HIGHLIGHT
merchandiser®



ZERO ZONE

HIGHLIGHT MERCHANDISER®

RHMC & RHLC

With CoolView® Doors and ChillBrite® LED Lighting

INSTALLATION & OPERATION MANUAL

ZERO ZONE®

AHRI CERTIFIED® www.ahridirectory.org
Commercial Refrigerated Display Merchandisers and Storage Cabinets AHRI Standard 1200

DOE COMPLIANT

NSF

ETL LISTED Intertek

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When installing a Highlight 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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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 6 times in 1 hour for 6 seconds. The door opening test period is for 8 hours during a single 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
RHMC30	Standard Cooler	30" x 68" CoolView® Envision® Doors
RHMC30BB	Back-to-Back Cooler	30" x 68" CoolView® Envision® Doors
RHMC30T	Tall Cooler	30" x 73" CoolView® Envision® Doors
RHMC30TBB	Tall Back-to-Back Cooler	30" x 73" CoolView® Envision® Doors
RHLC30	Standard Freezer	30" x 68" CoolView® Envision® Doors
RHLC30BB	Back-to-Back Freezer	30" x 68" CoolView® Envision® Doors
RHLC30T	Tall Freezer	30" x 73" CoolView® Envision® Doors
RHLC30TBB	Tall Back-to-Back Freezer	30" x 73" CoolView® Envision® Doors
RHLC30IM	Ice Merchandiser	30" x 68" CoolView® Envision® 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® Envision® Doors
- 90-bar rating available for CO_2 display cases

INSTALLATION & OPERATION

! **CAUTION!** DO NOT STAND ON TOP OF A HIGHLIGHT 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.

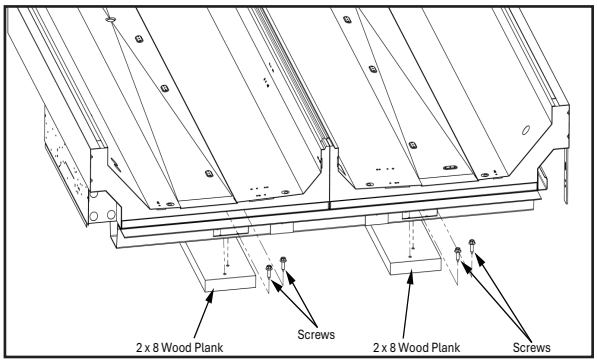
Note: The installation of the appliance and the refrigerant unit must only be made by the manufacturer's service personnel or suitably qualified person.

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) (**See Figure 2).**

FIGURE 2: Wood Plank Removal



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, kickplates, and verticle joining strip (V-strip) 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.

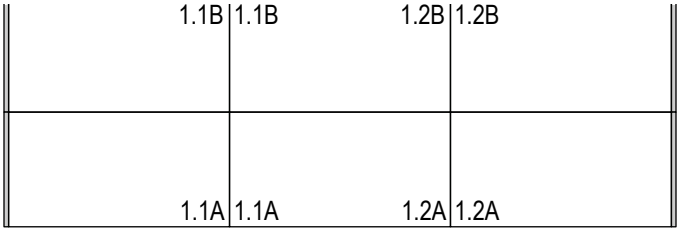
Materials for joining cases—including caulk, joining bolts, splices, and end filler posts—are shipped in each case to be joined.

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



Front of Lineup



Front of Back-to-Back Lineup

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.

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.

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.

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.

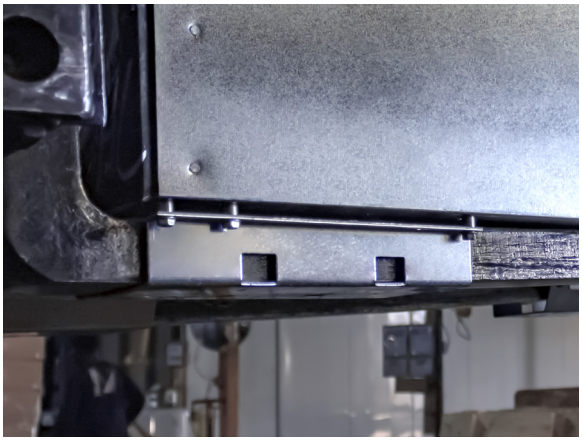
CASE MODELS	INSTRUCTIONS
1RHMC30 & 1RHLC30	Not fork-liftable from either end of the case
2RHMC30 & 2RHLC30	Forks must extend 26" to 30" under the case from either end
3RHMC30 & 3RHLC30	Forks must extend 39" to 43" under the case from either end
4RHMC30 & 4RHLC30	Forks must extend 44" to 47" under the case from either end
5RHMC30 & 5RHLC30	Forks must extend 44" to 47" under the case from either end

OPTIONAL BASES

For low shipping height applications, Zero Zone has optional expandable bases to accommodate up to 1 3/4" thick forks (**See Figure 3**). To use a forklift on cases with expandable bases, raise the case with a Johnson bar and place wooden blocks under the case, allowing the base to expand enough for forks to be inserted.

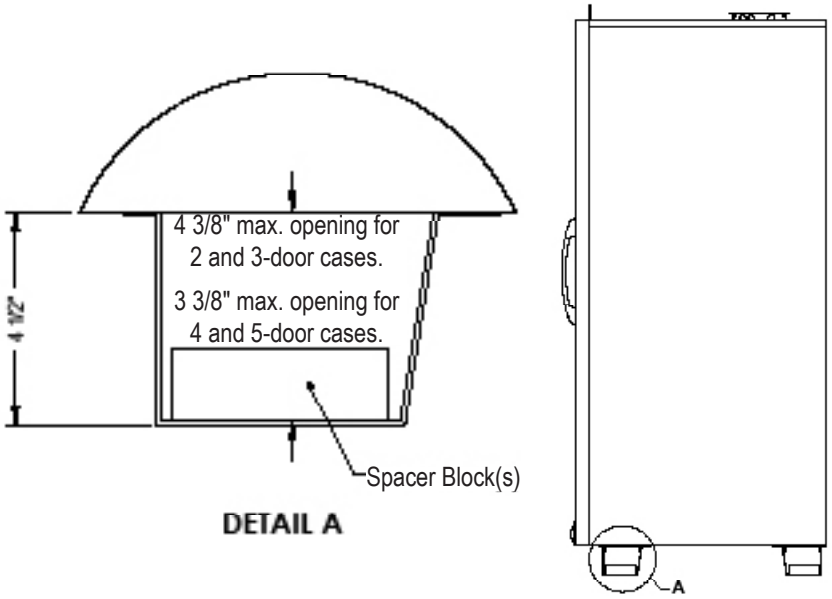
Spacer blocks are factory-installed in the end bases of 4 and 5-door cases that use bases taller than 3 1/2". These blocks limit the case's forward tilt while it is being lifted by a forklift (**See Figure 4 on page 7**).

FIGURE 3: Expandable Base



INSTALLATION & OPERATION

FIGURE 4: 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 5**). 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.

FIGURE 5: Measure and Mark Exact Case Outline

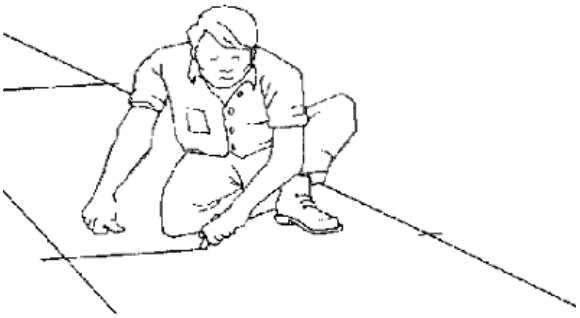
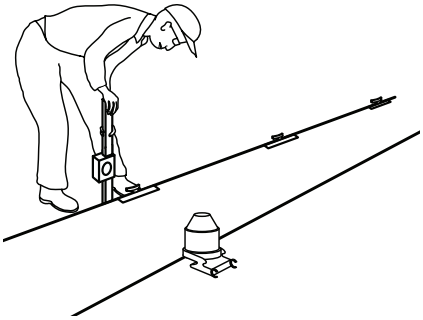
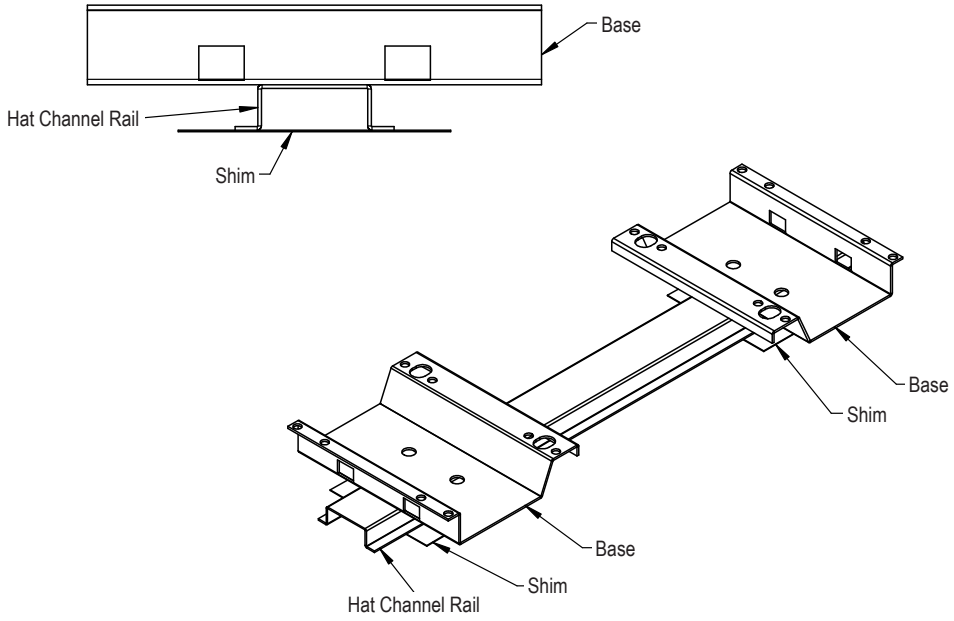


FIGURE 6: Mark Floor Level Difference



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 6**).

FIGURE 7: Hat Channel Rail Orientation

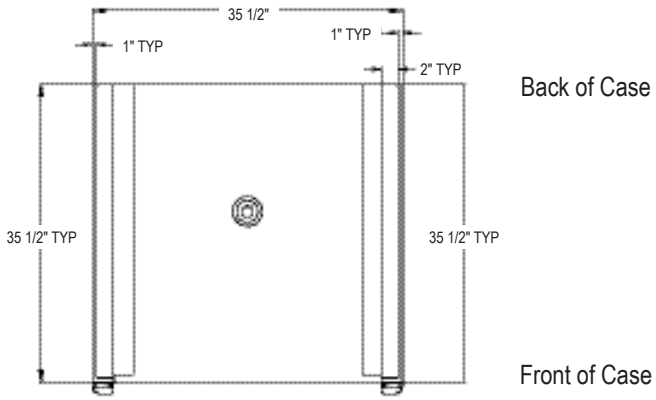


Position hat channel rails with tape up. Place shims perpendicularly under the hat channel rails.

- 1-door cases do not use 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 8: 1RHMC30 & 1RHLC30 Base Locations

Drawing is a top view with bases shown under the case. The front of the case is toward the bottom of the page. Case length is 35 1/2" with 2 end panels (2 1/2" wide each).

