

TYLER
REFRIGERATION



Carrier

A United Technologies Company

A series
Advantage

Installation & Service Manual



NVM, NVF, NVD

**FIXED VERTICAL GLASS MEAT/SEAFOOD/DELI SERVICE MERCHANDISERS
Medium Temperature Service Display 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 - 2003.

PRINTED IN U.S.A.	Specifications subject to change without notice.	REPLACES EDITION	11/05	ISSUE DATE	4/07	PART NO.	9043541	REV.	B
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The following Medium Temperature Fixed Vertical Glass Meat, Seafood and Deli Service Merchandiser models are covered in this manual:

MODEL	DESCRIPTION
NVM	6', 8' & 12' FIXED VERTICAL GLASS GRAVITY COIL MEAT SERVICE MERCHANDISER
NVF	6', 8' & 12' FIXED VERTICAL GLASS GRAVITY COIL SEAFOOD SERVICE MERCHANDISER
NVD	6', 8' & 12' FIXED VERTICAL GLASS FORCED AIR DELI SERVICE MERCHANDISER

NVM/NVF Fixed Vertical Glass Gravity Service Merchandisers NVD Fixed Vertical Glass Blower Service Merchandisers

Refrigeration Data:

MODEL	CASE LENGTH	CASE USAGE	CAPACITY (BTUH / FT)		EVAPORATOR (°F)	UNIT SIZING (°F)	DISCHARGE AIR		AVG. REF. CHARGE (LBS/FT)
			PARALLEL	CONVENTIONAL			TEMPERATURE (°F)	VELOCITY (FPM)	
NVM	ALL	Meat / Fish	195*	293*	+13**	+11	N/A	N/A	0.83
NVF	ALL	Fish (Iced)	178*	266*	+20**	+18	N/A	N/A	0.39
NVD	ALL	Deli	368*	551*	+15**	+13	30	325***	0.52

* Capacity data listed for cases with 1 row of T-8 top lights. ADD 20 BTUH/FT for each lighted mezzanine shelf.

For sizing all refrigeration equipment other than TYLER, use conventional BTUH values.

** Evaporator temperature is based on the saturated pressure leaving the case.

*** Air velocity measured 1 hour after defrost at the vertical part of the Rear Duct.

FOR SPECIFIC COMPRESSOR SIZING INFORMATION, REFER TO TYLER APPLICATIONS FOR RACK SYSTEM COMPRESSORS AND/OR THE COMPRESSOR MANUFACTURERS FOR SINGLE COMPRESSORS. FOR LINE SIZING INFORMATION, REFER TO THE MISCELLANEOUS SECTION "BUFF" IN THE TYLER SPECIFICATION GUIDE.

Electrical Data:

Fans (120 Volt)

MODEL	CASE LENGTH	FANS / CASE	TOTAL STANDARD FANS		TOTAL ECM FANS	
			AMPS	WATTS	AMPS	WATTS
NVM	4'	N/A	N/A	N/A	N/A	N/A
NVM / NVF	6'	N/A	N/A	N/A	N/A	N/A
NVM / NVF	8'	N/A	N/A	N/A	N/A	N/A
NVM / NVF	12'	N/A	N/A	N/A	N/A	N/A
NVD	6'	2	0.68	60.4	0.44	22.0
NVD	8'	2	0.68	60.4	0.44	22.0
NVD	12'	3	1.02	90.6	0.66	33.0

T8 Lighting with Electronic Ballasts (120 Volt)

MODEL	CASE LENGTH	CANOPY LIGHTS		SHELF LIGHTS - PER ROW				MAXIMUM LIGHTING *	
		AMPS	WATTS	AMPS		WATTS		AMPS (3 ROWS)	WATTS (3 ROWS)
				1 ROW	2 ROWS	1 ROW	2 ROWS		
NVM	4'	0.35	42.0	0.35	0.50	42.0	60.0	0.85	102.0
NV(M/F/D)	6'	0.40	48.0	0.40	0.80	48.0	96.0	1.20	144.0
NV(M/F/D)	8'	0.50	60.0	0.50	1.00	60.0	120.0	1.50	180.0
NV(M/F/D)	12'	0.70	84.0	0.70	1.40	84.0	168.0	2.10	252.0

* For cases with 1 row of canopy lights and 2 rows of shelf lights.

Defrost Data:

DEFROST TYPE	DEFROSTS PER DAY	DURATION TIME (MIN)	TERMINATION TEMP. (°F)	BACKUP PRESSURE SETTINGS *		EPR SETTINGS **		DEFROST WATER (LB / FT / DAY)
				CUT IN	CUT OUT	R22 (PSIG)	R404A (PSIG)	
TIME OFF - NVM / NVF	1	110	N/A	34# @ R22	24# @ R22	36	47	N/A
TIME OFF - NVD	1	46	N/A	34# @ R22	24# @ R22	36	47	N/A

* Used with electronic thermostat and EPR control.

** Set EPR to give this pressure at the case.

CASE-TO-CASE SUCTION LINE SUB-FEED BRANCH SIZING FOR CASE LINE-UPS (R-22 REFRIGERANT)												
MODEL	4'	6'	8'	12'	16'	20'	24'	28'	32'	36'	40'	44'
NVM	3/8"	3/8"	3/8"	3/8"	1/2"	1/2"	1/2"	1/2"	5/8"	5/8"	5/8"	5/8"
NVF	N/A	3/8"	3/8"	3/8"	3/8"	1/2"	1/2"	1/2"	1/2"	1/2"	5/8"	5/8"
NVD	N/A	3/8"	3/8"	1/2"	1/2"	5/8"	5/8"	5/8"	5/8"	7/8"	7/8"	7/8"

CONVENIENCE OUTLET CIRCUIT: One single convenience outlet is on the back of the 4' and 6' cases and two single convenience outlets are on the back of the 8' and 12' cases. Plan suitable 15A circuits for these 120V outlets.

An evaporator Pressure Regulator should be installed on each system to aid in temperature control. Set the EPR for 36 PSIG (R22).

Shelves not recommended in gravity coil cases since they disrupt airflow and compromise performance. Blower style cases may use shelving.

Pressure control settings shown in the above table are for backup purposes only. The actual temperature control should be set by the thermostat.

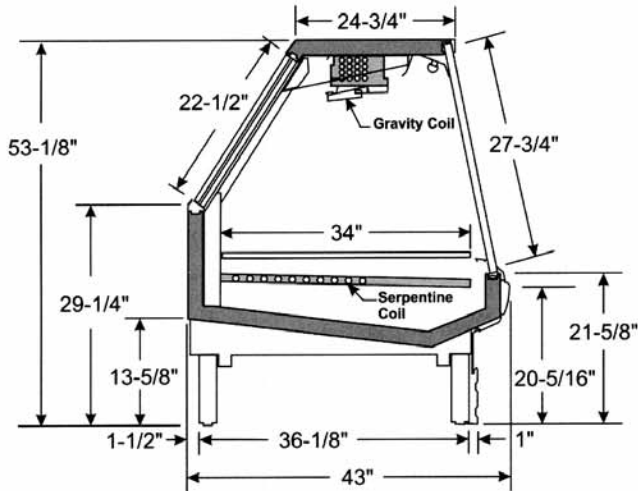
NVM setting for this case = CUT IN @ 32°F and CUT OUT @ 22°F. NVF setting for this case = CUT IN @ 34°F and CUT OUT @ 33°F. NVD setting for this case = CUT IN @ 31°F and CUT OUT @ 24°F.

NSF CERTIFIED to meet ANSI/NSF - 7.

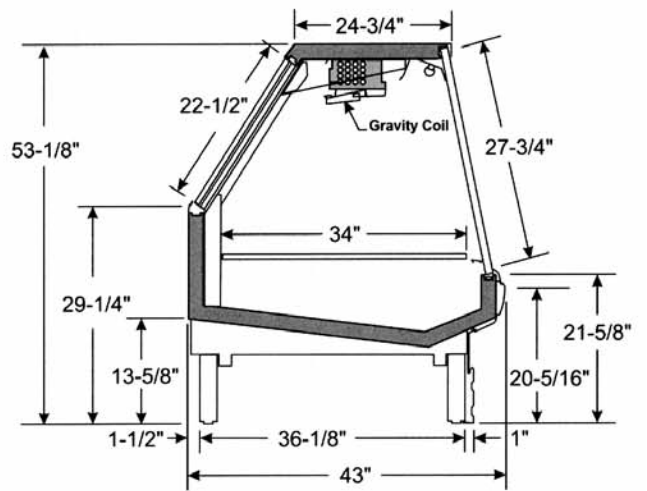
CASE BTUH REQUIREMENTS are calculated to produce approximately the indicated performance with absolute maximum operating ambient limits of 75°F & 55RH.

The information contained herein is based on technical analysis and/or tests performed in a controlled lab environment that are consistent with industry practices, and is intended as a reference for system sizing and configuration purposes only and for use by persons having technical skill at their own discretion and risk. Conditions of use are outside of Tyler's control and we do not assume and hereby disclaim any liability for results obtained or damages incurred through application of or reliance on the data presented, including but not limited to specific energy consumption with any particular model or installed application. SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

