

VRL (120V) *Low Temperature Self Contained Glass Door Merchandisers with R-290 Refrigerant*

WARNINGS:

If the information in these instructions are not followed exactly, a fire or explosion may result, causing property damage, personal injury or death.

Installation and service must be performed by a qualified installer or service agency.

READ THE ENTIRE MANUAL BEFORE INSTALLING OR USING THIS EQUIPMENT.

The unit uses R-290 gas as the refrigerant. R-290 is flammable and heavier than air. It collects first in low areas but can be circulated by the fans. If propane gas is present or even suspected, do not allow untrained personnel to attempt to find the cause. The propane gas used in the unit has no odor. The lack of smell does not indicate a lack of escaped gas. If a leak is detected, immediately evacuate all persons from the store, and contact the local fire department to advise them that a propane leak has occurred. Do not let any persons back into the store until the qualified service technician has arrived and that technician advises that it is safe to return to the store. No open flames, cigarettes or other possible sources of ignition should be used inside or in the vicinity of the units.

**FAILURE TO ABIDE BY THIS WARNING COULD
RESULT IN AN EXPLOSION, DEATH, INJURY AND
PROPERTY DAMAGE.**

IMPORTANT

Keep in store for future reference!



Installation & Operation Manual

P/N 315541_E
December 2023

Spanish 315542



BEFORE YOU BEGIN

Read these instructions completely and carefully.



PERSONAL PROTECTION EQUIPMENT (PPE)

Personal Protection Equipment (PPE) is required whenever installing or servicing this equipment. Always wear safety glasses, gloves, protective boots or shoes, long pants, and a long-sleeve shirt.



1. If the information in these instructions is not followed exactly, a fire or explosion may result, causing property damage, personal injury or death.
2. Installation and service must be performed by a qualified installer or service agency.
3. This unit is designed only for use with R-290 gas as the designated refrigerant.

THE REFRIGERANT LOOP IS SEALED. ONLY A QUALIFIED TECHNICIAN SHOULD ATTEMPT TO SERVICE!

- Propane is flammable and heavier than air.
- It collects first in the low areas but can be circulated by the fans.
- If R-290 (propane) is present or even suspected, do not allow untrained personnel to attempt to find the cause.
- The propane gas used in the unit has no odor.
- The lack of smell does not indicate a lack of escaped gas.
- If a leak is detected, immediately evacuate all persons from the store, and contact the local fire department to advise them that a propane leak has occurred.
- Do not let any persons back into the store until the qualified service technician has arrived and that technician advises that it is safe to return to the store.
- A hand-held propane leak detector (“sniffer”) shall be used before any repair and/or maintenance.
- No open flames, cigarettes or other possible sources of ignition should be used inside the building where the units are located until the qualified service technician and/or local fire department determines that all propane has been cleared from the area and from the refrigeration systems.
- Component parts are designed for propane and non-incendive and non-sparking. Component parts shall only be replaced with identical repair parts.

FAILURE TO ABIDE BY THIS WARNING COULD RESULT IN AN EXPLOSION, DEATH, INJURY AND PROPERTY DAMAGE.

ATTENTION

Merchandiser must operate for 24 hours
before loading product!

Regularly check merchandiser temperatures.

Do not break the cold chain. Keep products in
freezer before loading into merchandiser.

These merchandisers are designed
for only pre-frozen products.



IMPORTANT
KEEP IN STORE FOR FUTURE REFERENCE
Quality that sets industry standards!

12999 St. Charles Rock Road • Bridgeton, MO 63044-2483

U.S. & Canada 1-800-922-1919 • Mexico 1-800-890-2900

www.hussmann.com

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REVISION HISTORY

REVISION E

Updated warning and refrigerant recovery steps, page 23.

REVISION D

Added solid shelf installation for VRL3; Added 3-door case; added service replacement info for inverter, condenser motor, compressor, and solenoid valves

REVISION C

Added 3-door case; added service replacement info for inverter, condenser motor, compressor, and solenoid valves

REVISION B

Added the 2-door case


ORIGINAL ISSUE — NOVEMBER 2021

ATTENTION


Adjust closing torque by turning the bottom hinge pin in the direction the door closes.


Use a 1/2 inch (13 mm) wrench, and turn the hinge pin until the door closes on its own.


Usually it takes two clicks or a half turn.



ANSI Z535.5 DEFINITIONS

- 
• **DANGER** – Indicate[s] a hazardous situation which, if not avoided, will result in death or serious injury.

- 
• **WARNING** – Indicate[s] a hazardous situation which, if not avoided, could result in death or serious injury.

- 
• **CAUTION** – Indicate[s] a hazardous situation which, if not avoided, could result in minor or moderate injury.

- **NOTICE** – *Not related to personal injury* – Indicates[s] situations, which if not avoided, could result in damage to equipment.

FOR CALIFORNIA INSTALLATIONS ONLY:


WARNING:

Cancer and Reproductive Harm

www.P65Warnings.ca.gov

August 31, 2018
3069575


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.


CAUTION

Do NOT remove shipping crate until the merchandiser is positioned for installation.


CAUTION

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


WARNING

Case ventilation openings must be clear of any obstructions. Do not damage the refrigerant circuit.

INSTALLATION

NSF LISTING

These merchandisers are manufactured to meet ANSI / UL 471 standard requirements for safety. Proper installation is required to maintain this listing. Near the serial plate, each case carries a label identifying the type of conditions for which the merchandiser was tested.

ANSI/NSF-7 Type II – Display Refrigerator / Freezer Intended for 80°F / 55% RH Ambient Application

ANSI/NSF-7 – Display Refrigerator Intended for Bulk Produce

FEDERAL / STATE REGULATION

These merchandisers, at the time they are manufactured, meet all federal and state / provincial regulations.

HUSSMANN PRODUCT CONTROL

The serial number and shipping date of all equipment is recorded in Hussmann's files for warranty and replacement part purposes. All correspondence pertaining to warranty or parts ordering must include the serial number of each piece of equipment involved. This is to ensure the customer is provided with the correct parts.

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

If there is an obvious loss or damage, it must be noted on the freight bill or express receipt and signed by the carrier's agent; otherwise, carrier may refuse claim.

Concealed Loss or Damage

When loss or damage is not apparent until after equipment is uncrated, retain all packing materials and submit a written response to the carrier for inspection within 15 days.

LOCATION

These merchandisers are designed for displaying products in air conditioned stores where temperature is maintained at or below the ANSI / NSF-7 specified level and relative humidity is maintained at or below 55%.

| |
|--------------------------------------------------------------------------------------------------------------------------------------|
| <p>Recommended operating ambient temperature is between 60°F (15.6°C) to 80°F (26.7°C). Maximum relative humidity is 55%.</p> |
|--------------------------------------------------------------------------------------------------------------------------------------|

Placing refrigerated merchandisers in direct sunlight, near hot tables or near other heat sources could impair their efficiency. Like other merchandisers, these merchandisers 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 merchandiser.

6 INSTALLATION

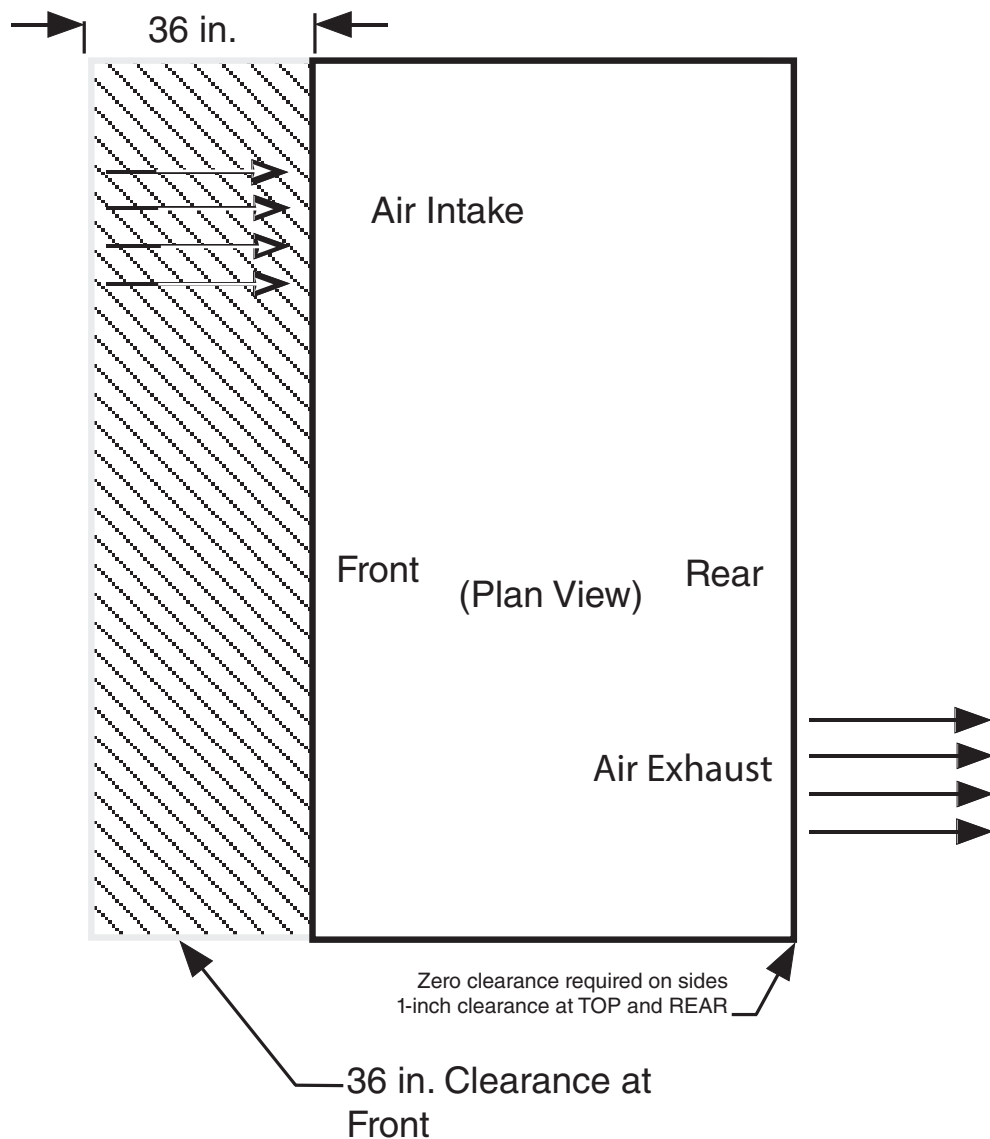
SELF CONTAINED (LOCATION)

Product should always be maintained at 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 the life of the product.

BE SURE TO POSITION SELF CONTAINED MERCHANDISERS PROPERLY.

VRL models have vented base panels to allow air circulation through the condensing unit.

Allow for a minimum 36 in. clearance in the front. Blocking or restricting air flow will adversely affect performance and may damage the refrigeration system.



UNLOADING

Unloading from Trailer:

Lever Bar (also known as a Mule, Johnson Bar, J-Bar, Lever Dolly, or Pry Lever)

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

Improper handling may cause damage to the merchandiser when unloading. To avoid damage:

1. Do not drag the merchandiser out of the trailer. Use a Johnson bar (Mule).
2. Use a forklift or dolly to remove the merchandiser from the trailer.



EXTERIOR LOADING

Do NOT walk on top of the merchandiser or damage to the merchandisers and serious personal injury could occur.

MERCHANDISERS ARE NOT STRUCTURALLY DESIGNED TO SUPPORT EXCESSIVE EXTERNAL LOADING such as the weight of a person. Do not place heavy objects on the merchandiser.

SHIPPING SKID

Each merchandiser is shipped on a skid to protect the merchandiser's base and to make positioning the case easier.

Remove the top of the crate and detach walls from each other (if applicable). Lift crate from the skid. Unscrew the case from the skid. The merchandiser can now be lifted off the crate skid. **Lift only at base of skid!** Remove any braces and/or skids attached (blanket wrapped merchandiser may have skids).

DO NOT TILT MERCHANDISER ON ITS SIDE OR END WHEN REMOVING SKID.

Once the skid is removed, the merchandiser must be lifted —NOT PUSHED— to reposition. To remove the skid, remove screws attaching skid to the merchandiser.

Check floor where merchandisers are to be set to if it is a level area. Determine the highest part of the floor.

MODEL DESCRIPTION

VRL merchandisers are low temperature self-contained cabinets, designed for pre-packaged frozen food or products that require frozen temperatures for conservation.

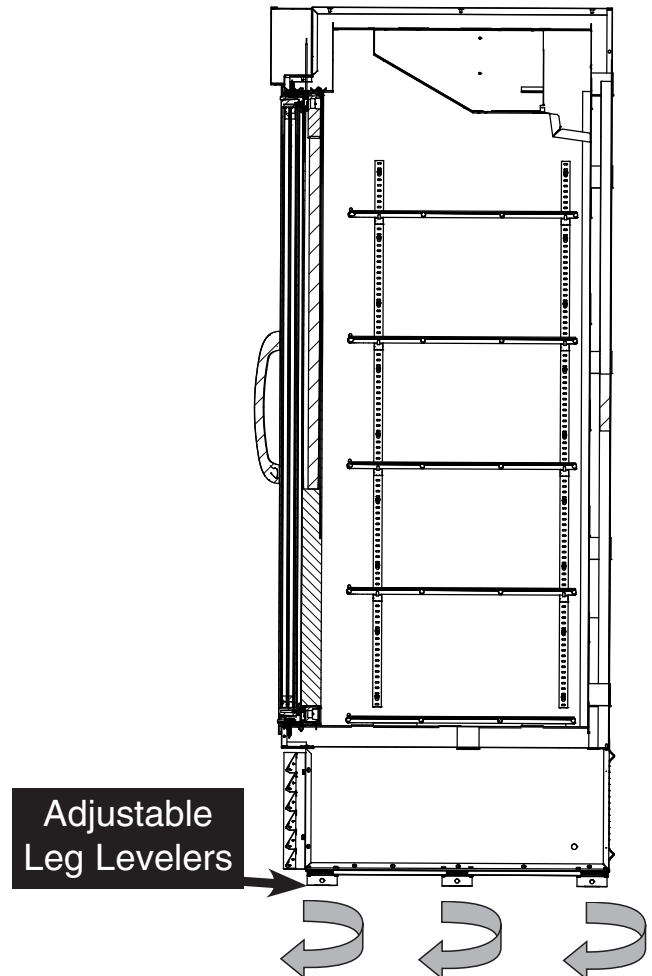
Design Features:

- Contemporary styling places maximum attention on merchandising
- All VRL merchandisers have the same access panel design for commonality between merchandisers
- Self-closing Innovator doors. Positive seal, torsion type closure system
- Triple-pane thermal insulated glass door assemblies
- Magnetic door gaskets of one-piece construction, removable without tools for ease of cleaning
- Merchandiser can be placed against wall - no air gap is required behind the case
- Digital display in center of case air grille

CABINET LEVELING

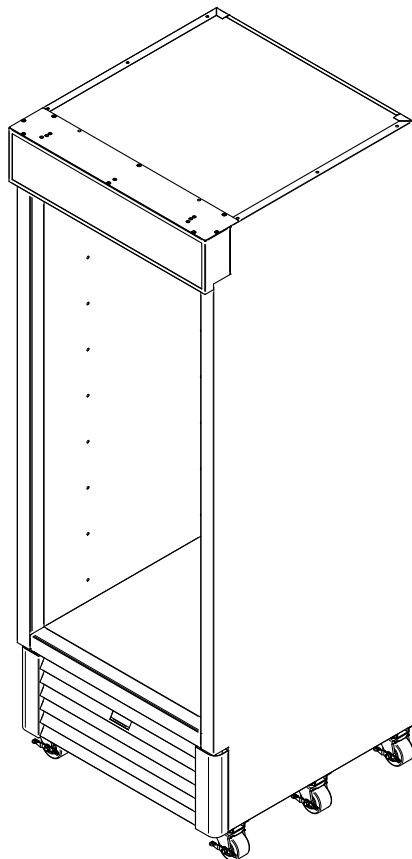
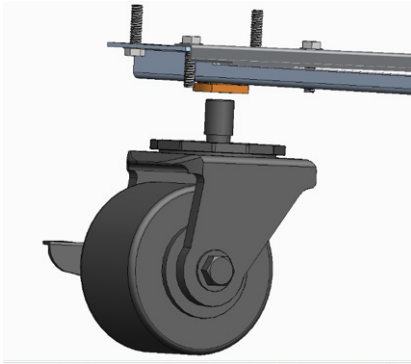
This merchandiser must be installed level (from back to front, and side to side) to allow maximum draining of the condensate water as well as proper door alignment and operation. Choose a level area to install case.

These cases have adjustable leg leveler at center front and back. Turn the leg levelers clockwise to add length to each leg for leveling.



CASTERS

When optional casters are used, screw them tight to the merchandiser base. Once in final position, lock each caster. This option is a ship loose kit. As a standard offering, this merchandiser is fabricated with hockey puck style leveler.

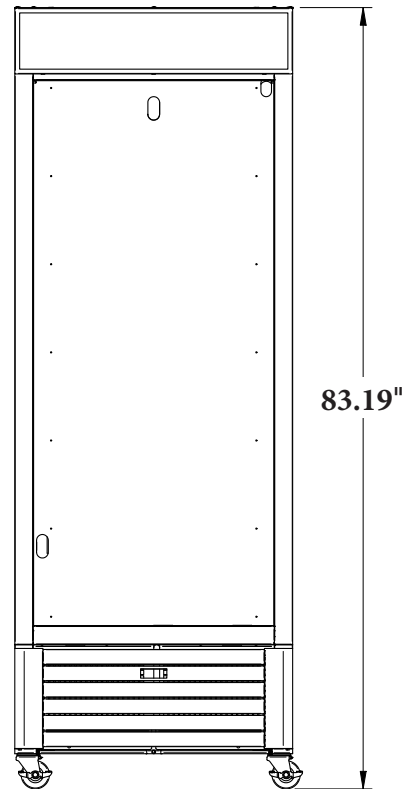
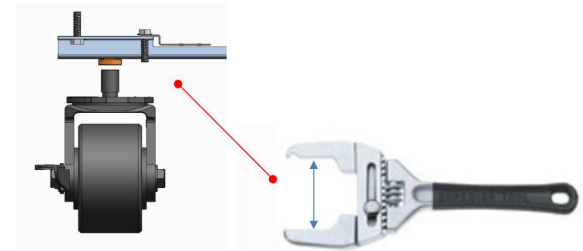


FIELD REQUIRED TOOLS

Pry (J) bar to lift up case to remove leg levelers.



Make sure the adjustable wrench used has a minimum opening of 2 5/16".