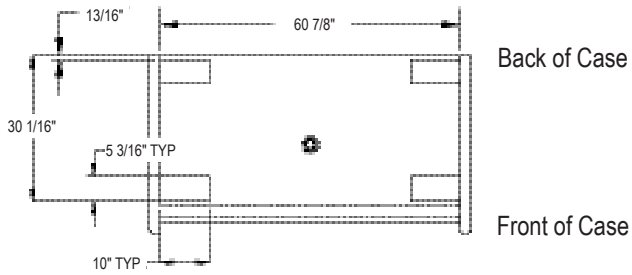


1RHMC30 & 1RHLC30

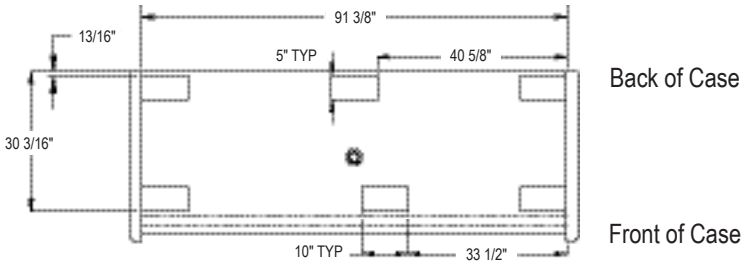
INSTALLATION & OPERATION

FIGURE 9: RHMC30 & RHLC30 Base Locations

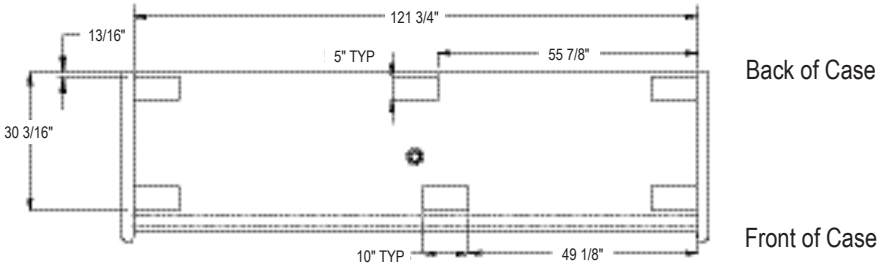
Drawings are top views with bases shown under the case. The front of the case is toward the bottom of the page. Case length does not include end panels (2 1/2" wide each).



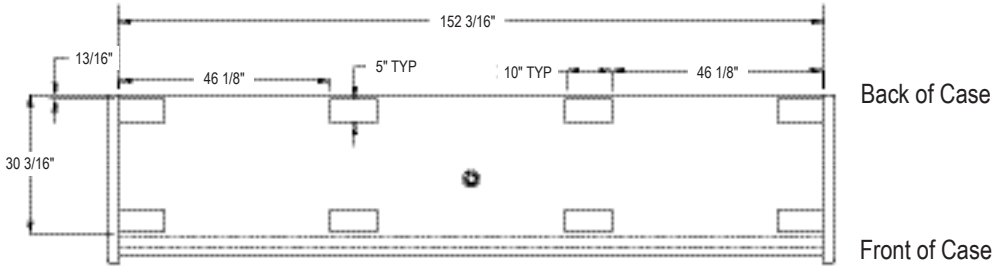
2RHMC30 & 2RHLC30



3RHMC30 & 3RHLC30



4RHMC30 & 4RHLC30

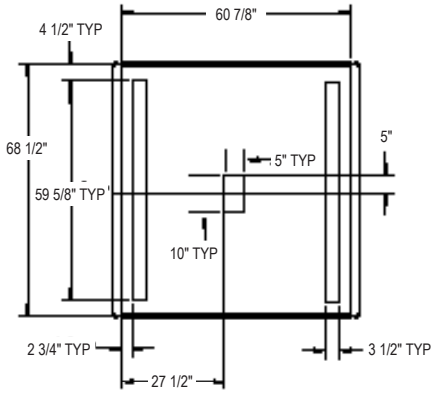


5RHMC30 & 5RHLC30

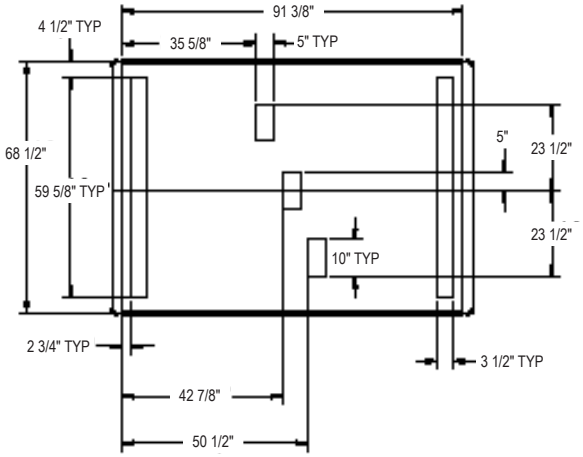
INSTALLATION & OPERATION

FIGURE 10: RHMC30BB & RHLC30BB Back-to-Back Base Locations

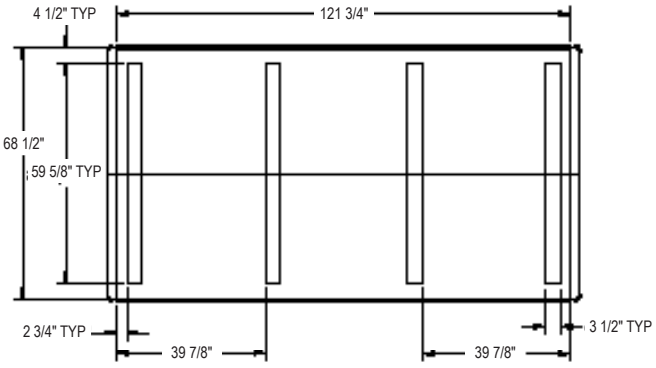
Drawings are top views with bases shown under the case.
Case length does not include end panels (2 1/2" wide each).



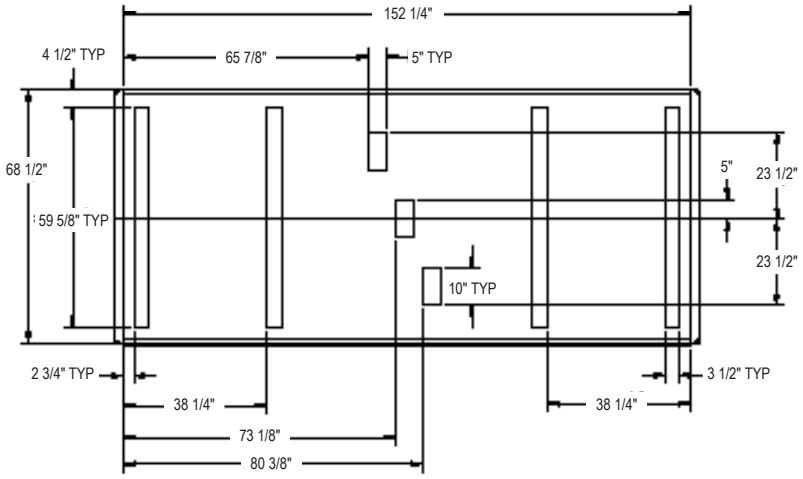
2RHMC30BB & 2RHLC30BB



3RHMC30BB & 3RHLC30BB



4RHMC30BB & 4RHLC30BB



5RHMC30BB & 5RHLC30BB

INSTALLATION & OPERATION

5. If your case uses optional hat channel rails to raise the case height, place shims ***under*** the hat channel rails (**See Figure 7 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; do not position hat channel rails under the drain hub (**See Figure 8 through Figure 10 starting on page 8**).

FIGURE 11: Tape Shims on the Floor Under Each Base or Hat Channel Rail

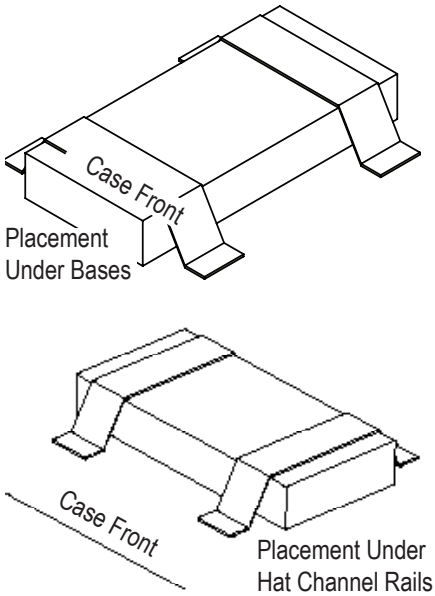
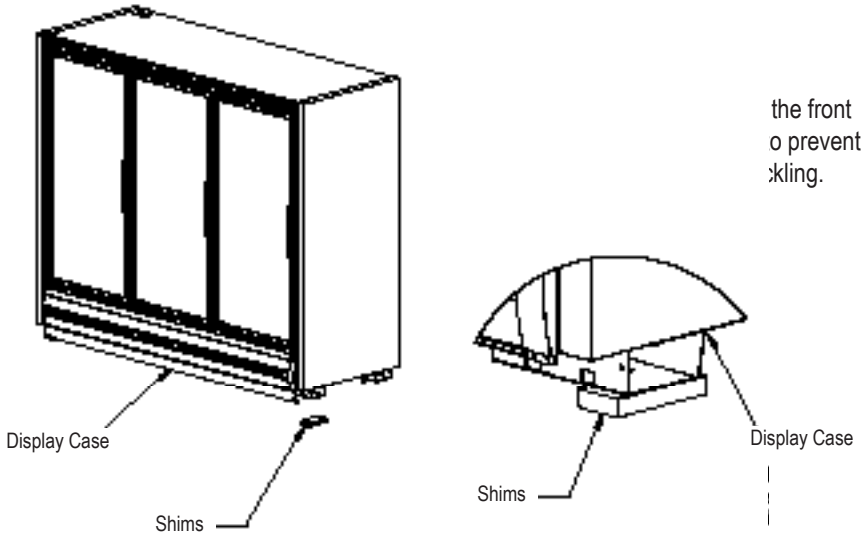


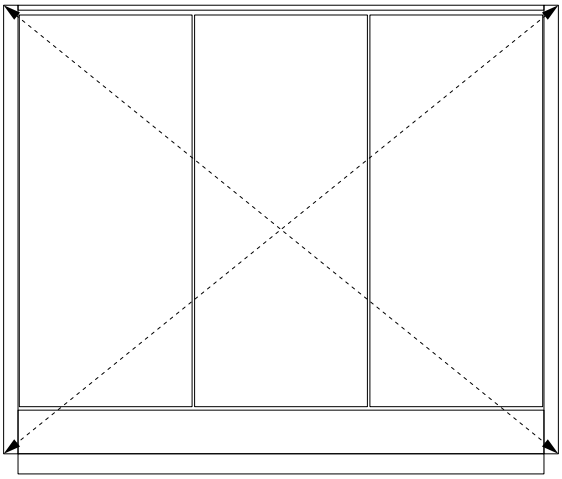
FIGURE 12: Shims Under Bases (Without Hat Channel Rails)



the front
o prevent
ckling.

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 11 and Figure 12**).
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. ***Note: Do not add extra shims in front to give the case a backward tilt.***
8. 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".***

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".

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 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 17 on page 13**).

Move the next case into position and bolt it to the first case using the joining bolts that are provided (**See Figure 14**). 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.*** Alignment holes are located in the rear end frames near the joining holes; use a drift pin or screwdriver to ensure those holes are aligned. Please note that Highlight™ cases have a weldnut in the rear center of the left end frame; this weldnut makes it possible to join the cases without removing the shelves and rear duct from the right case at the joint.

