

Reach-In Merchandisers

Medium & Low Temperature



Installation, Operation and Service Manual

Use this manual along with Insight Door Manual
P/N 3182257



INSIGHT® REACH-IN

This manual applies to case models: IRL ◊ IRLN ◊ IRM ◊ IRMN

Illustrations use model IRL unless otherwise stated.

June 2025
P/N 3181178_E
Spanish P/N 3181179_E
French P/N 3231993_E
MANUAL - IO Insight Reach-In

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BEFORE YOU BEGIN

READ THESE INSTRUCTIONS COMPLETELY AND CAREFULLY.

LEGAL DISCLAIMER

Review all safety warnings on the case and in this manual before attempting start-up. Hussmann shall not be liable for any repair or replacement made without the written consent of Hussmann, or when the product is installed or operated in a manner contrary to the printed instructions covering installation and service which accompanied such product. Please note that failure to follow the instructions in this document may void your factory warranty.

ANSI Z535.5 DEFINITIONS

The definitions below are used to clarify the magnitude and urgency of harm and damage, considering problems arising from misuse. Relative to their potential danger, the definitions are divided into five parts according to ANSI Z535 Series.

! DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

! WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

! CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to personal injury.

**SAFETY
INSTRUCTIONS**

Safety instructions (or equivalent) signs indicate specific safety-related instructions or procedures.

PROPOSITION 65



This warning does not mean that Hussmann products will cause cancer or reproductive harm, or is in violation of any product-safety standards or requirements. As clarified by the California State Government, Proposition 65 can be considered more of a 'right to know' law than a pure product safety law. When used as designed, Hussmann believes that our products are not harmful. We provide the Proposition 65 warning to stay in compliance with California State law.

It is your responsibility to provide accurate Proposition 65 warning labels to your customers when necessary. For more information on Proposition 65, please visit the California State Government Website.

SERIAL PLATE LOCATION

The serial plate is located inside of the case cabinet on the left-hand side. Serial plate contains all pertinent information such as model, serial number, amperage rating, refrigerant type, and charge.

UL LISTING

These merchandisers are manufactured to meet ANSI / UL 60335-2-89 and CSA C22.2 standard requirements for safety. Proper installation is required to maintain this listing. This appliance is to be installed in accordance with the Safety Standard for Refrigeration Systems, ANSI/ASHRAE 15.

FEDERAL / STATE REGULATION

These merchandisers, at the time they are manufactured, meet all federal and state/provincial regulations. Proper installation is required to ensure these standards are maintained. Near the serial plate, each case carries a label identifying the environment (temperature and relative humidity) in which the case was designed to be used. In compliance with DOE 2017, standard low temp reach-in cases with doors have an anti-sweat controller that maintains the door heat at a level that meets DOE energy limits. Any factory or field-installed anti-sweat controller applied to a low temp reach-in case with doors must be programmed to cycle the heaters at no more than 50% run time at design conditions of 75°, 55% Relative Humidity for frozen food operating conditions.

CLIMATE CLASS

The test room climate class for this appliance is Climate Class 8. Climate Class 8 means the unit has been tested for maximum ambient of 75° F (23.9° C) dry bulb and 55% relative humidity.

ADDITIONAL IMPORTANT SYMBOLS

The symbols below indicate specific types of information on the unit.



Grounding Connection Location

USER SAFETY AND PRODUCT INFORMATION

General Safety Instructions

SAFETY INSTRUCTIONS

This manual was written in accordance with originally prescribed equipment that is subject to change. Hussmann reserves the right to change or revise specifications and product design in connection with any feature of our products.

Personal Protection Equipment (PPE) is required. Wear safety glasses, gloves, protective boots or shoes, long pants, and a long-sleeve shirt when working with this equipment and while handling glass.



The safety of our customers and employees is paramount. The precautions and procedures described in this manual are intended as general methods for safe use of this equipment. Please be sure to comply with the precautions described in this manual to protect you and others from possible harm. Always follow OSHA standards for safety.

Only qualified personnel should install and service this equipment. Personal Protection Equipment (PPE) is required. Wear safety glasses, gloves, protective boots or shoes, long pants, and a long-sleeve shirt when working with this equipment and while handling glass.

Observe the refrigerant type the unit is designed to work with and any and all precautions on tags, stickers, labels and literature provided and referenced for this equipment. Use only Hussmann approved parts approved through the Hussmann Performance Parts Website. Verify that all repair parts are identical models to the ones they are replacing. Do not substitute parts such as motors, switches, relays, heaters, compressors, power supplies, or solenoids. Read all safety information regarding the safe handling of refrigerant and refrigerant oil, including the Material Safety Data Sheet. MSDS sheets can be obtained from your refrigerant supplier. Service is to be performed by factory-authorized service personnel, so as to minimize the risk of possible injury due to incorrect parts or improper service. Contact your Hussmann representative to arrange servicing.

WARNING

R-744 (CO₂) EQUIPPED MODELS ONLY

Before Working with R-744 (CO₂) Refrigerant

- **WARNING:** The refrigeration system is under high pressure. Do not tamper with it. Contact qualified service personal before disposal.
- R-744 (CO₂) systems have similar safety concerns with all conventional refrigerants, in that it displaces oxygen, is heavier than air and will concentrate closer to the floor if there is a system leak. R-744 should be monitored for leaks similar to other refrigerants.
- If the refrigeration system is de-energized, venting of the R-744 through the pressure regulating relief valves on the refrigeration system can occur. In such cases, the system might need to be recharged with R-744, but in any case, the pressure regulating relief valve(s) shall not be defeated or capped. The relief setting shall not be altered.
- A sufficient number of pressure relief and pressure regulating relief valves might need to be provided based on the system capacity and located such that no stop valve is provided between the relief valves and the parts or section of the system being protected.
- A pressure relief device shall be installed in the high-pressure side of the refrigeration system between the motor-compressor and the gas cooler. There shall be no shut off devices or other components except piping between the motor-compressor and the pressure relief device that could introduce a pressure drop.
- The pressure relief device shall be mounted so that any refrigerant released from the system during its operation cannot cause harm to the user of the appliance. The aperture shall be located so that it is unlikely to be obstructed in normal use.
- The installed pressure relief device shall have no provisions for setting by the end user.
- The pressure setting of the installed pressure relief device shall be no higher than the design pressure of the high-pressure side.
- Confirm operation of leak detectors (e.g., by exhaling near the sensor), audible / visible alarms, and machine room ventilation before operation.
- Ventilate adjacent enclosed areas to prevent the formation of dangerous concentrations of carbon dioxide.
- Avoid contact of the skin or eyes with solid carbon dioxide (dry ice) or objects cooled by solid carbon dioxide.
- Additional information on the safe use and handling of carbon dioxide can be found in Standards from the Compressed Gas Association Standard (www.cganet.com).
- The following checks shall be applied to installations:
 - a. The actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed.
 - b. The ventilation machinery and outlets are operating adequately and are not obstructed.
 - c. If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant.
 - d. Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected.
 - e. Refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.
- Replacement parts must be compatible with the specific equipment's maximum design pressure as shown on the equipment labeling. For example, if the equipment has been designed to meet 1,160 psig (80 bar) maximum design pressure then any replacement part must be 1,160 psig (80 bar) compatible.
- Never apply heat directly to piping containing CO₂. Rapid thermal expansion of CO₂ can cause the pipe to burst.

- Pressure transducers / leak detectors / warning lights / sounders/buzzers / and plant room ventilation must all be operational prior to charging with CO₂.
- Pressure relief devices / check valves must be located anywhere that liquid CO₂ can be trapped. Trapped CO₂ at -40° F (-40° C) will double in volume if allowed to rise to 86° F (30° C).
- Under no circumstances add Schrader valves to or remove Schrader valves from the system.
- Observe all warnings and labels on the unit being installed or serviced such as the one below indicating high pressure.

Asphyxiation

- R-744 is odorless, heavier than air, and is an asphyxiant gas. If sensor reading is maxed out or non-responsive assume an unsafe level of CO₂ and ventilate the room prior to entering.
- Practical limit of R-744 is 0.006 lb/ft³ (56,000 ppm).
- Personnel including rescue workers should not enter areas in which the carbon-dioxide content exceeds 3% (30,000 ppm) by measurement unless wearing an SCBA or supplied-air respirator.
- A leak of R-744 could result in a concentration exceeding the practical limit in an enclosed, occupied space such as a cold room. Precautions must be taken to prevent asphyxiation. These include the use of permanent leak detection, which activates an alarm in the event of a leak.
- The practical limit is defined in ASHRAE 34 but may vary depending on regional regulations. The table below summarizes the effect of R-744 at various concentrations in the air.

PPM of R-744 (CO ₂)	Effects
442	concentration in atmosphere
5,000	long-term exposure limit (8 hours)
15,000	short-term exposure limit (10 minutes)
30,000	discomfort, breathing difficulties, headache, dizziness, etc.
100,000	loss of consciousness, followed by death
300,000	quick and immediate death

CO₂ QUALITY

- CO₂ that is purchased for use in refrigeration systems should be of a purity level high enough to prevent accumulation of non-condensable gases and moisture. A build-up of these gases can block small orifices (such as expansion valves) or lead to high discharge pressure, reducing operation or causing the system to become inoperable.
- CO₂ is commercially available at several different purity levels. The common names and percent purity are listed below. Hussmann recommends using “Refrigeration Grade” (99.99% purity) CO₂.
- Mixing of higher purity grades of CO₂ is acceptable. Lower grades of CO₂ contain higher levels of contaminants and water and will decrease system performance. Higher levels of moisture may react with the CO₂ and form carbonic acid that can degrade component integrity. Hussmann recommends keeping enough refrigeration grade CO₂ on-site to charge the system.
- Medical grade CO₂ should not be used, due to the outlet pressure regulators typically present on tanks.
- Bone-Dry grade is the minimum acceptable purity to ensure proper operation of the equipment and is pure enough to technically prevent accumulation of non-condensable gases in the system.
- R-744 (CO₂) purity:

R-744 (CO ₂) Grade	Purity
Industrial and Medical Grade	99.5%
Bone Dry (minimum acceptable)	99.8%
Anaerobic Grade	99.9%
Refrigeration Grade (recommended)	99.99%
Coleman/Instrument Grade	99.99%
Research Grade	99.999%
Ultra-Pure Grade	99.9999%

CO₂ LEAK DETECTOR

Leak detectors are required anywhere that CO₂ gas may leak or be vented. Leak detectors provide an alarm if CO₂ is detected at an amount that exceeds the maximum allowable CO₂ concentration. Leak detectors are not provided with the case. Consult local safety codes for exact requirements.

STARTUP AND SHUT DOWN

If the refrigeration system is de-energized, venting of the R-744 (CO₂) through the pressure regulating relief valves on the refrigeration system can occur. In such cases, the system may need to be recharged with R-744 (CO₂), but in any case, the pressure regulating relief valve(s) are not to be defeated or capped. The relief setting shall not be altered.

Provisions must be made for startup and shutdown to prevent excessive pressures. Consult the pumping station instructions and local codes for requirements.

It is imperative that the case piping is clean and dry prior to charging the system with CO₂. All tubing MUST be rated with a minimum design pressure at or above the rating of the equipment. Consult equipment labeling to confirm pressure rating (e.g., 1,305 psig [90 bar]) before installation.

ALL REFRIGERANT TYPES

- Be aware that refrigerants may not contain an odour.
- Excessive ambient conditions may cause condensation and sweating on doors. Facility operators are responsible for monitoring doors and floor conditions and ensuring the safety of all persons present. Installation and service must be performed by a qualified installer or service agency only as recommended by the manufacturer.
- If a leak is present or even suspected, do not allow untrained personnel to attempt to find the cause.
- A hand-held leak detector ("sniffer") will be used before any repair and/or maintenance.
- WARNING: Keep clear of obstruction, all ventilation openings in the appliance enclosure or in the structure for build-in.
- WARNING: Do not use mechanical devices or other means to accelerate the defrosting process, other than those recommended by the manufacturer.
- WARNING: Do not damage the refrigerating circuit.
- WARNING: Do not use electrical appliances inside the food/ice storage compartments unless they are the type recommended by the manufacturer.
- Do not use any means to clean, other than those recommended by the manufacturer.
- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
- The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).
- Do not pierce or burn.

WARNING

- Do not store items or flammable materials atop the unit. Do not walk on case.
- Do not store explosive substances, such as aerosol cans with flammable propellant, in this appliance.
- 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.
- Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges, or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.
- Any insulation shall be suitable for use with the material being insulated.
- Protection devices, piping, and fittings shall be protected as far as possible against adverse environmental effects, for example, the danger of water collecting and freezing in relief pipes or the accumulation of dirt and debris.
- Piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ANSI/ASHRAE 15, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed
- The installation of pipe-work shall be kept to a minimum.
- Mechanical connections made in accordance shall be accessible for maintenance purposes.
- Provision shall be made for expansion and contraction of long runs of piping.
- Piping in refrigeration systems shall be so designed and installed to minimize the likelihood of hydraulic shock damaging the system.
- Flexible pipe elements shall be protected against mechanical damage, excessive stress by torsion, or other forces, and that they should be checked for mechanical damage annually.
- Precautions shall be taken to avoid excessive vibration or pulsation.
- LOCK OUT / TAG OUT — To avoid serious injury or death from electrical shock, always disconnect the electrical power at the main disconnect when servicing or replacing any electrical component. This includes, but is not limited to, such items as doors, lights, fans, heaters, and thermostats.
- To reduce the risk of fire, electrical shock or injury when cleaning this merchandiser:
 - Unplug the merchandiser before cleaning.
 - Keep all liquids away from electrical and electronic components.
- Merchandiser must be grounded. All wiring must be in compliance with NEC and local codes.
- The appliance shall not be installed in public corridors or lobbies.
- Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.
- Ensure that the apparatus is mounted securely.

- Ensure that seals or sealing materials have not degraded to the point that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.
- Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times, the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.
- During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.
- Component parts shall be replaced with like components, and servicing shall be done by factory authorized service personnel only, so as to minimize the risk of possible ignition due to incorrect parts or improper service.
- Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.
- After completion of field piping for split systems, the field pipework shall be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging, according to the following requirements:
 1. The minimum test pressure for the low side of the system shall be the low side design pressure and the minimum test pressure for the high side of the system shall be the high side design pressure, unless the high side of the system cannot be isolated from the low side of the system in which case the entire system shall be pressure tested to the low side design pressure.
 2. The test pressure after removal of pressure source shall be maintained for at least 1 h with no decrease of pressure indicated by the test gauge, with test gauge resolution not exceeding 5% of the test pressure.
 3. During the evacuation test, after achieving a vacuum level specified in the manual or less, the refrigeration system shall be isolated from the vacuum pump and the pressure shall not rise above 1,500 microns within 10 min. The vacuum pressure level shall be specified in the manual, and shall be the lessor of 500 microns or the value required for compliance with national and local codes and standards, which may vary between residential, commercial, and industrial buildings.
- Solenoid valves shall be correctly positioned in the piping to avoid hydraulic shock.
- Solenoid valves shall not block in liquid refrigerant unless adequate relief is provided to the refrigerant system low pressure side.

FAILURE TO ABIDE BY THESE WARNINGS COULD RESULT IN AN EXPLOSION, DEATH, INJURY, AND PROPERTY DAMAGE. READ ALL WARNINGS PRIOR TO INSTALLING, PERFORMING MAINTENANCE, OR SERVICING THE EQUIPMENT IN ANY WAY.

⚠ CAUTION

- Do NOT use HOT water on cold glass surfaces. This can cause the glass to shatter and could result in personal injury. Allow glass fronts, to warm before applying hot water.
- Do NOT allow cleaning agent or cloth to contact food product.
- Product will be degraded and may spoil if allowed to sit in a non-refrigerated area.

NOTICE

- Merchandiser must operate for 24 hours before loading product!
- Regularly check merchandiser temperatures.
- Do not break the cold chain. Keep products in cooler or freezer before loading into merchandiser.
- Low temperature merchandisers are designed for loading ONLY frozen products.
- Medium Temperature merchandisers are designed for loading ONLY chilled products.

LEAK DETECTION

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used. The following leak detection methods are deemed acceptable for all refrigerant systems:

- Electronic leak detectors may be used to detect refrigerant leaks but, in the case of FLAMMABLE REFRIGERANTS, the sensitivity might not be adequate, or might need recalibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25% maximum) is confirmed.
- Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine can react with the refrigerant and corrode the copper pipe-work.

Note: Examples of leak detection fluids are bubble method and fluorescent method agents.

If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Removal of refrigerant shall be according to the Refrigerant Recovery section provided.

BEFORE WORKING WITH R-744 (CO₂) REFRIGERANT

Safety Checks

- **WARNING:** The refrigeration system is under high pressure. Do not tamper with it. Contact qualified service personal before disposal.
- R-744 (CO₂) systems have similar safety concerns with all conventional refrigerants, in that it displaces oxygen, is heavier than air and will concentrate closer to the floor if there is a system leak. R-744 should be monitored for leaks similar to other refrigerants.
- If the refrigeration system is de-energized, venting of the R-744 through the pressure regulating relief valves on the refrigeration system can occur. In such cases, the system might need to be recharged with R-744, but in any case, the pressure regulating relief valve(s) shall not be defeated or capped. The relief setting shall not be altered.
- A sufficient number of pressure relief and pressure regulating relief valves might need to be provided based on the system capacity and located such that no stop valve is provided between the relief valves and the parts or section of the system being protected.
- A pressure relief device shall be installed in the high-pressure side of the refrigeration system between the motor-compressor and the gas cooler. There shall be no shut off devices or other components except piping between the motor-compressor and the pressure relief device that could introduce a pressure drop.
- The pressure relief device shall be mounted so that any refrigerant released from the system during its operation cannot cause harm to the user of the appliance. The aperture shall be located so that it is unlikely to be obstructed in normal use.
- The installed pressure relief device shall have no provisions for setting by the end user.
- The pressure setting of the installed pressure relief device shall be no higher than the design pressure of the high-pressure side.
- Confirm operation of leak detectors (e.g., by exhaling near the sensor), audible / visible alarms, and machine room ventilation before operation.
- Ventilate adjacent enclosed areas to prevent the formation of dangerous concentrations of carbon dioxide.
- Avoid contact of the skin or eyes with solid carbon dioxide (dry ice) or objects cooled by solid carbon dioxide.
- Additional information on the safe use and handling of carbon dioxide can be found in Standards from the Compressed Gas Association Standard (www.cganet.com).
- The following checks shall be applied to installations:
 - a. The actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed.
 - b. The ventilation machinery and outlets are operating adequately and are not obstructed.
 - c. If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant.
 - d. Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected.
 - e. Refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

Asphyxiation

- R-744 is odorless, heavier than air, and is an asphyxiant gas. If sensor reading is maxed out or non-responsive assume an unsafe level of CO₂ and ventilate the room prior to entering.
- Practical limit of R-744 is 0.006 lb/ft³ (56,000 ppm).
- Personnel including rescue workers should not enter areas in which the carbon-dioxide content exceeds 3% (30,000 ppm) by measurement unless wearing an SCBA or supplied-air respirator.
- A leak of R-744 could result in a concentration exceeding the practical limit in an enclosed, occupied space such as a cold room. Precautions must be taken to prevent asphyxiation. These include the use of permanent leak detection, which activates an alarm in the event of a leak.
- The practical limit is defined in ASHRAE 34 but may vary depending on regional regulations.

CO₂ Quality

- CO₂ that is purchased for use in refrigeration systems should be of a purity level high enough to prevent accumulation of non-condensable gases and moisture. A build-up of these gases can block small orifices (such as expansion valves) or lead to high discharge pressure, reducing operation or causing the system to become inoperable.
- CO₂ is commercially available at several different purity levels. The common names and percent purity are listed below. Hussmann recommends using "Refrigeration Grade" (99.99% purity) CO₂.
- Mixing of higher purity grades of CO₂ is acceptable. Lower grades of CO₂ contain higher levels of contaminants and water and will decrease system performance. Higher levels of moisture may react with the CO₂ and form carbonic acid that can degrade component integrity. Hussmann recommends keeping enough refrigeration grade CO₂ on-site to charge the system.
- Medical grade CO₂ should not be used, due to the outlet pressure regulators typically present on tanks.
- Bone-Dry grade is the minimum acceptable purity to ensure proper operation of the equipment and is pure enough to technically prevent accumulation of non-condensable gases in the system.

R-744 at various concentrations in the air.

PPM of R-744 (CO ₂)	Effects
442	concentration in atmosphere
5,000	long-term exposure limit (8 hours)
15,000	short-term exposure limit (10 minutes)
30,000	discomfort, breathing difficulties, headache, dizziness, etc.
100,000	loss of consciousness, followed by death
300,000	quick and immediate death

R-744 (CO₂) purity:

R-744 (CO ₂) Grade	Purity
Industrial and Medical Grade	99.5%
Bone Dry (minimum acceptable)	99.8%
Anaerobic Grade	99.9%
Refrigeration Grade (recommended)	99.99%
Coleman/Instrument Grade	99.99%
Research Grade	99.999%
Ultra-Pure Grade	99.9999%

INSTALLATION

NOTICE

CASE CLEARANCE

A 4-inch (102 mm) space between the rear of the merchandiser and wall must be maintained for air circulation. However, in high ambient conditions, sweating may still occur. If this happens, install a method of forced ventilation such as a fan ventilation kit.

LOCATION

These merchandisers are designed for displaying products in air-conditioned stores where the temperature is maintained at or below the ANSI/NSF-7 specified level, and relative humidity is maintained at or below 55% Relative Humidity. Placing refrigerated merchandisers in direct sunlight, near hot tables, or other heat sources could impair efficiency. Like other merchandisers, these are sensitive to air disturbances. Air currents passing around merchandisers will seriously impair their operation. Do not allow air conditioning, electric fans, open doors or windows, etc., to create air currents around the merchandisers.

To prevent sweating on the exterior surfaces of merchandisers, there must be a minimum clearance of 4 inches (102 mm) between the merchandisers and other fixtures or walls. Products should always be maintained at the proper temperature. This means that from the time the product is received, through storage, preparation, and display, the temperature of the product must be controlled to maximize product life.

