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The Leading Edge of Technology

INSTALLATION & OPERATION MANUAL

MODEL:

XL1 IL1 BIL(G)1 EBIL(G)1

FROZEN FOOD - ICE CREAM

Includes QIL Specification Sheet

THIS REFRIGERATOR CONFORMS TO THE COMMERCIAL REFRIGERATOR MANUFACTURERS ASSOCIATION HEALTH AND SANITATION STANDARD.



DIVISION OF KYSOR INDUSTRIAL CORPORATION

1600 INDUSTRIAL BLVD., CONYERS, GEORGIA 30207 / 404•483•5600 5201 TRANSPORT BLVD., COLUMBUS, GEORGIA 31907



INSTALLATION & OPERATION MANUAL ADDENDUM BALLAST RELOCATION

The ballast for this case has been relocated as of January 09, 2006. The advantage of the new location allows for more shelf space and lowers the BTU. The information we have placed in this addendum is for the shelf light ballast only. For any other information, refer to the manual or contact our office at 1-800-866-5596.

Ballast Location/Connections



Ballasts are located in canopy or the raceway. See wiring diagram for layout.



Remote Ballast Location (Canopyless Cases):



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 (see pictures below). If they are not completely seated, an electrical arc could occur which will cause the lamp holders to melt and become an electrical hazard. Care must be taken during cleaning, product stocking and relamping 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.

Note: The shelf light harness has power interruption circuit and ALL shelves must be plugged in correctly before any shelf lights will work. The <u>shelf plugs</u> are now located on the right side of each back panel. (See picture below).



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.

Wiring Diagram

Both Canopy and Raceway





Wiring Diagram for Canopy Light

Installation and Operating Instructions

Single Island and Back to Back Island

Frozen Food and Ice Cream Cases

Application

The Kysor//Warren Single Island Back to Back Island Freezers are designed to merchandise frozen food and ice cream products. These freezers should be installed and operated according to the instructions contained in this manual to insure proper performance. They are designed to display products in an air conditioned store where temperature and humidity are maintained at a maximum of 75 degF dry bulb temperature and 55% relative humidity.

Models	Description
XL1	Frozen food and ice cream island freezer (wall type) with electric or hot gas defrost.
IL1	Frozen food and ice cream single deck island freezer with electric or hot gas defrost.
BIL1	Same as ILl except back to back line-up.
EBIL1	Refrigerated end case for BIL1 island freezer.
BILG1	Same as BIL1 except for glass front.
EBIL(G)1	Refrigerated end case for BILG1 island freezer

GENERAL

These low temperature freezers may be installed individually or in a continuous line-up consisting of several 8-foot and 12-foot sections by using a joint trim kit. A plexiglass divider kit must be used between frozen food and ice cream cases or cases operating on different refrigeration systems. Divider will be factory installed if specified on order.

SHIPPING DAMAGE

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 "<u>must</u>" be noted that the equipment was received damaged. If damage is of a concealed nature you must contact the carrier immediately or no later than three days following delivery. A <u>claim</u> must be filed with the carrier by the <u>consignee</u> for all damage.

NOTE: ALL CLAIMS FOR SHORTAGES MUST BE MADE WITHIN 10 DAYS AFTER RECEIPT OF SHIPMENT.

LOCATION

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

JOINING

Two or more fixtures of like models can be joined together to form a continuous line-up. Instructions for joining fixtures are included in the joint kit. Before lining up refrigerator, inspect refrigeration lines, electrical connections and controls to insure refrigerators are in proper location in line-up and facing proper direction.

WASTE OUTLET

A 1" MPT waste outlet pipe terminates in the toe space in the center of the refrigerator at both sides. The waste outlet connections at the side opposite the electrical junction box is sealed with a 1" pipe cap. It is necessary for your protection to check this cap to make sure it is tight. This must be inspected prior to lining cases.

Before loading the fixture, be sure to check all access plates and make sure they are thoroughly sealed.

NOTE: ON SPLIT TEMPERATURE (ST) MODELS, DRAINS ARE PIPED TO BOTH SIDES OF THE CASE. INDIVIDUAL FLOOR DRAINS MUST BE PROVIDED FOR EACH SIDE OF THE CASE.

-2-

INSTALLING DRIP PIPE

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

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

CLEANING

To insure minimum maintenance cost, cabinet should be thoroughly emptied and washed out once a month. * 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 which will scratch or dull finish. The waste outlet should be flushed with a bucket of water following each cleaning.

