

CRYSTAL
merchandiser®



ZERO ZONE

CRYSTAL MERCHANDISER® FREEZERS

RVLC

With CoolView® Doors and ChillBrite® LED Lighting

INSTALLATION & OPERATION MANUAL



66-0025 REV N • AUG 2026



Table of Contents

ZERO ZONE WARRANTY	1
■ Limited Warranty	1
■ Warranty Claims	1
■ What is not covered under this warranty	1
INTRODUCTION	3
INSTALLATION & OPERATION	5
■ Delivery Inspection	5
■ Back-to-back Wood Plank Removal Instructions	5
■ Packaging	5
■ Location	6
■ Moving Cases	6
■ Optional Bases	6
■ Leveling	7
■ Lineup Assembly	12
■ Case Joint Caulking (Butyl*)	14
■ NSF Compliance Sealing (Silicone)	16
■ Drain	17
■ Condensate Removal System	17
■ Kickplates	17
■ Bumper	18
■ Top Trim Splice	18
■ CoolView® Doors	18
■ Anti-Sweat Reset Button	18
■ Door Handles	18
■ Hold-Open Bracket	18
■ Door Gasket	18
■ Adjusting Door Sag/Sawtooth	18
■ Torque Adjuster / Adjusting Door Tension	19
■ Removing a Door	19
■ Installing a Door	19
■ Reversing Door Swing	20
■ Shelves & Stocking Product	21
■ Cont. on next page	22
■ Cont. from previous page	23
REFRIGERATION	24
■ Symbols and Definitions	24
■ Mechanical Components	24
■ Evaporator Coil	24
■ Evaporator Fans	24
■ Expansion Valve	24
■ Refrigerant Piping	25
■ Leak Check, Evacuation, & Charging	25
■ Operation Set Points	26
■ Defrost	26
■ Electric Defrost - Settings	27
■ Electric Defrost - Components	27
■ Hot Gas Defrost - Settings	28
■ Hot Gas Defrost - Components	29
■ Air Sensors & Case Thermometers	29
■ Anti-Sweat Heaters	29
ELECTRICAL	30
■ General	30

When installing a Crystal Merchandiser® in a Hybrid™ configuration, refer to both this manual and the Hybrid™ Installation & Operation Manual.

ZERO ZONE WARRANTY

Limited Warranty

Zero Zone, Inc. (Seller) hereby warrants that any products sold are warranted to be free from defects in material and workmanship, under normal use and service for its intended purpose, for a period of one (1) year from the date of original installation (not to exceed 15 months from the date of factory shipment). Zero Zone ChillBrite® LED Lighting carries a 5-year parts warranty. Zero Zone CoolView® Doors carry a 10-year glass pack parts warranty. The obligation under this warranty shall be limited to repairing or exchanging any part, or parts, FOB Factory, which is proven to the satisfaction of the Zero Zone Service Department to be defective. Zero Zone reserves the right to inspect the job site, installation, and reason for failure. This limited warranty does not cover freight, or loss of food or product, including refrigerant loss. Any products sold on an "AS IS" basis shall not be covered by this warranty.

WARRANTY CLAIMS

All claims for labor and parts must be handled directly with Zero Zone.

- Customers are required to contact Zero Zone's Customer Experience Team to coordinate and schedule all warranty repairs. Case model and serial number will be required to schedule any service visits.
- All claims will require case model and serial number and the Package Refrigeration Unit (PRU) model and serial number if applicable.
- If the equipment has surpassed the 12 months from shipment, but not exceeded 15 months from shipment, customer will require proof of installation date.
- Retailer and/or the Refrigeration Contractor must contact Zero Zone's Technical Services Department to assist and confirm the diagnosis PRIOR to any work being started.
- All information related to the component, or system failure will need to be documented and presented to Zero Zone Technical Services Team.
- Claims can be mailed to service.cases@zero-zone.com with model and serial numbers, photos and documentation of the problem(s) including a Zero Zone Work Order #.
- Failure to notify Zero Zone prior to repairing equipment will breach this warranty and will hold it null and void.
- Zero Zone reserves the right to require any failed part covered under warranty to be returned.

WHAT IS NOT COVERED UNDER THIS WARRANTY

Zero Zone's obligation under this warranty is limited to either the repair or replacement of parts, at Zero Zone's discretion. This warranty neither assumes, nor authorizes, any person to assume obligations other than those expressly covered by this warranty.

- **NO CONSEQUENTIAL DAMAGES:** Zero Zone is not responsible for economic loss; profit loss; or special, indirect or consequential damages, including without limitation, loss or damage arising from loss of product, whether or not on account of failure of the refrigeration system.
- **WARRANTY IS NOT TRANSFERABLE:** This warranty is not assignable and applies only in favor of the original purchaser/user and the original installation location. ANY SUCH ASSIGNMENT OR TRANSFER SHALL VOID ALL WARRANTIES, EXPRESS OR IMPLIED.
- **IMPROPER USAGE/INSTALLATION:** Zero Zone assumes no liability for parts or labor coverage for component failure or other damages resulting from improper usage, negligence or installation error. This includes lack of preventative and/or regular maintenance as defined in the Zero Zone Installation & Operational Manual located at www.zero-zone.com.
- **RELOCATION FOR REPAIR:** Zero Zone is not responsible for the cost to move the equipment, or any other fixture or piece of equipment, for any reason from its position of operation on the user's premises to make a warranty repair.
- **NON-OEM PARTS:** OEM parts will be provided under this warranty free of charge to the end-user. Zero Zone is not responsible for defects or damage caused by parts not approved by Zero Zone. Warranty will be voided for any damage caused by a non-OEM part.
- **ALTERATION, NEGLECT, ABUSE, MISUSE, ACCIDENT, DAMAGE DURING TRANSIT OR INSTALLATION, FIRE, FLOOD, ACTS OF GOD:** Zero Zone is not responsible for the repair or replacement of any parts that Zero Zone determines have been subjected after the date of manufacture to alteration, neglect, abuse, misuse, accident, or damage during transit or installation, fire, flood, or act of God.

- **IMPROPER ELECTRICAL CONNECTIONS FOR ANY REASON:** Zero Zone is not responsible for the repair or replacement of failed or damaged components resulting from incorrect supply voltage, the use of extension cords, low voltage, or unstable supply voltage.
- **NO IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE: THERE ARE NO OTHER WARRANTIES, EXPRESSED, IMPLIED OR STATUTORY, EXCEPT AS SET FORTH IN THIS WARRANTY STATEMENT. THESE WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING IMPLIED WARRANTY AND MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.**

INTRODUCTION

Important User Information

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All rights reserved. No part of the contents of this manual may be reproduced, copied, or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of the publisher, Zero Zone, unless it is for the purchaser's personal use.

The information in this manual is subject to change without notice and does not represent a commitment on the part of Zero Zone. Zero Zone does not assume any responsibility for any errors that may appear in this manual. In no event will Zero Zone be liable for technical or editorial omissions made herein, nor for direct, indirect, special, incidental, or consequential damages resulting from the use or defect of this manual.

The information in this document is not intended to cover all possible conditions and situations that might occur. The end user must exercise caution and common sense when installing, using, or maintaining Zero Zone products. Zero Zone products should only be installed by qualified, professional refrigeration technicians. If any questions or problems arise, call Zero Zone at 800-247-4496.

Any change to a Zero Zone product made during the installation, start-up, or at any other time must be submitted in writing to Zero Zone for approval and be approved by Zero Zone in writing prior to commission. The product warranty is voided when any unapproved change is made to a Zero Zone product.

Manufacturer

Zero Zone, Inc.

110 N Oakridge Dr • North Prairie, WI 53153 • 800-247-4496 • www.zero-zone.com

Intended Use

Zero Zone products are intended to be installed and used as described in this manual and other related Zero Zone literature, specifications, drawings, and data. All Zero Zone products must be leveled after being installed.

This appliance is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

Do not store explosive substances such as aerosol cans with a flammable propellant in this appliance.

Testing Standards

These display cases were designed and tested using the following industry standards:

- NSF 7 – Commercial Refrigerators and Freezers (ANSI Approved) (equipment certified by NSF)
- NSF 51 – Food Equipment Materials (ANSI Approved) (equipment certified by NSF)
- UL 471 – Commercial Refrigerators and Freezers (ANSI Approved) (equipment certified by ETL)
- ASHRAE Standard 72 – Method of Testing Commercial Refrigerators and Freezers (ANSI Approved)
- AHRI 1200 – Performance Rating of Commercial Refrigerated Display Merchandisers and Storage Cabinets (ANSI Approved)
- DOE Compliant (All U.S. Sales and U.S. Territories)

ASHRAE Standard 72 specifies the test conditions for the equipment. It includes the ambient conditions of 75°F dry bulb and 55% RH. It also specifies the door opening requirements for the performance test. Doors are opened six times in one hour for six seconds. The door opening test period is for eight hours during one 24-hour performance test. As an example, a 5-door case will have 240 door openings during one 24-hour test. Consult the factory if your store exceeds these test conditions.

INTRODUCTION

Display Case Models

The information contained in this manual pertains to the following Zero Zone display cases:

CASE MODEL	DESCRIPTION	DOOR SIZE & TYPE
RVLC30	Standard Freezer	30" x 74" CoolView® Illusion™ Doors
RVLC30BB	Back-to-Back Freezer	30" x 74" CoolView® Illusion™ Doors
RVLC30IM	Ice Merchandiser	30" x 74" CoolView® Illusion™ Doors

Case Features

Zero Zone produces high quality refrigerated display cases using state-of-the-art components. The cases are built with the thickest insulation in the industry and a high efficiency evaporator coil. Case features include:

- Brushless DC electronic motors
- Zero Zone ChillBrite® LED Lighting
- Zero Zone CoolView® Illusion™ Doors
- 90-bar rating available for CO₂ display cases

INSTALLATION & OPERATION

! CAUTION! DO NOT STAND ON TOP OF A CRYSTAL MERCHANDISER®. THE TOP OF THE CASE IS NOT DESIGNED TO SUPPORT THE WEIGHT OF A PERSON.

Delivery Inspection

Zero Zone display cases are carefully factory-tested, inspected, and packed to ensure delivery in the best possible condition. The equipment should be unwrapped and checked for damage **immediately** upon delivery. **DAMAGE MUST BE NOTED AT TIME OF DELIVERY, AND ALL CLAIMS FOR DAMAGES MUST BE FILED WITH THE TRANSPORTATION COMPANY, NOT WITH ZERO ZONE.** The carrier will supply necessary report and claim forms. Contact your Zero Zone sales representative or the service department to arrange for replacement parts.

Do not leave, store, or hold case outdoors in direct sunlight or high ambient temperature. With the end panels on, the case is airtight; the inside temperature of the case will increase, and the heat will be unable to escape. This could potentially cause any plastic inside the case to deform or warp.

Note: The installation of the appliance and the refrigerant unit must only be made by the manufacturer's service personnel or suitably qualified person.

BACK-TO-BACK WOOD PLANK REMOVAL INSTRUCTIONS

Note: The wood planks mounted under the back-to-back display cases must be removed before installation.

Remove the 8 screws securing the wooden shipping planks to the display case (4 per side), as shown in **Figure 2**.

Packaging

Each **case** in a lineup is labeled to identify the **lineup** and **joint**. The label uses a 2-digit number designation, separated by a decimal. The first number indicates the case lineup. The second number indicates the case joint. Case joints begin with the number "1" at the left most joint in the lineup when looking at the front of the lineup. The first case in the lineup will be labeled on the right end and the second case in the lineup will be labeled on the left end. The numbers on each end to be joined will match, as indicated (**See Figure 1**). Back-to-Back cases have a side "A" and a side "B".

The *first* case in a lineup (with the right side labeled "x.1") has a packet attached to the shelving that contains touch-up paint. *Every* case in a lineup has a packet attached to the shelving that contains important information about the case and/or lineup and, if applicable, special instructions for installing ordered options.

Bumpers and kickplates are shipped on top of the case. Shelves for the case are tie-wrapped and blocked into the individual cases. Other accessories like drain traps, drain pans, condensate evaporation pans, and hat channel rails are shipped in the case that require the parts.

Materials for joining cases—including caulk, joining bolts, splices, and end filler posts—are shipped in each case to be joined.

The door is prevented from opening during shipment with the use of a door-holding shipping bracket. The bracket is screwed to the top of the case at each door and should be removed when the case is unpacked.

FIGURE 1: Case Label Information

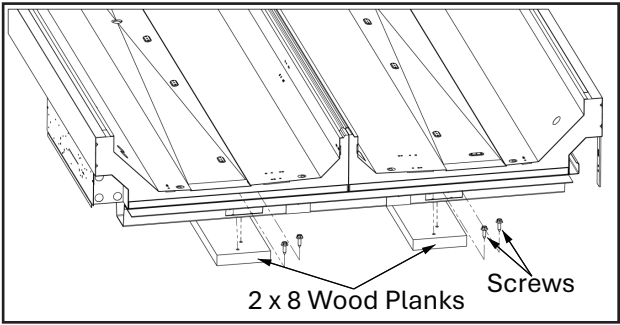
1.1	1.1	1.2 1.2

Front of Lineup

1.1B 1.1B	1.2B 1.2B
1.1A 1.1A	1.2A 1.2A

Front of Back-to-Back Lineup

FIGURE 2: Wood Plank Removal



INSTALLATION & OPERATION

Location

These cases must not be installed in the direct rays of the sun or near a source of radiant heat. Be certain that the floor under the installation is of sufficient strength to prevent sagging. Uneven surfaces will result in reduced performance.

Building soffits must be set back at least 6" from the front of the case to allow access to electrical wiring on the top of the case.