SHIPPING DAMAGE

All equipment should be thoroughly examined for shipping damage before and during unloading. This equipment has been carefully inspected at our factory. Any claim for loss or damage must be made to the carrier. The carrier will provide any necessary inspection reports and/or claim forms.

Apparent Loss or Damage

An obvious loss or damage must be noted on the freight bill or express receipt and signed by the carrier's agent; otherwise, the carrier may refuse the claim. The carrier will supply the necessary forms.

Concealed Loss or Damage

A claim for concealed damage is made when loss or damage is not apparent until after the equipment is removed from its shipping crate. Upon discovering the damage, make a request in writing to the carrier for inspection within 15 days and retain all packing. The carrier will supply the inspection report and required claim forms.

INSTALLATION TOOL LIST

Unloading From Trailer:

- Lever Bar (also known as a Mule, Johnson Bar, J-bar, Lever Dolly, and pry lever)
- Moving Dolly

Setting Case Line-Up:

- Level, 4 ft suggested
- Ratchet
- ¼-inch Socket
- ⅝-inch Socket
- ½-inch Socket
- Battery Drill / Screw Gun
- Caulking Gun
- 10-inch Adjustable Crescent Wrench

EXTERIOR LOADING

Do not walk on top of merchandisers or damage to the merchandisers and serious personal injury could occur. They are not structurally designed to support excessive external loading such as the weight of a person. Do not store items or flammable materials atop the unit.

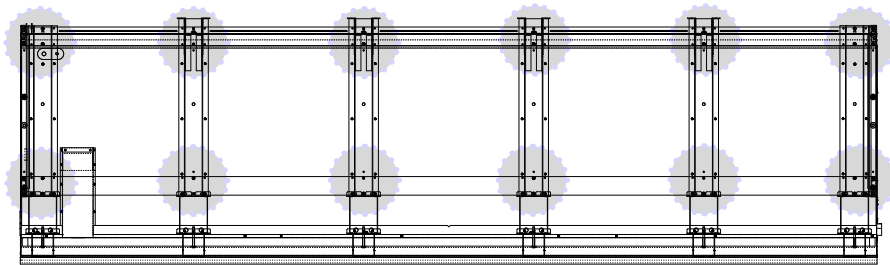
MERCHANDISERS SHIPPED WITH END INSTALLED

If the case was shipped with the end installed, two long bolts were used to hold the shipping brace to the end. If the shipping bolts are reinserted after removing the brace, they will extend into the product area and may damage the coil. Therefore, be sure to replace these bolts with the shorter bolts provided.

Be careful not to damage the factory-installed end while moving the merchandiser. Make sure that tools are positioned past the end and beneath the merchandiser's support bar.

SHIPPING BRACES

Move the merchandiser as close as possible to its permanent location and then remove all packaging. Check for damage before discarding packaging. Remove all separately packed accessories such as kits and shelves.



View from underneath 5-door case

Shim
Location



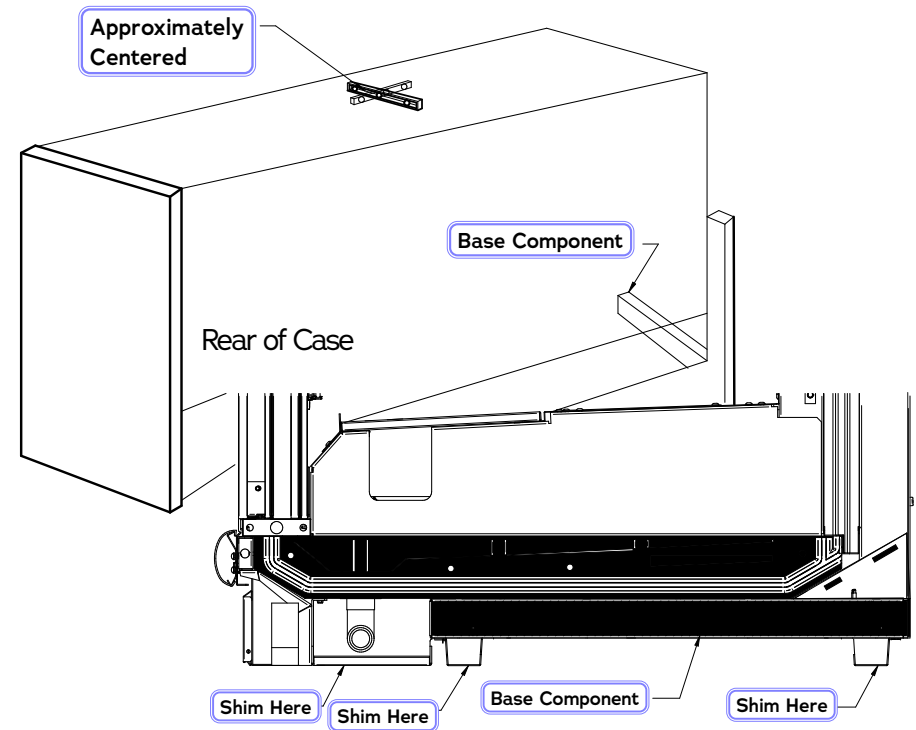
LEVEL CASE AND PLACE SHIMS

Begin lineup leveling from the highest point of the store floor. Merchandisers must be installed level to ensure proper operation of the refrigeration system and to ensure proper drainage of defrost water. When leveling merchandisers, use a carpenter's level.

Place shims under the rail and make sure that they are positioned at a base component (crossbar). This transfers the weight directly from the loaded case through to the floor. Placing shims at other locations will cause uneven distribution of weight leading to piping leaks, as well as sagging or wracked doors. Bottom front supports must be shimmed if not in full contact with the floor.

NOTICE

It is the installing contractor's responsibility to consult local agencies for local code requirements.



DOOR ADJUSTMENT

After leveling and joining the merchandisers, adjust and level doors according to the accompanying door manual for this case. Factory settings may be lost due to vibration during shipment.

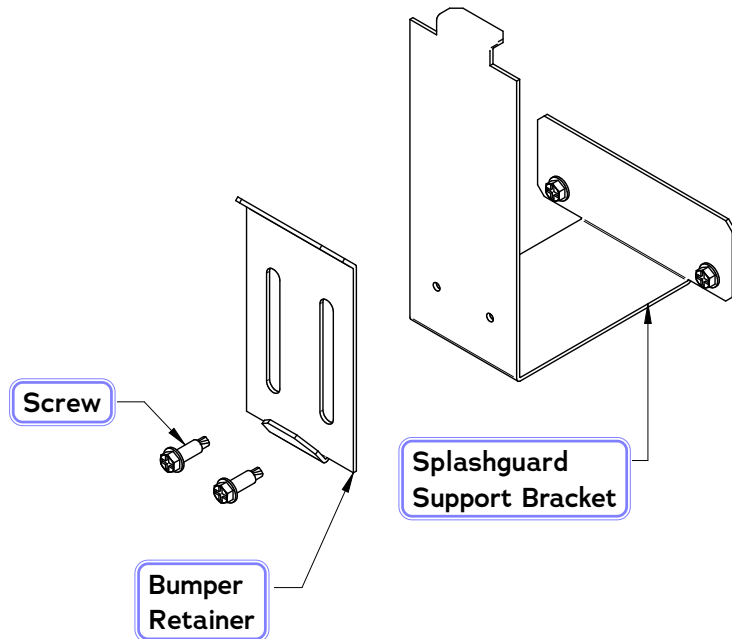
INSTALLING SPLASHGUARD BRACKETS

1. Attach bumper retainer and splashguard support bracket using two screws per bracket.
2. Install splashguard support brackets underneath case. The leveling brackets have a maximum extension of one (1) inch (25 mm) for uneven floors.

Do not place shims under splashguard brackets.

NOTE

Install splashguard support brackets before piping case.



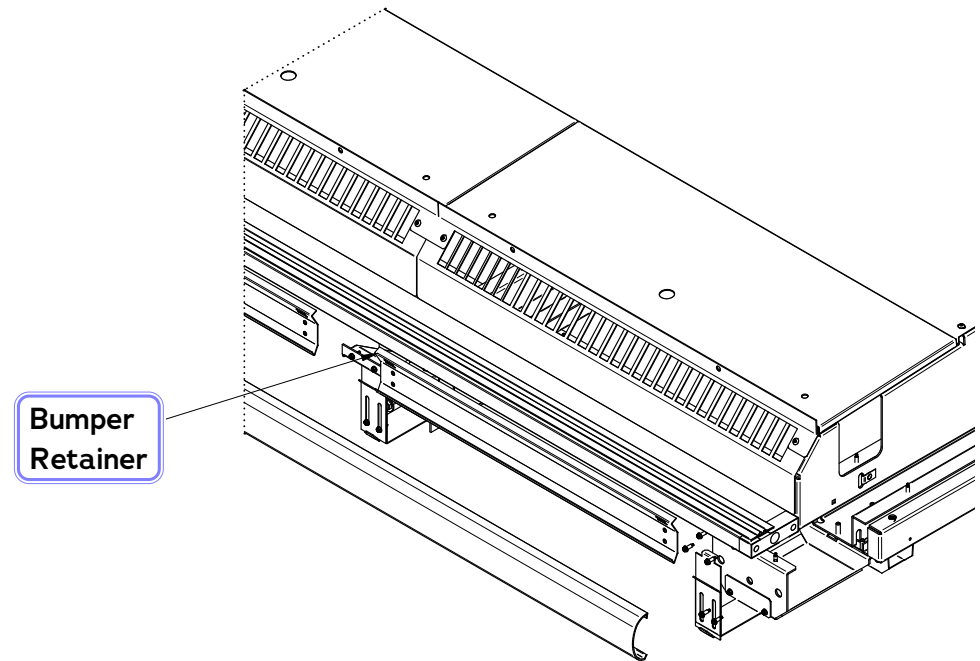
CASE JOINING

Sectional construction means that two or more merchandisers may be joined in line, yielding one long continuous display requiring only one pair of ends. Cases are joined from left to right. Start joining the right end to the left end of each merchandiser in the lineup.

To join like fixtures, a joining kit is required. To join merchandisers operating at different temperatures, a partition kit is needed. A partition kit is required to join the same temperature merchandisers that are on different defrost cycles.

All joints must be air-tight to prevent the formation of ice or condensation.

Refer to the joining instructions on the next page.



JOINING INSTRUCTIONS

IRL 5-door case shown

Parts List

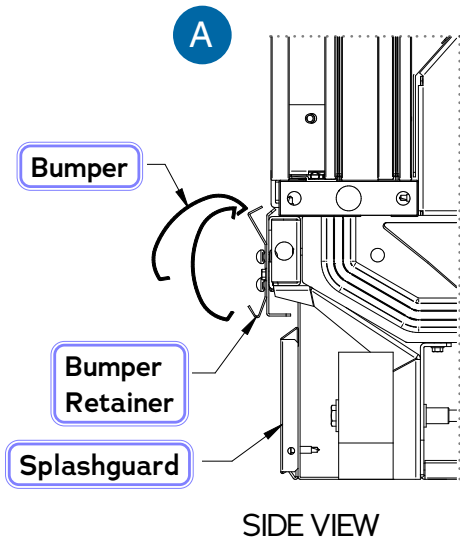
Item	Quantity (IRL / IRLN)	Description
1.	2	Donut Gasket (1250 ft)
2.	1	Gasket, .906 x 1/2 x 200 in.
3.	1	Gasket, 1/2 x 1/4 x 600 in.
4.	1	Shoe Gasket
5.	6	Cap Screw 5/16 -18 x 1 1/4
6.	6	Flat Washers 5/16
7.	1	Joint Trim
8.	1	Self-Drilling Screw 8-18 X 1/2 HX HD
9.	1	Optional Joint Trim

NOTE

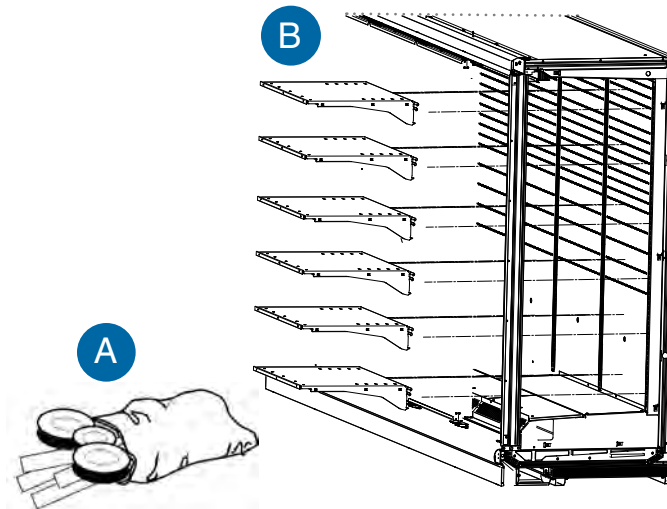
Be sure first merchandiser has been leveled according to the main installation instruction. Carefully unpack and inspect the joining parts listed above to verify completeness and that there is no damage.

- 1 Prepare cases for joining as shown in the pictures below.
 - A. Packing materials, bumpers and splashguards should be removed.
 - B. Remove shelves (if installed).
 - C. Remove display racks and pans from ends to be joined. Remove fan plenum covers if necessary.

Splashguard brackets must be installed before piping or wiring case.



Remove bumpers; splashguards should not be installed.



Remove joining kit and packing materials; remove shelves.

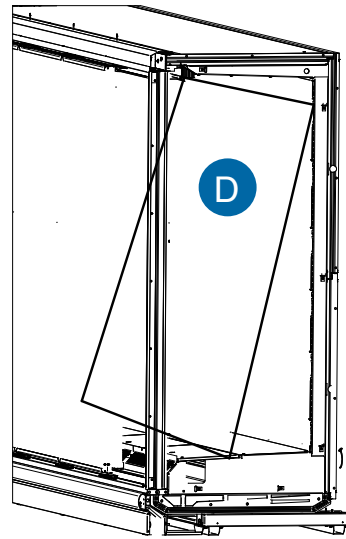


Remove display racks and bottom pans.

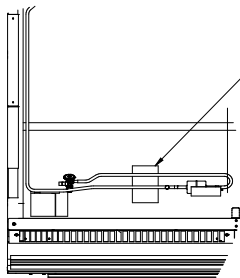
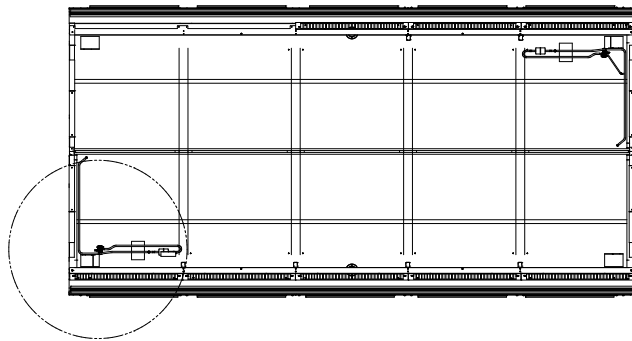
IRL 5-door case shown

D. Remove back panels from ends to be joined by lifting up and out near the bottom. No tools are necessary.

E. Remove joint molding from any door frames that will be joined to another case.



2 Locate and remove the shipping block(s) in the center of the heat exchanger in the interior bottom of each case as shown in the image below.



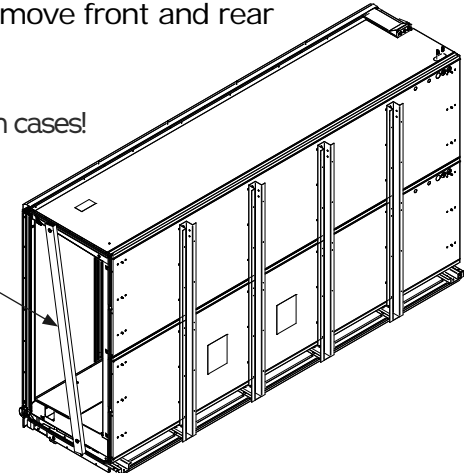
Remove Foam Shipping Block(s)

3 Snap a chalk line on the floor to use as a guide for positioning the front of the cases in the line-up. The front base frame should be on the chalk line.

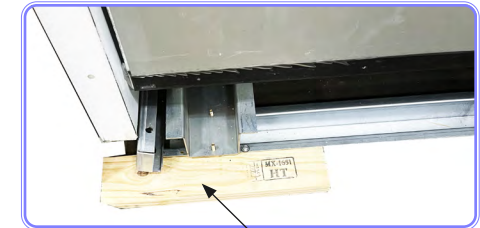
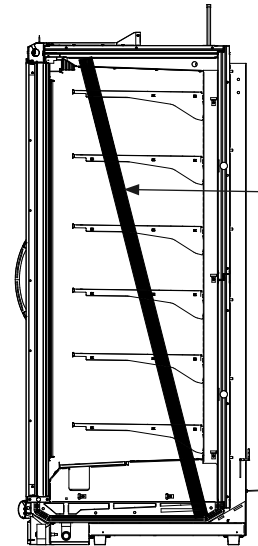
4 Once cases are close to final placement, remove the shipping braces from the ends to be joined, as shown in the images below. Discard bolts and flat washers used to hold shipping braces. Bolts are too long to be used for joining. Remove front and rear shipping skids.

Do not use shipping bolts to join cases!

Remove Shipping Braces



Remove Shipping Braces



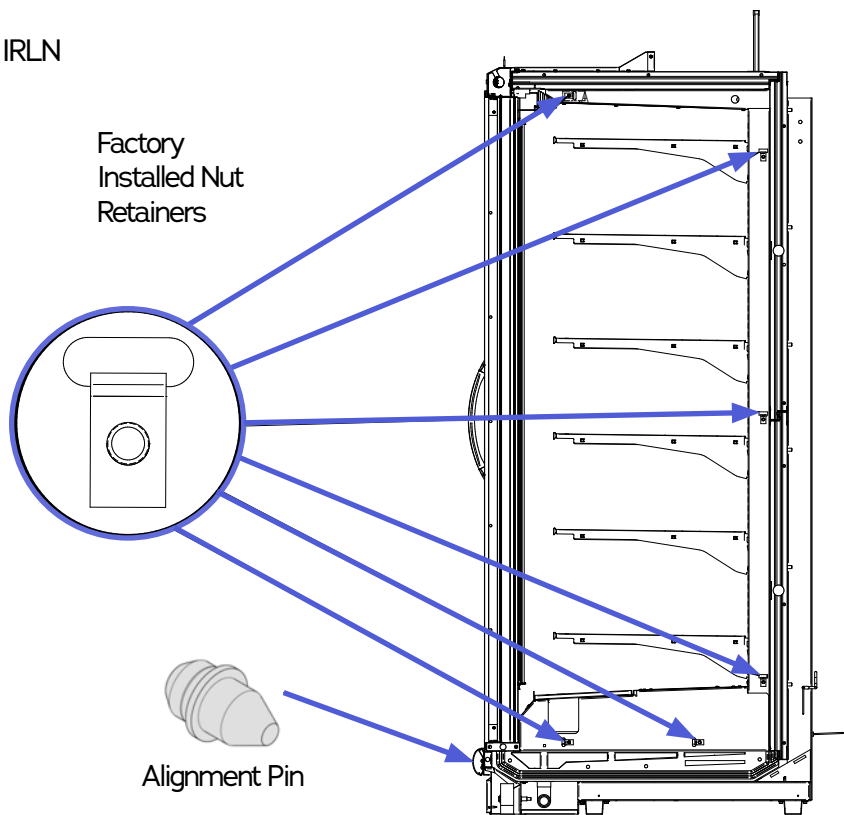
Remove rear shipping skids



Remove front shipping skids

- 5** If not already installed, make sure nut retainers and alignment pins are in place in the right end frame as shown in the image below. These are the cap screw locations for joining the cases together.

IRL / IRLN



Verify Nut Retainer Installation

- 6** Apply Donut Gasket and Silicone Sealant – Apply donut gasket (1-inch) in recess around left end case as shown below. Seat Donut Gasket into groove. Apply silicone sealant to joining surfaces and around outer donut gasket perimeter.

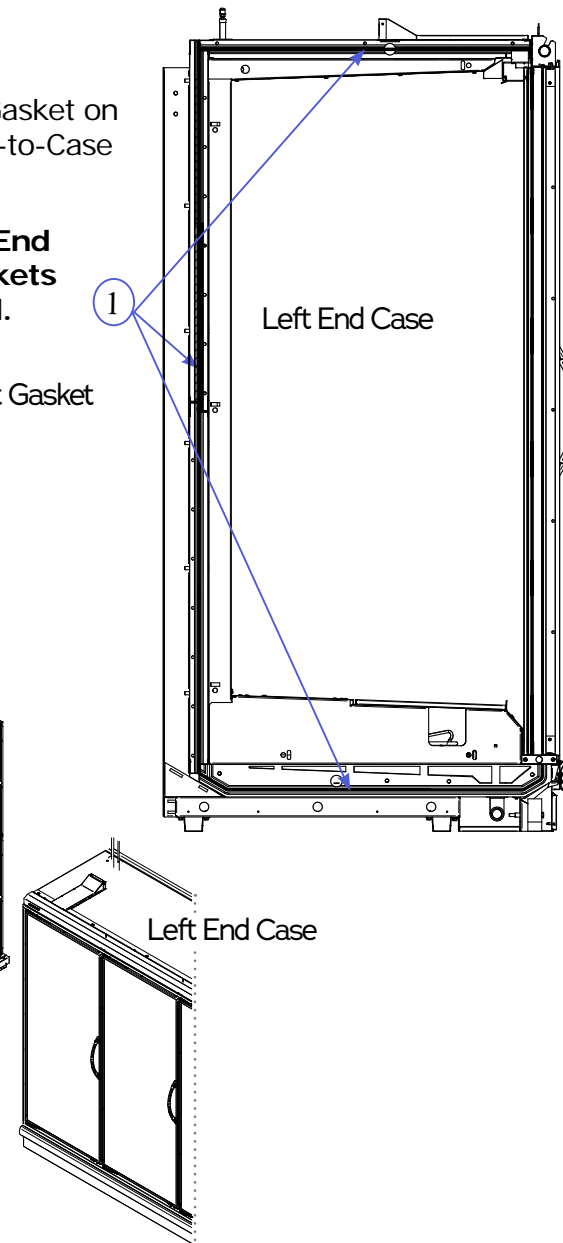
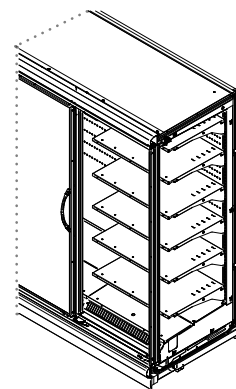
Left End Case

Only Use Donut Gasket on left end of a Case-to-Case Joint

If attaching an End Panel, all 4 Gaskets must be applied.

