2 series 800

Installation and Operation Manual

FGCEID

GLASS DOOR REACH-IN

This refrigerator conforms to the Commercial Refrigerator Manufacturers Association's Health and Sanitation Standard.

Merchandising Solutions By KYSOR/WARREN

INSTALLATION AND OPERATING INSTRUCTIONS

GLASS DOOR REACH-IN

APPLICATION

The Kysor glass door reach-in cases are designed to merchandise frozen food, ice cream and medium temperature products. Basic designs are either 4,6,8, or 10 door cases for each of the models listed below. 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 packaged products in an air-conditioned store where temperature and humidity are maintained at a **maximum of 75 degree F dry bulb temperature and 55% relative humidity.**

MODEL	DESCRIPTION
FGCEID	Island; Glass Door Merchandiser

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GENERAL

These cases may be installed individually or in a continuous line-up consisting of several 4, 6, 8, or 10 door sections by using a joint kit. A plexiglass divider kit must be used between cases operating on different refrigeration systems. The divider will be factory installed if specified on the order.

SHIPPING DAMAGE

All cases 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. Also, any damage must be noted on the equipment delivery receipt. If damage is of a concealed nature, you must contact the carrier immediately or no later than three (3) days following delivery. A claim must be filed with the carrier by the consignee for all damages.

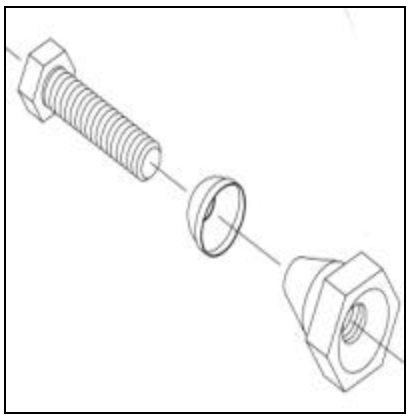
Note: All claims for shortages must be made within 10 days after receipt of shipment.

INSTALLATION & LOCATION

IMPORTANT: This case must be located on a firmly based floor and leveled within plus or minus 1/16". Use shims provided to level your case.

JOINING

Two or more cases of like models can be joined together to form a continuous line-up. Before lining up cases, inspect refrigeration lines, electrical connections and controls to insure cases are in the proper line-up and are in the proper sequence.



Line-Up Bolt

JOINING INSTRUCTIONS

1. Move cases as near their permanent location as possible before removing shipping braces, skids or rollers. NOTE: all cases are factory numbered with line-up and position numbers. Make sure that cases are installed in order. (Line up sticker will be on *Side "A"* of each case.)

2. Remove skids and shipping braces. There is a 1/2" x 3/4" gasket already mounted on the case to seal between joining cases or ends.

3. Move cases as close together as possible and level by using the shims provided. **CASES MUST BE LEVELED FROM FRONT TO BACK AND END TO END.**

Note: If glass door cases are not leveled properly during installation, it may cause saw toothing and doors not closing properly.

4. Remove access covers over line-up holes & place the special T-nut washer on the 3/8" machine bolt with hollow section away from the bolt head. Insert the small line-up bolts in the end frame. Tighten the 3/8" bolts with nut washer into the T-nuts alternately until cases are pulled up tight & 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.

5. Inspect joint for proper air and watertight seal inside and outside the case.

6. Replace line-up access cover plugs & plates.

7. Seal joint seam with silicone found in joint seam.

8. Most case trim can and should be installed immediately after cases are lined up. Where possible, install all trim immediately so it will not be lost. The trim that cannot be installed immediately such as kickplates, should be stored in a safe place until refrigeration and electrical work is completed.

WASTE OUTLET

These cases are equipped with two 1½" M-NPT waste outlet connection which terminates in the center of the case below the insulated bottom. The water seal trap is shipped loose for field installation.