Cases should be set to allow a minimum 3" of space behind the back of the units. This will allow necessary air to circulate behind the display cases and prevent condensation. Higher humidity stores with minimal air circulation require at least a 4" gap. A minimum 2" gap is recommended between cases on end-to-end installations. All minimum spacing requirements may increase if seismic restraints are used.

Moving Cases

Various tools and equipment may be used to move cases, including, but not limited to, a forklift, a Johnson bar, a pallet jack, furniture rollers, casters, or a Rol-A-Lift. Be careful to avoid damaging the store flooring. Only certified forklift drivers should use forklifts to move the cases. The case should only be lifted off the floor as high as necessary for transport. The forklift should be driven slowly; avoid abrupt motions or bumps.

- Use the end frame to push/pull the case. For best results, push/pull lower on the end frame. **Do not push/pull on the mullions as this can cause the mullions to bend.**
- When using a Johnson bar, only contact the sheet metal of the bottom foamed panel. **Do not contact the bumper support. Be careful not to pierce the sheet metal with the corner of the Johnson bar.**
- When using a pallet jack or furniture rollers, only place them under the floor panels. **Do not place them under the bumper support or drain pipe as that will crush the components.**
- Cases have steel protective support plates under the end panels (not under insulated dividers) to protect them from Johnson bar damage.

Make sure that a forklift with the proper fork dimensions is available. **Forks must be 48" long, 1 1/2" to 1 3/4" thick, and no more than 4" wide to fit the bases.** Refer to the table below for instructions.

CASE MODELS	INSTRUCTIONS
2RVLC30	Forks must extend 26" to 30" under the case from either end
3RVLC30	Forks must extend 39" to 43" under the case from either end
4RVLC30	Forks must extend 44" to 47" under the case from either end
5RVLC30	Forks must extend 44" to 47" under the case from either end

Back-to-Back cases are shipped with wood planks that allow the use of pipe rollers. These wood planks should be removed after the case is moved to its final location.

OPTIONAL BASES

FIGURE 3: Expandable Base

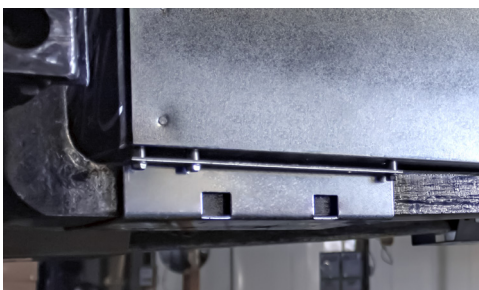


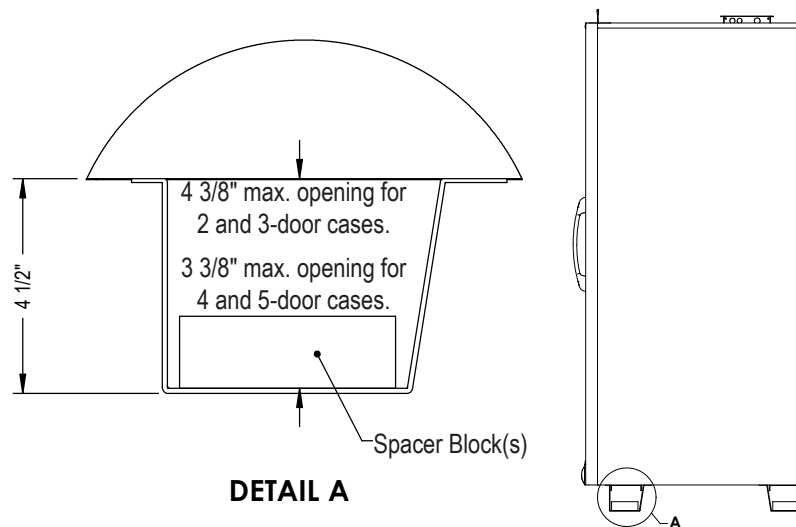
FIGURE 4: Nested Base



INSTALLATION & OPERATION

Spacer blocks are factory-installed in the end bases of 4 or 5-door cases that use bases taller than 3 1/2". These blocks limit the case's forward tilt while it is being lifted by a forklift (See "Figure 4: Nested Base" on page 6).

FIGURE 5: Spacer Block



Leveling

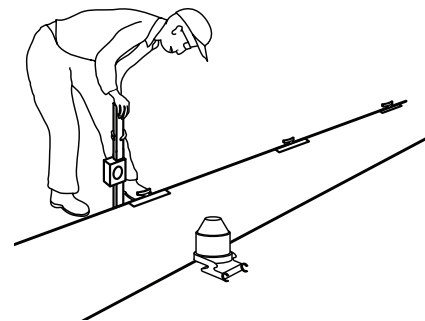
Cases should be set level from right to left to allow complete drainage of defrost and condensate water. Since a level floor area is seldom available, the following steps will ensure a level installation. If your case uses seismic restraints, specific instructions for attaching seismic restraints are included in your document package. **Read and understand these instructions before assembling the lineup.**

1. Measure off and mark on the floor the exact dimensions of the case lineup (See Figure 6). Refer to the fixture plan or floor plan.
2. Snap a chalk line at the locations for the front and back positions of the bases.
3. Mark locations of all joints, both front and back.
4. Using a laser level or transit, find the highest point along both base position lines. Using the high point as a reference, mark the difference directly on the floor to each base, both front and back (See Figure 7).

FIGURE 6: Measure and Mark Exact Case Outline



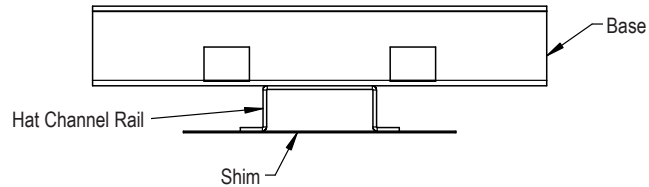
FIGURE 7: Mark Floor Level Difference



5. If your case uses optional hat channel rails to raise the case height, place shims **under** the hat channel rails (See Figure 8 on page 8). On 3 and 4-door cases, the center bases are not aligned, so the hat channel rails must be angled slightly to support the bases (See Figure 11 through Figure 12 starting on Page 9).
6. Place enough shims under each base or optional hat channel rail to equal the highest point. Shims should not extend beyond the front case bases or they will interfere with installing trim. The shims should be oriented to sit under the front and rear bends of each base. Tape all shims in place (See Figure 9 and Figure 10 on page 8).

INSTALLATION & OPERATION

FIGURE 8: Hat Channel Rail Orientation



Position hat channel rails with tape up. Place shims perpendicularly under the hat channel rails.

- 2-door cases get 2 hat channel rails.
- 3 and 4-door cases get 3 hat channel rails. Do not position under the drain hub.
- 5-door cases get 4 hat channel rails.

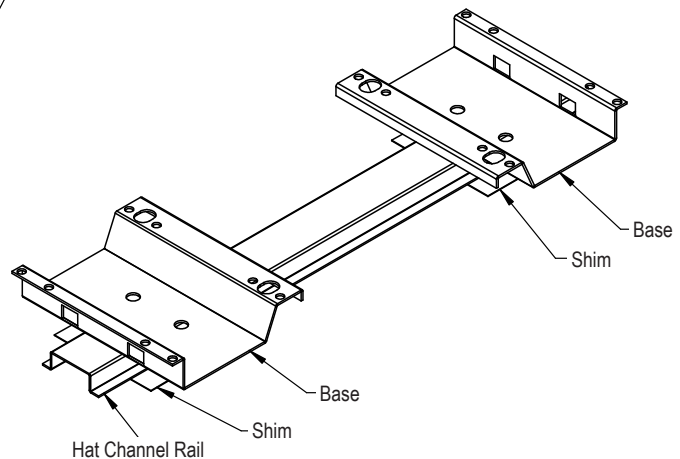


FIGURE 9: Tape Shims on the Floor Under Each Base or Hat Channel Rail

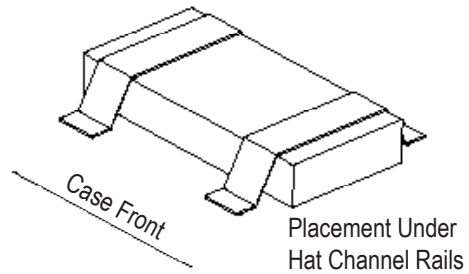
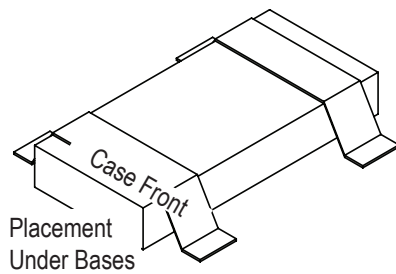
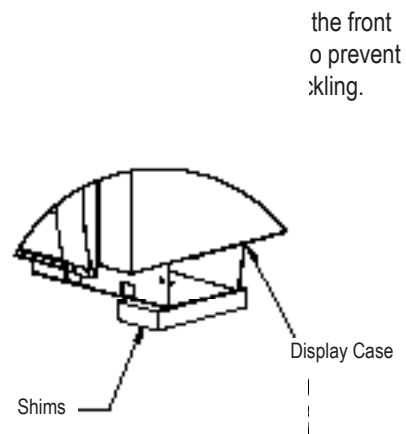
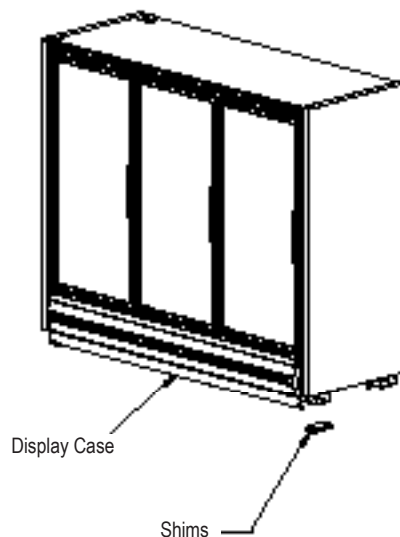


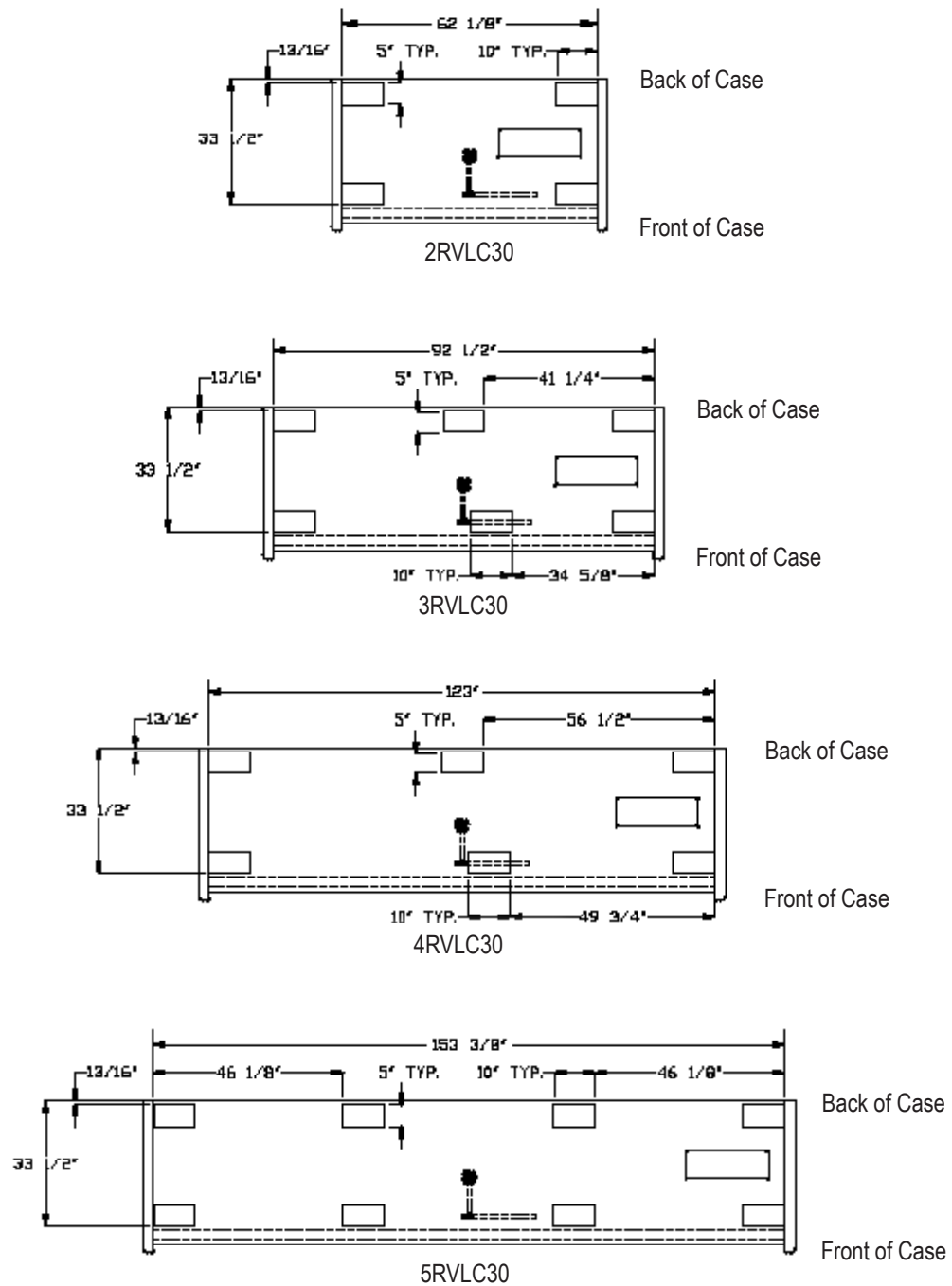
FIGURE 10: Shims Under Bases (Without Hat Channel Rails)