— 1 - Donut Gasket

Right End Case



Left End Case

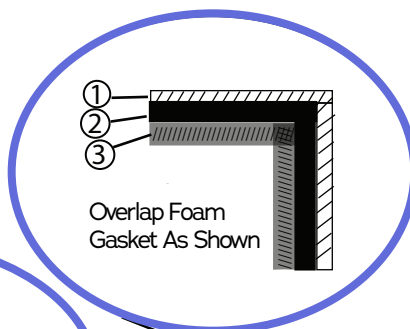
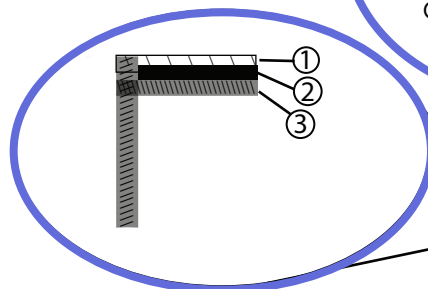
7 Apply the wider Foam Tape Gasket (.906) — 2 around the right end frame as shown in the image below.

Next, apply Shoe Gasket — 4 to right end first, then apply the narrower Foam Tape Gasket — 3 around the perimeter of the right end frame outside of the donut gasket.

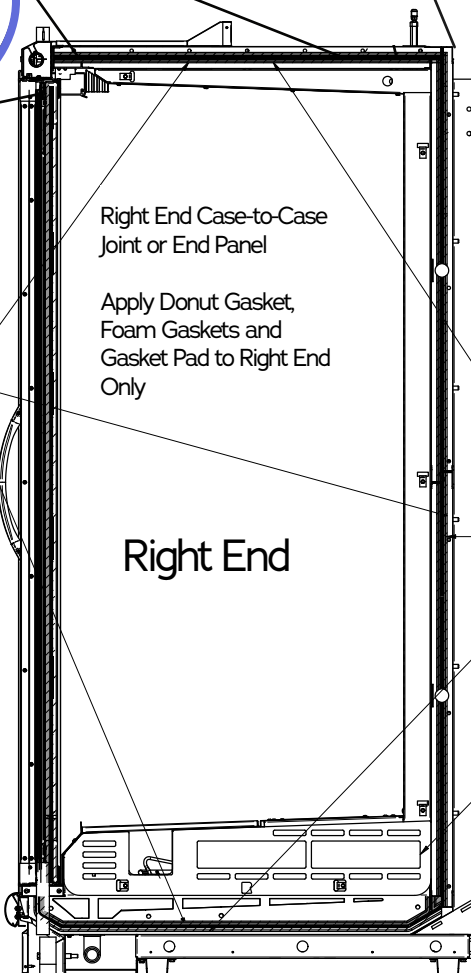


IRL / IRLN

Shoe Gasket



- ① Foam 1/2 inch x 1/4 inch
- ② Donut Gasket
- ③ Foam .906 inch x 1/2 inch x 200 inch



Butyl is NOT an acceptable substitute for donut or foam gasket.

Install Donut Gasket (seat into grooves)

Right End Case-to-Case Joint or End Panel

Apply Donut Gasket, Foam Gaskets and Gasket Pad to Right End Only

Apply a bead of Silicone Sealant along joining surface

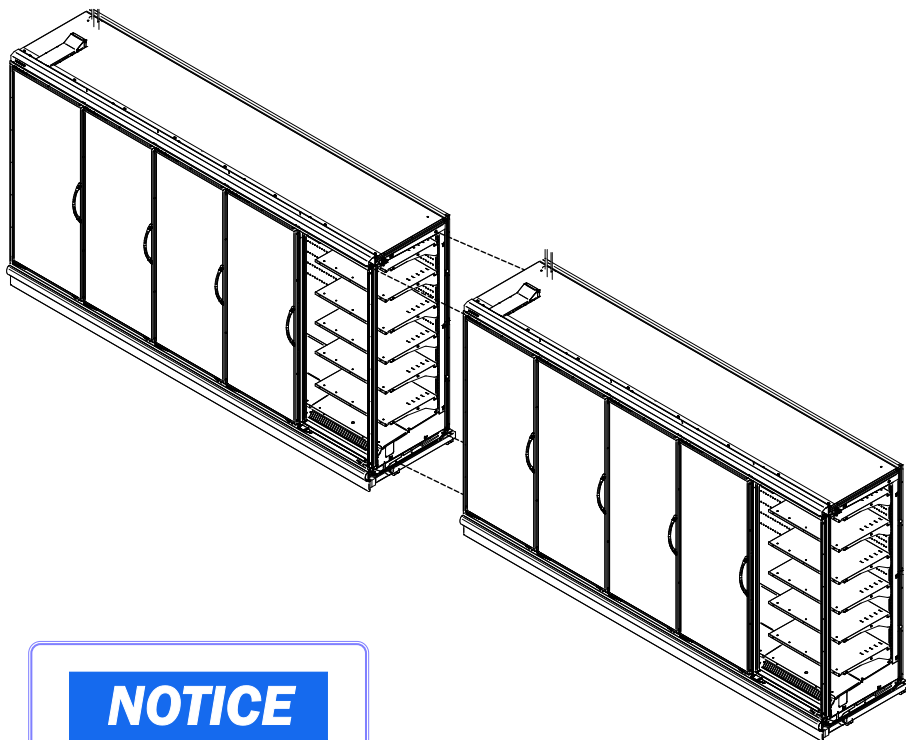
Apply Shoe Gasket

Apply Gasket to Right End

FRONT

- Lap gaskets at lower corners.
- Check that there are no gaps between gasket and case.
- Do not stretch gasket, especially around corners. To make sharp corners, paper backing can be torn without removing from gasket.
- Do not butt gaskets; always lap joints.
- Remove paper backing after gasket is applied to keep gasket free of debris.
- Gasket has high tack adhesive and must be properly placed the first time.

- 8 Move the second merchandiser against first, mating alignment pins with corresponding holes. Use care when pushing the cases together. Cases must be level to ensure a proper installation. Check for level, and insert shims. Refer to Page, 1-2 for shim placement instructions. Fastening and tightening order shown on the next page.

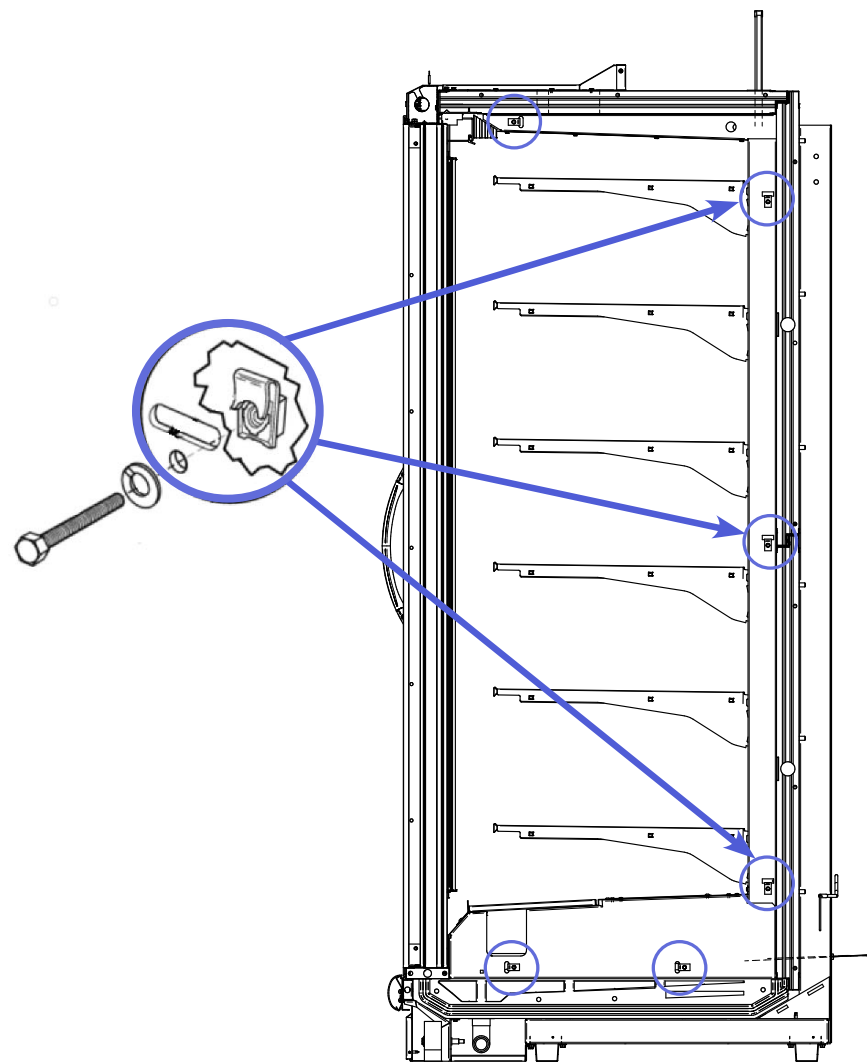


NOTICE

Install Splashguards after drip piping is installed. Refer to Section 3 for Splashguard Installation Instructions.

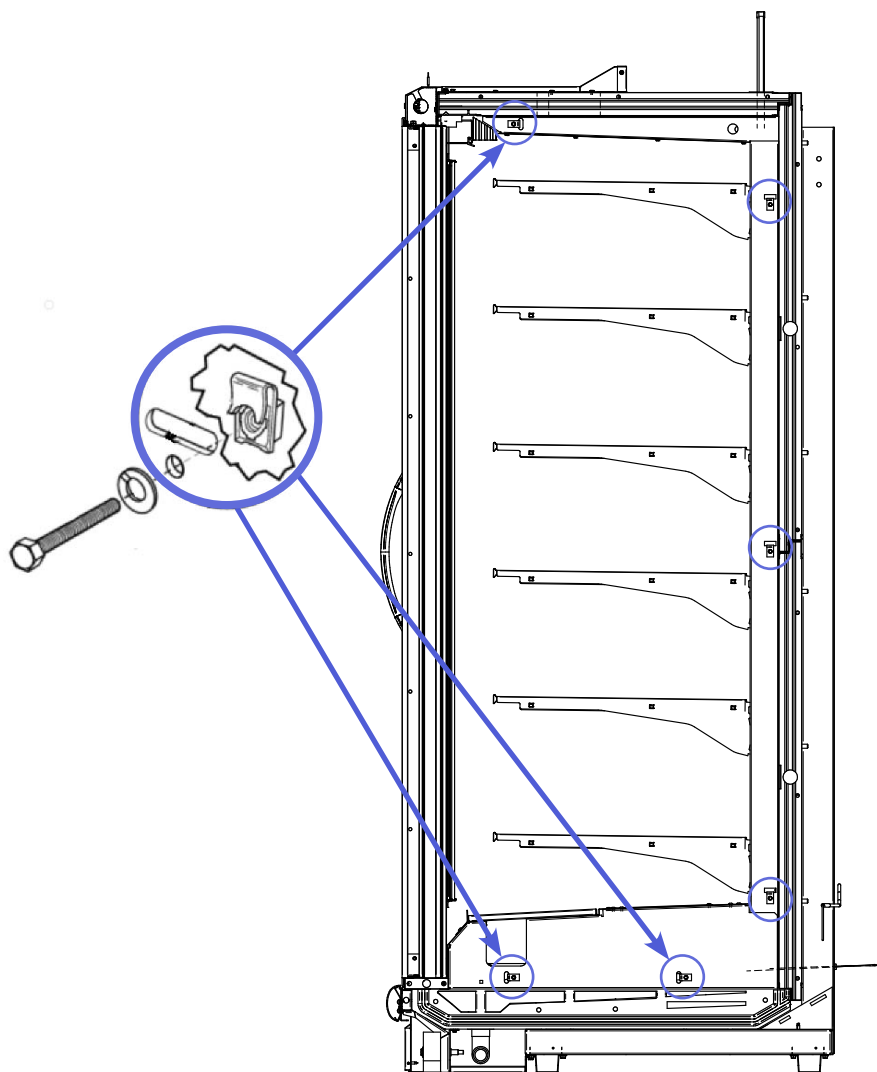
- 9 Loosely insert Cap Screw – 5 with Flat Washer – 8 into each nut retainer following the sequence shown below. Do not tighten fully.

To ensure proper alignment, utilize holes in the case end frame for drift pins. Starting with the joining locations on the rear of the cases, use the appropriate bolt and washer to begin tightening the case joint. Do not tighten completely.

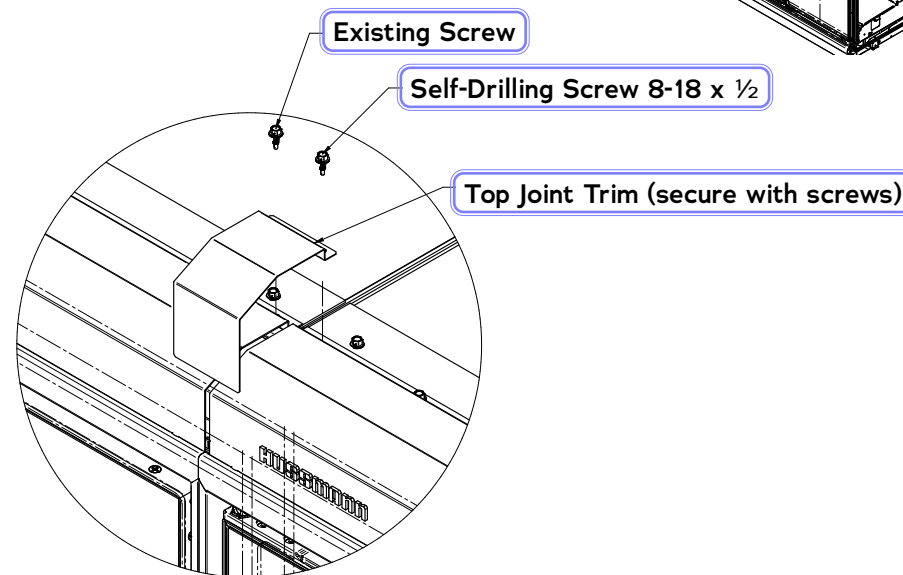
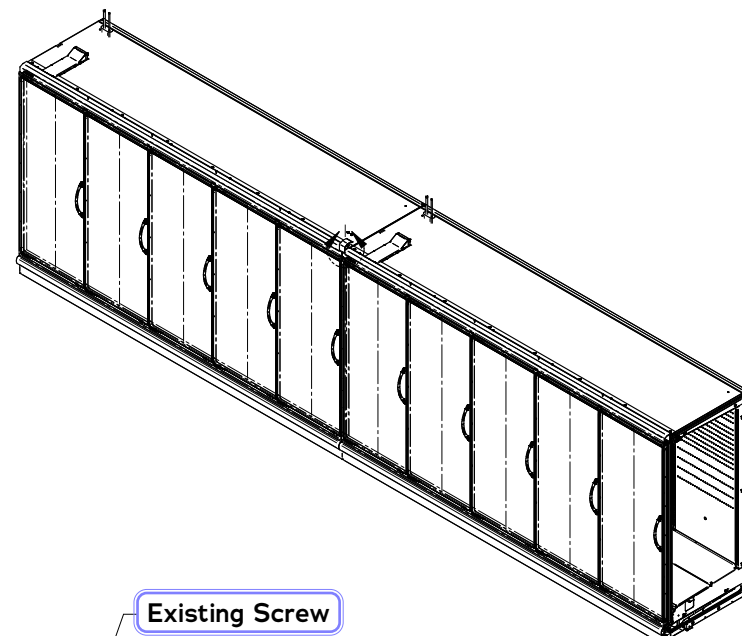


10 Once the 3 joints in the rear are started (but not tight), use the appropriate bolt and washer to start the remaining joining locations.

With all joining locations started, begin fully tightening the rear locations first. Then, fully tighten all remaining locations. Check overall alignment, and reinstall shelving, back panels, and deck pans. Following the same sequence, tighten each cap screw fully until the merchandisers are joined with a snug fit and the gaskets are compressed.



11 Install Top Joint Trim. Secure trim between joints in case canopy using Self-Drilling Screw – 9.



INSTALLING BUMPERS

Offsetting the bumpers and top rails helps to disguise the joint locations, giving the lineup a smoother look.

Begin at the left end of the line-up. A starter bumper is factory-installed with end kits. Insert the internal joint trim, then add the full-length bumper.

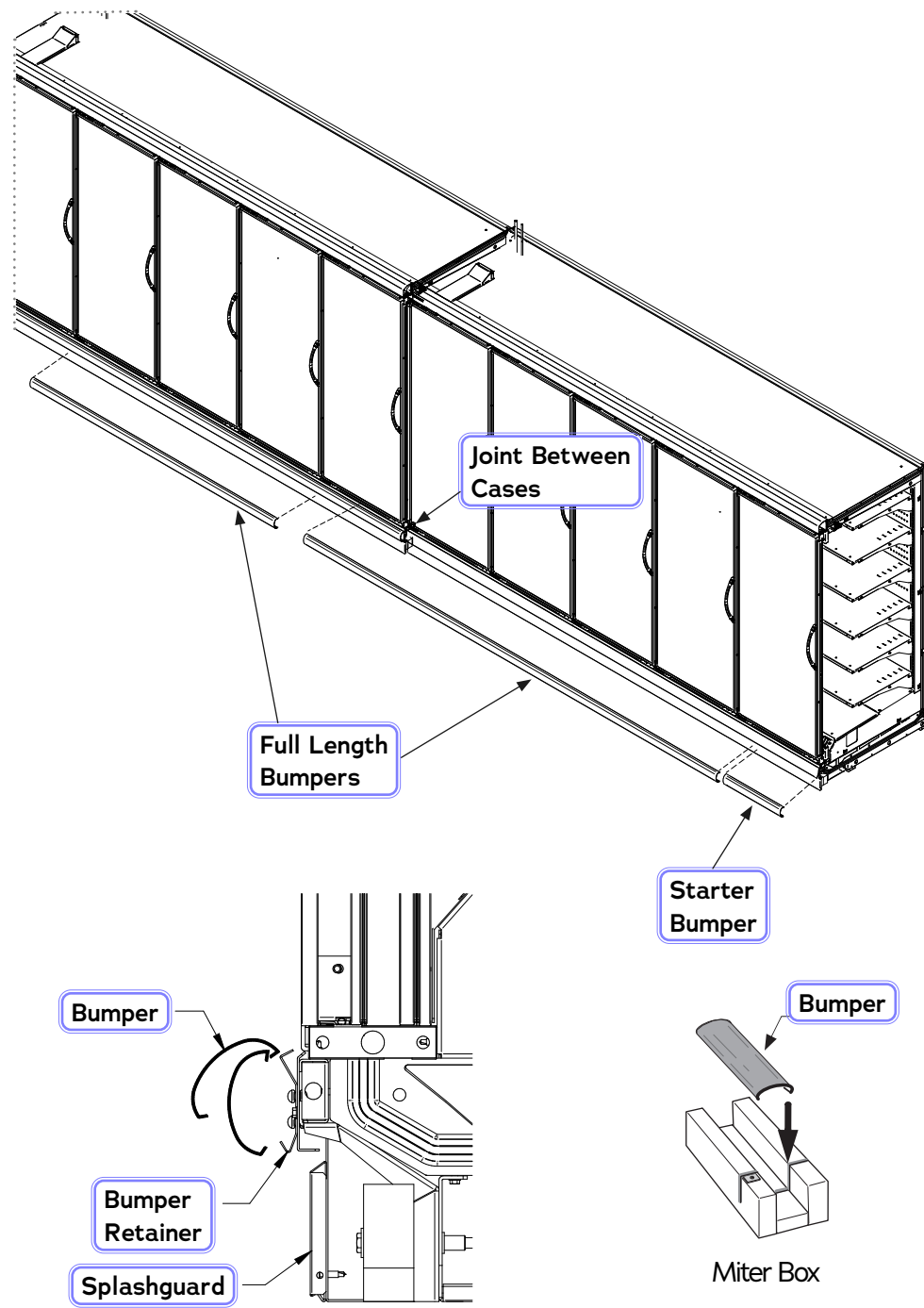
Align each bumper section with its retainer and push into place, working from the end of the lineup. Install full length bumpers and internal joint trims offset across joints. Make sure that no gaps exist between sections. Continue installing bumpers the length of the line up.

Do NOT install the last bumper sections at this time. These sections will be installed in the last step.

Once all except the last section of bumper have been installed, refrigerate the case lineup for at least six (6) hours. The last sections of bumper should be kept inside a refrigerated case or cooler during this time to allow the bumpers to contract.

Before installing the last full-length section, measure the remaining space. Use a miter box and fine-tooth saw to cut last bumper to length. Install the last section. Remove protective film from bumpers once installation is complete. Optional end bumpers are factory-installed.

Bumper End Caps can be adjusted horizontally to eliminate gaps.



INSTALLING END ASSEMBLIES

The procedure for installing an end assembly is similar to joining cases together.

