Part Number: 31E11046
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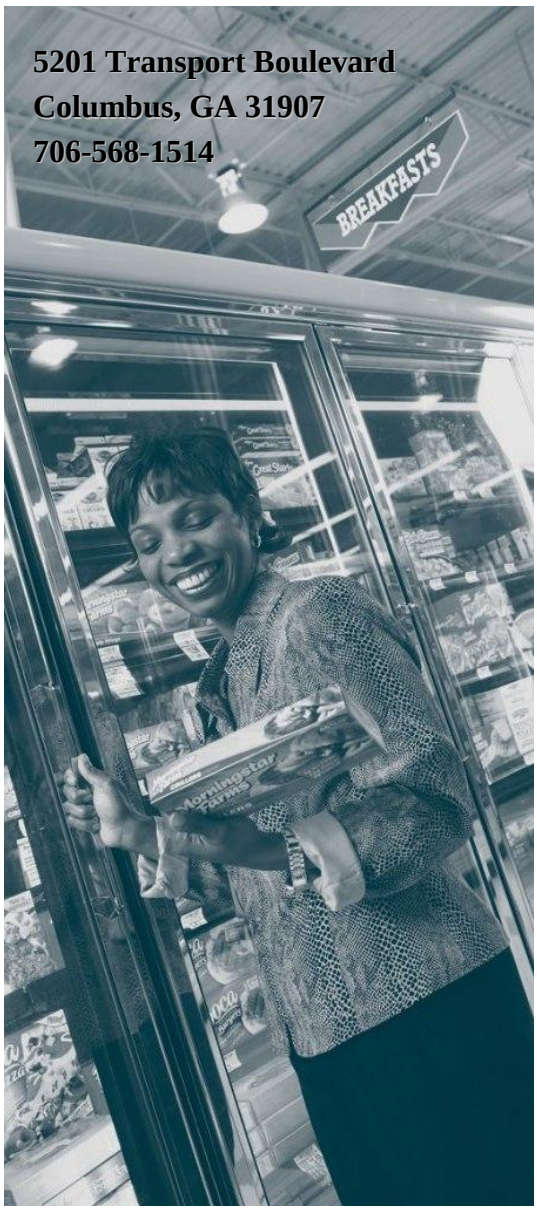
KYSOR/WARREN®



Installation & Operation Manual

QILG
Island Display Case

IMPORTANT - KEEP IN STORE FOR FUTURE USE

Table of Contents

Introductions - General Information

This manual has been prepared for our customers and the personnel involved in setting up and maintaining our cases.

ICON KEY	
	**Caution**
	**Special Note**
	**Warning**

The Kysor/Warren case is designed to provide years of trouble free service. **Kysor/Warren Frozen Food / Ice Cream Cases** are designed to merchandise frozen food products. These cases should be installed and operated according to the instructions contained in this manual to insure proper performance. They are designed for display of products in an air-conditioned store where temperature and humidity are maintained at a **maximum of 75% dry-bulb temperatures and 55% relative humidity**.

 **CAUTION**: Failure to maintain maximum design conditions may result in operational issues such as: increased BTU load, high product temperature, coil icing, product frosting, and internal and external sweating. Failure to follow factory recommendations for installation and set-up may cause operational issues and will void standard warranty.

Case Description

Model	Description
QILG – 06, 08, 12	Frozen Food / Ice Cream Island Case with glass front, 6 ft., 8 ft or 12 ft. lengths; offered with electric, off-cycle or hot gas defrost

Receiving/Shipping Damage/Lost Items

All equipment should be examined for shipping damage before and during unloading. If there is any damage, the carrier should be notified immediately and an inspection requested. The delivery receipt must be noted that the equipment was received damaged. If damage is of a concealed nature, you must contact the carrier within three (3) days following delivery. The consignee must file a claim with the carrier.

 ***NOTE:*** *All claims for shortages must be within 10 days after receipt of shipment.*

Refrigerant

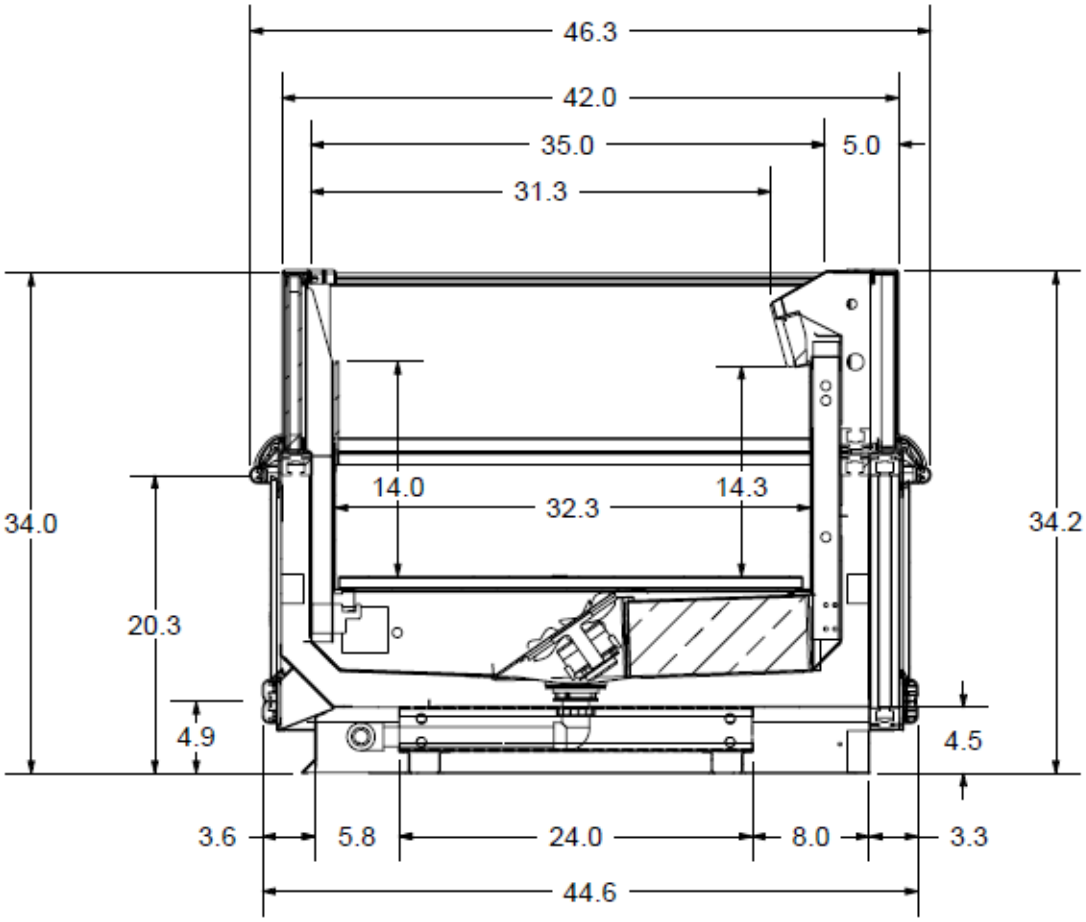
A variety of refrigerants can be used in the Kysor/Warren cases. Refrigerant type needs to be specified during case order so correct expansion valve will be equipped with the case (i.e., R–404A expansion valve required when the end user specifies R-404A refrigerant). Multiple expansion valves are available, depending on end user refrigerant requirements. Expansion valves are supplied for the refrigerant specified on the original sales order.

In addition, cases can be modified in the field to allow changing the type of refrigerant used. This requires changing the expansion valve and distributor orifice that is currently equipped in the case. Contact your Kysor/Warren Service Representative for additional information.

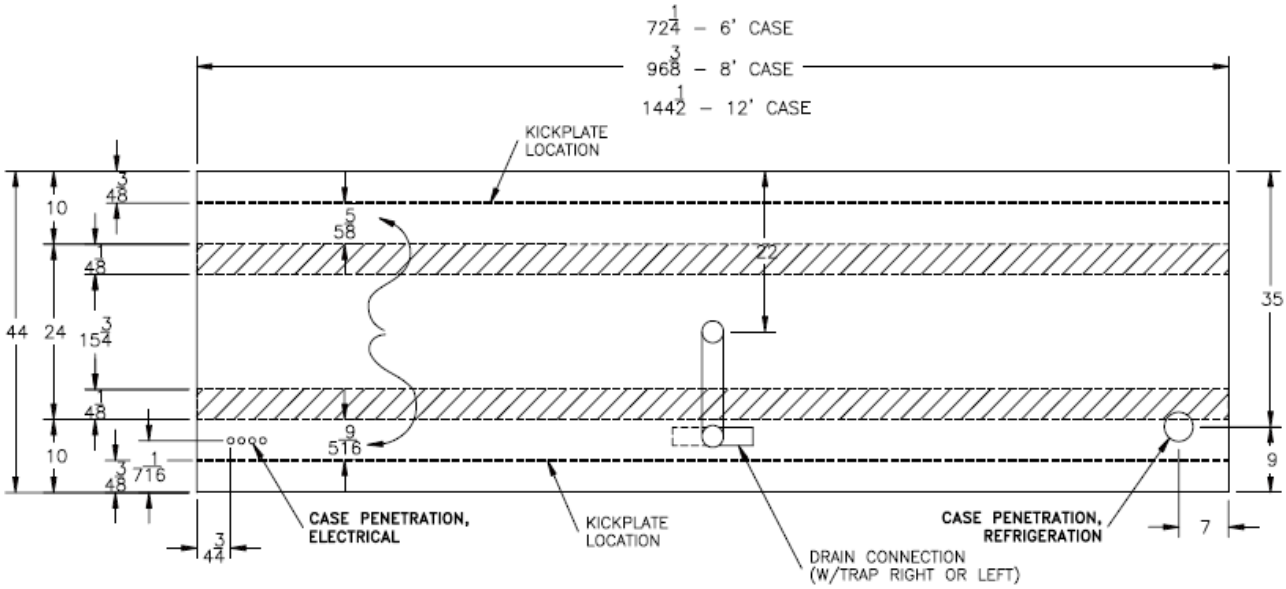
NOTE: *Refer to Case Data Control Settings for refrigeration requirements.*