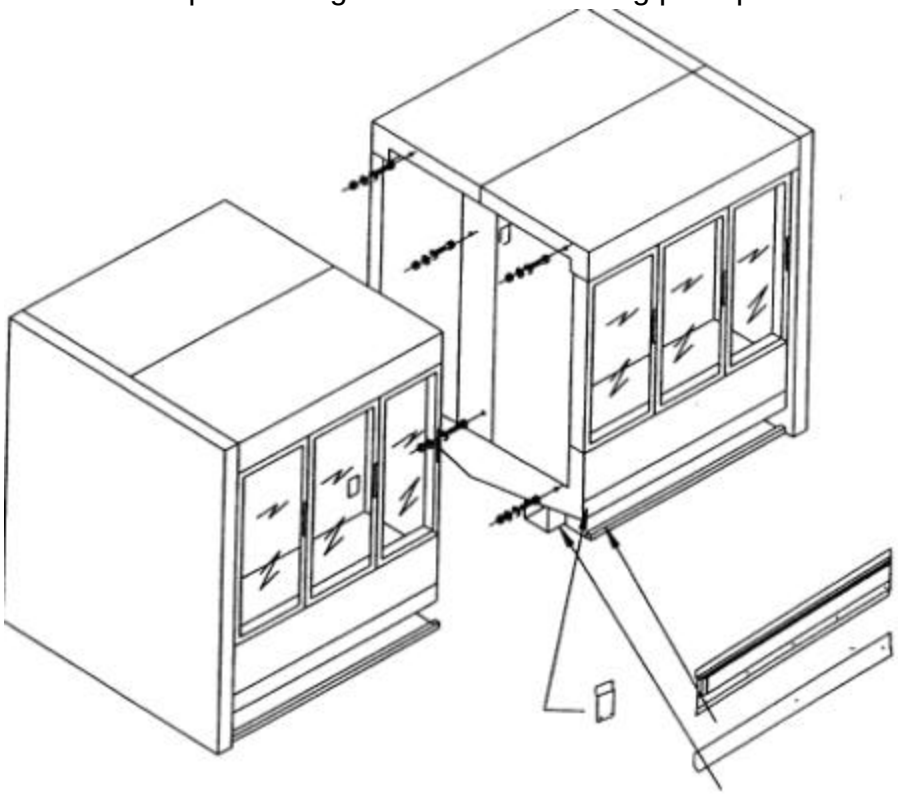
INSTALLING DRIP PIPE

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

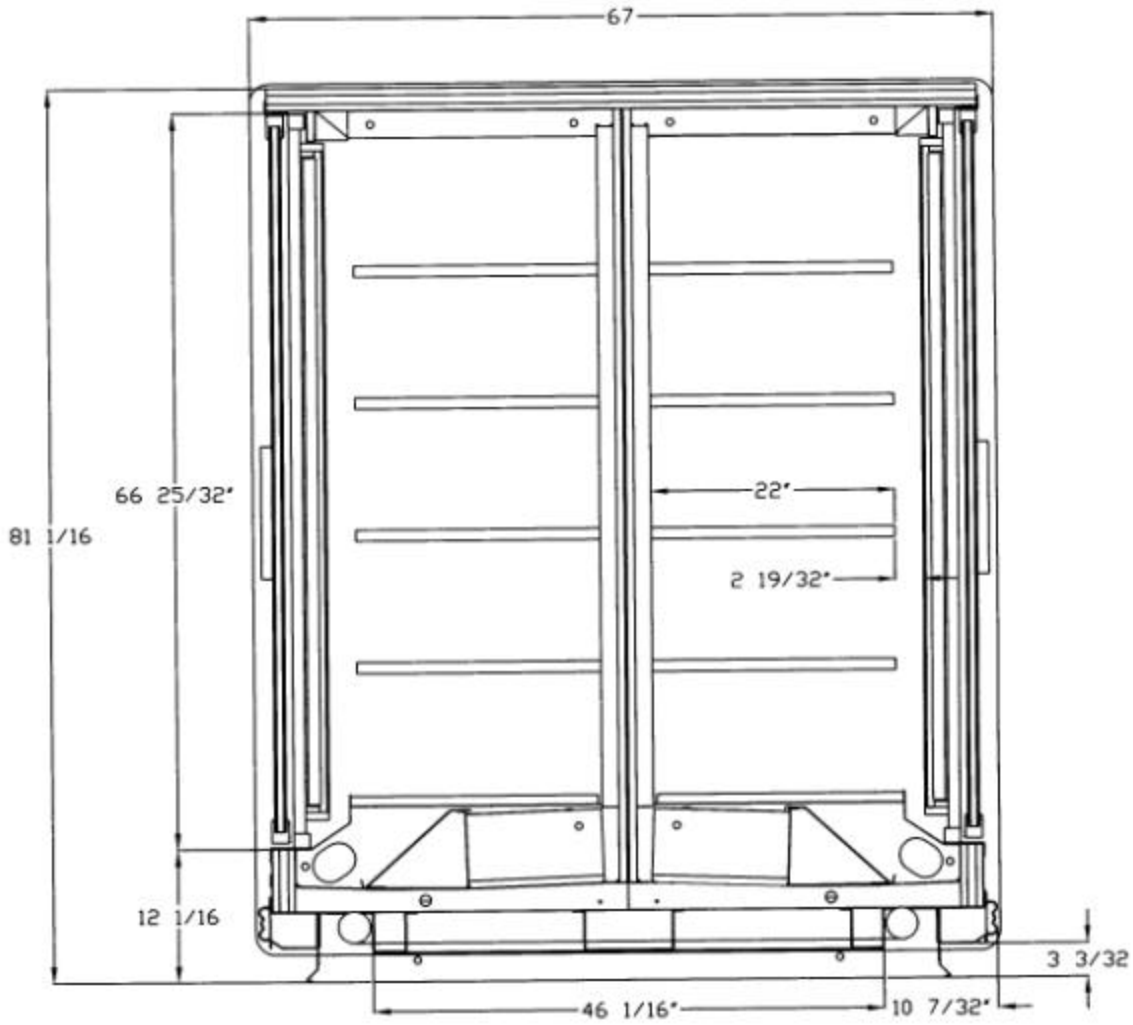
- Never use a double water seal.
- Never use a pipe smaller than the size pipe or water seal supplied with the case.
- Always provide as much fall as possible in drip pipe. (1" fall for each 4' of drip pipe.)
- Avoid long runs in drip pipe, which make it impossible to provide maximum fall in pipe.
- Provide a drip space between drip pipe and floor drain or sewer connection.
- Do not allow drip pipe to come in contact with uninsulated suction lines, which will cause the condensation from your case to freeze.