INSTALLATION & OPERATION

FIGURE 11: RVLC30 Base Locations

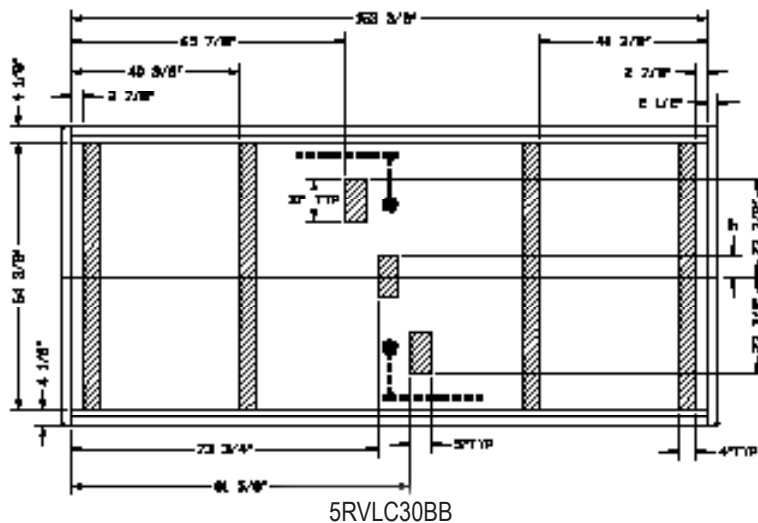
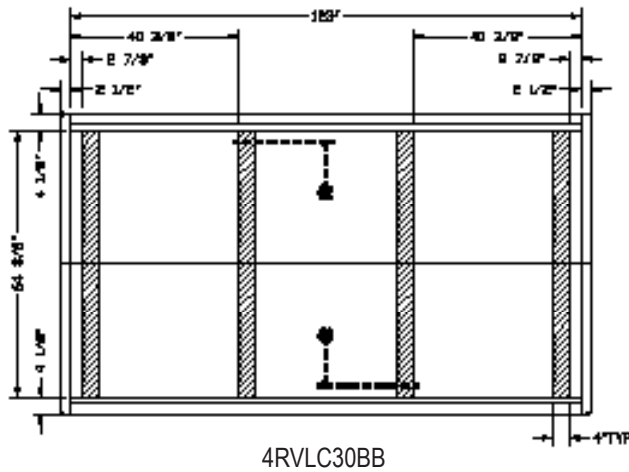
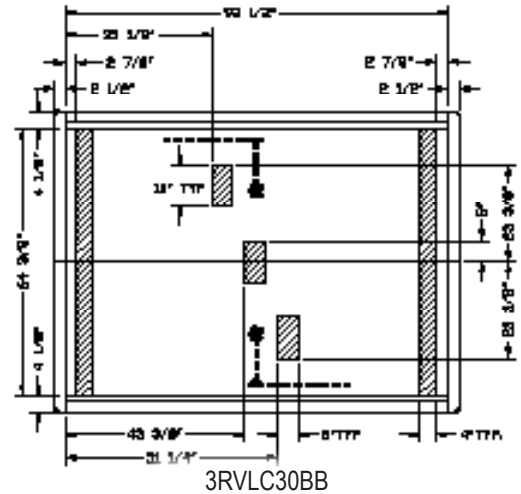
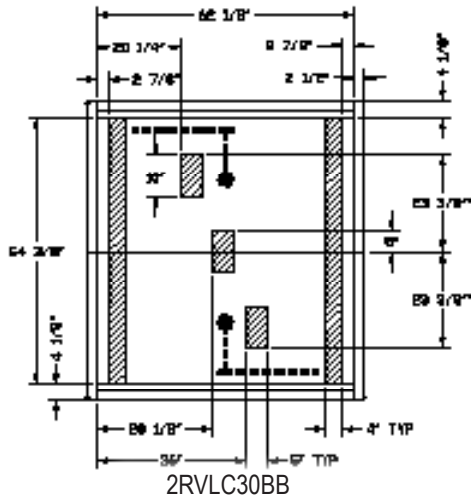
Drawings are top views with bases shown under the case. The front of the case is toward the bottom of the page.
Case length does not include end panels (2 1/2" wide each).



INSTALLATION & OPERATION

FIGURE 12: RVLC30BB (Back-to-Back) Base Locations

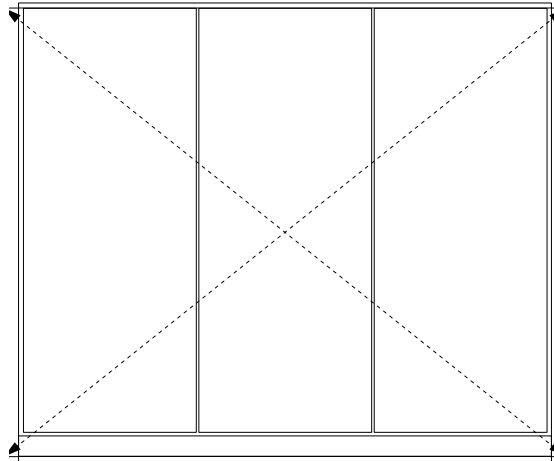
Drawings are top views with bases shown under the case.
Case length does not include end panels (2 1/2" wide each).



INSTALLATION & OPERATION

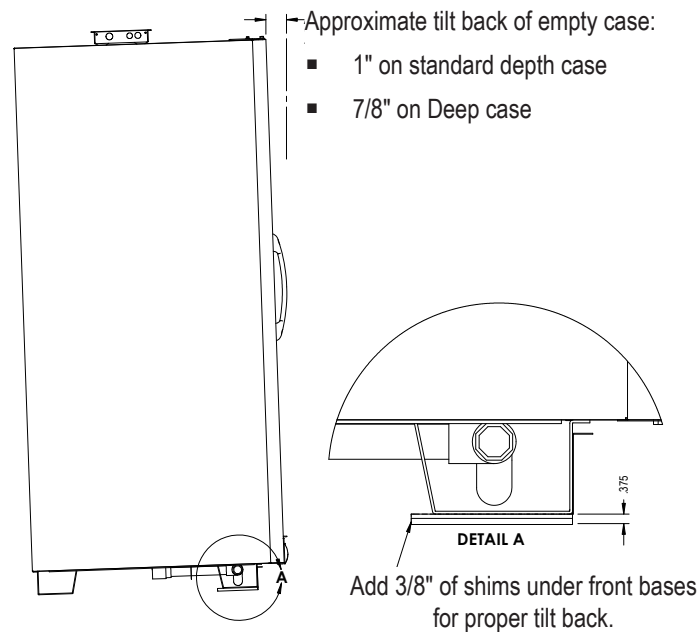
7. To maintain even, consistent gaps and proper door operation, the case must be leveled front-to-back and side-to-side. **Ensure that the case is set square to within 1/8"** (See Figure 13). After the case is set, use at least a 48" level to ensure the case is level. Add additional shims as needed under specific bases.

FIGURE 13: Case Squareness



1. Measure squareness from top right corner of the case to the bottom left corner of the case.
 2. Measure again from the top left corner of the case to the bottom right corner of the case.
 3. Measurements should be equal. Difference should be no more than 1/8".
8. Cases should be set with a slight backward tilt to offset the forward lean of a fully loaded case. We recommend an additional 3/8" of shims be installed under the front bases after the case is leveled (See Figure 14).

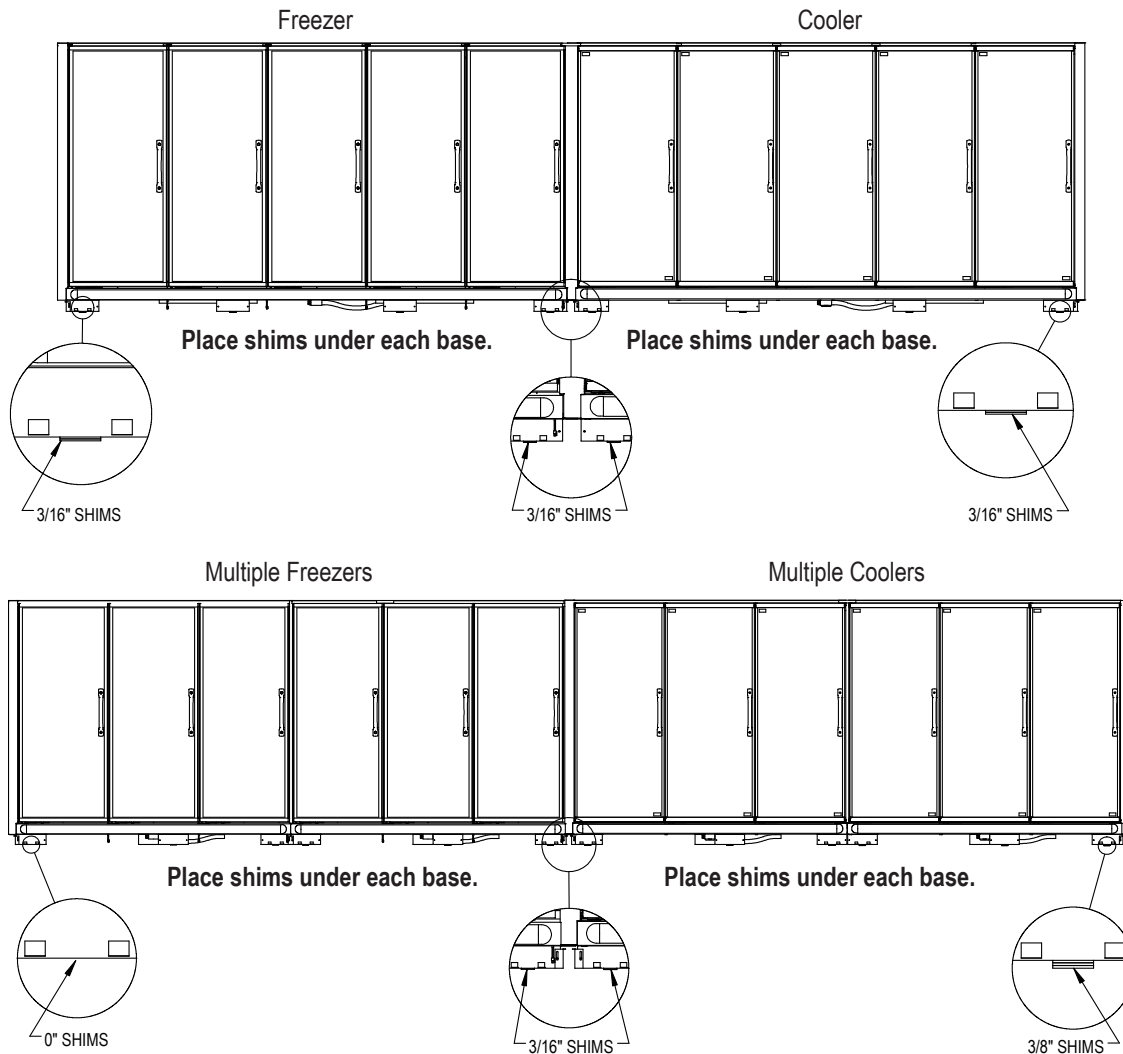
FIGURE 14: Tilt Back



INSTALLATION & OPERATION

9. When joining a Crystal™ freezer to a Crystal™ cooler, both cases should be tilted back with an additional 3/16" of shims under the front bases after the case is leveled. When joining multiple freezers and coolers in a lineup, the tilt back on the coolers should gradually increase while working away from the cooler/freezer joint until the last case has an additional 3/8" of shims under the front base and the tilt back on the freezers should gradually decrease to no additional shims while working away from the cooler/freezer joint (**See Figure 15**).

FIGURE 15: Cooler to Freezer Leveling



10. Place additional support shims under any bases or hat channel rails with gaps taller than one shim. Do not place shims between bases and hat channel rails. **Note: Total height of shims should be less than 3/4".**

Lineup Assembly

Zero Zone display cases have been designed for continuous display so that multiple cases may be joined together to create a lineup of any desired length. The lineup will be ready for assembly after removing the packaging material.

A case lineup must be properly aligned, which starts with properly leveling the case (**See "Leveling" on page 7**). It is crucial to use a laser level to measure the high points in the floor and properly shim each base location.

INSTALLATION & OPERATION

The bottom of the end panels are protected by steel support plates, which **must** be unbolted and removed before the lineup is set. There are bolts that go up through the support plates into the underside of the foamed floor.

A 1" wide vertical joint trim piece seals the vertical gap between cases. It is shipped on the left end of a case with an open end. The next case in the lineup will slide up to the trim piece so that the door seals against the trim piece. **Remove the packaging tape and the 3 screws** that hold the vertical trim during shipment, and use the provided hex bolts, acorn nuts, and washers to join the trim to the case using the top and bottom joining holes in the extrusion (See Figure 15).

A case must be prepared with Butyl caulk before setting the next case in the lineup. Case caulking instructions and caulk are shipped with every case (See Figure 16 on page 13).

Move the next case into position and bolt it to the first case using the joining bolts that are provided. Both display cases must be level within 1/8" of each other. Begin tightening the bolts at the top rear, working down the back of the case and up the front, making sure that the seams are flush. **Do not pull cases together using joining bolts.** (See Figure 17 on page 13). Alignment holes are located in the lower steel end frames. These are located 7" in from the joining holes.