Plan View and Cross-Sections

QILG Cross-Section



QILG Plan View



Case Data

QILG – 6 ft. 8ft. 12 ft. – (w/ three side Glass Front)

Capacities

Length (ft)	Facing Area (ft^2)	Cubic Capacity (ft^3)
6 ‘	39.5	19.8
8 ‘	53	26.4
12’	79	39.6

Refrigeration Data – Ice Cream

Length (ft)	BTUH – Fan Motors			Evaporator Temperature	Discharge Air	
	STD	PSC	ECM		Temperature	Velocity (1 hr. after defrost)
6’	2175	2115	2055	-20°F	-16°F	175 FPM
8’	2900	2840	2780			
12’	4350	4260	4170			

Refrigeration Data – Frozen Food

Length (ft)	BTUH – Fan Motors			Evaporator Temperature	Discharge Air	
	STD	PSC	ECM		Temperature	Velocity (1 hr. after defrost)
6’	1950	1890	1830	-15°F	-11°F	175 FPM
8’	2600	2540	2480			
12’	3900	3810	3720			

Refrigeration Data – Dairy Food

Length (ft)	BTUH – Fan Motors			Evaporator Temperature	Discharge Air	
	STD	PSC	ECM		Temperature	Velocity (1 hr. after defrost)
6’	1425	1365	1305	+24°F	+30°F	175 FPM
8’	1900	1840	1780			
12’	2850	2760	2670			

Electrical Data

Length(ft)	Fan Motor			Heaters			
	STD	PSC	ECM	Electric Defrost (Optional 230V)	Anti-Sweat	Drain Pan Heater (Electric Defrost)	Drain Heater (Hot Gas Defrost)
	Amps	Amps	Amps	Amps	Amps	Amps	Amps
6’	0.68/2	0.44/2	0.40/2	6.52	1.33	0.26	0.39
8’	0.68/2	0.44/2	0.40/2	9.37	1.35	0.26	0.65
12’	1.02/3	0.66/3	0.60/3	14.06	2.00	0.26	1.09

Defrost Controls

Defrost Type	Defrosts per Day	Fail Safe (Minutes)	Termination (°F)
Electric	1	45	48
Hot Gas	1	20	48
Off-Cycle	4	35	48

 ***NOTE:*** *All the BTU requirements shown in the case data are for use on parallel systems only. A minimum of 8% excess capacity should be added to all conventional single compressor condensing units.*

 ***NOTE:*** *The air current is very important to the performance of these cases. The load limit line (see load case selection) is the indicator of the inside edge of the air current and at no time should product, signs, debris, etc. interfere with air current.*

 ***NOTE:*** *All electrical data based on 115V and unlighted shelves. For lighted shelves, add 0.25 amps per shelf.*

 ***NOTE:*** *For sizing conventional/ individual condensing units, add 8% to BTU Load.*

 **NOTE**: Temperature is measured in discharge air. Defrost frequency is at design conditions. Higher temperature or humidity may require more defrost and longer fail-safes. These cases are not designed to operate environments where the ambient temperature is greater than 75ºF and the relative humidity is greater than 55%. Off-cycle defrost is the recommended defrost for all Q case models. Electric defrost and hot gas defrost are available for installations requiring a positive defrost.

 **CAUTION**: Failure to maintain maximum design conditions may result in operational issues such as: increased BTU load, high product temperature, coil icing, product frosting, and external sweating.

 **CAUTION**: Failure to properly install electrical wiring and control wiring as per wiring diagram(s), defrost settings, and temperature set-points may result in operational issues such as: increased BTU load, high product temperature, coil icing, product frosting, and external sweating.

Case Installation

These display cases may be installed individually or in a continuous lineup consisting of several 4', 8' and 12' sections using a joint kit.

Preparation

Prepare the installation area as follows:

1. Clean area where case is to be installed.
2. Verify installation area is at least 15 feet from any outside entrances or heating and cooling outlets.
3. Verify at least 2 feet of distance between hot and cold cases.

 **CAUTION**: To prevent condensation on the end panels of cases, a minimum of 6.0 inches between walls or other cases is required for airflow. If 6.0 inches is not possible, then the space between

the cases must be completely filled and sealed or an updraft fan kit must be installed to provide air circulation through the space.

4. Ensure floor loading will support the case and the case contents.
5. Ensure proper AC power is available. Refer to case AC input requirements located in the electrical connections section of this manual.
6. Ensure location will allow connection to drain lines and the drain line, when installed, will meet the recommendations as set forth in the refrigeration piping and dehydration section of this manual.
7. Ensure expansion valve in case is the proper valve for the type of refrigerant used at the installation site.

Installation

The following instructions are provided for unpacking, moving, loading, and lifting the case prior to installation.

 **NOTE**: READ ALL INSTRUCTIONS CAREFULLY BEFORE BEGINNING INSTALLATION.

Unpacking

1. Remove all shipping tape from lamps and ensure that all lamp ends are snapped in place.

 **CAUTION:** When removing the strapping in the following procedure, as the shelves are very heavy and could fall causing personal injury or equipment damage.

2. Ensure the evaporator cover is installed correctly with the deck pans installed.
3. Move the case into position, install, adjust superheat, and perform the operational checkout procedures following the instructions within this manual.

 **CAUTION**: Be careful not to damage the factory-installed end while moving the case. Use the case lift points on the case to move it to the proper location.

Installing First Case

1. Ensure all preparation for installation, as outlined in the above paragraphs, have been fully complied with and are complete.
2. If multiple cases are to be installed, find the highest area of the floor to place the first case.
3. Allow a minimum of 6 inches between the rear of the case and the store walls and/or other cases. This space reduces the possibility of condensation problems. It may be necessary to provide forced air ventilation in some installations.
4. All cases must be located on a firmly based floor and leveled within plus or minus 1/16 inch.
5. Use shims provided to support and level the entire length of your case(s). All rails of the case must be properly shimmed and in contact with the floor. Cases with shims on the ends must also have shims in the middle no more than 4 ft. apart. All legs of the case must be properly adjusted and in contact with the floor.
6. If multiple cases are to be installed, refer to the floor plan and install the first case in the lineup by snapping a chalk line where the front and rear of the cases are to be located.
7. Continue the chalk line if multiple cases are to be installed. The first case is typically the case that is at the highest area on the floor.

8. Connect water drain line. Reference waste outlet (drip pipe) description and location procedure.
9. Connect input AC power. Reference the electrical installation procedure later in this manual.
10. Connect refrigerant lines. Reference the procedure later in this manual.
11. Install all ends, caps, and trim per the applicable instructions contained in this manual.
12. Remove shipping tape on fluorescent lamps (if applicable) and remove all other shipping material.
13. Refer to the operational start up procedures later in this manual. If multiple cases are to be installed, refer to the following paragraph for installing subsequent cases.

Installing Subsequent Cases

If additional cases are to be installed, follow the same procedures as described in the installing first case procedure (above), in addition to the following:

1. Move cases as near their permanent location as possible before removing shipping braces, skids or rollers.

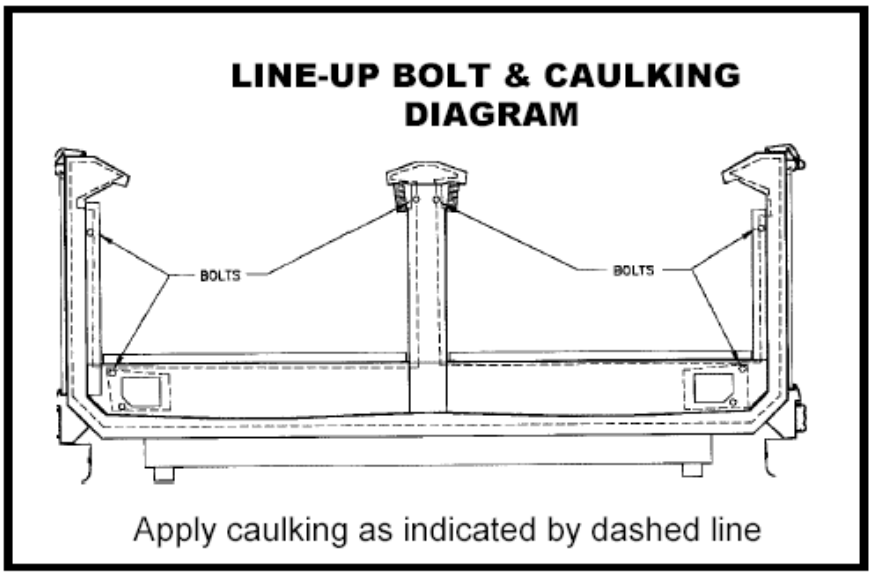
NOTE: All cases are factory numbered with lineup and position numbers. Make sure that cases are installed in order (lineup sticker found on the fan plenum or door and on the back panel of the case).