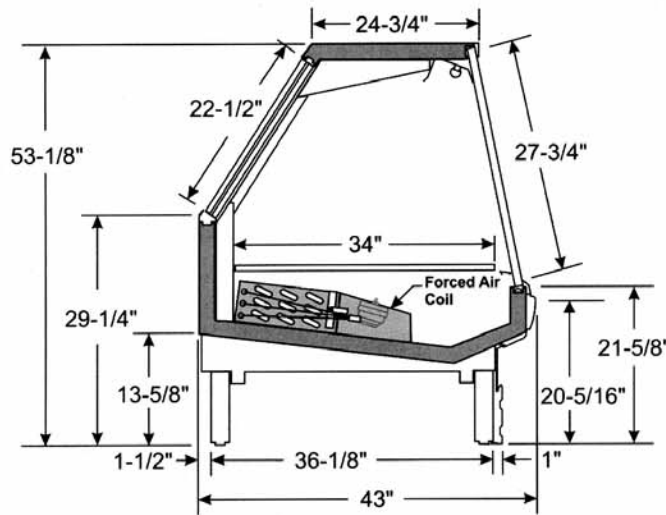
NVM CROSS SECTION



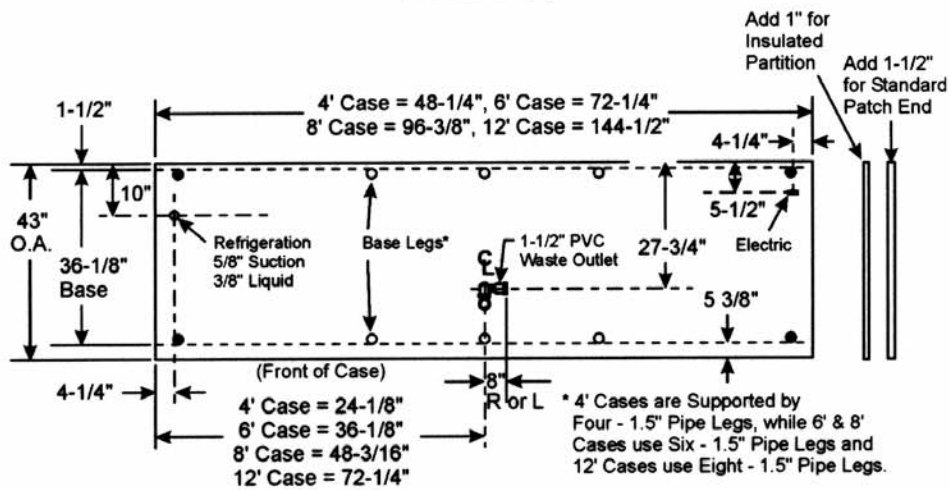
NVF CROSS SECTION



NVD CROSS SECTION



FLOOR PLAN



INSTALLATION PROCEDURES

Carpentry Procedures

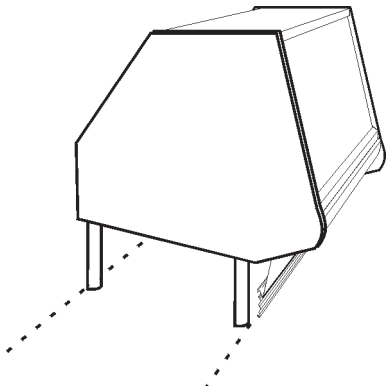
Case Line-Up

Before starting the case line-up, review the store layout floor plans 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.
- Do not walk on the tops of these cases. Tops of cases are not designed to support the weight of a human being.

Improper handling of these cases could result in personal injury.



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

NOTE

Front and rear edges of legs should always be used to line-up cases. All case legs have built-in adjustment capabilities.

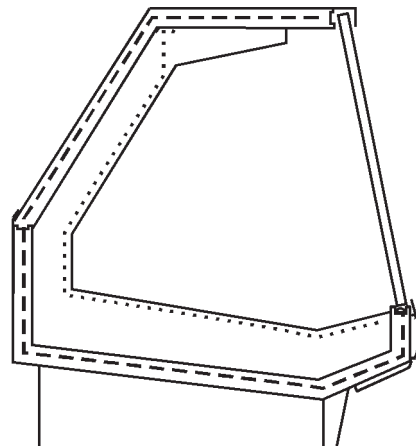
2. After rolling the case to approximate installation location, lift case one end at a time to remove the casters and install the legs. Make sure legs are completely threaded into the base to properly secure them. Thread out bottom leg insert, up to 1 1/2", to level the case. Check leveling across the top of the case .

CAUTION

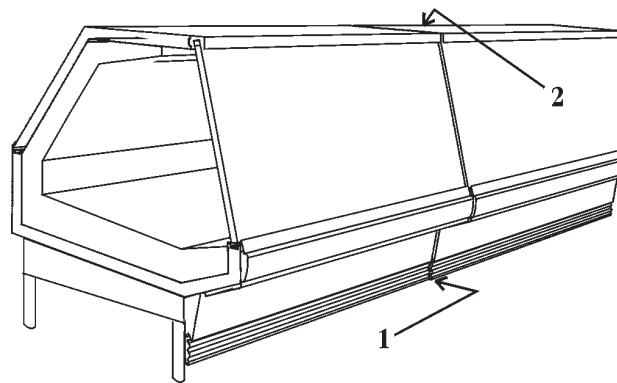
If the case is not completely level, the case could warp when loaded and possibly break the glass.

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!



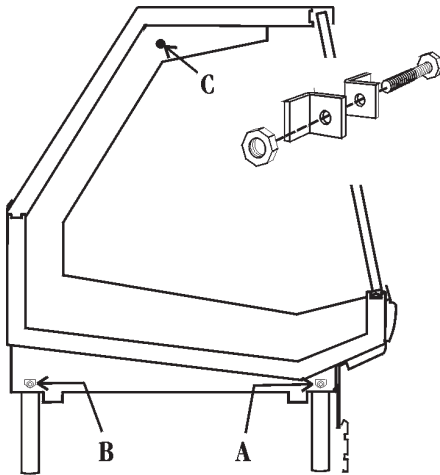
3. Apply two heavy beads of caulking compound from the Filler Kit to the end of case at dotted (. . .) and dashed (- - -) lines. Proper caulking provides good case refrigeration and sanitation.



4. Push cases tightly together making sure the pull-ups are aligned.
5. Adjust leg inserts (1) to align the front and rear pull-ups. Check leveling at top of the case (2).

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.

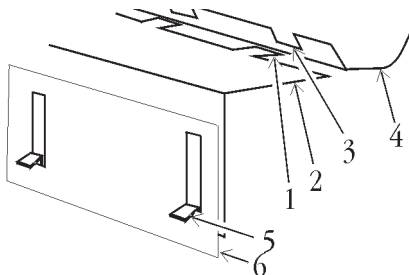


- Position pull-up bolts and mounting hardware at pull-up locations (A, B, and C). Do not tighten any pull-up hardware until all of it has been installed. Tighten all pull-up hardware equally starting at point A and finishing at point C. **Do not overtighten.**

Lower Cladding and Trim Installation

NOTE

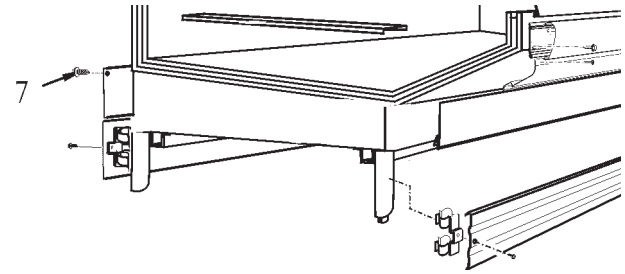
Lower cladding, kickplate, trims and hardware are shipped loose. Make sure all plumbing and electrical work is complete before installing these components.



Front Lower Cladding

Install top tabs (1) on front lower cladding (2) in slots (3) in bottom of front upper cladding (4) and rear tabs (5) in mounting holes in front of frame assembly (6). Make sure all tabs are securely fit into each slot.

Rear Rail Cover Installation



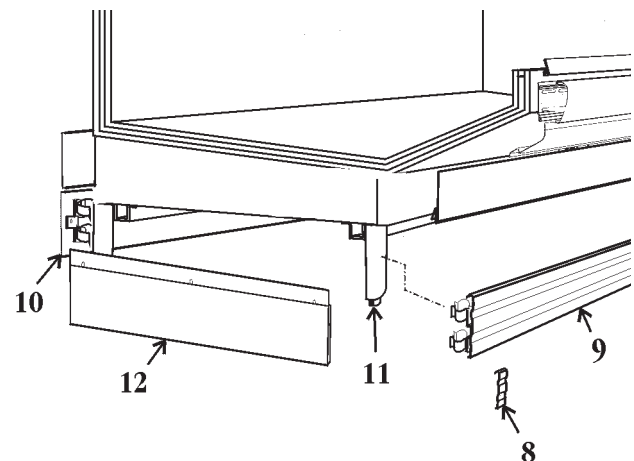
Position rear rail cover (7) over rear raceway opening and secure with screws in every hole.

Bottom and End Close-off Installation

Kickplate, optional rear bottom and end closeoffs have spring clips on the back side that secure to the pipe legs.

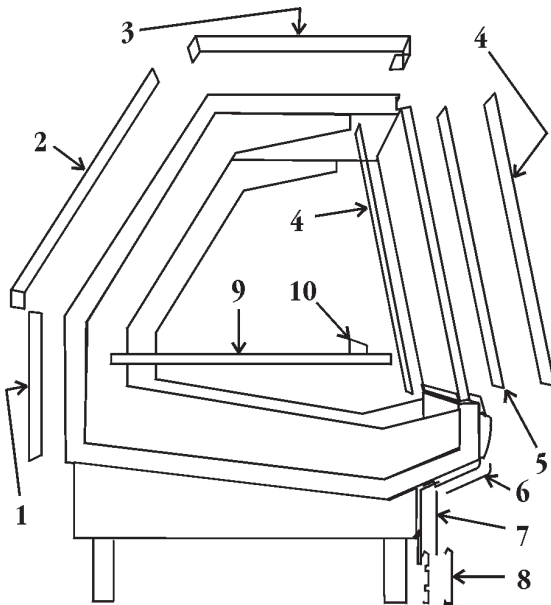
NOTE

Optional rear bottom close-offs do not require joint trim.



- Before installing kickplates on a multiple case lineup, snap a joint trim (8) over the top and bottom of one end of each kickplate (9).
- Lineup each kickplate (9) and/or optional rear bottom close-off (10) and push to se-cure the spring clips to the legs (11).
- Slide joint trims (8) over the case-to-case joints.
- Position end close-offs (12) over the end of the kickplate (9) and/or optional rear bottom close-off (10) and push until the spring clips secure to the legs (11).

Trim & NSF Thermometer Installation



The joint trim and mounting hardware are shipped loose. Trim includes rear lower joint trim (1), rear upper joint trim (2), top joint trim (3), outer and inner glass joint trim (4), compound tape (5), upper cladding joint trim (6), lower cladding joint trim (7), kickplate joint trim (8) and horizontal joint trim (9).

Horizontal joint trim covers gaps between the cases. The trim is glued onto the shipping cardboard. Apply trim with notch side towards front of case, after running beads of caulking on edges of the cases. Sheet metal screws can be used for additional securing.

NOTE

Compound sealing tape can be added to inside surfaces of inner and outer glass joint trim to make the trim level and even.

Glass joint trim pieces are secured to inside and outside of glass joint with compound tape.

Patch end trim is shipped factory installed. The compound tape has already been installed under the trim. Check and/or trim any exposed compound tape.

The NSF product thermometer and bracket assembly (10) is shipped loose with the case.

After removing the thermometer and bracket assembly from the shipping packaging,

position bracket over left horizontal joint trim and case-to-case joint where the joint trim is notched out. Make sure the bracket is positioned to the front of the case, flush with the top and left edge of the bottom case end welds. Secure thermometer bracket with two screws in the pre-drilled holes.