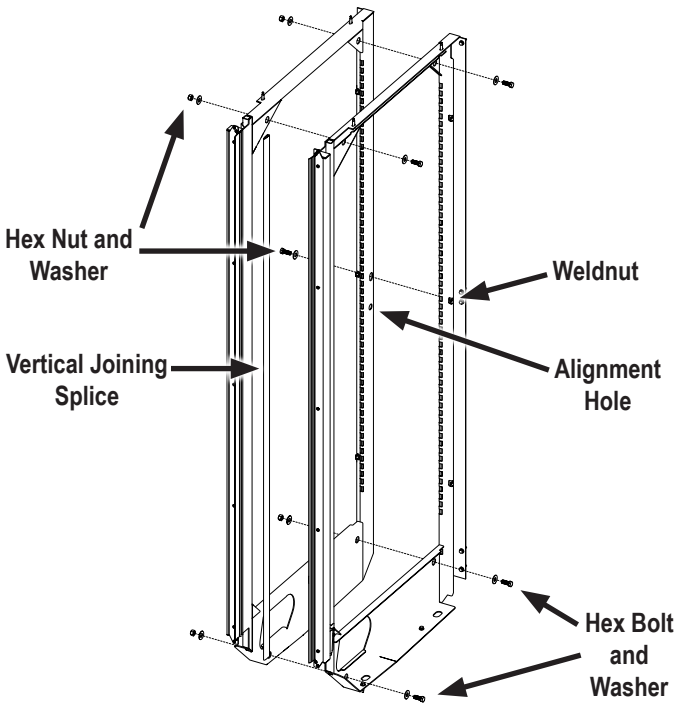
The vertical joining splice (V-strip) will be shipped with the kickplate and bumper. Install the V-splice at the joint between cases by snapping it onto the end mullions of the adjacent cases (**See Figure 15 and Figure 16**). The V-strip should be installed low enough to clear the door's top electrical connector and high enough to clear the door's torque adjuster. For cases with door locks, the lock strike plate will get in the way of the joining splice. In this scenario, cut the joining splice to fit around the strike plate. Put masking tape on the joining splice, line it up against the end mullions, and mark about 1/8" above and below the strike plate. Cut a notch out of the V-strip by using a tin snips or cutter for the horizontal cuts and a utility knife for the vertical cuts.

An insulated divider is used to join 2 different case models or 2 different temperature cases. The divider is typically factory installed to one of the cases. There are 2 types of insulated dividers:

1. Between a Highlight™ case and a different case model: The insulated divider has a panel on each side with nut inserts in the panels; each side is bolted to the respective end frames.
2. Between 2 Highlight™ cases: 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, remove the short bolts one at a time and install the longer joining bolts to bolt the cases together. ***Do not pull cases together using joining bolts.***

FIGURE 14: Case Joining Hardware

Only showing end frames of cases



3/8"-16 x 1" hex bolts (5), 3/8"-16 hex nuts (4), 3/8" washers (9)

FIGURE 15: Vertical Joining Splice (V-Strip, Top View)

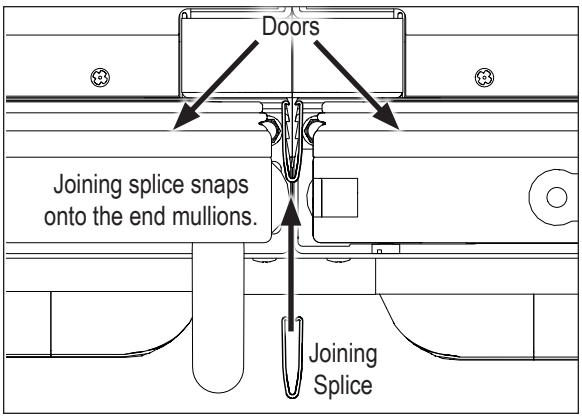
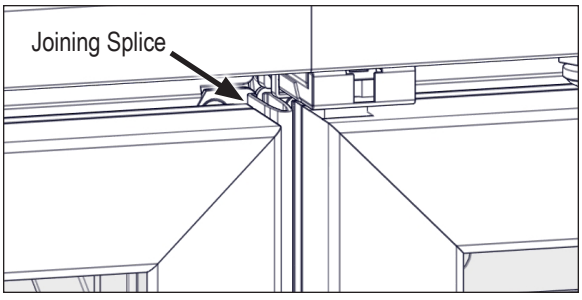


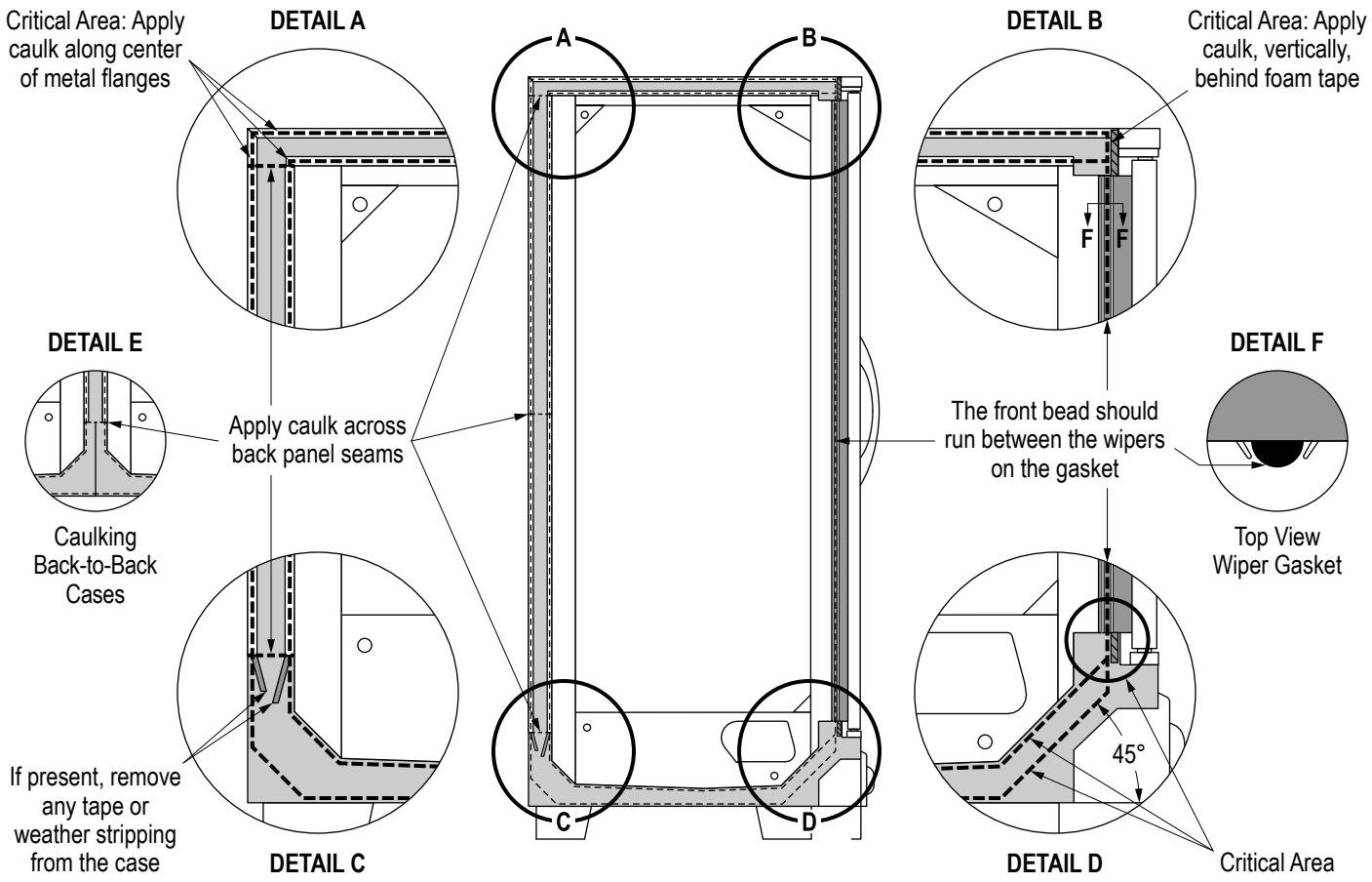
FIGURE 16: Vertical Joining Splice (V-Strip, Front View)



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.

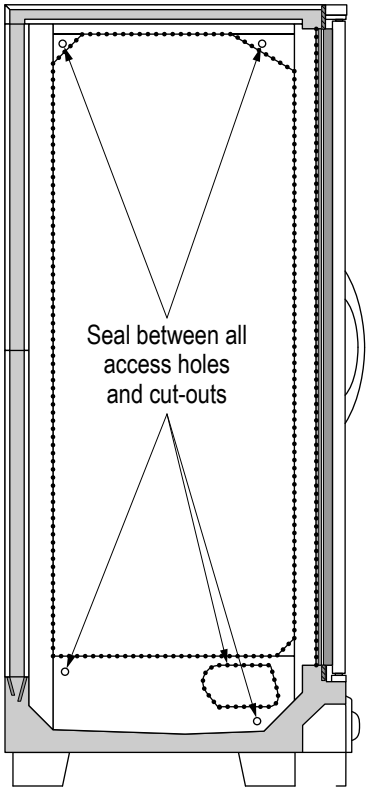
SURFACES TO BE CAULKED MUST BE CLEAN, DRY, FREE OF TAPE/ADHESIVE, AND FREE OF FROST (ABOVE 40ºF).

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.

1. Remove all shipping material. This includes packaging and packing tape.
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 18 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).

FIGURE 18: 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 40ºF).

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 13.**

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

The interior case seams must be sealed using silicone sealant for NSF compliance (**See Figure 18 on page 14**). Do not allow Butyl caulk and silicone sealant to contact one another as this may affect adhesion or color of each.

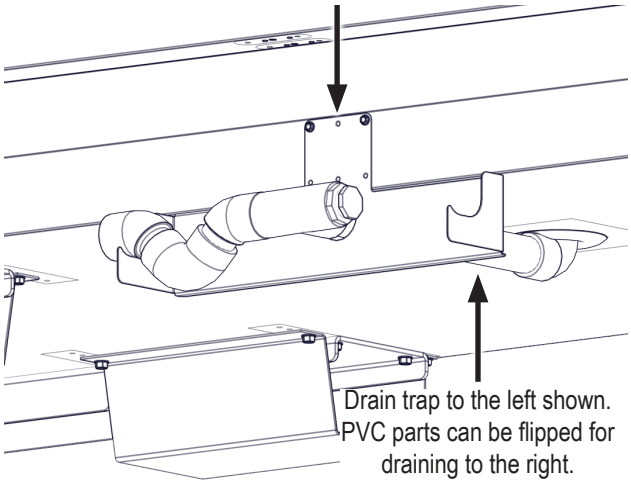
Drain

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 line exits the case in the center. The lateral runs of drain pipe should be installed in front of the bases and behind the kickplate. Make sure the drain lines will fit behind the kickplate.

Install the tee to the lateral and a drain trap to the tee. Plug the open end of the tee using the clean-out plug supplied with the drain trap kit. The tee, drain trap, and plug are supplied with the case. The drain lateral and trap will rest in the one-piece support bracket (**See Figure 19**). ***The drain trap should be primed with water after installation. The drain line must be pitched away from the case enough to ensure proper drainage.*** Consult local codes for minimum requirements.

FIGURE 19: Drain Lateral and Trap Support Bracket



On cases with 1 3/4" bases, the support bracket will be shipped loose. Fasten it to the front of the floor using 2 screws. There is a flange on the left side that should rest flush with the bottom of the case to ensure that the support bracket is level.

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 & Bumper

Each case is shipped with a protective bumper and a front kickplate to protect the bottom front of the case. Cases with end panels are shipped with 1 side kickplate per end panel. Cases that join together are shipped with a kickplate splice.

Contact the factory to order optional louvered kickplates (provides 150 CFM per door) if additional airflow is required.

END KICKPLATE

The end kickplate attaches to the small bracket on the end of the case (**See Figure 20 on page 16**). The kickplate can be adjusted vertically to match the height of the floor below it.

1. Attach a Tinnerman clip to the end bumper support bracket.
2. Position the end kickplate against the Tinnerman clip. A scratch awl or screwdriver can be used to line up the holes.
3. Fasten the end kickplate to the Tinnerman clip using the provided screws.
4. The front of the end kickplate fits behind the front kickplate and is attached with screws to the front kickplate.

INSTALLATION & OPERATION

FRONT KICKPLATE & BUMPER

The front kickplate and bumper attaches to brackets on the front of the case (**See Figure 20**). The kickplate can be adjusted up and down to match the height of the floor below it.