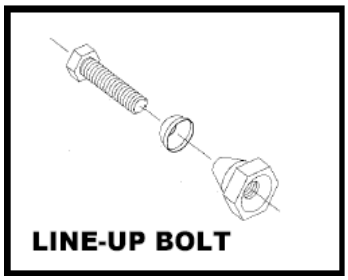
2. Remove skids and shipping braces.
3. Ensure all case expansion valves are correct.
4. Do not install electrical, drain lines, or refrigerant lines until all the cases have been set/placed into position and properly leveled.
5. Do not install case trim, ends, or caps until all cases have been set into position and properly positioned and leveled.
6. Before lining up cases use the front and rear edges as a baseline to inspect refrigeration lines, electrical connections and controls, and to insure cases are in proper lineup and are in proper sequence.
7. Remove shipping tape on fluorescent lamps (if applicable) and remove all other shipping material. Follow all joining instructions listed below to connect cases in a lineup.

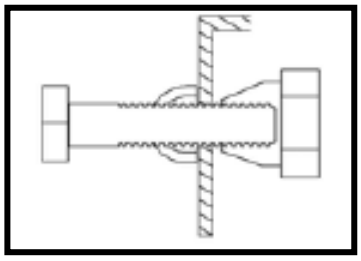
Joining Instructions

Two or more cases of like models can be joined together to form a continuous lineup. Before lining up cases, inspect refrigeration lines, electrical connections and controls to insure cases are in the proper lineup and sequence. Reference and become familiar with the below figure, then join the cases using the instructions that follow.

Lineup Bolt Holes on the Side of the Cases - See Caulking Diagram Below







1. Apply foam insulation tape and caulking around the side of the case as shown in the diagram above.
2. Remove access covers over lineup holes and insert the small lineup bolts (see previous diagram) in the end frame in the bolthole pattern. Place the special T-nut washer on the 3/8" machine bolt with the hollow section away from the bolt head. Tighten the 3/8" bolts with nut washer into the T-nuts alternately until cases are pulled up tight and the joint is completely sealed. (Reasonable care should be exercised in this procedure to prevent end frame distortion.) Assist pulling case up tight by bumping from opposite end of case or by using pry bar.
3. Inspect joint for proper air and watertight seal inside and outside the case.
4. Replace lineup access cover plugs and plates.
5. Move cases as close together as possible and level by using the shims provided (same as original case). Use shelf standard struts for alignment to be sure cases are level.

CASES MUST BE LEVELED FROM FRONT TO BACK END-TO-END AND SUPPORTED CONTINUOUSLY AS NEEDED WITH SHIMS.

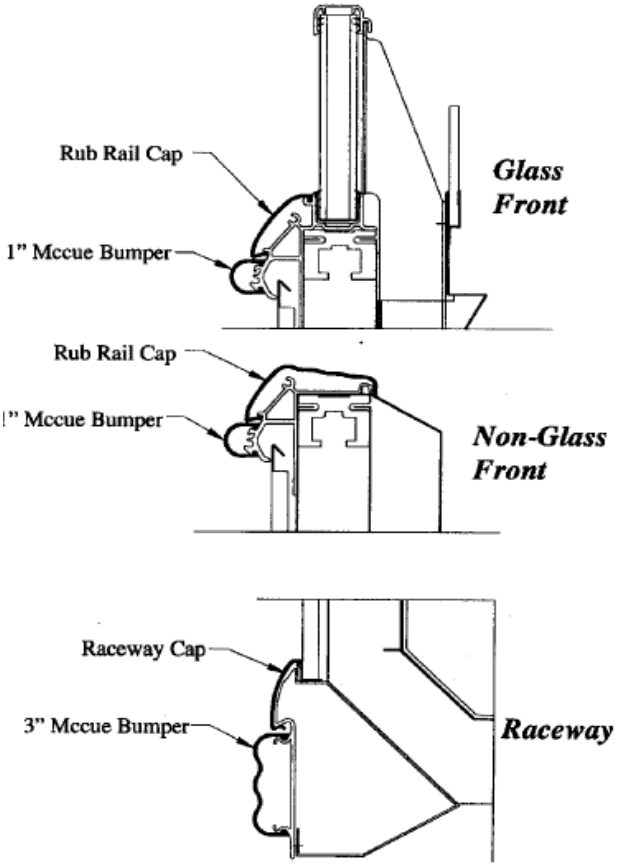
Installation of Trim, Caps, & Shelves

We offer several different trim packages and different models. Below are basic instructions for our 3000 trim and may or may not apply to the specific model you have. For other trim packages or questions not answered below, please contact the Technical Service Department at Kysor/Warren (800-866-5596).
Case front part selection and case trim selection are provided in the information that follows:

Case Front Part Selection

For Cases in a Lineup:

- Rub Rail Cap Starter 1/lineup Std. or w/ptm
- Raceway Cap Starter 1/lineup
- 1” McCue Bumper Starter 1/lineup
- 3” McCue Bumper Starter 1/lineup
- Rub Rail Cap 1/case Std. or w/ptm
- Raceway Cap 1/case
- 1” McCue Bumper 1/case
- 3” McCue Bumper 1/case



For Single Case:

- Rub Rail Cap 1/case Std. or w/ptm
- Raceway Cap 1/case
- 1” McCue Bumper 1/case
- 3” McCue Bumper 1/case
- Canopy End Trim 2/lineup
- Glass Cap End Trim 2/lineup
- Glass Cap Joint Trim 1/joint
- Front Panel End Trim 2/lineup

Case Trim Selection

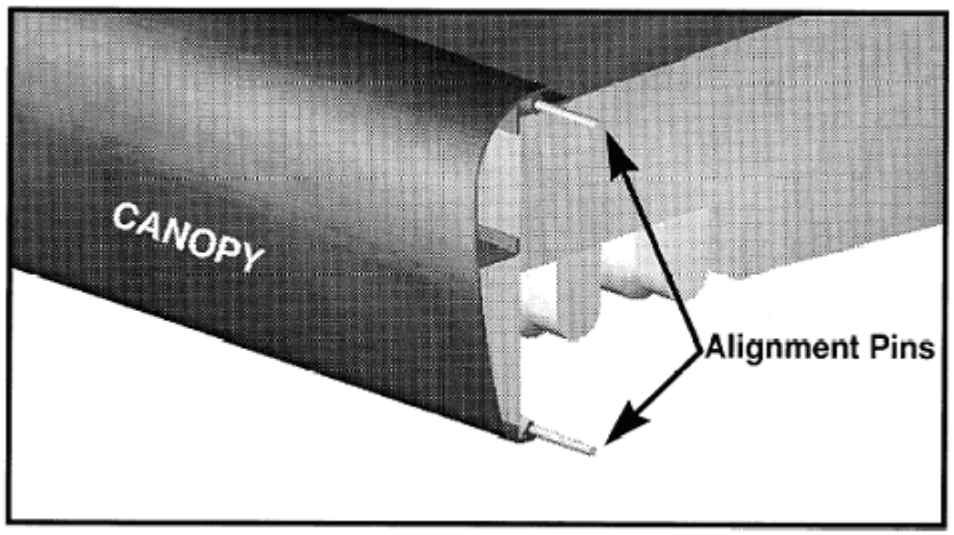
Trim is provided on the right and left end cases only. All exterior panels slide from right to center and left to center.

For Single Case with Two Ends:
The trim is factory installed.

For Mutual End in a Lineup:
Proper additional piece of end trim should be used.

Canopy

After the display cases are properly joined and sealed, align the canopies by sliding the alignment pins across the joint from one canopy into the adjoining canopy. It may be necessary to loosen and/or remove the screws at the top of the canopy to aid in the alignment of the two canopies and to eliminate any gap between the canopies. The screws should be tightened after canopies are aligned.
Align the case front rails with a single alignment pin sliding the pin across the joint into the adjoining



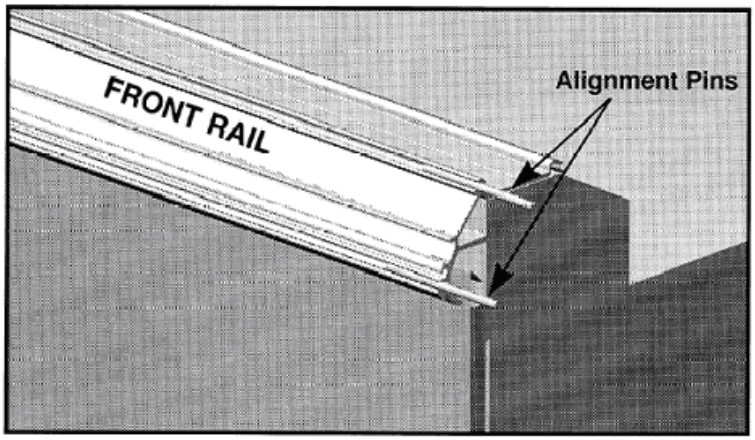
front rail. It may be necessary to loosen the screws holding the front rail to aid in the alignment process. The screws should be tightened after the front rails are aligned.

For Single Case with Two Ends:
Trim is factory installed.

For Mutual End in a Lineup:
Proper additional piece of end trim should be used.

Front Rail Alignment

After the display cases are properly joined and sealed, Align the case front rails with a single alignment pin sliding the pin across the joint into the adjoining front rail. It may be necessary to loosen the screws holding the front rail to aid in the alignment process. The screws should be tightened after the front rails are aligned.