See “General-UL/NSF I&S Manual” for bumper and color band installation and alignment.

Refrigeration Procedures

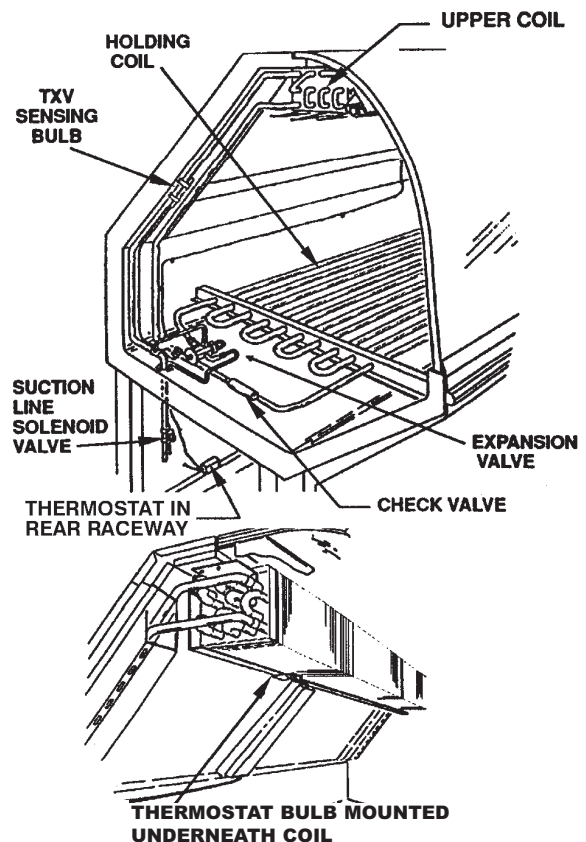
Refrigeration system and superheat instructions can be found in the “General-UL/NSF I&S Manual”. Service case temperature control information is listed below.

Temperature Control

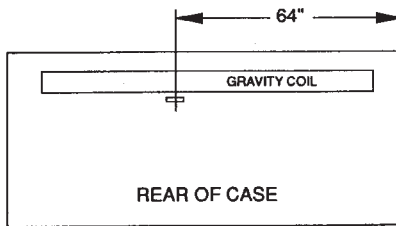
The temperature of each case is controlled with a thermostat and suction line solenoid. One thermostat and one solenoid are required for up to three cases.

The NVM, NVF and NVD cases use an electronic thermostat for improved temperature control.

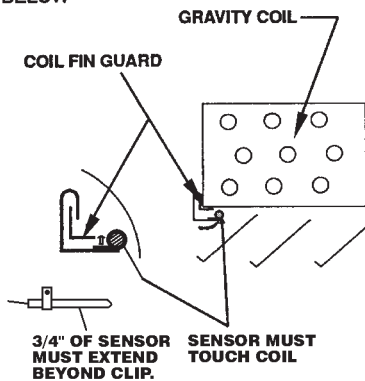
Typical Service Case with Gravity Coil



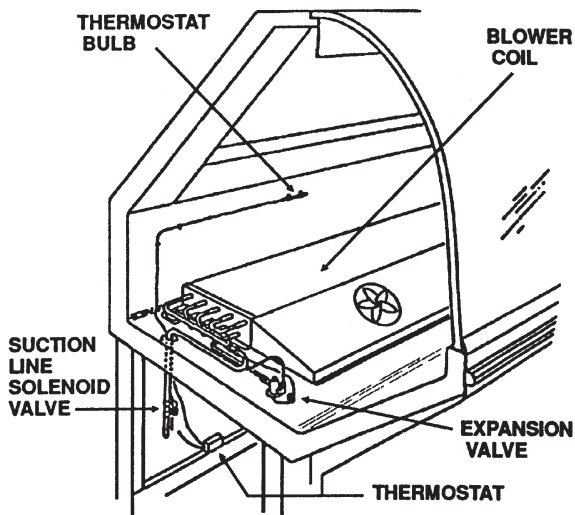
THERMOSTAT BULB PLACEMENT



** 64" APPLIES TO 8 & 12 FOOT CASES ONLY. LOCATE APPROXIMATELY IN CENTER OF CASE FOR 6 FOOT CASES. HOOK ONTO COIL FIN GUARD AS SHOWN BELOW



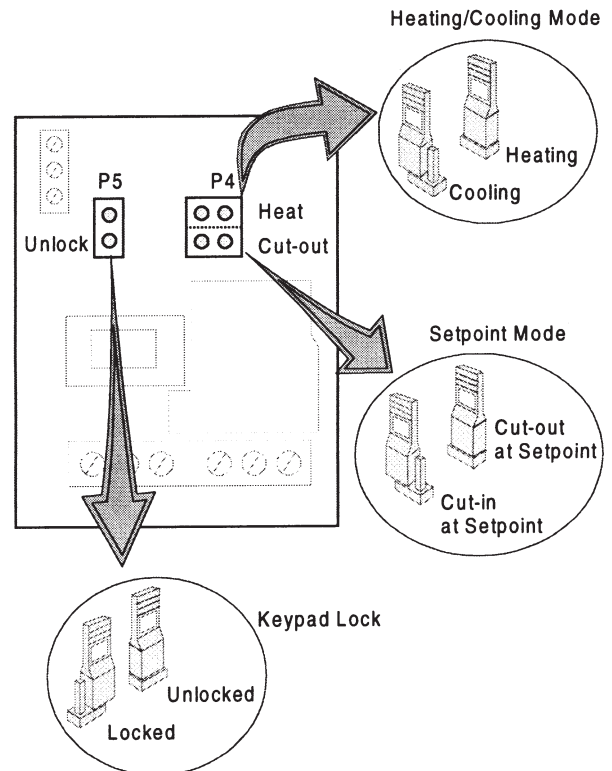
Typical Service Case with Blower Coil



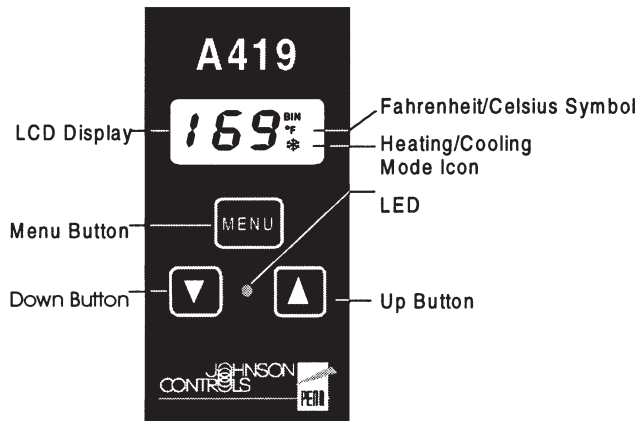
In addition to the thermostat and suction solenoid, a suction stop EPR valve is required in the suction line. The EPR valve acts as a low pressure limit to aid in the overall temperature control.

Setting the Electronic Thermostat

1. Remove the four screws and cover from the electronic thermostat.
2. Connect sensor wires to the common (COM) and sensor (SEN) terminals of the terminal strip located at the top left of the printed circuit board. The sensor wires are interchangeable.



3. Set the Heating/Cooling jumper blocks to the "COOL" position.
4. Set the Cut-in at Setpoint/Cut-out at Setpoint jumper blocks to the "Cut-out at Setpoint" position.
5. Set the Keypad Locked/Unlocked jumper blocks to the "Unlocked" position.
6. Replace the electronic thermostat cover and secure with four screws.



7. To adjust the setpoint:
 - a. Push the Menu Button. “SP” will flash on the LCD display.
 - b. Push the Menu Button one more time and a setpoint temperature will be displayed.
 - c. Push the Up or Down Button until the desired setpoint is displayed. (NVM = 22°F, NVF = 33°F or NVD = 24°F)
 - d. Push the Menu Button.
8. To adjust the differential:
 - a. Push the Menu Button. “SP” will flash on the LCD display.
 - b. Push the Down Button until “DIF” is shown on the LCD display.
 - c. Push the Menu Button one more time and a differential number will be displayed.
 - d. Push the Up or Down Button until the desired differential setting is displayed. (NVM = 10°F, NVF = 1°F or NVD = 7°F)
 - e. Push the Menu Button.

With the cooling mode selected, the differential is ABOVE the setpoint. The relay will be energized and the LED indicator will illuminate when the temperature reaches the differential setting. When the temperature drops to the setpoint, the relay and LED indicator will de-energize and refrigeration will stop.

The settings above are specific to TYLER service cases. Other applications will require different setpoints and differentials.

Electrical Procedures

Electrical Considerations

CAUTION

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

NOTE

The ballast box is located at the lower left rear corner of the case. It houses ballasts and terminal blocks.

Case Fan Circuit (NVD Only)

This circuit is to be supplied by an uninterrupted, protected 120V circuit. The case fan circuit is not cycled on this case.

Fluorescent Lamp Circuit

NV(M/F/D) case lighting is supplied by T-8 electronic ballast lights. It is controlled by a light switch in each case. The standard lighting is 1-row of T-8 canopy lights.

