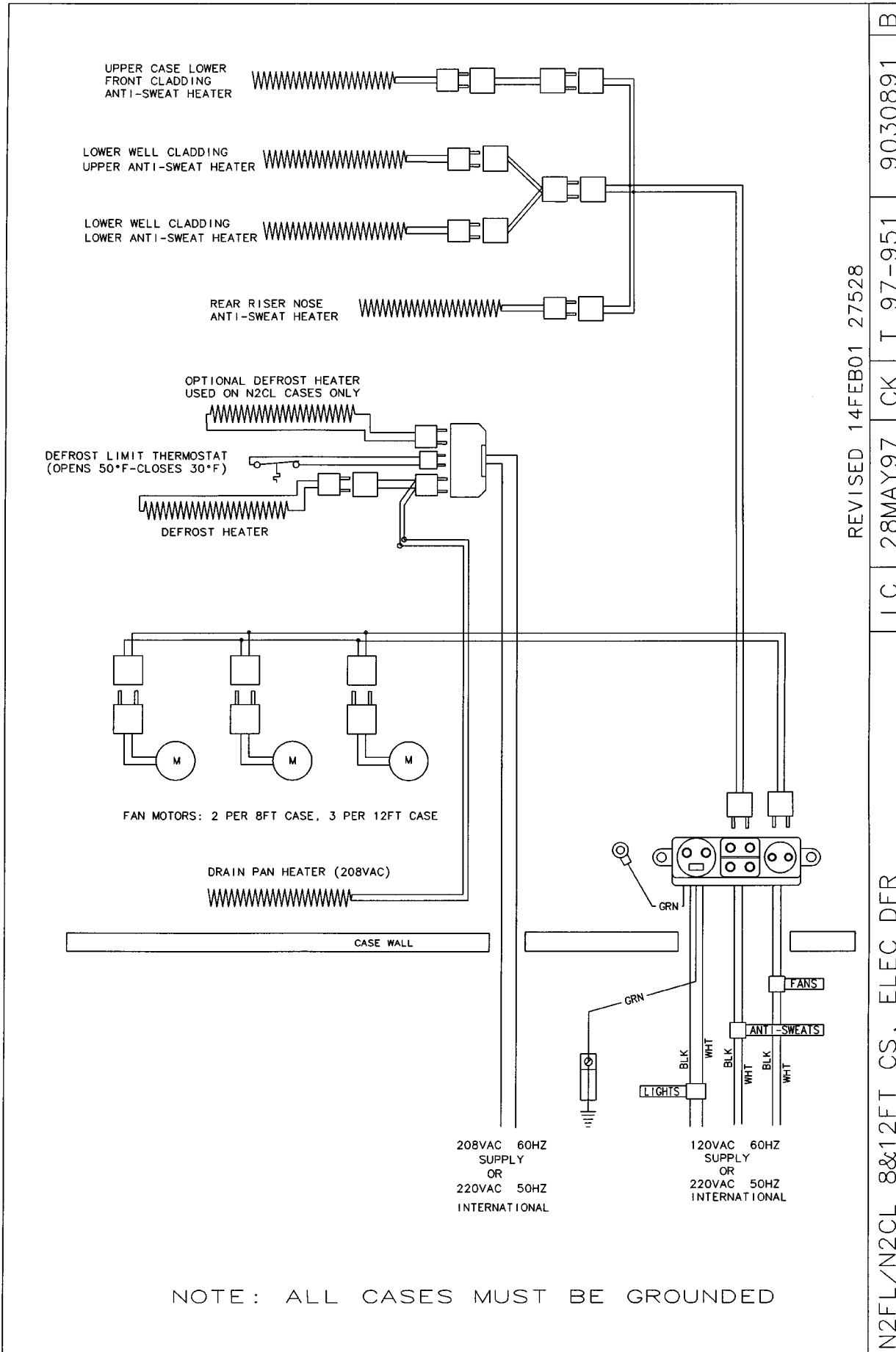
N2FGU 8&12FT LT. ELEC DFR REVISED 14FEB01 27528 LC 30MAY97 CK T 97-951 9030890 B

N2NGU Upper Case Circuits (208V)



N2NGU 8&12FT NT CS
 REVISED 14FEB01 27528 LC 30MAY97 CK T 97-951 9030889 B

N2FL/N2CL Lower Case Circuits with Electric Defrost (208V)



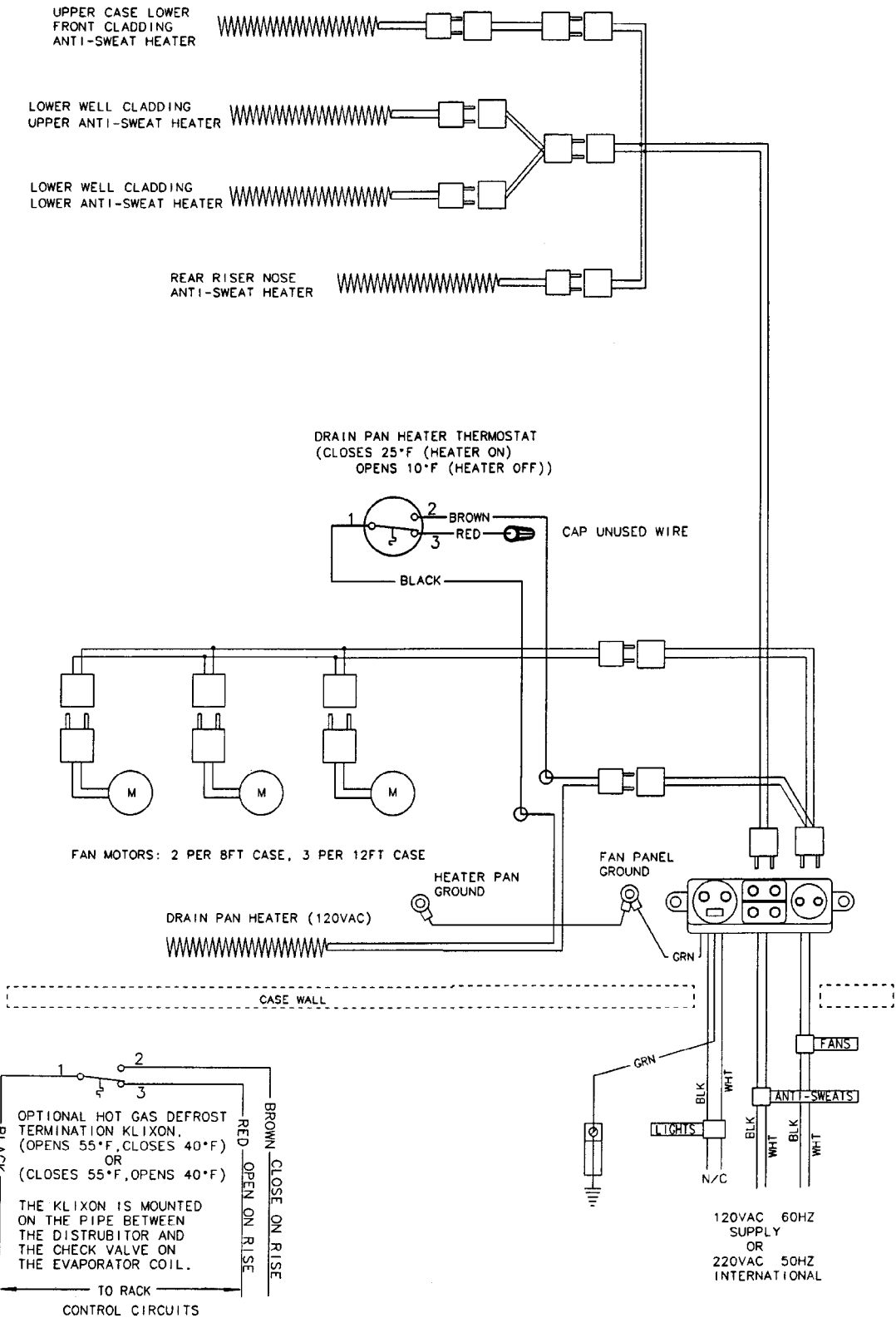
REVISED 14FEB01 27528

N2FL/N2CL 8&12FT CS, ELEC DFR LC 28MAY97 CK T 97-951 9030891 B

N2FL/N2CL Lower Case Circuits with Gas Defrost (208V)