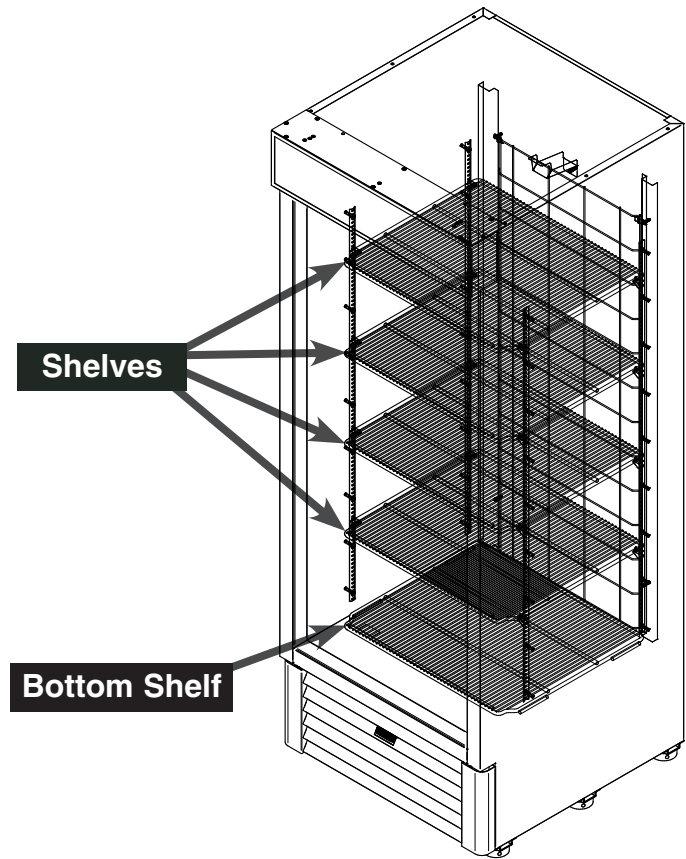


(1-door model shown)
Case height is the same for
1, 2 and 3-door case models

SHELF AND WIRE PRODUCT STOP INSTALLATION

After the cabinet is leveled, the shelves may be installed. Wire shelves are adjustable. Shelf spacing can be adjusted by positioning the shelf clips according to individual loading requirements.

VRL merchandisers have four movable wire shelves and one bottom wire shelf per door as a standard option. Extra shelves can be ordered as optional kits.



SOLID SHELF INSTALLATION

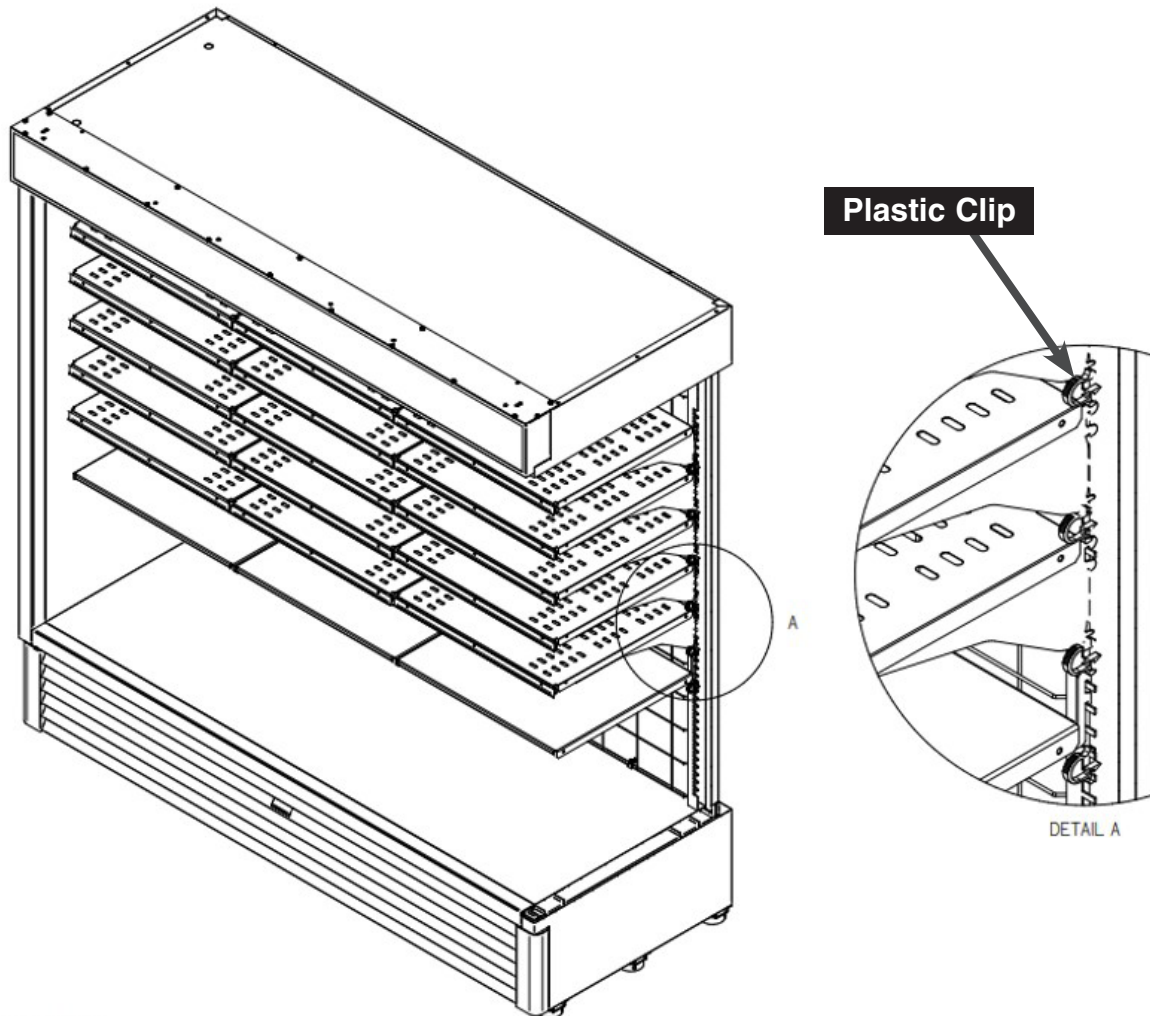
Solid shelf shown in these instructions only applies to VRL3B1A merchandiser models.

The illustration below shows the arrangement of shelves shipped from the factory. Shelves must be repositioned to ensure proper air circulation and refrigeration performance.

Remove the plastic clips from the shelves after placing the case in its final location. Shelf repositioning is shown on the next page.

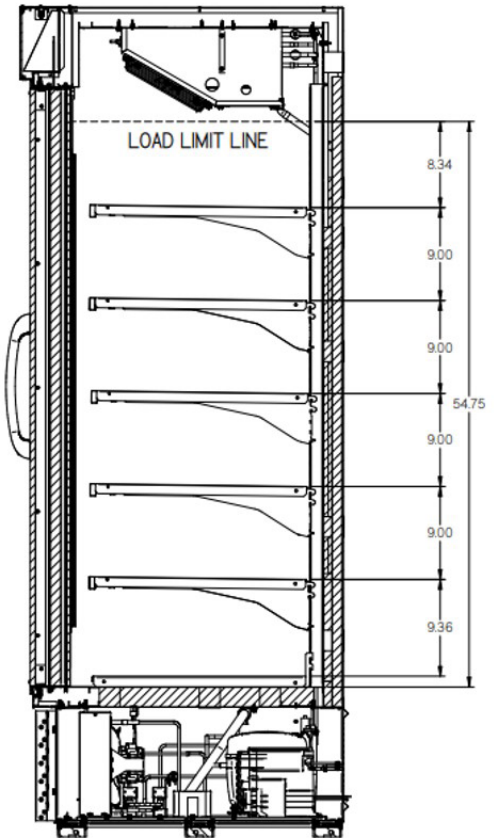
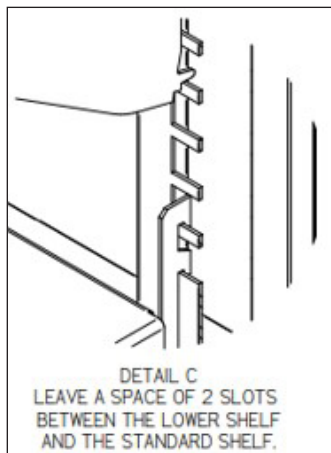
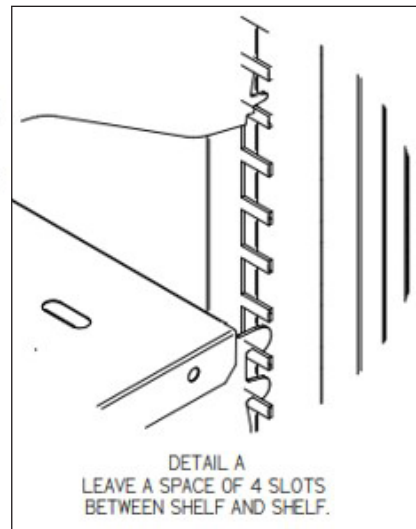
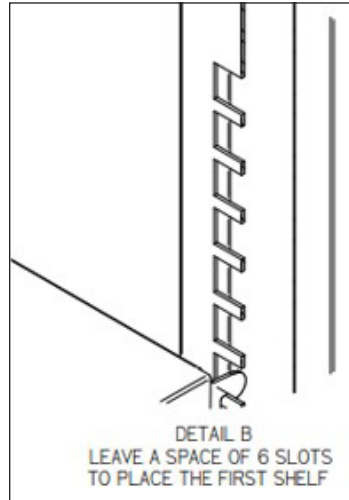
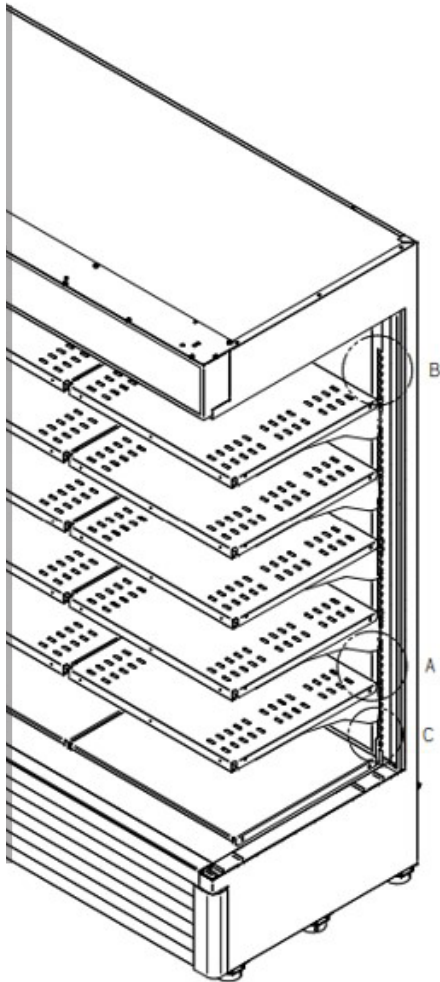
This model is specially designed for use with five standard shelves and one bottom shelf as it was shipped from the factory. Do not add additional shelving. Use of unauthorized specialty shelving or additional shelving will hamper refrigeration performance.

Please consult your Hussmann representative to ensure the optimum performance of all Hussmann equipment.



Begin installing shelves at the lowest row. Insert the shelf into the slots. Be sure to count the number of slots between shelves as shown in the illustrations below. Tabs must be seated firmly into position.

- Leave two slots between the lower shelf and the standard shelf (Detail C).
- Leave four slots between the lower shelf and the shelf to be installed above it (Detail A).
- The top shelf should have six slots shown above it (Detail B).



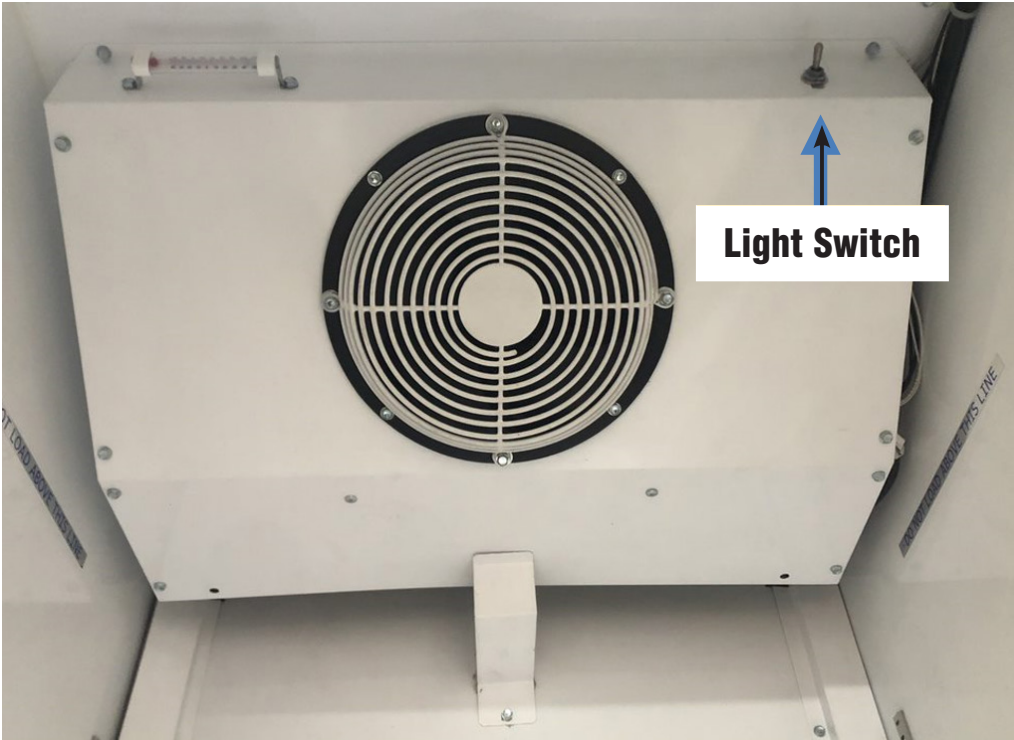
Case cross-section view shows the recommended distance between each shelf, allowing the proper airflow along the cabinet.

CAUTION

Shelves are designed to support a maximum load of 150 lbs. Exceeding this load can cause damage to the shelves, case, damage to store products, and potentially create a hazardous condition for customers and store personnel.

LAMPS

The light switch for the lamps is located at the top of the fan plenum on the righthand side as shown below. The switch controls the display lighting and interior lighting.



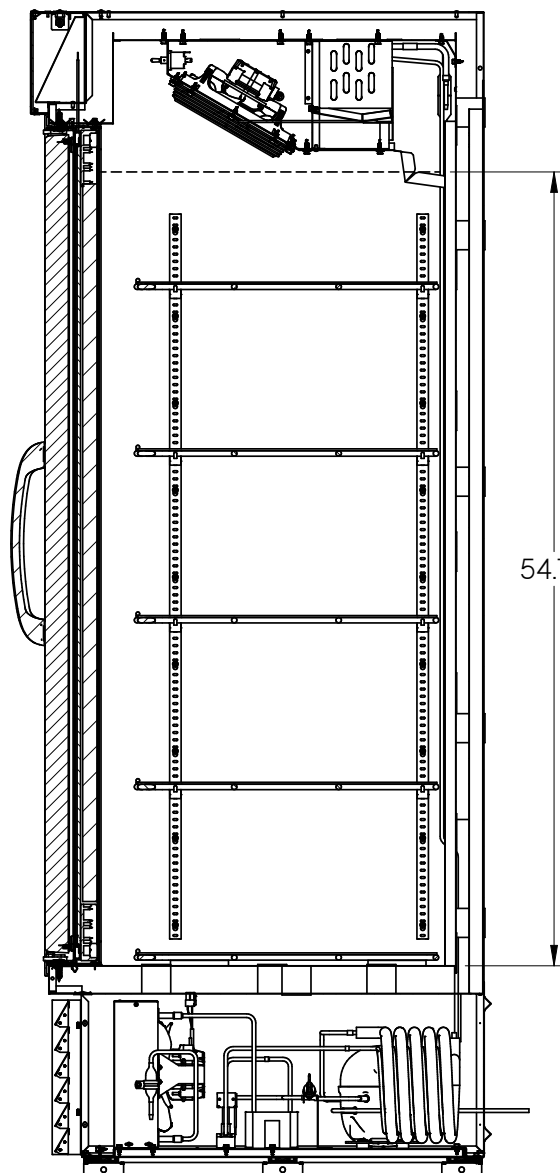
(1-door model shown) light switch location is in similar location for all models - right hand side of the fan plenum

STOCKING

Product should NOT be placed in case until merchandiser is at proper operating temperature. **The VRL merchandisers must remain in operation for at least 24 hours before product may be loaded into case cabinet.** 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 EXHAUST AND RETURN GRILLE MUST REMAIN OPEN AND FREE OF OBSTRUCTION AT ALL TIMES.

Do not allow product, packages, signs, etc. to block air exhaust or return grille. Do not use non-approved shelving, baskets, display racks, or any accessory that could hamper air curtain performance.



SECTION A-A

LOAD LIMITS

Product must be within designated load limit to ensure proper refrigeration and air curtain performance.

DO NOT VIOLATE THE LOAD LIMIT LINES OF VRL CASES. PRODUCT WILL BLOCK THE COLD AIR FLOW.

54.75 Load Limit for VRL Merchandisers

Hussmann Self-Contained Refrigeration Equipment Start Up Check List

Please note that failure to follow this start-up document may void your factory warranty

| Step | Startup Activity | Check |
|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| 1 | Locate, read and maintain install/operation manual in a safe place for future reference. | <input type="checkbox"/> |
| 2 | Examine unit. Confirm there is NO damage or concealed damage. | <input type="checkbox"/> |
| 3 | Level the unit, side to side and front to rear. | <input type="checkbox"/> |
| 4 | Remove all shipping brackets/compressor straps/bolts etc. | <input type="checkbox"/> |
| 5 | Unit must be run on a dedicated electrical circuit without the use of an extension cord. | <input type="checkbox"/> |
| 6 | Ensure that the proper electrical requirements for the equipment are supplied. | <input type="checkbox"/> |
| 7 | Verify field electrical connections are tight. | <input type="checkbox"/> |
| 8 | Verify all electrical wiring is secured and clear of any sharp edges or hot lines. | <input type="checkbox"/> |
| 9 | Verify the condensate drain line is properly trapped and pitched. Ensure condensate drain tube is properly located against condensate pan. | <input type="checkbox"/> |
| 10 | Verify all required clearances on the sides and back of unit. | <input type="checkbox"/> |
| 11 | Verify there are no air disturbances external to the unit. Heat and air registers, fans, and doors etc. | <input type="checkbox"/> |
| <p>Advise owner/operator that merchandiser must operate at temperature for 24 hrs prior to loading with product.</p> | | |

Form HSCW01 Rev. 30MAY12 P/N 0525209_B

LEGAL DISCLAIMER:

Hussmann shall not be liable for any repair or replacements 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.

ELECTRICAL / REFRIGERATION / CONTROLLER

PLUG

These merchandisers use a single, 9 ft. power cord and plug.

1 and 2-door case models use a NEMA 5-15P (plug). 3-door models use a NEMA 5-20P.

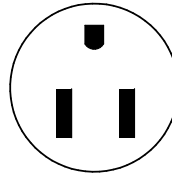
The plug is located on the right-hand side at the rear of the merchandiser.

Disconnect power before servicing. VRL merchandisers require a dedicated electrical circuit with ground. 12AWG is the minimum-sized acceptable wire.