CAUTION: NEVER INTRODUCE WATER INTO THE FIXTURE FASTER THAN THE WASTE OUTLET CAN CARRY IT AWAY.

BE SURE REFRIGERATION IS TURNED OFF AND ALL ELECTRICAL IS OFF BEFORE WASHING YOUR REFRIGERATOR.

LOADING

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

* For proper cleaning you must remove all deck pans and open the hinged fan plenum and coil cover. Clean the bottom of the case as necessary to remove all foreign materials.

At no time should the fixture be stacked beyond the load line located on the top of the back baffle and each end of the refrigerator.

For proper operation, you must not stack merchandise above the load lines. In doing so, you 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 <u>NATIONAL</u> ELECTRICAL CODE AND LOCAL CODES.

ELECTRICAL RACEWAY

An electrical raceway is provided with each refrigerator for running fan, anti-sweat heaters, and defrost 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, wiring must be run in accordance with local and national electrical codes.

ELECTRICAL CONNECTIONS

All field connections are made in the lower electrical raceway.

Make sure that proper voltage is supplied to your refrigerator. Check refrigerator nameplate for fan and anti-sweat volts and defrost volts. ALL REFRIGERATORS MUST BE GROUNDED.

Fan motors and waste outlet heaters must operate continuously, and panel must be marked sufficiently to prevent the fan motors and anti-sweat heaters from being turned off accidentally. When refrigerators are multiplexed, add the total of these amperage valves to determine wire size and circuit protection. Anti-condensate controllers can be used to control the display and return air rail heaters.

On electric defrost models, the defrost heater amperages 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.

Chart #1 shows the electrical ratings for your refrigerator. This is the same information that appears on your refrigeration nameplate.

-4-

NOTE: SPLIT TEMPERATURE (ST) CASES REQUIRE SEPERATE POWER AND CONTROL CIRCUITS FOR EACH SIDE OF THE CASE.

REFRIGERATING 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.

ANTI-SWEAT HEATERS

These heaters are placed in the fixture to eliminate sweat and frost from forming on certain areas of fixture. The cross-section of fixture shows location of these heaters.

DEFROST HEATERS

A standard 208/230 volt heater is located under the deck pans on both sides of the case. These heaters are designed to give full heat coverage to the evaporator coils to insure proper defrosting of the refrigerator. For safety, a safety cut out thermostat is wired in series with the defrost heater to open the circuit at 70 deg.F.

EXPANSION VALVE

The expansion valve furnished with your refrigerator 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 2PSIG.) 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 and allow 10 minutes or more between adjustments. Superheat should be set to 6-8 Degree F.

REFRIGERANT LINES

The liquid and suction lines are located in the left end of the refrigerator facing the electrical junction box. The suction line is $1 \ 1/8$ " OD and the liquid line is 3/8" OD. Make sure that all refrigerant lines lie as close to the refrigerator bottom as possible so as not to obstruct the air pattern of the refrigerator. Do not run suction lines of one system through cases on another system.

End Cap Cases have their suction and liquid lines stubbed to the center of the refrigerator facing a cutout that joins the 8' or 12' refrigerator. The refrigerant lines can be run into the 8' or 12' refrigerators and connected to the main refrigerant lines, or they can be connected to a separate compressor.

NOTE: IF THE REFRIGERANT LINES ARE ROUTED FROM THE END CAP CASES TO THE 8'OR 12' CASES, THE PENETRATION FOR THE REFRIGERANT LINES MUST BE SEALED FOR PROPER OPERATION.

These 8' and 12' freezers have polyurethane foamed-in-place insulation. In opening 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.

IMPORTANT - SEAL AROUND LINES AFTER CONNECTIONS ARE MADE. KEEP DIRECT FLAME FROM BOTTOM OF REFRIGERATOR, AS HEAT WILL DISINTEGRATE THE ALUMINUM BOTTOM AND INSULATION. USE A HEAT SHIELD WHEN WELDING NEAR THE BOTTOM OF THE CASES.

REFRIGERANT

R-502 expansion valves are standard. If other refrigerant is used, the order must specify the expansion valve to be supplied.

HEAT EXCHANGER

Heat exchangers are standard in these refrigerators. They aid to increase operating efficiency and reduce frosting and flood-back to compressors.