TYLER REFRIGERATION COMPANY	
PART TYPE	N T S
MODEL	X
FABRICATED	X
PURCHASED	
REP	CC

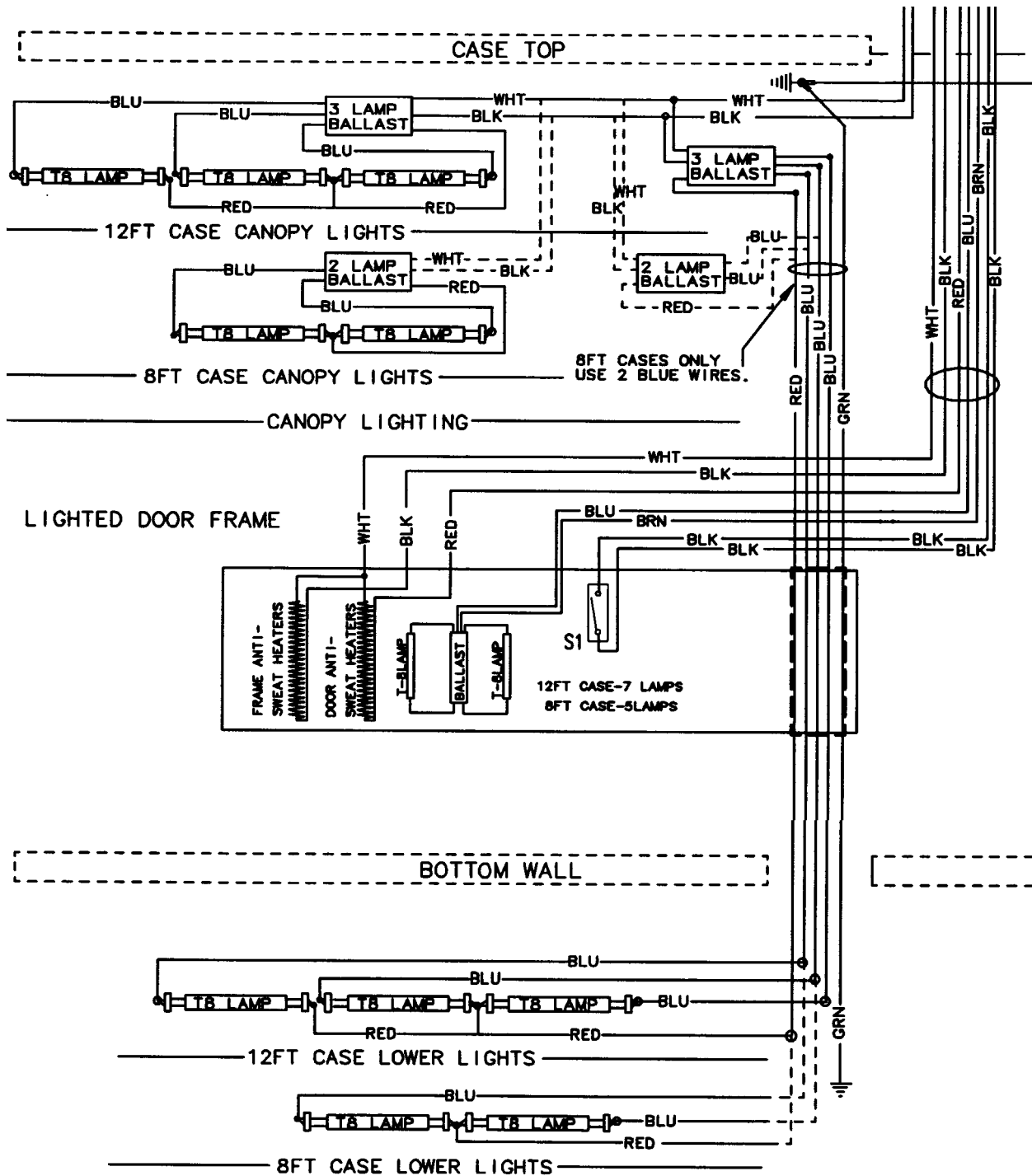
1. TYLER REFRIGERATION CORP. CLAIMS RIGHTS
 2. INFORMATION IS FOR ENGINEERING USE ONLY.
 3. ALL DIMENSIONS ARE IN INCHES UNLESS
 4. SPECIFIED OTHERWISE. FINISHED PART AFTER
 5. ANY TREATMENT. REVISIONS ALLOWED.



NOTE: ALL CASES MUST BE GROUNDED

DECIMALS +/- .030 ANGLES +/- 1 DEG	NONE	NONE
DATE	31 JUL 97	NONE
REVISED MODEL NAME AND SYM	LC	LC
REVISED PER EGN	27528	14 FEB 01 LC CK
RELEASE	22198	18 MAR 99 LC CK
DATE	97-97/8	BY: GSK
DESCRIPTION	DIAGRAM WRG HG DFR N2(FL)(CL)8&12FT	
REV	9031369	

N2TG Case Lighting Circuits



CLEANING AND SANITATION

Component Removal and Installation Instructions for Cleaning

Shelves and Shelf Brackets (Upper Case)

1. Open door and remove product from shelves.
2. Push shelves back and then lift up and out to remove them from the shelf brackets. Carefully remove shelves through the door openings.
3. Remove shelf brackets from slots in rear uprights.
4. After cleaning, replace in reverse order.

Bottom Trays

1. Remove product from the case and remove shelves and shelf brackets from the upper case, see this page.
2. Grasp and lift out each of the bottom trays from the case interior and carefully remove through the door openings or from the lower case.
3. After cleaning, replace in reverse order.

NSF Product Thermometer

1. On upper case, remove two screws and product thermometer access panel from right top location in the case.

On lower case, remove four screws and product thermometer bracket assembly from right rear location in the case.
2. After cleaning, replace product thermometer access panel and/or product thermometer bracket assembly and secure with mounting screws.

Front Air Ducts

1. Remove bottom trays, see this page.
2. On upper case, lift out front air duct sections and carefully remove through door openings.

On lower case, remove screws and front air duct panels from case.

3. After cleaning, replace air ducts, air duct panels and remaining components in reverse order.

Rear Duct Panels

1. On upper case, remove shelves and bottom trays, see above.

On lower case, remove bottom trays and discharge air honeycomb, see this page.

2. Remove mounting screws from rear duct panel.
3. Carefully remove rear duct panels through the door openings in upper case or from top opening in lower case.
4. After cleaning, replace in reverse order.

Discharge Air Honeycomb

1. On upper case, loosen screws securing rear retainer plate.

On lower case, remove screws and bottom retainer strip from rear interior of case.

NOTE

Note position of the honeycomb grid during removal so it can be reinstalled the same way.

2. On upper case, slide rear retainer plate back until the honeycomb grid sections can be removed from the top duct.

On lower case, remove honeycomb grid sections from rear of case.