1. Starting from the left end of the lineup, attach a Tinnerman clip to each bumper support bracket.
2. Attach the kickplate splice to the right side of the kickplate using the shorter screw in the lower hole.
3. Lean the kickplate against the bumper support bracket.
4. Hang the bumper on the case. The kickplate should be located behind the bumper.
5. Install the longer screw through the bumper, kickplate, kickplate splice, and into the Tinnerman clip. A scratch awl or screwdriver can be used to line up the holes.
6. Follow these steps to install the next bumper in the lineup. A bumper splice should be installed between each case. Center the splice and adjust the height so the decorative tape (if applicable) lines up. Use the provided self-tapping screws to attach the upper portion of the splice using the predrilled holes in the splice. Then, with 2 more screws, attach the lower half.
7. For Back-to-Back (BB) cases, 2 end kickplates will be used along the ends, and the kickplates will overlap 1/2" at the center.

FIGURE 20: Kickplates & Bumper

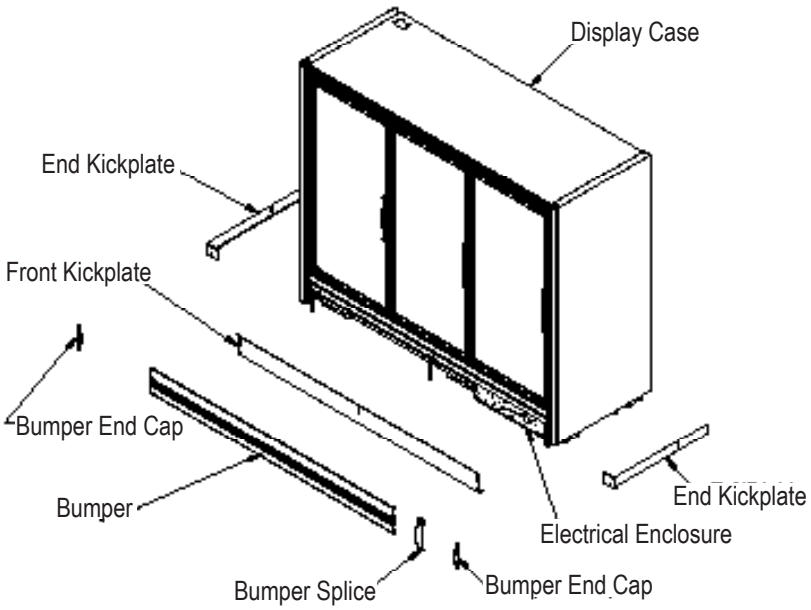
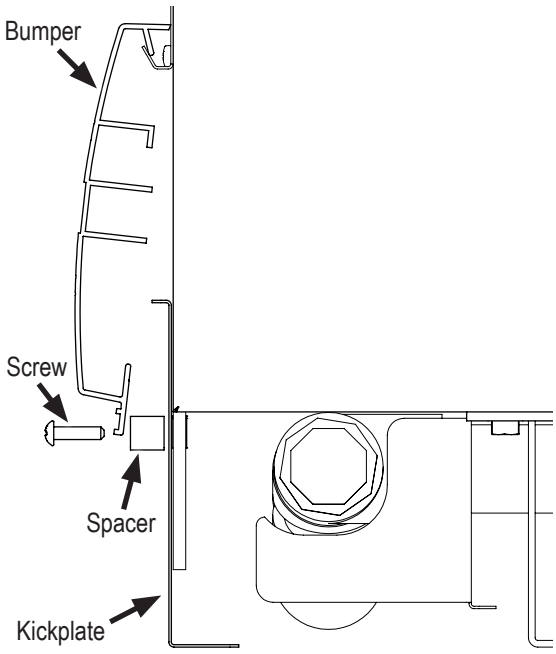


FIGURE 21: Airflow Spacer Installation



AIRFLOW SPACER FOR KICKPLATE & BUMPER

An airflow spacer may be ordered for under case return airflow. The number of 3/8" spacers will be equal to the number of doors.

The spacer is inserted between the bumper and kickplate using the same screw used to attach the bumper. Hook the bumper to the case and position the kickplate. Pull the bottom edge of the bumper forward, hold the spacer in place, and then insert the screw through the bumper, spacer, kickplate, bumper bracket, and into the Tinnerman clip (**See Figure 21**). It may be easier for 2 people to work together to install the spacers.

With the spacers in place, air will flow between the bumper and kickplate and then underneath the case. The target airflow rate under the case is 50 cfm/door. **Note: An optional louvered kickplate that provides 150 cfm/door is available.**

INSTALLATION & OPERATION

CoolView® Doors

DOOR HANDLES

CoolView® Envision® doors use either a Crescent™, Classic™, or Full Length door handle. These are attached to the door frame by screws.

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.

DOOR GASKET

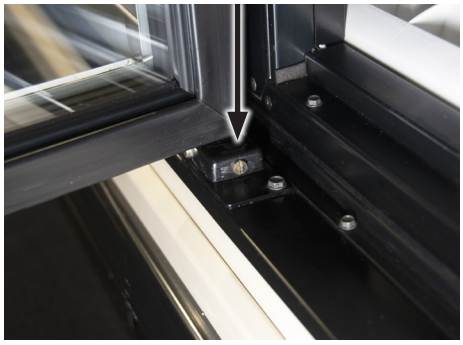
Each single-swing door has a full perimeter gasket mounted to the edge of the door.

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 Highlight™ cases, the torque adjuster must be moved by turning the sag adjustment screw.

1. Open the door to gain access to the sag adjustment screw (**See Figure 22**) on the bottom of the hinge side of the door.
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.

FIGURE 22: Sag Adjustment Screw



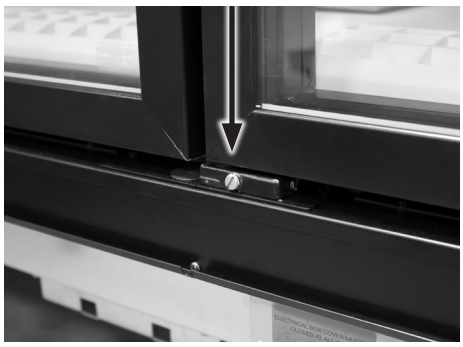
TORQUE ADJUSTER / ADJUSTING DOOR TENSION

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 23**). ***Do not use power tools; a screwdriver allows for more control.***
3. To increase tension, hold the door open 2" and turn the screw counter-clockwise until the door begins to close. Once it closes, increase tension by 2 more full turns.
4. To decrease tension, turn the screw clockwise.

The torque adjuster is secured to a bracket that is attached to the display case.

FIGURE 23: Door Tension Screw



INSTALLATION & OPERATION

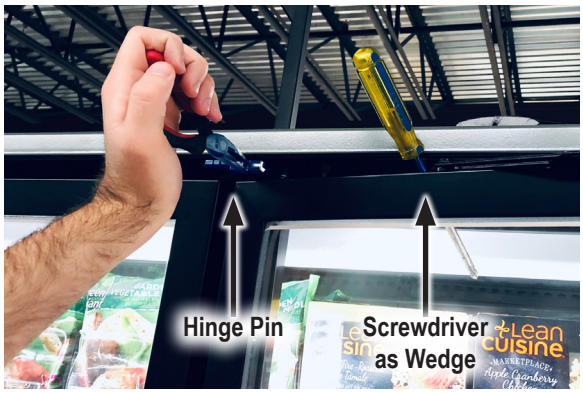
REMOVING A DOOR

1. Turn the door tension screw clockwise until the door does not close on its own (**See Figure 23 on page 17**). This removes tension between the door and torque adjuster so the door can be removed.
2. Disconnect the hold-open bracket from the top of the door (**See Figure 24**).
3. 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 25**). ***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 (**See Figure 26**). ***Note: The door is heavy. Be prepared to catch the weight of the door.***
4. 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.***

FIGURE 24: Locate the Hold-Open Bracket



FIGURE 25: Use a Wedge & Pinch Hinge Pin



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 27**). ***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 top of the door and the top of the case (**See Figure 24**).
4. Turn the door tension screw counter-clockwise until the door gently closes itself (**See Figure 23 on page 17**). Check for sag/ sawtoothing.

FIGURE 26: Hinge Pin

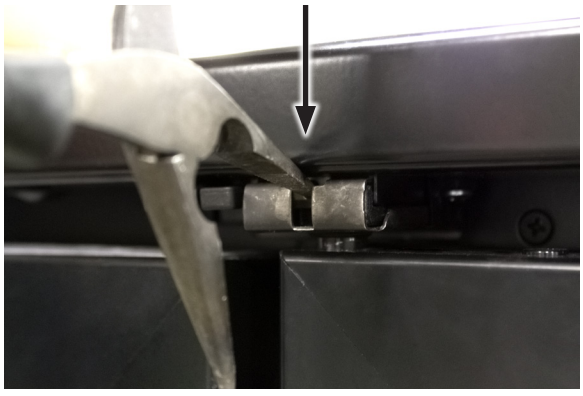


FIGURE 27: Push Door & Hinge Pin into Place



INSTALLATION & OPERATION

REVERSING DOOR SWING

1. Remove the door from the display case. **See "Removing a Door" on page 18** for a detailed description. ***Note: The door is heavy. For safety, lift the door by the rails; do not lift by the handle.***
2. 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.
3. 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 28**). 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 29**). Disconnect the bullet connectors and pull the hinge pin out.
4. Pry the torque rod from the bottom of the door using a screwdriver (**See Figure 30**).
5. Remove the hold-open bracket from the door.
6. 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 28**).

FIGURE 28: Hinge Pin Wiring

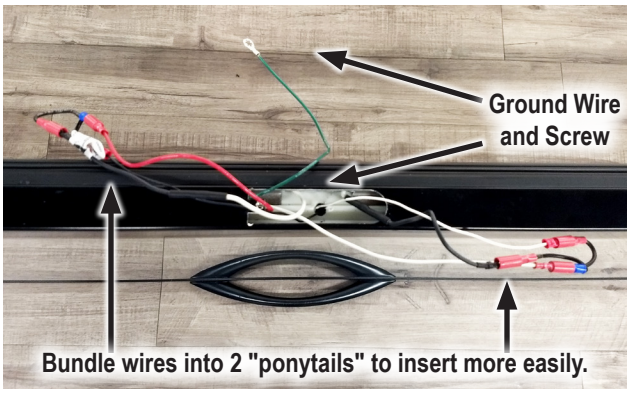
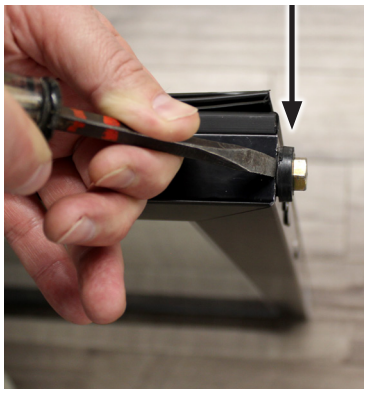


FIGURE 29: Remove Hinge Pin



FIGURE 30: Remove Torque Rod



7. There are two hinge locations per door opening (**See Figure 31 and Figure 32**). Remove the raceway cover to access the parts that must be switched to the opposite side of the door opening.
8. Disconnect the terminal from the wire harness and remove the terminal from the raceway. Unscrew the gib and slide it to the side to remove. Swap the terminal and the gib to the opposite sides and reconnect the terminal to the wire harness. Swap the hole cover.
9. Remove the hold-open fastener using a hex wrench to hold the bottom stationary and remove the nut on top. Remove the finned fastener (tree-shaped plug) on the opposite side. Swap the hold-open fastener and the finned fastener.