An insulated divider is used to join 2 different case models or 2 different temperature cases. Use a black nylon retainer instead of the hex bolt, acorn nuts, and washers when an insulated divider is used. The divider is typically factory-installed to one of the cases. There are 2 types of insulated dividers:

1. Between a Crystal™ freezer and a different case: The insulated divider has a panel on each side with nut inserts in the panels; each side is bolted to the respective end frames. **Do not pull cases together using joining bolts.**

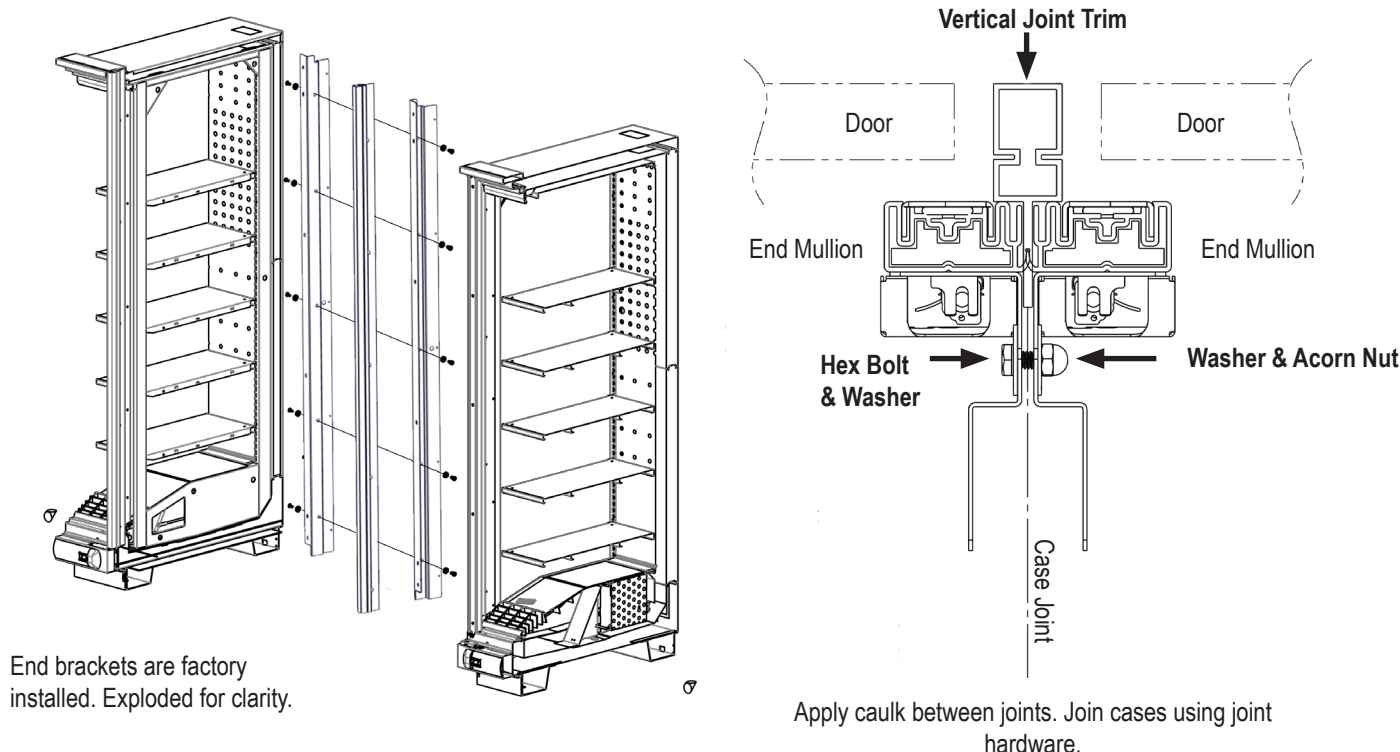
Note: Use the pattern noted in Figure 16 to caulk the insulated divider.

2. Between 2 Crystal™ freezers: The insulated divider uses a thru-bolt design. The divider is attached to one of the cases using short bolts for shipping. When the cases are installed, the short bolts are removed and longer joining bolts are installed to bolt the cases together. **Do not pull cases together using joining bolts.** (See Figure 18 on page 13).

Use a Johnson Bar or pallet jack to push the display cases together.

The interior case seams must be sealed using silicone sealant for NSF compliance (See Figure 19 on page 13). Do not allow Butyl caulk and silicone sealant to contact one another as this may affect adhesion or color of each.

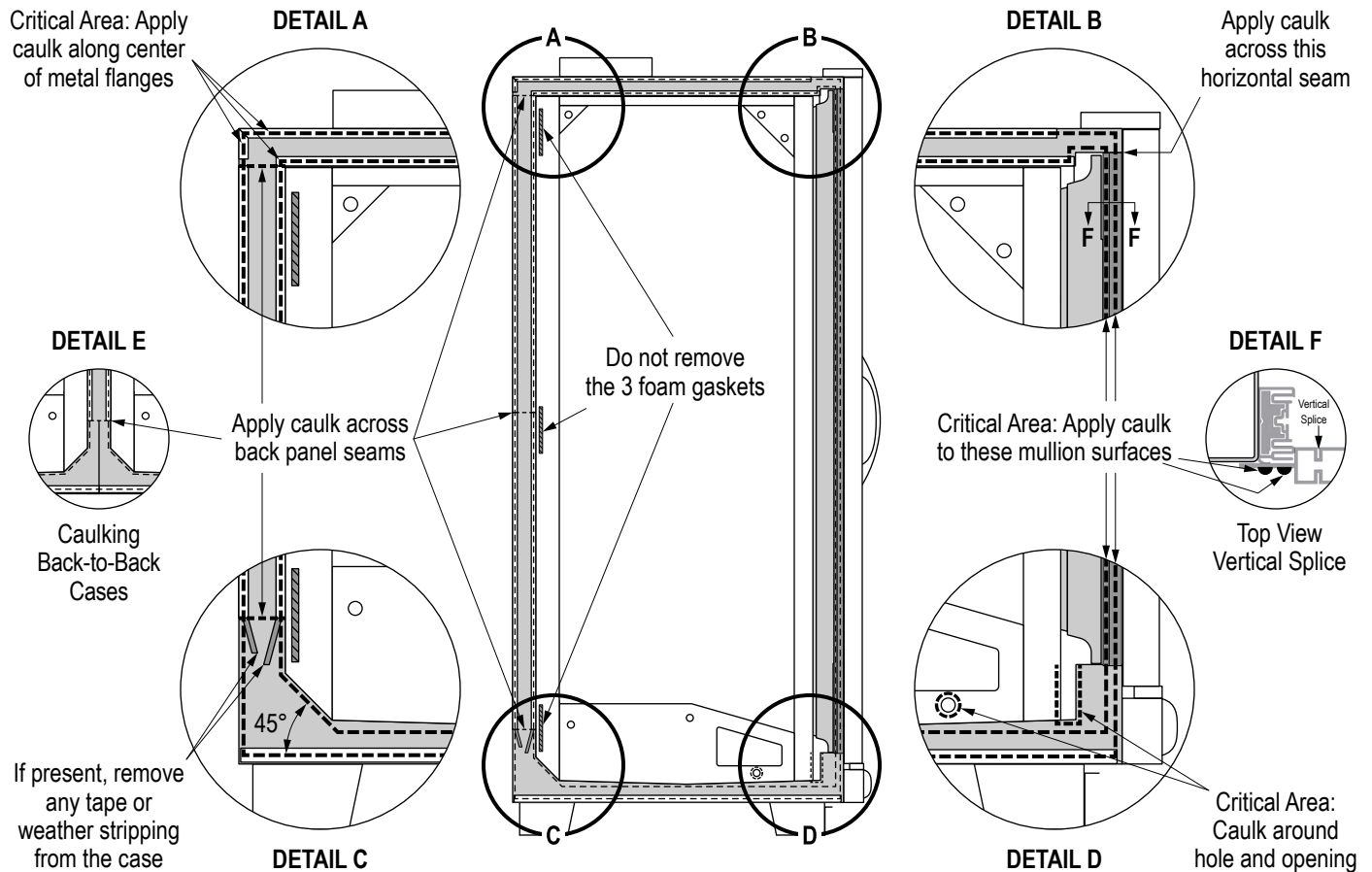
FIGURE 16: Vertical Joint Trim Installation



INSTALLATION & OPERATION

Before joining the cases, remove all packaging material on the display case, including any spacer blocks inside the bases. Repeat caulking between each case in the lineup.

FIGURE 17: Case Joint Caulking (Butyl*)



IT IS CRITICAL TO FOLLOW THIS PROCEDURE TO ENSURE CASES ARE PROPERLY SEALED.

SURFACES TO BE CAULKED MUST BE CLEAN, DRY, FREE OF TAPE/ADHESIVE, AND FREE OF FROST (ABOVE 40°F).

Note: Apply Butyl caulk to only one case—not both cases. The caulk will spread out when the cases are pushed together, and excessive caulk may squeeze out of the joint. Wipe away any caulk that squeezes out. Butyl caulk will not mix with silicone sealant (used for NSF sealing), which will affect adhesion of both.

Note: Increase bead size for irregular surfaces.

1. Remove all shipping material. This includes packaging, packing tape, and the shipping screws on the vertical trim.
2. Apply 1/2" thick beads of Butyl caulk* along the ceiling, rear wall, bottom of the case, and the mullion where indicated by the dashed lines in the drawing. Caulk must be continuous with no gaps. Always apply 2 beads where specified. Caulk must be applied around a plexiglass divider and not onto the divider itself, if applicable.
3. After cases are joined and tightened, caulk the top and back exterior seams, if accessible, to ensure a tight seal.
4. Back-to-Back (BB models) share the rear wall. Apply 2 beads of caulk along the shared rear wall as shown in **DETAIL E**.
5. **See Figure 19 on page 14** for information about NSF compliance sealing with silicone sealant.

*DO NOT APPLY BUTYL CAULK ON SEAFOOD OR BAKERY CASES. Butyl caulk never cures and emits vapors that affect seafood and bakery products. Recommended alternative caulk: Polyurethane-based (full curing, durable, moisture-activated) or silicone-based (full curing).

INSTALLATION & OPERATION

FIGURE 18: Case Joining Hardware
Only showing end frames of cases

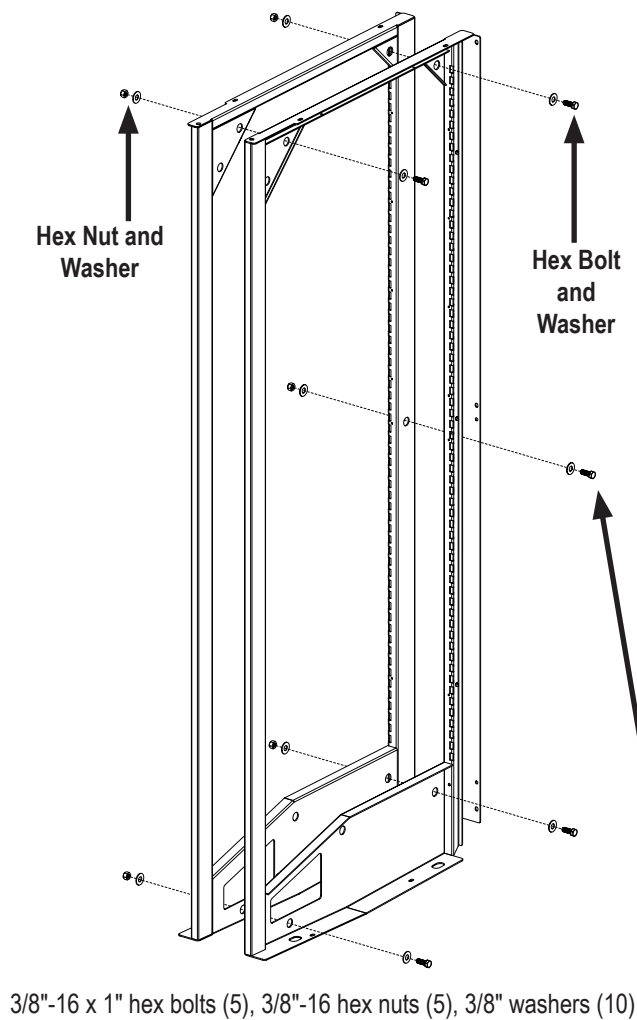
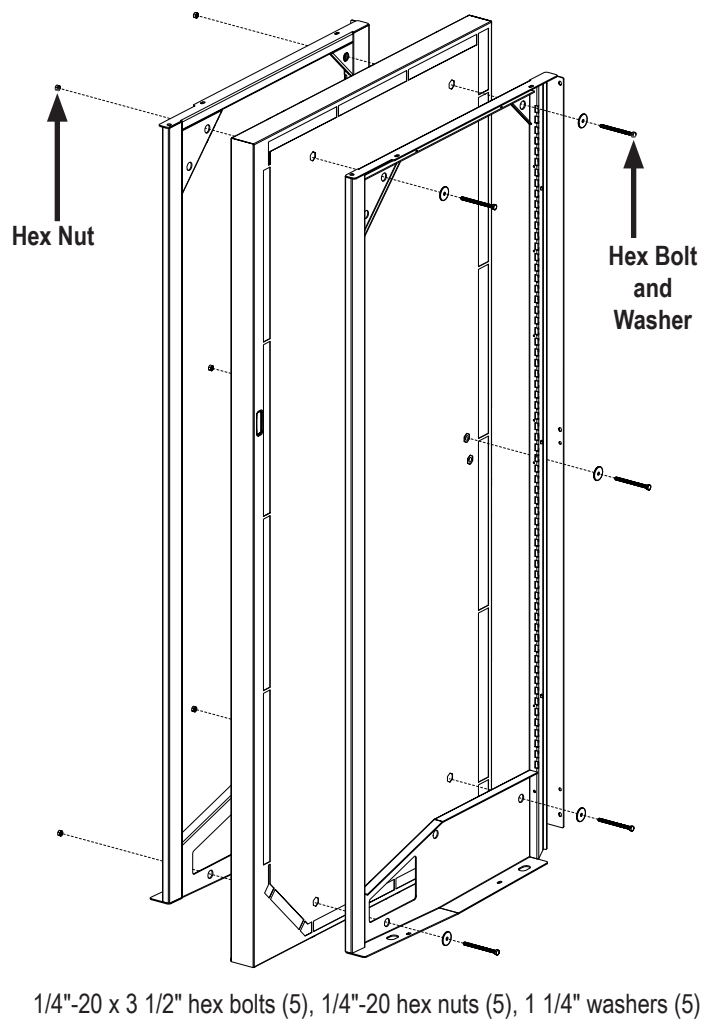


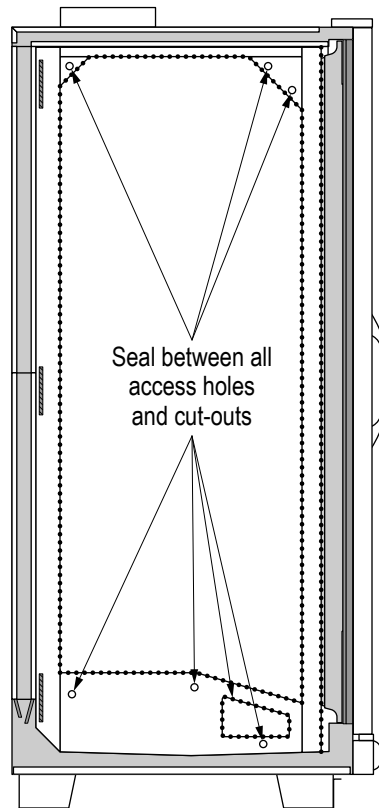
FIGURE 19: Case Joining Hardware with Insulated Divider
Only showing end frames of cases



The joining hole in the back of the case is located behind the rear duct. Remove the rear duct to install joining hardware.