CAUTION

Improper installation of the honeycomb grid section could result in improper air flow and/or poor refrigeration.

3. After cleaning, replace honeycomb grid sections as they were removed and secure with the rear retainer plate or bottom retainer strip and screws.

Top Duct (Upper Case)

1. Remove shelves and shelf brackets, see page 17.
2. Remove screws, rear retainer plate and honeycomb grid sections from top front of case, see page 17.
3. Remove screws and top duct from case.
4. After cleaning, replace top duct and remaining components in reverse order.

Front Cladding

1. Remove mounting screws, upper front cladding joint trim and upper front cladding from bottom of upper case.
2. Remove front kickplate and raceway cover from bottom of lower case.
3. Remove screws from bottom and top of lower front cladding and pull cladding down to remove it from behind the edge of the bumper retainer.
3. After cleaning, replace lower front cladding, upper front cladding and remaining front components in reverse order.

SERVICE INSTRUCTIONS

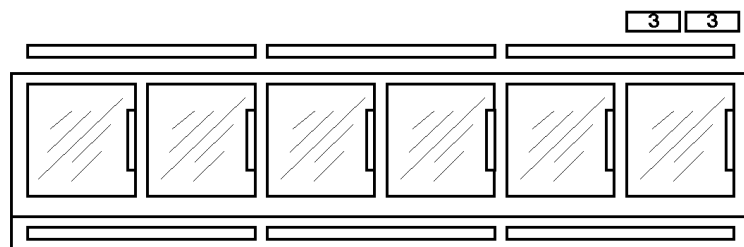
See "General-UL/NSF I&S Manual" for fan blade and motor replacement, color band and bumper replacement and raceway cover removal instructions.

Light Servicing

Ballast and Lighting Locations

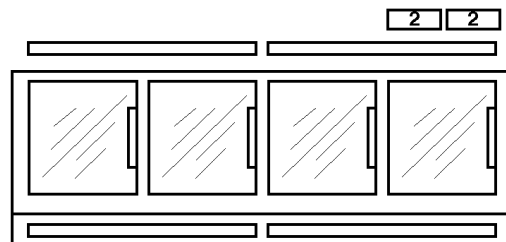
Horizontal T-8 Electronic Lighting

12' CASE



6 - T-8 48" BULBS
2 - 3-LAMP BALLASTS

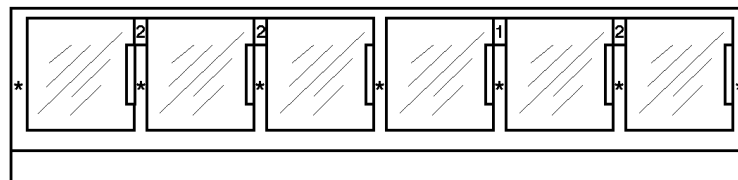
8' CASE



4 - T-8 48" BULBS
2 - 2-LAMP BALLASTS

Vertical T-8 Electronic Lighting

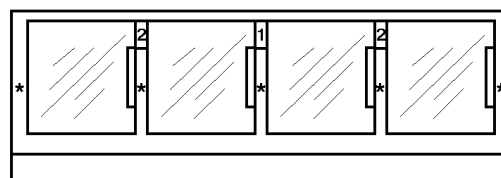
12' CASE



* - BULB LOCATIONS

7 - T-8 24" BULBS
3 - 2-LAMP BALLASTS
1 - 1-LAMP BALLAST

8' CASE



* - BULB LOCATIONS

5 - T-8 24" BULBS
2 - 2-LAMP BALLASTS
1 - 1-LAMP BALLAST

Lamp Replacement

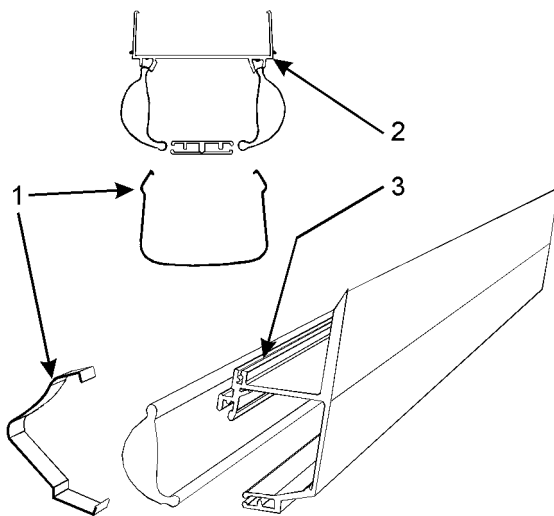
CAUTION

Shut off light switch or disconnect power supply before changing a lamp. Lighting system power and/or ballast surges can burn out adjacent lamps if power is left on.

NOTE

See "T-8 Lamp Replacement" in "General-UL/NSF I&S Manual" for canopy and/or open well lamp replacement instructions.

T-8 Electronic Vertical Lamp (Prism)

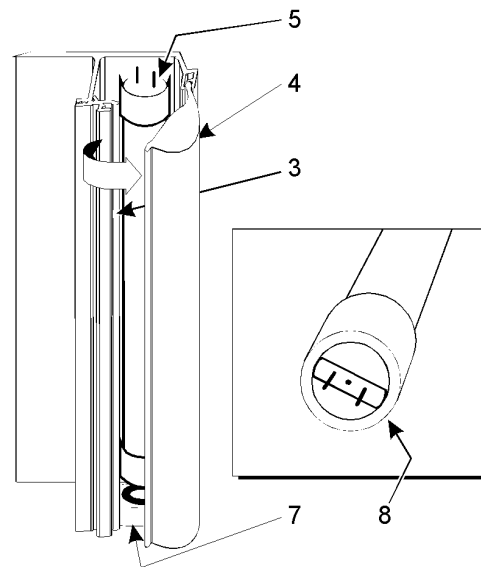


1. Carefully remove two steel clips (1) from mullion (2) and/or light fixture (3). Save clips for reinstallation.

NOTE

The light cover does not need to be completely removed to replace the lamp.

2. Separate light cover (4) from groove in light fixture (3) and swing light cover (4) into the case to expose the lamp (5).



3. Hold lamp (5) with fingers and twist to line up tabs on end of lamp (5) with slots in receptacles (7). Carefully remove lamp (5) from receptacles (7) and case.
4. Remove insulator tubes (8) from each end of lamp (5).

CAUTION

Foam end caps and insulator tubes must be properly installed. Improper installation of these components could decrease lamp efficiency and/or product life.

5. Install insulator tubes (8) on ends of new lamp (5).
6. Install new lamp (5) in receptacle slots (7) and carefully turn two clicks.
7. Make sure foam end caps (9) are in place above and below the receptacles (7).
8. Rotate light cover (4) over lamp (5) and snap into groove in light fixture (3).
9. While holding light cover (4) snugly against top of light fixture (3), snap two steel clips (1) into place.
10. Turn on the light switch or reconnect the power to the lights.

**Electronic Ballast Replacement
(Prism Lighting)**

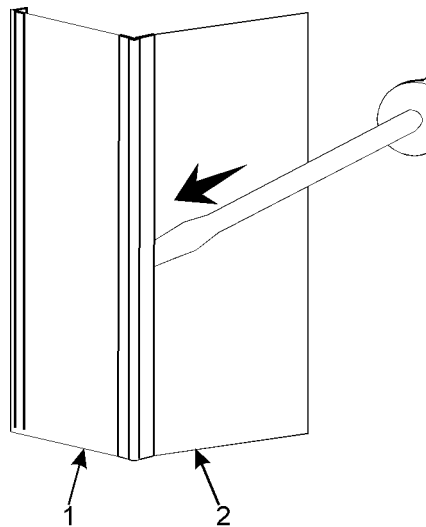
WARNING

Before replacing a ballast, make sure all power is off to the case. Electrical servicing should always be done by a qualified electrician. Improper servicing could result in product damage and/or personal injury.