Defrost Information

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

Defrost Control Chart

NVM/NVF Defrost Option Settings

Defrost			
Defrost Type	Defrosts Per Day	Duration (Min)	Term. Temp.
Off Time	1	110	-----

NVD Defrost Option Settings

Defrost			
Defrost Type	Defrosts Per Day	Duration (Min)	Term. Temp.
Off Time	1	46	-----

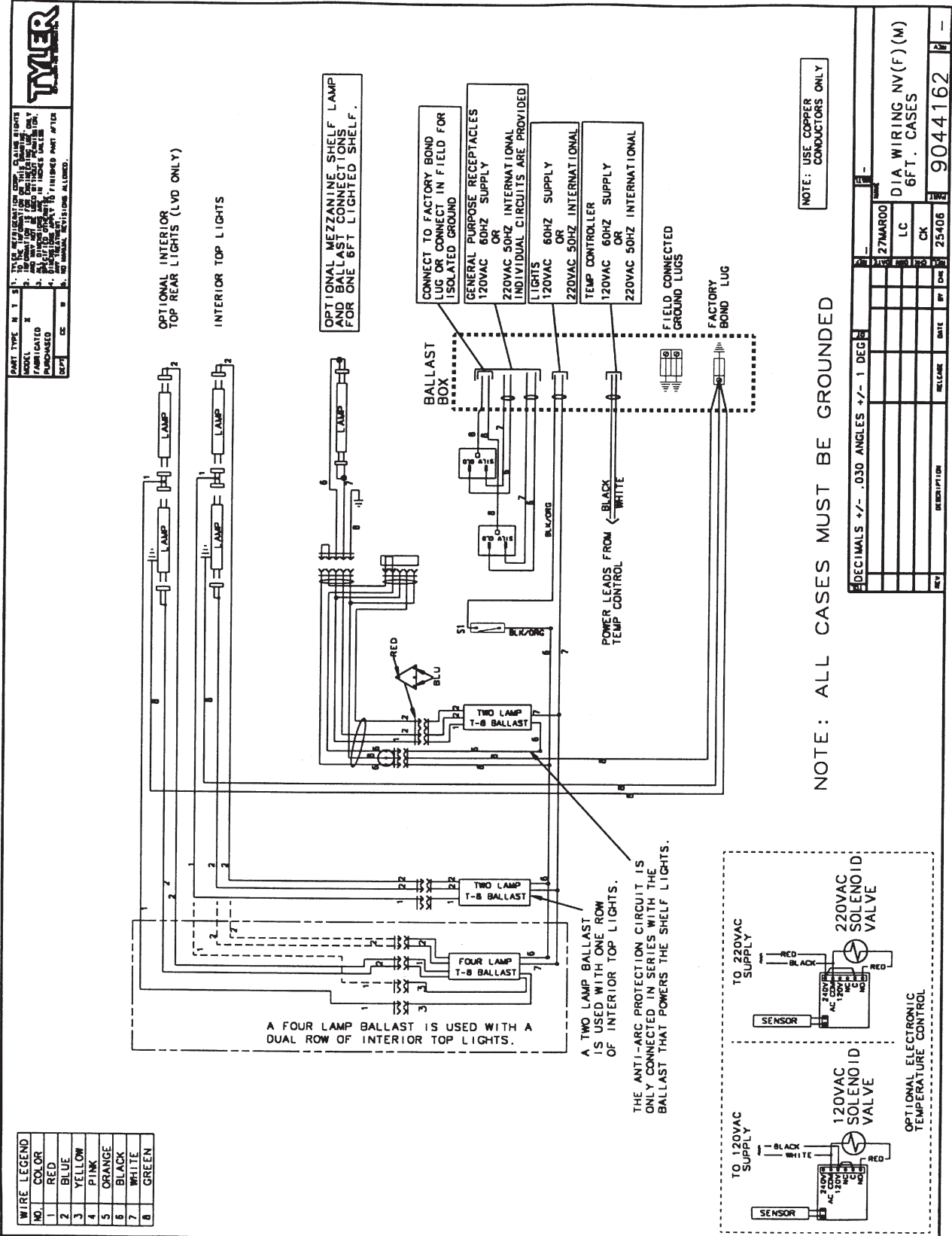
Thermostats and sensors are shown on pages 8 and 9 of this manual.

WIRING DIAGRAMS

ELECTRICIAN NOTE - OVERCURRENT PROTECTION

120V circuits should be protected by 15 or 20 Amp devices per the requirements noted on the cabinet name-plate 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.

NVM/NVF Domestic & Export (50 Hz) Case Circuits (6' Cases)

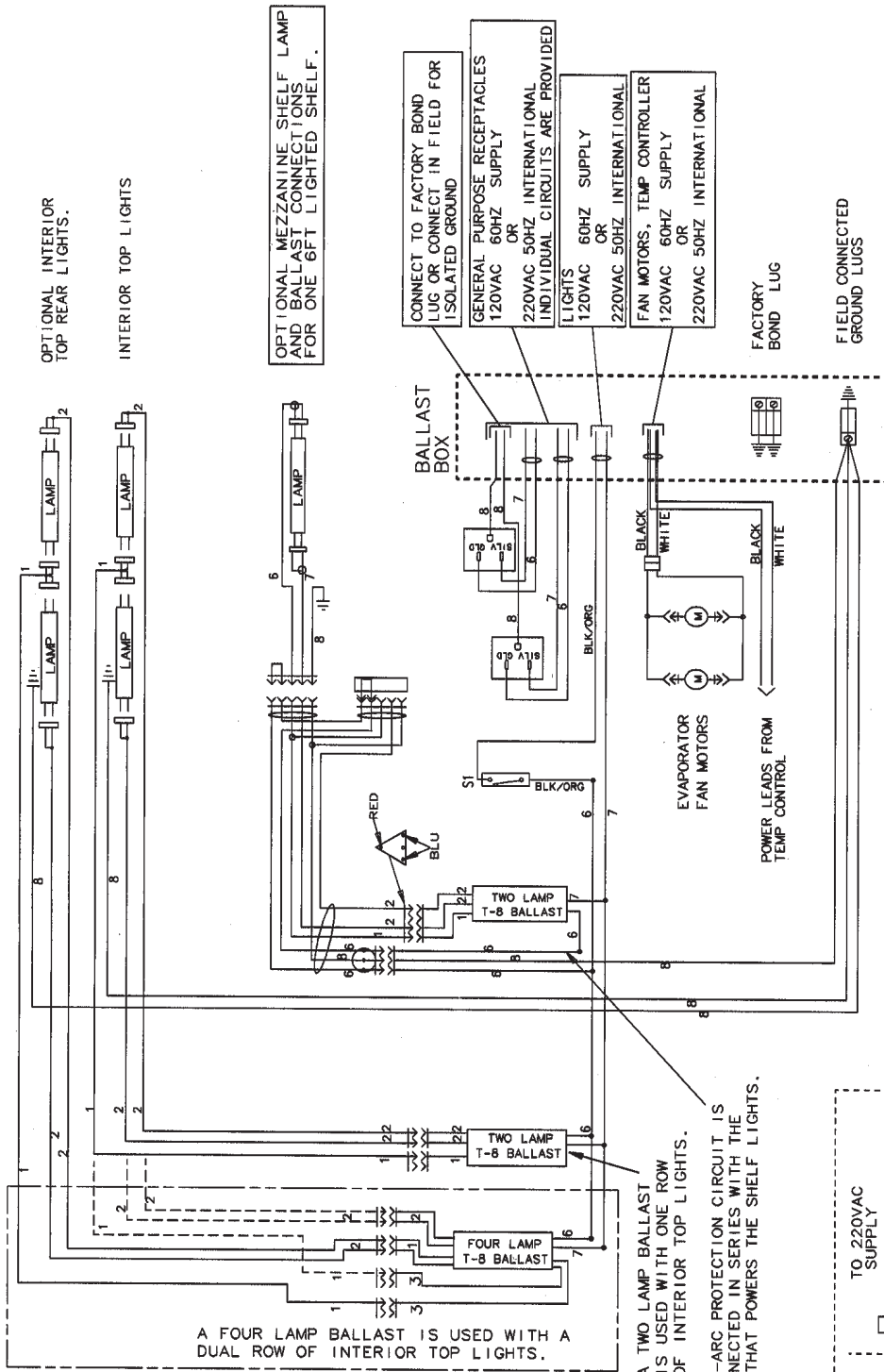


NVD Domestic & Export (50 Hz) Case Circuits (6' Cases)



1. TYLER REPLICATION CLAIMS RIGHTS.
2. INFORMATION IS FOR ENGINEERING USE ONLY.
3. ALL DIMENSIONS ARE IN INCHES UNLESS NOTED OTHERWISE.
4. DIMENSIONS APPLY TO FINISHED PART AFTER ANY TREATMENT.
5. NO MANUAL REVISIONS ALLOWED.

NO.	COLOR
1	RED
2	BLUE
3	YELLOW
4	PINK
5	ORANGE
6	BLACK
7	WHITE
8	GREEN



A FOUR LAMP BALLAST IS USED WITH A DUAL ROW OF INTERIOR TOP LIGHTS.

A TWO LAMP BALLAST IS USED WITH ONE ROW OF INTERIOR TOP LIGHTS.

THE ANTI-ARC PROTECTION CIRCUIT IS ONLY CONNECTED IN SERIES WITH THE BALLAST THAT POWERS THE SHELF LIGHTS.

NOTE: USE COPPER CONDUCTORS ONLY

NOTE: ALL CASES MUST BE GROUNDED

REV	DATE	BY	CHK	RELEASE	DESCRIPTION
A	01MAY07	CH	LC	45597	CHANGED THE BORDER AND REMOVED THE HO LIGHTING
27MAR00					

REV	DATE	BY	CHK	RELEASE	DESCRIPTION
25406		CK	LC		

REV	DATE	BY	CHK	RELEASE	DESCRIPTION
9044163					

NVM/NVF Domestic & Export (50 Hz) Case Circuits (12' Cases)