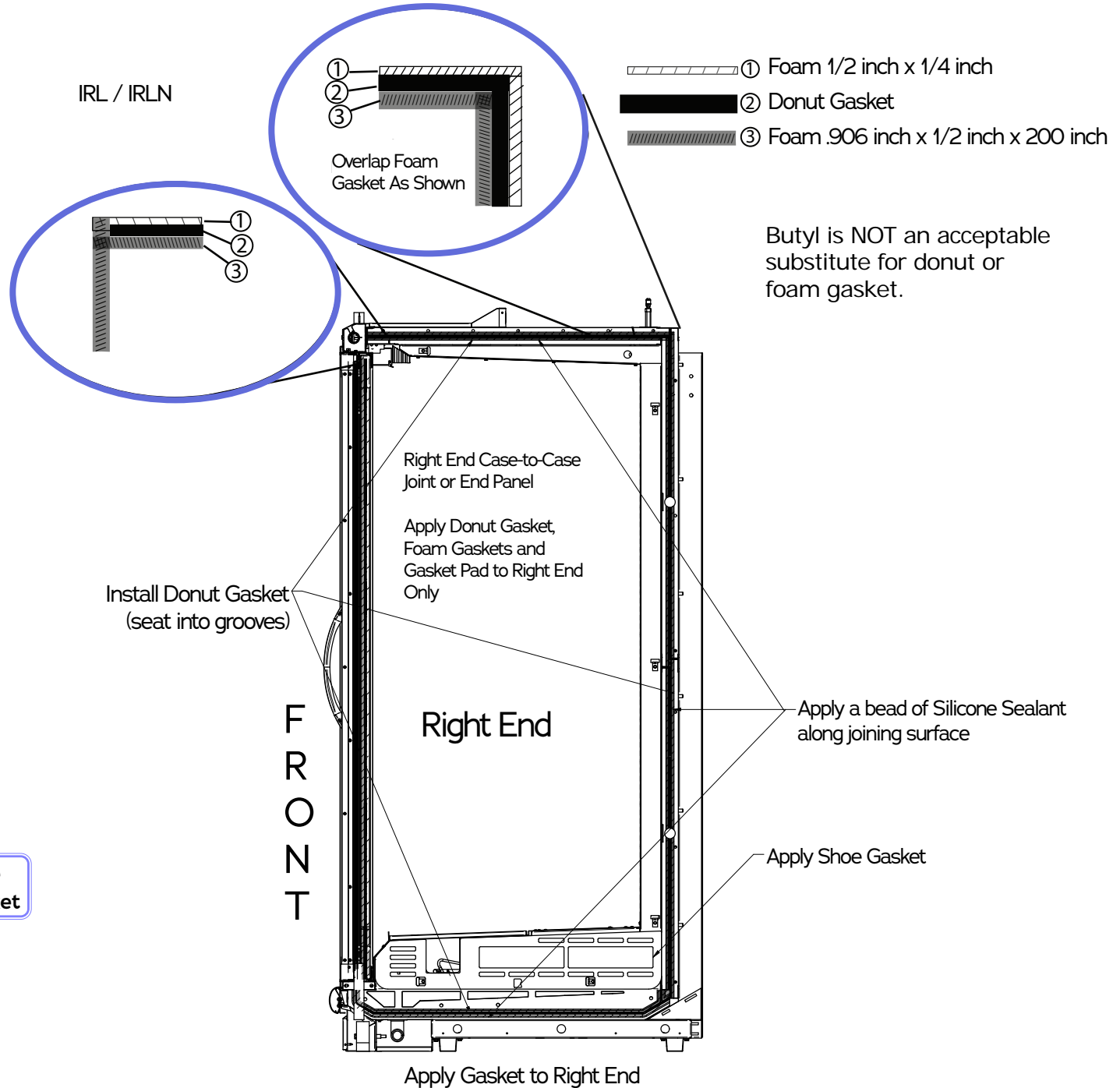
1. Remove the top and rear interior panels from the left side of the case.
2. Apply gaskets as shown below.

Apply the wider Foam Tape Gasket (.906) — 2 around the right end frame as shown in the image below.

Next, apply Shoe Gasket — 4 to right end first, then apply the narrower Foam Tape Gasket — 3 around the perimeter of the right end frame outside of the donut gasket.



Shoe Gasket



3. Insert the bolts to the end assembly as shown.
4. Fasten end assembly to case by using provided washers and screws.

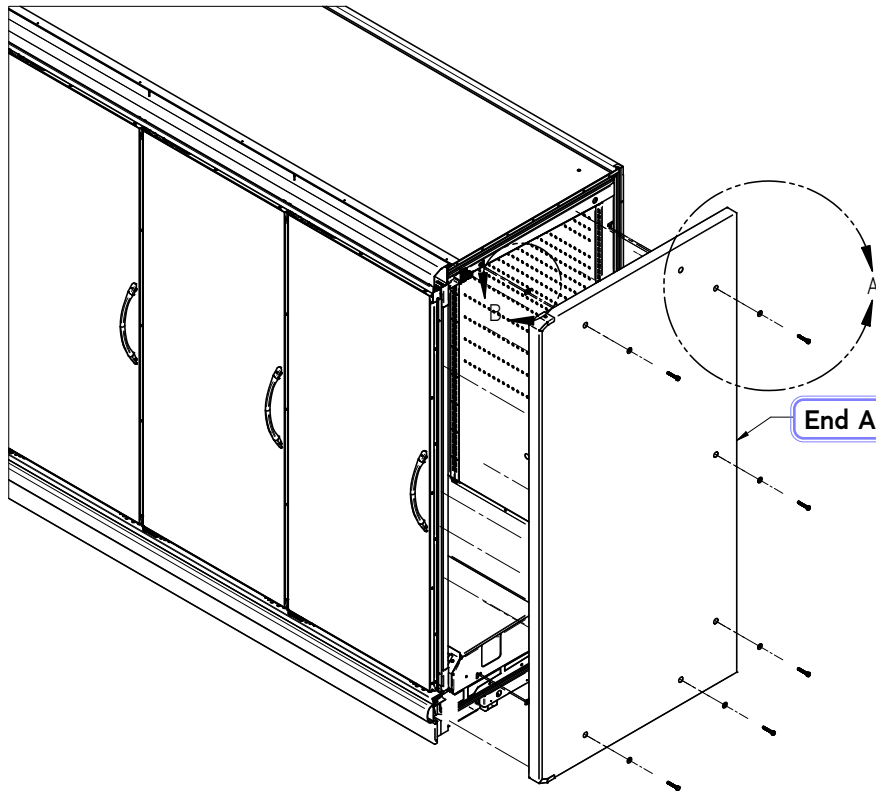
NOTE

Installation is similar for end assemblies installed on either the left side or right side of case.

5. Reinstall the top and rear vertical panels.



Ensure any exposed locations on the end panel are covered using foam insulation and a plug button.



Plug Button

Foam Insulation

End Assembly

Flat Washer
5/16"

Cap Screw
5/16" 18 x 2

Detail A

End Assembly

Factory
Installed Nut
Retainer

Detail B

REFRIGERATION / ELECTRICAL

REFRIGERANT CHARGING PROCEDURE

Only the specified refrigerant type can be used. The correct type of refrigerant will be stamped on each merchandiser's serial plate which is located on the left-hand end of the interior top liner.

The triple evacuation method should be used to achieve a leak-free, dry system. For the first evacuation, the system should be pulled down to 1,000 microns. The second evacuation should be pulled to 500 microns. The final evacuation should be pulled down to at least 300 microns. A dry, leak-free system is when the system holds a vacuum of 300 microns for 24 hours with the vacuum pump de-energized and valved off. Between each evacuation, break the vacuum with dry nitrogen.

When connecting hoses between the refrigeration system, manifold gauges, and refrigerant cylinder, ensure that the connections are secure and there are no potential sources of ignition nearby. Ensure that contamination of different refrigerants does not occur when using charging equipment.

Use dedicated hoses to service the type of refrigeration system being serviced (e.g., R-454C equipment for an R-454C system). Hoses or lines should be as short as possible to minimize the amount of refrigerant contained in them.

Ensure that the refrigeration system is properly grounded prior to charging the system with refrigerant, to avoid the potential for static build-up.

In addition to conventional charging procedures, the following requirements shall be followed:

- a. Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- b. Cylinders shall be kept in an appropriate position according to the instructions.
- c. Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant.

- d. Label the system when charging is complete (if not already).
- e. Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

Extreme care must be taken not to overfill the refrigeration system. After charging, carefully disconnect the hoses, attempting to minimize the quantity of refrigerant released. Further leak check the service ports, hoses, refrigerant tanks.

WARNING

- » Refrigeration lines are under pressure. Depressurize and recover refrigerant before attempting any connection or repair. Refrigerant vapor is hazardous to your health and can cause death. Avoid breathing refrigerant and lubrication vapor or mist. Exposure may irritate eyes, nose and throat. If accidental system discharge occurs, ventilate work area before resuming service.
- » Always wear safety goggles and protective gloves when working with refrigerants. Contact with refrigerant may cause injury. Disconnect hoses with extreme caution! All hoses may contain liquid refrigerant under pressure.
- » Be sure that any room where you are working is thoroughly ventilated, especially if a leak is suspected.
- » Read all safety information regarding the safe handling of refrigerant and refrigerant oil, including the Material Safety Data Sheet. MSDS sheets can be obtained from your refrigerant supplier.

PIPING INSTALLATION REQUIREMENTS

- Installation shall include protection from physical damage in operation and service and be in compliance with national and local codes and standards, such as ANSI/ASHRAE 15, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.
- The installation of pipework shall be kept to a minimum.
- A brazed, welded, or mechanical connection shall be made before opening the valves to permit refrigerant to flow between the refrigerating system parts.
- Mechanical connectors used indoors shall comply with ISO 14903 or UL 207 or CSA C22.2 No. 140.3. When mechanical connectors are reused indoors, sealing parts shall be renewed. When flared joints are reused indoors, the flare part shall be refabricated.
- Refrigerant tubing shall be protected or enclosed to avoid damage. Flexible refrigerant connectors (such as connecting lines between the indoor and outdoor unit) that might be displaced during normal operation shall be protected against mechanical damage.
- Mechanical connections shall be accessible for maintenance purposes.
- Provision shall be made for expansion and contraction of long runs of piping.
- Protection devices, piping, and fittings shall be protected as far as possible against adverse environmental effects, for example, the danger of water collecting and freezing in relief pipes or the accumulation of dirt and debris.
- Piping in refrigeration systems shall be so designed and installed to minimize the likelihood of hydraulic shock damaging the system.
- Flexible pipe elements shall be protected against mechanical damage, excessive stress by torsion, or other forces, and they should be checked for mechanical damage annually.
- Precautions shall be taken to avoid excessive vibration or pulsation to the refrigerant piping.
- After completion of field piping for split systems, the field pipework shall be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging, according to the following requirements as detailed by UL safety standard. Pressures may come from unit data plate or from customer specification.
 1. The minimum test pressure for the low side of the system shall be the low side design pressure and the minimum test pressure for the high side of the system shall be the high side design pressure, unless the high side of the system cannot be isolated from the low side of the system in which case the entire system shall be pressure tested to the low side design pressure.
 2. The test pressure after removal of the pressure source shall be maintained for at least 1 hour with no decrease of pressure indicated by the test gauge, with test gauge resolution not exceeding 5% of the test pressure.
 3. During the evacuation test, after achieving a vacuum level specified in the manual or less, the refrigeration system shall be isolated from the vacuum pump and the pressure shall not rise above 1500 microns within 10 min.
- Field-made refrigerant joints indoors shall be tightness tested according to applicable codes and requirements.
- Equipment piping in the occupied space shall be installed in such a way to protect against accidental damage in operation and service.
- Any solenoid valves and/or safety shut-off valves shall be correctly positioned in the piping to avoid hydraulic shock or pressure.
- Insulation shall be suitable for use with the material being insulated.
- The indoor equipment and pipes shall be securely mounted and guarded such that accidental rupture of equipment cannot occur from such events as moving furniture or reconstruction activities.

REFRIGERATION PIPING

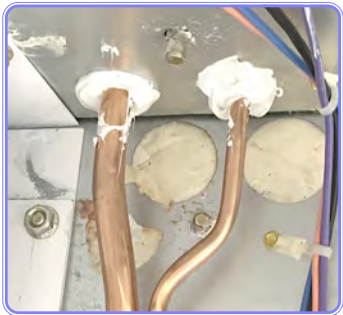
Standard piping is on top of the case on the left rear side. Pipe penetrations must be sealed.

Ensure piping penetrations are sealed after refrigeration lines are brazed.

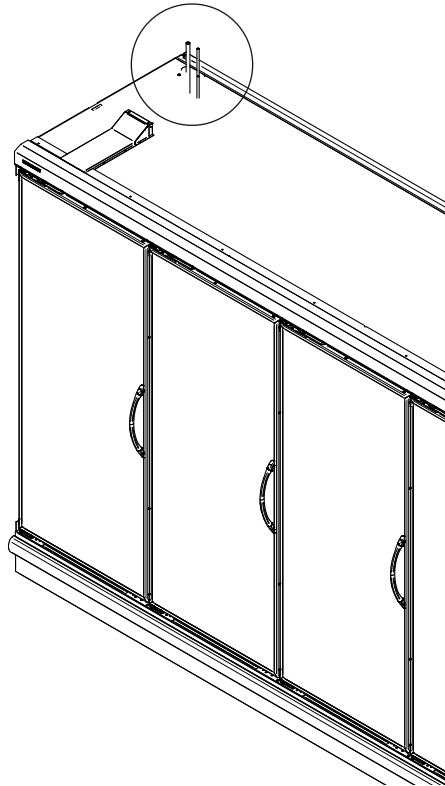
It is recommended to use an expanding polyurethane foam insulation. Piping outlet should be sealed on both the inside and outside of the case using silicone sealant. Cover foam with silicone to ensure a good seal around insulation and to prevent deterioration of foam.



Seal piping penetration on top of case.



Remove top panel and seal piping penetration.



⚠ CAUTION

- » When brazing pipes be sure to use the insulation blanket shipped with the merchandiser to prevent damage to the plastic case bottom.

REFRIGERANT PIPING

Optional Connection Location:

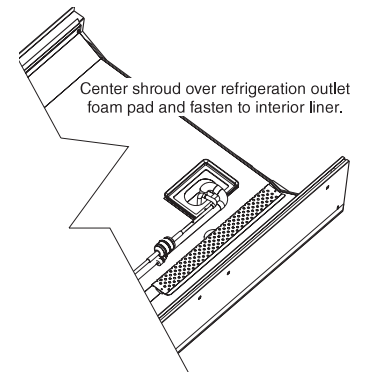
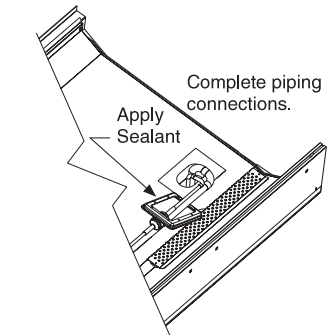
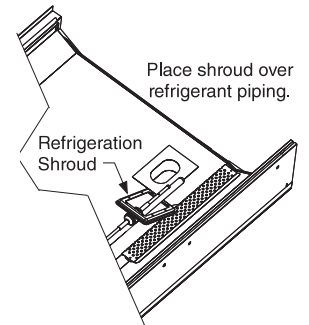
The refrigerant line connections are at the right-hand end of merchandiser (end opposite the main serial plate) beneath the display pans. A sticker marks the location of the connection. The installer must saw a hole to exit the cases.

A refrigeration shroud ships with each case. Before making connections, place the refrigeration shroud over refrigeration piping so that when the shroud is rotated, it will be upright. The image at right shows the correct orientation.

When making connections, be careful not to burn, scorch, or overheat the shroud. Once connections have been made, apply silicone sealant to the bottom of the shroud, as shown in the image at right.

As shown in the image at right, rotate and center the shroud over the refrigeration outlet foam pad.

Seal this outlet thoroughly. Seal both the inside and the outside. We recommend using an expanding polyurethane foam insulation. Cover the foam with silicone to prevent water from entering the foam.



Multiplexing

Piping of merchandisers operating on the same refrigeration system may be run from merchandiser to merchandiser through the end frame saddles provided for this purpose. Do NOT run refrigerant lines through merchandisers that are NOT on the same refrigeration system, as this may result in poor refrigeration control and compressor failure.

NOTE

If Gas defrost is used, the liquid line must be increased two sizes larger inside the merchandiser area. The increase in size is necessary to ensure even liquid drainage from all evaporators during defrost.

Line Sizing

Refrigerant lines should be sized as shown on the refrigeration legend furnished for the store or according to ASHRAE guidelines.

Oil Traps

Install P-traps (oil traps) at the base of all suction line vertical risers.

Pressure Drop

Pressure drop can rob the system of capacity. To keep the pressure drop to a minimum, keep the refrigerant line run as short as possible using a minimum number of elbows. Where elbows are required, use long-radius elbows only.

INSULATION

With GAS Defrost

The suction and liquid lines should not contact each other and should be insulated separately for a minimum of 30 ft (9144 mm) from the merchandiser.

With Other Than Gas Defrost

The suction and liquid lines should be clamped or taped together and insulated for a minimum of 30 ft (9144 mm) from the merchandiser.

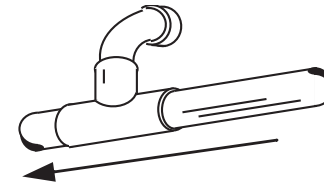
With All Defrost

Additional insulation for the balance of the liquid and suction lines is recommended wherever condensation drippage is objectionable or the lines are exposed to ambient conditions.

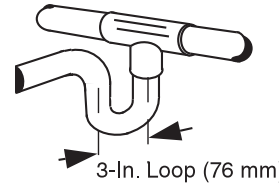
BRANCH LINE PIPING

Suction Line – All Defrosts

- Pitch in direction of flow.
- May be reduced by one size at one third of case run load and again after the second third. Do NOT reduce below evaporator connection size.
- Suction returns from evaporators enter at the top of the branch line. Liquid Line – Off-time and Electric Defrost
- May be reduced by one size after one half the case load run. Do not reduce below evaporator connection size.
- Take-offs to evaporators exit the bottom of the liquid line. Provide an expansion loop for each evaporator take-off (minimum 3 in. (76 mm) diameter).



Suction Line Return



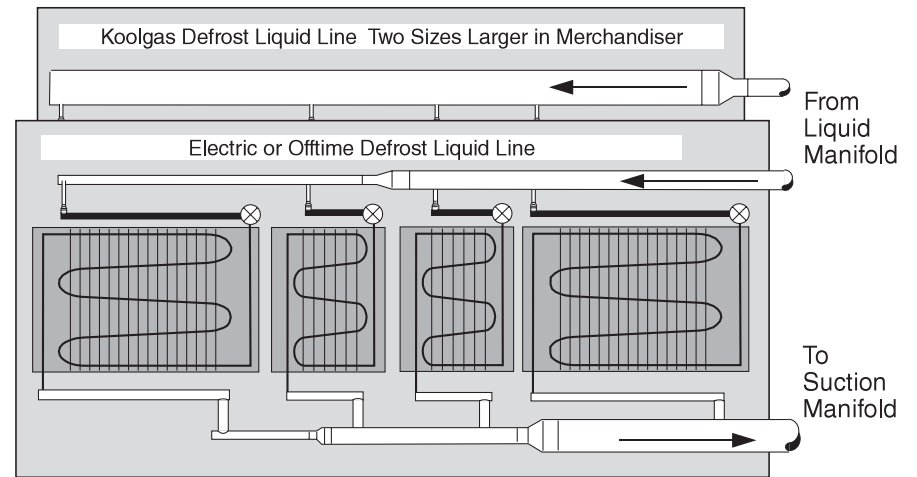
Liquid Line Take Off

Liquid Line – Koolgas Defrost

- Maximum of 6 evaporators per Branch System.
- Increase the liquid line size inside the case by two sizes over the branch size.

Branch Size	In Case Size
1/2	7/8
5/8	1 1/8
7/8	1 3/8
1 1/8	1 5/8
1 3/8	2 1/8

- Take-offs to evaporators exit the bottom of the liquid line. Provide an expansion loop for each evaporator take-off (minimum 3 in. (76 mm) diameter).



CAUTION

» This information is applicable only for piping Hussmann merchandisers to Hussmann refrigeration equipment.

EXPANSION VALVE ADJUSTMENT

Expansion valves must be adjusted to fully feed the evaporator. Before attempting to adjust valves, make sure the evaporator is either clear or only lightly covered with frost, and that the merchandiser is within 10 deg F (6.5 deg C) of its expected operating temperature. Adjust valves as follows:

NOTE

When using high glide refrigerants (e.g., R-407A, R-448A), use the evaporator pressure and subtract the dew point from the coil outlet refrigerant temperature to measure the superheat level.