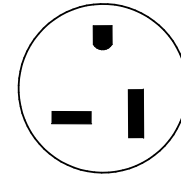
- Always use a dedicated circuit with the amperage stated on the unit.
- Plug into an outlet designed for the plug.
- Do not overload the circuit.
- Never use extension cords or adapters.
- If in doubt, call an electrician.

| Nominal Voltage | Minimum Voltage | Maximum Voltage |
|-----------------|-----------------|-----------------|
| 110-120 | 110 | 120 |

ALWAYS CHECK THE SERIAL PLATE FOR COMPONENT AMPERES



NEMA 5-15P
115V 60Hz
(1 and 2-door case models)



NEMA 5-20P
115V 60Hz
(3-door case models)

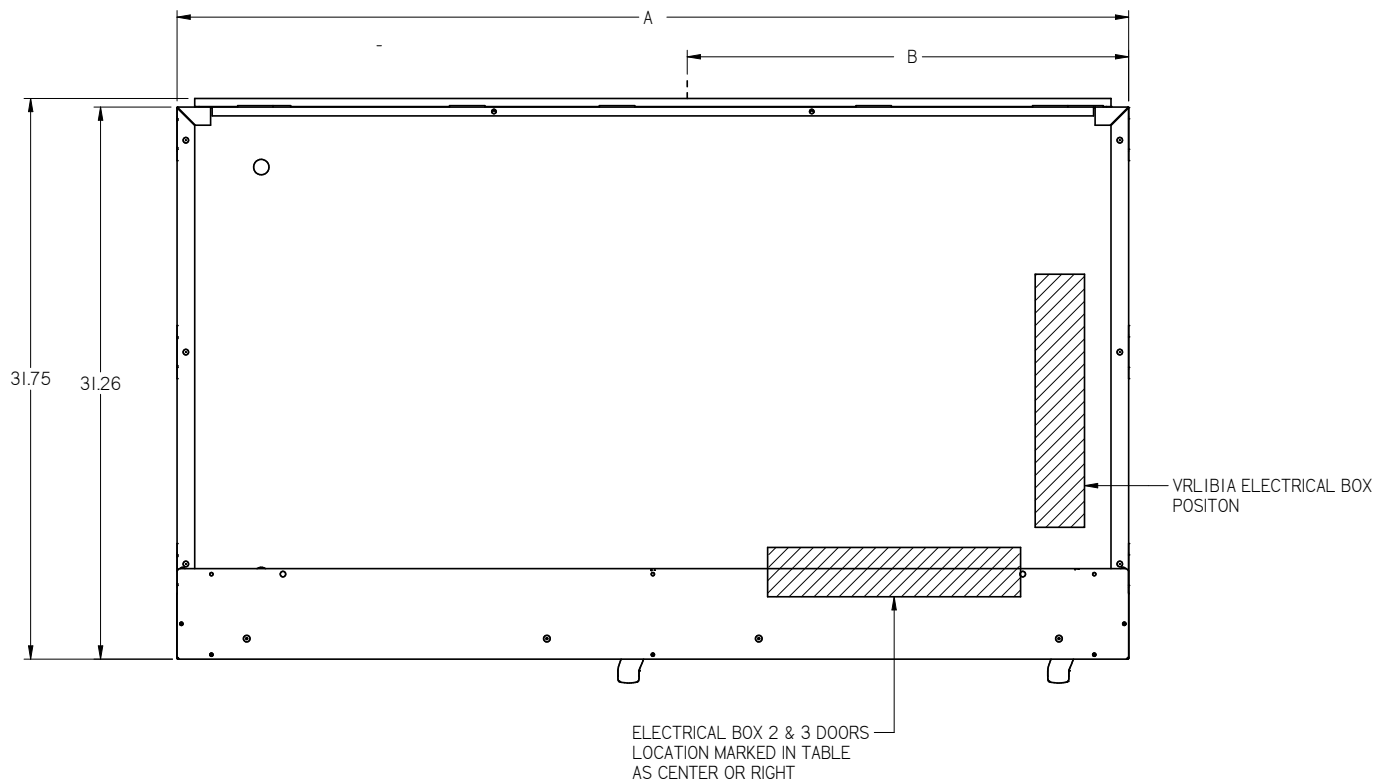
! WARNING
Merchandiser must be grounded.
Do not remove the power supply cord ground.

! CAUTION
Risk of Electric Shock. If cord or plug becomes damaged, replace only with a cord and plug of the same type.

! WARNING
— 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.

ELECTRICAL BOX & POWER CORD LOCATION

| VRLBIA CASES GENERAL DIMENSIONS | | | |
|---------------------------------|--------------|------------|---------------|
| General dimensions | 1 DOOR | 2 DOOR | 3 DOOR |
| Case Length (A) | 29 5/8 (752) | 54 (1372) | 78 1/4 (1988) |
| Power cord outlet (B) | 14 3/4 (375) | 2 3/4 (70) | 2 3/4 (70) |
| Electrical box (C) | RIGHT | RIGHT | CENTER |



**REFRIGERATION SYSTEM
FUNCTIONALITY**

These cases can be used for frozen food. These merchandiser model is self-contained and has a controller that automates the refrigeration cycle and the defrost cycle.

During refrigeration mode, the discharge line solenoid valve (RSV) is energized and held open, allowing the gas to flow through the condenser.

Once the refrigerant is in a liquid state, a capillary tube is used as an expansion device that feeds the evaporator.

During refrigeration mode, hot gas solenoid valve (HGSV) is deenergized and closed.

**Figure A. System Diagram— Refrigeration Mode
(This diagram is applicable for both 1 and 2-door models)**

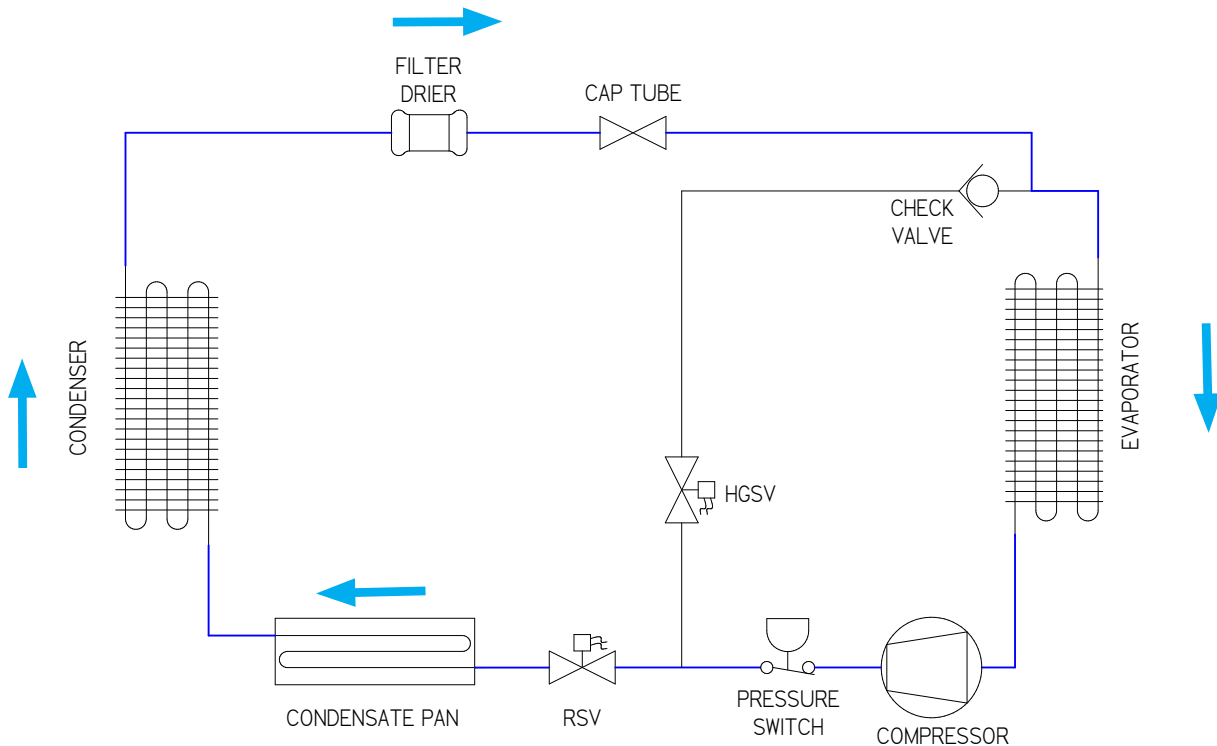
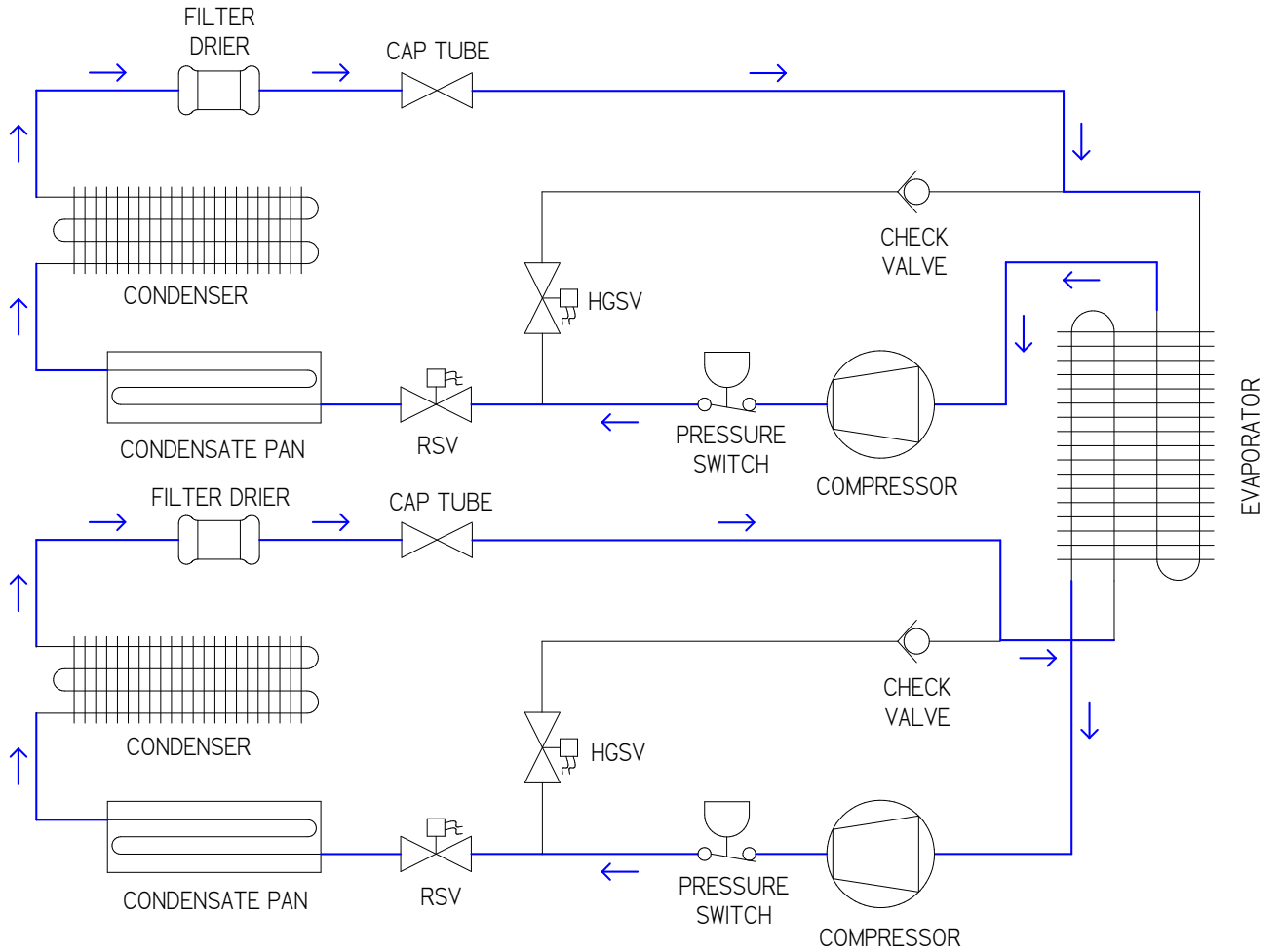


Figure B. System Diagram— Refrigeration Mode
(This diagram is applicable for 3-door models)



REFRIGERATION SYSTEM FUNCTIONALITY (Continued)

During defrost mode, the defrost solenoid valve (HGSV) is energized and held open allowing the gas to be redirected through the evaporator inlet. The evaporator is split and circuited for 2 refrigeration circuits.

Defrost cycle is temperature-terminated with a failsafe that is 50 minutes. Normally only 3 defrost per day are required.

**Figure C. System Diagram – Defrost Mode – Hot Gas Bypass
(This diagram is applicable for both 1 and 2-door case models)**

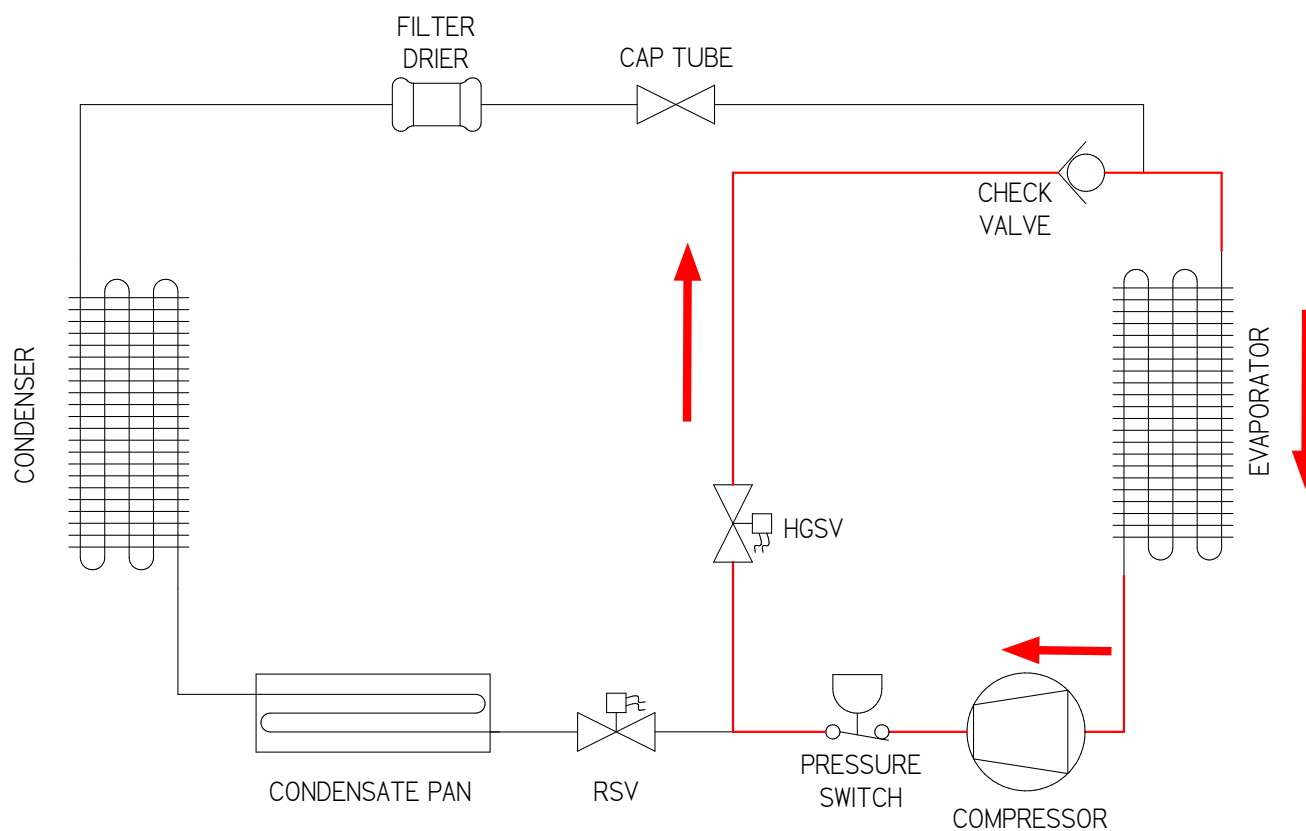
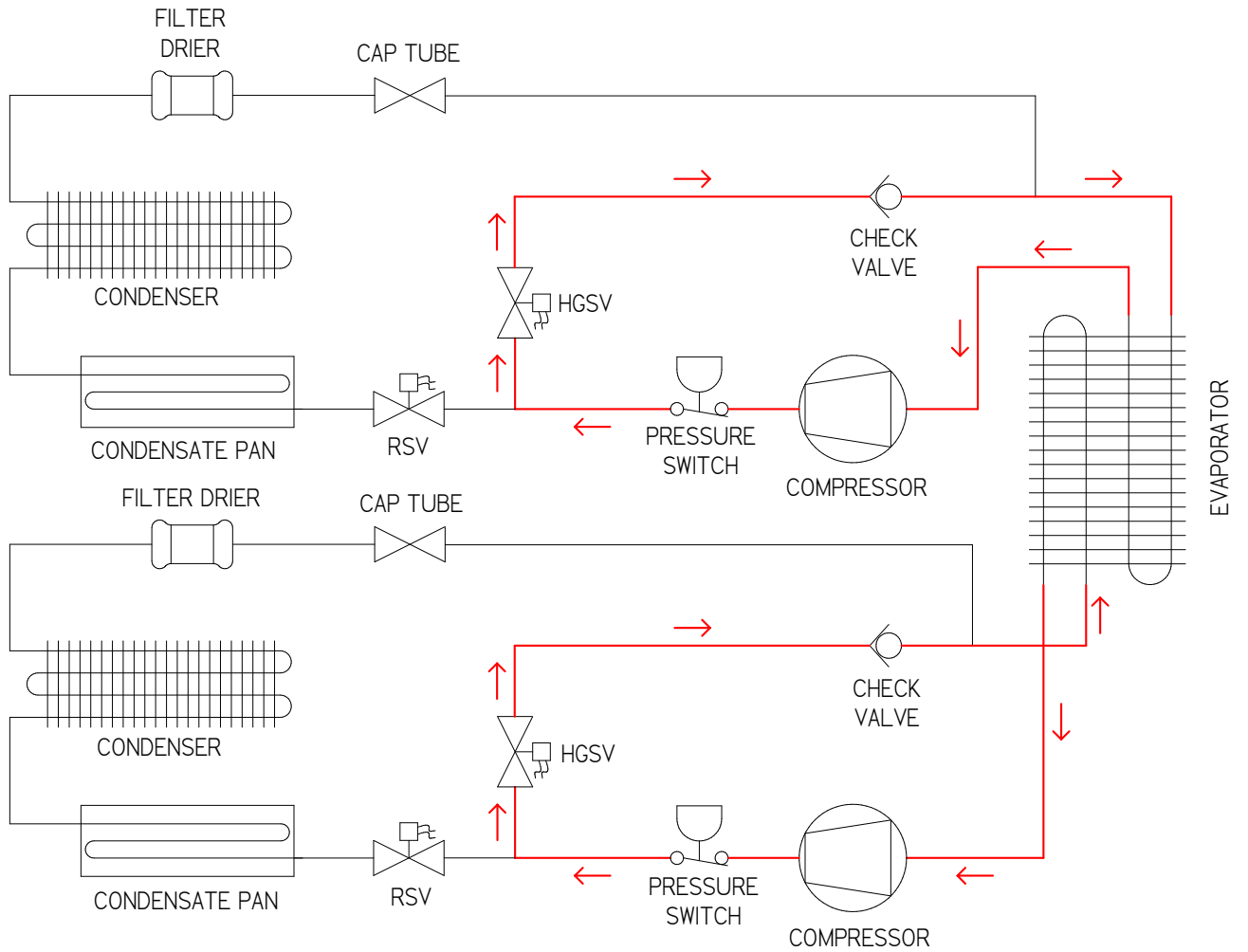


Figure D. System Diagram – Defrost Mode – Hot Gas Bypass
(This diagram is applicable for 3-door case models)



Before Beginning Any Service or Repair:

Use a hand-held propane leak detector (“sniffer”) to ensure no propane is present in the immediate area, the inside of the display case and the inside of the refrigeration system. R-290 is an odorless refrigerant. Keep the area clear of all customers and non-essential or unauthorized personnel.