CASE PULL-UP INSTRUCTIONS

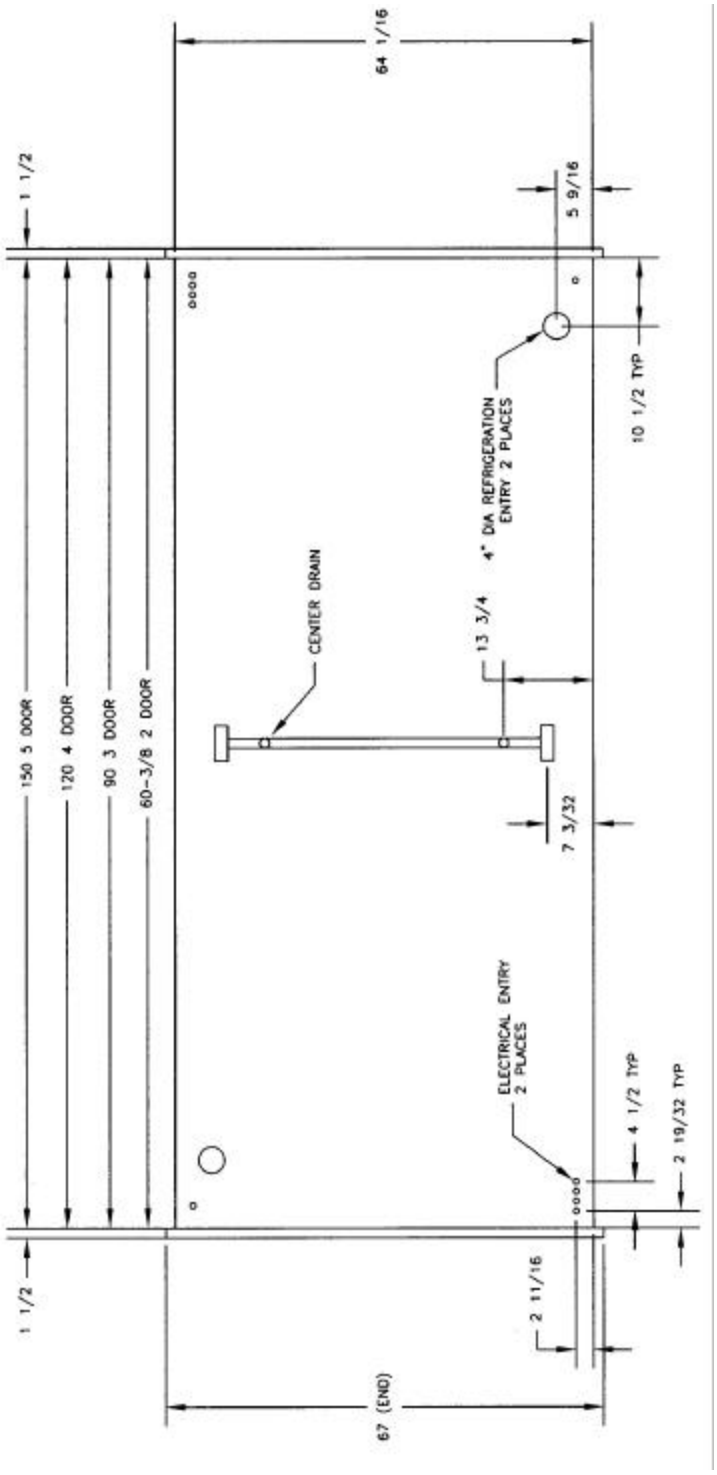
1. Check level of floor area to be used.
2. Use metal shims provided to level as needed.
3. Be sure cases are pushed together before securing pull up bolts.



FGCEID CASE VIEW



PLAN VIEW


64 1/16
1 1/2
5 9/16
10 1/2 TYP
4" DIA REFRIGERATION ENTRY 2 PLACES
CENTER DRAIN
13 3/4
7 3/32
150 5 DOOR
120 4 DOOR
90 3 DOOR
60-3/8 2 DOOR
ELECTRICAL ENTRY 2 PLACES
4 1/2 TYP
2 19/32 TYP
2 11/16
1 1/2
67 (END)

CLEANING

To insure minimum maintenance cost, case should be thoroughly emptied and washed out at least once every three months. The exterior should be washed weekly. A mild soap and water solution is recommended for painted surfaces of the cabinet. Do not use cleaners containing abrasive materials, or ammonia bases cleaners, which will scratch or dull the finish. The waste outlet should be flushed with water following each cleaning.

CAUTION: Be sure that refrigeration and all electrical power is off before washing your case.

WARNING: Never introduce water into the case faster than the waste outlet can carry it away. Do not use steam or high-pressure systems to clean the case, as seals may be broken which will cause the case to leak. When cleaning lighted shelves, wipe down with a wet sponge or cloth so that water does not enter the light rails. Do not use a hose or submerge shelves in water.