FIGURE 31: Left Hinge Location

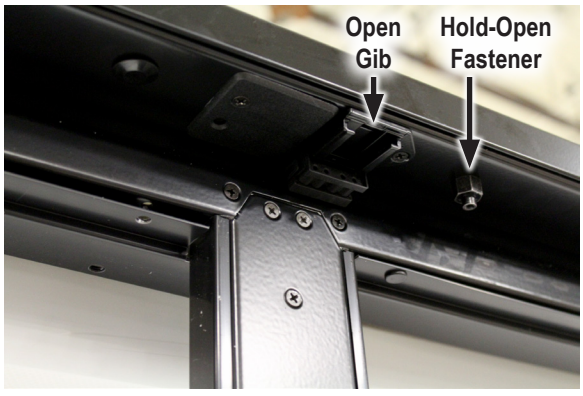
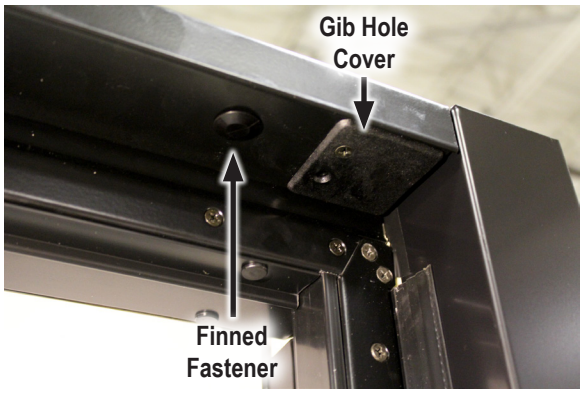


FIGURE 32: Right Hinge Location



10. To unlock the torque adjuster from the case, turn the locking screw that was under the torque rod by 1/16 turn (**See Figure 33**). Remove the torque adjuster. Pry up the torque adjuster plug on the opposite side (**See Figure 34**). Swap the plug and torque adjuster.
11. Install the reversed door. **See "Installing a Door" on page 18** for a detailed description. ***Note: The door is heavy. For safety, lift the door by the rails; do not lift by the handle.***

FIGURE 33: Torque Adjuster Locking Screw

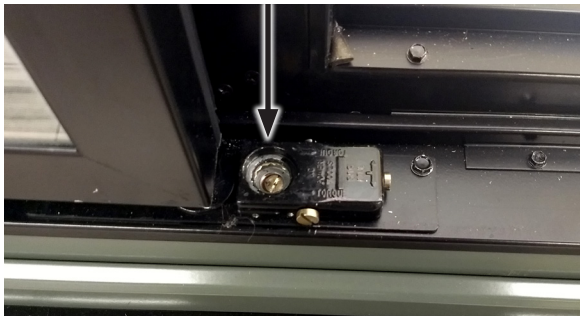


FIGURE 34: Torque Adjuster Plug



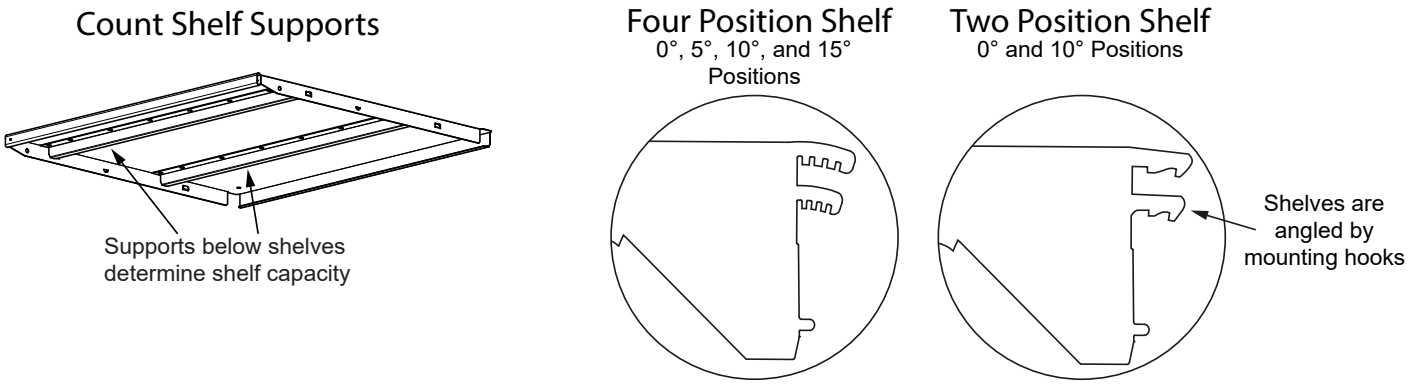
Shelves & Stocking Product

On 2 to 5-door cases, 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 (**See Figure 35**).

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 (**See Figure 38 on page 22**). ***Do not exceed shelf load capacity*** (**See Figure 38 on page 22**). 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.***

FIGURE 35: Shelf Angling and Supports



INSTALLATION & OPERATION

The display case can be fitted with standard duty or heavy duty shelves. Standard duty shelves have a maximum capacity of 175 lbs at a 0° shelf angle. Heavy duty shelves have a maximum capacity of >250 lbs at a 0° shelf angle. **See Figure 37** to determine heavy duty shelf capacity.

Shelf load capacity is determined by shelf angle, shelf width, shelf depth, bracket position, and the number of shelf supports

To determine heavy duty shelf capacity, take the following steps:

1. Measure the width and depth of case shelves.
2. Count the number of supports below shelf (**See Figure 35 - Left Side**) and determine shelf position (**See Figure 35 - Right Side**).
3. Refer to **See Figure 37** to determine maximum shelf capacity.

FIGURE 37: 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"	22" 24"	2	2	350 lbs	N/A	150 lbs	N/A
		2	4	350 lbs	250 lbs	150 lbs	100 lbs
30"	24"	1	2	175 lbs	N/A	75	N/A
	22" 24"	2	2	350 lbs	N/A	150 lbs	N/A
	22" 24"	2	4	350 lbs	250 lbs	150 lbs	100 lbs
48"	22" 24"	3	2	350 lbs	N/A	150 lbs	N/A

FIGURE 36: Acrylic Product Stops (1" Shown)

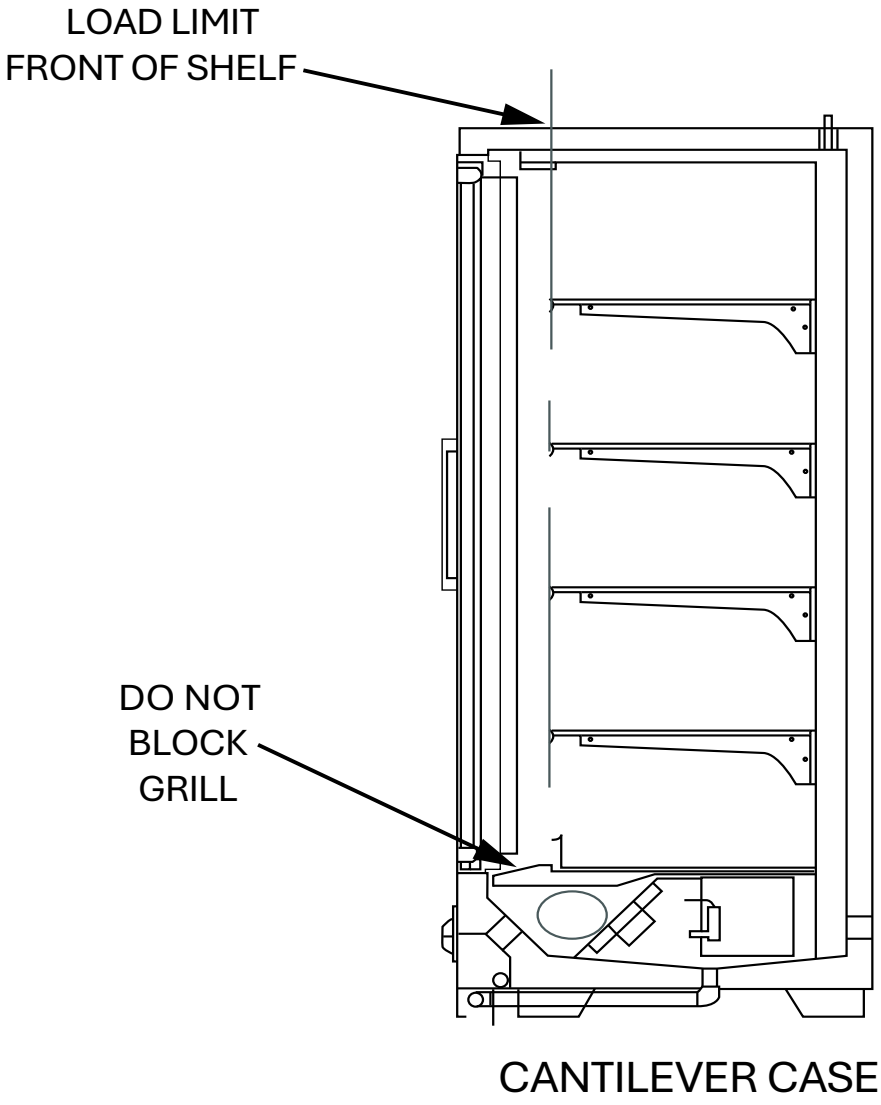


Product stop fits into the price tag molding.

INSTALLATION & OPERATION

! **WARNING!** DO NOT LOAD SHELVES BEYOND LOAD LIMIT LINE (**SEE FIGURE 44).** OVERLOADING WILL DISRUPT AIRFLOW AND PREVENT UNIFORM TEMPERATURE BALANCE WITHIN THE DISPLAY CASE.

FIGURE 38: Shelf Load



INSTALLATION & OPERATION

Shelves can be ordered with 1", 2", or 3" acrylic product stops, which fit into aluminum price tag molding. Slide the product stop into the price tag molding and push it down to the bottom of the channel (**See Figure 36**). 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.

1-DOOR SHELF INSTALLATION

FIGURE 39: Hold Shelf Facing Downward

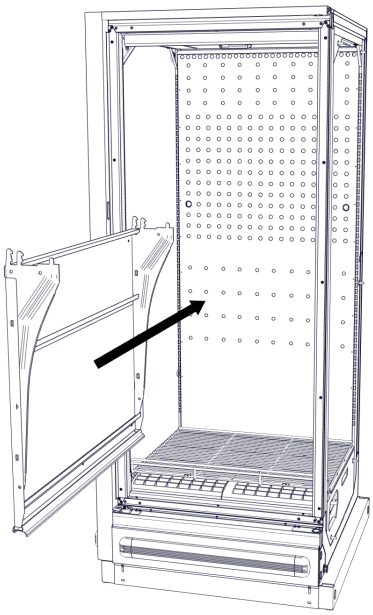


FIGURE 40: Bring Shelf Through the Door

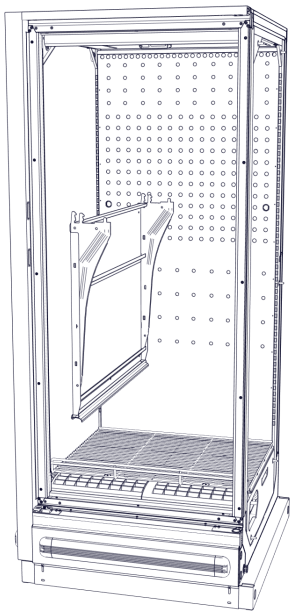


FIGURE 41: Rotate the Shelf

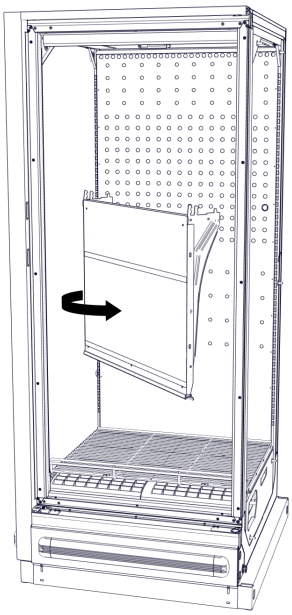


FIGURE 42: Hold Shelf Inside Case

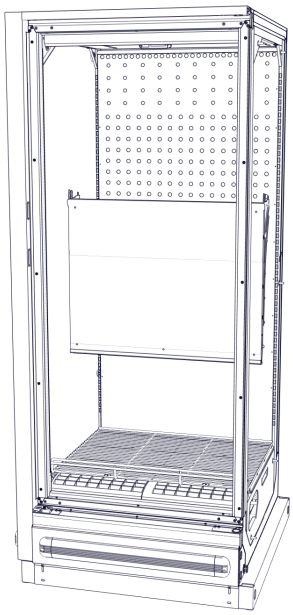


FIGURE 43: Lift Up the Front

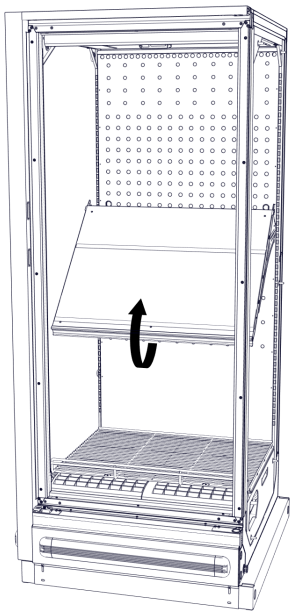
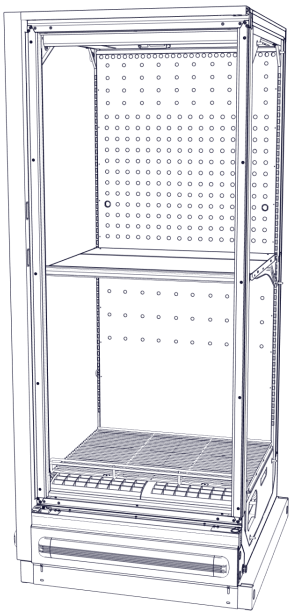


FIGURE 44: Insert into Shelf Standards



Note: For clarity, the right end panel is not shown. 1-door cases typically have both end panels.