INSTALLATION & OPERATION

FIGURE 20: NSF Compliance Sealing (Silicone)



THIS PROCEDURE MUST BE FOLLOWED FOR NSF COMPLIANCE.

SURFACES TO BE SEALED MUST BE CLEAN, DRY, FREE OF BUTYL CAULK, AND FREE OF FROST (ABOVE 40°F).

Note: Cases must be properly caulked and joined before NSF sealing. Wipe away any Butyl caulk that squeezes out of the case joint. Butyl caulk and silicone sealant will not mix, which affects the adhesion of both. See Figure 17 on page 14.

1. Apply silicone-based sealant in small, continuous beads where indicated by the dotted lines in the drawing. Do not thin or feather, as that will affect adhesion.
2. Sealant must be added between cases at case joints, between a case and an end panel, and between all access holes and cut-outs in the case end frame.

INSTALLATION & OPERATION

Drain

The drain is located at the center of the case in the floor pan. The 1" PVC drain outlet is located at the center front of the case behind the kickplate. To clean the drain, the kickplate must be removed for access.

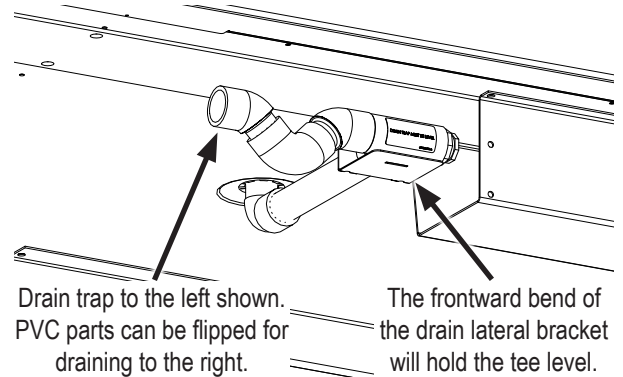
The drain trap will run through the bases. There is no room in front of the base for the drain trap because the kickplate installs directly to the front of the bases.

The tee, drain trap, and plug are shipped loose with the case. Install the tee to the lateral. **The frontward bend of the drain lateral bracket will hold the tee level (See Figure 21).** Install the drain trap to the tee in the direction of the floor drain. Plug the open end of the tee using the clean-out plug supplied with the drain trap kit. **The drain trap should be primed with water after installation.**

Complete piping from the drain trap to the floor drain. The piping must be pitched away from the drain trap enough to ensure proper drainage. Consult local codes for minimum requirements.

When cases have 1" bases, they are shipped on wooden skids or pallets, and the drain lateral and bracket must be shipped loose so they will not be crushed during shipment. Run the lateral from the floor drain. Fasten the bracket to the floor behind the forklift plates with the lateral through it. Continue with the rest of the drain installation.

FIGURE 21: Drain Installation



Condensate Removal System

Zero Zone remote cases can be equipped with a condensate removal system. The system uses a drain pan with pump located behind the kickplate and a condensate evaporation pan mounted on the top of the case.

Condensate water and any liquid spilled in the case will drain into the drain pan. The pump is equipped with a float that turns the pump on when there is a sufficient liquid level. Liquid is pumped through a plastic hose through a check valve and into the condensate evaporation pan. The evaporation pan is equipped with a heater and a float switch to turn on when the heater is submerged in liquid. When the heater is energized, the evaporation pan will be extremely hot and should not be touched. The pump and evaporation pan should be cleaned regularly. Any spilled product, other than water, should be cleaned to prevent odors.

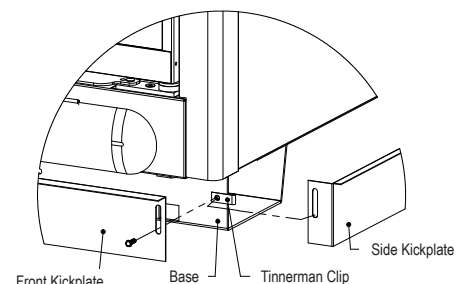
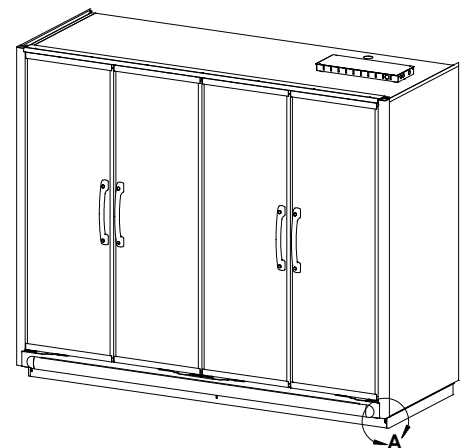
Kickplates

Each case is shipped with a front kickplate. Cases with end panels are shipped with 1 side kickplate per end panel. Cases that join together are shipped with a kickplate splice.

1. Front and side kickplates are attached to the case bases using Tinnerman clips. Install Tinnerman clip at each base (See Figure 22).
2. Position side kickplate.
3. Position front kickplate with flange on top and facing outward.
4. Insert screws through the front and side kickplates and into the Tinnerman clips.

There is a natural gap between the top of the kickplate and the underside of the Crystal Merchandiser® that allows airflow of 50 CFM per door. Contact the factory to order optional louvered kickplates (provides 150 CFM per door) if additional airflow is required.

FIGURE 22: Kickplate Installation



DETAIL A (EXPLODED)

INSTALLATION & OPERATION

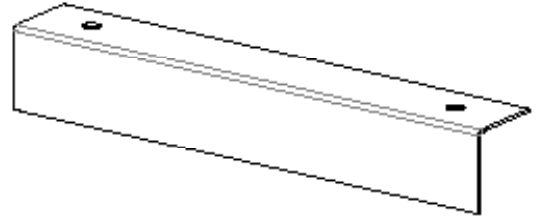
Bumper

Cases are supplied with a 3" protective bumper shipped loose on top of each case. Each case has its own bumper assembly, including end caps. The steel bumper support and snap track are factory installed on the front of the case. The bumper may need trimming before snapping it onto the snap track.

Top Trim Splice

Top trim is factory installed, and it hides the door hardware located on the top exterior of the case. Joint splices are shipped loose and must be field installed at the upper case joints (See Figure 23). Screw the top trim joint splice into the top trim.

FIGURE 23: Top Trim Splice

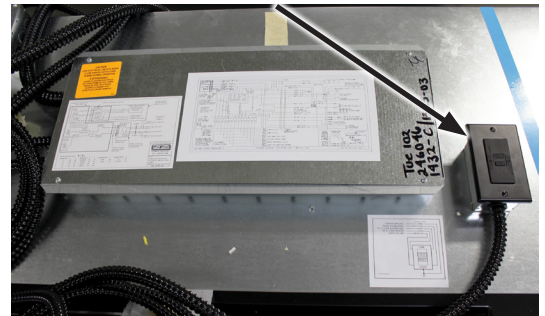


CoolView® Doors

ANTI-SWEAT RESET BUTTON

The door anti-sweat circuit on CoolView® Illusion™ doors is protected by a ground fault interrupt (GFI) device. The reset button is located on the top of the display case near the electrical box (See Figure 24).

FIGURE 24: Anti-Sweat Reset Button



DOOR HANDLES

CoolView® Illusion™ doors use the CoolArc™ door handle. The CoolArc™ door handle is attached to the glass surface of the door by an industrial-grade adhesive.

HOLD-OPEN BRACKET

CoolView® doors are self closing, and closing tension increases as the door opens wider. The hold-open bracket keeps the door open when engaged, which is useful for stocking shelves or case maintenance. To engage the hold-open bracket, open the door to at least 90° until it clicks. Closing the door to about 80° will release tension on the door, and it will self close again.

The hold-open bracket is located on the bottom of the door on Crystal™ freezers (See Figure 25).

FIGURE 25: Hold-Open Bracket



DOOR GASKET

Each single-swing door has a full perimeter gasket mounted to the edge of the door.

ADJUSTING DOOR SAG/SAWTOOTH

Door sag/sawtooth is when the handle-side of the door is either higher or lower than the adjacent door. To fix door sag on Crystal™ freezers, the torque adjuster must be moved by turning the sag adjustment screw.

1. Open the door to gain access to the sag adjustment screw on the bottom of the hinge side of the door (See Figure 25).
2. Use a flathead screwdriver to turn the sag adjustment screw. **Do not use power tools; a screwdriver allows for more control.**
3. To lower the handle side of the door, turn screw clockwise. The torque adjuster should move away from you as you turn the screw.
4. To raise the handle side of the door, turn screw counter-clockwise. The torque adjuster should move toward you as you turn the screw.
5. Turn the sag adjustment screw until the door is level with the adjacent door.

INSTALLATION & OPERATION

TORQUE ADJUSTER / ADJUSTING DOOR TENSION

The torque adjuster automatically closes the door. It is located on the bottom of the hinge side of the door. The torque rod inside the door sets into the torque adjuster, which transfers the closing tension to the torque rod. This means that the torque rod must be aligned with the torque adjuster when installing a door. An adjustment screw on the front can be used to increase or decrease tension.

1. Open the door to observe current door tension. A properly tensioned door will close itself gently and not swing open.
2. Use a flathead screwdriver to turn the door tension screw (**See Figure 26**). **Do not use power tools; a screwdriver allows for more control.**
3. To increase tension, hold the door open 2 inches and turn the screw counter-clockwise until the door begins to close. Once it closes, increase tension by 2 more turns.
4. To decrease tension, turn the screw clockwise.

REMOVING A DOOR

1. Remove the top case trim and electrical raceway cover that covers the door hinges.
2. Turn the door tension screw clockwise until the door does not close on its own (**See Figure 26**). This removes tension between the door and torque adjuster so the door can be removed.
3. Disconnect the hold-open bracket from the bottom of the door (**See Figure 25 on page 18**).
4. Crack open the door and add a wedge, such as a screwdriver. Use a needle-nose pliers to pinch the hinge pin while closing the door. This will disconnect the door from the case (**See Figure 27**). **Note: The door is heavy. Be prepared to catch the weight of the door.**
 - a. Alternative: Use a needle-nose pliers to pinch the hinge pin, and then pull the top corner of the door away from the case. **Note: The door is heavy. Be prepared to catch the weight of the door.**
5. Lift the door clear of the torque adjuster and set it down carefully. **Note: For safety, lift the door by the rails; do not lift by the handle.**

INSTALLING A DOOR

1. Lift the door and set it into the torque adjuster. Swivel the door back and forth until you can feel that the door has dropped into the torque adjuster. **Note: The door is heavy. For safety, lift the door by the rails; do not lift by the handle.**
2. Carefully open the door until it is perpendicular to the case, align the hinge pin, and then push the top of the door so the hinge pin clicks into place (**See Figure 28**). **Note: Test whether the door is held securely by the hinge pin by pulling down on the door.**
3. Attach the hold-open bracket between the bottom of the door and the bottom of the case (**See Figure 25 on page 18**).
4. Turn the door tension screw counter-clockwise until the door gently closes itself (**See Figure 26**). Check for sag/sawtoothing.

FIGURE 26: Door Tension Screw

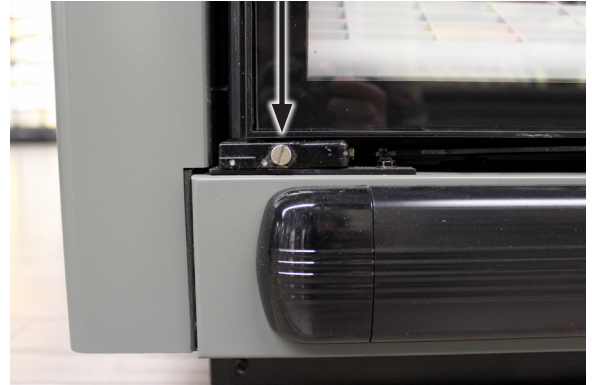


FIGURE 27: Use a Wedge & Pinch Hinge Pin



FIGURE 28: Push Door & Hinge Pin into Place



INSTALLATION & OPERATION

REVERSING DOOR SWING

1. Remove the top case trim and electrical raceway cover that covers the door hinges.
2. Remove the door from the display case. See **"Removing a Door"** on page 19 for a detailed description. **Note: The door is heavy. For safety, lift the door by the rails; do not lift by the handle.**
3. Lift the door clear of the torque adjuster and lean it on its side, handle side down. This makes it easier to access the wiring cover on the hinge side of the door.
4. The wires to the hinge pin must be disconnected. Remove the wiring cover, disconnect the ground screw, and then pull the wires out of the door (See Figure 29). Pry the hinge pin out from the top of the door and tug on it to identify which wires need to be disconnected (See Figure 30). Disconnect the bullet connectors and pull the hinge pin out.
5. Pry the torque rod from the bottom of the door using a screwdriver (See Figure 31).
6. Remove the hold-open bracket from the door.
7. Reinstall the hinge pin, torque rod, and hold-open bracket on the opposite ends of the door. For the hinge pin, after feeding the wires through the door and reconnecting them, it may be easiest to bundle the wires into 2 "ponytails" to fit them inside the door (See Figure 29).