Merchandise should not be placed in the case until all controls have been adjusted and the case is at proper temperature. **AT NO TIME SHOULD THE CASE BE STOCKED BEYOND THE LOAD LINE OR OVER THE FRONT EDGE OF ADJUSTABLE SHELVES.** Doing so will seriously affect the performance which will result in higher product temperatures and increase operating costs.

ELECTRICAL

All field installed wiring must comply with the **National Electrical Codes** and **Local Codes**.

ELECTRICAL RACEWAY

An electrical raceway is provided with each case for wiring the fans, anti-sweat heaters, and light circuits from case to case without using conduit. This applies, of course, when the front bumper is properly secured into position. This is an approved method by the Underwriters' Laboratories; however, field wiring must be in accordance with local and national electrical codes.

Warning: Flat tip screws from joint kit must be used to secure raceway case to case. The sharp tip on self-tapping screws may cut and short wiring.

ELECTRICAL CONNECTIONS

All field connections are made in the electrical raceway. Make sure that proper voltage is supplied to your case. Check case nameplate for the required voltage for fans, anti-sweat heaters, lights and defrost heaters. **ALL CASES MUST BE GROUNDED.**

NOTE: Fan motors must operate continuously except during defrost on low temp models and panel must be marked sufficiently to prevent the fan motors and anti-sweat heaters from being turned off accidentally. When cases are multiplexed, add the total of these amperage values to determine wire size and circuit protection. Anti-condensate controllers can be used to control the anti-condensate heater.

On electric defrost models, the defrost heater amperages of all cases on each defrost circuit should be added together, and if their rating exceeds the defrost time clock or condensing unit breaker capacity, a defrost relay and circuit breaker must be employed and furnished by others. Make sure that proper wire size and branch circuit protection are employed for safe operation.

The Case Data chart on page 15 shows the electrical ratings for your case. This is the same information that appears on your case nameplate.

ELECTRONIC LIGHTING ADVISORY

When electronic lighting is used, special attention must be given to the proper installation of bulbs. It is imperative that the pins of the bulbs be completely seated in their respective lamp holder. If they are not completely seated, an electrical arc could occur that will cause the lamp holders to melt and become and electrical hazard. Care must be taken during cleaning and stocking processes to insure that bulbs are not dislodged.

NOTE: The fluorescent bulb is capable of lighting even if the bulb is not completely seated.

REFRIGERATION FAN MOTORS

The fan motors employed are permanently oiled for the life of the motor and requires no periodic maintenance. They are wired according to the enclosed wiring diagram and must run continuously except during defrost on low temperature cases.

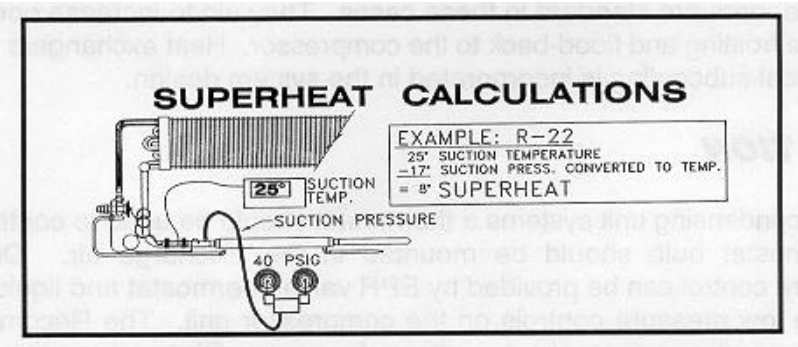
ANTI-SWEAT HEATERS

Anti-sweat heaters are built in the glass doors and frames to eliminate condensation or frost from forming on the case. There is also a heater in front of the door near honeycomb.

Note:	The case has a fixed safety cut-off bi-metal control to turn off the A/S heaters should the case temperature rise above 50 °F. This safety cut-off control is located in the inside top of the case behind the left door and can be serviced by removing the access cover at the left inside top of the case.

EXPANSION VALVE & SUPERHEAT

The expansion valve furnished with your case has been sized for maximum coil efficiency. To adjust superheat, place a thermocouple under the expansion valve bulb. Read the suction line pressure as near coil as possible. (If at the condensing unit, estimate suction line loss at 2 PSIG.) 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.) Do not set superheat until cases have pulled down to operating temperature and never open or close valve over 1/4 turn between adjustments always allow 10 minutes or more between adjustments. Superheat setting should be between 6 and 8 °F.



REFRIGERATION LINES

The refrigeration lines are located under the return air grille on the door cases. A refrigeration outlet is provided in the front right hand end of the 3 cases. Make sure all refrigeration lines lie close to the refrigeration bottom so as not to obstruct the air pattern or block the deck pans. See the section on “Recommended Piping Practices” for additional piping details.

REFRIGERATION LINES (cont.)

These 4, 6, 8, or 10 door cases have polyurethane foamed-in-place insulation. To open a ferrule hole, simply heat a piece of copper tubing of the same size as the tubing to be employed and force it through the ferrule hole.

NOTE: Seal around lines after connections are made. Keep direct flame from bottom of case, as heat will disintegrate the bottom and insulation. Use a heat shield when welding near the bottom of the cases.