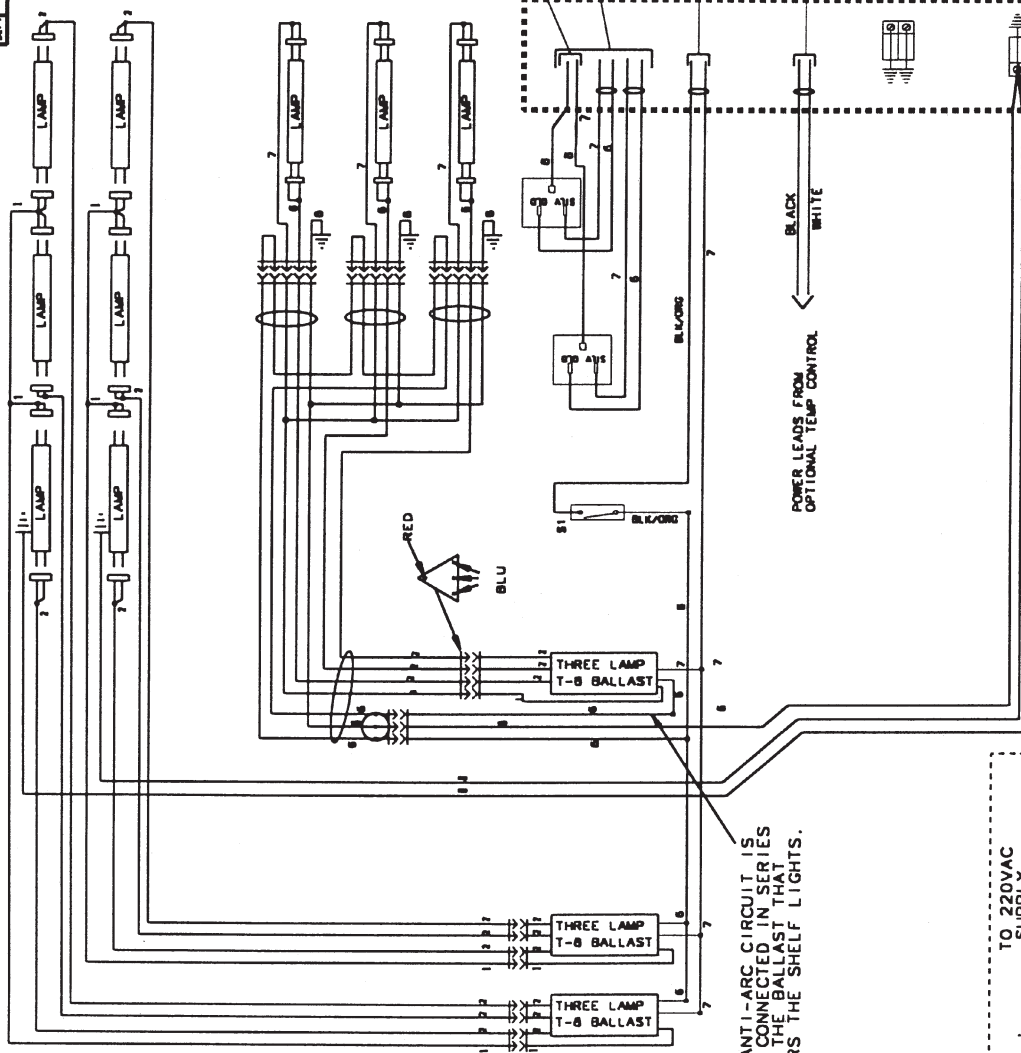


WIRE NO.	WIRE COLOR
1	RED
2	BLU
3	BLK
4	YEL
5	ORNG
6	BRN
7	WHTE
8	GRN

PART TYPE N T S
 MODEL X
 FABRICATED
 PURCHASED
 CO B
 DEPT

1. TO BE REGENERATOR COMP. CALLER RIGHTS
 2. THIS DRAWING IS FOR CONSTRUCTION USE ONLY.
 3. ALL DIMENSIONS ARE IN INCHES UNLESS NOTED.
 4. DIMENSIONS SHOWN IN FINISHED PART AFTER
 5. NOT NEARLY FINISHED PART.
 6. NO DIMENSIONS ARE ALLOWED.

INTERIOR TOP LIGHTS
 OPTIONAL INTERIOR TOP
 REAR LIGHTS.



OPTIONAL MEZZANINE SHELF LAMPS
 AND BALLAST CONNECTIONS FOR ONE
 ROW OF LIGHTED SHELVES.

CONNECT TO FACTORY BOND
 LUG OR CONNECT IN FIELD FOR
 ISOLATED GROUND
 GENERAL PURPOSE RECEPTACLES
 120VAC 60HZ SUPPLY
 220VAC 50HZ INTERNATIONAL
 INDIVIDUAL CIRCUITS ARE PROVIDED

LIGHTS 60HZ SUPPLY
 120VAC OR
 220VAC 50HZ INTERNATIONAL

TEMP CONTROLLER
 120VAC 60HZ SUPPLY
 OR
 220VAC 50HZ INTERNATIONAL

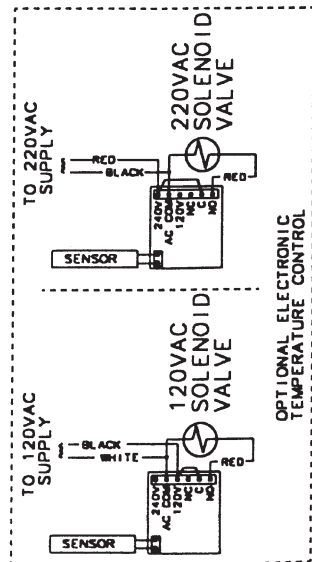
FIELD CONNECTED
 GROUND LUGS

FACTORY
 BOND LUG

NOTE: USE COPPER
 CONDUCTORS ONLY

THE ANTI-ARC CIRCUIT IS
 ONLY CONNECTED IN SERIES
 WITH THE BALLAST THAT
 POWERS THE SHELF LIGHTS.

POWER LEADS FROM
 OPTIONAL TEMP CONTROL



NOTE: ALL CASES MUST BE GROUNDED

REV	DESCRIPTION	RELEASE	DATE	BY	CHK	25406
1						
2						
3						
4						
5						
6						
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DIA WIRING NV(F)(M)
 12FT. CASES

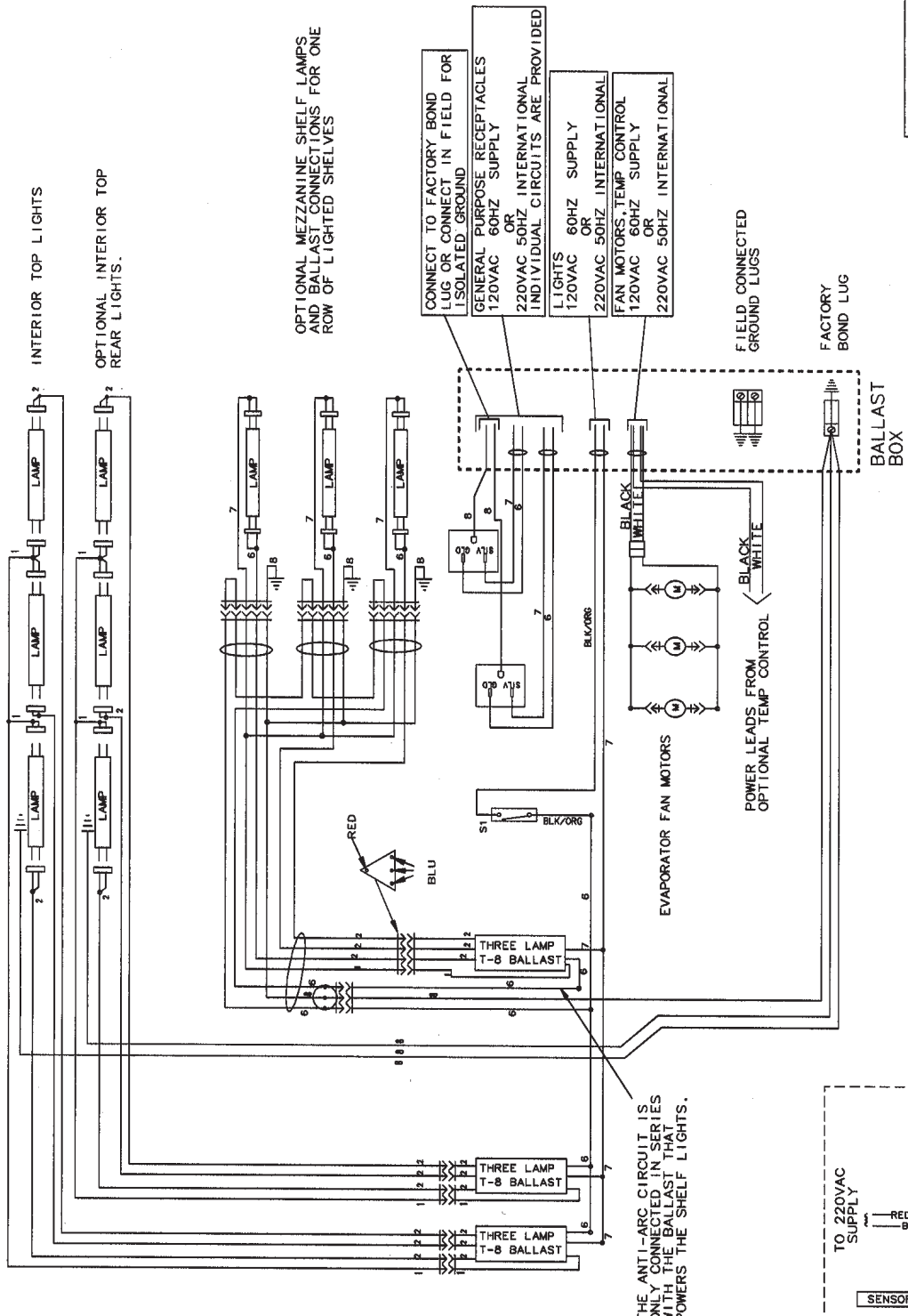
9043708

NVD Domestic & Export (50 Hz) Case Circuits (12' Cases)

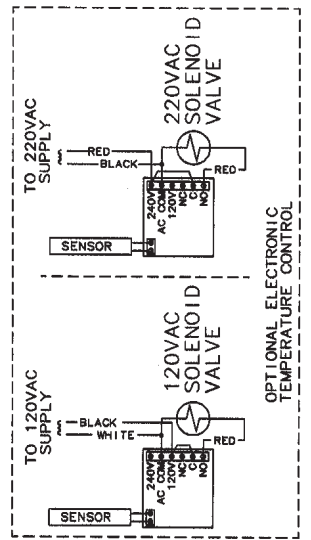


1. TYLER REFRIGERATION CLAIMS RIGHTS IN CONNECTION WITH THIS DOCUMENTATION IS FOR ENGINEERING PURPOSES ONLY AND MAY NOT BE USED WITHOUT PERMISSION.
2. SPECIFIED DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.
3. ANY TOLERANCES NOT SPECIFIED SHALL BE TO FINISHED PART AFTER TREATMENT.
4. NO MANUAL REVISIONS ALLOWED.

WIRE NO.	LEGEND
1	RED
2	BLACK
3	BLUE
4	YELLOW
5	PINK
6	ORANGE
7	BLACK
8	WHITE
9	GREEN



THE ANTI-ARC CIRCUIT IS ONLY CONNECTED IN SERIES WITH THE BALLAST THAT POWERS THE SHELF LIGHTS.



NOTE: ALL CASES MUST BE GROUNDED

NOTE: USE COPPER CONDUCTORS ONLY

REV	DESCRIPTION	DATE	BY	CHK	25406
B	CHANGED THE BORDER AND REMOVED THE HO LIGHTING	01MAY07	GH	LC	
REV	RELEASE	DATE	BY	CHK	25406
45597					
NAME	24MAR00				
DATE	LC				
CHK	CK				
DATE					
REV					
DESCRIPTION	DIAGRAM WRG NVD 12FT. CASES				
REV	9043709				
DATE	B				

CLEANING AND SANITATION

Component Removal and Installation Instructions for Cleaning

Lower Trays and Screens

1. Open and remove the rear sliding doors. See page 20.
2. Remove product from the case interior.
3. Grasp and lift out each lower tray or screen from the bottom of the case.
4. After cleaning, replace in reverse order.