FIGURE 29: Hinge Pin Wiring

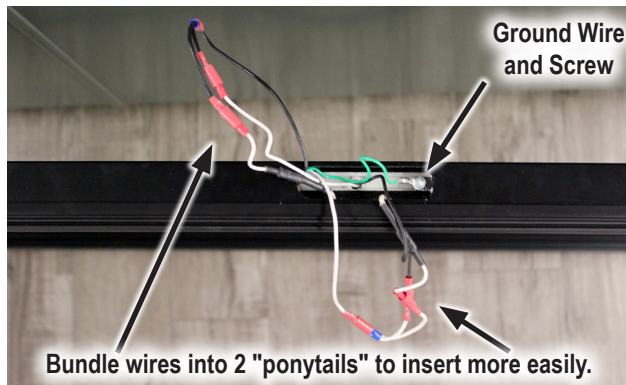


FIGURE 30: Remove Hinge Pin

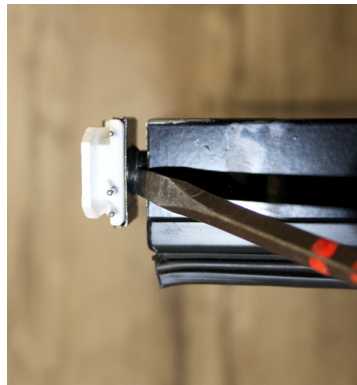
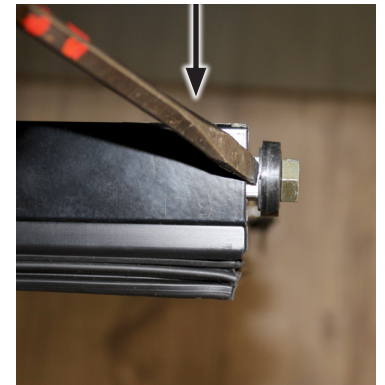


FIGURE 31: Remove Torque Rod

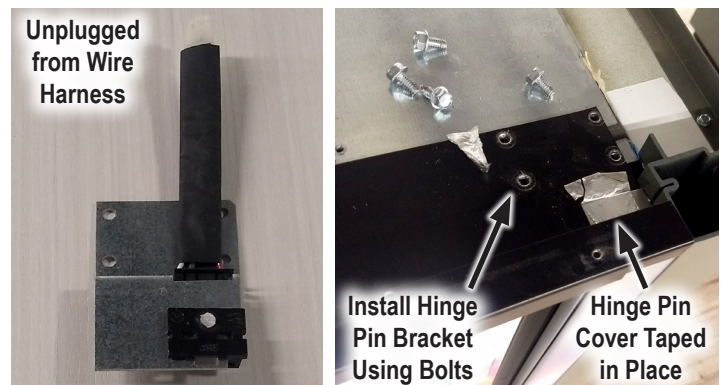


8. Move the hinge to the opposite side by swapping the hinge pin bracket and hinge cover (See Figure 32 and Figure 33).
 - a. Inside the electrical raceway, unplug the hinge pin from the wire harness. Use a 3/8" socket to remove the bolts that hold the hinge pin bracket, set the bracket aside, and reinstall the bolts into the backer plates.
 - b. Remove the hinge pin cover and bolts on the opposite side of the door, and then install the new hinge pin bracket using those bolts.
 - c. Plug the wire harness into the new hinge pin. Tape the hinge pin cover on the opposite side.

FIGURE 32: Switch the Hinge to the Opposite Side



FIGURE 33: Hinge Pin Bracket



INSTALLATION & OPERATION

FIGURE 34: Torque Adjuster Locking Screw

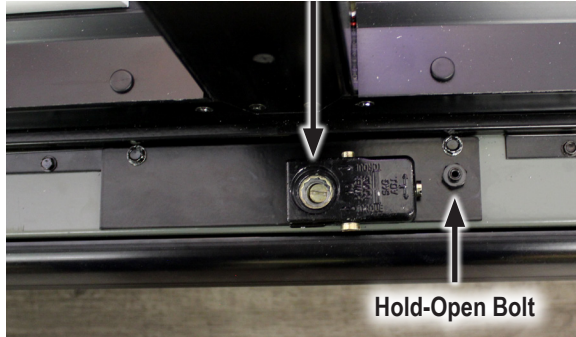
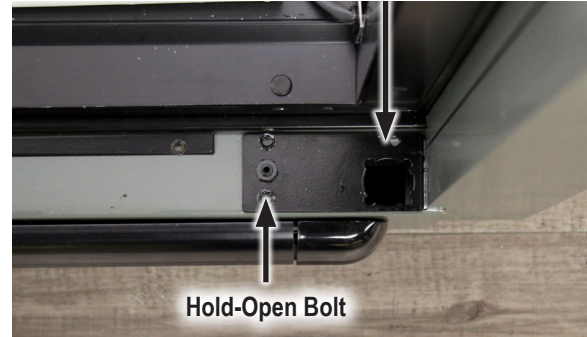


FIGURE 35: Empty Torque Adjuster Bracket



9. Unlock the torque adjuster from the case by turning the locking screw that was under the torque rod by 1/16 turn (See Figure 34). Remove the torque adjuster and save it to reuse on the opposite side.
10. Remove the torque adjuster bracket in order to remove the hold-open bolt (See Figure 34). Reinstall the empty bracket and add a plug into the hole left by the torque adjuster.
11. Remove the blank bracket on the opposite side of the door and replace with a new torque adjuster bracket (See Figure 35). Install the hold-open bolt, and then install the torque adjuster and lock it into place.
12. Install the reversed door. See "Installing a Door" on page 19 for a detailed description. **Note: The door is heavy. For safety, lift the door by the rails; do not lift by the handle.**
13. Reinstall the top trim piece and electrical raceway cover on top of the case.

Shelves & Stocking Product

Tilt the shelf sideways and bring it through the door. Level the shelf inside the case and tilt the back of the shelf down so the shelf tabs fit into the slots in the shelf standards. Lower the front of the shelf until the shelf is held securely by the standards. To unassemble a shelf, insert a putty knife between the side of the shelf and the shelf bracket. Pry the pieces apart to disengage the bracket.

Shelf location may be adjusted in 1" vertical increments in any position for best display advantage. Make sure the shelf brackets are securely seated before placing any product on the shelf. The standard shelves may be tilted down at a 10° angle. Optional shelf assemblies are available that may be tilted at 5°, 10°, or 15° angle.

The case may be stocked with product after it has operated at least 24 hours with correct case temperature and proper control operation. When stocking the shelves, leave a gap between the product and the shelf above, which allows an air curtain on top of the product. Product should not extend beyond the front of the shelves or bottom wire rack. **Do not exceed shelf load capacity (See Figure 36).** Ice merchandiser load limit is up to 30 pounds per cubic foot; refer to case spec sheet. **Do not stand on the case when stocking or adjusting shelves.**

Shelves can be ordered with 1", 2", or 3" acrylic product stops, which slides into the aluminum price tag molding (See Figure 37). The channel of the price tag molding may need to be pried open with a screwdriver, but the product stop should slide in easily once started.

FIGURE 36: Shelf Load Capacities

SHELF TYPE	WIDTH	DEPTH	BRACKET TYPE	LOAD CAPACITY (LBS.)
Solid Shelf	30"	22"	2-Position (0°/10°)	350/150
			4-Position (0°/5°/10°/15°)	250/250/150/100
		24"	2-Position (0°/10°)	350/150
			4-Position (0°/5°/10°/15°)	250/250/150/100
Wire Shelf	30"	22"	2-Position (0°/10°)	250/150

FIGURE 37: Acrylic Product Stop



Product stop fits into the price tag molding.

INSTALLATION & OPERATION

FIGURE 38: Shelf Load Capacities

SHELF WIDTH	SHELF DEPTH	# OF SUPPORTS BELOW SHELF	SHELF BRACKET POSITION	CAPACITY AT 0°	CAPACITY AT 5°	CAPACITY AT 10°	CAPACITY AT 15°
24"	10" 12" 14" 15" 16" 18"	2	2	250 lbs	N/A	150 lbs	N/A
		3	2	250 lbs	N/A	150 lbs	N/A
	20"	3	2	250 lbs	N/A	150 lbs	N/A
	10" 12" 14" 16" 18"	2	4	250 lbs	250 lbs	150 lbs	100 lbs
	20"	3	4	250 lbs	250 lbs	150 lbs	100 lbs
	22" 24"	2	2	350 lbs	N/A	150 lbs	N/A
		2	4	250 lbs	250 lbs	150 lbs	100 lbs
	27"	4	2	350 lbs	N/A	150 lbs	N/A
30"	24"	1	2	175 lbs	N/A	75 lbs	
	18" 20"	2	2	250 lbs	N/A	150 lbs	N/A
	22" 24"	2	2	350 lbs	N/A	150 lbs	N/A
		2	4	250 lbs	250 lbs	150 lbs	100 lbs
	27"	2	2	350 lbs	N/A	150 lbs	N/A
48"	22" 24"	3	2	350 lbs	N/A	150 lbs	N/A
	10" 12" 14" 16"	2	2	350 lbs	N/A	150 lbs	N/A
	18" 20"	3	2	350 lbs	N/A	150 lbs	N/A
	27" 30"	4	2	350 lbs	N/A	150 lbs	N/A

CONT. ON NEXT PAGE

INSTALLATION & OPERATION

CONT. FROM PREVIOUS PAGE

SHELF WIDTH	SHELF DEPTH	# OF SUPPORTS BELOW SHELF	SHELF BRACKET POSITION	CAPACITY AT 0°	CAPACITY AT 5°	CAPACITY AT 10°	CAPACITY AT 15°
48"	10" 12" 14" 16"	2	4	350 lbs	250 lbs	150 lbs	100 lbs
	18" 20"	3	4	350 lbs	250 lbs	150 lbs	100 lbs
	22"	4	4	350 lbs	250 lbs	150 lbs	100 lbs
	24"	5	4	350 lbs	250 lbs	150 lbs	100 lbs

! WARNING! DO NOT LOAD SHELVES BEYOND LOAD LIMIT LINE (SEE FIGURE 39). OVERLOADING WILL DISRUPT AIRFLOW AND PREVENT UNIFORM TEMPERATURE BALANCE WITHIN THE DISPLAY CASE.

FIGURE 40: Shelf Angling and Supports

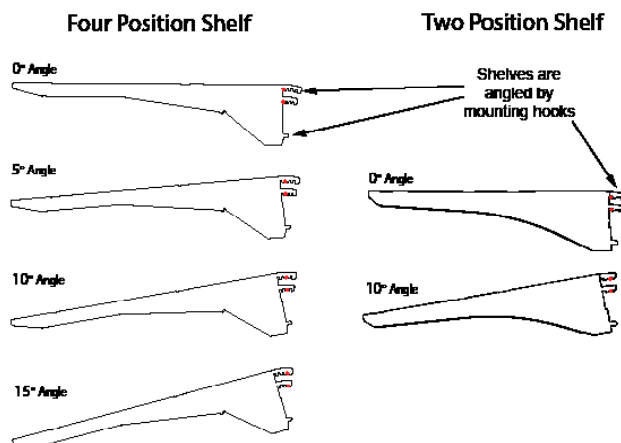
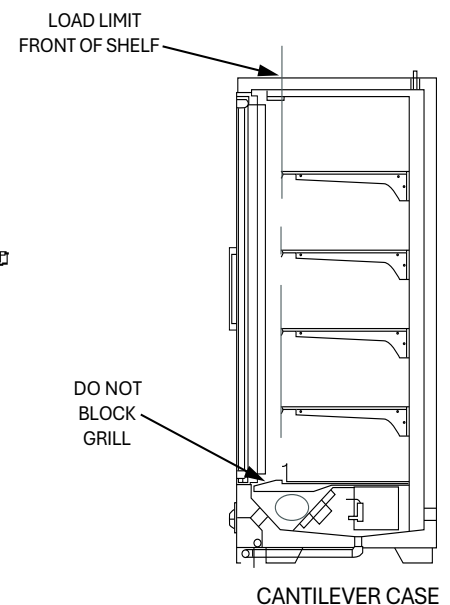


FIGURE 39: Shelf Load



REFRIGERATION

! WARNING! REFRIGERATION SYSTEMS USING R-744 (CO₂) ARE UNDER HIGH PRESSURE. DO NOT TAMPER WITH THE SYSTEM. CONTACT QUALIFIED SERVICE PERSONAL BEFORE DISPOSAL.

Symbols and Definitions



Symbol ISO 70000-1701 (2004-01)

Pressure

Mechanical Components

EVAPORATOR COIL

The evaporator coil, located at the rear bottom of the case, is factory assembled with distributor, expansion valve, and other refrigeration components. To inspect the coil, remove the center or left of center coil cover. A small inspection window is located at the rear of the case. To inspect the entire coil, remove the remaining coil covers and raise the evaporator cover.