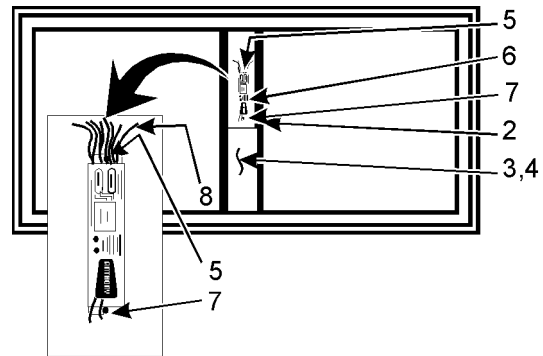
NOTE

Refer to T-8 ballast location page and wiring diagrams in this manual for specific model information.

1. Remove door following the door removal instructions in this manual.



2. Using a flat-headed screwdriver under the back edge of the contact plate retainer (1), gently pull up to unsnap both sides of retainer (1) from mullion (2).
3. Remove contact plate (3) and heat barrier (4) from mullion (2).



4. Remove screw (5) on top end of ballast (6). Slide ballast (6) up and out of punched tabs (7) in mullion (2).

NOTE

If wire leads are cut during removal, make sure to leave enough wire to reconnect a new ballast with a wire nut.

5. Disconnect or cut all wire leads (8) to ballast (6).
6. Insert bottom of new ballast (6) in bottom tabs (7) on mullion (2) and secure with screw (5) in top end of ballast (6).
7. Reconnect wire leads (8) to new ballast (6) following the wiring diagram on the new ballast (6).
8. Position heat barrier (4) in the mullion (3).
9. Position contact plate (3) flat on the mullion (2). While holding contact plate (3), insert retainer (1) into front edge of mullion (3), then snap retainer (1) into back edge of mullion (3). Repeat process to install retainer (1) on opposite side.
10. Replace door following the door installation instructions in this manual.
11. Reconnect power to the case.

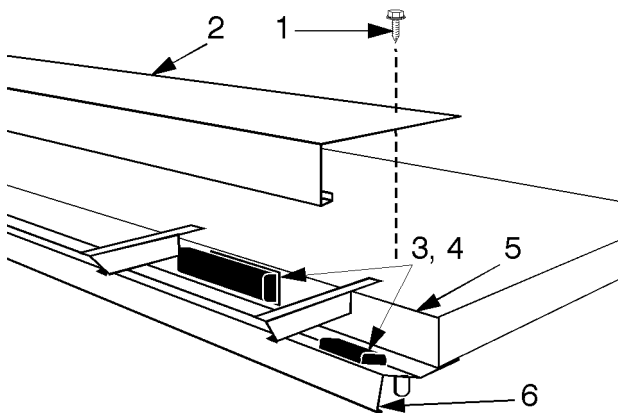
(Horizontal Lighting)

WARNING

Before replacing a ballast, make sure all power is off to the case. Electrical servicing should always be done by a qualified electrician. Improper servicing could result in product damage and/or personal injury.

NOTE

- Refer to ballast & lighting location page and wiring diagrams in this manual for specific model information.
- If wire leads are cut during removal, make sure to leave enough wire to reconnect a new ballast with a wire nut.



1. Remove the screws (1) and the canopy (2) from the front top of the case.
2. Remove four screws (3) and defective ballast (4) from front of top shelf (5) or top of light channel (6).
3. Disconnect or cut all wire leads to ballast (4).

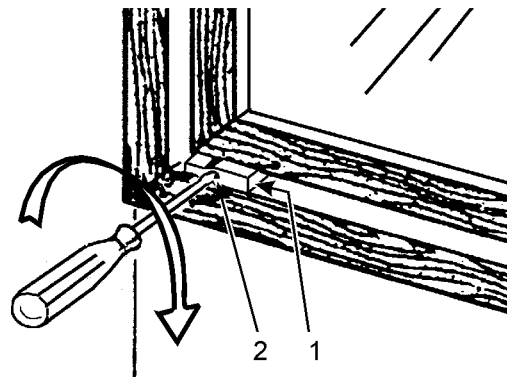
4. Install new ballast (4) on the top shelf (5) or light channel (6) with four screws (3).
5. Reconnect wire leads to new ballast (4) following the case lighting circuit wiring diagram in this manual.
6. Replace canopy (2) and secure with the screws (1).
7. Reconnect power to the case.

Upper Case Door Servicing

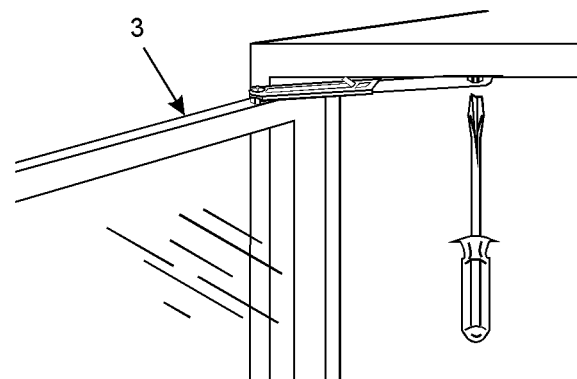
Door Removal

CAUTION

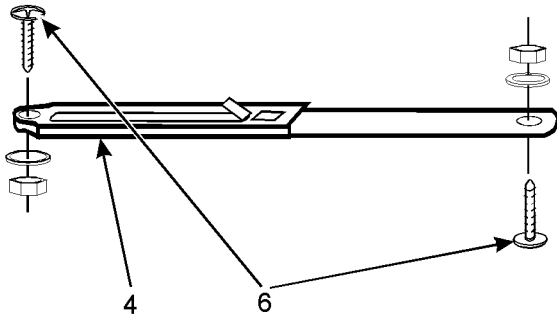
Before removing door, decrease torque tension clockwise to prevent possible damage to the door.



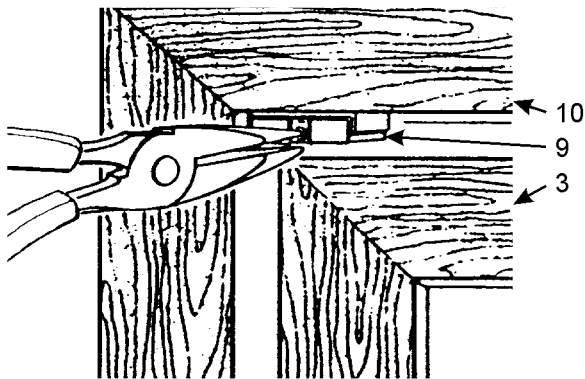
1. Release tension on Torquemaster™ (1) by turning screw (2) clockwise.



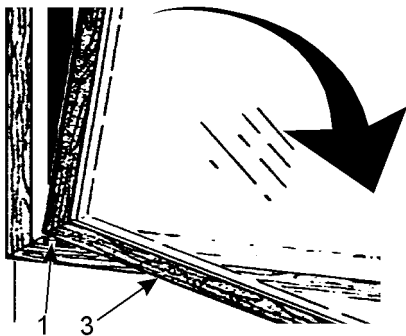
2. Open door (3) and lock into the hold-open position.