Method 1 (recommended):

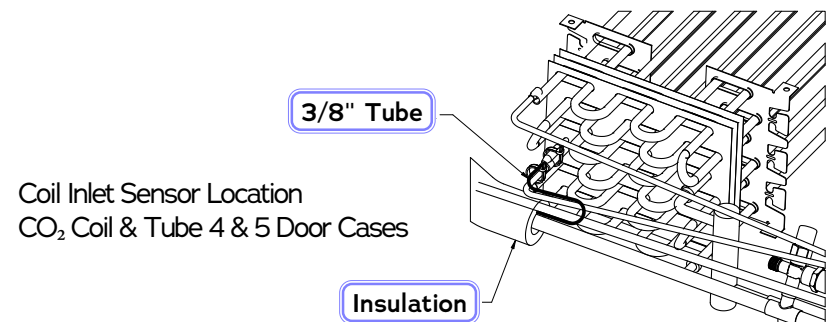
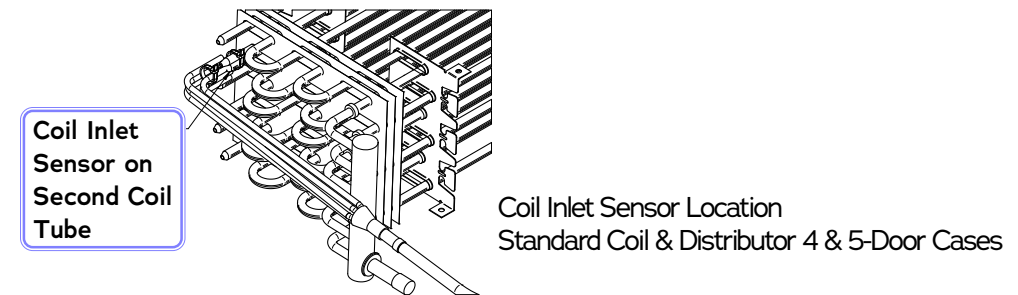
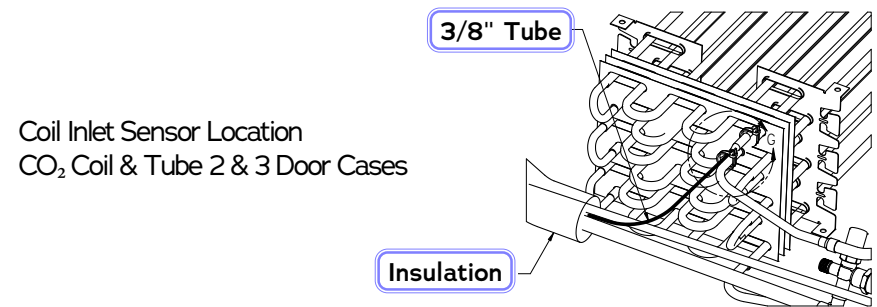
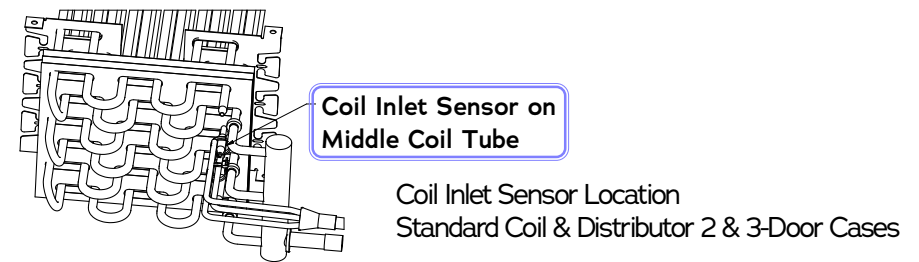
Attach a sensing probe (either thermocouple or thermistor) to the evaporator outlet, under the clamp holding the expansion valve bulb. Attach a pressure probe to the access valve on the suction line. Measure superheat by subtracting the saturation temperature at the measured pressure from the measured outlet temperature.

Method 2:

Attach two sensing probes. Attach two sensing probes (either thermocouple or thermistor) to the evaporator. Position one under the clamp holding the expansion valve bulb; securely tape the other to the coil inlet line.

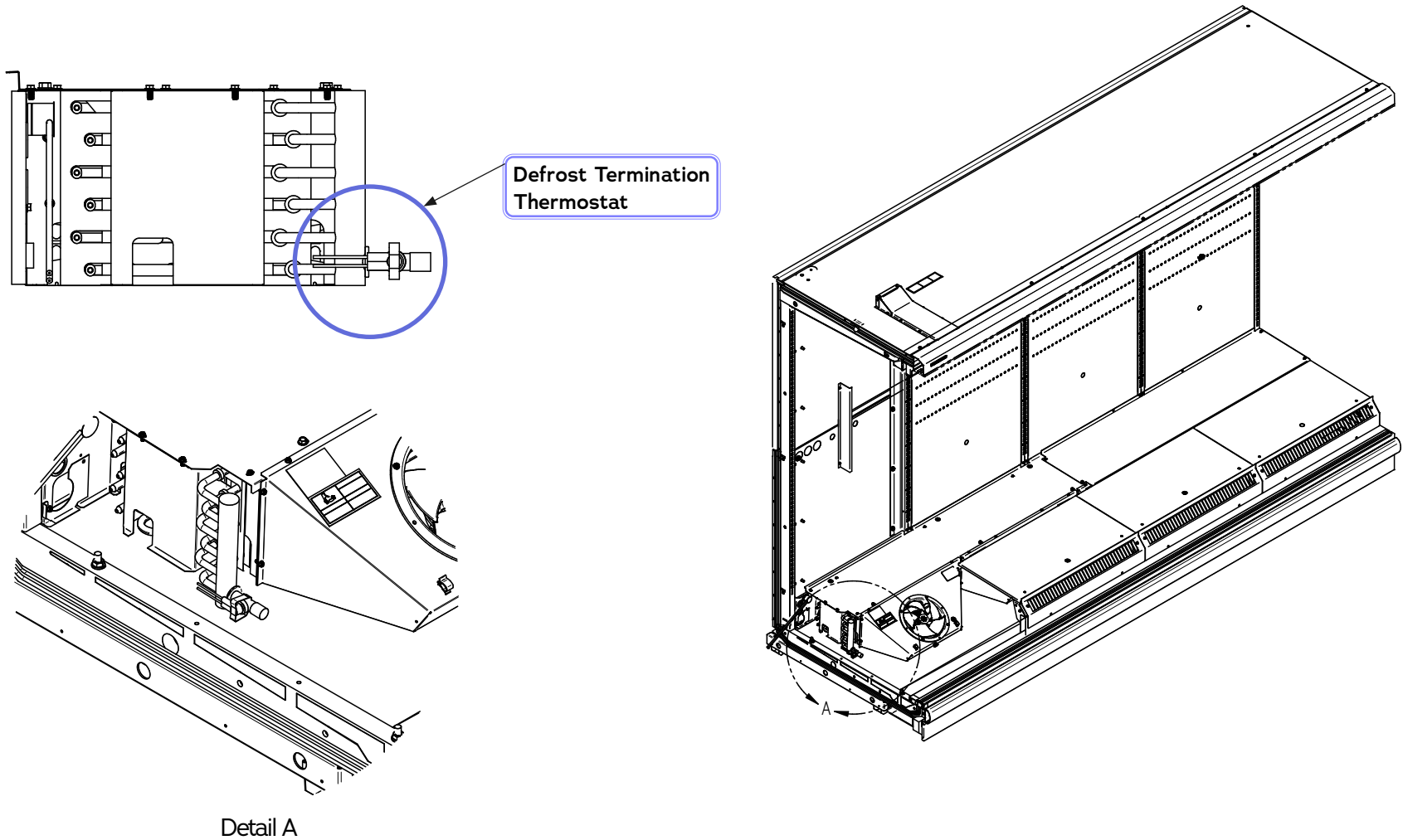
Some "hunting" of the expansion valve is normal. The valve should be adjusted so that during the hunting the greatest difference between the two probes is 3–5 deg F (1.7–2.8 deg C). With this adjustment, during a portion of the hunting the temperature difference between the probes will be less than 3 deg F (1.7 deg C) and at times 0.

Make adjustments of no more than ¼ turn for Balanced Port TEV and ½ turn at a time for other valve models. Wait at least 15 minutes before rechecking the probe temperature or making further adjustments.



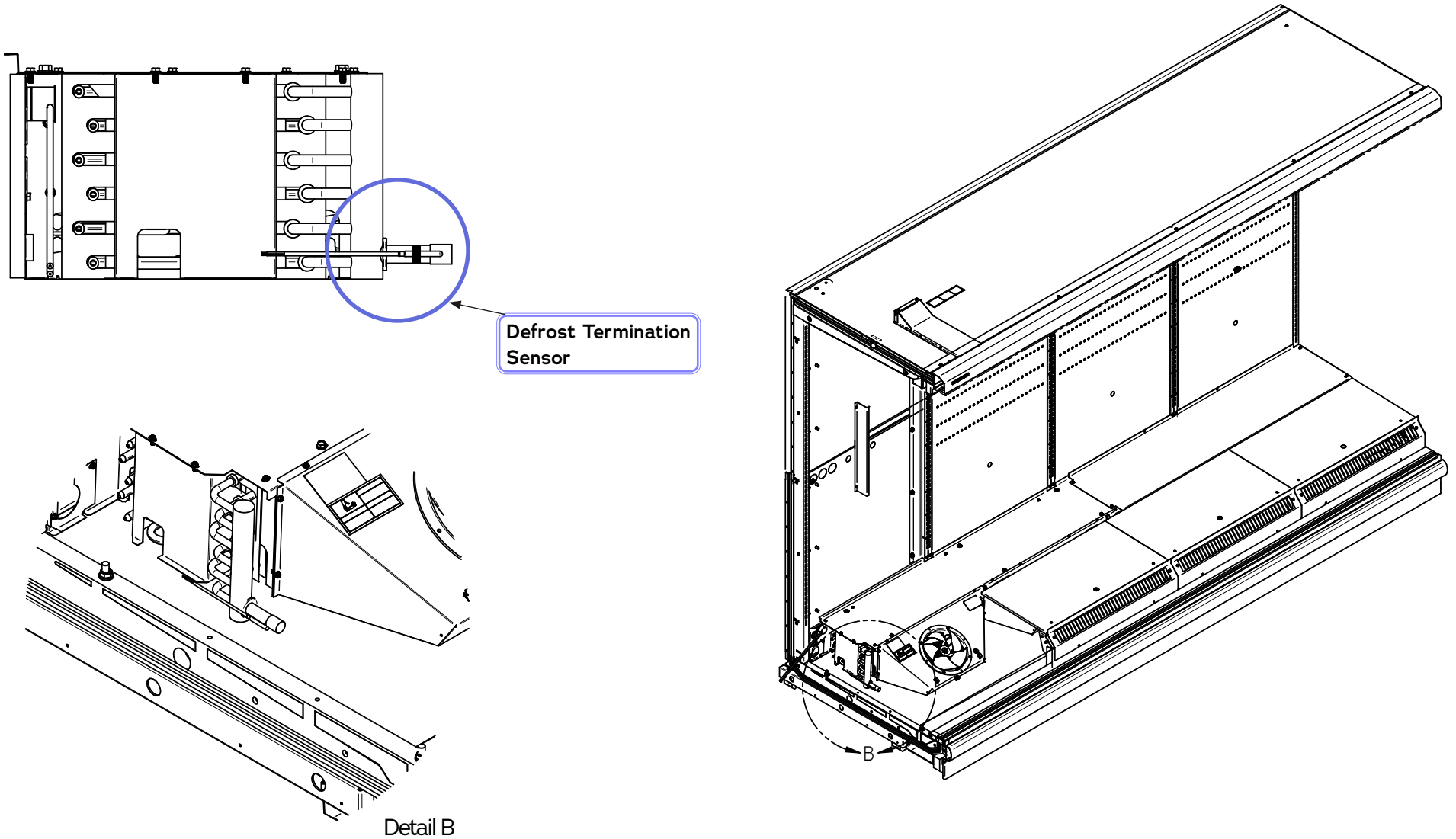
ELECTRIC DEFROST TERMINATION THERMOSTAT AND HEATER LIMIT (WITHOUT CASE CONTROLLER)

For low-temperature merchandisers equipped with electric defrost heaters without a case controller, the defrost termination thermostat is positioned on the outlet of the suction manifold. The defrost limit switch comes factory-installed and pre-wired, located at the coil close-off on the left end. If an optional adjustable thermostat is used, its sensing bulb should be clamped to the suction line on the merchandiser's left end.



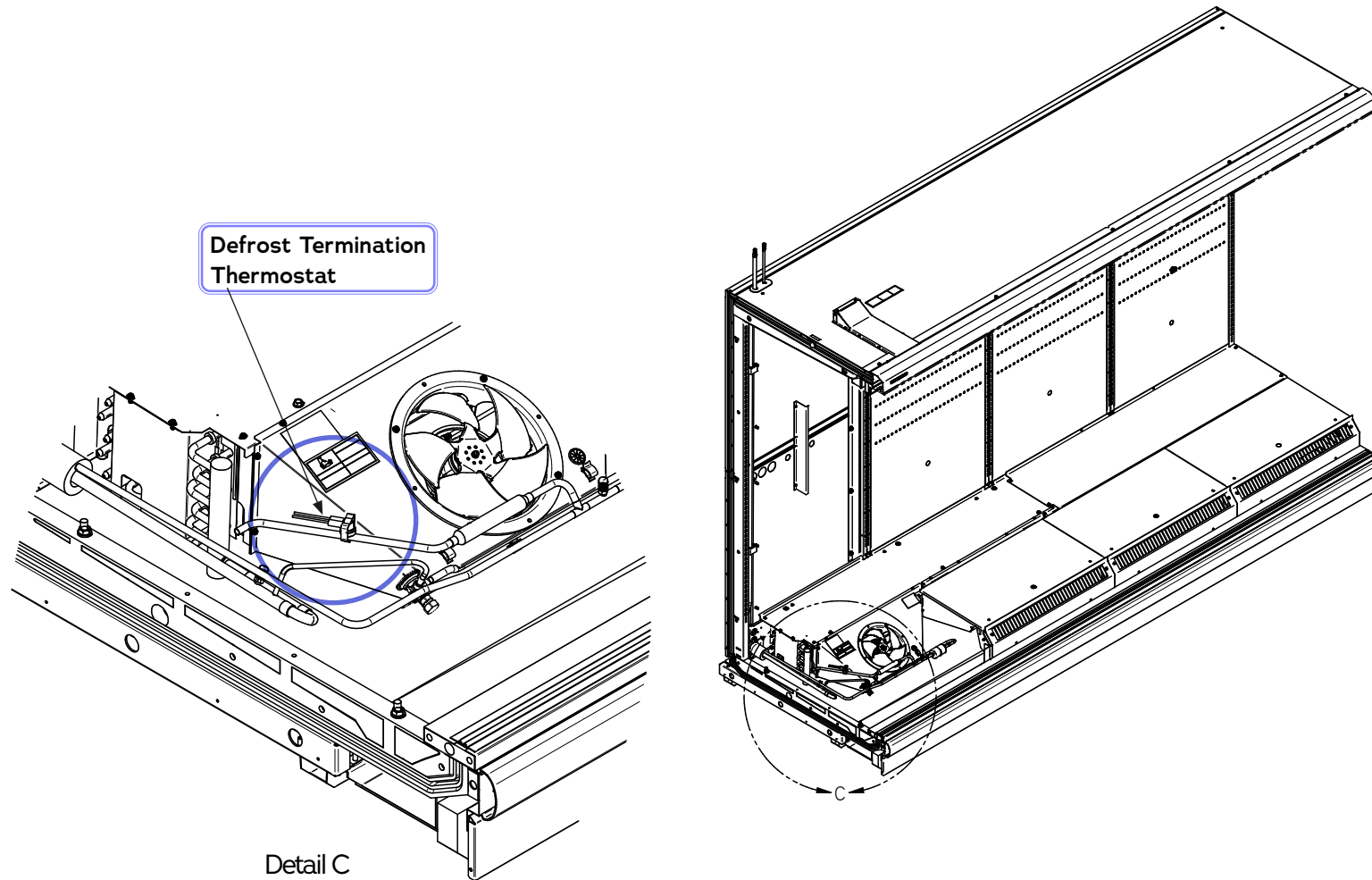
ELECTRIC DEFROST TERMINATION SENSOR (WITH CASE CONTROLLER)

For low-temperature merchandisers using electric defrost heaters with a case controller, the defrost termination sensor is installed on the outlet of the suction manifold. The defrost limit switch is factory-wired and mounted at the coil close-off on the left end.



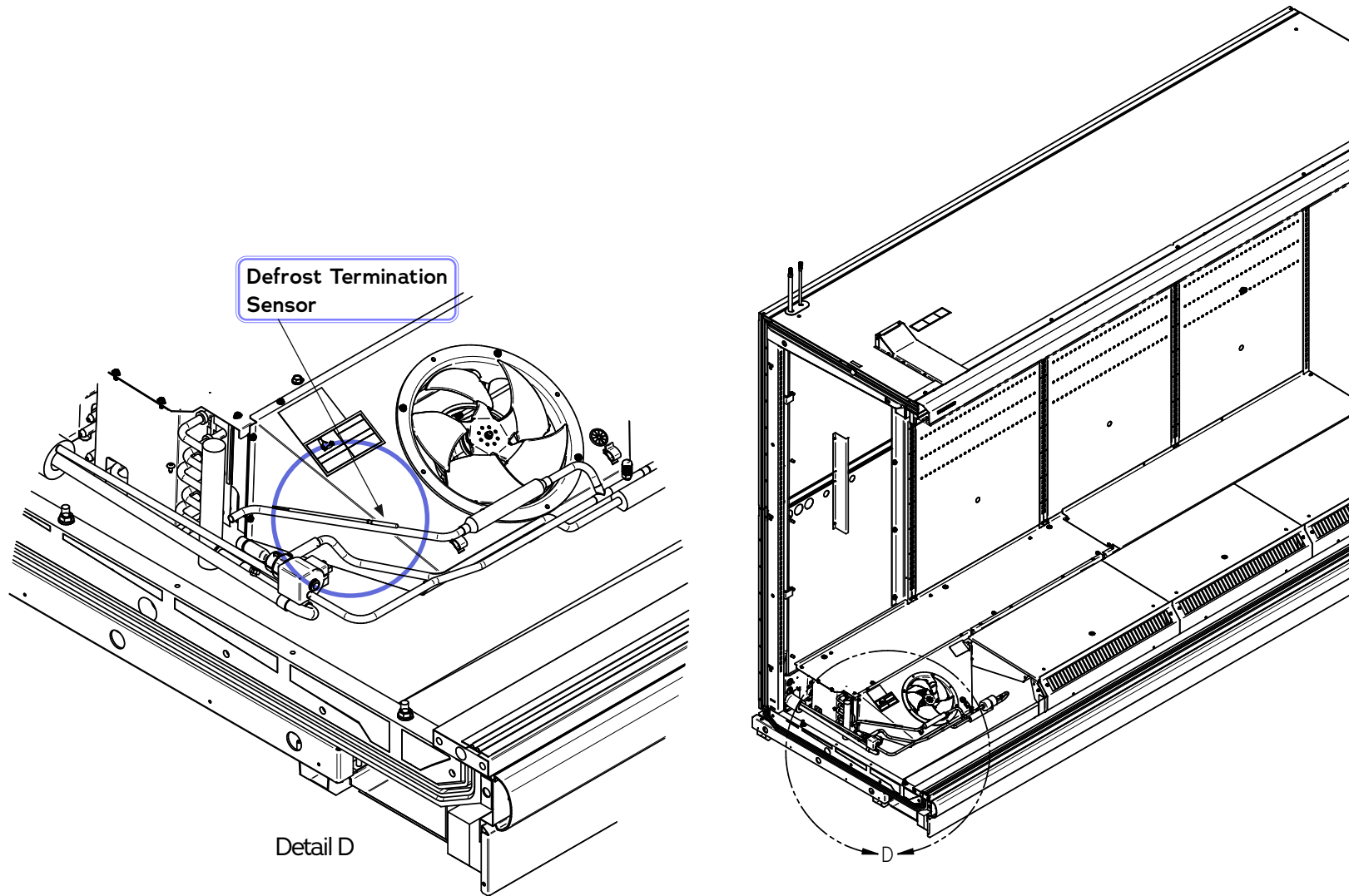
GAS DEFROST TERMINATION THERMOSTAT (WITHOUT CASE CONTROLLER)

For low-temperature merchandisers using gas defrost without a case controller, the defrost termination thermostat is located on the bypass line between the check valve and the distributor bypass outlet. If an optional adjustable thermostat is installed, its sensing bulb should be clamped in the same location. A defrost limit switch is not required for gas defrost.



GAS DEFROST TERMINATION SENSOR (WITH CASE CONTROLLER)

For low-temperature merchandisers using gas defrost with a case controller, the defrost termination sensor is located on the bypass line, positioned between the check valve and the distributor bypass outlet. A defrost limit switch is not required.



CONTROL SETTINGS MEDIUM TEMPERATURE

Conventional Single Compressor:

Measure Discharge Air Temperature at the center of the case at the discharge honeycomb.

A thermostat or other device with a 3–6 deg F (1.7–3.3 deg C) differential must control the merchandiser temperature. It will be wired to control the compressor motor contactor.

Standard Off Time defrost is time terminated. On outdoor units, the defrost timer will control a liquid line solenoid beginning a defrost pump-down 4 minutes before defrost.

The defrost frequency and lengths listed may require adjustment for specific store conditions. Factors include:

- **Store temperature and humidity**
- **Low head pressure**
- **Long refrigerant line runs**
- **Seasonal changes**
- **Merchandiser temperature lower than recommended**

When practical, defrost when store is closed.

Low pressure control settings apply to outdoor condensing units where ambient temperature does not fall below 0 deg F.

CONTROL SETTINGS LOW TEMPERATURE

Conventional Single Compressor:

Measure Discharge Air Temperature at the center of the case at the discharge honeycomb.

A thermostat or other device with a 3–6 deg F (1.7–3.3 deg C) differential must control the merchandiser temperature. It will be wired to control the compressor motor contactor.

Standard Electric defrost is temperature terminated. The defrost termination thermostats for all the merchandisers on one compressor are wired in series. Failsafe must not control defrost cycle length, especially when less than 208V power supply is used for defrost heaters or if frost build-up is heavy from shopping demands.

On outdoor units, the defrost timer will control a liquid line solenoid beginning a defrost pump-down 4 minutes before defrost.

Optional Gas defrost is time terminated and has fan cycling thermostat. The defrost frequency and lengths listed may require adjustment for specific store conditions. Factors include:

- **Store temperature and humidity**
- **Low head pressure**
- **Long refrigerant line runs**
- **Seasonal changes**
- **Merchandiser temperature lower than recommended**

Defrost after store closes when practical. Low pressure control settings are applicable to outdoor condensing units where ambient does not fall below 0 deg F.

CONTROL SETTINGS MEDIUM TEMPERATURE

Parallel Compressor Rack:

Measure Discharge Air Temperature at the center of the case at the discharge honeycomb.

Merchandiser temperature must be controlled by a mechanical or electronic pressure regulator or thermostat that will be mounted on the rack.

Standard Off Time defrost is time terminated. The defrost frequency and lengths listed may require adjustment for specific store conditions. Factors include:

- **Store temperature and humidity**
- **Low head pressure**
- **Long refrigerant line runs**
- **Seasonal changes**
- **Merchandiser temperature lower than recommended**

Stagger defrosts to maintain stable compressor loading and sufficient defrost gas. When practical, defrost when store is closed.