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.

Failure to do so can result in an explosion, death, injury and property damage. Parts used on hydrocarbon cases must meet specific UL certification for non-incendive or non-sparking components. Use only Hussmann approved parts approved through the Hussmann Performance Parts Website. <https://parts.hussmann.com/>

Brazing must not begin before all propane has been cleared from the immediate area — the inside of the displays case and the inside of the refrigeration system.

If a leak is detected, follow store safety procedures. It is the store’s responsibility to have a written safety procedure in place. The safety procedure must comply with all applicable codes such as local fire department’s codes.

At minimum, the following actions are required:

- Immediately evacuate all persons from the store, and contact the local fire department to advise them that a propane leak has occurred.
- Call Hussmann and/or a qualified service agent and inform them that a propane sensor has detected the presence of propane.
- Do not let any persons back into the store until the qualified service technician has arrived and that technician advises that it is safe to return to the store.

WARNING

Only Hussmann or factory trained technicians should service or repair this R-290 (propane) equipment.

Failure to follow instructions can result in an explosion, death, injury and property damage.

- The propane gas used in the unit has no odor. The lack of smell does not indicate a lack of escaped gas.
- A hand-held propane leak detector (“sniffer”) should be used before any repair and/or maintenance is attempted. All repair parts must be identical models to the ones they are replacing.
- No open flames, cigarettes or other possible sources of ignition should be used inside the building where the units are located until the qualified service technician and/or local fire department determines that all propane has been cleared from the area and from the refrigeration systems.

REPLACING REFRIGERATION SYSTEM COMPONENTS

! DANGER

Only Hussmann service technicians or technicians qualified to handle R-290 (propane) refrigerant should service or repair this R-290 (propane) equipment. Failure to follow instructions can result in an explosion, death, injury and property damage.

! WARNING

This refrigeration system uses hot gas defrost and incorporates a Normal Closed Solenoid. In order to remove all the refrigerant for service, the valve must be held open while the refrigerant is being evacuated. Failure to remove all the refrigerant can cause a fire or explosion.

Make sure the system is purged through all access ports (red marked). Components should be cut-out (tubing cutters) as opposed to using a torch.

STEPS TO RECOVER REFRIGERANT

1. Make sure you are in a well ventilated area before making any service or repair to the refrigeration system.
2. Disconnect all power sources from the system. Some systems may have more than one plug or power supply.
3. Tap system with line tap valves, attaching gauges to the high and low sides of the system.



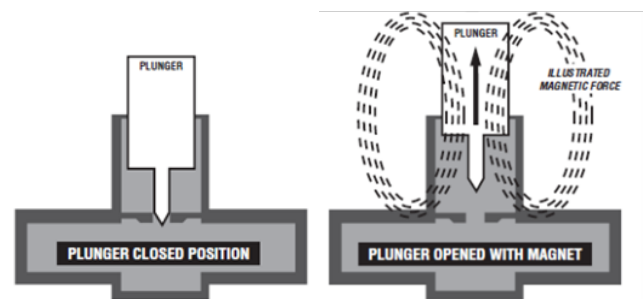
refrigeration
line tapping
valve

4. Secure so that the solenoid valves are open to correct evacuation; use a recommended tool (solenoid valve magnet). Place solenoid magnet over the enclosing tube, which creates a magnetic field to lift the plunger and stem assembly. This is strongly recommended during refrigerant recovery and evacuation process. Recommended suppliers for the use of solenoid valve magnet as a field tool to operate manually solenoid valve:

1. JB
2. YELLOW JACKET
3. CPS



5. Connect hose to an evacuated recovery tank. Open refrigeration gauges and recovery tank.



6. With the suction valve in vacuum, the refrigerant will be recovered into the recovery tank.
7. Once recovered, close the tank valve and remove the gauge from the tank and connect nitrogen tank to the system to purge it with nitrogen.
8. Pull vacuum to a minimum of 200 microns or lower.

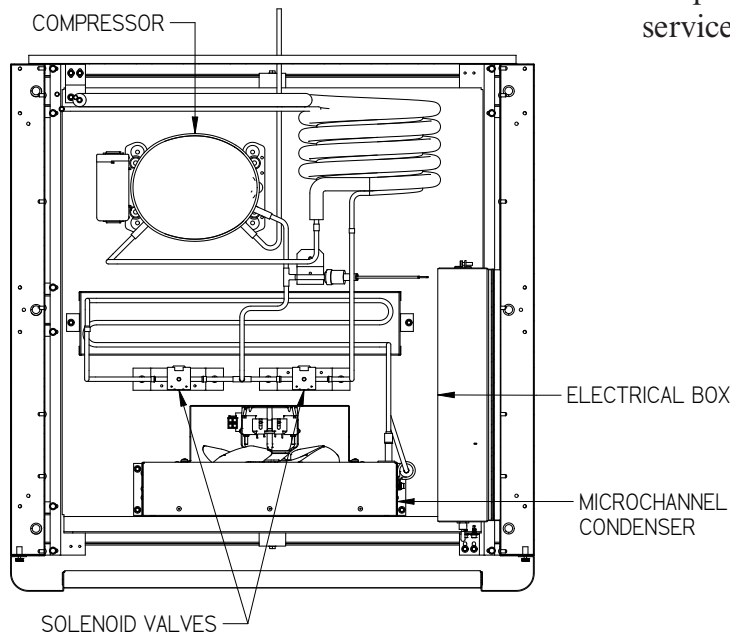
CHARGING

A calibrated scale with +/-2 gram accuracy must be used to charge the system. The charge amount is shown on the serial plate. Only R-290 grade refrigerant can be used. Standard propane does not meet the purity/moisture content of R-290, and therefore cannot be used to charge cases.

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 R-290 (propane) 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.



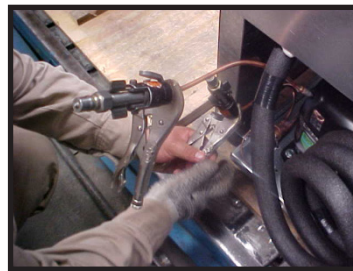
(1-door case shown)

WARNING

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.

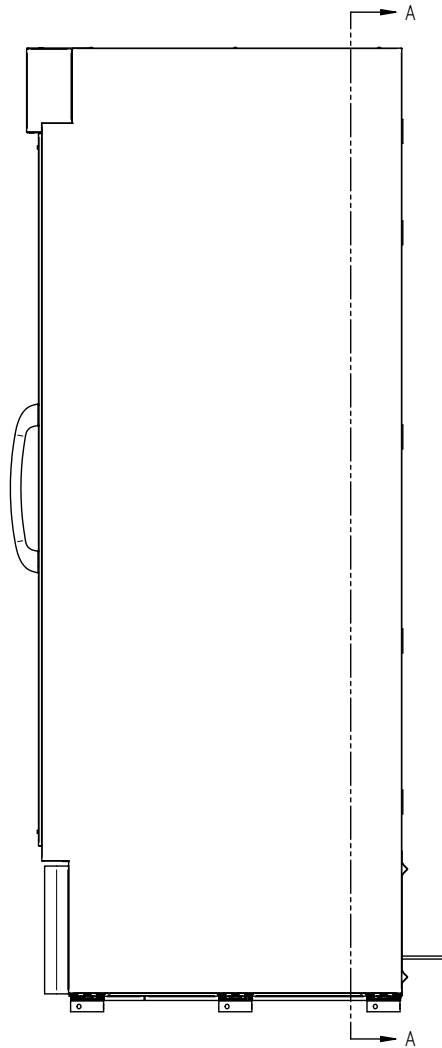
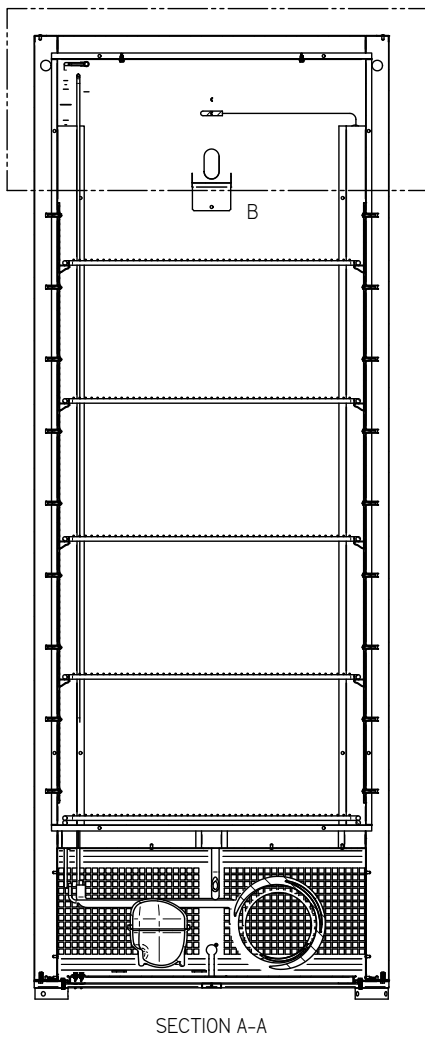
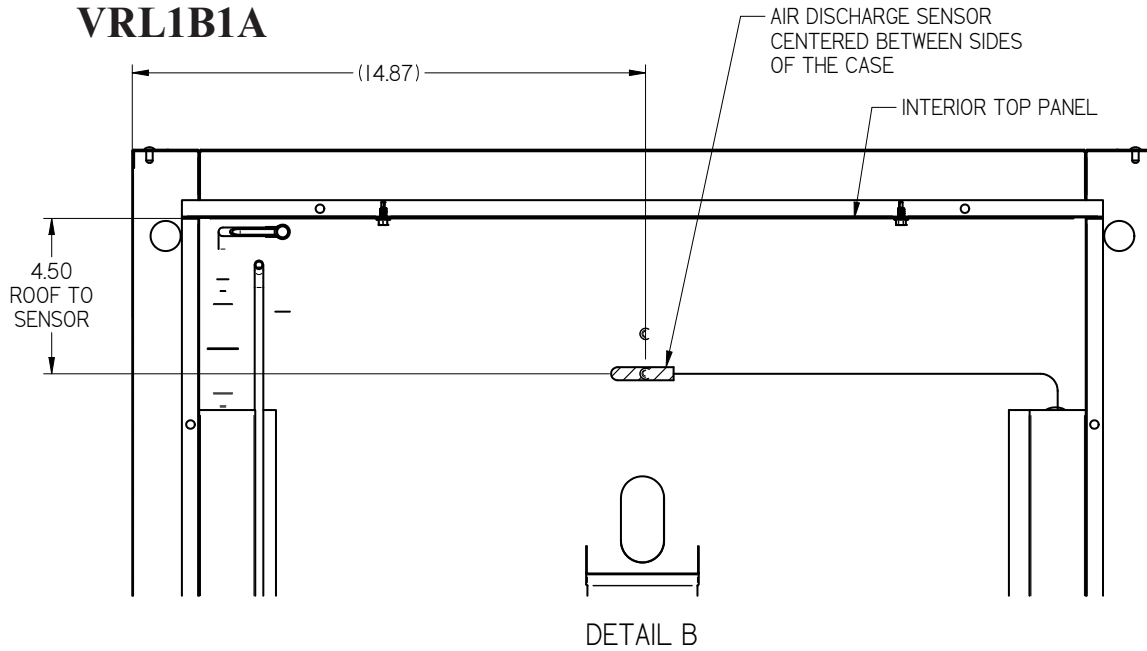
Extreme care must be taken not to overfill the refrigeration system. After charging, carefully disconnect the hoses, attempting to minimize the quantity of refrigerant released. Further leak check the service ports, hoses, refrigerant tanks. The service ports shall be checked for leaks using a hydrocarbon leak detector with a sensitivity of 3 grams/year (0.106 Oz/year) leak rate.

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.