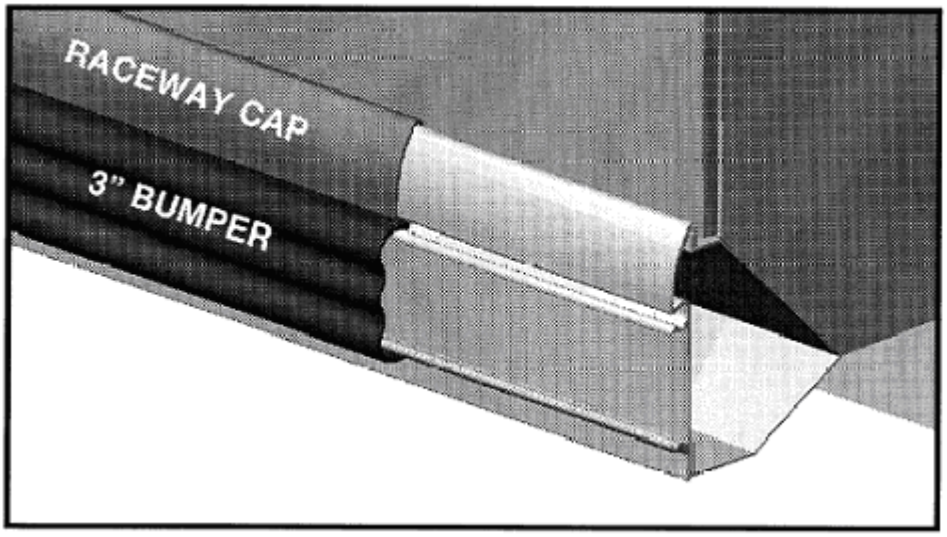


3" Bumper

Install the 3" bumper parts to the raceway using the same procedure as described for the 1" bumper parts.

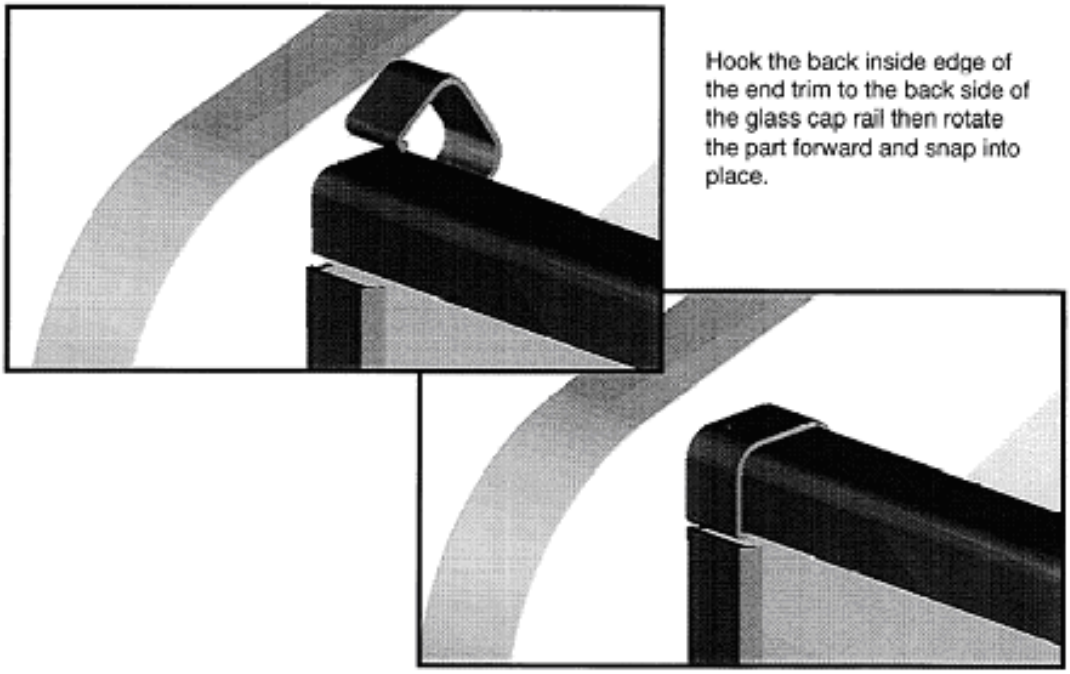
Raceway Cap

Install the raceway cap parts to the raceway using the same procedure as described for the rub rail cap.



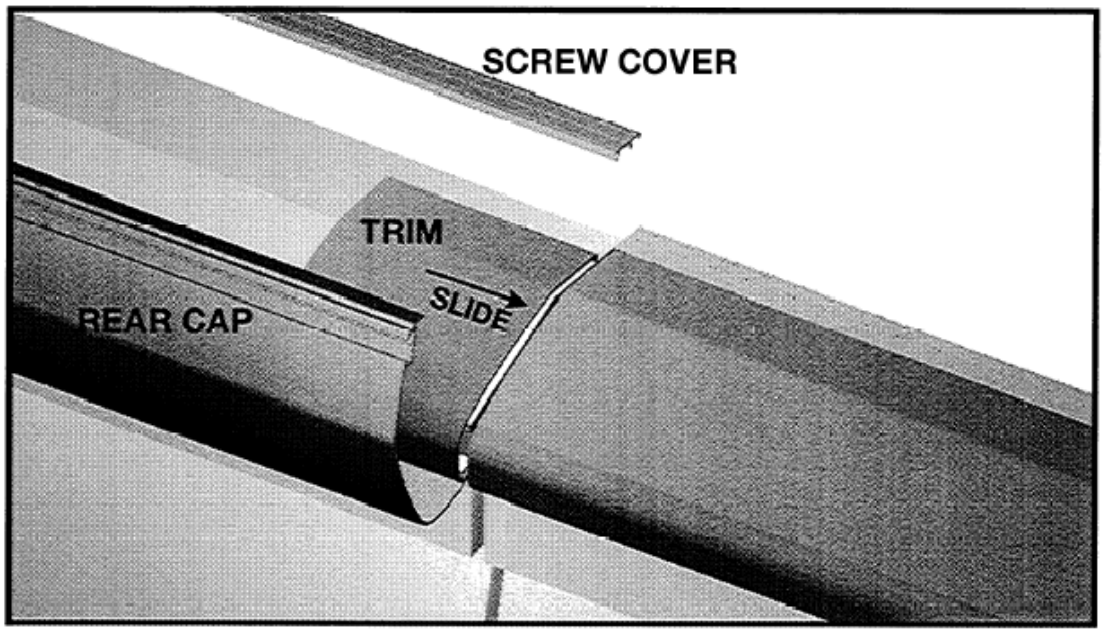
NOTE: The raceway cover parts do not overlap as the rub rail cap parts do.

Glass Cap Rail End Trim Installation - Glass Models

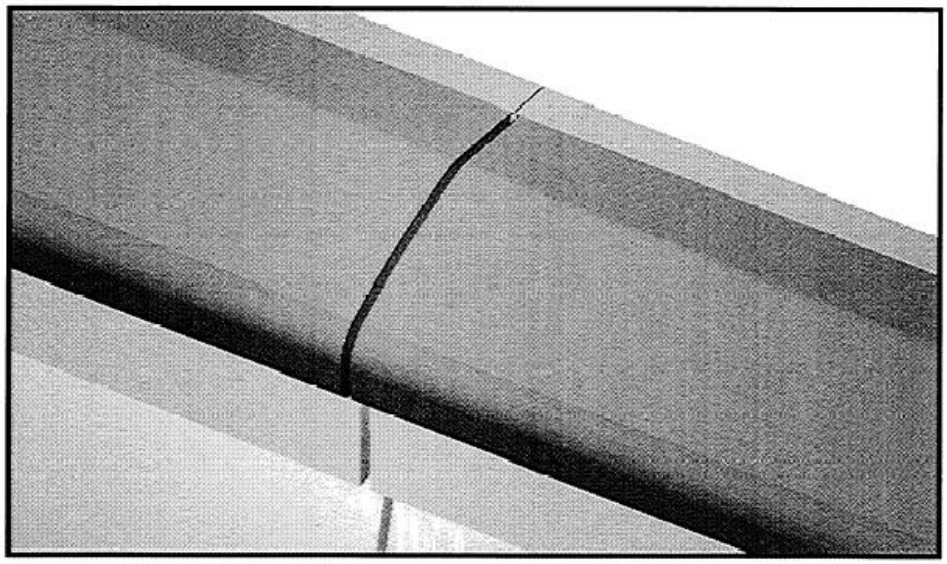


Rear Cap Joint Trim Installation

After the display cases are properly joined and sealed, remove the screw cover from the rear cap of every other case in the lineup and remove the screws from the rear cap. Rotate the rear cap forward (the alignment pins will hold it in place) and position the trim as shown in the illustration. Slide the trim across the case joint under the rear cap of the adjoining case about half the width of the trim.



Rotate the rear cap back into place over the trim and secure the rear cap and screw cover. Repeat this procedure for each case joint.



Bumper, Rub Rail Cap, and Raceway Cover Installation

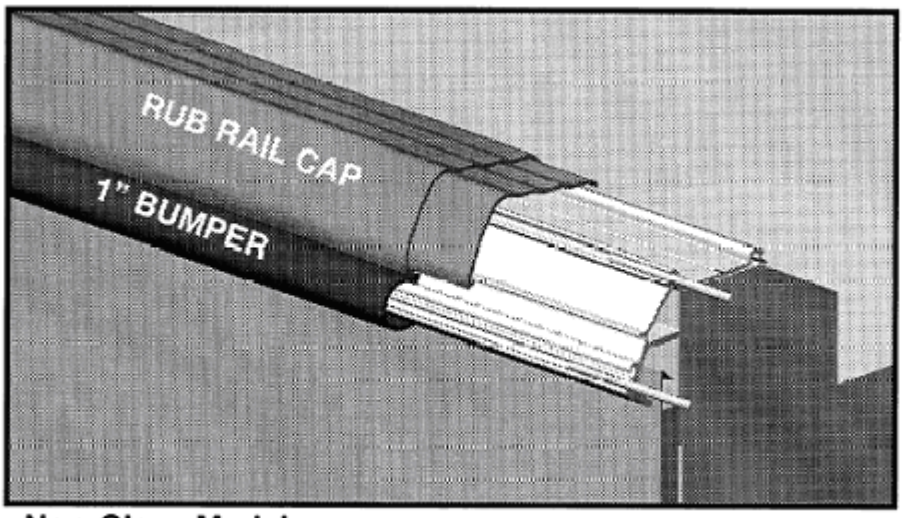
1” Bumper

Install the two-foot length of 1” bumper to the left hand end of the first case in the lineup. To install the bumper, hook the lower edge of the bumper to the aluminum retainer. Rotate the bumper up and snap the top edge onto the retainer. Install this part as close to the case flat end panel as possible.
Install the additional case length 1” bumper parts, crossing over the joint of the cases in the lineup and trimming the last piece to fit the last case in the lineup.