REFRIGERANT

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

HEAT EXCHANGER

Heat exchangers are standard in these cases. They aid in increasing operating efficiency and reduce frosting and flood-back to the compressor. Heat exchangers may be deleted if mechanical sub cooling is incorporated in the system design.

OPERATION

On single condensing unit systems a thermostat should be used to control case temperatures. The thermostat bulb should be mounted in the discharge air. On parallel units, temperature control can be provided by EPR valve, thermostat and liquid line solenoid or solid-state low-pressure controls on the compressor unit. The Recommended Control Settings chart shows approximate settings for cases. Since many variables are present in each installation, such as store temperature, length of tubing runs, temperature desired in case, etc., the case data is only a guide for the installer.

DEHYDRATION OF REFRIGERATION SYSTEMS

Please read carefully before placing system into operation. To prevent scaling due to brazing, dry nitrogen should be allowed to flow through lines at 2 psi while brazing operations are taking place. After laying refrigerant lines, they should be blown out with dry nitrogen before making final connection at fixture or condensing unit to prevent any foreign matter being left in the lines.

After the case has been pressure-tested (not to exceed 250 pounds) and proven leak-free, it is recommended that the case be dehydrated with a vacuum pump to 1000 microns for the first two evacuations and 500 microns on the third.

DEHYDRATION OF REFRIGERATION SYSTEMS (cont.)

This triple evacuation method requires evacuating the case three successive times and breaking the first two vacuums with dry nitrogen. The third vacuum would be broken with the refrigerant specified for the case.

CAUTION: During installation and service of this case, precautions should be taken to prevent loss of refrigerant to the atmosphere.

Electric Defrost

These low temperature case models must use electric or optional hot gas defrost.

For the electric defrost models, multiple cal-rod heaters are utilized. The defrost heaters are 774 watts each and are located under the coil. There are 2 heaters per side in a 4 door, 3 per side in a 6 door, 4 per side in a 8 door and 5 per side in a 10 door. The case fans run continuously except during defrost. The defrost is initiated by time and must be terminated by the defrost terminator in the case.

The defrost terminator is mounted on the 5/8" cross over tube at the left end of the coil. The control is a bi-metal thermostat set at 65 °F. At the same location, there is a defrost safety and fan delay control. The defrost safety control is wired in series with the defrost heater to turn the heater off at temperatures over 70 °F. The delay is wired in series with the fan motors and keeps the fans off until the coil reaches 10 degrees F.

When a defrost is initiated, the refrigeration is stopped, the case fans are turned off by a current sensing relay and the defrost heater is turned on. The defrost cycle continues until the coil temperature reaches approximately 65 °F. At this point, the defrost heater is turned off, the refrigeration is turned on and the fans start when the coil temperature reaches 10 °F.

If desired, a 3–5 minute run-off time may be programmed into the rack control defrost times. This delay allows the system pressure to stabilize and insures that all drain water has exited the case. Some rack controllers may not have the run-off feature. Recommended electric defrosts are 1 per 24 hours with 60 min. failsafe. (See wiring diagram on page 16).

Note: Schedule defrost at store closing time or 2 hours before store opening. Avoid defrosts during shopping and stocking periods.

Hot Gas Defrost

The basic operation and control location of hot gas defrost cases are the same as electric, except that the heat for defrost is from the discharge gas of the compressor system and not an electric heater.

NOTE: Hot gas defrost cases are intended for use with a multi-compressor parallel system equipped for reverse cycle hot gas defrost.

When a defrost is initiated, the refrigeration stops, the fans stop and the appropriate valves on the condensing unit are activated to direct discharge gas through the suction line to the cases on defrost.

As the hot gas reaches the case, it is directed to the coil. The fans stop when the evaporator temperature reaches approximately 25°. A low watt heater continuously warms the drain pan area to insure proper run off of all condensate water.

The defrost termination control is located on the expansion valve bypass line at the left end of the case. This control is a bi-metal control, fixed at 65 °F.

The defrost is terminated by temperature when the bypass line reaches approximately 65 °F. This deactivates the hot gas defrost valves on the condensing unit and returns the system to refrigeration. After the coil has reached the pre-set temperature, the fans will start and the case will return to normal operating temperatures. A fixed bi-metal control, mounted on the lower coil tube keeps fans off until proper temperature is reached (10 °F).

A 3 – 5 minute run-off time may be programmed into the rack controller. This delay allows the system pressure to stabilize and insures that all drain water has exited the case. Some rack controllers may not have the run-off feature. Recommended hot gas defrosts are 1 per 24 hours with a 34 min. failsafe.