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

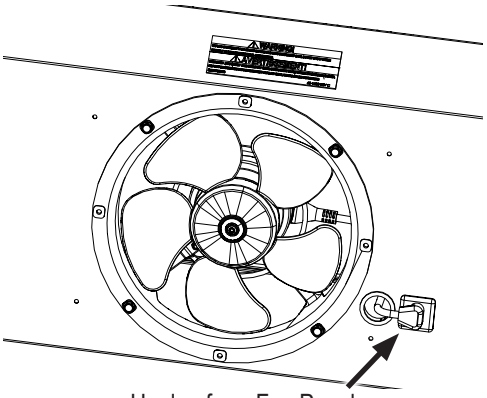
Evaporator Coil

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 operate at all times except during electric or hot gas defrost; fan motors will operate during off-cycle defrost. Highlight™ cases built after 1/1/2023 will use a fan pack (**See Figure 45**), and cases built before 2023 will use a factory-assembled fan and motor (**See Figure 46**).

FIGURE 45: Fan Pack



Unplug from Fan Panel

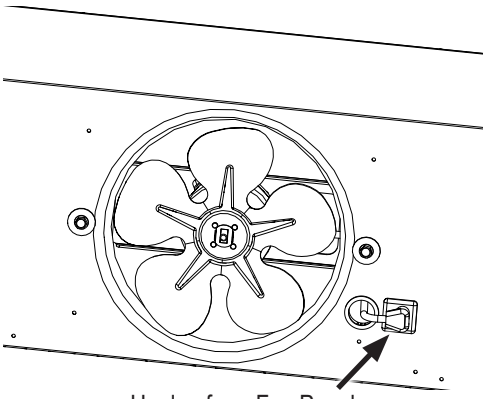
FAN PACK REPLACEMENT

Fan packs must be replacement with OEM parts that have the same characteristics, including type, size, lubricant tempearture, range, wattage, RPM, and fan pitch.

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. Unplug the fan pack from the front of the fan panel.
3. Unscrew the 4 mounting screws and remove the fan pack.
4. Install the replacement fan pack.
5. Plug the replacement fan pack into the front of the fan panel. Restore case power.

FIGURE 46: Fan-and-Motor Assembly



Unplug from Fan Panel

FAN-AND-MOTOR REPLACEMENT

Fan motors must 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 2 mounting bolts and remove the fan assembly from the fan housing.
4. Remove the 3 fan motor mounting screws from the back of the fan motor.
5. Replace the fan, and reverse steps 1-3 to install the cover. Restore case power.

REFRIGERATION

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.***

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 terminate inside the case under the coil covers. 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 left rear back panel or the left rear top panel of the case. Other exit options are available. 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.

When placing refrigeration through the rear duct remove the end baffle, cut a hole in it to fit over the tubing and replace the baffle. Make sure that the tubing does not rub on the baffle. Leaving the baffle off entirely will have an adverse effect on freezer performance.

Gaps around tubing should be filled with foam tape or other pliant material to prevent air recirculation and tube chafing.

Electric defrost heating element expands by 1" to left. Protect refrigeration piping & insulation from heater expansion. Do not restrict heater expansion.

FIGURE 47: P-Trap 45° Elbow Suction Line

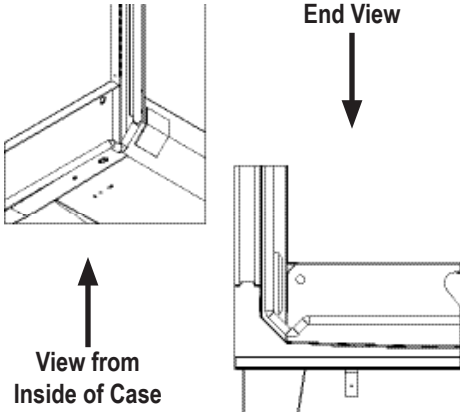
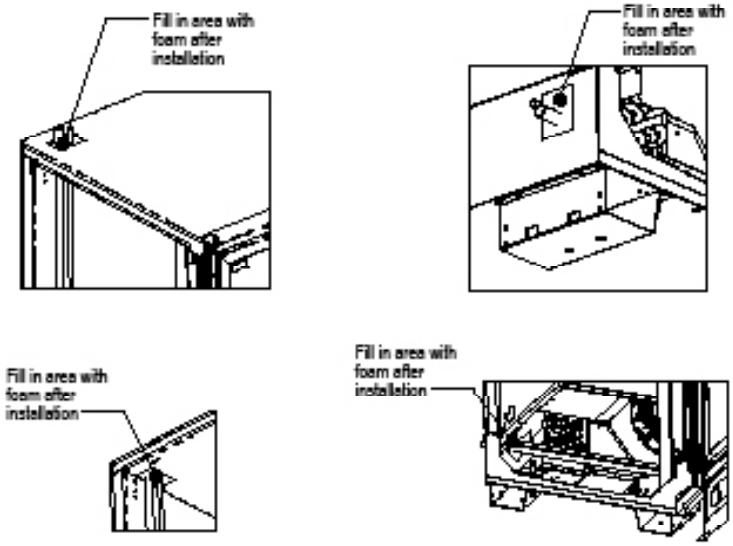


FIGURE 48: Penetration Sealing



REFRIGERATION

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.

Install a P-trap at the bottom of all vertical suction risers (**See Figure 47**). Install a shallow trap at the bottom of the riser.

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 (example: Great Stuff). Penetrations made in sheet metal baffles should also be sealed (**See Figure 48 on page 25**).

Cases will be equipped with a liquid-line filter drier by default. Cases using CO_2 will be equipped with pressure-relief ball valves on the liquid line and suction line for easier servicing. Remove all foam blocks and foam spacers from the coil piping before start-up. The foam blocks are used for shipping only.

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

FIGURE 49: Case Temperature Internal Control Options

SETTING	FROZEN FOOD			ICE CREAM			COOLER		
Evaporator Temp	-7°F			-16°F			28°F		
Return Air Temperature Set Point	0°F			-9°F			30°F		
Return Air Temperature Differential	6°F			6°F			4°F		
Discharge Air Temperature Set Point	-3°F			-12°F			33°F		
Discharge Air Temperature Differential	6°F			6°F			4°F		
SETTING	**R-404A**	**R-448A**	**Sat. Temp**	**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	74 psig	62 psig	33°F
Condensing Unit Cut-Out	25 psig	18 psig	-8°F	18 psig	12 psig	-17°F	62 psig	51 psig	25°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.									

Operation Set Points

Refer to the case spec sheet for btu/h requirements and electrical requirements. Operate the case at the following settings to maintain correct product temperature, per food safety regulations (**See Figure 49**). 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 the superheat setting to avoid flood back.

FIGURE 50: Defrost Settings

SETTING	FROZEN FOOD		ICE CREAM		COOLER
Defrost Type	Electric	Hot Gas	Electric	Hot Gas	Off-Cycle
Frequency	1 Per Day	1 Per Day	1 Per Day	1 Per Day	2 Per Day
Duration	55 Minutes	30 Minutes	55 Minutes	30 Minutes	30 Minutes
Temperature Termination Set Point	50°F	65°F	50°F	65°F	45°F

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

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 or by off-cycle 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.

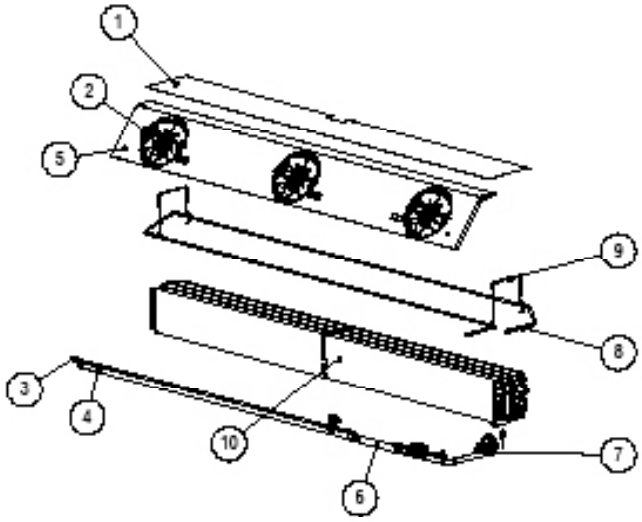
ELECTRIC DEFROST - SETTINGS

See Figure 50 on page 27 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.

Optional electric defrost termination 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.

FIGURE 51: 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 (Single Phase)
9	Heater Clip
10	Defrost Termination Probe

REFRIGERATION

Electric defrost termination temperature is set at 50°F. At ASHRAE test conditions and 208V defrost heater operation, the observed defrost durations are typically 55 minutes for frozen food and 55 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.

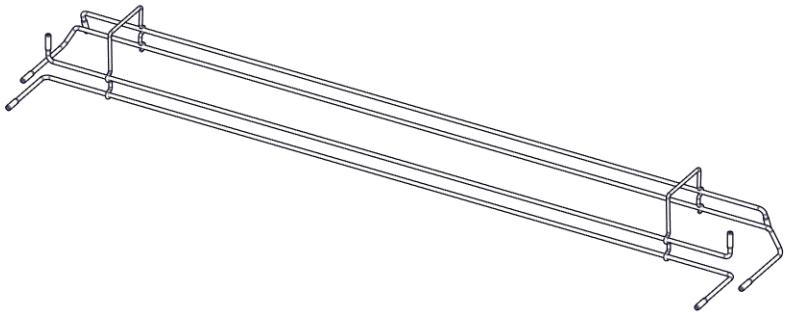
Freezers with electric defrost are equipped with a safety cutout thermostat (high-limit, snap-disc type) that de-energizes the defrost heater if the coil temperature exceeds 85°F to provide a secondary safety termination. This thermostat is installed at the right end of the evaporator coil.

ELECTRIC DEFROST - COMPONENTS

See Figure 51 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 the electrical enclosure behind the kickplate.

FIGURE 52: Heater Wires for 3-Phase Defrost



To replace the heater element, disconnect power to the case, and then remove the fasteners that hold the heater element 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 be removed by raising the retaining clips 2" at a time, 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 52**). These heater elements can be replaced by following the same process as for single-phase defrost cases.