3. Remove two screws (6) and hold-open (4) from frame and door standoffs (7 & 8).

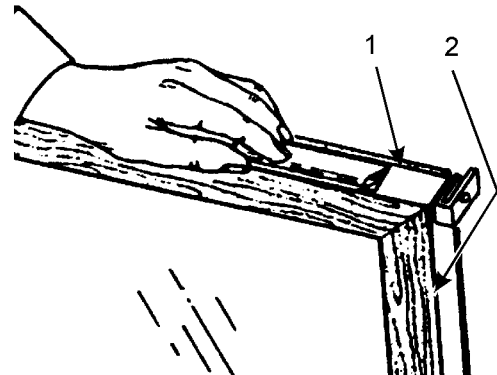


4. Compress and pull hinge pin plug (9) with needle nose pliers to release top of door (3) from frame (10).

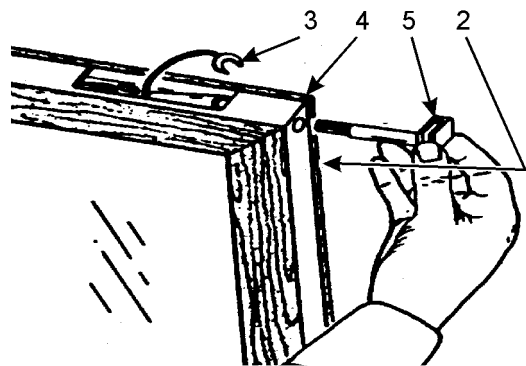


5. Lift door (3) out of Torquemaster™ (1) and remove from case. Place door (3) on its side and lean against a stable surface.

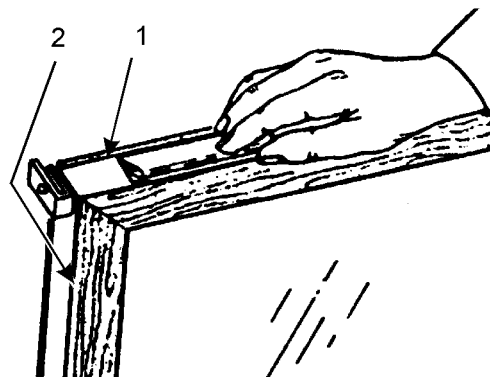
Reversing Door Hardware



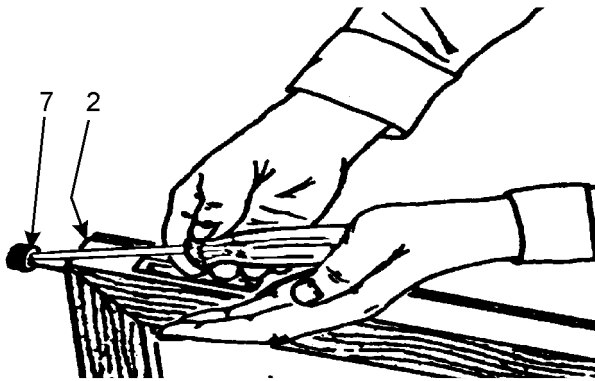
1. Remove hinge pin plug access covers (1) from both side of door (2).



2. Unplug connectors (3) to door and/or glass heater (4) and remove hinge pin plug (5) through top of door (2).
3. Reroute lead wires (6) to new hinge pin location in opposite end of door (2).

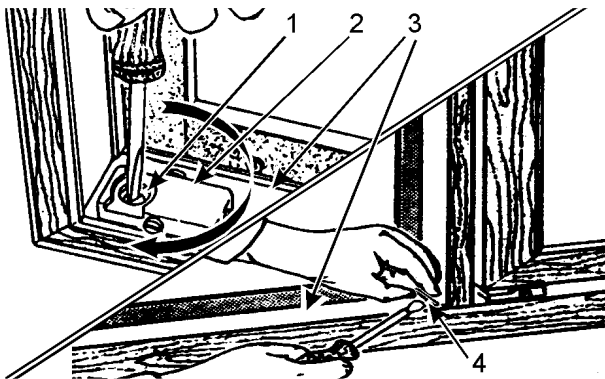


4. Install hinge pin plug (5) and attach connectors (3) to lead wires (6).
5. Carefully replace hinge pin plug access covers (1).

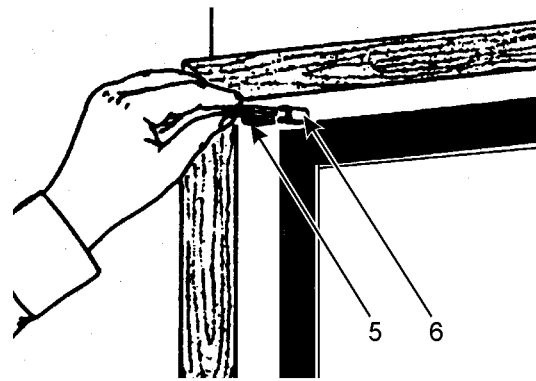


- Slide out torque rod (7) from bottom of door (2) and insert back into opposite end of door (2).

Reversing Frame Hardware

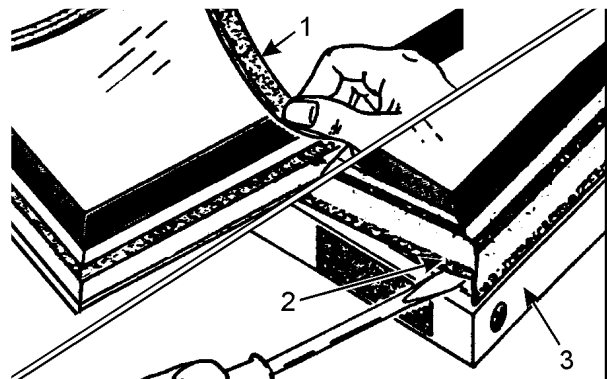


- Turn center screw (1) counter-clockwise and remove Torquemaster™ (2) from bottom door frame (3).
- Pry out cover plate (4) from opposite end of bottom door frame (3).
- Reverse positions and install Torquemaster™ (2) and cover plate (4) in bottom door frame (3).

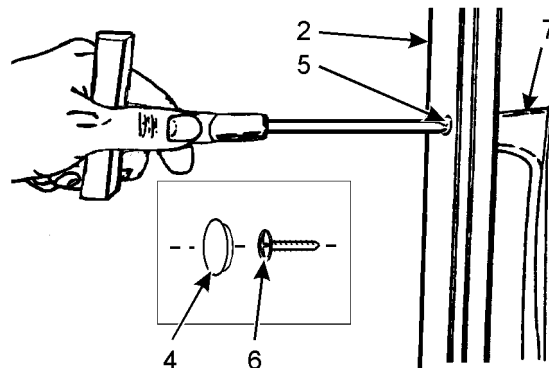


- Insert dummy plug (5) into old top hinge pin receptacle (6).

Door Handle Replacement



- Starting at a corner, remove the gasket (1) from retainer strip (2) on handle side of the door (3).
- Starting at corner, remove retainer strip (2) from handle side of door (3).



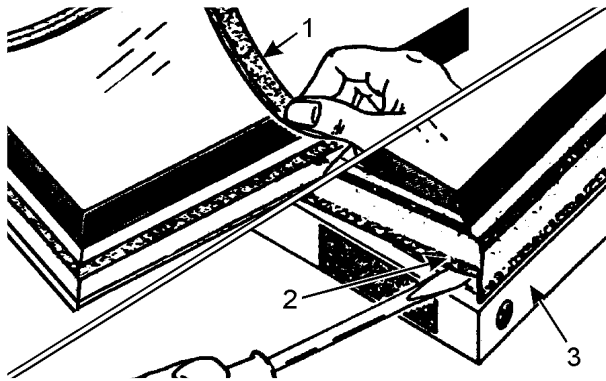
- Remove plastic hole plugs (4) from handle access holes (5).
- Using a 5/32" allen wrench, remove two screws (6) and handle (7) from door (2).
- Install new handle (7) in reverse order.