CONTROL SETTINGS LOW TEMPERATURE

Parallel Compressor Rack:

Measure Discharge Air Temperature at the center of the case at the discharge honeycomb. Merchandiser temperature must be controlled by a mechanical or electronic pressure regulator or thermostat that will be mounted on the rack.

Standard Electric defrost is temperature terminated. Failsafe must not control defrost cycle length, especially when less than 208V power supply is used for defrost heaters, or if frost build up is heavy from shopping demands.

Optional Gas defrost is time terminated and has fan cycling thermostat. The defrost frequency and lengths listed may require adjustment for specific store conditions. Factors include:

- **Store temperature and humidity**
- **Low head pressure**
- **Long refrigerant line runs**
- **Seasonal changes**
- **Merchandiser temperature lower than recommended**

Stagger defrosts to maintain stable compressor loading and sufficient defrost gas. When practical, defrost when store is closed.

MERCHANDISER ELECTRICAL DATA

Merchandiser data sheets for specific models are shipped with this manual. The data sheets provide merchandiser electrical data, standard electrical schematics, parts lists and performance data. Refer to the merchandiser data sheets and merchandiser serial plate for electrical information. Refer to the separate wiring diagrams shipped with the case for specific information about the merchandiser and any optional wiring kits that may have been applied.

FIELD WIRING

Field wiring must be sized for component amperes stamped on the serial plate. Actual ampere draw may be less than specified. Field wiring from the refrigeration control panel to the merchandisers is required for defrost termination thermostats and for optional refrigeration thermostats. When multiple merchandisers are on the same defrost circuit, the defrost termination thermostats are wired in series.

Always check the serial plate for component amperes.

Electric Defrost is standard for low temperature merchandisers and requires temperature termination. Gas defrost is optional. Off Time Defrost is standard for medium temperature merchandisers and is time terminated.

When two or more merchandisers with full-length wireways are installed in line, remove the wireway covers, and install the nipple and nuts (supplied) providing electrical passage from one merchandiser to the next. Following NEC and local codes is the responsibility of the electrical contractor.

ELECTRICAL CONNECTIONS

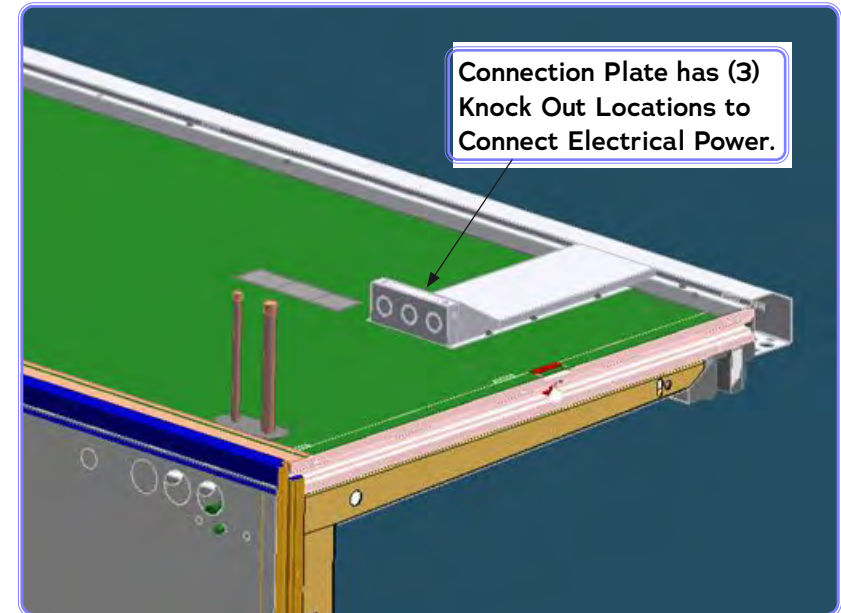
All wiring must be in compliance with NEC and local codes. All electrical connections are to be made at the connection plate located at the top, left-hand side of the case behind the fascia panel.

NOTE:

Cases ordered with defrost protection kits, will have a separate electrical box for electrical power connections.

IDENTIFICATION OF WIRING

Leads for all electrical circuits are identified by colored plastic bands. These bands correspond to the color code sticker (shown below) located inside the merchandiser wireway.



WIRING COLOR CODE

Leads for all electrical circuits are identified by a colored plastic band: neutral wire for each circuit has either White insulation or a White plastic sleeve in addition to the color band.

PINK..... REFRIG. THERMOSTAT LOW TEMP.	ORANGE OR
LIGHT BLUE.. REFRIG. THERMOSTAT NORM TEMP.	TAN.....LIGHTS
DARK BLUE.. DEFROST TERM. THERMOSTAT	MAROONRECEPTACLES
PURPLE..... ANTI-SWEAT HEATERS	YELLOW*DEFROST HEATERS, 120V
BROWN FAN MOTORS	RED*DEFROST HEATERS, 208V
GREEN* GROUND	

***EITHER COLORED SLEEVE OR COLORED INSULATION**
ELECTRICIAN NOTE: Use copper conductor wire only.
CASE MUST BE GROUNDED

THESE ARE MARKER COLORS WIRES MAY VARY.

⚠ WARNING

— LOCK OUT / TAG OUT —

- » Merchandiser must be grounded. All wiring must be in compliance with NEC and local codes.
- » To avoid serious injury or death from electrical shock, always disconnect the electrical power at the main disconnect when servicing or replacing any electrical component. This includes, but is not limited to, such items as doors, lights, fans, heaters, and thermostats.

DRIP PIPING & SPLASHGUARDS

WASTE OUTLET & WATER SEAL

The waste outlet location varies for each for different case lengths. Drip piping is located between the front merchandiser base and the splashguard fixture and runs parallel to the merchandiser (see Data Sheet for exact locations).

INSTALLING DRIP PIPING

Poorly or improperly installed drip pipes can seriously interfere with the merchandiser's operation and result in costly maintenance and product losses. Please follow the recommendations listed below when installing drip pipes to ensure proper installation.

Never use drip piping smaller than the nominal diameter of the pipe or water seal supplied with the merchandiser.

When connecting drip piping, the water seal must be used as part of the drip piping to prevent air leakage or insect entrance. Never use two water seals in series in any one drip pipe. Double water seals in series will cause an air lock and prevent draining.

Pitch the drip piping in the direction of flow. There should be a minimum pitch of 1/4 in. per ft (20 mm per 1 m).

Avoid long runs of drip piping. Long runs make it impossible to provide the pitch necessary for good drainage.

NOTICE

Splashguard brackets **MUST** be installed before piping merchandiser.
(See Page 1-3)

Provide a suitable air break between flood rim of the floor drain and outlet of drip pipe. To meet code on low base merchandisers, it may be necessary to install a field-supplied drip pipe reducer. An alternative is to cut the last section of drip pipe at an angle.



Prevent drip pipes from freezing sweating or freezing:

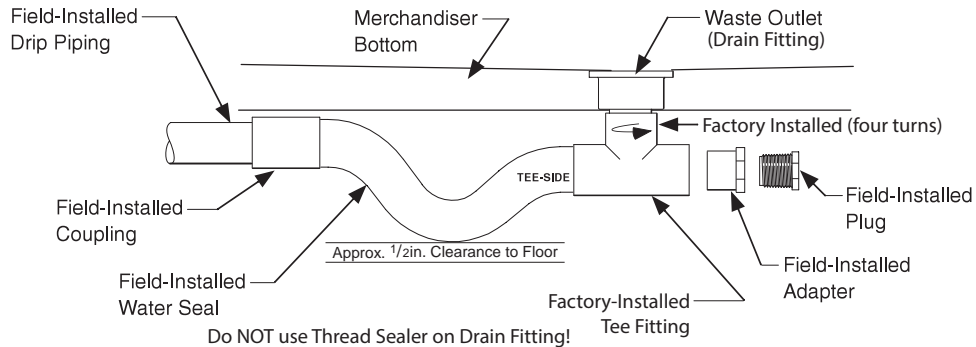
- A. Do not install drip pipes in contact with uninsulated suction lines. Suction lines should be insulated with a non-absorbent insulation material.
- B. Where drip pipes are located in dead air spaces, such as between merchandisers or between a merchandiser and a store wall, provide means to prevent drip pipe from sweating. External ventilation fans may be required to prevent sweating.

1. Tee is factory-installed. Do not over-tighten threads, or the drain fitting or tee may become damaged.
2. Do NOT use thread sealer on ABS drain fitting. If sealer is used the ABS drain fitting may crack or leak! (If a tee needs to be installed it should be tightened no more than 4 turns.) Do not over-tighten threads.
3. Dry fit the supplied water seal / trap to ensure approximately 1/2 inch of clearance from the bottom of the trap to the floor as shown.

NOTE:

It may be necessary to rotate water seal (trap) inside the tee a few degrees to ensure clearance at two locations. There must be clearance between the bottom of the water seal and the floor, and between the top of the water seal outlet and the bottom of the merchandiser.

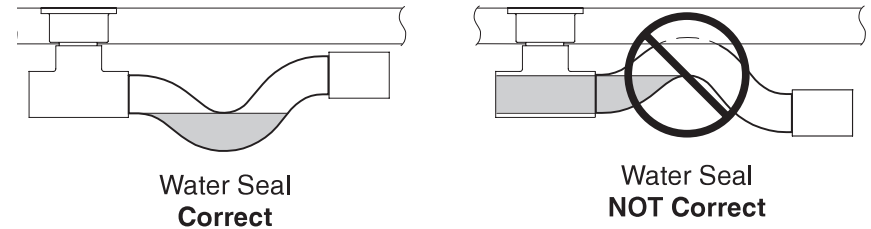
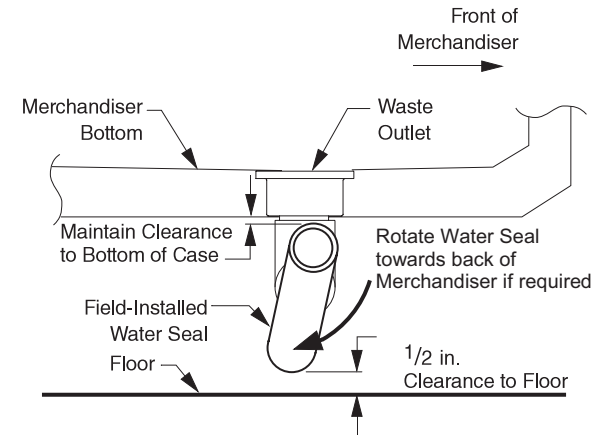
Do not over-rotate or gravity seal may be compromised. Always rotate trap bottom toward merchandiser support rail.



NOTICE

It is the installing contractor's responsibility to consult local agencies for local code requirements.

4. Install remaining PVC drain parts using recommended PVC cleaner, primer and cement per manufacturer's recommendations.
5. Thread plug into the adapter until snug but not to exceed four full rotations.
6. Installed drip piping may require additional support depending on the number and location of the hub floor drains. The installer should always provide adequate support to all drip piping arrangements to prevent excess stress on all drip piping components. The installer must provide additional support when "evac" type waste water systems are applied to drip piping lineup arrangements.

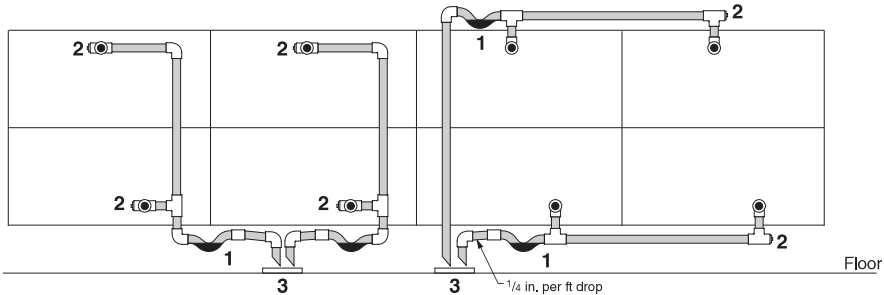
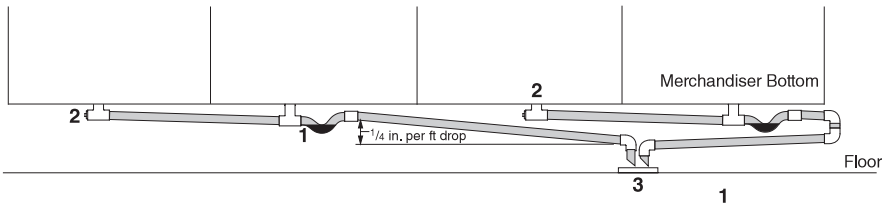
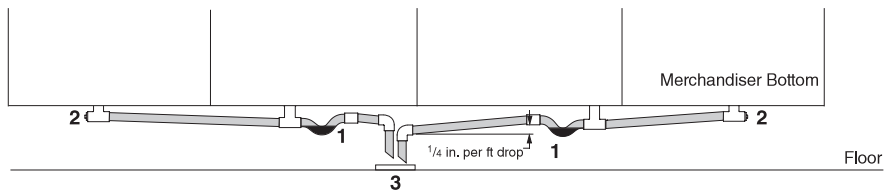


DRIP PIPING LINEUP ARRANGEMENTS

The following illustrations below show typical arrangements for installing drip pipes for a lineup of merchandisers. Illustrations are for reference only. Piping may vary with location and access to hub drain(s). Each merchandiser waste outlet must be individually piped to a hub drain if 1/4 in. drip piping pitch cannot be maintained.

NOTE:

No more than two merchandiser are to be piped per water seal. Do not install water seal between two merchandiser waste outlets that are piped together. (Double water seals in series will cause an air lock and prevent drainage.)

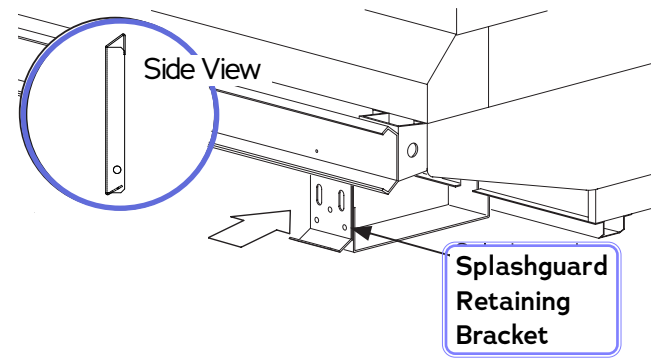


1 = Water Seal 2 = Clean Out Plug 3 = Hub Drain

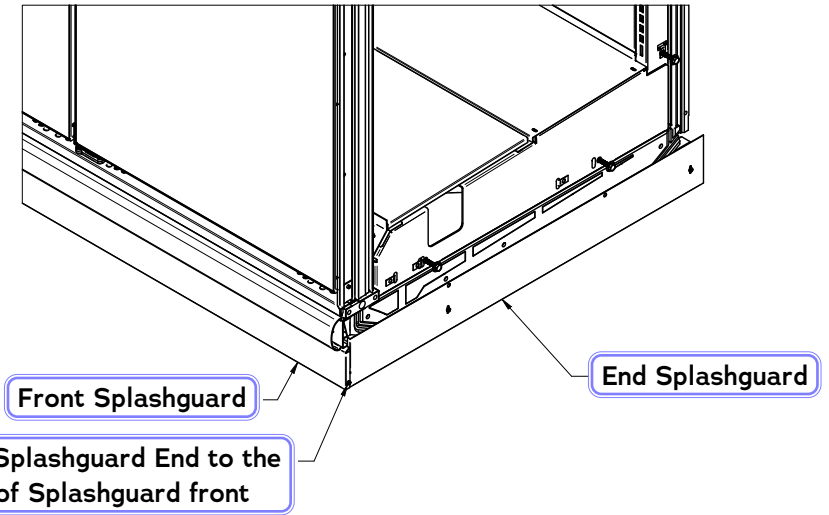
INSTALLING SPLASHGUARDS

The splashguard is shipped inside each merchandiser. After merchandisers have been leveled and joined, and all drip piping, electrical and refrigeration work has been completed, re-install the front color panel, then install the splashguards.

First, position top of splashguard over the top edge of the bracket; second, push the lower edge of the splashguard toward the bottom of the bracket until it snaps into place.



Installing End Splashguard:



START UP / OPERATION

START UP AND OPERATION

See the merchandiser's Technical Data Sheet for refrigerant settings and defrost requirements. Bring merchandisers down to the operating temperatures listed on the data sheet. Merchandiser(s) must operate for 24 hours before loading products.

Monitor case temperature regularly to ensure it is at the proper level. Monitor the unit for any unusual noises or vibrations and address them promptly to prevent further problems. Check the electrical connections and wiring for any issues.

Excessive ambient conditions may cause condensation and therefore sweating of doors. Facility operators should monitor doors and floor conditions to ensure safety of persons.

12 HOURS AFTER START UP CHECKLIST

- Check case temperature.
- Check water connections for leaks or accumulation of water.
- Verify the fans are running.
- Check compressor's amperage, and validate with the information on serial plate.
- Check the door operation again to ensure doors open and close properly once the case is down to operating temperature.
- Check that all inspection plates and covers have been properly replaced.
- Inspect for any water accumulation due to incorrect or unsealed penetrations where electrical or other lines pass through insulated walls of the case.
- Verify that the lights are "ON". (lights are switched remotely.) If lights are "OFF", check the illumination schedule and circuit breaker for the lights.
- Check the water outlet temperature from each condensing unit. Water outlet temperature should be less than 10° above water inlet temperature.

STOCKING

Product should not be placed in merchandisers until all refrigeration controls have been adjusted and merchandisers are at proper operating temperature.

Hussmann recommends solid shelves for ice cream.

All shelves and the lower deck are intended to display product. Shelf height is adjustable in one inch increments. Spacing of 12 inches is recommended for most applications. Maximum load per shelf is 200 pounds. Merchandisers may be ordered with optional "L" shaped wire shelves.

Proper rotation of product during stocking is necessary to prevent product loss. Always bring the oldest product to the front and set the newest to the back.

Air discharge and return flues must remain open and free of obstruction at all times to provide proper refrigeration and air curtain performance. Do not allow product, packages, signs, etc. to block these grilles. Do not use non-approved shelving, baskets, display racks, or any accessory that could hamper air curtain performance.

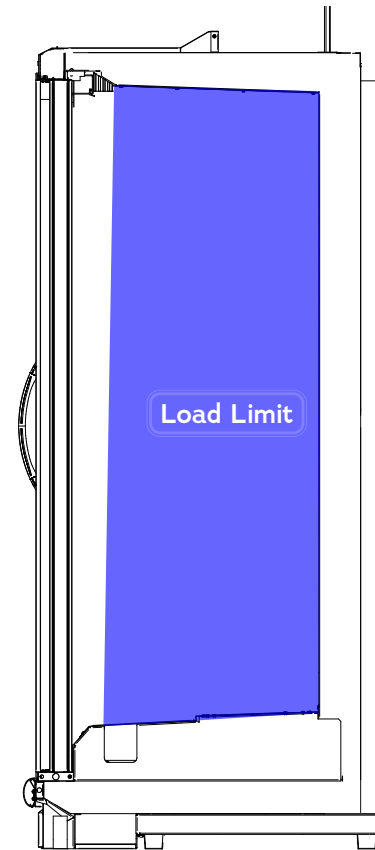
Do not prop doors open while stocking. And keep the doors closed as much as possible to prevent coil frosting and high merchandiser temperature.

LOAD LIMITS

Shelf life of perishables will be short if load limit is violated. At no time should merchandisers be stocked beyond the load limits indicated.

The standard depth for standard and narrow cases are 24" and 22" respectively.

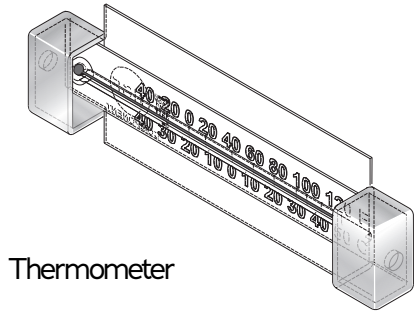
Do not block honeycomb.



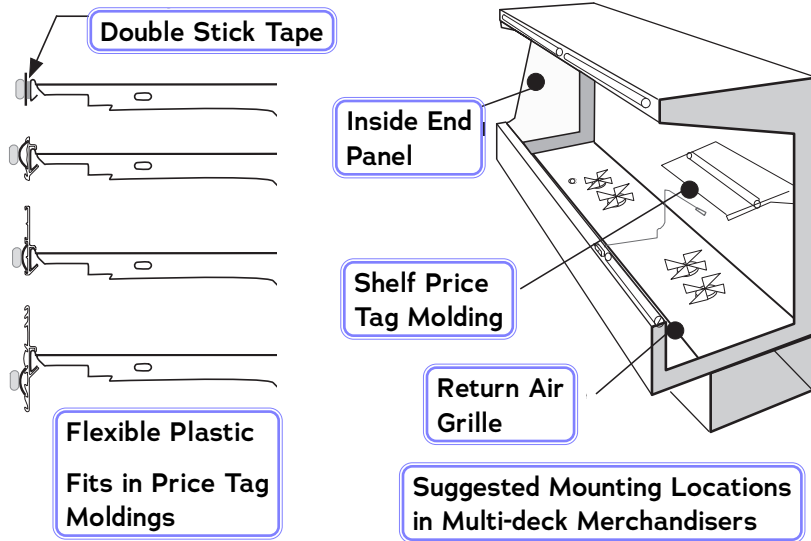
INSTALLING FDA/NSF REQUIRED THERMOMETER

The following pages provide the same information that ships with the thermometer. This requirement does not apply to display refrigerators intended for bulk produce (refer to Page 1-1). Please note that the tape cannot be exposed after installation.

**This is an NSF-7 &
US FDA Food Code
Required
Thermometer**



Thermometer



Important – Please read!

This thermometer is provided in response to United States Food and Drug Administration (US FDA) Food Code [<http://www.fda.gov/>] and National Sanitation Foundation (NSF / ANSI) Standard 7 [<http://www.nsf.org/>]

Each installation will be different depending on how the unit is stocked, shopping patterns in the department and ambient conditions of the store. The suggested locations provided herein are possible locations. It is the responsibility of the purchaser / user to determine the location within the food storage area of the unit that best meets the code requirements above.