Each freezer has a factory-set limit thermostat attached to the right end of the evaporator coil to regulate the operation of the evaporator fans and defrost heater. Another 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

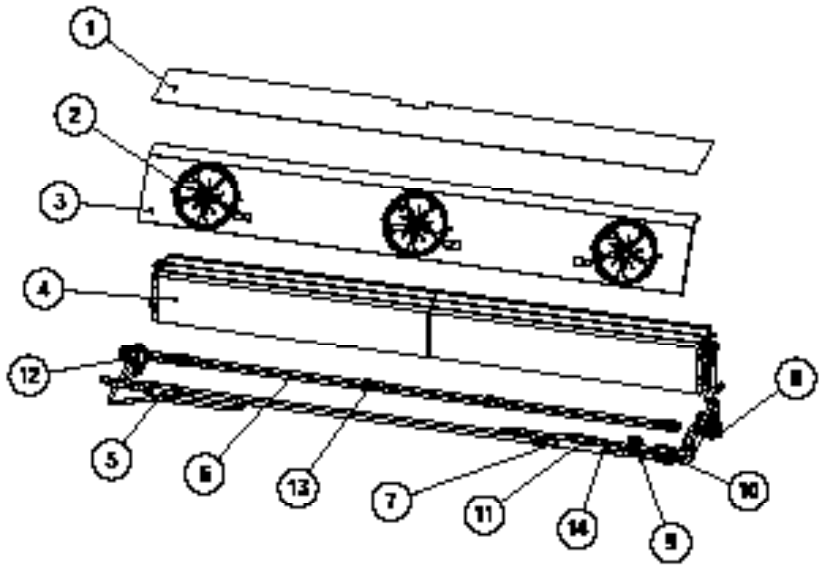
See Figure 50 on page 27 for defrost settings.

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

FIGURE 53: 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 (Typical)
14	Defrost Termination Probe

HOT GAS DEFROST - COMPONENTS

See Figure 53 on page 29 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.

OFF-CYCLE DEFROST

See Figure 50 on page 27 for defrost settings.

During off-cycle defrost, refrigerant is stopped either by stopping the compressor or by closing the liquid line solenoid valve and allowing the compressor to pump down. The fans, lights, and anti-sweat heaters remain on during off-cycle defrost.

If temperature termination is selected, set the termination temperature for 45°F for discharge air and coil temperature. ***Note: Stocking or shopping during off-cycle defrost may cause premature defrost termination.***

REFRIGERATION

Air Sensors & Case Thermometers

- Discharge air sensors can be located in several places, including the honeycomb, ceiling pocket cover, rear duct, and return air.
- The sensing bulb for temperature control is located under the coil cover.
- 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

All mullions are equipped with anti-sweat heaters. They are located behind the front metal strike plate. Remove the front fasteners on the mullion, and then remove the front strike plate to access the heater.

The case sill has an anti-sweat heater. It is located under the front metal strike plate below the door opening.

For stores with low humidity and tightly controlled ambient conditions, the lower sill heater may be disconnected for additional energy savings.

Contact the Zero Zone Service Department for questions about servicing 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.

An electrical enclosure is located behind the kickplate on the right side of the case. Cases may have an optional top-mounted electrical box. Inside the electrical box or electrical enclosure are 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 54**). 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.

FIGURE 54: Light Switch



- **See Figure 55 on page 32** for a sample wiring diagram for a freezer with electric defrost.
- **See Figure 56 on page 32** for a sample wiring diagram for a freezer with hot gas defrost
- **See Figure 57 on page 33** for a sample wiring diagram for a cooler with off-cycle defrost.
- **See Figure 58 on page 33** for a sample wiring diagram for an upper electrical box on a cooler with off-cycle defrost.
- **See Figure 59 on page 34** for a sample wiring diagram for an upper electrical box on a Hybrid™ display case.
- ***Always refer to the wiring diagrams shipped with the case.***

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.

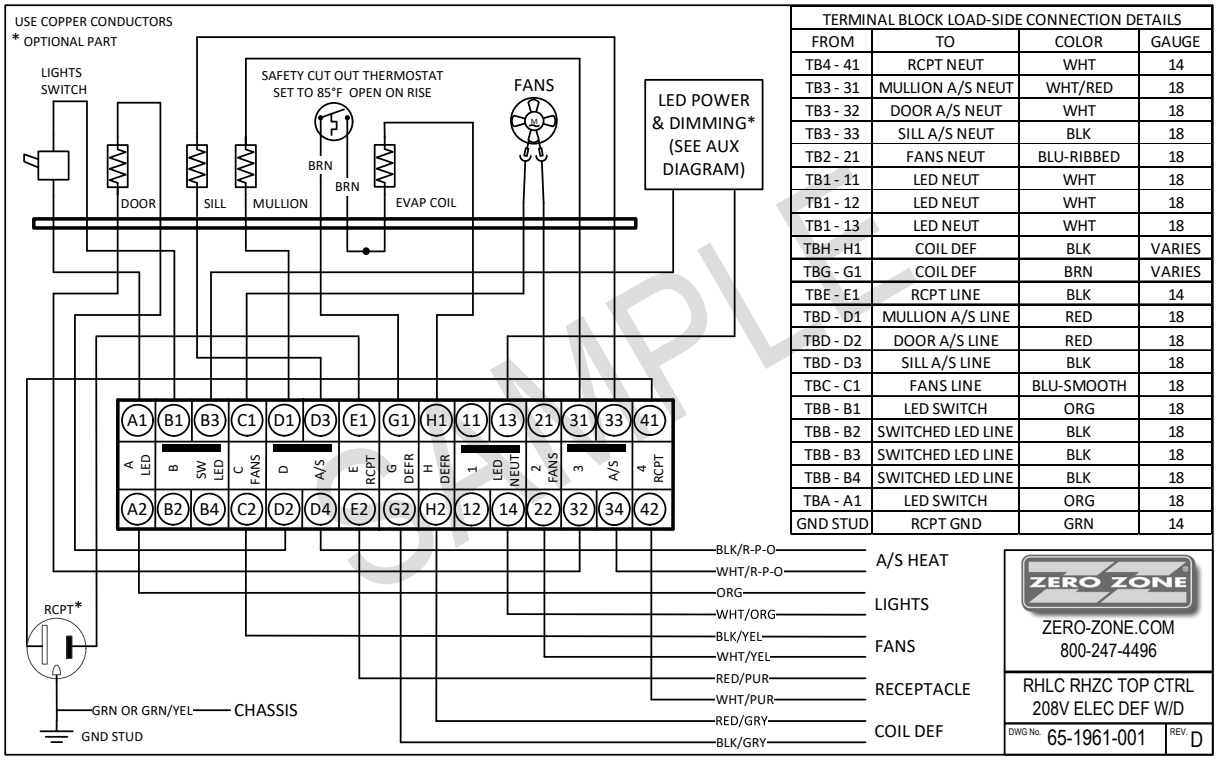
All wiring must comply with the National Electrical Code (NEC) and all local codes. After installing the equipment, correct operation of the electrical circuits, controls, and defrost controls should be verified. All operating voltages and amperages should be measured and recorded. Display cases that 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.
- The evaporator probe (defrost termination) is located in the evaporator coil.
- In coolers, 1 sensor bulb is factory installed. Temperature probe wires are white (common) and green (supply).
- In freezers, 2 sensor bulbs are factory installed. Temperature probe wires are white (common) and green (supply). Evaporator probe wires are white (common) and orange (supply).

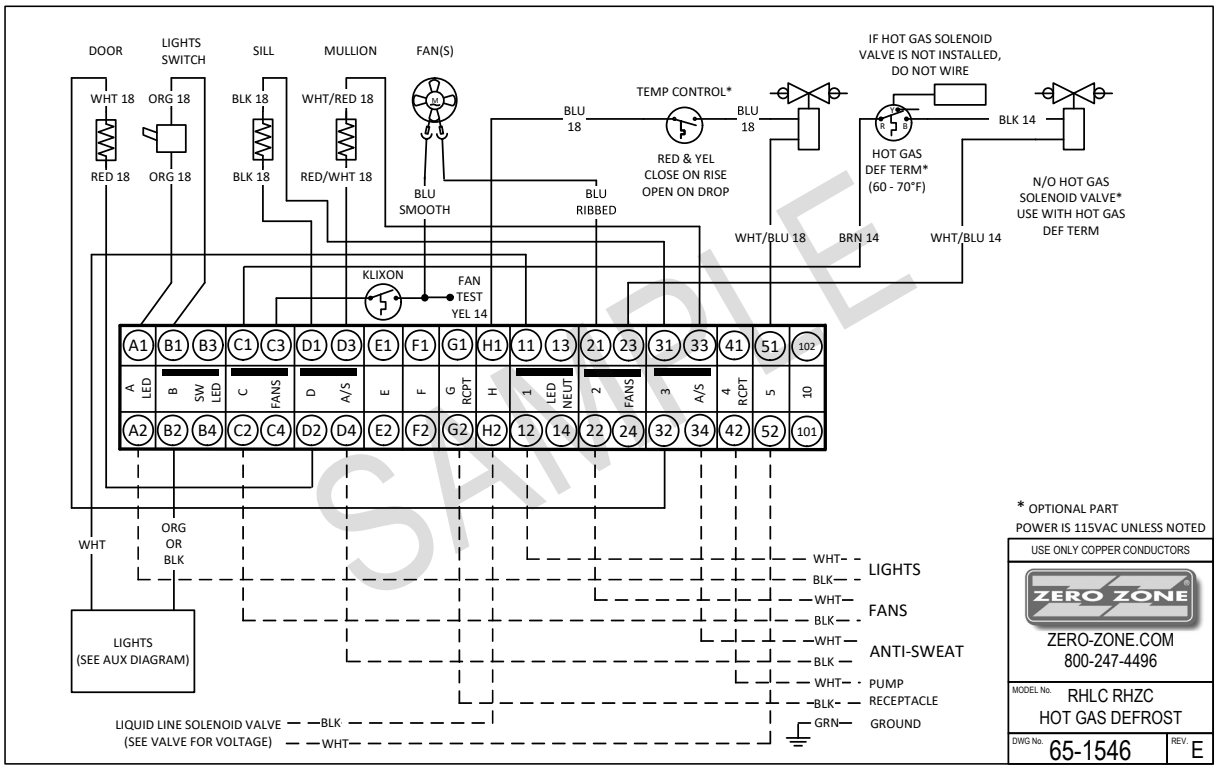
ELECTRICAL

FIGURE 55: Sample Wiring Diagram – Lower Electrical Enclosure – Electric Defrost



TERMINAL BLOCK LOAD-SIDE CONNECTION DETAILS			
FROM	TO	COLOR	GAUGE
TB4 - 41	RCPT NEUT	WHT	14
TB3 - 31	MULLION A/S NEUT	WHT/RED	18
TB3 - 32	DOOR A/S NEUT	WHT	18
TB3 - 33	SILL A/S NEUT	BLK	18
TB2 - 21	FANS NEUT	BLU-RIBBED	18
TB1 - 11	LED NEUT	WHT	18
TB1 - 12	LED NEUT	WHT	18
TB1 - 13	LED NEUT	WHT	18
TBH - H1	COIL DEF	BLK	VARIES
TBG - G1	COIL DEF	BRN	VARIES
TBE - E1	RCPT LINE	BLK	14
TBD - D1	MULLION A/S LINE	RED	18
TBD - D2	DOOR A/S LINE	RED	18
TBD - D3	SILL A/S LINE	BLK	18
TBC - C1	FANS LINE	BLU-SMOOTH	18
TBB - B1	LED SWITCH	ORG	18
TBB - B2	SWITCHED LED LINE	BLK	18
TBB - B3	SWITCHED LED LINE	BLK	18
TBB - B4	SWITCHED LED LINE	BLK	18
TBA - A1	LED SWITCH	ORG	18
GND STUD	RCPT GND	GRN	14