Door and Mullion Heater Replacement

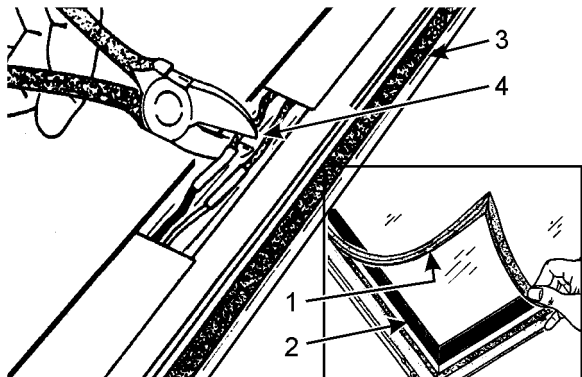
All glass door cases use the same door and mullion heaters. Medium and low temperature cases run different wattages through them. Low temperature cases also use electrically heated door glass. Mullion heaters are located in four different locations. Door frame heater is a full length wire in each door frame. Perimeter heater is a full length wire around the entire case frame. Threshold heater is a additional wire across the lower part of the case frame. Vertical heater has a separate heater and wire in each vertical mullion between the doors.

Door Heater

1. Remove door from case following the door removal instruction in this manual.



2. Starting at corner, remove gasket (1) from retainer strip (2).
3. Starting at a corner, remove all retainer strips (2) from the door (3).

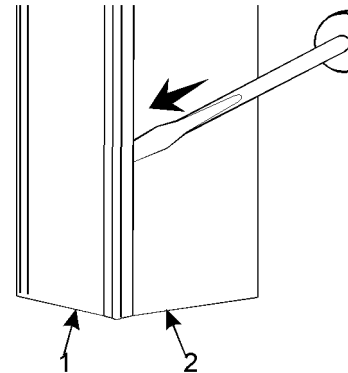


4. Disconnect or cut solid heater lead wire (4) and remove from door (3). Insert and connect new solid lead wire (4) in door (3).

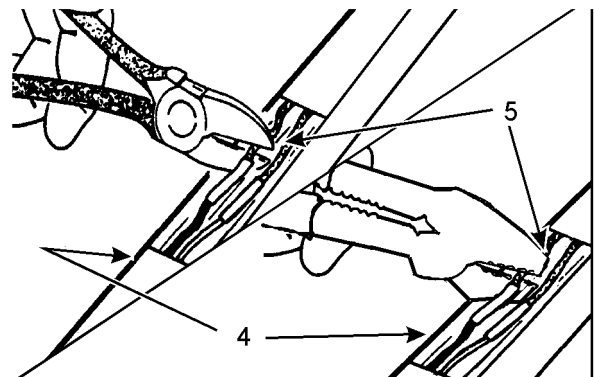
5. Replace retainer strips (2) and gasket (1) on the door (3).
6. Replace door on case following the door installation instructions in this manual.

Mullion Heater

1. Remove necessary door(s) following the door removal instructions in this manual.



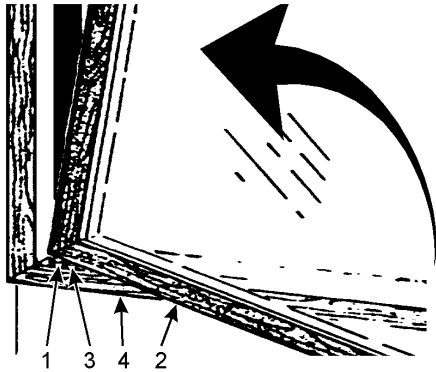
2. Using a screwdriver, remove necessary contact plate retainers (1) and contact plates (2) and heat barriers (3), where applicable, from mullions (4) to expose heater wire(s). Vertical wire requires removal of vertical contact plate and two adjacent top contact plates. Threshold wire requires removal of bottom and end contact plates. Perimeter wire requires removal of all contact plate (top, bottom, end, and center).



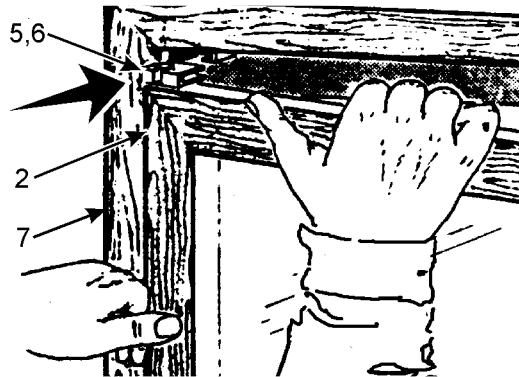
3. Disconnect or cut defective heater wire (5) and remove from mullion (4).
4. Connect and install new heater wire (5) in mullion (4).

5. Replace heat barriers (3), where applicable, and contact plates (2) and contact-plate retainers (1) on mullions (4)
6. Replace door(s) following the door installation instructions in this manual.

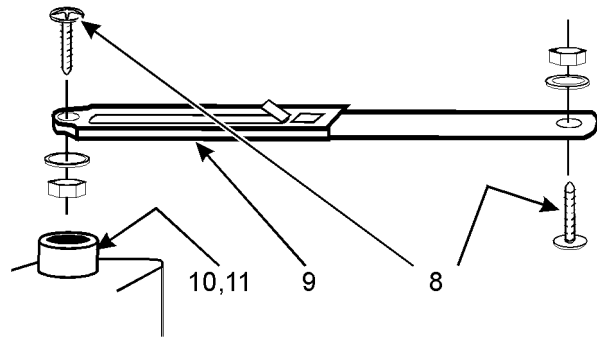
Door Installation



1. Insert door torque rod (1) on bottom of door (2) into Torquemaster™ (3) at base of door frame (4).



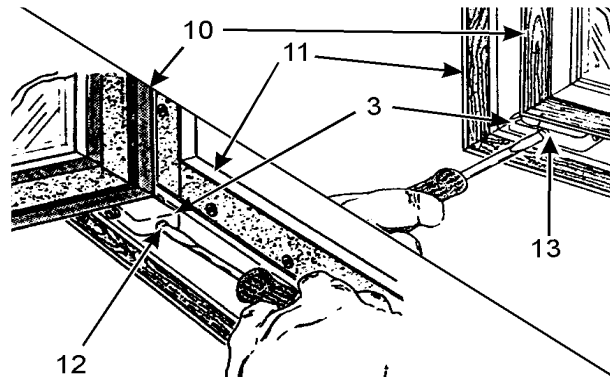
2. Insert hinge pin plug (5) on top of door (2) into hinge pin plug receptacle (6) at top of door frame (7). Push in top of door (2) until hinge pin plug (5) snaps into place.



3. Apply loctite to threads of two screws (8).
4. Install hold-open (9) on door and frame standoffs (10 & 11) and secure with two screws (8). **Do not overtighten the screws.**

NOTE

- Do not use power tools to adjust the Torquemaster™.
- When Torquemaster™ is properly adjusted, the door will securely close without slamming. Over adjusting will cause the door to slam during closing.



5. Align door (10) in frame (11) by adjusting screw (12) on side of Torquemaster™ (3).
6. Adjust closing force by turning the screw (13) on the front of the Torquemaster™ (3). Turn screw (13) counter-clockwise to increase, or clockwise to decrease the closing force.