Front Air Ducts

1. Remove lower trays or screens, see this page.
2. Lift out front air duct sections.
3. After cleaning, replace in reverse order.

Rear Air Ducts

1. Remove lower trays or screens, see this page.
2. Remove mounting screws from rear air duct.
3. Lift out rear air duct sections.
4. After cleaning, replace in reverse order.

Mullion Covers

1. Open the front curved glass by lifting the handle at the bottom.
2. Remove mounting screws from each mullion cover.

WARNING

Mullion covers with electrical receptacles can be cleaned without removing the electrical receptacles. Do not get moisture on electrical wires when cleaning under this cover. Moisture on wires could cause premature product failure and/or personal injury or death from electrical shock.

3. Carefully remove each mullion cover from the rear uprights.

4. After cleaning, replace and secure mullion covers in reverse order.

End Coil Cover (NVM/NVF)

1. Open rear sliding doors at each end.
2. Remove screws and end coil covers from ends of upper coil.
3. After cleaning, replace end coil covers in reverse order.

Refrigeration Line Cover (NVM Only)

1. Remove lower screens, see this page.
2. Remove mounting screws and refrigeration line cover.
3. After cleaning, replace in reverse order.

Electrical Cover (NVM Only)

1. Remove lower screens, see this page.
2. Remove mounting screws and electrical cover.

WARNING

Do not get moisture on electrical wires when cleaning under this cover. Moisture on wires could cause premature product failure and/or personal injury or death from electrical shock.

4. After cleaning, replace in reverse order.

Front Lower Cladding

1. Remove front kickplate.
2. Lift and pull out front lower cladding until rear tabs clear holes in front of frame assembly. After rear tabs are clear, pull down on cladding to clear upper tabs from slots in bottom of upper front cladding and remove cladding from case.
3. After cleaning, replace front lower cladding by inserting top tabs, then rear tabs. Make sure all tabs are securely fit in each slot. Replace front kickplate.

Front Upper Cladding

1. Remove color band, bumper and bumper retainer from the case. See page 23.

2. Remove front kickplate.
3. Remove screws and front lower cladding. See page 17.
4. Remove screws from top and bottom of front upper cladding and remove front upper cladding.
5. After cleaning, replace front upper cladding and remaining front components in the reverse order.

Cleaning Instructions

CAUTION

- **When cleaning this case, try not to introduce water into the case faster than it can be carried away by the waste outlet.**
- **Liquid chlorine bleach is corrosive to metals. The use of bleach or products containing bleach will damage metals surfaces and void the case warranty.**
- **Sanitize the case with Quaternary Ammonium Solutions (ex: KAYQUAT II, J-512 Sanitizer, SANIQUAT 512, etc...) approved per 21CFR 178.1010, followed by adequate draining and air drying. These solutions may be obtained from Kay Chemical Co., Johnson Wax Profession, Coastwide Laboratories, etc....**
- **Always use a soft cloth or sponge with mild detergent and water to clean the front glass. Never use abrasives or scouring pads to clean glass. They can scratch and/or damage the glass.**

WARNING

TYLER Refrigeration does not recommend the use of high pressure cleaning equipment on service style cases!! The sealing of front glass and end joints is critical in these cases and high pressure cleaners can penetrate and/or damage these seals. Damaged seals allow water leaks and/or air leaks that can cause poor case refrigeration.

See “General (UL/NSF) I&S Manual” for case cleaning instructions.

Stainless Steel Cleaning Methods

The cleaning data in the following stainless steel cleaning chart was supplied by AISI. The information was supplied by Prime Metals Division, Alumax Aluminum Corporation.

<u>TYPE OF CLEANING</u>	<u>CLEANING AGENT*</u>	<u>APPLICATION METHOD**</u>	<u>EFFECT ON FINISH</u>
Routine cleaning	Soap, ammonia or detergent and water.	Sponge with cloth, then rinse with clear water and wipe dry.	Satisfactory for use on all finishes.
Smears and fingerprints	Arcal 20, Lac-O-Nu, Lumin Wash O’Cedar Cream Polish, Stainless Shine	Rub with cloth as directed on the package.	Satisfactory for use on all finishes. Provides barrier film
Stubborn spots and stains, baked-on splatter, and other light discolorations	Allchem Concentrated Cleaner	Apply with damp sponge or cloth.	Satisfactory for use on all finishes.
	Samae, Twinkle, or Cameo Copper Cleaner	Rub with damp cloth.	Satisfactory for use on all finishes if rubbing is light.
	Grade FFF Italian pumice, whiting or talc	Rub with damp cloth.	Use in direction of polish lines on No. 4 (polished) finish. May scratch No. 2 (mill) and No. 7 and 8 (polished) finishes.
	Liquid NuSteel	Rub with dry cloth. Use a small amount of cleaner.	Use in direction of polish lines on No. 4 (polished) finish. May scratch No. 2 (mill) and No. 7 and 8 (polished) finishes.

<u>TYPE OF CLEANING</u>	<u>CLEANING AGENT*</u>	<u>APPLICATION METHOD**</u>	<u>EFFECT ON FINISH</u>
	Paste NuSteel or DuBois Temp	Rub with dry cloth. Use a small amount of cleaner.	Use in direction of polish lines on No. 4 (polished) finish. May scratch No. 2 (mill) and No. 7 and 8 (polished) finishes.
	Cooper's Stainless Steel Cleaner, Revere Stainless Steel Cleaner	Apply with damp sponge or cloth.	Use in direction of polish lines on No. 4 (polished) finish. May scratch No. 2 (mill) and No. 7 and 8 (polished) finishes.
	Grade F Italian pumice, Steel Bright, Lumin Cleaner, Zud or Restoro	Rub with a damp cloth.	Use in direction of polish lines on No. 4 (polished) finish. May scratch No. 2 (mill) and No. 7 and 8 (polished) finishes.
	Penny-Brite or Copper-Brite	Rub with a dry cloth. Use a small amount of cleaner.	Use in direction of polish lines on No. 4 (polished) finish. May scratch No. 2 (mill) and No. 7 and 8 (polished) finishes.
Heat tint or heavy discoloration	Penny-Brite or Copper-Brite	Rub with a dry cloth.	Use in direction of polish lines on No. 4 (polished) finish. May scratch No. 2 (mill) and No. 7 and 8 (polished) finishes.
	Paste NuSteel or DuBois Temp	Rub with dry cloth. Use a small amount of cleaner.	Use in direction of polish lines on No. 4 (polished) finish. May scratch No. 2 (mill) and No. 7 and 8 (polished) finishes.
	Revere Stainless Steel Cleaner	Apply with a damp sponge or cloth.	Use in direction of polish lines on No. 4 (polished) finish. May scratch No. 2 (mill) and No. 7 and 8 (polished) finishes.
	Allen Polish, Steel Bright, Wyandotte or Zud	Rub with a damp cloth.	Use in direction of polish lines on No. 4 (polished) finish. May scratch No. 2 (mill) and No. 7 and 8 (polished) finishes.
Burnt-on foods and grease, fatty acids, milkstone (where swabbing or rubbing is not practical)	Easy-Off, De-Grease-It, 4-6% hot solution of such agents as trisodium tripolyphosphate, or 5-15% caustic soda solution	Apply generous coating. Allow to stand for 10-15 min. Repeated application may be necessary.	Excellent removal, satisfactory for use on all finishes.
Tenacious deposits, rusty discolorations, industrial atmospheric stains	Oakite No. 33, Dilac, Texo 12, Texo N.Y., Flash-Klenz, Caddy Cleaner, Turco Scale 4368 or Permag 57.	Swab and soak with clean cloth. Let stand 15 minutes or more according to directions on package. Rinse and dry.	Satisfactory for use on all finishes.
Hard water spots and scale	Vinegar	Swab or wipe with a cloth. Rinse with water and dry.	Satisfactory for use on all finishes.
	5% oxalic acid, 5% sulamic acid, 5-10% phosphoric acid, or Dilac, Oakite No. 33, Texo 12 or Texo N.Y.	Swab or soak with a cloth. Let stand 10-15 minutes. Always follow with neutralizer rinse, and dry.	Satisfactory for use on all finishes. Effective on tenacious deposits or where scale has built up.

TYPE OF CLEANING	CLEANING AGENT*	APPLICATION METHOD**	EFFECT ON FINISH
Grease and oil	Organic solvents such as carbon tetrachloride, trichlorethylene, acetone, kerosene, gasoline, benzene, alcohol and chlorethane n.u.	Rub with a cloth. Organic solvents may be flammable and/or toxic. Observe all precautions against fire. Do not smoke while vapors are present. Be sure area is well ventilated.	Satisfactory for use on all finishes.

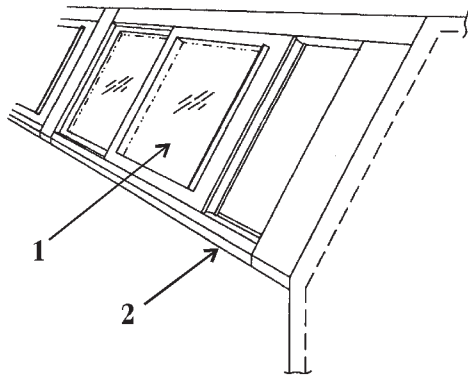
* Use of proprietary names is intended only to indicate a type of cleaner, and does not constitute an endorsement, nor is omission of any proprietary cleanser to imply its inadequacy. It should be emphasized that all products should be used in strict accordance with instructions on package.

** In all applications a sponge or fibrous brush or pad are recommended. DO NOT use ordinary steel wool, steel brushes, chlorine bleach or products containing bleach for cleaning or sanitizing stainless steel.

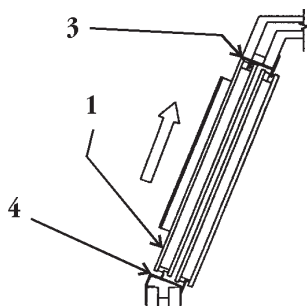
GENERAL INFORMATION

Rear Sliding Door Removal and Installation

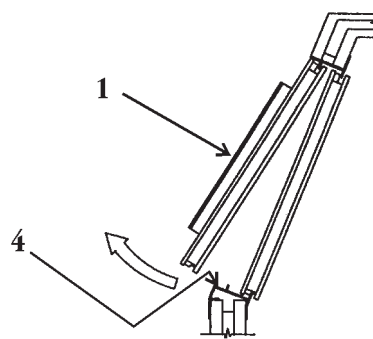
The sliding doors come installed from the factory in the door frame. These doors are removable for cleaning and to aid in case maintenance. **NOTE: DO NOT FULLY IMMERSE DOORS WHEN CLEANING.** The inner and outer doors are marked with labels from the factory. If the doors are not labeled, the inner door can be identified as having the limiter stops on it.