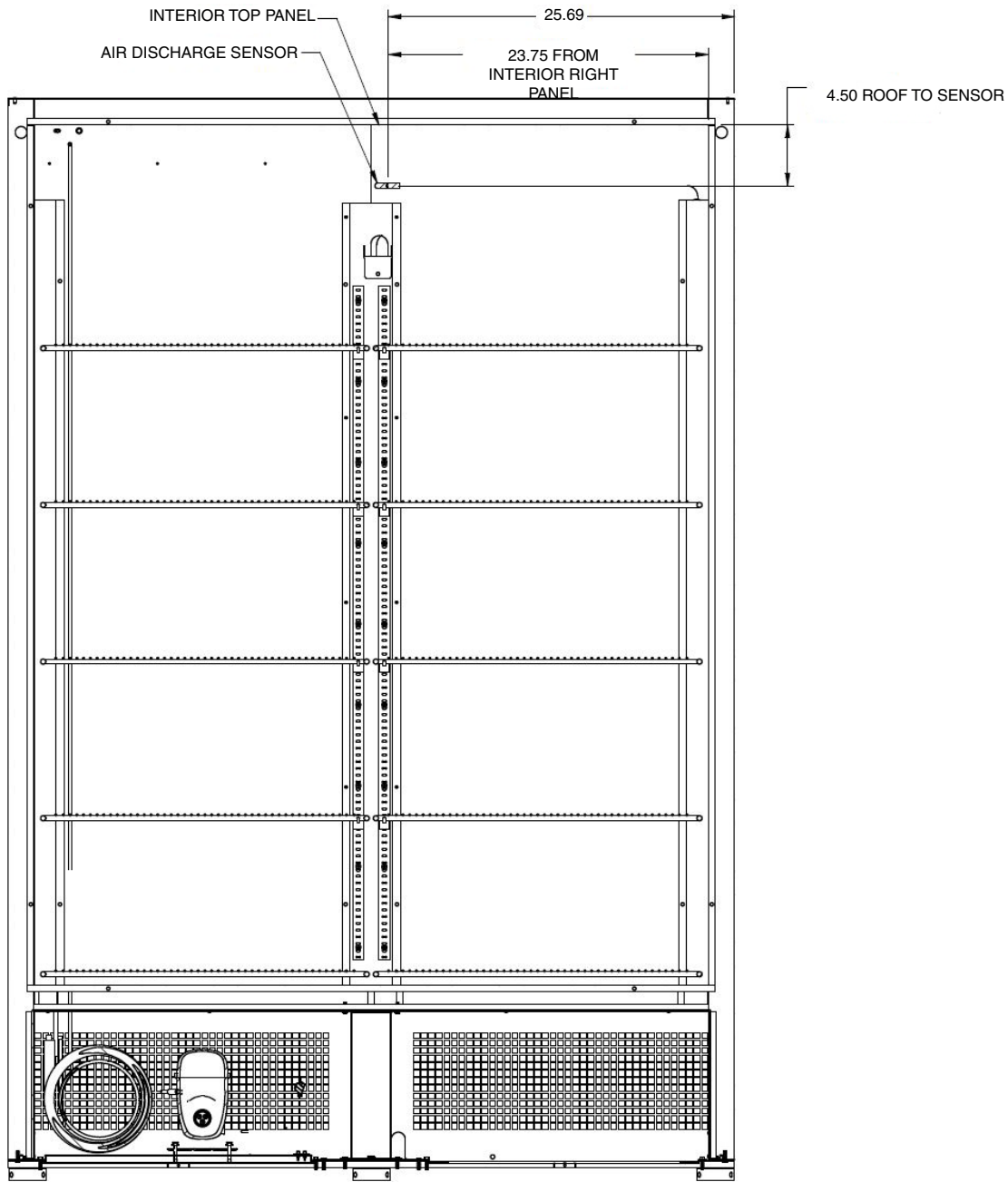


DISCHARGE SENSOR LOCATION

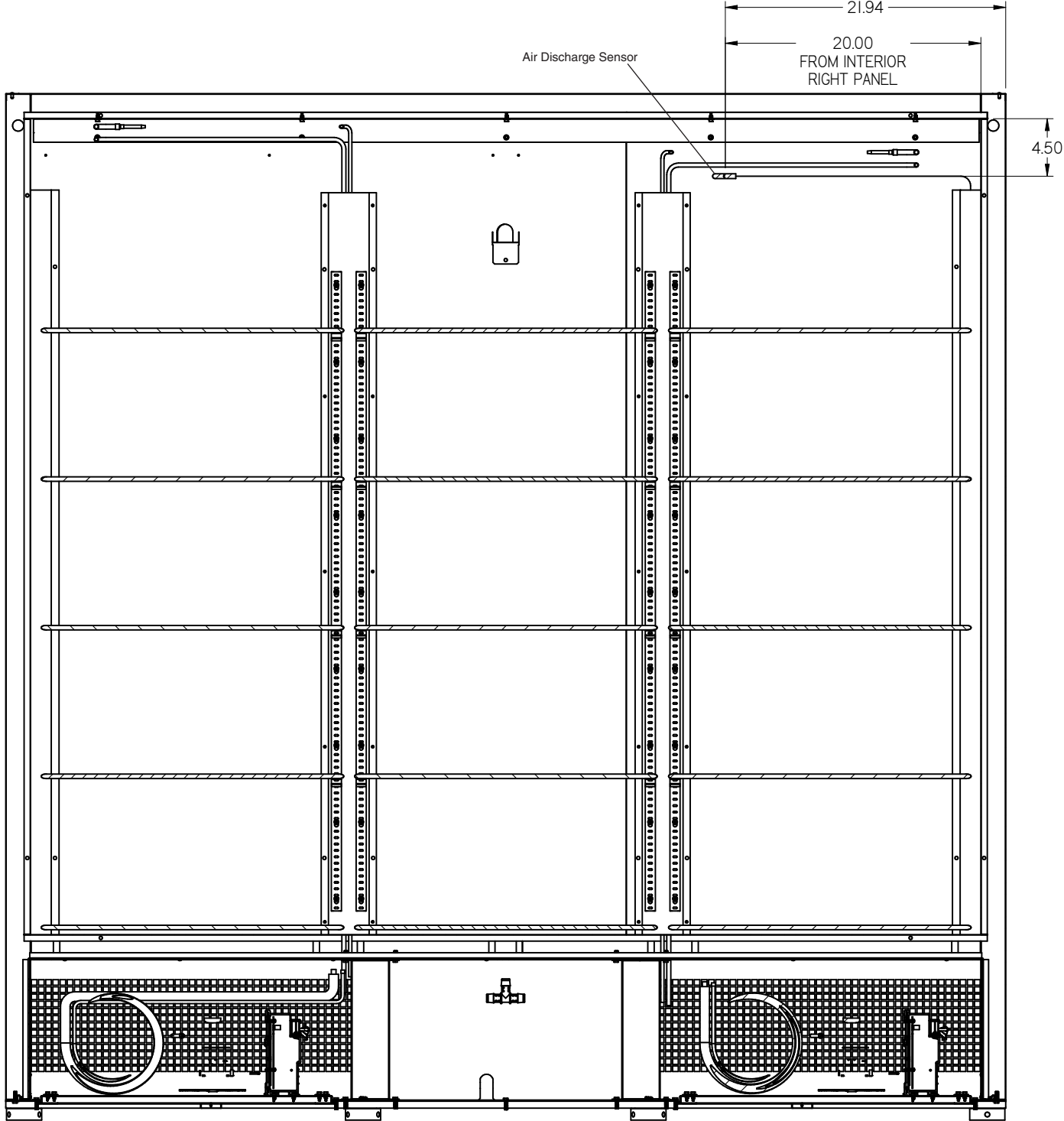
VRL1B1A



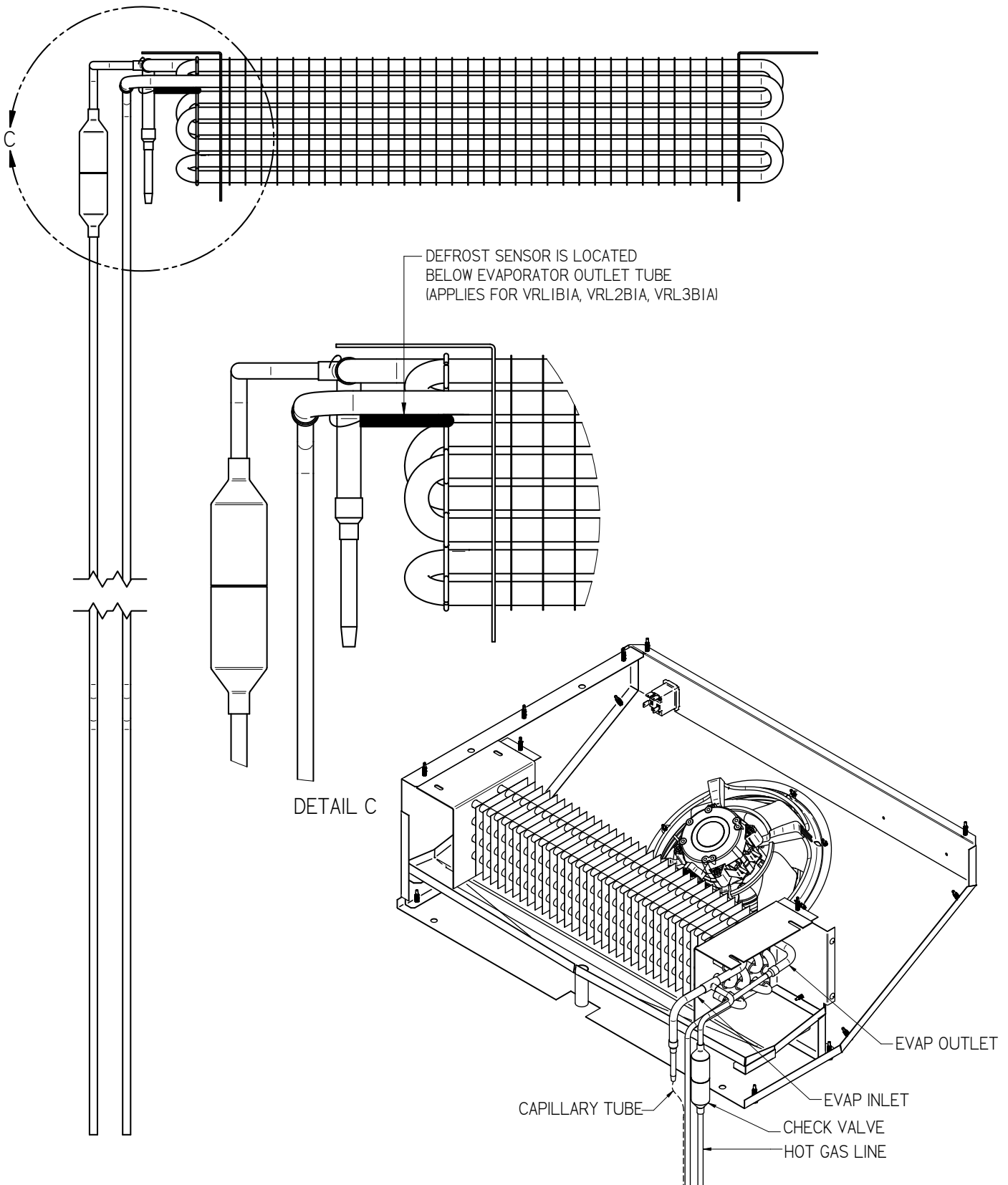
DISCHARGE SENSOR LOCATION
VRL2B1A



DISCHARGE SENSOR LOCATION VRL3B1A

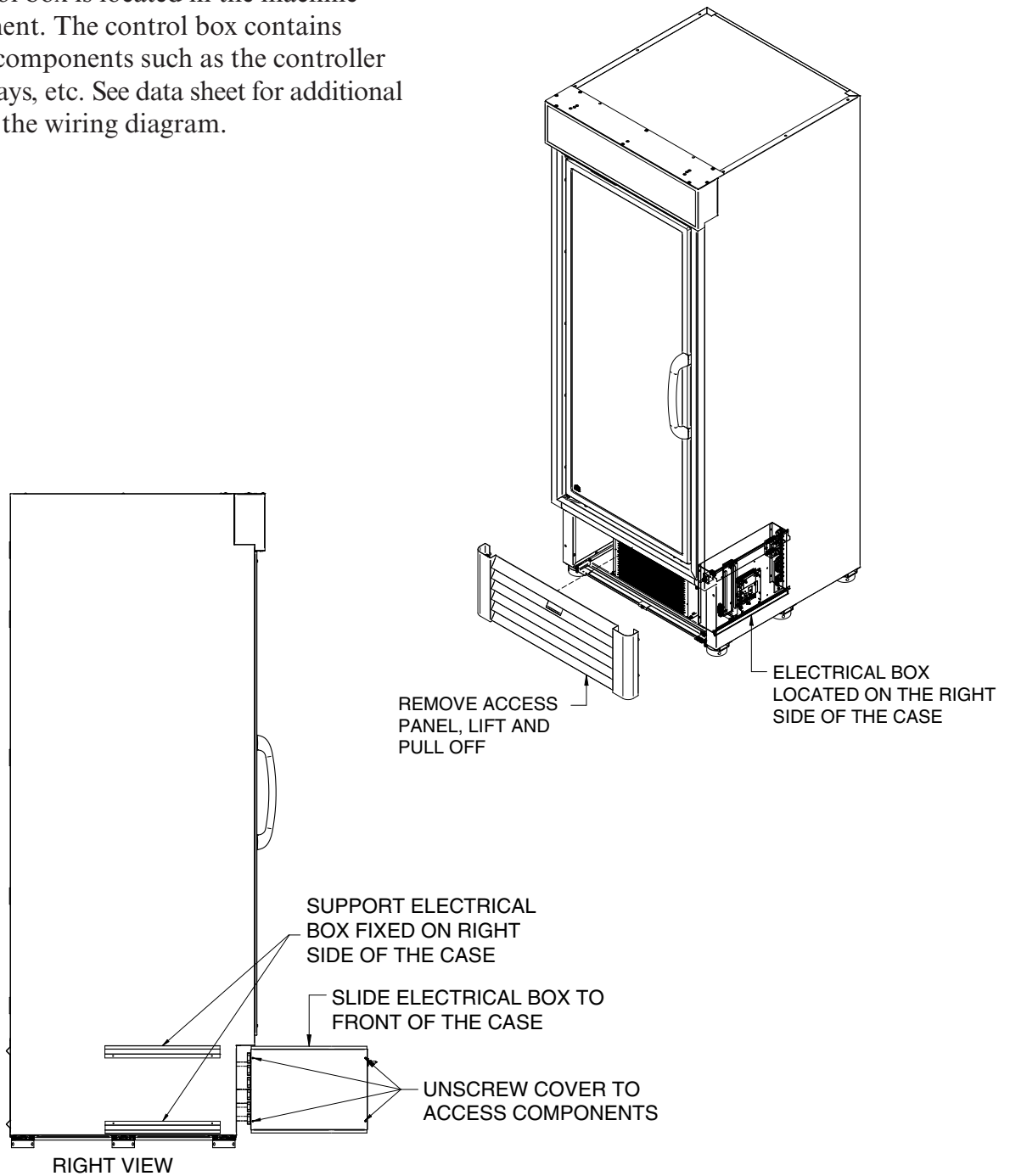


DEFROST SENSOR LOCATION



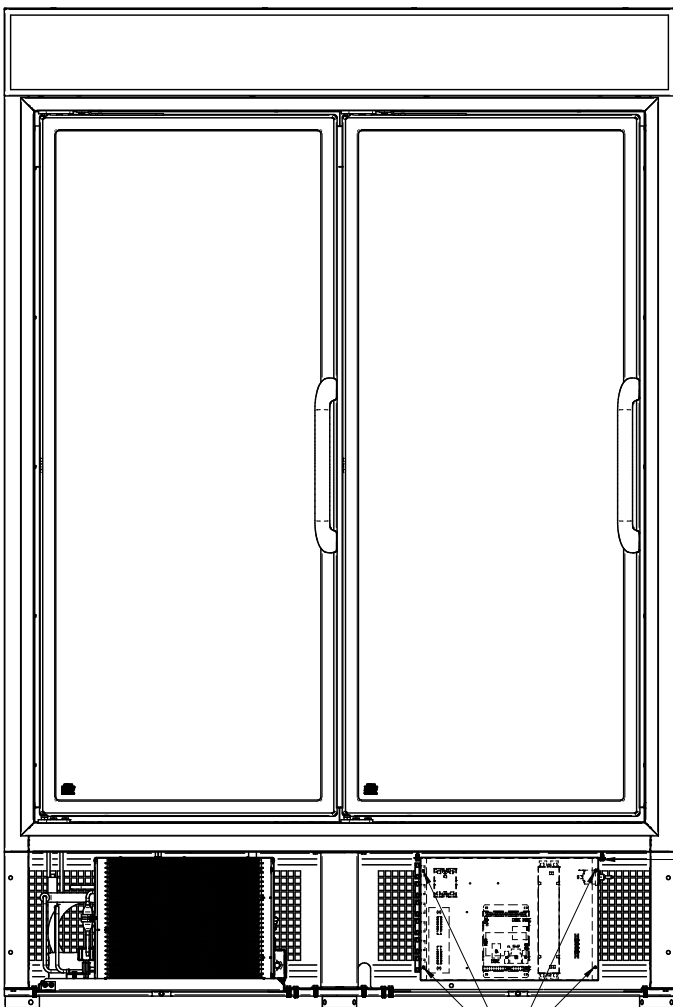
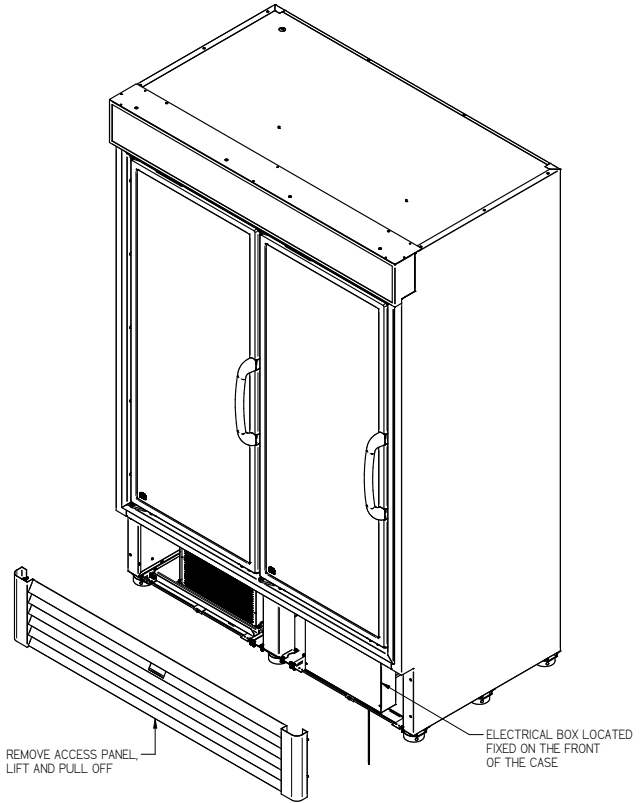
CONTROL BOX VRL1B1A

The control box is located in the machine compartment. The control box contains electrical components such as the controller board, relays, etc. See data sheet for additional details on the wiring diagram.



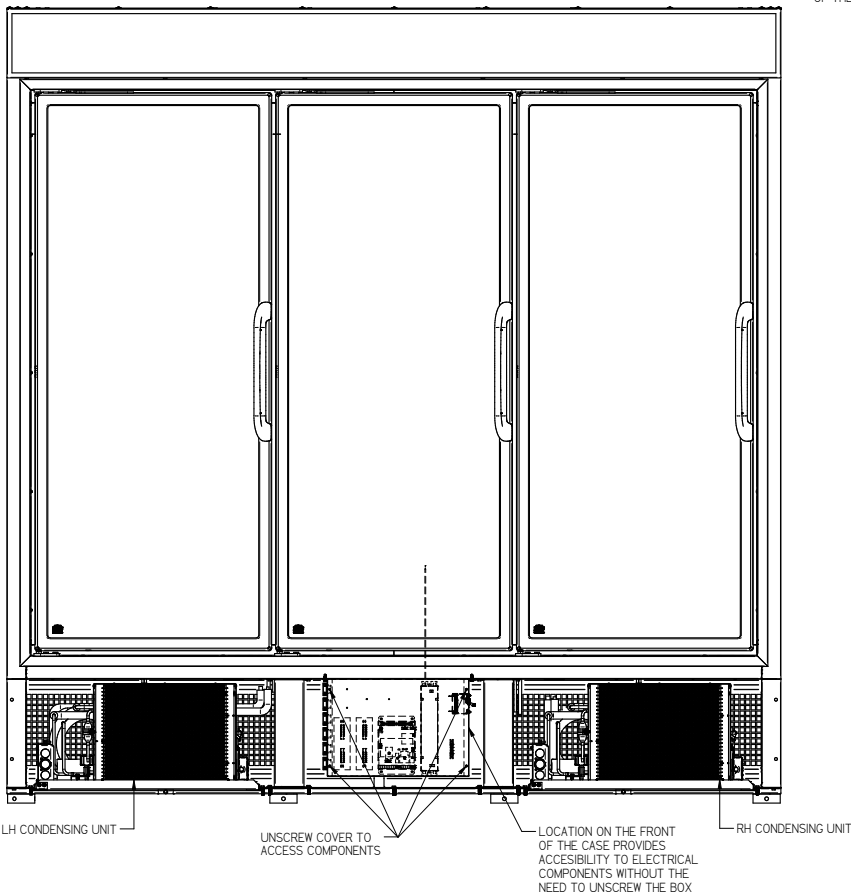
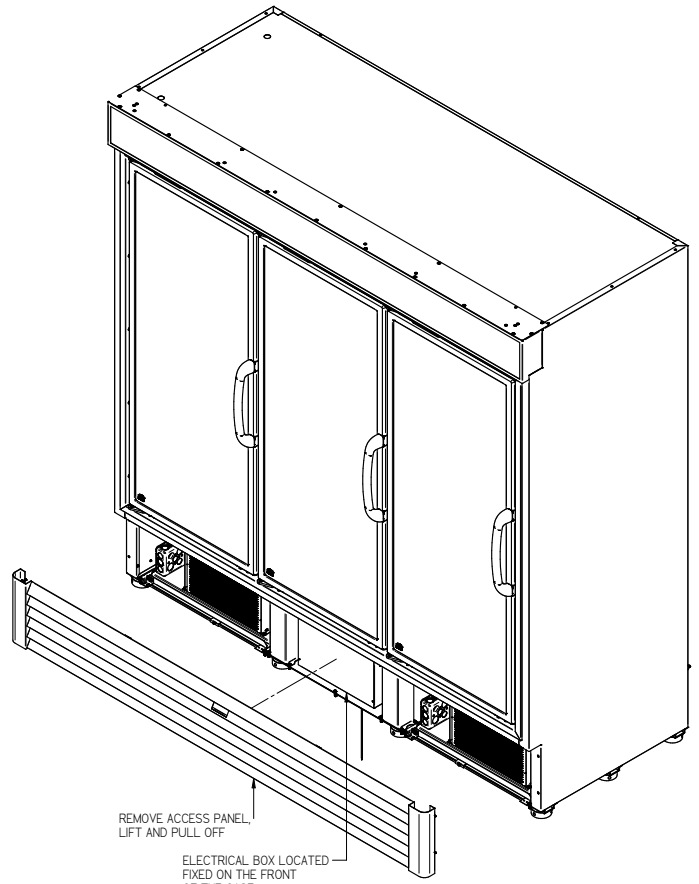
CONTROL BOX VRL2B1A

The control box is located in the machine compartment. The control box contains electrical components such as the controller board, relays, etc. See data sheet for additional details on the wiring diagram.



CONTROL BOX VRL3B1A

The control box is located in the machine compartment. The control box contains electrical components such as the controller board, relays, etc. See data sheet for additional details on the wiring diagram.