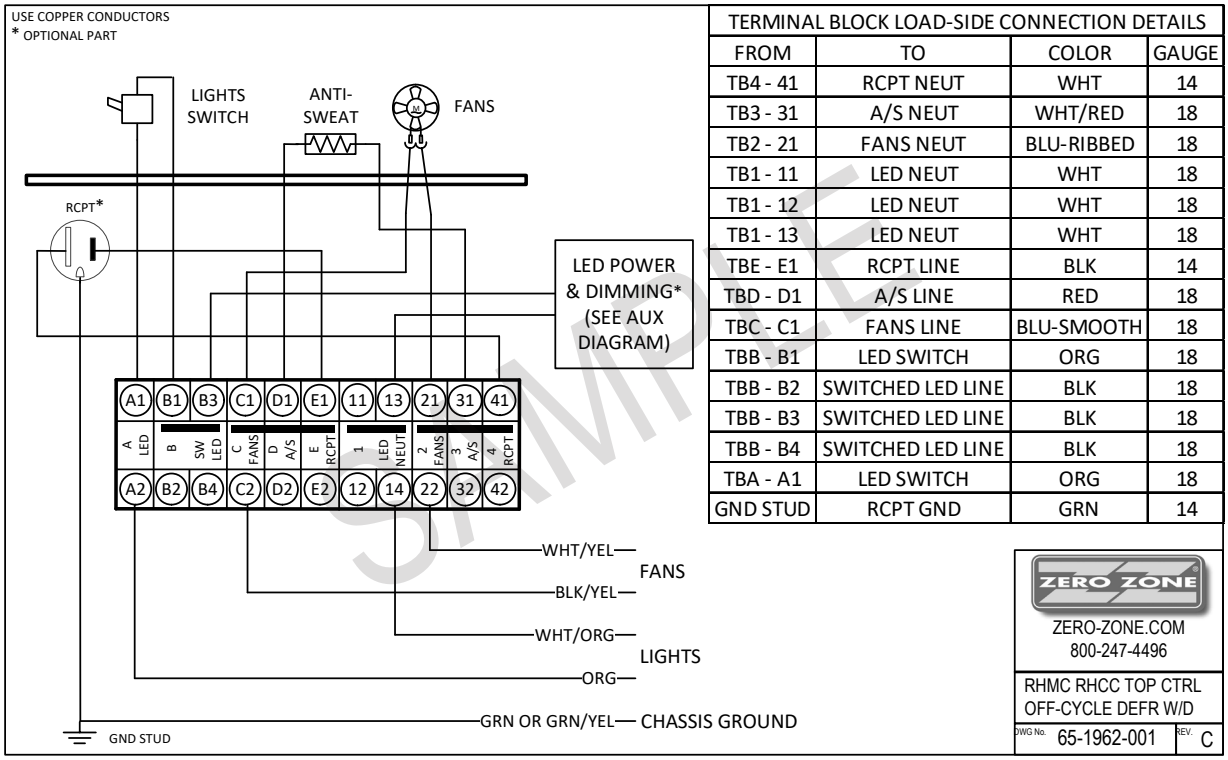
FIGURE 56: Sample Wiring Diagram – Lower Electrical Enclosure – Hot Gas Defrost



SAMPLE

ELECTRICAL

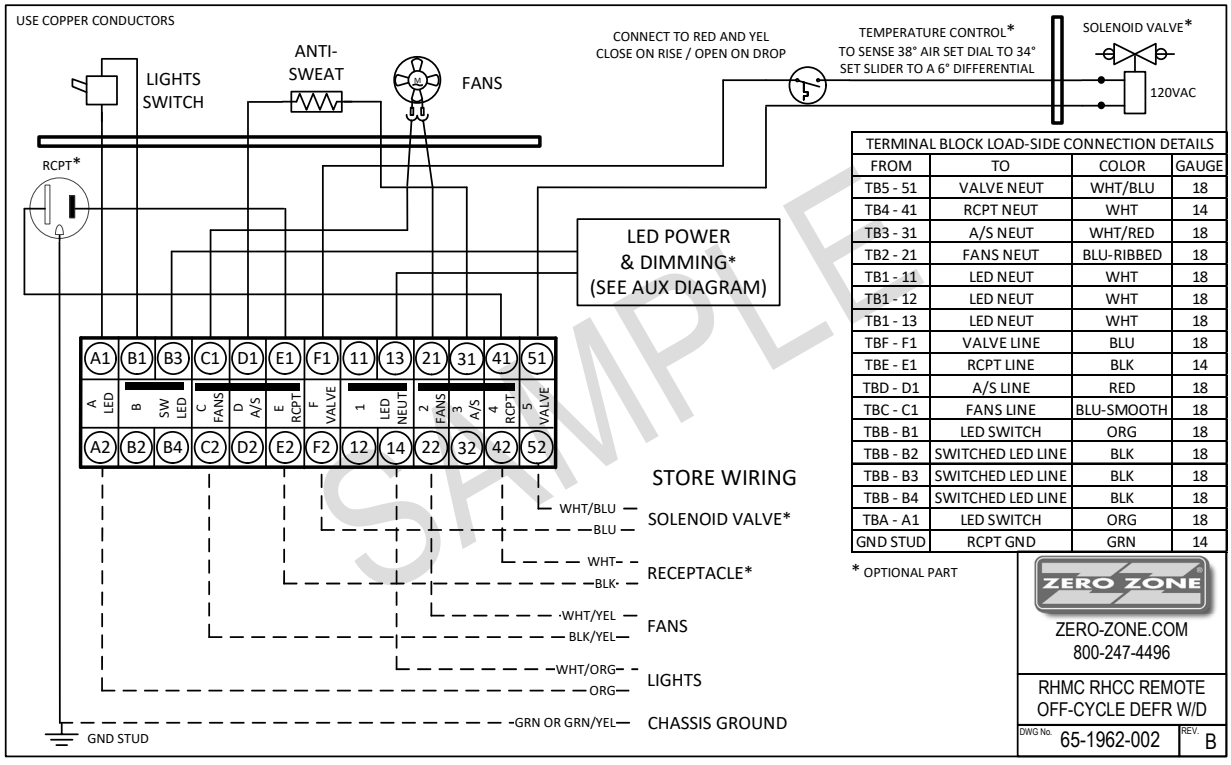
FIGURE 57: Sample Wiring Diagram – Lower Electrical Enclosure – Cooler (Off-Cycle Defrost)



TERMINAL BLOCK LOAD-SIDE CONNECTION DETAILS

FROM	TO	COLOR	GAUGE
TB4 - 41	RCPT NEUT	WHT	14
TB3 - 31	A/S NEUT	WHT/RED	18
TB2 - 21	FANS NEUT	BLU-RIBBED	18
TB1 - 11	LED NEUT	WHT	18
TB1 - 12	LED NEUT	WHT	18
TB1 - 13	LED NEUT	WHT	18
TBE - E1	RCPT LINE	BLK	14
TBD - D1	A/S LINE	RED	18
TBC - C1	FANS LINE	BLU-SMOOTH	18
TBB - B1	LED SWITCH	ORG	18
TBB - B2	SWITCHED LED LINE	BLK	18
TBB - B3	SWITCHED LED LINE	BLK	18
TBB - B4	SWITCHED LED LINE	BLK	18
TBA - A1	LED SWITCH	ORG	18
GND STUD	RCPT GND	GRN	14

FIGURE 58: Sample Wiring Diagram – Upper Electrical Box – Cooler (Off-Cycle Defrost)



TERMINAL BLOCK LOAD-SIDE CONNECTION DETAILS

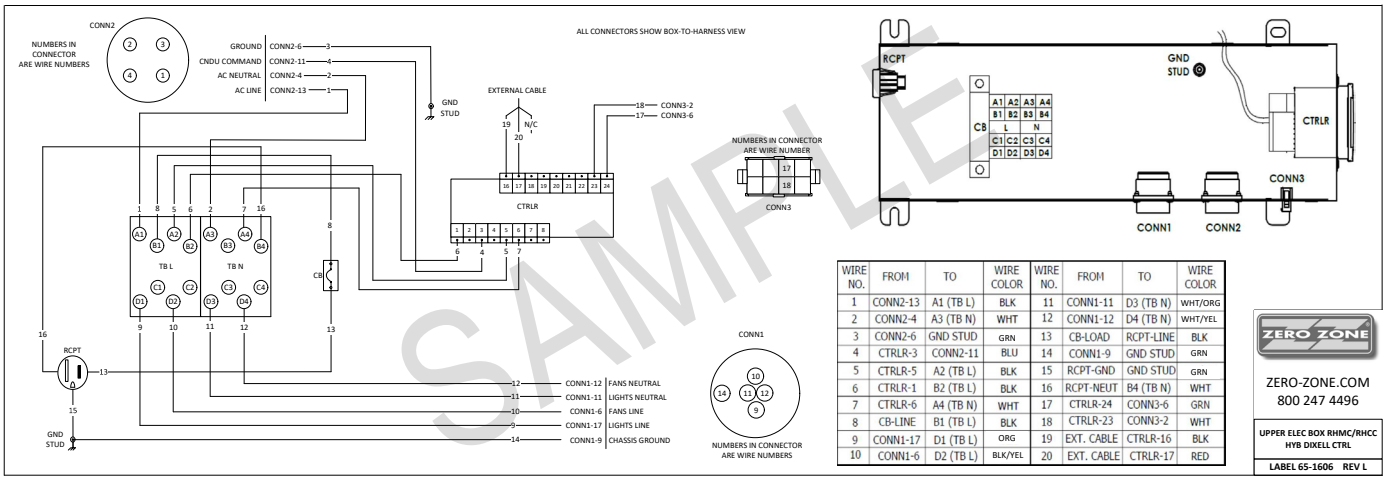
FROM	TO	COLOR	GAUGE
TB5 - 51	VALVE NEUT	WHT/BLU	18
TB4 - 41	RCPT NEUT	WHT	14
TB3 - 31	A/S NEUT	WHT/RED	18
TB2 - 21	FANS NEUT	BLU-RIBBED	18
TB1 - 11	LED NEUT	WHT	18
TB1 - 12	LED NEUT	WHT	18
TB1 - 13	LED NEUT	WHT	18
TBF - F1	VALVE LINE	BLU	18
TBE - E1	RCPT LINE	BLK	14
TBD - D1	A/S LINE	RED	18
TBC - C1	FANS LINE	BLU-SMOOTH	18
TBB - B1	LED SWITCH	ORG	18
TBB - B2	SWITCHED LED LINE	BLK	18
TBB - B3	SWITCHED LED LINE	BLK	18
TBB - B4	SWITCHED LED LINE	BLK	18
TBA - A1	LED SWITCH	ORG	18
GND STUD	RCPT GND	GRN	14

* OPTIONAL PART

SAMPLE

ELECTRICAL

FIGURE 59: Sample Wiring Diagram – Upper Electrical Box – Hybrid™ Case



WIRE NO.	FROM	TO	WIRE COLOR	WIRE NO.	FROM	TO	WIRE COLOR
1	CONN2-13	A1 (TB L)	BLK	11	CONN1-11	D3 (TB N)	WHT/ORG
2	CONN2-4	A3 (TB N)	WHT	12	CONN1-12	D4 (TB N)	WHT/YEL
3	CONN2-6	GND STUD	GRN	13	CB-LOAD	RCPT-LINE	BLK
4	CTRLR-3	CONN2-11	BLU	14	CONN1-9	GND STUD	GRN
5	CTRLR-5	A2 (TB L)	BLK	15	RCPT-GND	GND STUD	GRN
6	CTRLR-1	B2 (TB L)	BLK	16	RCPT-NEUT	B4 (TB N)	WHT
7	CTRLR-6	A4 (TB N)	WHT	17	CTRLR-24	CONN3-6	GRN
8	CB-LINE	B1 (TB L)	BLK	18	CTRLR-23	CONN3-2	WHT
9	CONN1-17	D1 (TB L)	ORG	19	EXT. CABLE	CTRLR-16	BLK
10	CONN1-6	D2 (TB L)	BLK/YEL	20	EXT. CABLE	CTRLR-17	RED

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UPPER ELEC BOX RHMC/RHCC
HYB DIXELL CTRL

LABEL 65-1606 REV L

SAMPLE

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).
- In a fully stocked cooler, a typical velocity reading is 300-400 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 bumper and 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.

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