EVAPORATOR FANS

Air is circulated throughout the case by fans. Fan motors must be operating at all times except during defrost. Fan motors should be replaced with motors having the same characteristics including type, size, lubricant temperature range, wattage, and RPM. Fan blades should be replaced with OEM parts or have the same fan pitch as the OEM fan blade.

! CAUTION! DISCONNECT POWER TO THE CASE BEFORE SERVICING ELECTRICAL COMPONENTS TO AVOID PERSONAL INJURY AND DAMAGE TO THE UNIT.

1. Disconnect power to the fan.
2. Remove the fan blade nut and fan blade.
3. Remove the two mounting bolts and remove the fan assembly from the fan housing.
4. Remove the three fan motor mounting screws from the back of the fan motor.
5. Replace the fan, and reverse steps 1-3 to install the cover and restore case power.

EXPANSION VALVE

Unless otherwise specified, a superheat-adjustable, externally equalized thermostatic expansion valve (TXV) with a removable strainer and pressure limiting charge is mounted to the evaporator coil. The TXV is not preset. Adjust the superheat setting for maximum coil effectiveness. Typical superheat settings are between 6°F and 10°F. Contact Zero Zone for superheat setting if using high-glide refrigerants. Cases connected to a condensing unit should use the higher superheat setting to minimize the chance of liquid flood back.

To adjust the TXV, remove the right end coil cover. On Sporlan TXVs, remove the cap on the bottom of the TXV. On Danfoss TXVs, remove the nut on the side of the TXV. When looking at the valve stem end, turn the valve stem counterclockwise to decrease superheat. Turn the valve stem clockwise to increase superheat. Measure the suction line temperature at the TXV sensing bulb and compare it to the suction temperature corresponding to the saturated pressure. Make sure that line pressure drop is taken into account.

Turn the valve stem only 1/4 turn at a time and allow sufficient time (20 to 30 minutes) for the TXV to settle before making further adjustments. Replace the valve stem cap after the superheat has been adjusted. ***Be certain the valve stem cap is wiped dry first.***

REFRIGERATION

Refrigerant Piping

The display case must be connected to a refrigeration unit using the same refrigerant indicated on the display case serial tag.

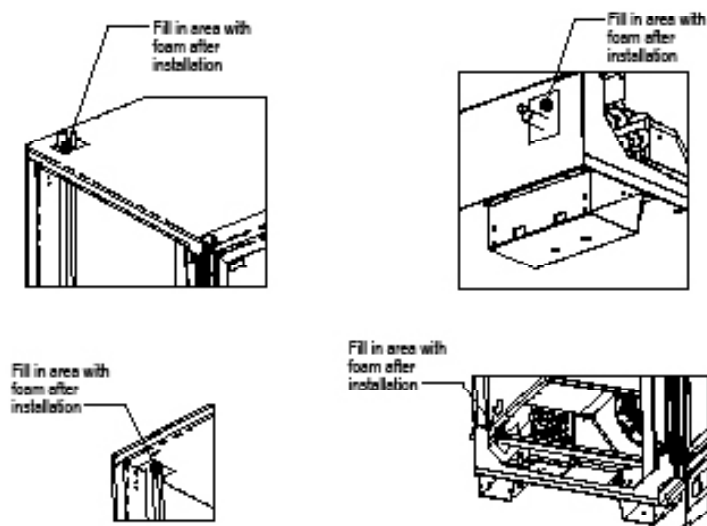
Unless otherwise specified, the liquid and suction connections are made inside the case under the removeable evaporator fan/coil return air grill bottom. Refrigerant piping is secured to inside wall by straps located behind the rear duct. Lift out rear duct, loosen straps, and complete all refrigeration connections. Refrigerant piping may enter the case through the front left bottom, the left rear bottom, or the left rear top of case. The copper pipe should not touch or rub on the edges of the sheet metal and should sit at least 1" from all galvanized surfaces.

Correct refrigeration line sizing and industry standard installation practices are essential for proper system operation. Zero Zone offers many refrigerant choices. We recommend using the Sporlan Virtual Engineer Toolbox to calculate sizing for liquid, suction, and discharge lines: <https://solutions.parker.com/sporlanvirtualengineer>. Go to the link, select the line type, and then enter the information required to calculate the recommended line size. Toggle between metric or imperial units as needed.

Refrigeration risers should be sized to maintain proper refrigerant velocity and oil return. Zero Zone recommends one riser per refrigeration circuit on circuits utilizing hot gas defrost. Field piping must be 3" away from the defrost heater element on cases utilizing electric defrost.

The end frames on the cases have cut-outs built into them to allow for case-to-case field piping.

FIGURE 41: Penetration Sealing



When multiple case sections are connected to a single compressor, the main liquid and suction line for the group should be run through the cases and be brought out through the refrigeration outlet of a single case only. The factory recommends 1 riser per circuit/system for hot gas defrost when using top back refrigeration exit. The end frames on the cases have cut-outs built into them to allow for case-to-case field piping.

Tighten straps when all refrigeration connections are completed. After connections have been made, the refrigeration access hole in the case must be sealed completely with an aerosol-dispensed urethane insulation or equivalent (e.g. GREAT STUFF[™]). Penetrations made in sheet metal baffles should also be sealed. **See Figure 20 on page 36.** Remove all foam blocks and foam spacers from the coil piping before start-up. The foam blocks are used for shipping only.

Cases will be equipped with a liquid-line filter drier by default. Cases using CO₂ will be equipped with pressure-relief ball valves on the liquid line and suction line for easier servicing.

Leak Check, Evacuation, & Charging

After all of the refrigeration piping and system components have been assembled, the entire system must be pressurized and checked for leaks. When the system is leak free, evacuate with a deep vacuum pump. Triple evacuation should be done to 500 microns or less, and nitrogen

REFRIGERATION

sweep is recommended. After the system has been thoroughly evacuated of all moisture and non-condensable gas, charge the system with the specified refrigerant.

Operation Set Points

Refer to the case spec sheet for btu/h requirements and electrical requirements. Customers may operate their cases based on a variety of set points, including evaporator temp, return air, discharge air, or condensing unit pressure. Operate the case at the following settings to maintain correct product temperature (See Figure 42). The settings are approximate due to variations in gauge accuracy, differences in compressor efficiency, line pressure drop, and superheat settings. Before making adjustments for store or stocking conditions, make sure the superheat is set. Close coupled systems typically run at the higher end of this range to avoid flood back. For Hybrid™ cases, please refer to the Hybrid™ Installation & Operation Manual.

FIGURE 42: Case Temperature Internal Control Options

SETTING	FROZEN FOOD			ICE CREAM		
Evaporator Temp	-7°F			-16°F		
Return Air Temperature Set Point	0°F			-9°F		
Return Air Temperature Differential	6°F			6°F		
Discharge Air Temperature Set Point	-3°F			-12°F		
Discharge Air Temperature Differential	6°F			6°F		
SETTING	R-404A	R-448A	Sat. Temp	R-404A	R-448A	Sat. Temp
Condensing Unit Cut-In	31 psig	23 psig	-2°F	23 psig	16 psig	-11°F
Condensing Unit Cut-Out	25 psig	18 psig	-8°F	18 psig	12 psig	-17°F
Note: Set points based on superheat of 6-8°F. For high-glide refrigerants, use dew point for unit sizing. Adjust evaporator pressure as needed to maintain discharge air temperature. To receive the full benefit of high-glide refrigerant properties, the superheat may need to be lowered to 4-6°F. Contact Zero Zone with questions.						

Defrost

Periodic defrosting to keep the evaporator coil free of frost is accomplished by a time clock used in conjunction with an electric or hot gas defrost. Defrost is typically scheduled at night to avoid periods of heavy shopping or stocking. Use a temperature-terminated defrost with a defrost termination thermostat or probe for optimal performance.

The refrigeration technician should recheck coil conditions after one week of normal operation to ensure that the frequency and duration of defrost is adequate.

FIGURE 43: Defrost Settings

SETTING	FROZEN FOOD		ICE CREAM	
Defrost Type	Electric	Hot Gas	Electric	Hot Gas
Frequency	1 Per Day	1 Per Day	1 Per Day	1 Per Day
Duration	55 Minutes	30 Minutes	55 Minutes	30 Minutes
Temperature Termination Set Point	50°F	65°F	50°F	65°F

Note: Hot gas drip time is 5 minutes. A reduced temp option would take 40 minutes.

REFRIGERATION

ELECTRIC DEFROST - SETTINGS

See Figure 43 for defrost settings.

The compressor stops when the defrost is initiated in a non-pump-down system. On pump-down systems, the liquid line solenoid will be de-energized when the defrost is initiated. The clock will energize the defrost contactor, which will energize the defrost heater. This de-energizes the fans and anti-sweat heaters. After the defrost period, the compressor will operate and fans will start on a delay.

Electric defrost thermostat are open-on-rise contacts that are wired in series with the defrost heaters. Unless the installer rewires the defrost thermostat, the defrost heater is de-energized when defrosting is complete.

Electric defrost termination temperature is set at 50°F. At ASHRAE test conditions and 208V defrost heater operation, the observed defrost durations are typically 30 minutes for frozen food and 40 minutes for ice cream. Electric defrost termination sensors are located in the center of the evaporator coil.

If it is not possible to terminate the defrost cycle based on a defrost termination thermostat or probe sensing the temperature at the coil, and the only available temperature probe is sensing the discharge air temperature, then the termination temperature should be set to 65°F, with 0 minutes drip time. Duration will vary depending on how much frost accumulates on the coil.

Freezers with electric defrost are equipped with a safety cutout thermostat (high-limit, snap-disc type) that de-energizes the defrost heater if the coil temperature exceeds 85°F to provide a secondary safety termination. This thermostat is installed at the right end of the evaporator coil.

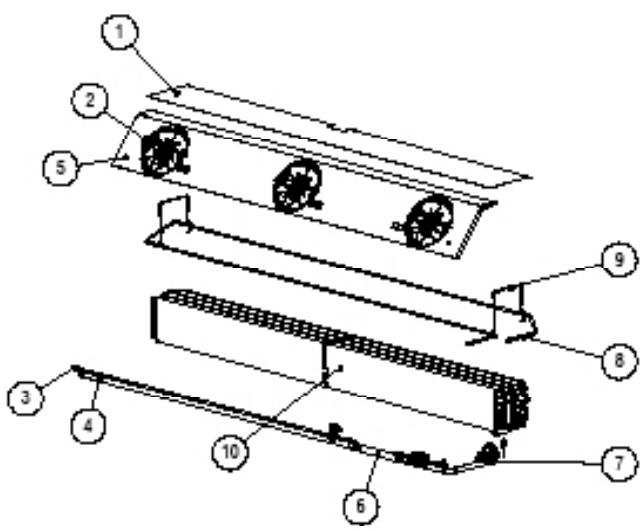
ELECTRIC DEFROST - COMPONENTS

See Figure 44 for defrost components.

Half of the U-shaped defrost heater element is located on the front of the coil and the other half is located on the rear of the coil. The front heater is located approximately 1" off the floor and the rear heater is approximately 2" off the floor. The heater is secured to the coil by stainless steel heater retaining clips. The heater is fastened to the floor on the right-hand side of the coil. The electric wire leads are connected in a raceway under the coil cover on the right-hand side of the case.

To replace the heater element, remove the fasteners that hold it to the case floor. First, pull the front leg of the retaining clip away from the coil and slide the heater out from under the clip. Then the rear leg of the heater can then be removed by raising the retaining clips 2" at a time,

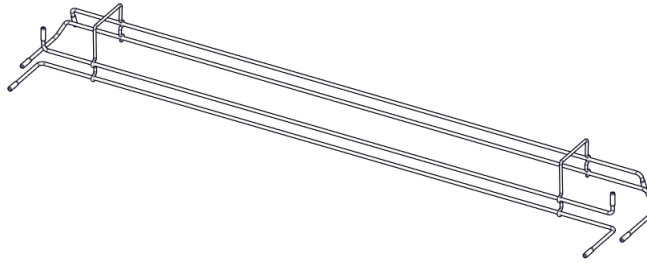
FIGURE 44: Electric Defrost Components



ITEM	PART
1	Coil Cover
2	Fan
3	Liquid Line
4	Suction Line
5	Fan Housing
6	Heat Exchanger
7	TXV
8	Heater Element
9	Heater Clip
10	Defrost Termination Probe

REFRIGERATION

FIGURE 45: Heater Wires for 3-Phase Defrost



working from right to left on the coil. Repeat this process until the retaining clips are free of the coil. The heater will slide up with the retaining clip. Install the replacement heater in reverse order of how it was removed.

Cases set up for 3-phase defrost use 2 additional heater elements ([See Figure 45 on page 28](#)). These heater elements can be replaced by following the same process as for single-phase defrost cases.

Each freezer has factory-set limit thermostats attached to the right end of the evaporator coil to regulate the operation of the evaporator fans and defrost heater. A second limit thermostat may be included to control the lights.

! **CAUTION!** OPERATING THE LIMIT THERMOSTATS CAUSES THE EVAPORATOR FANS TO REMAIN OFF UNTIL THE COMPRESSOR IS OPERATING AND THE COIL TEMPERATURE IS BROUGHT BELOW THE THERMOSTAT CUT-IN SETTING. SUPERHEAT MUST BE SET CORRECTLY FOR PROPER THERMOSTAT OPERATION.