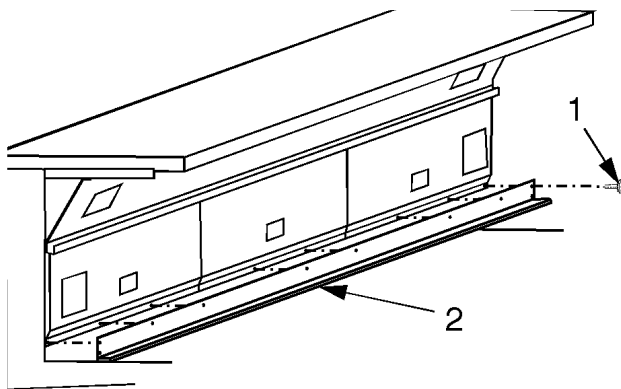
Case Defrost & Dan Pan Heater Replacement

WARNING

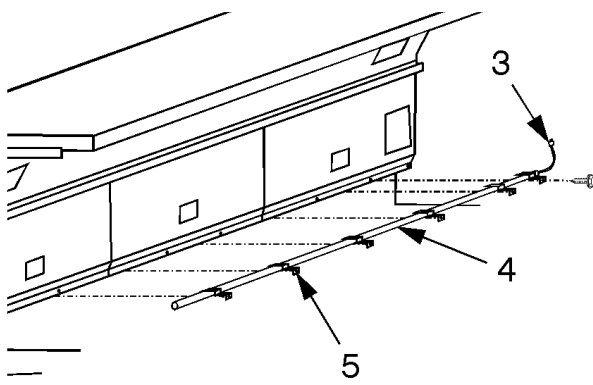
Before replacing defrost or drain pan heater, shut off electrical power to the case to avoid personal injury and/or death.

Upper Case Electric Defrost Heater

1. Open doors and remove bottom trays from case.



2. Open doors and remove screws (1) and lower back panel (2) from rear of case.

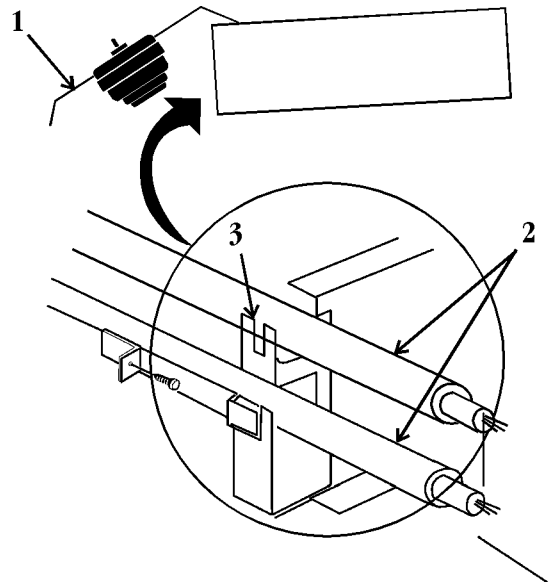


3. Disconnect heater wire (3) from terminal block behind back panel.
4. Remove defective heater (4) from mounting brackets (5).
5. Install new heater (4) in reverse order.
6. Connect heater wire (3) to terminal block behind back panel.

7. Install lower back panel (2) with screws (1) and replace bottom trays in case.
8. Restore electrical power to the case.

Lower Case Electric Defrost Heater

1. Remove screens and bottom trays from case.



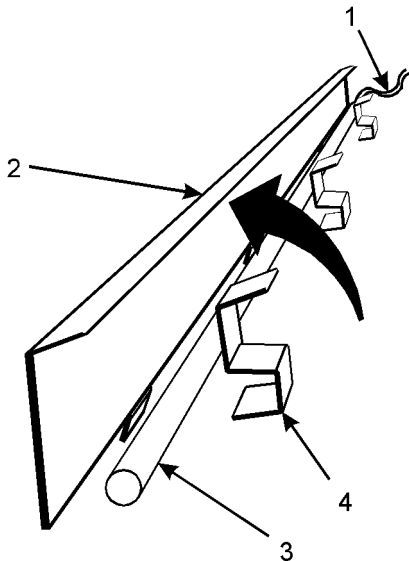
2. Unclip and lift up fan plenum (1).
3. Disconnect defective defrost heater (2) and remove from mounting clips (3) and case.
4. Install new defrost heater (2) in reverse order.
5. Restore electrical power to case.

Lower Case Drain Heater

1. Remove screens and bottom trays from case.

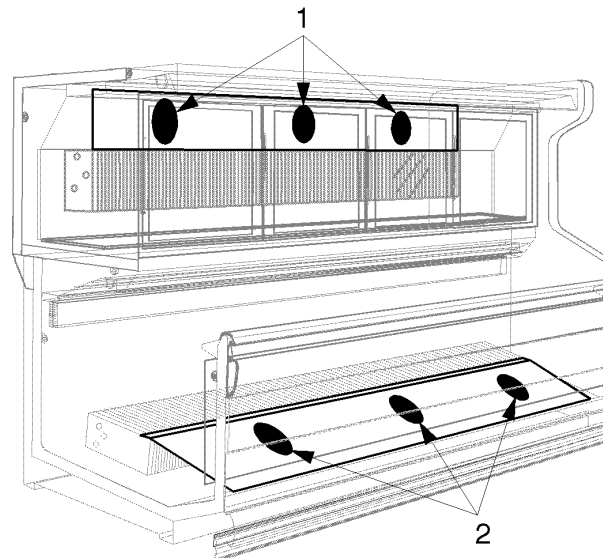
NOTE

Note the positioning of the drain heater wires before disconnecting for proper installation of the new heater.



2. Disconnect drain heater wires (1) at the wire nut connections in the bottom of the case.
3. Lift up drain trap heater support (2) and remove defective drain heater (3) from mounting brackets (4).
4. Install new drain heater (3) in mounting brackets (4) and lower drain trap heater support (2).
5. Connect heater wires (1) as removed and secure with wire nuts at connections.
6. Install bottom trays and screens in case.
7. Restore electrical power to the case.

Fan Locations and Access



The upper case fans (1) are located behind the slanted upper panel. Remove the upper panel to access the upper case fan panel. The lower case fans (2) are located in the bottom of the lower well. Remove the bottom trays to access the lower case fan panel.

See "General-UL/NSF I&S Manual" for fan blade and motor replacement instructions.

Anti-Sweat Replacement

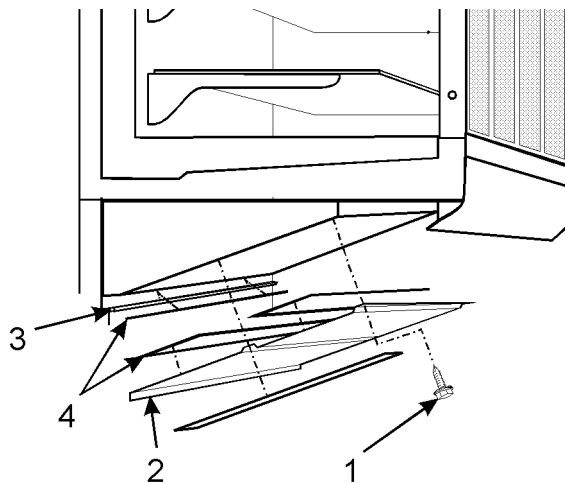
WARNING

Shut off or disconnect power supply to case before changing an anti-sweat. Electrical power from wire ends could damage other components and/or cause personal injury or death.