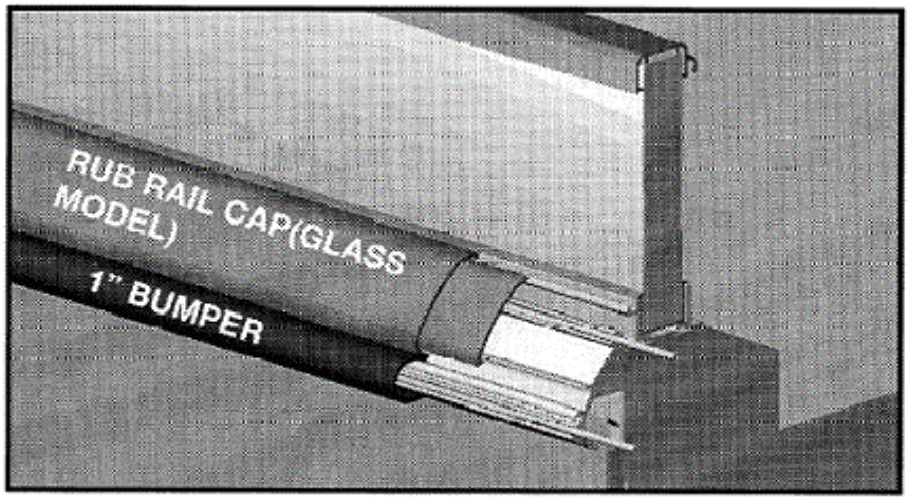
Rub Rail Cap

Install the four foot rub rail cap to the left hand of the first case in the lineup. To install the rub rail cap hook the lower edge of the cap to the aluminum front rail just above the 1” bumper. On non-glass models, rotate the cap toward the case and snap the cap onto the back hook of the aluminum front rail. For glass models, rotate the cap toward the case and snap the cap onto the top hook of the aluminum rail. Install this part as close to the case flat end panel as possible.

Install the additional case length rub rail cap parts as close to one another as possible, crossing over the joint of the cases in the lineup and overlapping each part where provided. Trim the last part to fit the last case in the lineup.



Non-Glass Model



Glass Model

NOTE: If a mutual end is used in a lineup, the proper additional pieces of trim should be used.

Waste Outlet (Drip Pipe) Description and Location

These cases are equipped with 1 ½" M-NPT waste outlet connection that terminates in the center of the refrigerator below the insulated bottom. The water seal trap is shipped unattached for field installation.

NOTE: Improperly installed drip pipes can seriously effect the operation of this case and result in increased maintenance costs. Listed below are some general rules for drip pipe installation:

- Never use a double water seal.
- Never use a pipe smaller than the size pipe or water seal supplied with the case.
- Always provide as much fall as possible in drip pipe. (1" fall for each 4' of drip pipe.)
- Avoid long runs in drip pipe, which make it impossible to provide maximum fall in pipe.
- Provide a drip space between drip pipe and floor drain or sewer connection.

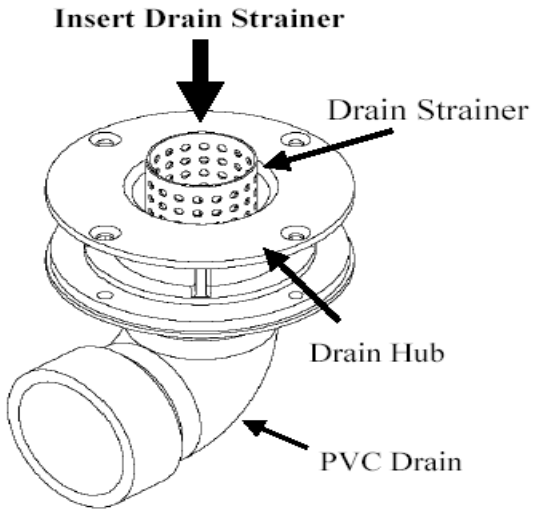
- Do not allow drip pipe to come in contact with un-insulated suction lines, which will cause the condensation from your case to freeze.

Drain Strainer

NOTE: Not all of our cases have drain strainers. This information applies only to the cases equipped with the strainers.

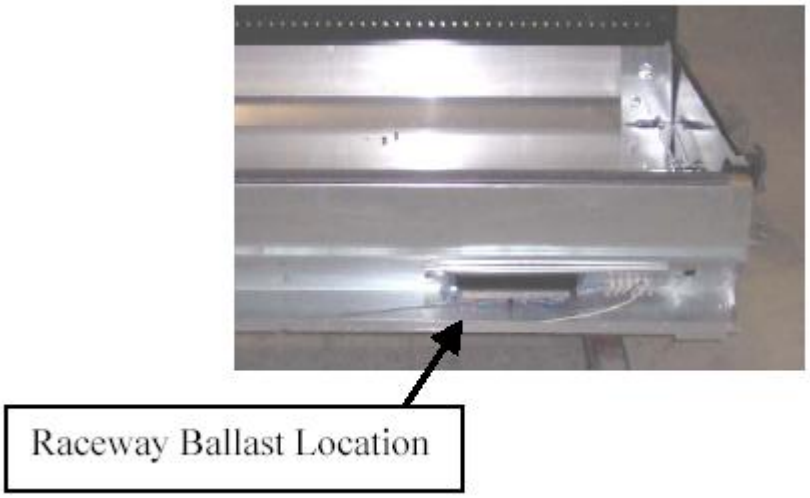
- Purpose: Keep debris or any foreign objects from entering the PVC drain, which could cause blockage.
- Installation: Insert into drain until drain strainer stops - it will not be flush. The strainer will exceed the hub by 1".
- DO NOT flatten drain strainer.

NOTE: 1 ½" Drain Pipe



Electrical Connections - General

Cases are standard with one row of high output lamps. Ballasts are located in the raceway. If lighted shelves are supplied, ballasts for each shelf will be located under each shelf in the electrical raceway. See wiring diagram for layout.



WARNING! It is imperative that the pins of the bulbs and the shelf power cords be completely seated in their respective lamp holder or receptacle. If they are not completely seated, an electrical arc could occur which will cause the lamp holders or the shelf light receptacles to melt and become an electrical hazard. Care must be taken during cleaning, product stocking and re-lamping processes to insure that the bulbs and shelf cords are not dislodged.

NOTE: The fluorescent bulb is capable of lighting even if the bulb and shelf power cord are not completely seated.

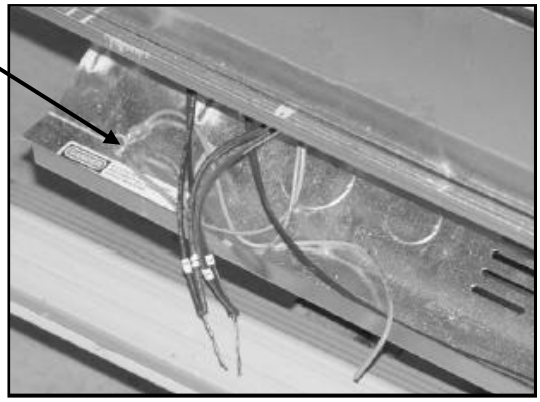
WARNING! Ensure the Kick plate does not come in contact with the case electrical wiring. Live electrical wiring that comes in contact with the case is a shock hazard that may cause severe injury or death by electrocution.

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 light bulbs. Failure to disconnect the electrical power may result in personal injury or death.