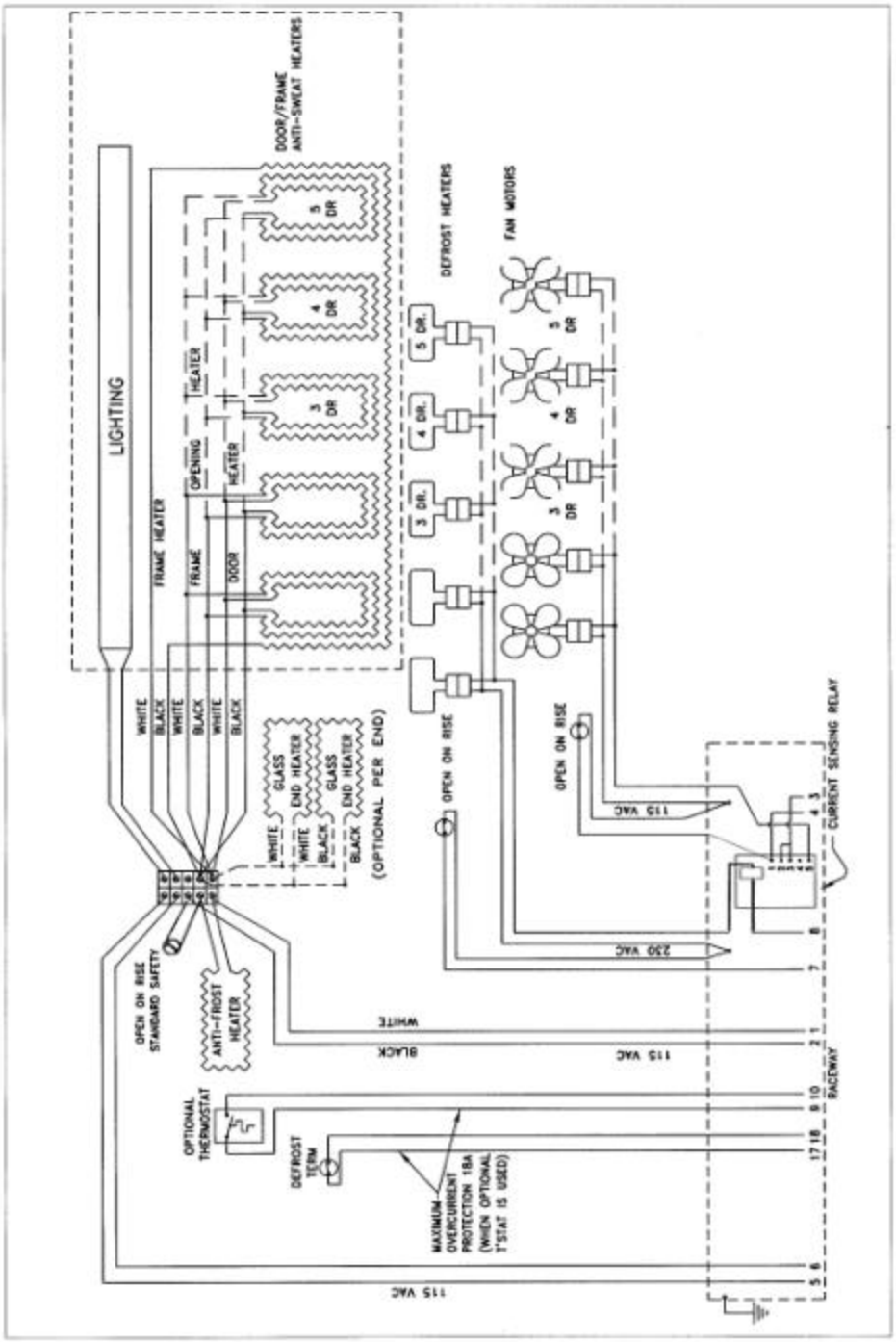
CASE DATA

	4 Door	6 Door	8 Door	10 Door
Cubic Foot Storage Capacity	102.4	153.6	204.8	256.0
Square Footage				
# Of Fans/Amps @115V (Std)	4/1.44	6/2.16	8/2.88	10/3.60
For Gas Models	4/2.22	6/3.46	8/4.70	10/5.94
Light Amps @ 115 V	2.9	3.88	4.84	5.82
Optional Defrost Heater Load (watts)	3096w	4646w	6192w	7742w
Electric Defrost Amps @ 230 V	13.46	20.20	26.92	33.66
A/S @ 115 V	7.8	11.56	15.1	18.9
# Defrosts/Fail Safe (Electric)	1/60	1/60	1/60	1/60
# Defrosts/Fail Safe (Hot Gas)	1/34	1/34	1/34	1/34
Temp. Termination Hot Gas/ Electric (Coil Temp)	65°	65°	65°	65°
Superheat Settings	6° to 8°	6° to 8°	6° to 8°	6° to 8°
Discharge Air Temp	-5° to 0°	5° to 0	-5° to 0	-5° to 0
FGCEID (Frozen Foods)	-15°	-15°	-15°	-15°
***BTUH** (PER SIDE)	3000	4500	6000	7500
TOTAL	6000	9000	12,000	15,000