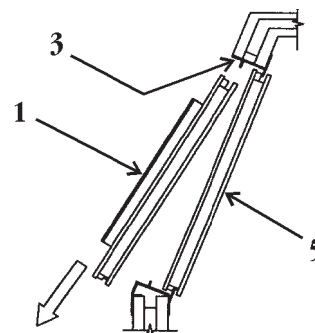
1. Remove the outer door (1) by sliding it to the right end of the door frame (2) (within an inch of being closed).



2. Firmly grasp both sides of the outer door (1) and lift into the upper track (3) until it clears the lower track (4).



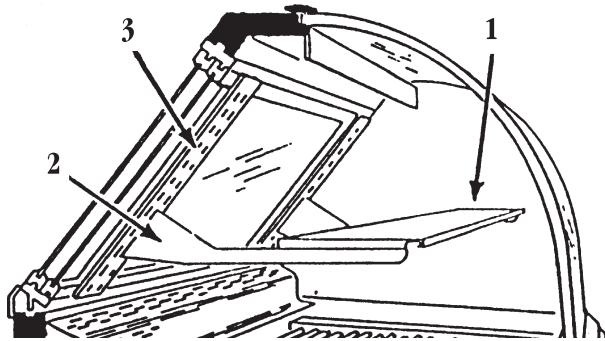
3. Tilt out the bottom of the outer door (1) so it can clear the lower track (4).



4. Lower the outer door (1) out of the upper track (3) to remove it from the case.
5. Repeat steps 1 thru 4 to remove the inner door (5).
6. Reverse the above steps to replace the inner and outer doors (5 and 1).

Mezzanine Shelving

Mezzanine shelves are available in 10" or 12" widths. One level of shelving is optionally available for NVM and NVF cases, while two levels of shelving is available for NVD cases. The shelves can be moved forward from the mullions in two inch increments and can be locked into three positions.



To install mezzanine shelving, position and insert the mezzanine shelf (1) and captive shelf brackets (2) into slots in the uprights (3).

NOTE

The brackets can be moved vertically at 1" increments in the uprights.

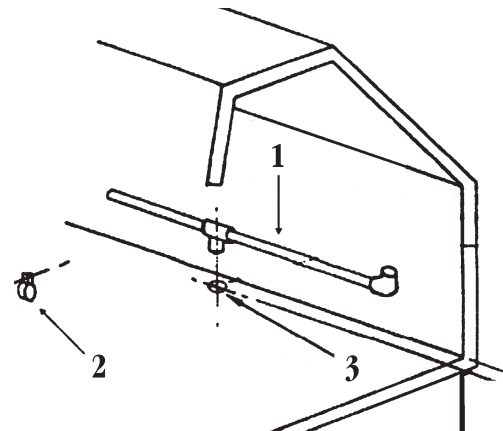
Lighted Shelves

Lights are optional on the 10" and 12" mezzanine shelves. Wiring harnesses for all shelf locations are factory installed. Ballasts are optionally supplied for all shelf light sockets. The ballasts are located in the rear raceway channel behind the rear rail cover.

Service Case Flush System

Flush systems are offered only on NVF cases to provide a convenient and effective means of maintaining case cleanliness. The system may be operated either manually by a hand valve or automatically using a solenoid and a time clock. The flush water is drained from the case via the normal drain path.

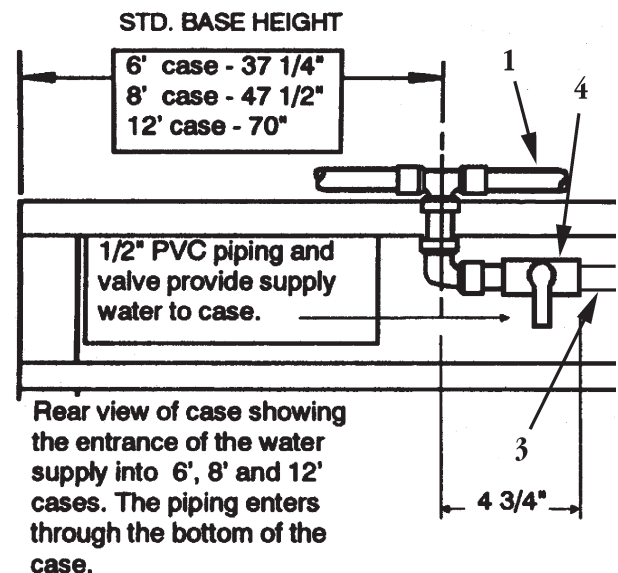
Water is supplied to the system through a pressurized water connection to a domestic water supply. The water is fed to a nozzle array which provides even flushing throughout the case interior. It is recommended to flush cases at least once a day. Flush time varies depending on the specific case needs.



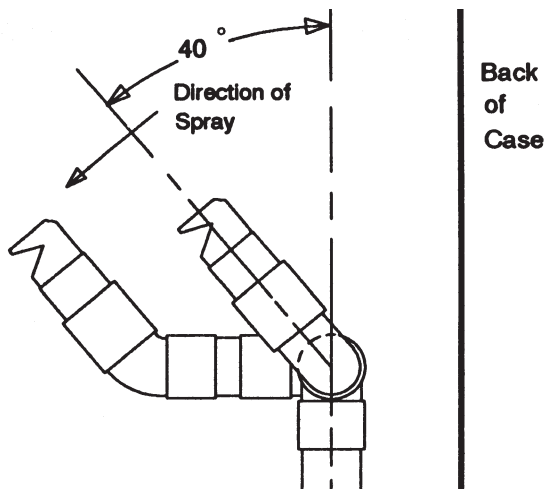
1. Position the manifold (1) near the rear case wall and secure with manifold anchor clamps (2).
2. Cut a hole in the case well just large enough to connect manifold to 1/2" PVC water supply piping (3).

NOTE

A suitable water supply must be downstream of the isolation valve.

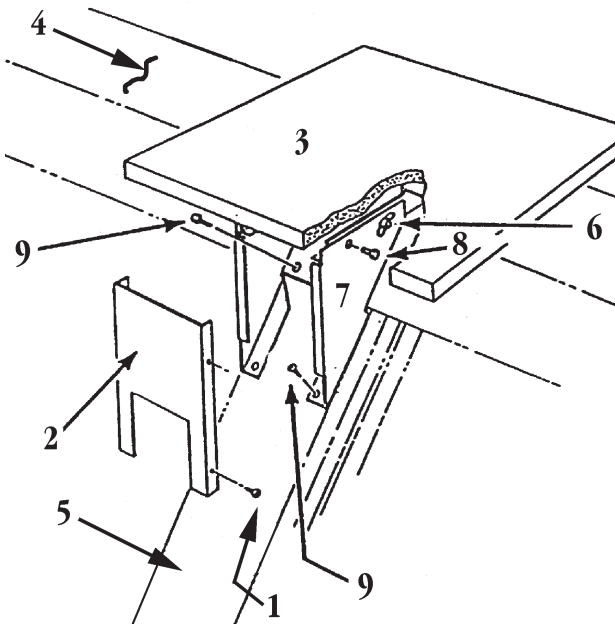


3. Install isolation valve (4) (hand or solenoid) and manifold (1) to water supply piping (3).
4. Caulk the area where the water supply piping (3) enters the case well to prevent water leakage during system flushing.



Top Mounted Scale Shelf Installation

The optional top scale shelf is mounted to the mullion on the back of the case. The shelf rests on the flat portion of the top of the case. Use the following instructions to mount the scale shelf assembly.



1. Remove the screws (1) and rear cover (2) from the scale shelf assembly (3).
2. Center the scale shelf assembly (3) on the top rear of the case (4) at the selected mullion (5) location.
3. Loosen wing nut (6) on the front right side of the lower rear support (7) and the two locking capscrews (8) at the rear.

4. Adjust scale shelf (3) to sit level from front-to-rear and side-to-side. When the shelf is level, retighten the wing nut (6) and the two locking capscrews (8).
5. Drill pilot holes in the top two holes in the lower rear support (7), and start top two screws (9). Check for proper shelf alignment, then tighten top two screws (9).
6. Drill pilot holes thru lower two holes in lower rear support (7) and secure with lower two screws (9).
7. Replace rear cover (2) and screws (1) on scale shelf assembly (3).

SERVICE INSTRUCTIONS

Connecting the Refrigeration Piping and Components

WARNING

Be sure to position a flame and heat-resistant shield over the bottom of the case liner. Heat from brazing could damage the liner and/or cause personal injury or death from fire.

1. Remove screws and refrigeration piping cover from the left bottom of the case.
2. Position loose refrigeration piping and/or optional valves between the open lines in the bottom and upright of the case.

NOTE

- Make sure all sensor and thermostat wires are clear of areas being heated.
 - Mount all refrigeration lines off the floor to allow for cleaning access.
3. Apply flux to all joint ends. Starting at one end, thoroughly heat each new pipe joint and braze it together. Repeat this process until all new pipe joints have been brazed.
 4. After piping has cooled, route and connect thermostat and sensor wires through openings in the bottom of the case.

Light Servicing

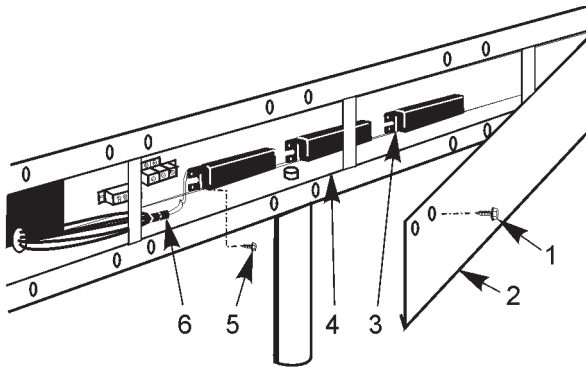
See "General-UL/NSF I&S Manual" for T-8 lamp, fan blade and motor (NVD only), and replacement instructions.

Ballast and Lighting Locations

All light ballasts are located in the rear raceway channel behind the rear rail cover.

In order to retain safety approval with Underwriters Laboratory and the Canadian Standards Association, the mounting of electrical components and interconnecting wires must not deviate from the following instructions. Only qualified personnel are authorized to install the accessory items. TYLER Refrigeration recommends you order all component parts from its Service Parts Department.