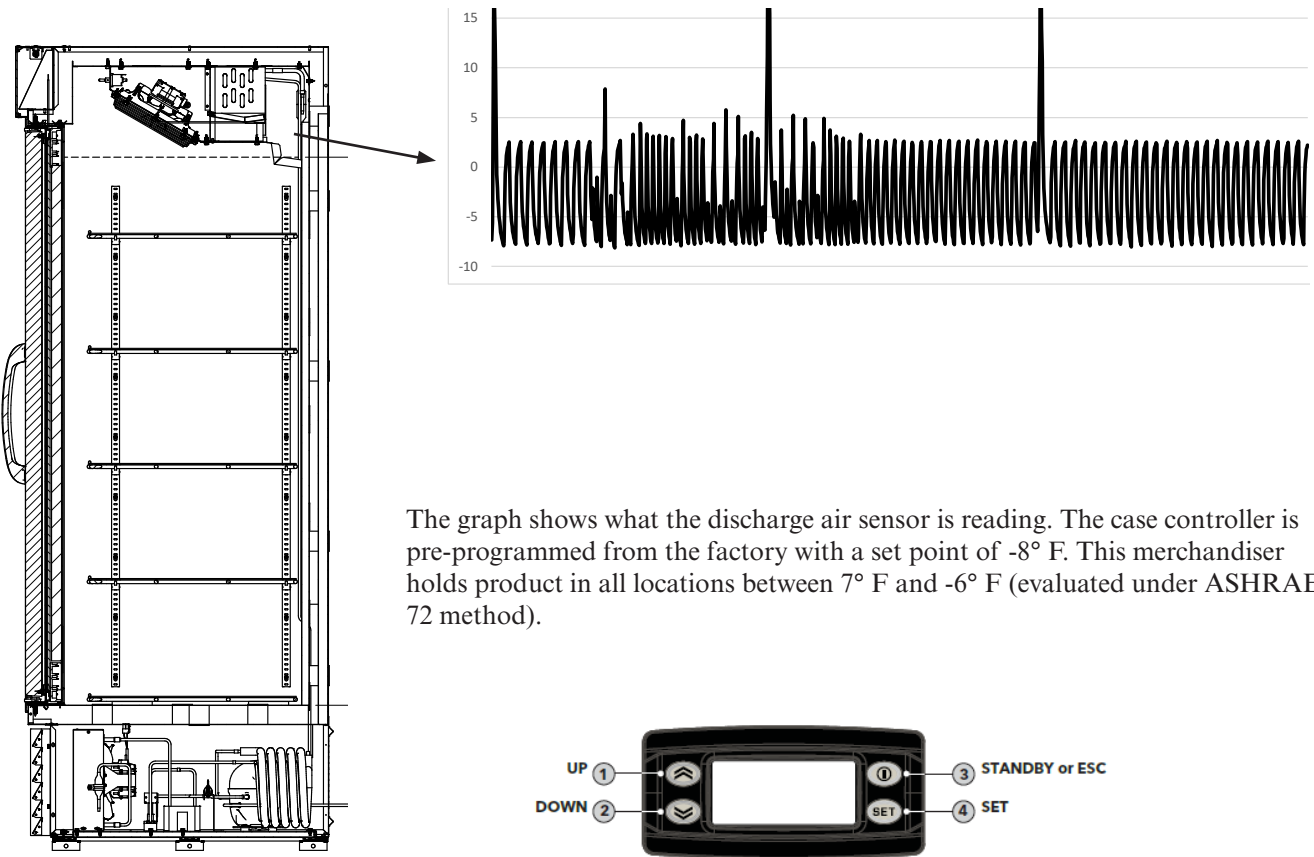
| Model | Product Application | Discharge Air Temperature (Refrigeration Mode) | Controller Set Point Range (° F) | Defrost Frequency (per day) | Type of Defrost | Temp. Termination | Failsafe Time (min) |
|---------|---------------------|------------------------------------------------|---------------------------------------|-----------------------------|-----------------|-------------------|---------------------|
| VRL1B1A | Frozen Food - DOE | 0 | *** -10 to -8 ° F (- 23 to - 22 ° C) | 3 | Hotgas | 55 ° F (12 ° C) | 50 |
| VRL2B1A | Frozen Food - DOE | -7 to 2 ° F (-21 to -16 ° C) | *** -10 to -8 ° F (- 23 to - 22 ° C) | 3 | Hotgas | 47 ° F (8 ° C) | 40 |
| VRL3B1A | Frozen Food - DOE | -7 to 2 ° F (-21 to -16 ° C) | *** -10 to -8 ° F (- 23 to - 22 ° C) | 3 | Hotgas | 60 ° F (15 ° C) | 40 |

Notes *** :

- 1) Controller Set point from factory is - 8 ° F for VRL1B1A
- 2) Controller Set point from factory is - 10 ° F for VRL2B1A.
- 3) Controller Set point from factory is - 10 ° F for VRL3B1A.
- 4) The controller set point range listed in the table above may be required when you are evaluating the product under ASHRAE 72 - EE DOE conditions to

Hussmann Controller Operation RTN

The Controller controls refrigeration temperature. This is factory installed in the control panel. Defrosts are time initiated and temperature terminated for self contained. The defrost setting is factory set as shown above. To ensure a thorough defrost, defrost must be terminated by the temperature termination setting — not by time.

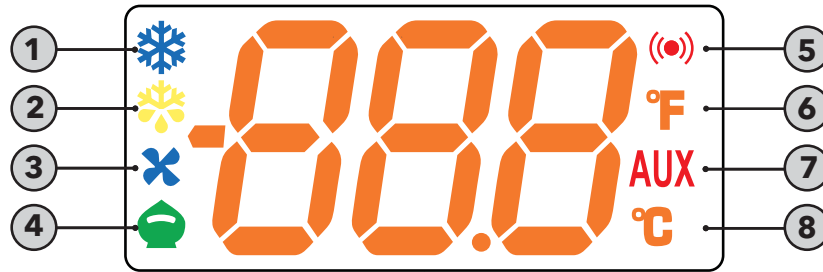


The graph shows what the discharge air sensor is reading. The case controller is pre-programmed from the factory with a set point of -8° F. This merchandiser holds product in all locations between 7° F and -6° F (evaluated under ASHRAE 72 method).

LED

RTN400 family controllers will also function even if a keyboard has not been connected.

With **KDEPlus** or **KDWPlus** keyboards (which are the same and guarantee the same functions), the display will be as follows:



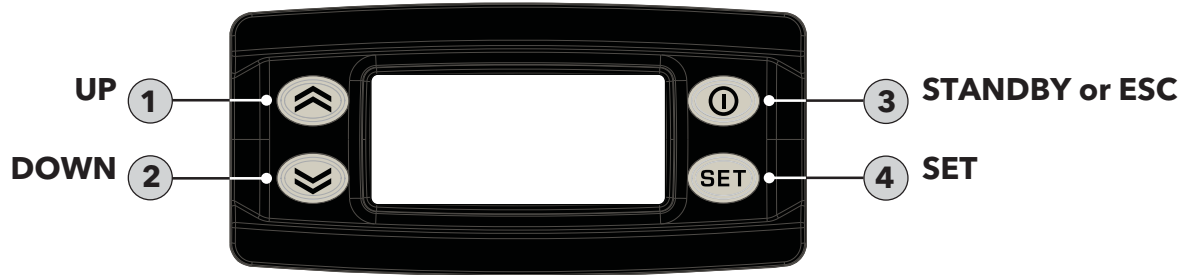
Meaning of LEDs:

| No | Icon | LED | Operation | Meaning |
|----|------|------------------------------|----------------|------------------------------------------|
| 1 | | Compressor | Permanently on | compressor on |
| | | | Blinking | Delay, protection or start-up blocked |
| | | | OFF | otherwise |
| 2 | | Defrost | Permanently on | Defrost active |
| | | | Blinking | Activated manually or from Digital Input |
| | | | OFF | otherwise |
| 3 | | Fans | Permanently on | Fans active |
| | | | OFF | otherwise |
| 4 | | Reduced SET / Economy | Permanently on | Energy Saving active |
| | | | Blinking | Reduced setpoint active |
| | | | OFF | otherwise |
| 5 | | Alarm | Permanently on | alarm active |
| | | | Blinking | Alarm acknowledged |
| | | | OFF | otherwise |
| 6 | | °F readout | Permanently on | °F setting (dro = 1) |
| | | | OFF | otherwise |
| 7 | | AUX | Permanently on | Aux output active and/or light on |
| | | | Blinking | Deep cooling on |
| | | | OFF | otherwise |
| 8 | | °C readout | Permanently on | °C setting (dro = 0) |
| | | | OFF | otherwise |

N.B.: When the instrument is powered on it performs a lamp test, during which time the display and LEDs will flash for several seconds to check that they all function correctly.

KDEPLUS BUTTONS

The **KDEPlus** keyboard has 4 keys, as shown in the illustration:







Each key has a different function depending on whether it is:

- Pressed and released
- Pressed for at least 5 seconds
- Pressed and held at start-up
- Pressed in combination with another key.

KEYS

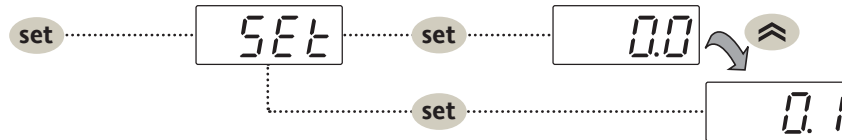
The following table summarizes the function of each key:

| No | Key | Action | | |
|----|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| | | Pressed and released | Press for at least 5 secs | Start-up |
| 1 |  | <ul style="list-style-type: none"> • Scrolls through menu items • Decreases values | Activates the Manual Defrost function (from outside menus). | --- |
| 2 |  | <ul style="list-style-type: none"> • Scrolls through menu items • Decreases values | Function can be configured by the user (from outside menus). (see parameter H32) | --- |
| 3 |  | <ul style="list-style-type: none"> • Returns to the previous menu level • Confirms parameter value | Activates the Stand-by function (from outside menus). | --- |
| 4 |  | <ul style="list-style-type: none"> • Displays any alarms (if active) • Opens Machine Status menu • Confirms commands | Opens the Programming Menu (User and Installer parameters) | When pressed during start-up it enables the user to select the application to be loaded. |

SETPOINT: SETTING AND EDIT LOCK

To display the Setpoint value, press the **set** key to enter the "Machine Status" menu, then press the **set** key again when the "SEt" label is displayed.

The Setpoint value appears on the display. To change the Setpoint value, press the **UP** and **DOWN** keys within 15 seconds. Press **set** to confirm the modification.



It is possible to disable the keypad on this device.

The keypad can be locked by programming the "LOC" parameter appropriately.

With the keypad locked, you can still access the "Machine Status" menu by pressing **set** to display the Setpoint, but you cannot edit it. To disable the keypad lock, repeat the locking procedure.

DISPLAY PROBES VALUE

To display the value read by probes connected to the device, press the **set** key and enter the "Machine Status" menu, then press the key again when one of the probe-related labels "Pb1...Pb5" press the **set** key again. The value measured by the associated probe will appear on the display.

NOTE: The displayed value is read-only and cannot be modified.

KDEPLUS BUTTONS

The KDEPlus keyboard has 4 keys, as shown in the illustration:



KEY-ACTIVATED FUNCTIONS

All models have the **UP** key set to enable the "Manual Defrost" function.

The DOWN and ESC keys can also be set to activate any other function required by the user.

The parameters for configuring the two keys are:

- **H11** = DOWN key configuration
- **H33** = ESC key configuration

The values that can be set apply to both keys and the functions that can be activated are:

| H32/H33 value | Function to enable |
|---------------|--------------------|
| 0 | disabled |
| 1 | defrost |
| 2 | reduced set |
| 3 | Light |
| 4 | Energy saving |
| 5 | AUX |
| 6 | Stand-by |
| 7 | Deep cooling cycle |
| 8 | Start/end defrost |

MAINTENANCE

WARNING

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;**
- **Do not use any mechanical device or other means to speed the defrost process, except as recommended by the manufacturer.**

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, this unit should be thoroughly cleaned, all debris removed and the interiors washed down. Cleaning often will control or eliminate odor buildup. Frequency of cleaning is dependent on usage and local health requirements.

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.

Exterior Surfaces

The exterior surfaces must be cleaned with a mild detergent and warm water to protect and maintain their attractive finish.

NEVER USE ABRASIVE CLEANERS OR SCOURING PADS. NEVER USE CAUSTIC SODA, KEROSENE, GASOLINE, THINNER, SOLVENTS, DETERGENTS, ACIDS, CHEMICALS OR ABRASIVES. DO NOT USE AMMONIA-BASED CLEANERS ON ACRYLIC PARTS.

PN_3155541_E

Interior Surfaces

DO NOT USE AMMONIA-BASED PRODUCTS TO CLEAN LIGHT SHIELDS. NEVER USE ABRASIVE CLEANSERS OR SCOURING PADS.

The interior surfaces may be cleaned with most domestic detergents and sanitizing solutions with no harm to the surface. Always read and follow the manufacturer's instructions when using any cleaning product.

Inspect all LED connections and plug/receptacles for signs of arcing. Replace any component that shows signs of arcing. Make sure all unused receptacles have close-off covers securely attached.

CLEANING UNDERNEATH THE CASE

The case can be moved to facilitate cleaning. Unplug the merchandiser, and move it out if the way in order to sweep and mop the area underneath the case. Brush away all dirt and litter from the area. Ensure there is no dirt build up around the bottom of the case or near the intake or exhaust.

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.
- A hose on lighted shelves or submerge the shelves in water.
- Solvent, oil or acidic based cleaners on any interior surfaces.
- A hose on rail lights, canopy lights or any other electrical connection.
- Rinse with hot water, but do NOT flood.
- Allow merchandiser to dry before resuming operation.
- Wipe down lighted shelves with a damp sponge or cloth so that water does not enter the light channel. **DO NOT USE A HOSE OR SUBMERGE SHELVES IN WATER.**
- After cleaning is completed, restore power and turn on the merchandiser.

**WARNING**

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

Do:

- **First turn off refrigeration, then disconnect electrical power.**
- Remove product and loose debris.
- Thoroughly clean all surfaces with soap and hot water. **DO NOT USE STEAM OR HIGH WATER PRESSURE HOSES TO WASH THE INTERIOR. THESE DESTROY MERCHANDISER'S SEALING CAUSING LEAKS AND POOR PERFORMANCE.**
- Take care to minimize direct contact between fan motors and cleaning or rinse water.

Cleaning Shelves

Shelves and shelf clips are easily removed for cleaning the interior as well as the shelves themselves.

CLEANING CONDENSER COILS

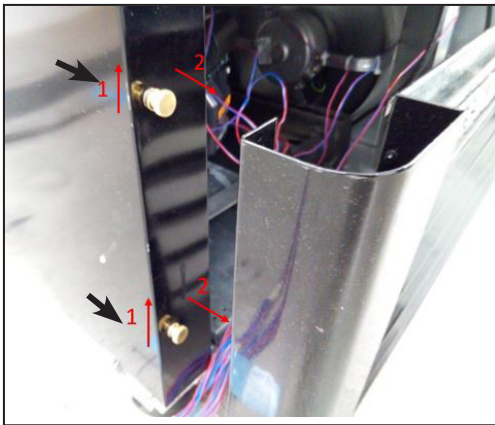
The coil should be cleaned at least once each month to maintain peak operating efficiency. A dirty coil slows product cooling significantly and increases energy consumption by as much as 20 percent. Dirt buildup on coils can also cause the compressor to lock up damaging the condenser unit.

To clean the coils, use a vacuum cleaner with a wand attachment and a soft (non-metallic) brush to remove dirt and debris. Do not bend coil fins. Always wear gloves and protective eye wear when cleaning near sharp coil fins and dust particles.

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.

All VRL models have the same access panel design for commonality between merchandisers. To remove the front grille perform the following steps:

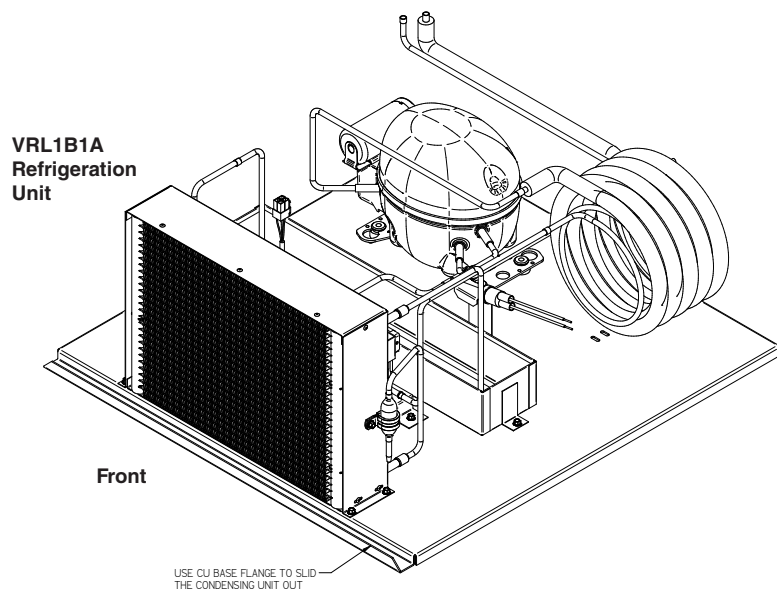
1. Lift up, and pull off the grille.
2. Remove the holding bracket to release the condensing unit base. Once the condensing unit base is free, you can slide it out for service. Use base flange to pull out the condensing unit. **Pulling on refrigeration lines or others parts will cause damage to the unit.**



Lift up, and pull off the grille.



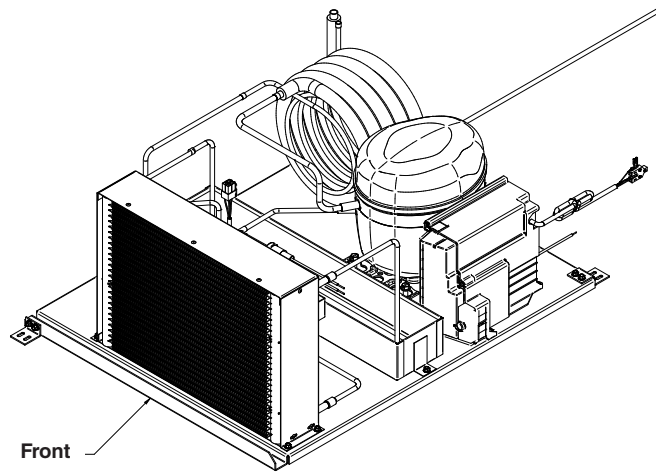
Front Grille



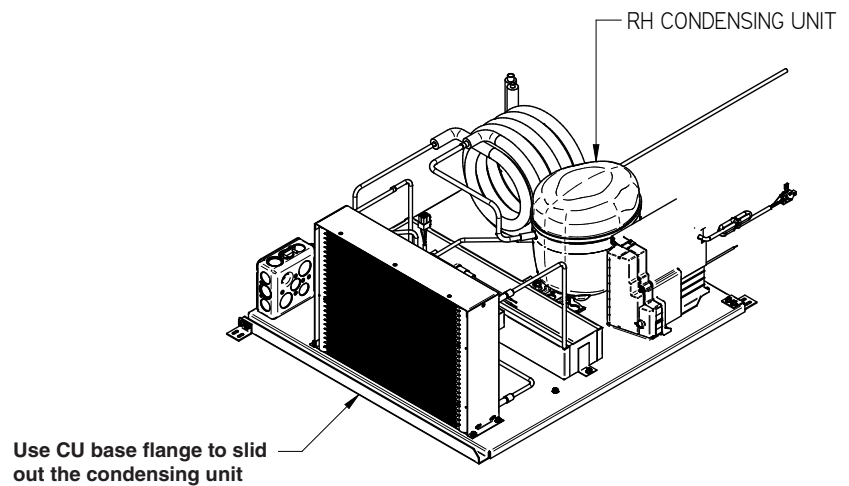
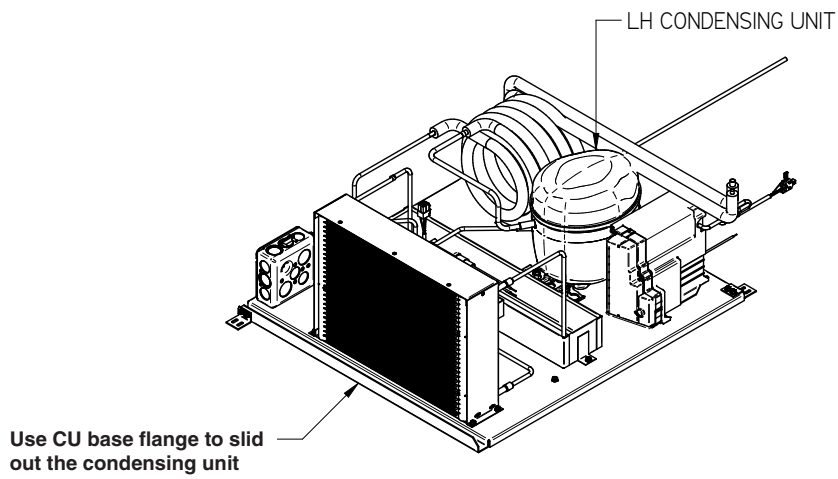
NOTE:

Condensing unit view for 2-door and 3-door models are shown on the next page.

VRL2B1A Condensing Unit



VRL3B1A Condensing Units



- Use a soft hand brush attachment on a vacuum to remove accumulated dust and debris.

Consult an authorized service technician if more extensive cleaning is needed. If the refrigeration unit is damaged, it can be replaced with a new unit.