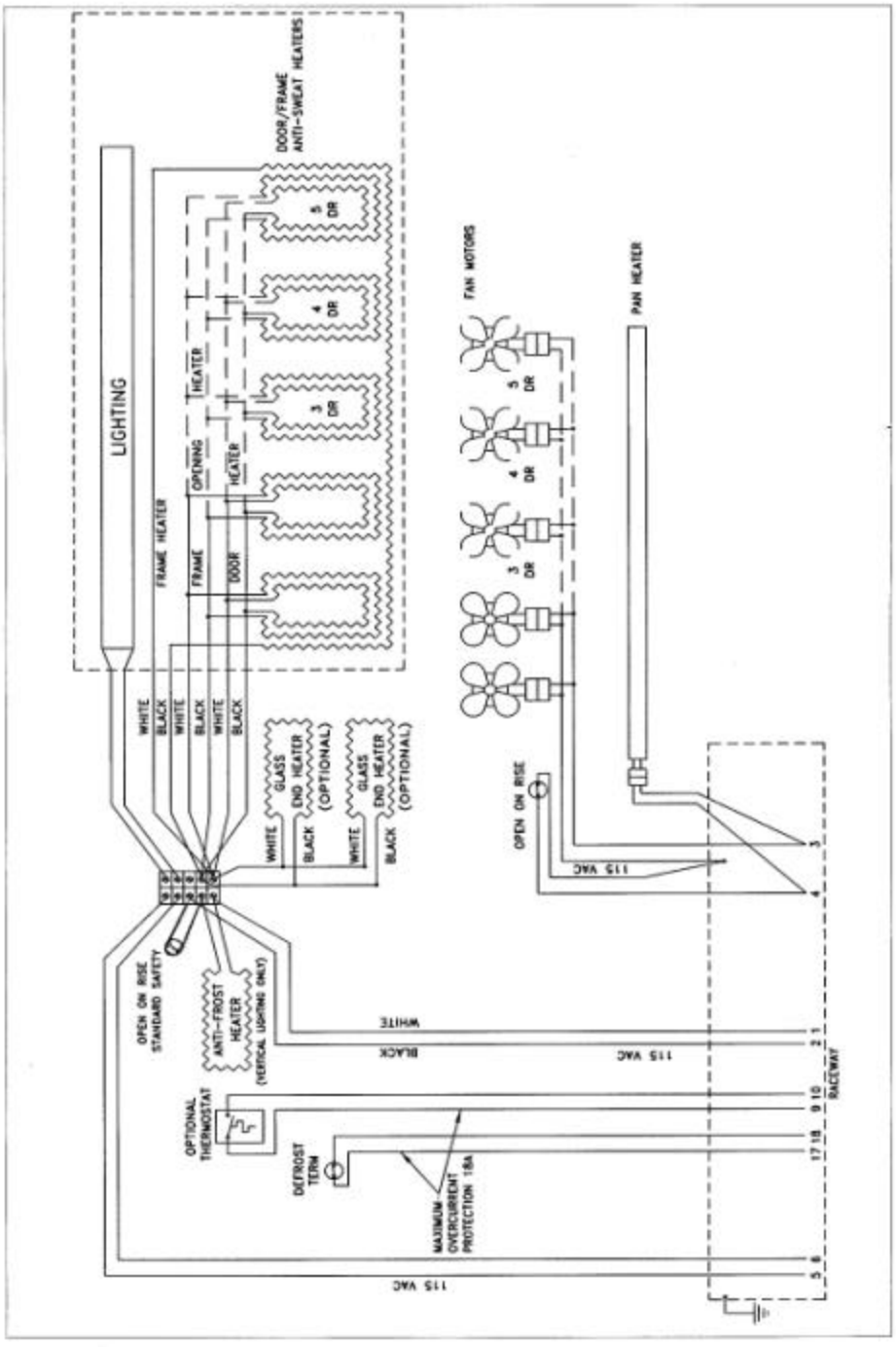
* Hot gas models have drain pan heaters wired in parallel with fan motor circuit.

IMPORTANT: *BTU requirements shown are for use on parallel systems only. A minimum excess capacity should be added to all conventional single compressor units.

WIRING DIAGRAM – (FGCEID) ELECTRIC DEFROST



WIRING DIAGRAM –(FGCEID) HOT GAS



RECOMMENDED PIPING PRACTICES FOR KYSOR CASES

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 cost. Consult the technical manual or legend sheet for proper line sizes.

2. Refrigeration lines in cases in line-ups can be reduced. However, the lines should be no smaller than the main truck 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 preferable to bring the main truck lines in at the center of line-up. Liquid lines on systems with 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.

3. Do not run refrigeration lines from one system through cases on another system.

4. Use dry nitrogen in lines during the 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 sub-cooled 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 droppage.

6. Suction and liquid lines should never be taped or soldered together. Adequate heat exchanger is provided in the case. Kysor recommends use of heat exchanger in all medium and low temperature case 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 towards the compressor, 1/2" each 10'. Do not leave dips in the line that would trap oil.

9. Provide “P” traps at the bottom of suction line risers, 4’ or longer. Use a double “P” trap for each 20' of risers. “P” traps should be the same size as the horizontal line. Consult the technical manual or legend sheet for proper size risers.

RECOMMENDED PIPING PRACTICES FOR KYSOR CASES (cont)

10. Use long radius ells and avoid 45-degree ells.

11. Provide expansion loops in suction lines of systems on hot gas defrost. An expansion loop is required for each 100' of straight run.