The thermometer may need to be moved several times to find the warmest location. Mounting options include flexible plastic for price tag molding application, magnet applied to back of flexible plastic for steel end wall, and double stick tape. Tape must not be exposed after installation.

Questions about either code should be addressed to local agencies or other appropriate officials.

**Keep with merchandiser
or give to store manager.**

DO NOT DESTROY.

MAINTENANCE AND SERVICE

SAFETY CHECKS

WARNING

- Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment, so all parties are advised. Initial safety checks shall include:
 - i. Ensure that capacitors are discharged—this shall be done in a safe manner to avoid the possibility of sparking.
 - ii. Ensure that no live electrical components and wiring are exposed while charging, recovering, or purging the system.
 - iii. Ensure that there is continuity of earth bonding.
- Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.
- LOCK OUT / TAG OUT — To avoid serious injury or death from electrical shock, always disconnect the electrical power at the main disconnect when servicing or replacing any electrical component. This includes, but is not limited to, such items as doors, lights, fans, heaters, and thermostats.
- Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges, or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.
- Refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.
- To reduce the risk of fire, electrical shock or injury when cleaning this merchandiser:
 - Unplug the merchandiser before cleaning
 - Keep all liquids away from electrical and electronic components.

BEFORE WORKING WITH REFRIGERANT

Safety Checks

- Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure that the risk of ignition is minimized.
- Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.
- All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.
- The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e., non-sparking, adequately sealed, or intrinsically safe.
- If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available on hand. A dry chemical or CO₂ fire extinguisher should be adjacent to the charging area.
- No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment shall be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.
- Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.
- Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times, the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.
- The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:
 - a. The actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed;
 - b. The ventilation machinery and outlets are operating adequately and are not obstructed;
 - c. If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
 - d. Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
 - e. Refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

CARE AND CLEANING

Long life and satisfactory performance of any equipment is dependent upon the care it receives. To ensure long life, proper sanitation and minimum maintenance costs, these merchandisers should be thoroughly cleaned, all debris removed and the interiors washed down, weekly. The cases may need additional cleaning, especially in high traffic areas, dusty areas and during unusually extended periods of use of the equipment.

The directions below are recommended cleaning instructions for reach-in cases and should not be used as a substitute for the store's regular maintenance schedule. Follow all local and national health codes. This guide lists some of the key areas of the cases that require cleaning to help maintain the overall appearance and performance of the equipment and keep it free of debris.

Interior Surfaces

The interior surfaces may be cleaned with most domestic detergents and sanitizing solutions with no harm to the surface. Avoid saturating the case interior to the point where cleaning agents are running or dripping into the bottom compartment. The presence of bleach and ammonia will damage the case's aluminum coils.

Clean and disinfect the inside of the case frequently. To disinfect, use EPA List N disinfectants, diluted household bleach solutions prepared according to the manufacturer's label for disinfection, or alcohol solutions with at least 70% alcohol, and are appropriate for the surface. Allow the compartments to dry before resuming operation.

Exterior Surfaces

The exterior surfaces should be cleaned with a mild detergent and warm water to protect and maintain their attractive finish. Never use abrasive cleansers or scouring pads.

Fan Plenum

To facilitate cleaning, the fan plenum is hinged and also fastened with screws at each end. After cleaning be sure the plenum is properly lowered into position and that screws are reinstalled or product loss will result due to improper refrigeration.

⚠ WARNING

- » Shut Fans Off During the Cleaning Process
- » Always disconnect the electrical power at the main disconnect when servicing or replacing any electrical component. This includes, but is not limited to, such items as fans, heaters, thermostats and lights.

Anti-Fog Glass Doors

Wipe inside of anti-fog glass doors with isopropyl alcohol and a micro-fiber cloth. Only use a terry weave micro-fiber cloth. Allow surface to dry before closing door. Use of other cleaners or abrasives may damage the surface, and/or void the warranty. Ensure protective shipping film is removed from the doors. Make sure to remove protective film from the doors. The film was applied for only for use in shipping.

⚠ WARNING

- » Do not use HOT water on COLD glass surfaces. This can cause the glass to shatter and could result in personal injury. Allow glass fronts, ends and service doors to warm before applying hot water.

DO NOT USE:

- Abrasive cleansers and scouring pads, as these will mar the finish.
- Coarse paper towels on coated glass.
- Ammonia-based cleaners on acrylic parts.
- Solvent, oil or acidic based cleaners on any interior surfaces.

DO:

- Remove the product and all loose debris to avoid clogging the waste outlet.
- Store product in a refrigerated area such as a freezer. Remove only as much product as can be taken to the freezer in a timely manner.
- First turn off refrigeration, then disconnect electrical power.
- Thoroughly clean all surfaces with soap and hot water. Do not use steam or high water pressure hoses to wash the interior. These will destroy the merchandisers' sealing causing leaks and poor performance.
- Remove screws and lift hinged fan plenum for cleaning. Be sure to reposition the fan plenum after cleaning merchandiser.
- Take care to minimize direct contact between fan motors and cleaning or rinse water.
- Rinse with hot water, but do not flood. Never introduce water faster than the waste outlet can remove it.
- Allow merchandisers to dry before resuming operation.
- After cleaning is completed, turn on power and refrigerant to the merchandiser.
- Verify that merchandiser is working properly.

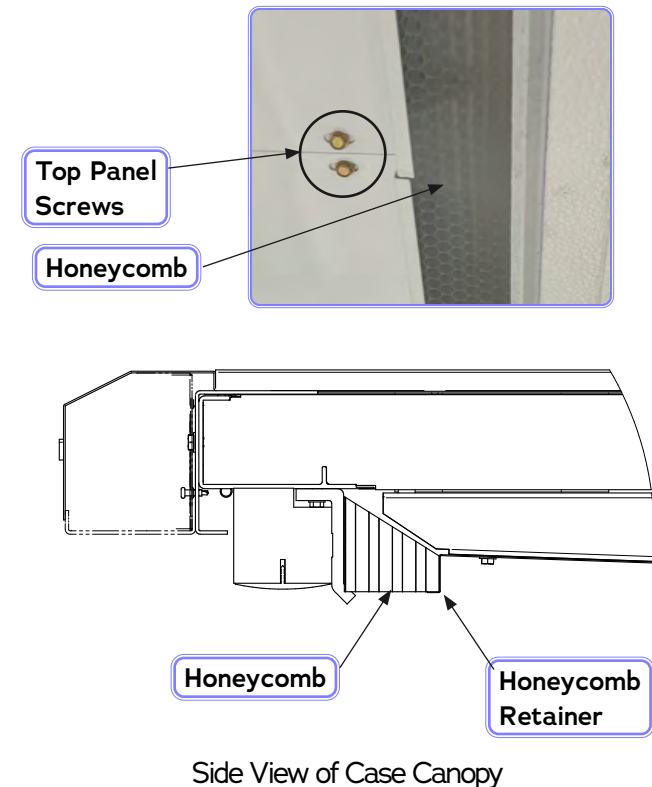
⚠ WARNING

- » Product will be degraded and may spoil if allowed to sit in a non-refrigerated area.

CLEANING HONEYCOMB ASSEMBLIES

Honeycombs should be cleaned every six months. Dirty honeycombs will cause merchandisers to perform poorly. The honeycombs may be cleaned with a vacuum cleaner. Soap and water may be used if all water is removed from the honeycomb cells before reassembling. Be careful not to damage the honeycombs.

1. Remove the sheet metal screws located in the top panels and remove the top panels.
2. Lift the honeycomb assembly out.
3. Clean and dry the honeycomb.
4. After cleaning, reassemble in reverse order of removal.



CLEANING STAINLESS STEEL SURFACES

- Use non-abrasive cleaning materials, and always polish with grain of the steel. Use warm water or add a mild detergent to the water and apply with a cloth. Always wipe rails dry after wetting.
- Use alkaline chlorinated or non-chlorine containing cleaners such as window cleaners and mild detergents. Do not use cleaners containing salts as this may cause pitting and rusting of the stainless steel finish. Do not use bleach.
- Clean frequently to avoid build-up of hard, stubborn stains. A stainless steel cleaning solution may be used periodically to minimize scratching and remove stains. Rinse and wipe dry immediately after cleaning. Never use hydrochloric acid (muriatic acid) on stainless steel.

CLEANING COILS

- Never use sharp objects around coils. Use a soft brush or vacuum brush to clean debris from coils.
- Do not puncture coils!
- Do not bend fins. Contact an authorized service technician if a coil is punctured, cracked, or otherwise damaged.
- Do NOT use chlorine or ammonia-based cleaners to clean aluminum coils.
- ICE in or on the coil indicates the refrigeration and defrost cycle is not operating properly. Contact an authorized service technician to determine the cause of icing, and to make adjustments as necessary. To maintain product integrity, move all product to a cooler until the unit has returned to normal operating temperatures.

CLEANING UNDER MERCHANDISERS

Remove splashguards not sealed to floor. Use a vacuum with a long wand attachment to remove accumulated dust and debris from under the merchandiser.

REMOVING SCRATCHES FROM BUMPER

Most scratches and dings can be removed using the following procedure.

1. Use steel wool to smooth out the surface area of the bumper or top rail.
2. Clean area.
3. Apply vinyl or car wax and polish surface for a smooth glossy finish.

WARNING

- » Do NOT allow cleaning agent or cloth to contact food product.

TROUBLESHOOTING

Problem	Possible Cause	Possible Solution
Case temperature is too warm.	Ambient conditions may be affecting the case operation.	Check case position in store. Is the case located near an open door, window, electric fan or air conditioning vent that may cause air currents? Case must be located minimum 15 ft away from doors or windows. Cases are designed to operate at 55% Relative humidity and a temperature of 75°F.
	Discharge air temp is out of spec.	Check evaporator fan operation. Check electrical connections and input voltage.
		Fans are installed backwards. Check airflow direction.
		Make sure fan blades have correct pitch and are per specification.
		Check to see that fan plenum is installed correctly. It should not have any gaps.
		Check suction pressure and ensure that it meets factory specifications.
	Case is in defrost.	Check defrost settings. See Technical Specifications section.
	Product is outside of the load limit area, blocking airflow.	Redistribute product so it does not exceed load limit. There is a sticker on the inside of the case indicating the maximum load limit.
Coil is freezing over.	Return air is blocked, make sure debris is not blocking the intake section.	
	Coil close-offs are not installed. Inspect coil to make sure these parts are on the case.	
	Clean coil.	
Condensing coil or evaporator coil is clogged or dirty.		
Case temperature is too cold.	The t-stat temp is set too low.	Check settings. See Technical Specifications on the data sheet.
	Ambient conditions may be affecting the case operation.	Check case position in store. Is the case located near an open door, window, electric fan or air conditioning vent that may cause air currents? Case must be located minimum 15 ft away from doors or windows. Cases are designed to operate at 55% Relative humidity and a temperature of 75°F.
Condensation on glass.	Ambient conditions may be affecting the case operation.	Check case position in store. Is the case located near an open door, window, electric fan or air conditioning vent that may cause air currents? Case must be located minimum 15 ft away from doors or windows. Cases are designed to operate at 55% Relative humidity and a temperature of 75°F.
	Inadequate air circulation.	Check if air sweep fans are functioning, check electrical connections.
	Doors are not completely shut.	Close doors correctly.

TROUBLESHOOTING CONTINUED

Problem	Possible Cause	Possible Solution
Water has pooled under case.	Case drain is clogged.	Clear drain.
	PVC drains under case may have a leak.	Repair as needed.
	Case tub has unsealed opening.	Seal as needed.
	If the case is in a line-up, case to case joint is missing or unsealed.	Install case to case joint and seal as needed.
	Evaporator pan is overflowing (if applicable).	Check electrical connection to evaporator pan. Check float assembly, it should move freely up and down the support stem. Clear any debris.
	Case is not level.	Level the case.
	Drain screen is plugged.	Clean drain screen and remove any debris.
Case is not draining properly.	Drain or P-trap is clogged.	Clear any debris.
Frost or ice on evaporator coil.	Evaporator fans are not functioning.	Check electrical connections.
	Defrost clock is not functioning.	Case should be serviced by a qualified service technician.
	Coil is freezing over.	Return air is blocked, make sure debris is not blocking the intake section. Coil close-offs are not installed. Inspect coil to make sure these parts are on the case.
Lights do not come on.	LED Driver / light socket wiring.	Check electrical connections. See Electrical Section and check wiring diagram.
	LED Driver needs to be replaced.	Case should be serviced by a qualified service technician. See Electrical Section.
	LED fixture socket / connection needs to be replaced.	Case should be serviced by a qualified service technician.
	LED fixture needs to be replaced.	See Maintenance Section.
	Light Switch needs to be replaced.	Case should be serviced by a qualified service technician.

REFRIGERANT REMOVAL, EVACUATION AND RECOVERY

When breaking into the refrigerant circuit to make repairs—or for any other purpose—conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

- a. Safely remove refrigerant following local and national regulations;
- b. Purge the circuit with inert gas;
- c. Evacuate;
- d. Purge with inert gas;
- e. Open the circuit by cutting or brazing.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. The system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

Refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

RECOVERY PROCEDURE

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely. When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available.

All cylinders to be used are designated for the recovered refrigerant and labeled for that refrigerant (i.e., special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, FLAMMABLE REFRIGERANTS. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that...

FLAMMABLE REFRIGERANT does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the supplier. Only electric heating to the compressor body shall be employed to accelerate this process.

When oil is drained from a system, it shall be carried out safely.

REFRIGERANT CHARGING PROCEDURE

A calibrated scale with +/-2 gram accuracy must be used to charge the system. The charge amount is shown on the serial plate.

No gas charge adjustments are allowed. When connecting hoses between the refrigeration system, manifold gauges, and refrigerant cylinder, ensure that the connections are secure and there are no potential sources of ignition nearby. Ensure that contamination of different refrigerants does not occur when using charging equipment.

Use dedicated hoses to service refrigeration systems. Hoses or lines should be as short as possible to minimize the amount of refrigerant contained in them.

Ensure that the refrigeration system is properly grounded prior to charging the system with refrigerant, to avoid the potential for static build-up.

In addition to conventional charging procedures, the following requirements shall be followed:

- a. Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- b. Cylinders shall be kept in an appropriate position according to the instructions.
- c. Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant.
- d. Label the system when charging is complete (if not already).
- e. Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

Extreme care must be taken not to overfill the refrigeration system. After charging, carefully disconnect the hoses, attempting to minimize the quantity of refrigerant released. Further leak check the service ports, hoses, refrigerant tanks.

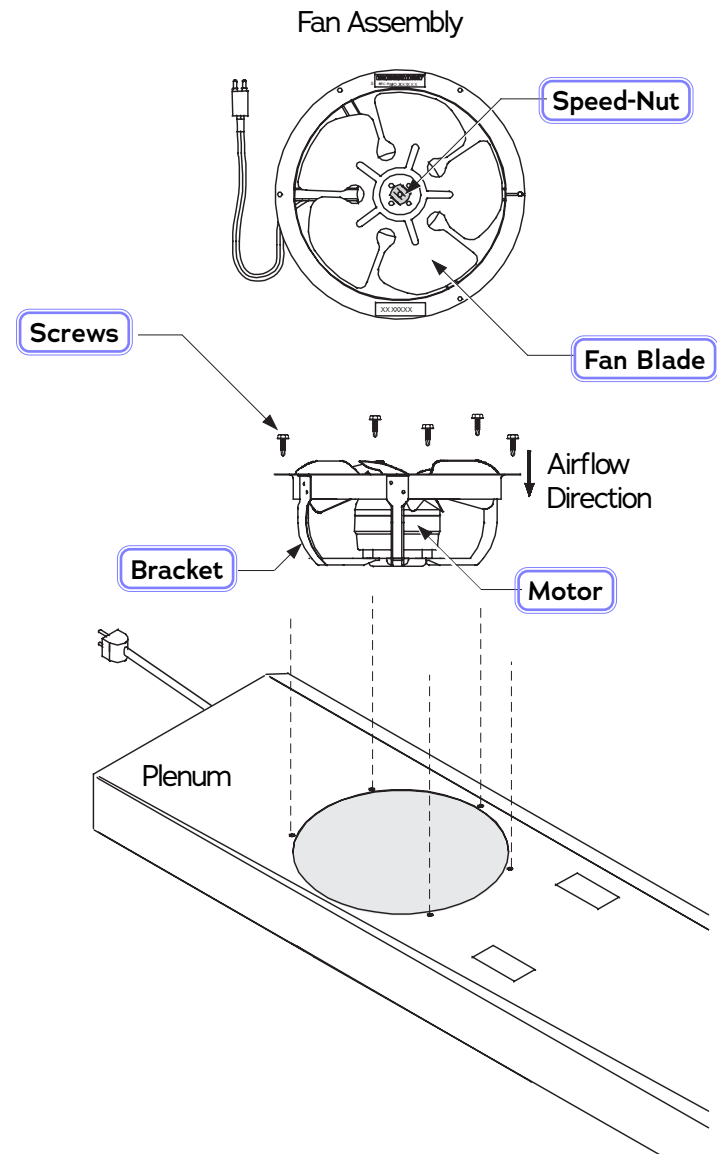
Thoroughly leak check the service ports. If no leak is present, use a pinch-off tool to close the ends of the service tubes before brazing them shut. If a Schrader valve is used on the compressor service tube, it must be removed and the previous steps followed in order to braze the service tube shut.

REPLACING FAN MOTORS AND BLADES

See cross section for location of evaporator fans. Should it ever be necessary to service or replace the fan motors or blades be certain that the fan blades are re-installed correctly. Fan assemblies may vary, but replacement procedures are similar.

Fan Access:

1. Disconnect power to the case.
2. Remove bottom display pans.
3. Remove plug clip and disconnect fan from wiring harness.
4. Remove fan blade.
5. Remove screws holding fan motor/bracket assembly to plenum and remove assembly.
6. Replace fan motor/bracket assembly and reinstall screws.
7. Reinstall fan blade.
8. Reconnect fan to wiring harness, and replace plug clip.
9. Turn on power.
10. Verify that motor is working and blade is turning in the correct direction.
11. Close large air gaps under fan plenum. Warmer air moving into refrigerated air reduces effective cooling. If the plenum does not rest against the case bottom without gaps, apply foam tape to the bottom of the fan plenum to reduce improper air movement, however defrost water should not be blocked by fan plenum. Do NOT seal fan plenum so that water can not drain.
12. Replace display pans. Bring merchandiser to operating temperature before restocking.



Hussmann recommends against frame heater cycling with doors to prevent door seals from freezing to the frames and tearing.

REPLACING ELECTRIC DEFROST HEATERS

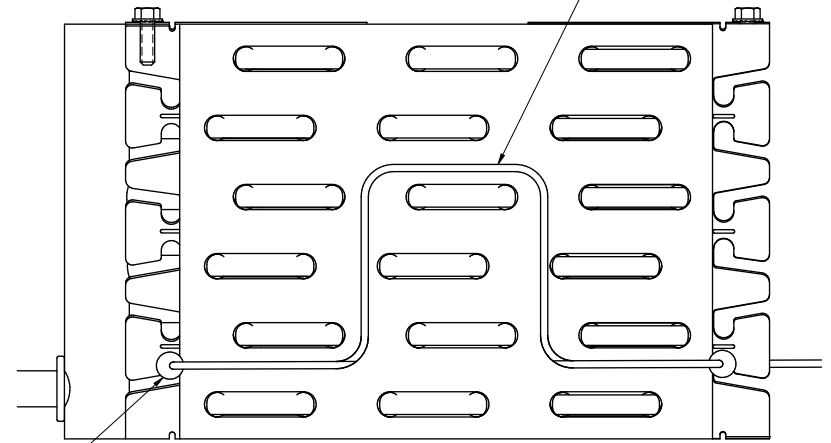
(Low Temperature Cases)

Electric defrost requires a heater on the front and rear of the coil as shown. The heaters are held in place by tabs in the coil brackets.

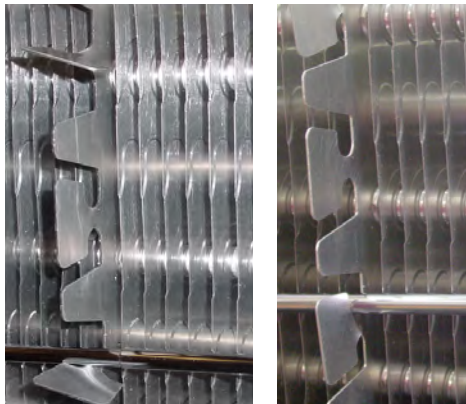
Front Defrost Heater

1. Disconnect power to the case.
2. Lift fan plenum up and back to access the heater.
3. Bend tabs holding heater to horizontal.
4. Remove heater from coil bracket.
5. Position new heater in bracket.
6. Bend tabs back to vertical to hold heater in bracket.
7. Replace the coil cover and lower fan plenum.
8. Turn on power.
9. Verify that heater is working correctly.
10. Close air gaps under fan plenum. Warmer air moving into refrigerated air reduces effective cooling. If the plenum does not rest against the case bottom without gaps, apply foam tape to the bottom of the fan plenum to reduce improper air movement. Use silicone sealant to close other gaps.
11. Replace display pans. Bring merchandiser to operating temperature before restocking.