TIPS AND TROUBLESHOOTING

There are a few simple things to check before calling for service:

- Product not cold? Refrigeration unit requires 24 hours at initial startup to cool down to operating temperature with **NO PRODUCT LOADED** in merchandiser. Ask when merchandiser was stocked, and what the usage has been. It may take 30 minutes or more for product to chill following stocking.
- Check the door and door seal for air leaks.
- Power Supply:
 - Is the unit plugged in?
 - Is there power to the unit?
- Location
 - What are the ambient conditions—temperature and humidity, direct sun, nearby source of heat, such as oven or grill?
 - Is the unit level? Has the unit been moved recently?
- Shelves and Stocking
 - Are the standard shelves in the correct places?
 - Is the product stocked properly?
 - Is the bottom shelf at the proper location?
- Confirm that the defrost schedule is properly set.

IMPORTANT INFORMATION

For prompt service when contacting the factory, be sure to have the case model and serial number from the case serial plate.

⚠ WARNING

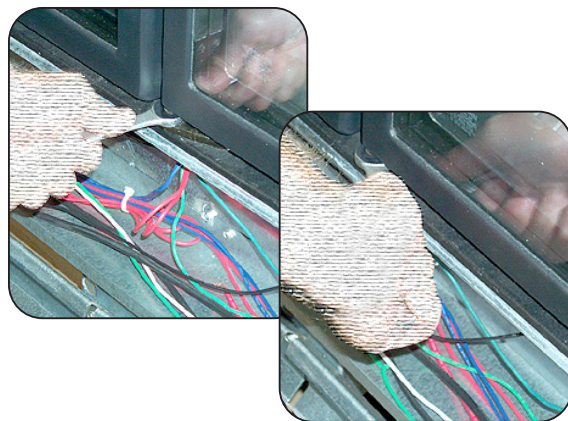
— LOCK OUT / TAG OUT —

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.

ADJUSTING CLOSING TORQUE

Adjust closing torque by turning the bottom hinge pin in the direction the door closes. Use a 1/2 in. (13 mm) wrench. Turn the hinge pin until the door closes on its own, usually to 2 clicks or 1/2 turn.

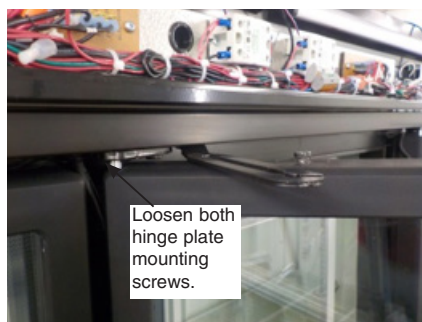
DO NOT over-torque the hinge spring assembly. Excessive torque (over 1 full turn) will result in damage to the spring assembly and/or door. If door does not close on its own after one full turn (5 clicks), look for obstructions causing the door to hang up.



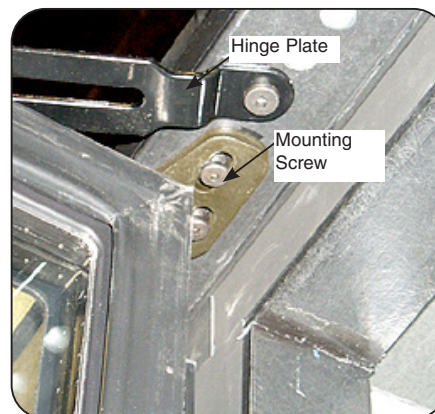
Adjusting Closing Torque

ADJUSTING DOOR SAG

To adjust door sag (saw-tooth effect from door to door), loosen the two hinge plate mounting screws using a Torx Plus no. 27 bit. Adjust hinge plate as needed, then tighten the screws.



Adjusting Door Sag



INNOVATOR DOOR MAINTENANCE

As part of an ongoing maintenance program for Innovator Doors, Hussmann recommends that the items below be checked annually.

- a) Proper door closing torque.
- b) Gasket performance (check for tearing and proper sealing).
- c) Check the top hinge pin to ensure the pin is properly seated and not bent.
- d) Check the bottom hinge plate for excessive wear (worn cam teeth).
- e) Proper operation of hold open brackets.

1. Check the doors for proper closing torque:

Torque adjustment, if needed, should be performed “one click” at a time. A “zero” torque door should not require more than 4 clicks. If the torque cam and hinge socket are severely rusted, both components should be replaced.

A severely rusted cam / socket assembly will not hold torque. Rust on the cam socket assembly is usually caused by one of the following:

- High humidity conditions > ASHRAE Type I
- Cycling of the frame heaters

Note 1: A rusted torque cam / socket assembly can cause excessive wear on the torque rod’s spacer and sleeve bearing. The result is a door that can “seat” farther down the rod assembly to the point that it causes binding at the hold open bracket.

It can also cause the top hinge pin’s sleeve bearing to deform. If the door is seated too far down the torque rod assembly, it most likely damaged the top hinge pin sleeve bearing. If the pin is not bent, replacing the pin’s nylon sleeve bearing will be sufficient. Although the torque rod assembly’s sleeve bearing and spacer are replaceable, we recommend that a severely rusted torque rod assembly be replaced.

Innovator Door Maintenance Continued...**2. Inspect door gaskets:**

- Check for tearing gaskets
- Make sure the gasket's dart is properly seated into the door's gasket groove.

3. Inspect the top hinge assembly for excessive movement at the top hinge socket.

- By design, the door will have a small, but discernible amount of movement at the top hinge pin / hinge plate socket joint. If excessive movement is detected, the hinge pin assembly should be inspected to ensure that the hinge pin is not bent (refer to note #1).

**4. Inspect hold open bracket:**

- Open the door to the “hold open” engagement position. The “hold open” bracket should retain the door.
- If the bracket fails to retain the door, replace the bracket and the shoulder screw.

5. If a door passes the three “open / close” tests, and there is no excessive movement at the top hinge pin, then it is highly unlikely that any components require replacement.

Self-Contained Refrigeration Equipment Maintenance Check List

| | |
|-----------------------------------------------------------------------------------------------------------------------|--|
| ***** Warranty does not cover issues caused by improper installation or lack of basic preventative maintenance. ***** | |
| Record starting date | |
| Store Name and Number | |
| Store Address | |
| Unit Model Number | |
| Unit Serial Number | |
| Contractor/Technician | |

| PM activity-For visual inspection items, denote "ok or complete" in the column to right when PM has been performed. For measured data requested, record data requested in the appropriate column to the right) | Technician | | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------|----|----|----|----|----|----|----|----|
| | Quarterly | Semi-Annually | | | | | | | | |
| Check in with store manager, record any complaints or issues they have with unit. | X | | | | | | | | | |
| Look unit over for any damage, vibrations or abnormal noise. | X | | | | | | | | | |
| Verify unit is level side to side and front to rear. | X | | | | | | | | | |
| Confirm refrigerant lines properly are secured and not touching or rubbing other lines, wires or frame work. | X | | | | | | | | | |
| Verify fan motors and motor mounts are tight. | X | | | | | | | | | |
| Confirm fan blade/s are tight and not rubbing or hitting. | X | | | | | | | | | |
| Make sure all electrical connections, factory and field, are tight. | X | | | | | | | | | |
| Verify electrical connections at lamps are they secure and dry. | X | | | | | | | | | |
| Check for and replace any frayed or chaffed wiring. | X | | | | | | | | | |
| Check all electrical wiring make sure it is secured and not on any sharp edges or hot lines. | X | | | | | | | | | |
| Check for air disturbances external to the unit. Heat and air registers, fans, and doors etc. | X | | | | | | | | | |
| Check for water leaks. | X | | | | | | | | | |
| Clean evaporator coil/s and fan blade/s. Do not use an acid base cleaner. Rinse off any cleaner residue. | | X | | | | | | | | |
| Clean discharge air honeycombs or grilles. Do not use an acid base cleaner. Rinse off any cleaner residue. | | X | | | | | | | | |
| Clean condenser coil/s and fan blade/s. Do not use an acid base Cleaner. Rinse off any cleaner residue. | | X | | | | | | | | |
| Clean condensate drain pan and drain line. | | X | | | | | | | | |
| Verify condensate drain lines are clear and functioning. | | X | | | | | | | | |
| Record voltage reading at unit with unit off? | | X | | | | | | | | |
| Verify condenser and evaporator fans are working. | X | | | | | | | | | |
| Record condenser air inlet temperature | X | | | | | | | | | |
| Record condenser air outlet temperature | X | | | | | | | | | |
| Is condenser air inlet or air exhaust restricted or recirculating? | X | | | | | | | | | |
| Use a handheld propane leak detector ("sniffer") to check for refrigerant leaks. | X | | | | | | | | | |
| Record voltage reading with unit running. | | X | | | | | | | | |
| Record compressor amp draw. | | X | | | | | | | | |
| Record defrost heater voltage and amp draw. | | X | | | | | | | | |
| Record anti-sweat heater voltage and amp draw. | | X | | | | | | | | |
| Record case product temperature. | X | | | | | | | | | |
| Record unit discharge air temperature. | X | | | | | | | | | |
| Record unit return air temperature. | X | | | | | | | | | |
| Record ambient conditions around unit (wet bulb temperature and dry bulb temperature). | X | | | | | | | | | |
| Check product loading, do not load beyond the units load limits. | X | | | | | | | | | |
| Verify clearances on sides/back of unit. | X | | | | | | | | | |
| Check unit controller for proper operation. See controller or 1/0 Manual for proper controller operation. | | X | | | | | | | | |
| Confirm door switches function. | X | | | | | | | | | |
| Verify unit doors and lids work and are sealed correctly. | X | | | | | | | | | |
| Verify that all the panels, shields and covers are in place. | X | | | | | | | | | |

| |
|-------------------|
| Technician Notes: |
|-------------------|

Form HSCW03 Rev-29 OCTOBER13

REPLACING DISPLAY LAMP

*Note: This procedure applies to all VRL models
(1-door model is shown in the photos)*

1. Disconnect power to the merchandiser. Remove the screws at the top of the unit display.
2. Remove the top panel.



Display Slides out to access Wireway

3. Remove the merchandiser's plexiglass panel.



4. Remove the cover display in order to have access to the LED fixture harness.



5. Replace the LED with like fixture, and re-attach connection.
6. Replace the display panel cover.
7. Return power to the merchandiser.

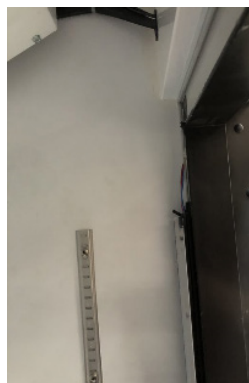
SERVICE**REPLACING SHELF LAMPS**

1. Disconnect power to the merchandiser. The LED fixtures are located behind the top of the door frame.



LED Location

2. Remove the screws and disconnect the LED fixture from the merchandiser.



3. Replace the LED with like fixture.



4. Return power to the merchandiser.

REPLACING EVAPORATION PAN HEATER

*Note: This procedure applies to all VRL models
(1-door model is shown in the photos)*

1. Remove screws from Fan Plenum. See figure for screws location and drain tube channel. See Figure A
2. Tilt the fan plenum to access to the evap. fan harness connection as well as the light switch.
3. Identify and disconnect the evap. fan harness.
4. Remove Fan plenum. See Figure B
5. Identify evap. pan heater leads. See Figure C.
6. Disconnect heater leads from harness
7. Pass heater leads through bushing.
8. Unscrew hexagonal head screws in order to release the evaporator pan assembly. See Figure E.
9. See Figure F for the evaporator pan assembly example.
10. Remove aluminum foil and old wire heater. See Figure G, which shows the sheet metal pan.



Figure A

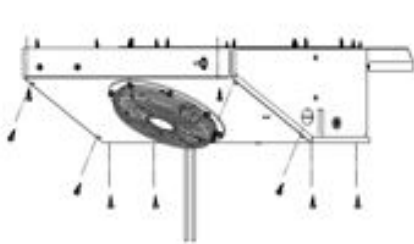


Figure B

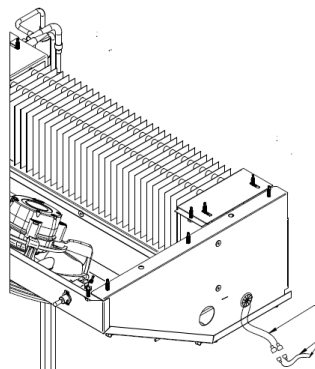


Figure C

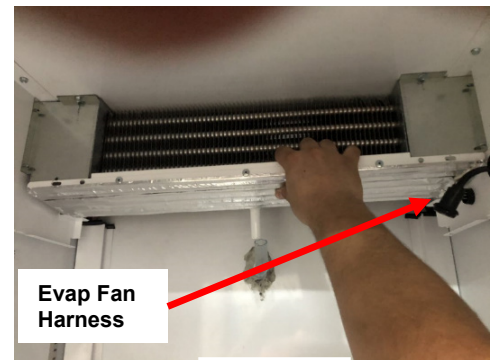


Figure D

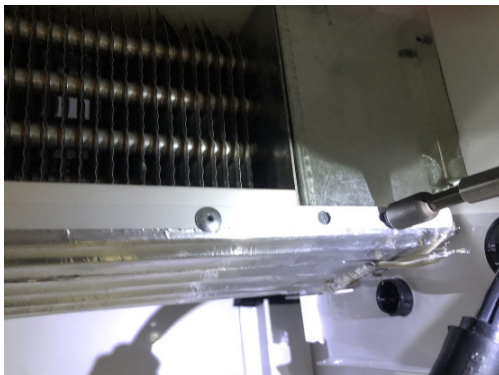


Figure E



Figure F



Figure G

FRAME HEATER REPLACEMENT

Always turn off power to the case before working on any electrical components. The old wireway covers must be removed to access the door frame heaters. Begin by inserting a putty knife into the groove between the wireway cover and fiberglass frame, about an inch (25 mm) away from joints in the frame as shown. Carefully begin to pry off the cover.



Use a second putty knife or flat head screwdriver to hold up the cover as shown in **A**. Pry the remainder of the section up, using putty knife only, until the entire cover is off and the frame heater inside the door frame is exposed as shown in **B**.



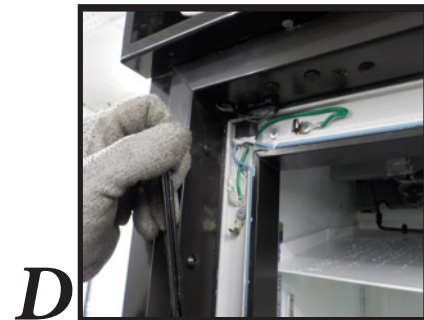
Door frame heaters may now be replaced.

During installation, the white portion of the heater should not come in contact with itself. The heater should be installed so that only one white portion of the wire enters the raceway. The other portion entering the raceway will be the black lead wire.



Once the heater wire is connected, check resistance (ohm reading) before replacing wireway covers. This will ensure that heater wire was not broken during installation. Wiring diagrams are shown on the last pages of this manual.

After covers are reinstalled, turn power on and verify that heaters are working properly.



REPLACING INVERTER

(Applies only for VRL2 and VRL3)

Unplug the power cord before servicing.

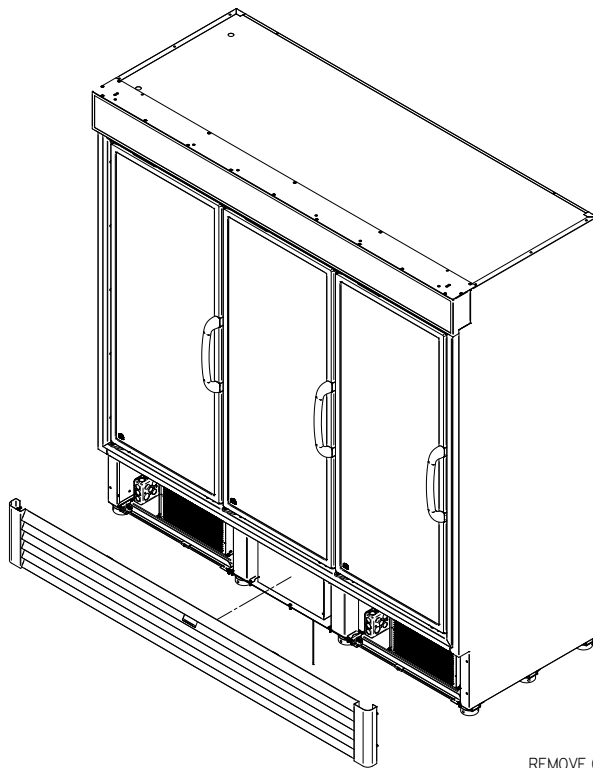
Parts may be ordered at Hussmann's Performance
Parts e-store:
<https://parts.hussmann.com/>
or
Call toll free: 855-487-7778

Required Tools:

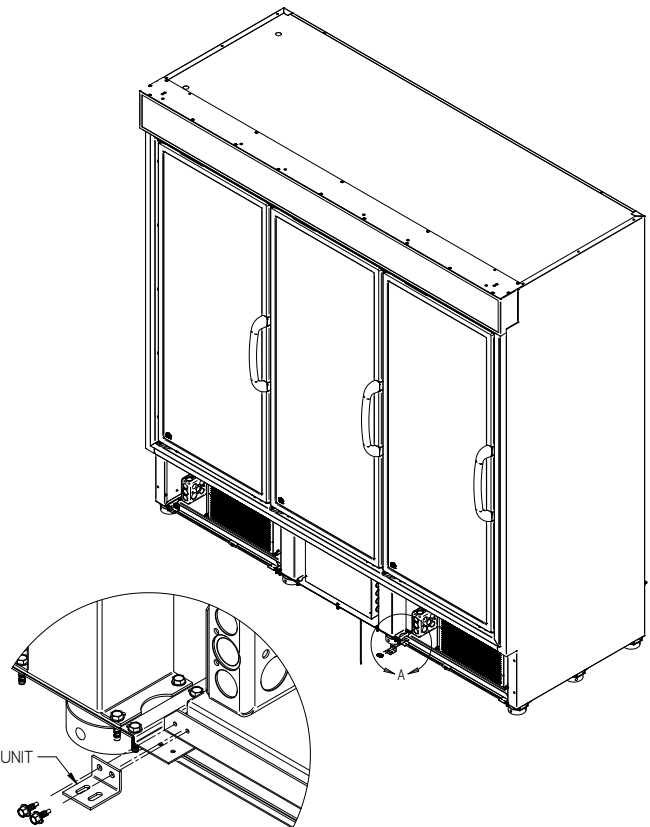
- Screwdriver / Philips Tip
- 1/4" Allen Wrench



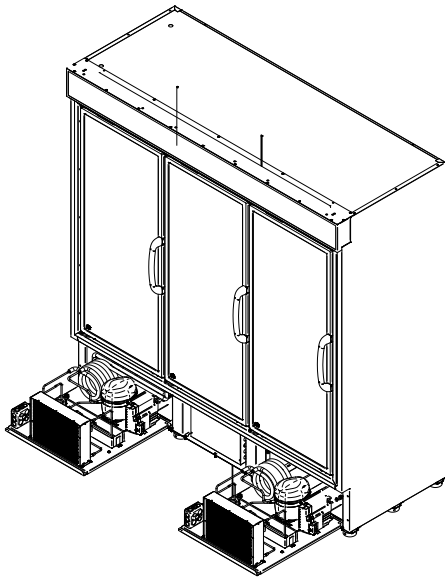
1. Remove product and place in a refrigerated area. Make sure the power is off to the case.
2. Make sure there is no voltage in the refrigerator. Remove rear lower panel as shown below.