Electrical Termination

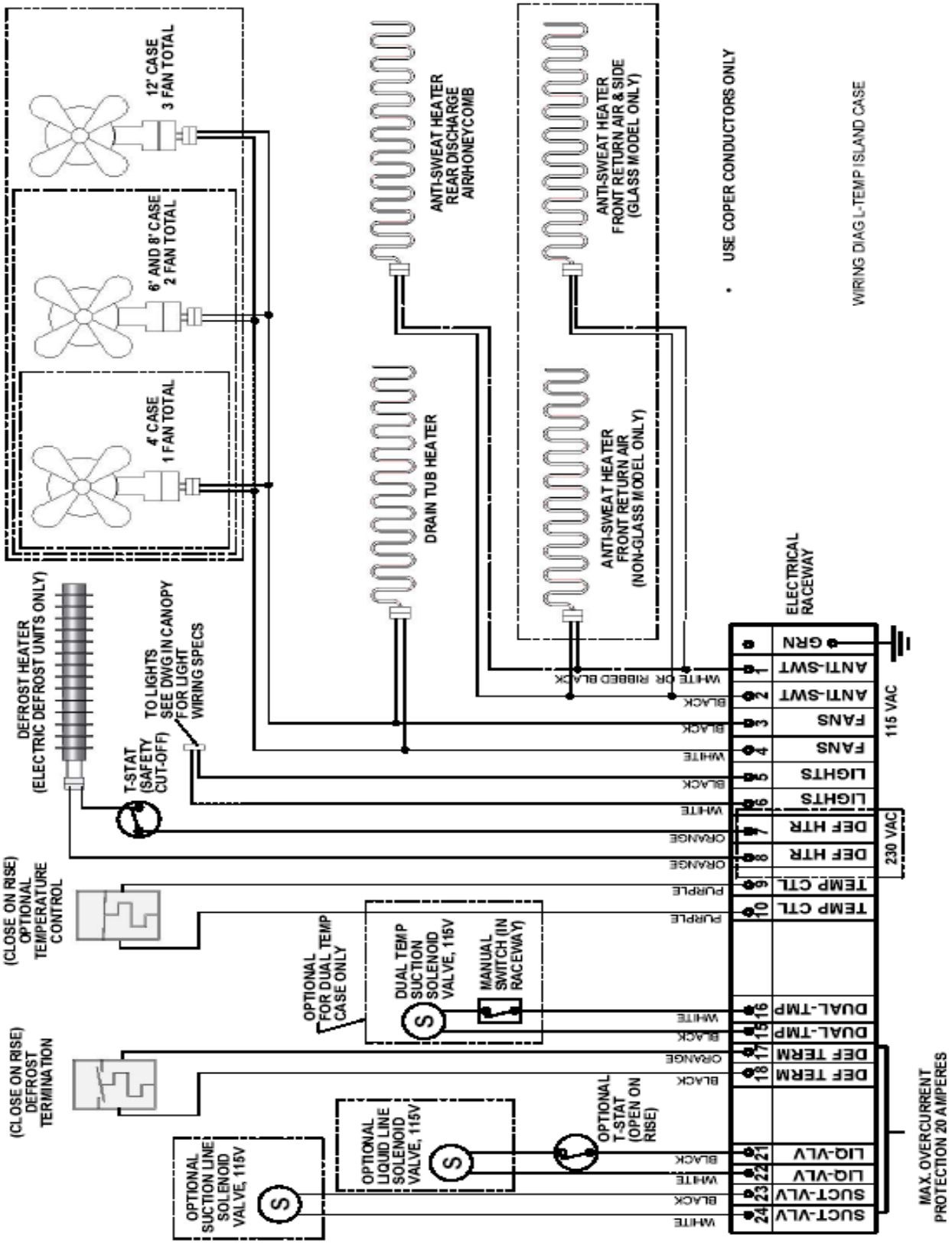
The wires are clearly identified for termination purposes as follows:

All electrical connections are made in the electrical raceway.

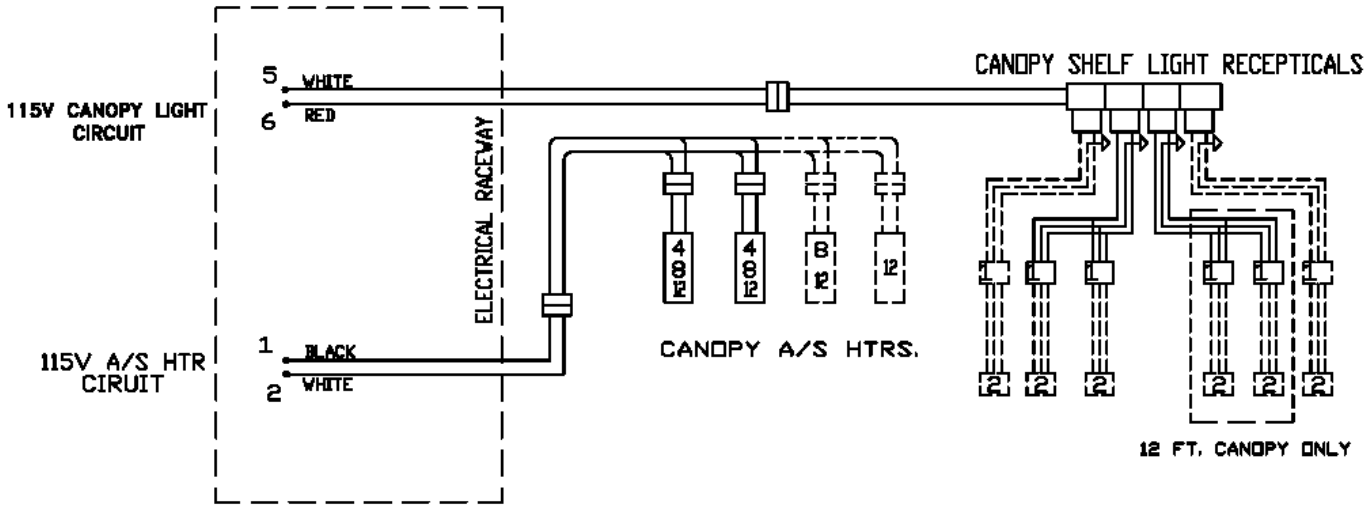


Component	**Wire Number**
Anti-Sweat Heater	1 and 2
Refrigerator Fan Motors and Drain Heater	3 and 4
Lighting Circuit	5 and 6
Defrost Heaters	7 and 8
Temperature Control	9 and 10
Dual Temperature	15 and 16
Defrost Termination Control	17 and 18

Wiring Diagram (Per Side)



Canopy One (1) and Two (2) Light Rows

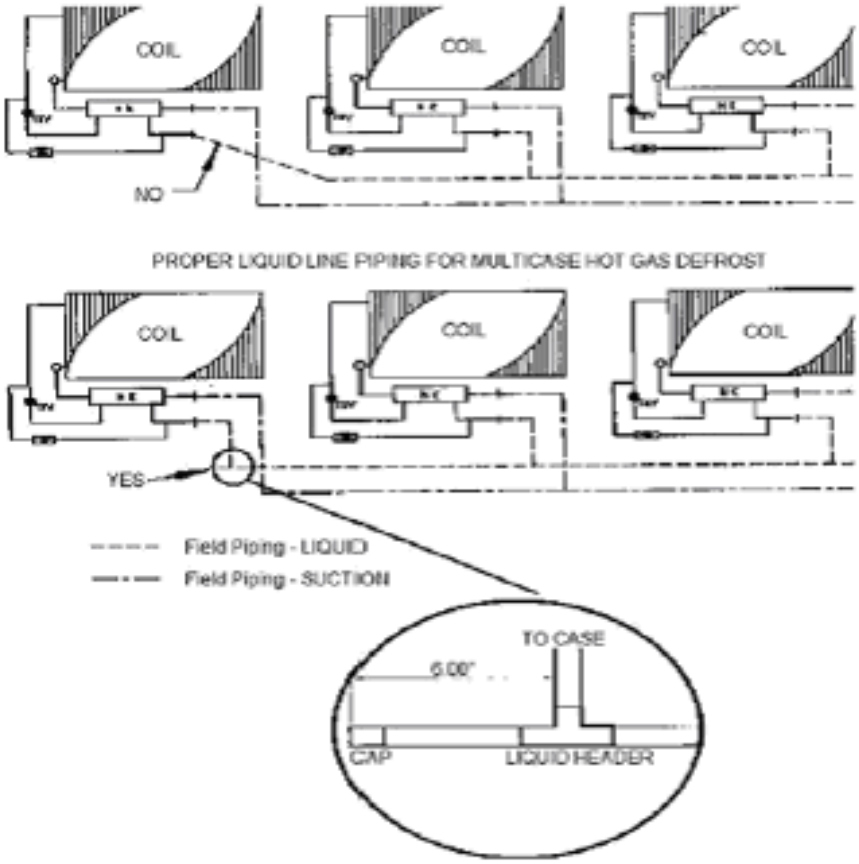


Refrigeration Piping and Dehydration

Opening a Ferrule Hole

The refrigeration lines are located under the deck pans. A refrigeration outlet is provided in all four corners. All refrigeration lines need to be as close to the drain pan as possible so as not to obstruct the air pattern or block the deck pans. After refrigeration lines have been connected and pressure tested, fill case pipe penetration with spray foam. Let spray foam dry, cut excess foam flush with inside of case bottom and then add a layer of silicone sealant for a water tight seal.

Recommended Piping Instructions



1. Proper size refrigeration lines are essential to good refrigeration performance. Suction lines are more critical than liquid or discharge lines. Oversized suction lines may prevent good oil return to the compressor. Undersized lines can rob refrigeration capacity and increase operating costs.
2. Refrigeration lines in cases in lineups can be reduced. However, the lines should be no smaller than the main trunk lines in at least 1/3 of the cases and no smaller than one size above the case lines to the last case. Reductions should not exceed one line size per case. It is preferred to bring the main trunk lines in at the center of lineup. Liquid lines on systems on hot gas defrost must be increased one line size above the main trunk line for the entire line-up. Individual feed lines should be at the bottom of the liquid header. (See proper liquid line piping diagram).
3. Do not run refrigeration lines from one system through cases on another system.
4. Use dry nitrogen in lines during brazing to prevent scaling and oxidation.
5. Insulate suction lines from the cases to the compressor with 3/4" wall thickness foam on low temperature cases to provide maximum of 65-degree super heated gas back to the compressor and prevent condensation in exposed areas. Insulate suction lines on medium temperature cases with 1/2" thick insulation in exposed areas to prevent condensate dropped.