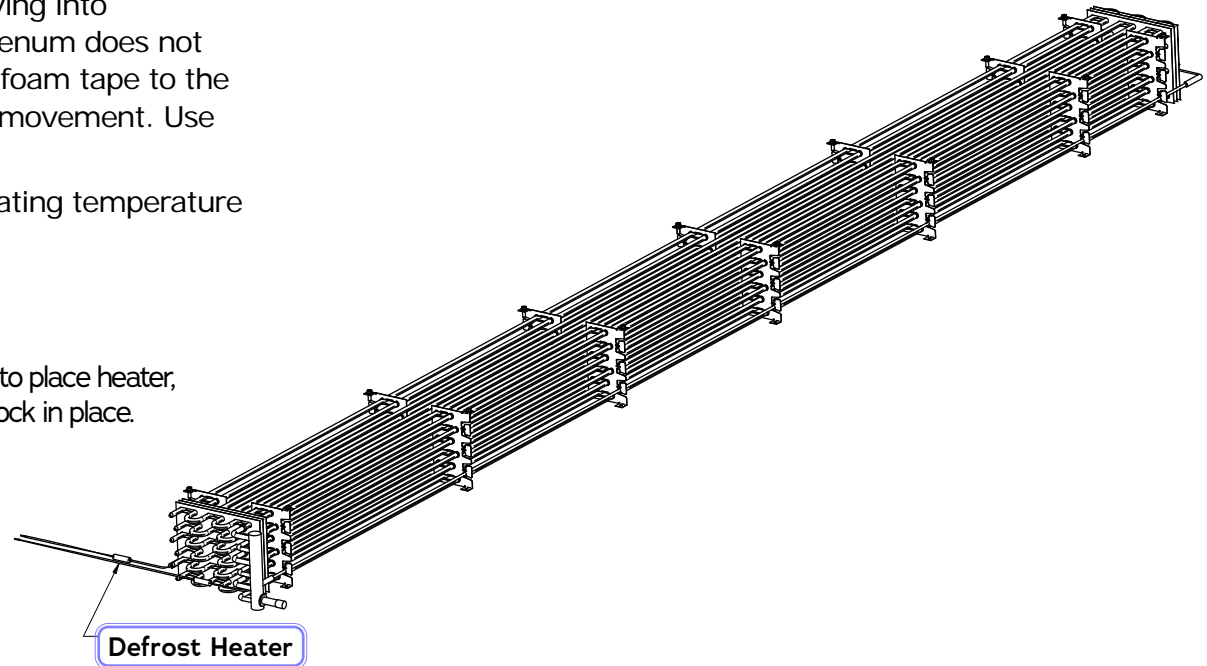
Coil excess heater loop around coil as shown.



Use the bottom hole location for defrost heater.



Bend tabs back to place heater,
and re-bend to lock in place.



Defrost Heater

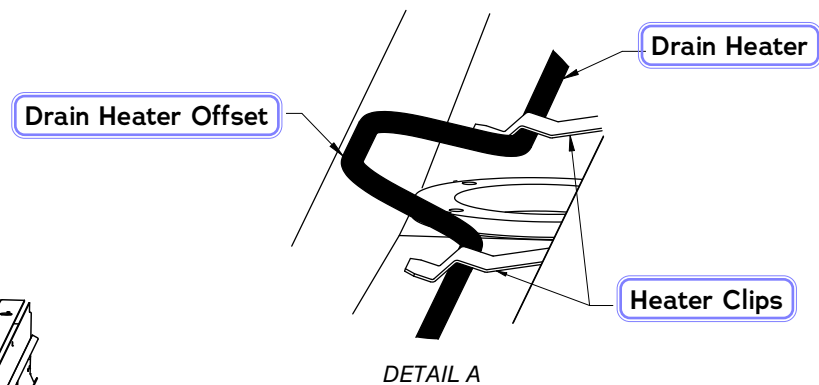
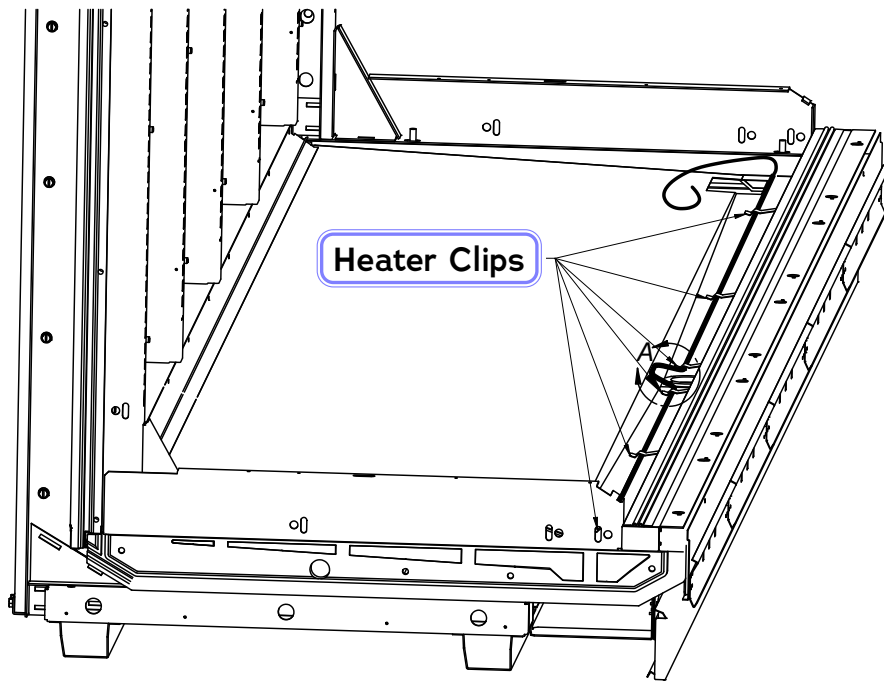
REPLACING DRAIN PAN HEATER

Electric and Gas Defrost
(Low Temperature Only)

The drain pan heater is located as shown below.

Remove Drain Pan Heater

1. Disconnect power.
2. Pull heater out from under heater clips.
3. Position new heater under heater clips. Be sure offset is properly positioned around the drain.
4. Reconnect power.
5. Verify that heater is working correctly.



⚠ WARNING

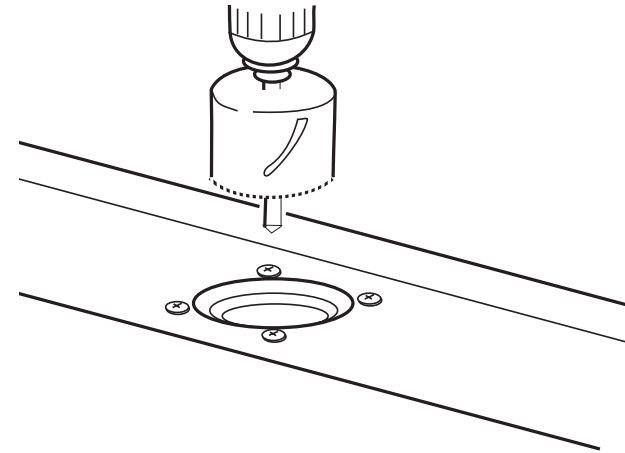
- » Always disconnect the electrical power at the main disconnect when servicing or replacing any electrical component. This includes, but is not limited to, such items as fans, heaters, thermostats and lights.

REPLACING DAMAGED DRAIN FITTING

The following procedure is for the field repair of a broken drain fitting.

1. Use a drill with a 1 ⁷/₈-inch (48 mm) hole saw to drill out the bottom of the drain fitting.

Be sure to drill completely through fitting and bottom liner.



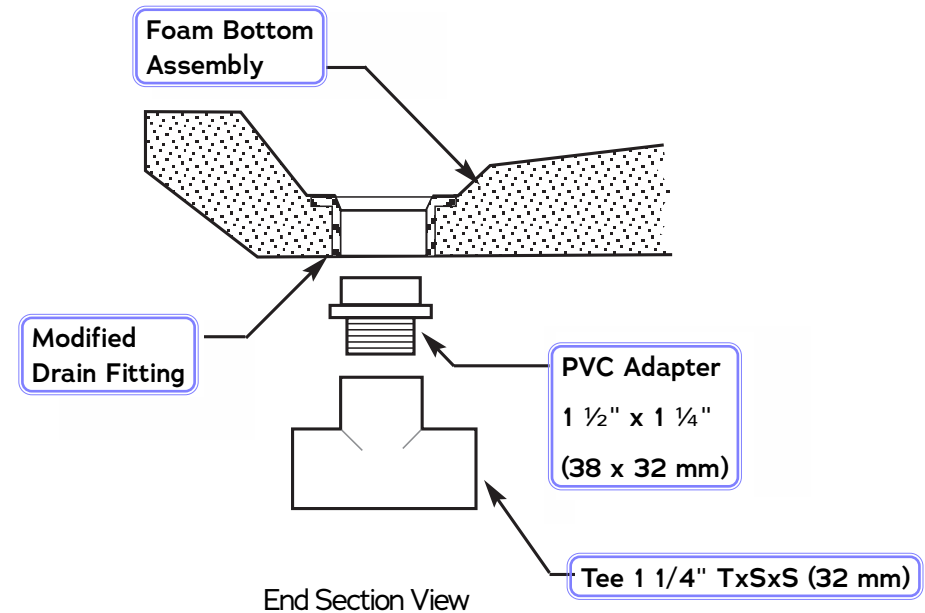
Drain Fitting Viewed from Inside Case

2. Insert adapter into drain fitting. Do NOT use thread sealer on ABS drain fitting.

If sealer is used the ABS drain fitting may crack or leak!

(Tee should be tightened no more than 4 turns.)

Do not over-tighten threads.



REPAIRING ALUMINUM COIL

The aluminum coils used in Hussmann merchandisers may be easily repaired in the field. Materials are available from local refrigeration wholesalers.

Hussmann recommends the following solders and technique:

Solders

Aladdin Welding Products Inc.
P.O. Box 7188
1300 Burton St.
Grand Rapids, MI 49507

Phone: 1-800-645-3413

Fax: 1-800-645-3414

X-Ergon

1570 E. Northgate
P.O. Box 2102
Irving, TX 75062

Phone: 1-800-527-9916

NOTE:

Hussmann Aluminum melts at: 1125°F (607°C)

Aladdin 3-in-1 rod at 732°F (389°C)

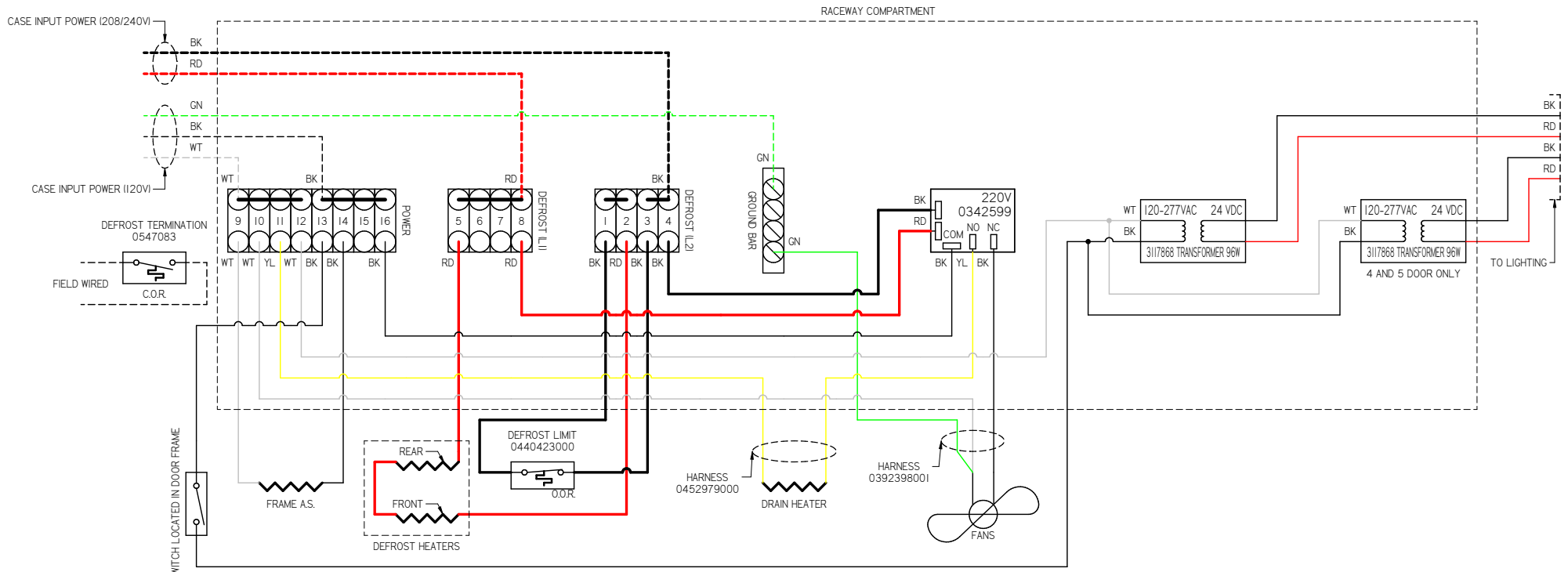
X-Ergon Acid core at 455°F (235°C)

Technique:

1. Locate Leak.
2. REMOVE ALL PRESSURE.
3. Brush area UNDER HEAT.
4. Only Use a PRESTOLITE TORCH. Number 6 tip.
5. Maintain separate set of stainless steel brushes and USE ONLY ON ALUMINUM.
6. Tin surface around area.
7. Brush tinned surface UNDER HEAT, thoroughly filling the open pores around leak.
8. Repair leak. Let aluminum melt solder, NOT the torch.
9. Don't repair for looks. Go for thickness.
10. Perform a leak check.
11. Wash with water.
12. Cover with a good flexible sealant.

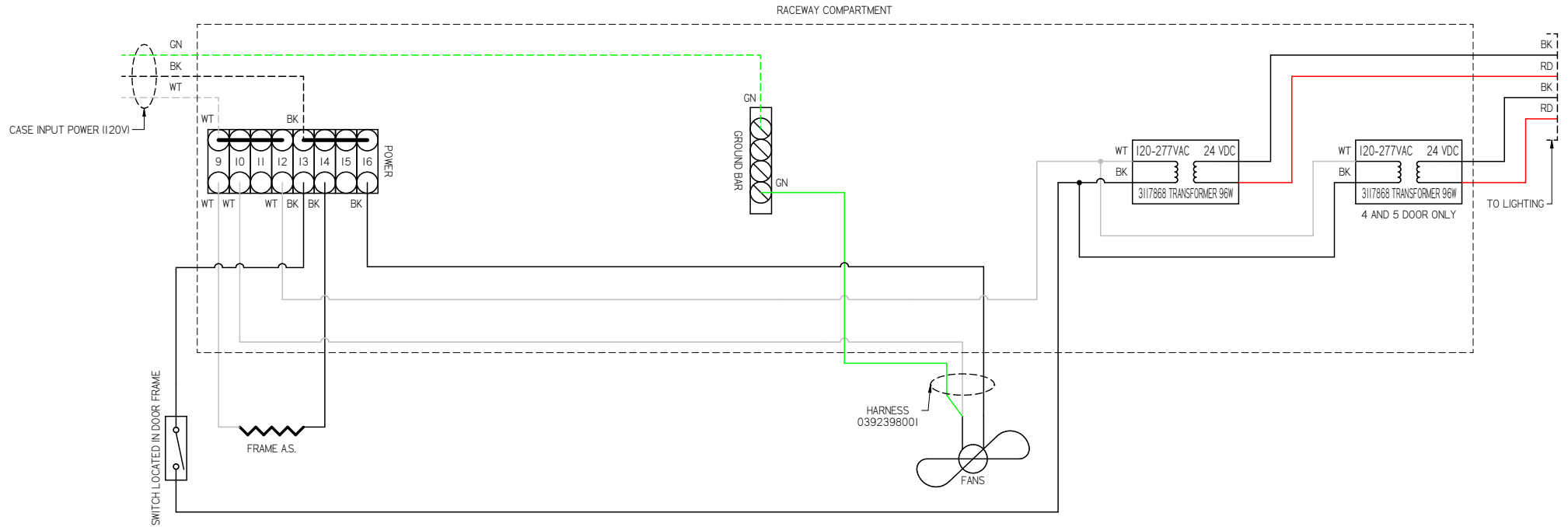
LOW TEMPERATURE CASE WIRING DIAGRAM

This is the standard wiring diagram. See case serial plate and QR code (located on the serial plate) for case-specific wiring options.

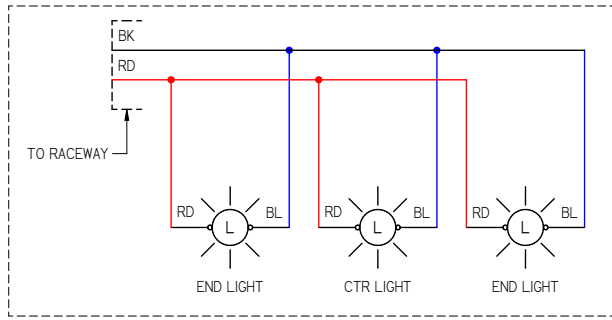


MEDIUM TEMPERATURE CASE WIRING DIAGRAM

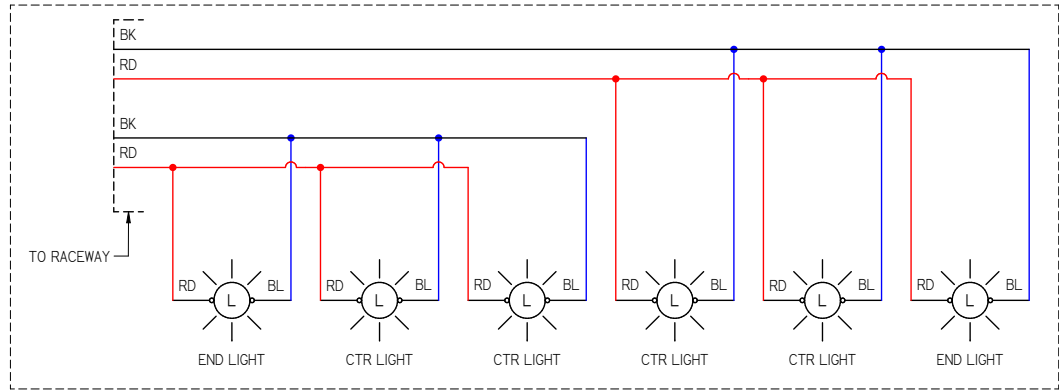
This is the standard wiring diagram. See case serial plate and QR code (located on the serial plate) for case-specific wiring options.



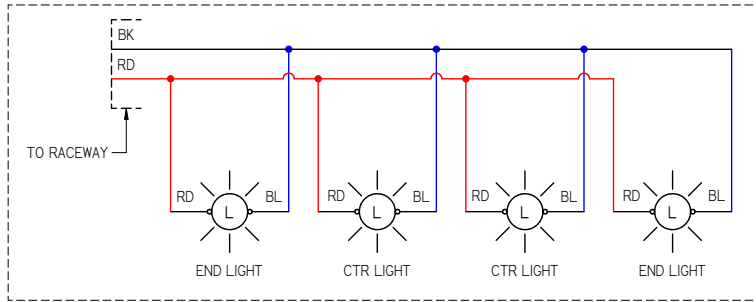
MULLION LED LIGHTING WIRING DIAGRAM



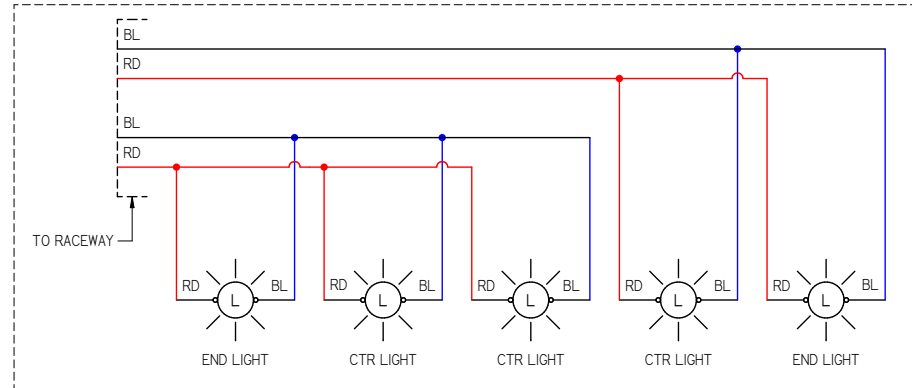
2 DOOR



5 DOOR
TWO POWER SUPPLIES



3 DOOR



4 DOOR
TWO POWER SUPPLIES

DECOMMISSIONING PROCESS

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its details. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample should be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

- a. Become familiar with the equipment and its operation.
- b. Isolate the system electrically.
- c. Before attempting the procedure, ensure:
 - i. Mechanical handling equipment is available, if required, for handling refrigerant cylinders.
 - ii. All personal protective equipment is available and being used correctly.
 - iii. The recovery process is supervised at all times by a qualified, competent person.
 - iv. Recovery equipment and cylinders conform to the appropriate standards.
- d. Pump down refrigerant system, if possible.
- e. If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
- f. Make sure that cylinder is situated on the scales before recovery takes place.
- g. Start the recovery machine and operate in accordance with instructions.
- h. Do not overfill cylinders (no more than 80% volume liquid charge).
- i. Do not exceed the maximum working pressure of the cylinder, even temporarily.
- j. When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
- k. Recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked.

Equipment shall be labeled stating that it has been decommissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing flammable refrigerants, ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

WARRANTY

To obtain warranty information or other support, contact your Hussmann representative or visit: <https://www.hussmann.com/services/warranty>.

Please include the model and serial number of the product.

For questions about your equipment, please contact our Technical Support Team at 1-866-785-8499

For general support or service calls, contact our Customer Support Call Center at 1-800-922-1919

For ordering aftermarket warranty parts, call 1-855-HussPrt (1-855-487-7778) or email the following address:

Hussmann_part_warranty@hussmann.com

REVISION HISTORY

REVISION E — September 2025 - Updated Defrost Thermostats and Sensors, Section 2

REVISION D — May 2025 - Updated Field Electrical Connection Location, Page 2-10; Updated information for cases that use CO₂; Added refrigerant removal, charging, recovery, and system piping procedures;

REVISION C — November 2024 - Updated for UL 60335

REVISION B — May 2023 - Updated pages, 1-4, 2-8 and 4-2

REVISION A — April 2023 - Original Issue



Scan the QR code on your mobile device to access additional product information or order parts using unit serial number.

Parts may also be ordered at:

parts.hussmann.com

Call toll free: 1.855.487.7778