HOT GAS DEFROST - SETTINGS

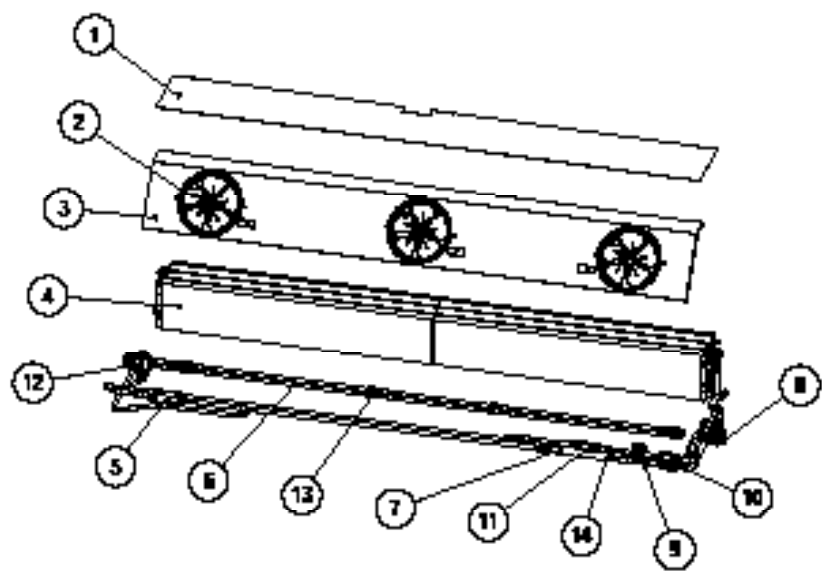
[See Figure 43 on page 26](#) for defrost settings.

REFRIGERATION

The timer starts the hot gas defrost cycle by energizing a solenoid, reversing valve, or directional valve. The hot gas is injected from the source into the suction line of the evaporator to be defrosted. The hot gas flows into the serpentine coil attached to the floor of the case and then into the evaporator. Condensed liquid leaves the evaporator through the side port distributor, through a check valve into the liquid line.

Hot gas defrost termination temperature is set at 65°F. At ASHRAE test conditions, the observed durations are typically 12-22 minutes. Hot gas

FIGURE 46: Hot Gas Defrost Components



ITEM	PART
1	Coil Cover
2	Fan
3	Fan Housing
4	Coil
5	Check Valve
6	Serpentine
7	Heat Exchanger
8	TXV
9	Hand Valve (Optional)
10	Drier (Optional)
11	Check Valve
12	Hot Gas Solenoid Valve (Optional)
13	Hot Gas Clip
14	Defrost Termination Probe

defrost termination sensors are located on the TXV bypass line ("dump line").

HOT GAS DEFROST - COMPONENTS

See Figure 46 for defrost components.

Freezers equipped for hot gas defrost include a side port distributor, a TXV check valve for coil defrost, and a suction line check valve to bypass hot gas to the serpentine coil. The serpentine coil is attached to the bottom of the pan to ensure pan and drain defrost.

Air Sensors & Case Thermometers

- Discharge air sensors are located in the center of the ceiling behind the rear duct.
- Hot gas defrost termination sensors are located on the TXV bypass line ("dump line") unless otherwise specified.
- Electric defrost termination sensors are located in the center of the evaporator coil unless otherwise specified.
- An NSF thermometer is shipped loose and should be installed in the warmest product location as required by NSF. Specific field installation instructions are packaged with the NSF thermometer.

Anti-Sweat Heaters

ELECTRICAL

General

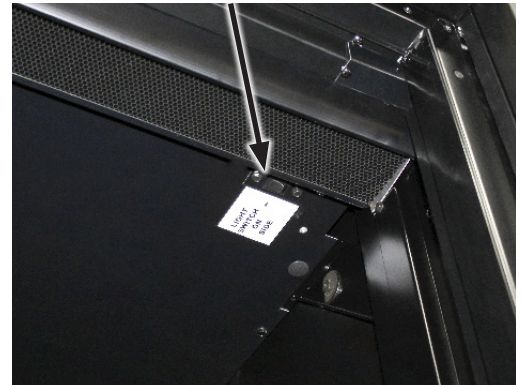
! CAUTION! DISCONNECT POWER TO THE CASE BEFORE SERVICING ELECTRICAL COMPONENTS TO AVOID PERSONAL INJURY AND DAMAGE TO THE UNIT.

! CAUTION! A DISCONNECT NEEDS TO BE INCORPORATED IN THE FIXED WIRING.

The electrical box is mounted on the exterior top right of the case. It includes the power connection and power supplies for the LED light sticks. The light switch is located on the front right side of the false ceiling (See Figure 47). Black and white wires and wire nuts are supplied, and the wire nut must be connected inside the electrical box. A ground connection should also be connected inside the electrical box.

- See Figure 48 on page 31 for a sample wiring diagram with electric defrost.
- See Figure 49 on page 31 for a sample wiring diagram with hot gas defrost.
- *Always refer to the wiring diagram shipped with the case.*

FIGURE 47: Light Switch



External wiring should be sized according to the amperage rating stamped on the serial tag, which is located on the ceiling inside the left-hand door. Typical electrical values are shown on specification sheets that are available online. All internal wiring has been completed at the factory.

All wiring must comply with the National Electrical Code (NEC) and all local codes. After installing the equipment, correct operation of the electrical circuits, controls, and defrost controls should be verified. All operating voltages and amperages should be measured and recorded. Display cases that do not include a remote disconnect must be field installed with a remote disconnect in accordance with NFPA 7.0 of the National Electric Code.

Controller Sensor Wires

- The temperature probe (discharge air) is located in the false ceiling. Temperature probe wires are white (common) and green (supply).
- The evaporator probe (defrost termination) is located in the evaporator coil. Evaporator probe wires are white (common) and orange (supply).

ELECTRICAL

FIGURE 48: Sample Wiring Diagram for Electric Defrost

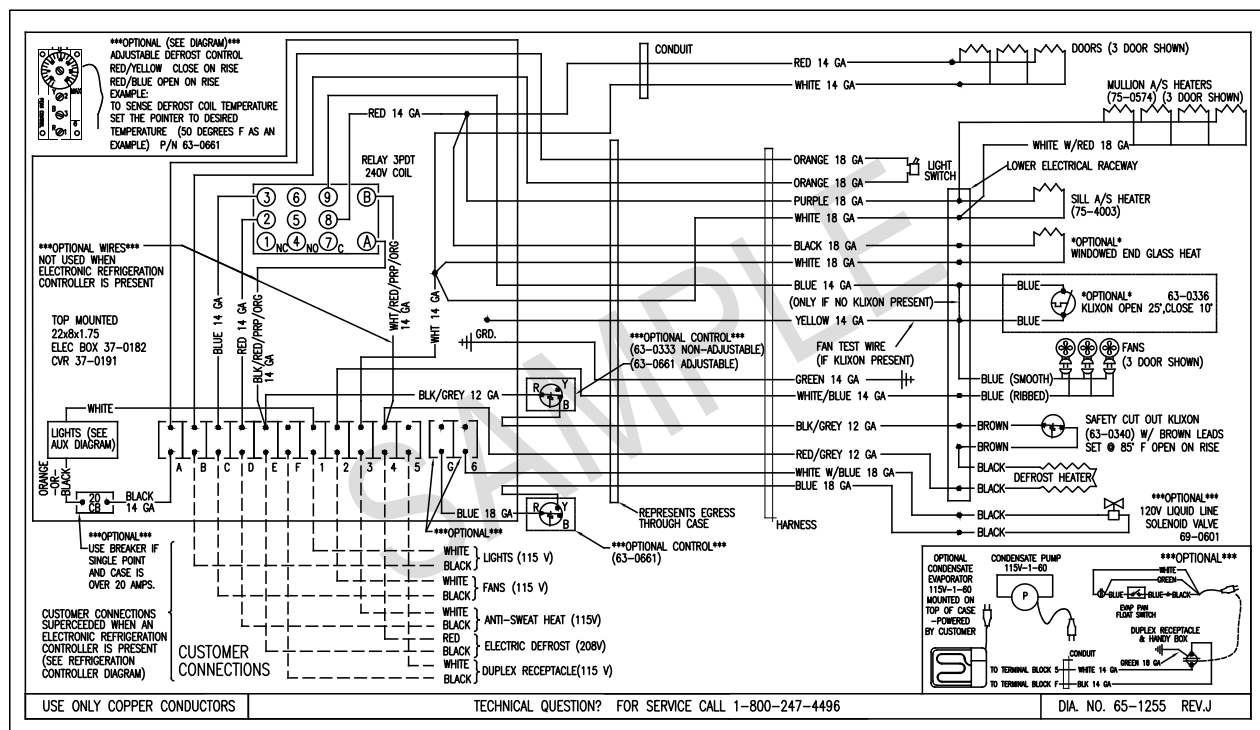
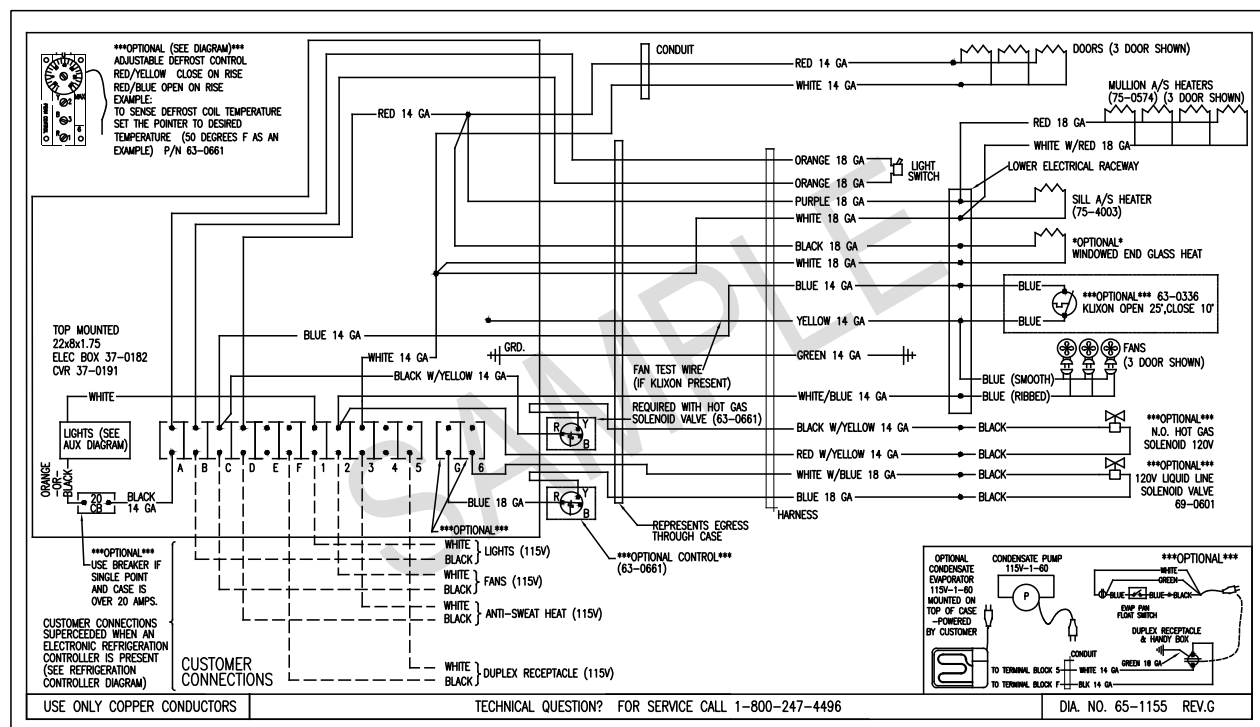


FIGURE 49: Sample Wiring Diagram for Hot Gas Defrost



MAINTENANCE

Air Curtain Velocity

Air curtain velocity is affected by stocking levels, coil frost loads, temperature, fan condition, and measurement method. Indicated velocity can also vary from one velometer to another.

Measure air velocity at the top of the center door of the case. In a fully stocked freezer, a typical velocity reading is 400-500 feet per minute (after the case has defrosted and pulled down to operating temperature). Air curtain velocity in a partially packed case is significantly lower because more air exits through the rear duct.

Cleaning

Although each Zero Zone display case is thoroughly cleaned before shipping, the cases should be thoroughly cleaned again before start-up and routinely thereafter to maintain a clean appearance. With just a few minutes of cleaning each week, the case will remain in top condition.

1. Do not use high-pressure water or steam to clean the interior or any components.
2. Do not wash fan motors. A damp cloth can be used to wipe the fan motors. Cover the fan motors with a plastic bag when washing the case.
3. Wipe out the case interior using a mild detergent and warm water (never an abrasive cleaner).
4. Clean all glass doors, windowed ends, and mirrors using glass cleaner. Cleaning interior glass reduces fogging and increases visibility. Do not use any cleaning products containing silicon for anti-fog door coating.
5. Internal components can be cleaned after removing coil covers, access panels, and sheet metal components. Use a mild detergent and warm water or a mild sanitizer.
6. If the case is equipped with a condensate pan and pump, the drain should be blocked before washing coils. Water can be removed with a shop vacuum.
7. Coils may be cleaned with a garden hose or pails of water. If the case is equipped with a condensate pan and pump, cases should be cleaned with a minimal amount of water so the evaporator, pump, and drain pans do not get overfilled.
8. The case drain should frequently be cleaned of debris to prevent clogging. If water is rising, check if the drain is clogged.

UNDER CASE FLOOR CLEANING (NSF)

The floor under your Zero Zone display case can be cleaned by following these steps:

1. Remove the fasteners attaching the kickplate to the case. The fasteners are accessed from the front of the unit.
2. With the kickplates removed, remove debris from the floor.
3. Vacuum under the case to remove any dirt, debris, and dust build-up.
4. Mop under the unit using non-abrasive floor cleaner and warm water.
5. When finished mopping, squeegee any remaining water under the unit to the floor drains to speed up the drying process. Replace the kickplates when the floor has dried.



For other technical support, please refer to
the Technical Resources page at:

WWW.ZERO-ZONE.COM

or contact the Zero Zone Service Department at:

800-247-4496

All specifications subject to change without notice.