NOTE

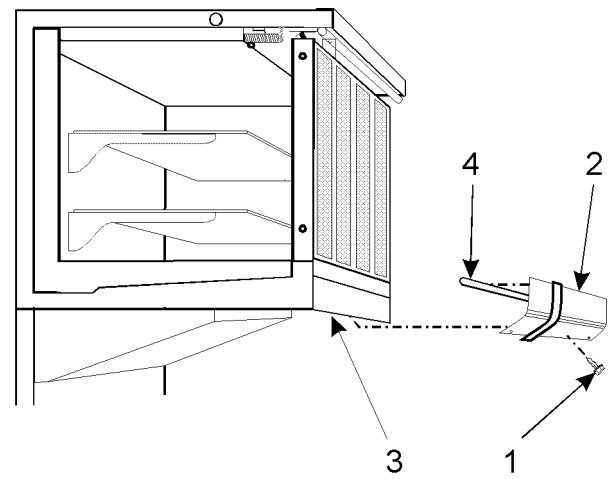
See "Upper Case Door Servicing" section in this manual for upper case anti-sweat replacement instructions.

Deflector Panel & Discharge Air Grid Anti-Sweats (N2FL/N2CL)



1. Remove screws (1) and slanted deflector panels (2) from area above the lower case discharge air grid (3).
2. Disconnect or cut the defective anti-sweat wire (4) from the case wires. There are two anti-sweat wires on the back of the slanted deflector panels and one anti-sweat wire on top of the discharge air grid support.
3. Remove and replace the aluminum tape and defective anti-sweat wire (4) from slanted deflector panels (2) or top of discharge air grid support assembly (3).
4. Reconnect the anti-sweat wire (4) to case wires and replace the slanted deflector panels (2).

Upper Front Cladding Anti-Sweat (N2FGU)

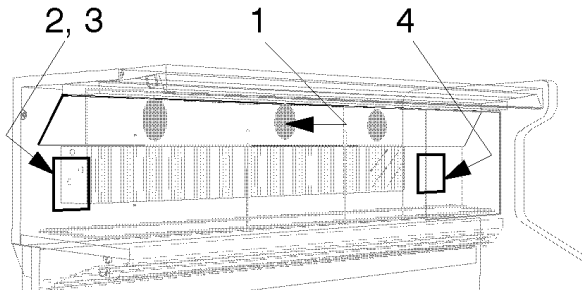


1. Remove screws (1) and upper front cladding (2) from bottom of upper case (3).
2. Disconnect or cut the defective anti-sweat wire (4) from the case wires.
3. Remove and replace the aluminum tape and defective anti-sweat wire (4) from back of upper front cladding (2).
4. Reconnect the anti-sweat wire (4) to case wires and replace the upper front cladding (2) and screws (1).

Optional Sensor Locations and Access

This case can be equipped with up to eight different sensors, four for the upper case and four for the lower case. The sensors monitor discharge air, coil in, coil out temperatures and defrost termination.

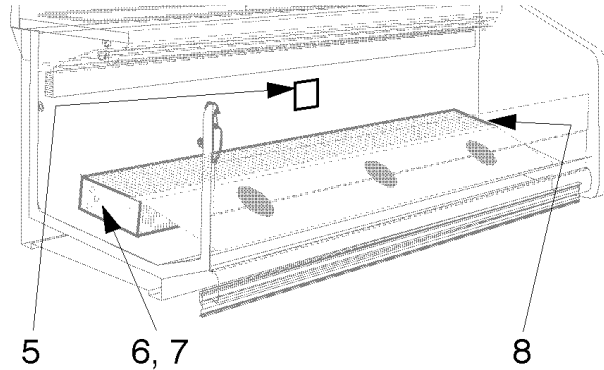
The upper case sensor locations:



1. Discharge air is located on the back wall behind the center fan assembly. It can be accessed by removing the slanted upper panel and the center fan assembly.
2. Coil in is located on the left end of the coil accessed thru the back panel .

3. Coil out is located on the left end of the coil accessed thru the back panel .
4. Defrost termination is on the right end of the coil accessed thru the back panel.

The lower case sensor locations:



5. Discharge air located on back of center access cover.
6. Coil in is located on left end of coil under the lower tray.
7. Coil out is located on left end of coil under the lower tray.
8. Defrost termination is located on the right end of the coil under the lower tray.

PARTS INFORMATION

Operational Parts List

<u>Desc. (Domestic & Export)</u>	<u>UPPER CASE</u>		<u>LOWER CASE</u>	
	<u>4DR</u>	<u>6DR</u>	<u>8'</u>	<u>12'</u>
Electric Defrost Heater	5199301	5199302	5960934*	5960935*
Electric Defrost Term. Klixon	5125211	5125211	5125211	5125211
Electric Defrost Fan Delay Klixon	5236993	5236993	-----	-----
Opt. Gas Defrost Fan Delay Klixon	5125211	5125211	5125211	5125211
Opt. Gas Defrost Term. Klixon	5023508	5023508	5023508	5023508
Electric Drain Pan Heater**	-----	-----	5236462	5236465

Cladding and Trim Parts List

<u>Item</u>	<u>Description</u>	<u>8' / 4DR</u>	<u>12' / 6DR</u>
1	Bumper End Trim	color per order	
2	Upper Front Cladding, Painted	5968090	5968091
3	Bumper Retainer/Hand Rail	color per order	
	Screw	9025833 (18)	9025833 (26)
4	Color Band, Painted	9020981	9020982
5	Bumper	color per order	
6	Lower Front Cladding, Painted	9025209	9025210
	Cladding Retainer	9300197 (4)	9300197 (4)
	Screw	5183536 (8)	5183536 (8)
7	Raceway Cover	color per order	
8	Kickplate	color per order	
	Screw	5183536 (6)	5183536 (8)
9	Raceway Cover Retainer	9300600 (4)	9300600 (6)
	Screw	5183536 (4)	5183536 (6)
10	Kickplate Support Assy.	9042341 (3)	9042341 (4)
	Shoulder Screw	9025833 (12)	9025833 (16)
11	Raceway Cover Backer	color per order	
12	Raceway Cover End Trim	color per order	
13	Raceway	9300218	9300219
	Screw	5183536 (18)	5183536 (18)
	Raceway Support	9041321 (6)	9041321 (8)
	Raceway CVR Support	9041325 (6)	9041325 (8)
	Screw	5183536 (12)	5183536 (16)
14	RH End Close-off, Painted	9030856	9030856
	LH End Close-off, Painted	9030855	9030855
	Screw	5048626 (4)	5048626 (4)
15	Bumper Backer	color per order	
16	Horizontal Joint Trim	5127503	5127503
17	Color Band Backer, Painted	9025982	9025982
18	Hand Rail Backer	9025316	9025316
19	Front Duct Joint Trim	5203017	5203017
	Screw	5105037 (4)	5105037 (4)
20	Upper Front Cladding Joint Trim, Painted	5217592	5217592
	Screw	5205439 (4)	5205439 (4)

<u>Item</u>	<u>Description</u>	<u>8' / 4DR</u>	<u>12' / 6DR</u>
21	Rear Riser Joint Trim	5945062	5945062
	Rivet	5104702 (6)	5104702 (6)
22	Door Joint Trim	5967778	5967778
	Binding Screw	5222637 (2)	5222637 (2)
23	Light Channel Joint Trim	5217606	5217606
24	Screw	5205439 (8)	5205439 (8)
25	Canopy Joint Trim, Painted	5646488	5646488
26	Hood Canopy, Painted	5967715	5967716
27	Screw	5619204 (8)	5619204 (12)