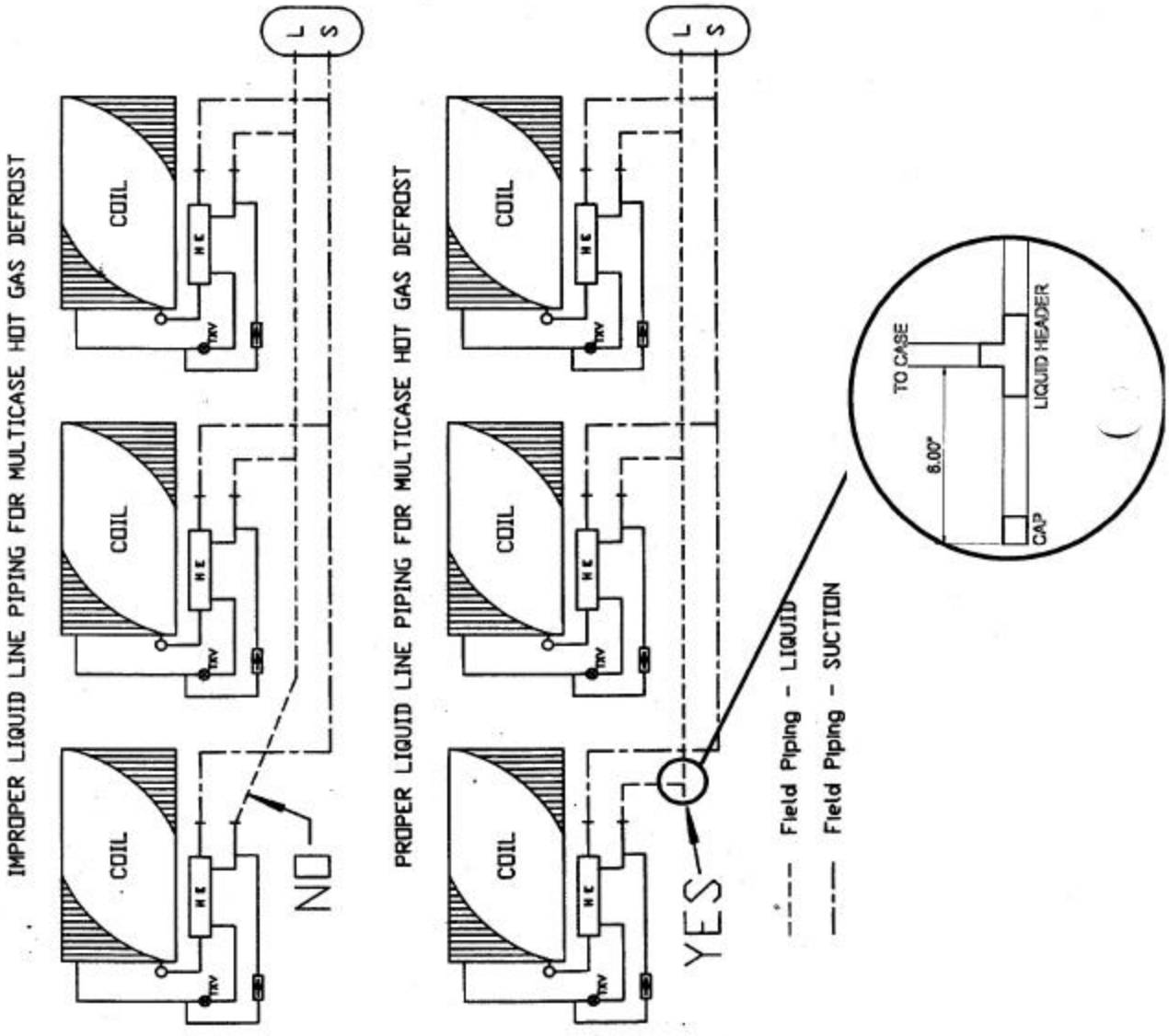
12. Strap and support tubing to prevent excessive line vibration and noise.

13. Brazing copper to copper should be with a minimum of 15% silver. Copper to brass or copper to steel should be with 35% silver.

14. Avoid the use of “bull head” tees in suction lines. An example is where suction gas enters both ends of the tee and exists 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.

PIPING DIAGRAM



PARTS WARANTY POLICY

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

NEW EQUIPMENT PARTS SHORTAGES AND DEFECTS

Any parts shortages or damage must be reported to Kysor no more than 10 working days from the date of delivery. After this time has expired Kysor 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 parts department with the following information:

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

If the order is for a replacement part still in warranty a Purchase Order Number will be required from the contractor placing the order. We will issue a Return Material Authorization Tag 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 within 30 days from replacement part ship date and must be accompanied by a RMA in order to ensure proper credit. The RMA tag number 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.

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.

KYSOR/WARREN®

DIVISION OF KYSOR INDUSTRIAL CORPORATION

P.O. Box C
1600 Industrial Blvd.
Conyers, Georgia 30207
770-483-5600

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. CONYERS, GEORGIA), such part or parts as prove defective, and which **KYSOR/WARREN**'s examination discloses 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 unit used with refrigerated equipment unless same 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 cost 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, terms and conditions of this Warranty.

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 noncompliance 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 purchaser and the sole and exclusive liability of **KYSOR/WARREN** in connection with this product.