6. Suction and liquid lines should never be taped or soldered together. Adequate heat exchanger is provided in the case. Kysor/Warren recommends use of heat exchanger in all medium and low temperature cases that are not mechanically sub-cooled for proper operation.
7. Refrigeration lines should never be placed in the ground unless they are protected against moisture and electrolysis attack.
8. Always slope suction lines down toward the compressor, 2" each 10'. Do not leave dips in the line that could trap oil.
9. Provide P traps at the bottom of suction line risers that are 4 feet or longer. Use a double P trap for each 20 feet of risers. P traps should be the same size as the horizontal line. Consult the technical manual or legend sheet for proper size risers.
10. Use long radius ells and avoid 45 degree ells.
11. Provide expansion loops in suction lines on systems on hot gas defrost. An expansion loop is required for each 100' of straight run.
12. Strap and support tubing to prevent excessive line vibration and noise.
13. Brazing of copper-to-copper should be with a minimum of 10% silver. Copper to brass or copper to steel should be with 45% silver.
14. Do not use bullhead tees in suction lines. Example: when suction gas enters both ends of the tee and exits the center. This can cause a substantial increase in pressure drop in the suction lines.
15. When connecting more than one suction line to a main trunk line, connect each branch with an inverted trap.
16. Suction Lines
    a. Should be pitched in the direction of flow.
    b. Should enter at the top of the branch line.
    c. May be reduced by one size at 1/3 of case run load and after 2/3 of case run load. DO NOT reduce below the case suction line size.

Expansion Valve and Superheat

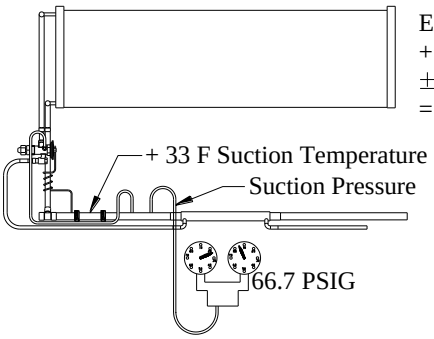
Expansion valves are supplied for the refrigerant specified on the original sales order.

CAUTION: During service of this equipment, precautions should be taken to prevent loss of refrigerant to the atmosphere. Always install the expansion valve stem cap after making valve adjustments.

The expansion valve furnished with your case has been sized for maximum coil efficiency. To adjust superheat, perform the following:

1. Place a thermocouple near the expansion valve bulb. Read the suction line pressure as near coil as possible. (If at the condensing case, estimate suction line loss at 2 PSIG).
2. Convert coil suction pressure to temperature. The difference between coil temperature and the thermocouple temperature is superheat. (Use average superheat when expansion valve is hunting).
3. Do not set Superheat until cases have been pulled down to operating temperature. Never open or close the valve over ¼ turn between adjustments. Allow 10 minutes or more between adjustments.
4. Superheat should be set to 6-8°F.
5. After the initial setting, the superheat should be rechecked when product is stocked and at desired temperature.

Superheat Calculations



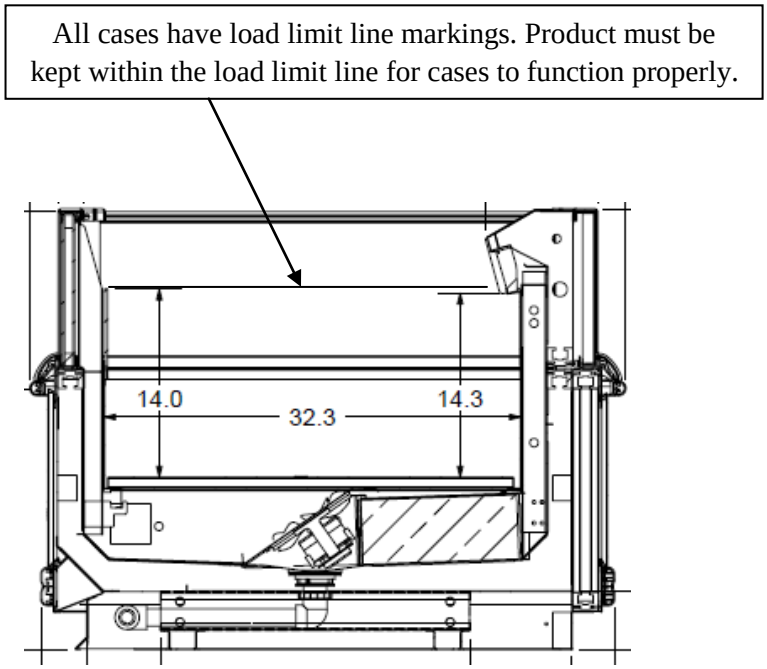
Example: R404
+ 33 F Suction temperature
± 28 F Suction pressure converted to temperature
= +5 F Superheat

Operation

Loading

Merchandise should not be placed in the fixture until all controls have been adjusted and the case is at the proper temperature.

NOTE: AT NO TIME SHOULD THE CASE BE STOCKED BEYOND THE LOAD LINE OR OVER THE FRONT EDGE OF ADJUSTABLE SHELVES.



Do not place product in cases until it is at proper operating temperature. Air discharge and return flues must remain open and free of debris or obstruction at all times to provide proper refrigeration and air current performance. Do not allow any product, signs, debris, etc. to block these grilles. Do not use any non-approved shelving, display racks or any accessory that could hamper air current performance.

 **WARNING! Do not walk on top of the cases!** This could result in damage to the case and serious personal injury could occur. These cases are not designed to support excessive external weight. Do not use top of cases for storage.

Normal Operation

Below are the different operation methods for our cases. Cases vary depending on application and how they were specifically ordered. Review the data plate on your cases and refer to the Case Data previously listed in this manual for your models specific information.

1. Off-Cycle Defrost. The fans run continuously and defrost termination is by termination Klixon.
2. Electric Defrost models are optional. Electric heaters are utilized to melt the frost and ice on the coil. The heaters are located in the air stream in front of the coil. The defrost cycle is time initiated and should be temperature terminated. Case fans operate continuously in defrost and refrigeration. As a safety precaution, a safety cutoff Klixon is wired in this series with the defrost heater set to turn the heater off at temperatures above 70°F.
3. Hot Gas Defrost models are optional for parallel compressor operation only. Hot gas is routed through the suction line and evaporator coil. It exits the coil through a by-pass around the expansion valve and heat exchanger, in order to return to the liquid line. The condensed liquid is then used to feed the other cases on the parallel case. The display case' fans continue to operate during defrost to warm up the drain pan and air ducts. The defrost cycle is time-initiated and should be temperature terminated.
4. Single Condensing Case Systems. A thermostat should be used to control case temperatures. The thermostat bulb should be mounted in the discharge air.

 **NOTE**: Heat exchangers are standard in hot gas defrost models. They aid in increasing operating efficiency and reducing frosting and flood-back to the compressor. Heat exchangers may not be used if mechanical subcooling is incorporated in the system design.

Cleaning

As a general rule, always use mild soap and water to wipe the case down. Special precautions must be taken when cleaning some components of the case.

Exterior surfaces should be cleaned with warm water and mild soap to protect and maintain the finish. **Do not use cleaners containing abrasive materials or ammonia, which will scratch or dull the finish.** The waste outlet should be flushed with water following each cleaning.

Interior surfaces may be cleaned with most mild soap formulas, as well as ammonia based cleaners and sanitizing solutions. These cleansers should not harm the interios surface.

 **WARNING!** Always shut power off during the cleaning process. Cleaning the case with electrical power applied is a shock hazard that may cause serious injury or death.

WARNING! DO NOT USE HOT water on COLD glass surfaces. This could cause the glass to shatter and could result in personal injury. Glass fronts and ends should be warm before applying hot water

CAUTION: The following could damage the case:

- Do not use solvent, oil or acidic-based cleaners on any interior surfaces as the surface may become damaged.
- Do not use abrasive cleaners and scouring pads, as these will mar the finish.
- Never introduce water into the case faster than the waste outlet can release it.
- **DO NOT USE STEAM OR HIGH PRESSURE SYSTEMS TO CLEAN THE CASE AS SEALS MAY BE BROKEN WHICH WILL CAUSE THE CASE TO LEAK.**

Shelves

Do not use a hose or submerge shelves in water. Wipe the shelves clean with a wet sponge or cloth so that water will not enter the light rails.

Mirrors

Mirrors are sheets of clear glass that have a very thin reflective coating applied to one side. These coatings are susceptible to deterioration if certain cleaning solutions and even water are allowed to come in contact with them. Every precaution should be made to keep liquids away from the coated side of the mirrors. If liquids are allowed to flow along the face side of the mirror to its edge, the liquid can seep between the coating and the glass, causing serious damage.

To help prolong the life of the mirrors:

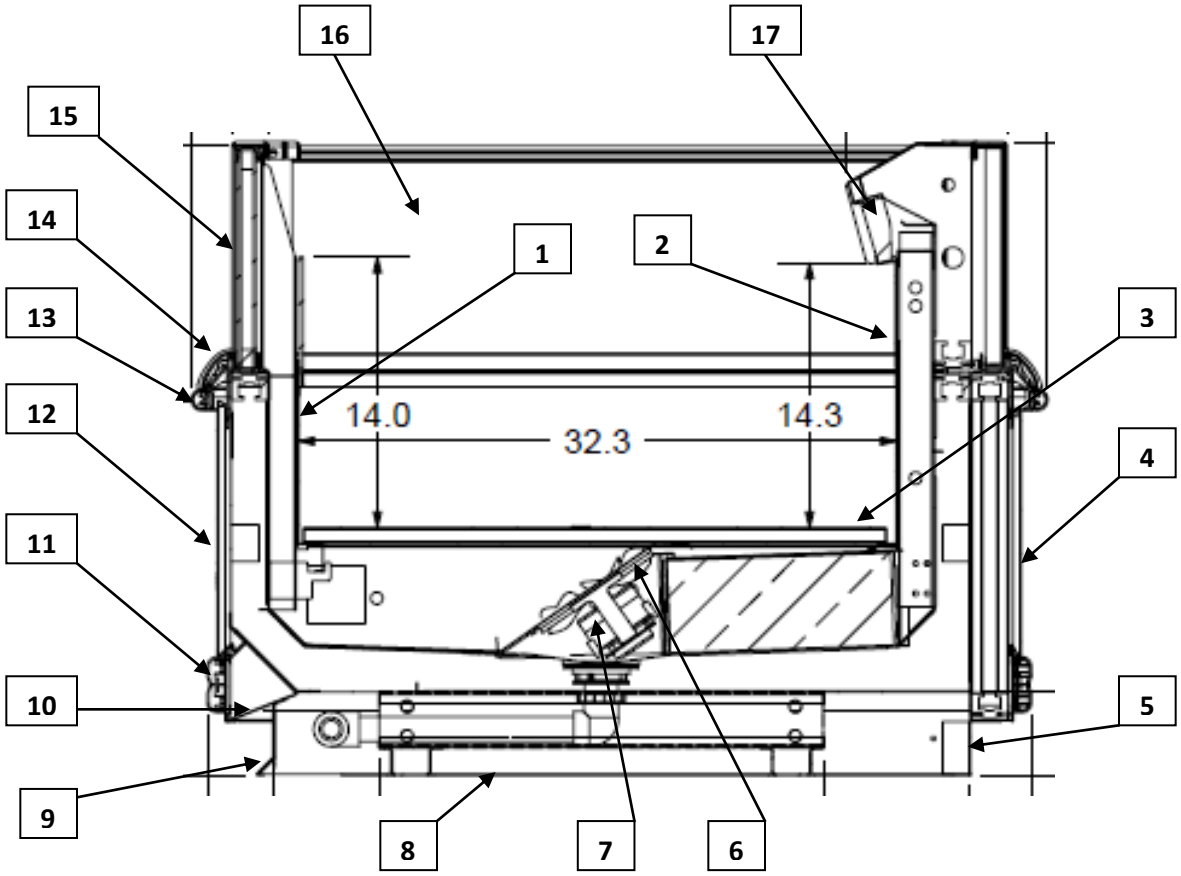
- Use only mild cleaning solutions (Windex, Solox, or a weak solution of vinegar and water.)
- Do NOT spray liquids on mirrors. Dampen the cleaning cloth, and then use the cloth to wipe the mirror.
- Wipe water from the mirrors immediately to prevent difficult to remove water spots and also to prevent the water from reaching the mirrors edge.
- Never use dirty cloths, scrapers or any other abrasive materials for cleaning.

Honeycomb Assembly

Honeycomb should be cleaned every 6-8 months, depending on store conditions. The Honeycomb may be cleaned with a vacuum cleaner or be removed and washed with soap and water. The honeycomb must be completely dry before returning it to the case.

***NOTE**: The position and angle of the honeycomb when removing from the case. Honeycomb must be replaced at the same angle.*

Parts List and Drawings



1	Return Baffle	10	Raceway
2	Discharge Baffle	11	3” Bumper
3	Deck Pan	12	Upper Front Exterior Panel
4	Upper Rear Exterior Panel	13	1” Bumper
5	Rear Kickplate	14	Rubrail
6	Fan Motor	15	Insulated Front Glass
7	Fan Blade	16	Insulated Side Glass
8	End Kickplate	17	Honeycomb
9	Front Kickplate		

Parts List

Description	Part No.	Quantity		
		6 ft	8 ft	12 ft
Expansion Valve	(See Note)			
Evaporator Coils	05A20399	2		
	05A20400		2	
	05A20401			2
Evap Fan Mtr STD (5W 115V)	09A10098	4	4	6
Evap Fan Mtr PSC (6W 115V)	09A10097	4	4	6
Evap Fan Mtr ECM (6W -12W 115V)	09A10107	4	4	6
Evap Fan Blade (7" - 20 Deg)	09B10013			
Evap Fan Blade (7" - 15 Deg)	09B10045	4	4	6
Drain Pan Heater (Electric Defrost)	10K12209	2	2	2
Drain Pan Heater (Hot gas Defrost)	10K12219	2		
	10K12220		2	
	10K12223			2
Defrost Heater (Electric)	10K10128		2	
	10K10198	2		
	10K10199			
	10K10127			2
Fan Wiring Harness (2 fan)	10M10151			
Fan Wiring Harness (3 fan)	10M10148	2	2	
Fan Wiring Harness (4 fan)	10M10152			
Deck Pan – PTD	54N18287	6	8	12
Deck Pan – BRT	55M16059	6	8	12
Deck Pan – PTD (end case)	54N18567			
Deck Pan – BRT (end case)	55M16158			
Honeycomb White	13A15133	2	4	6
Honeycomb Black	13A15134	2	4	6
Honeycomb White	13A15137			
Honeycomb Black	13A15138			

***NOTE**: The above diagram and list of parts is a complete listing for the basic QWST unit.*

***NOTE:** Standard parts are provided in the parts lists. Cases may be equipped with specialty parts that were incorporated into the case(s) at the time they were manufactured. It is important to have the case serial number when contacting Kysor/Warren for replacement parts.*

Warranty

IN THE CONSTANT EFFORT TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO CHANGE AT ANY TIME SPECIFICATIONS, DESIGN, OR PRICES WITHOUT INCURRING OBLIGATION.

One-Year Warranty

KYSOR/WARREN warrants to the original purchaser this new equipment and all parts thereof, to be free from defects in material and workmanship under normal use and service. If any part or parts of the equipment should prove defective during the period of one year from installation date (not to exceed one year and thirty days from the date of original shipment from the factory), KYSOR/WARREN hereby guarantees to replace or repair, without charge (F.O.B. Columbus, Georgia), such part or parts as proven defective, and which KYSOR/WARREN'S examination disclosed to its satisfaction to be thus defective, with a new or functionally operative part. The liability of KYSOR/WARREN under this warranty shall be limited to claims made by the original purchaser to KYSOR/WARREN or its local distributor within the warranty period.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED OR STATUTORY, INCLUDING, BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR FITNESS, AND ALL OTHER OBLIGATIONS OR LIABILITIES OF KYSOR/WARREN.

I. **GLAZING:**

Glass is not guaranteed against breakage. If this refrigerator is equipped with a glazing assembly carrying the manufacturer's brand name (Thermopane, Twindow, etc.), the manufacturer's glazing warranty in effect at the time of this shipment is extended to that assembly. It is void outside the continental United States.

II. **BULBS:**

Light bulbs and fluorescent lamp tubes are not covered by any warranty for length of life or for any type of breakage.

III. **THIS WARRANTY SHALL NOT APPLY:**

1. To the condensing case used with refrigerated equipment unless it was sold and shipped by KYSOR/WARREN.
2. When this equipment or any part thereof is damaged by fire, flood, act of God, or when the original model and serial number plate has been altered, defaced, or removed.
3. When this equipment or any part thereof is subject to accident, alteration, abuse, misuse, tampering, operation on low or improper voltages, or is put to a use other than recommended by KYSOR/WARREN.
4. When this equipment or any part thereof is damaged, or when operation is impaired due to failure to follow installation manual (improper installation is the responsibility of the installer).
5. Outside the continental United States, Canada and Mexico.
6. To labor costs for replacement of parts, or for freight or shipping expenses.
7. To freight or shipping charges or to customs duties to any country.
8. If the Warranty holder fails to comply with all the provisions, as well as terms and conditions of this Warranty.
9. Parts replaced under this Warranty are warranted only through the remainder of the original Warranty. KYSOR/WARREN may, at its option and in its discretion, elect to honor this

Warranty and to disregard the original purchaser's non-compliance with any of the provisions, terms and conditions of the Warranty.

THIS WARRANTY DOES NOT COVER CONSEQUENTIAL DAMAGES.KYSOR/WARREN shall not be liable under any circumstances for any consequential damages, including loss of profits, additional labor costs, loss of refrigerant or food products, or injury to person or property caused by defective material or parts or for any delay in the performance of this Warranty due to causes beyond its control. The foregoing shall constitute the sole and exclusive remedy of any purchase and the sole and exclusive liability of KYSOR/WARREN in connection with this product.

Parts Warranty Policy

The following procedures are in accordance with Kysor/Warren's standard one-year warranty, which warrants any part to be free of defects under normal use and service for one year from the date of installation. **This date is not to exceed one year and thirty days from the date of original shipment from the factory.**

New Equipment Parts Shortages and Defects

Any parts shortages or damage must be reported to Kysor/Warren no more than 10 working days from the date of delivery. After this time has expired, Kysor/Warren will assume the parts were lost during installation and all parts required will be charged cost plus shipping to replace.

Parts Ordering Procedure

All parts must be ordered through the Kysor/Warren parts department with the following information:

- Store Name and Number
- Location
- Case or Case Model and Serial Number
- Firm or Contractor Placing Order
- Shipping Address
- Parts Description
- Reason for Defect

If the order is for a replacement part still under warranty, a Purchase Order Number will be required from the contractor placing the order. We will then issue a Return Material Authorization Tag (RMA) that will be sent to the firm or contractor who has ordered the part.

Return Authorization Procedure

Warranty parts must be returned postage prepaid to Kysor/Warren within 30 days from replacement part ship date and must be accompanied by a RMA in order to ensure the proper credit. The RMA should also be written on the outside of the box. Any parts not returned within 30 days will be invoiced to the firm or contractor who has placed the order.

IN THE CONSTANT EFFORT TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO CHANGE, AT ANY TIME, SPECIFICATIONS, DESIGN, OR PRICES WITHOUT INCURRING OBLIGATION.

Contact Information

Kysor/Warren
5201 Transport Boulevard
Columbus, Georgia 31907
706-568-1514

Telephone:
1-800-866-5596
Email: solutions@kysorwarren.com
Website http://www.kysorwarren.com/

Kysor/Warren, whose policy is one of continuous improvement, reserves the right to change at anytime, these specifications, designs or prices without incurring obligation.