VRL3B1A Shown

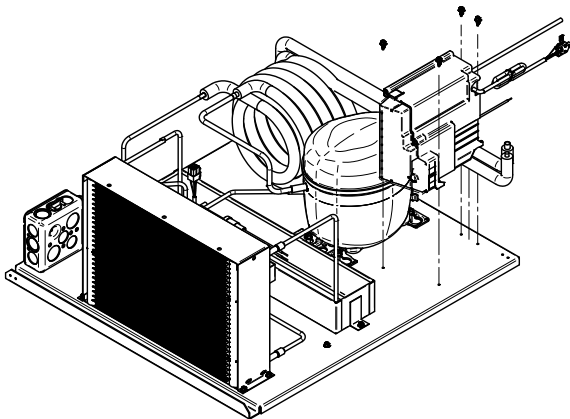


3. Remove motor screws.



4. Disconnect inverter harness and ground.

5. Take off the inverter screws.



6. Replace inverter with the new one.

7. Reverse the process, and make sure screws are hand-tight and everything is working properly.

INVERTER BOARD DIAGNOSTICS

Diagnostics:

The Fullmotion CF10B Inverter has two diagnostics methods, by visual light emission using a LED indication, or by serial communication protocol.

LED indication:

The LED diagnostics function helps service technicians to diagnose possible fault components by blinking a LED inside the box in different patterns. Basically, it indicates if there is a problem with compressor CF10B Inverter or Thermostat. The table below describes the failure modes:

| LED Status | Period | Color | Description |
|------------|------------|--------|-----------------------------------|
| 1 Flash | 30 seconds | Green | Normal operation |
| 2 Flashes | 5 seconds | Green | Communication problem |
| 3 Flashes | 5 seconds | Red | Inverter problem |
| 4 Flashes | 5 seconds | Orange | Compressor problem |
| No Flash | - | - | No input power / Damaged inverter |

REPLACING CONDENSER MOTOR

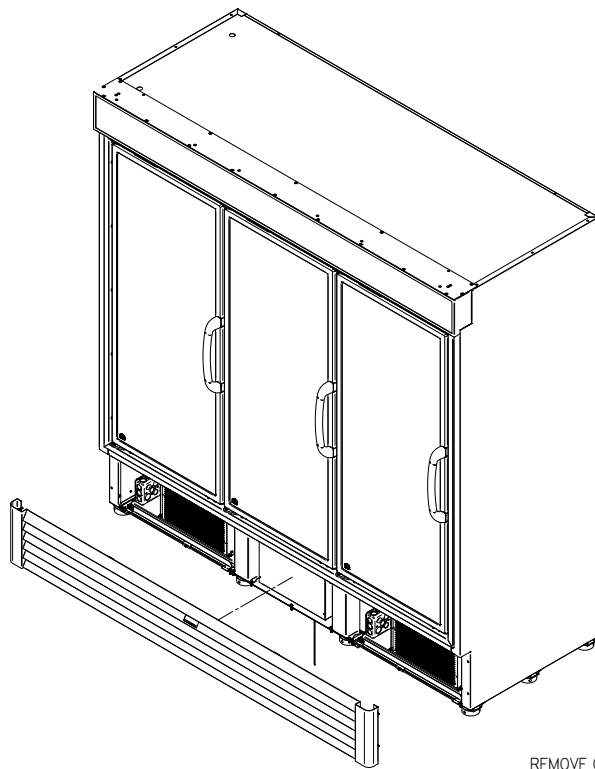
Unplug the power cord before servicing.

Parts may be ordered at Hussmann's Performance Parts e-store:
<https://parts.hussmann.com/>
 or
 Call toll free: 855-487-7778

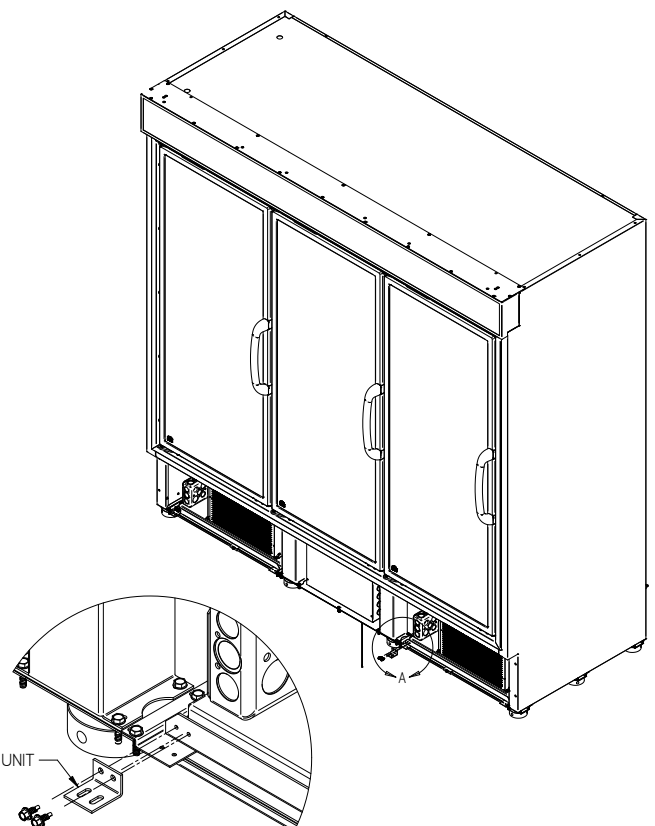
Required Tools:

- Screwdriver / Philips Tip
- 1/4" Allen Wrench

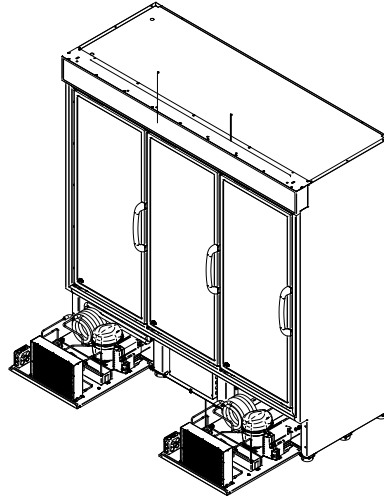
1. Remove product and place in a refrigerated area. Make sure the power is off to the case.
2. Make sure there is no voltage in the refrigerator. Remove rear lower panel as shown in the illustration.
3. Slide out the condensing unit. Be careful using the condensing unit base to pull it out. Make sure not to stress or interfere with other parts.



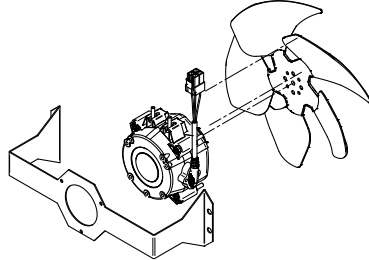
VRL3B1A Shown



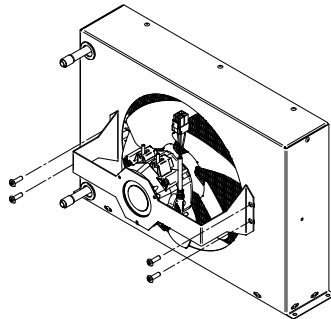
4. Disconnect condenser motor harness.
5. If a flexible extension is used, skip Step 6.
6. Release screws to partially remove venturi assembly.



7. Release screws to remove condenser fan assembly.



8. Release motor screws to get to motor / blade assembly.



9. Change failed part.
10. If the only damaged part is the motor, remove blade.
11. Reverse the process and make sure everything is in place and working.

REPLACING COMPRESSOR

Unplug the power cord before servicing.

Parts may be ordered at Hussmann's Performance
Parts e-store:

<https://parts.hussmann.com/>

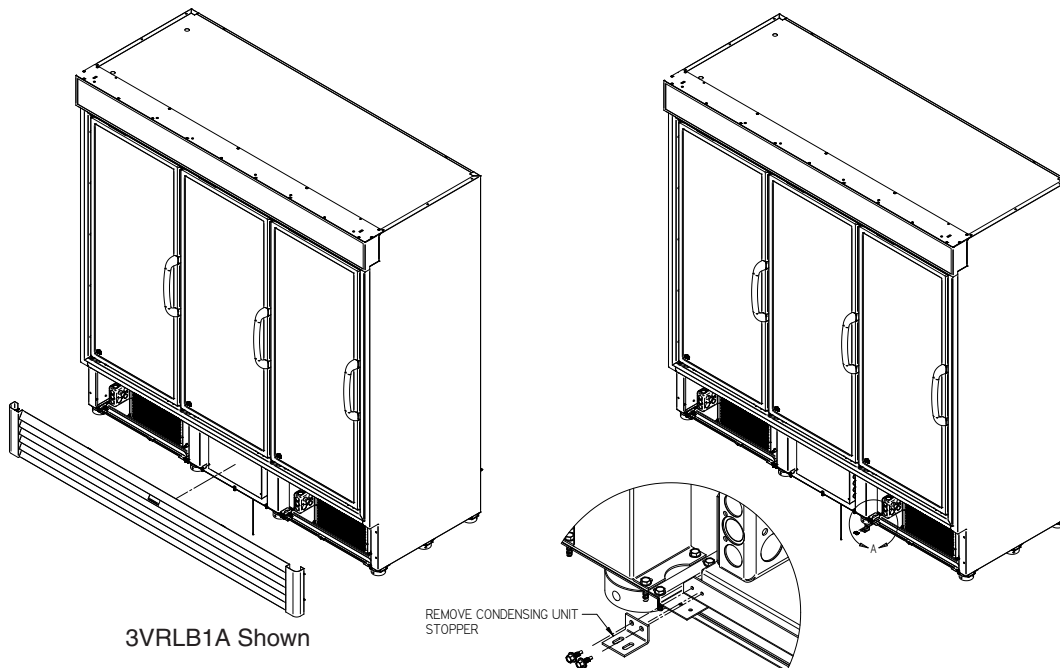
or

Call toll free: 855-487-7778

Required Tools:

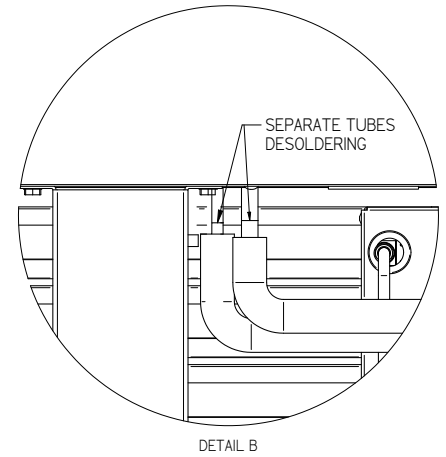
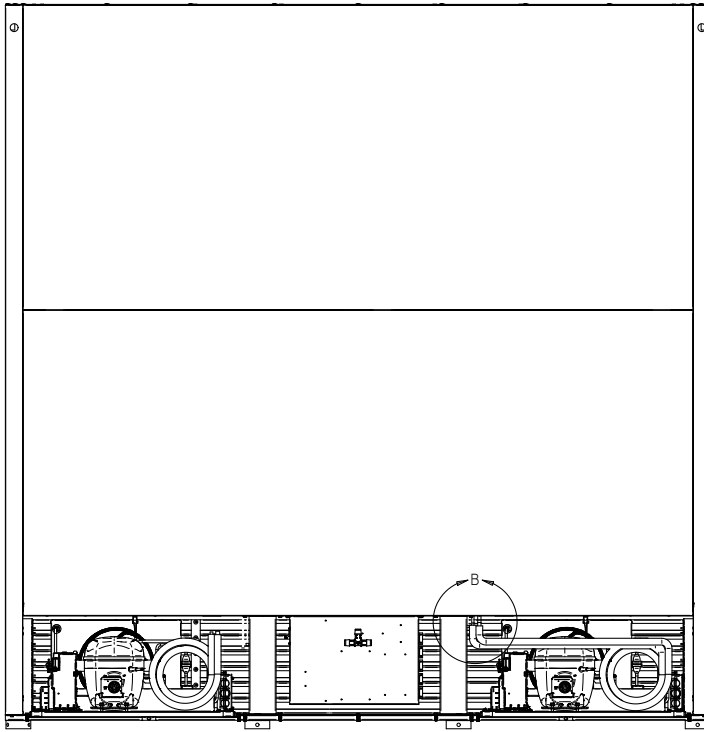
- Screwdriver / Philips Tip
- 1/4" Allen Wrench
- Copper Tubing Cutter
- Blow Torch

1. Remove product and place in a refrigerated area. Make sure the power is off to the case.
2. Make sure there is no voltage in the refrigerator. Remove lower panels.

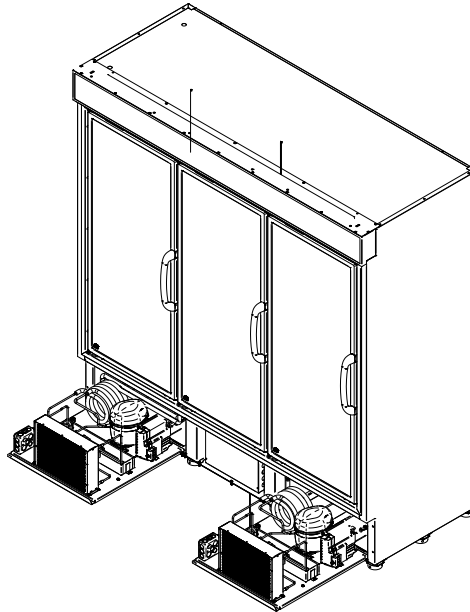


3. Make sure there is no refrigerant left in the system. Refer to Page 2-6 - Steps to Recover Refrigerant.

4. Remove welded joints that connect the condensing units and the evaporator.

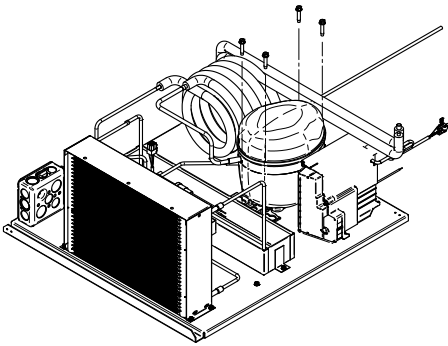


5. Slide out the condensing unit completely. Be careful using the condensing unit base to pull it out. Make sure not to stress or interfere with other parts.

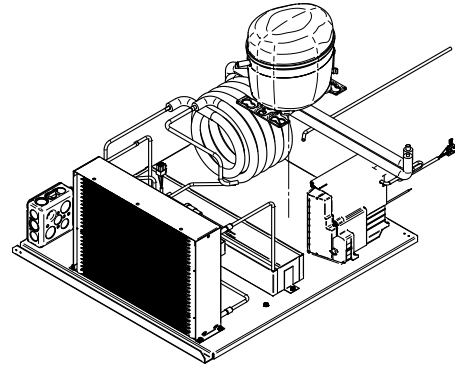


6. Disconnect all wires and harness from the compressor.

7. Take off compressor screws.



8. Remove welded joints to the compressor and replace with new compressor.



9. Reverse the process and make sure everything is in place.

REPLACING SOLENOID VALVES

Unplug the power cord before servicing.

Parts may be ordered at Hussmann's Performance Parts e-store:

<https://parts.hussmann.com/>

Call toll free: 855-487-7778

or

Required Tools:

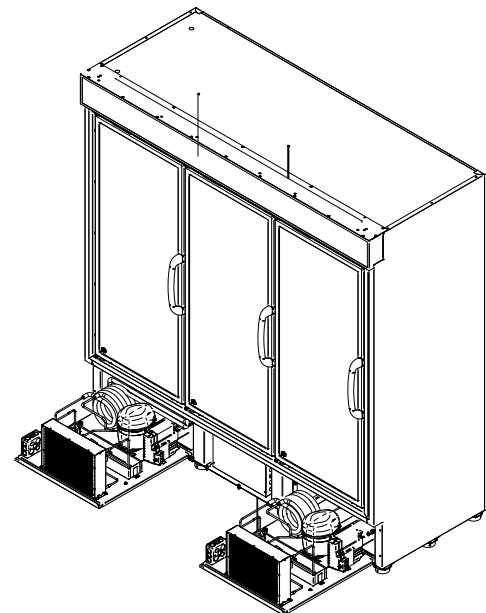
- Screwdriver / Philips Tip
- 1/4" Allen Wrench
- Copper Tubing Cutter
- Blow Torch

1. Remove product and place in a refrigerated area. Make sure the power is off to the case.

2. Make sure there is no voltage in the refrigerator. Remove rear lower panel.

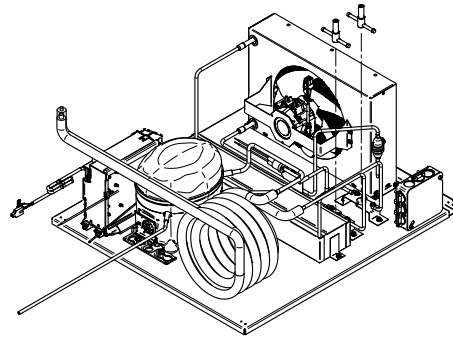
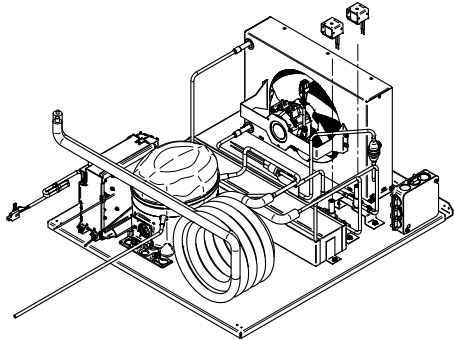
3. Make sure there is no refrigerant left in the system.

4. Slide out the condensing unit. Be careful using the condensing unit base to pull it out. Make sure not to stress or interfere with other parts.



3VRLB1A Shown

5. Remove coil by pulling up and disconnect wires.
6. Release clamps and remove welded joints from the valves.
7. Replace solenoid valves.



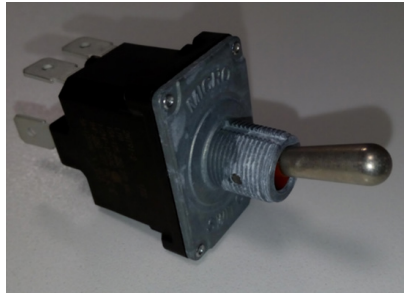
8. Reverse the process and make sure everything is in place.

TECHNICAL INFORMATION

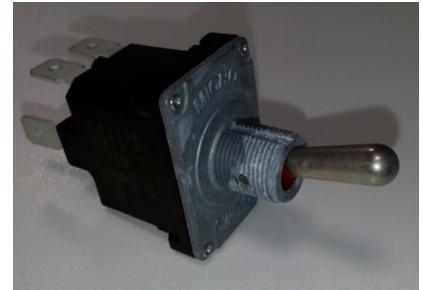
Visual Description of R290 Replacement Parts



**Main Switch
(3-door models)**



**Main Switch
(1 & 2-door models)**



Light Switch



Control RTN400



Control Display KDE



Solid State Relay

! WARNING

Component parts are specifically chosen for propane exposure and therefore non-incendive and non-sparking. Component parts shall be replaced with identical 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.



Sealed Pressure Switch

HUSSMANN[®]

To obtain warranty information or other support,
contact your Hussmann representative.

Please include the model and
serial number of the product.

Husmann Corporation

12999 St. Charles Rock Road
Bridgeton, MO 63044-2483
www.husmann.com