Ballast Installation



1. Remove screws (1) and rear rail cover (2) from rear of case.

NOTE

If tappit screws are not available, a starwasher should be used between the ballast and the heads of the screws.

2. Install required number of ballasts (3) in rear electrical raceway (4) with two screws (5) each.
3. Identify and connect required wiring harnesses (upper, lower, etc...) to the ballast connectors (6).
4. Replace rear rail cover (2) and secure with screws (1).

Color Band, Bumper and Bumper Retainer Replacement

NOTE

Color band, bumper and bumper retainer must be removed to access the upper screws in the front upper cladding.

1. Remove color band and color band backers by prying bottom free from top of bumper.
2. Push in on center of bumper while pulling out on bottom of bumper. This will start to separate bumper from bumper retainer.
3. Make sure the bottom of the bumper is released from the bumper retainer for the full length of the case.
4. After bottom is released, firmly pull out top of bumper to snap it free from bumper retainer.
5. Remove bumper backers from both ends of the bumper
5. Mark position of the bumper retainer on front of case.
6. Remove mounting screws and bumper retainer from front of case.

NOTE

Bumper backer and color band backer must be installed in same position as removed to assure proper fit and alignment during installation.

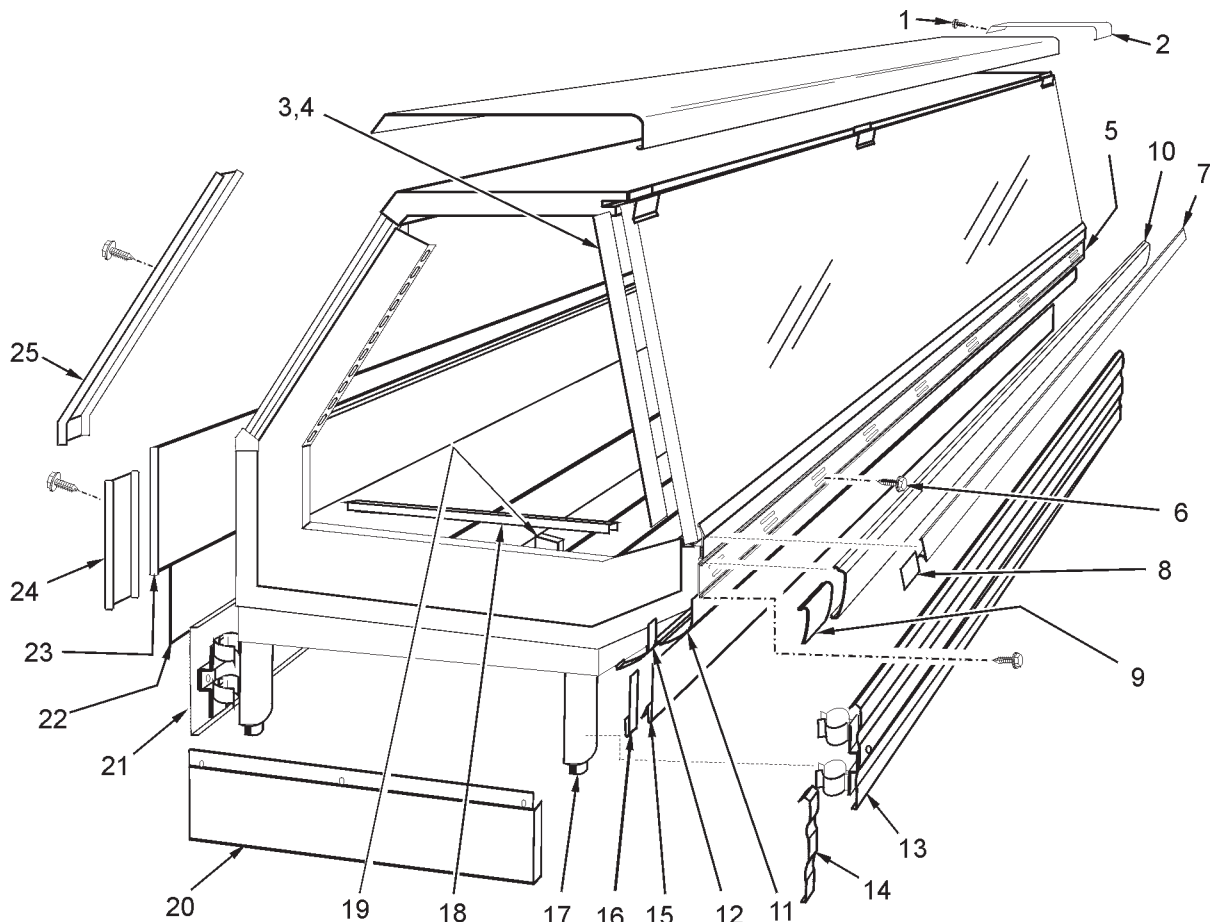
7. Install bumper retainer on front of case with mounting screws in same position as removed.
8. Position bumper backers in ends of bumper sections still installed, so half of the bumper backers are still exposed.
9. Replace the bumper on the bumper retainer.
10. Position color band backers under ends of color bands still installed, so half if the color band backer is still exposed.
11. Insert top of color band under top molding and snap bottom of color band over top of bumper.

PARTS INFORMATION

Cladding and Trim Parts List

<u>Item</u>	<u>Description</u>	<u>6'</u>	<u>8'</u>	<u>12'</u>
1	Screw	5619204(2)	5619204(2)	5619204(2)
2	Top Joint Trim	5239835	5239835	5239835
3	Inner/Outer Glass Joint Trim	5239840(2)	5239840(2)	5239840(2)
4	Tape, Compound	5615115	5615115	5615115
5	Bumper Retainer	9025052	9025058	9025061
6	Screw, Shoulder	9025833(12)	9025833(16)	9025833(24)
7	Color Band, Ptd.	9025232	9025233	9025234
8	Color Band Backer, Ptd.	9025979	9025980	9025981
9	Bumper Backer	-----	color per order	-----
10	Bumper	-----	color per order	-----
11	Upr. Frt. Cladding, Ptd.	9024922	9024923	9024924
	Screw	5183535(8)	5183536(9)	5183536(11)
12	Upr. Frt. Cladding Joint Trim	9043829	9043829	9043829
	Screw	9024814(4)	9024814(4)	9024814(4)
13	Frt. Kickplate Assembly, Std.	9024937	9024938	9024939
	Frt. Kickplate Assembly, Opt.	9024974	9024975	9024976
14	Kickplate Joint Trim	9043816	9043816	9043816
	Screw	5619204(4)	5619204(4)	5619204(4)
15	Lwr. Frt. Cladding, Std. Ptd.	9043822	9043823	9043824
	Lwr. Frt. Cladding, Opt. Ptd.	9043825	9043826	9043827
16	Lwr. Frt. Cladding Joint Trim	9043893	9043893	9043893
	Opt. Lwr. Frt. Clad. Joint Trim	9043891	9043891	9043891
	Screw	9024814(4)	9024814(4)	9024814(4)
17	Pipe Leg, Std. (2" X 9.75")	9024894(4)	9024894(4)	9024894(8)
	Pipe Leg, Opt. (2" X 6.00")	9024893(4)	9024893(4)	9024893(8)
18	Horizontal End Trim	9037279	9037279	9037279
19	NSF Product Thermometer	5967100	5967100	5967100
20	RH Base End Close-off, Ptd. (per patch end)	9024986	9024986	9024986
	LH Base End Close-off, Ptd. (per patch end)	9043066	9043066	9043066
	Opt. Base End Close-off, Ptd. (per patch end)	9024980	9024980	9024980
21	Opt. Rear Base Close-off (per patch end)	9024934	9024935	9024936
22	Rear Rail Cover, Ptd.	9024929	9024928(2)	9024929(2)
	Screw	9043080(16)	9043080(24)	9043080(32)

23	Lwr. Rear Shelf Cover	9024770	9024771	9024772
	Screw	9024814(6)	9024814(7)	9024814(12)
24	Lwr. Rear Joint Trim	9603948	9603948	9603948
	Screw	9043080(4)	9043080(4)	9043080(4)
25	Upr. Rear Joint Trim	9603945	9603945	9603945
	Screw	9043080(4)	9043080(4)	9043080(4)
26	Refrig. Line Cover (NVM) (Not Shown)	9024864	9024864	9024864
27	Electrical Wire Cover (NVM) (Not Shown)	5236336	5236336	5236336



Operational Parts List

Case Usage	Domestic			Export		
	115 Volt 60 Hertz			220 Volt 50 Hertz		
Case Size	6'	8'	12'	6'	8'	12'
Electrical Circuit						
Fan Motor (NVD)	5125532 5 Watt	5125532 5 Watt	5125532 5 Watt	5126572 5 Watt	5126572 5 Watt	5126572 5 Watt
Fan Motor Brackets (NVD)	5962269	5962269	5962269	5962269	5962269	5962269
Fan Bracket Plate (NVD)	9041077	9041077	9041077	9041077	9041077	9041077
Fan Blades (7" 25° 5B) (NVD)	5236974	5236974	5236974	5236974	5236974	5236974
Opt. ECM Fan Motor (NVD)	9025002 8 Watt	9025002 8 Watt	9025002 8 Watt	----	----	----
Opt. ECM Fan Brackets (NVD)	9025005	9025005	9025005	----	----	----
Opt. ECM Fan Blades (7" 30° 5B) (NVD)	5223370	5223370	5223370	----	----	----
Rocker Switch	5961377	5961377	5961377	5961377	5961377	5961377
Rectangular Outlet	5236335	5236335	5236335	5236335	5236335	5236335
T-8 Lamp Ballast (canopy)(1-row)	5991029	5991029	5991030	9028437	9028437	9028438
(opt. canopy)(2-row)	5966635	5966635	5991030	9028439	9028439	9028438
(opt. shelf)(per row)	5991029	5991029	5991030	9028437	9028437	9028438
T-8 Lampholder (canopy)	5232279	5232279	5232279	5232279	5232279	5232279
(opt. shelf)	5092414	5092414	5092414	5092414	5092414	5092414
Suction Solenoid Valve	5191445	5191445	5191445	5231619	5231619	5231619
Electronic Thermostat	5997588	5997588	5997588	5997588	5997588	5997588
Check Valve (NVM)	5199417	5199417	5199417	5199417	5199417	5199417
NSF Product Thermometer	5967100	5967100	5967100	5967100	5967100	5967100

For information on operational parts not listed above contact the TYLER Service Parts Department.