OPERATION

On single condensing unit systems a thermostat should be used to control 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 compressor unit. Chart #2 shows approximate settings for frozen food and ice cream merchandisers. Since many variables are present in each installation, such as store temperature, length of tubing runs, temperature desired in refrigerator, etc., Chart #2 is only a guide for the installer.

DEHYDRATION OF REFRIGERATION SYSTEMS

<u>Please read carefully before placing system into operation</u>. After laying refrigerant lines, they should be blown out before making final connection at fixture or condensing unit. Use dry nitrogen to prevent any foreign matter being left in the lines. Keep pressure below 250 pounds. To prevent scaling due to brazing, dry nitrogen should be allowed to flow through lines while brazing operations are taking place.

-6-





Type I refrigerator, intended for use in an area where the environmental conditions are controlled and maintained such that conditions do not exceed 75°F and 55% relative humidity. Kysor//Warren[®], whose policy is one of continuous improvement, reserves the right to change at anytime, specifications, design or prices without incurring obligation. Dual-Jet[®] and Air Defrost[®] are registered trademarks of Kysor//Warren[®].

BTUH			
	6'	8'	12'
lc	e Cream (-22°F)	
STD Fan	2400	3200	4800
PSC Fan	2340	3140	4710
ECM Fan	2280	3080	4620
Frozen Food (-17°F)			
STD Fan	2250	3000	4500
PSC Fan	2190	2940	4410
ECM Fan	2130	2880	4320
Dairy (+24°F)			
STD Fan	2025	2700	4050
PSC Fan	1965	2640	3960
ECM Fan	1905	2580	3870
NOTE: For sizing conventional/			
individual condensing units, add 8%			
to BTUH load.			

CAPACITIES			
	6'	8'	12'
Facing Area	13.4 ft ²	17.8 ft ²	26.7 ft ²
Cubic Capacity	19.4 ft ³	25.9 ft ³	38.9 ft ³

Evap Temp	Discharge Air Velocity (1 hr. after Defrost)	Discharge Air Temp
-22°F -17°F +24°F	200 FPM	-12°F (low temp)

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The above case model, has case lengths that are UL and NSF approved.



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QIL - Narrow Island

After the refrigeration system has been pressure tested and proven leak-free, it recommended that the system be dehydrated with a vacuum pump to 1000 microns for the first two evacuations and 500 microns on the third. The triple evacuation method requires evacuating the system three successive times and breaking each vacuum with dry refrigerant. Allow the pressure to rise above atmospheric pressure.

"ELECTRIC DEFROST" Models - On the electric and hot gas defrost models, the evaporator fans must run continuously to circulate air through the coils and baffles to remove frost that has accumulated. On electric defrost models, the defrost cycle is started by the time clock, which opens the control circuit on the refrigeration cycle and closes the defrost circuit, which engages the defrost heaters until the defrost termination control or the fail-safe setting on the time clock terminates the defrost cycle and returns the case to refrigeration. Each case has one defrost terminator mounted on the return bend end of the coil on the connection side of the case. The terminator is preset at 45 deg.F. Control settings for the defrost cycle are listed on Chart #2.

All electric defrost cases have a 70 degree F Thermo Disc wired in series with each defrost heater for thermal safety.

"HOT GAS DEFROST" Models - On hot gas defrost models, (parallel compressors 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 to return to the liquid line where the "condensed" liquid is used to feed the other cases on the same parallel unit. The case fans continue to operate during defrost to warm up the drain pan and air ducts.

Hot gas defrost cases are equipped with a 65 degree F Thermo-Disc on the expansion valve bypass line for defrost termination.

NIGHT COVERS

Aluminum night covers should be used during the defrost cycle on ice cream freezers. These covers should fit flat over the product and below the discharge and return air ducts. They reflect the heat during defrost so the product has less temperature rise. They also assist in hardening the product during the night while the store is closed.

MODEL	Evaporator Fans and Continuous Operated Heaters		Anti-Cond. Amps* (Cyclable)	Defrost Heater Amps
	115volt	5	115volt	230volt
	(Elec.def.)	(Hot Gas)		
XL1-8	1.26	1.65	1.39	9.37
XL1-12	1.26	2.09	2.43	14.06
IL1-8	1.26	1.65	1.39	9.37
IL1 - 12	1.26	2.09	2.43	14.06
BIL1				
BILG1				
EBIL1	.5	.5	.68	6.5
EBIL(G)1				

CHART 1

XL1 OPTIONAL REAR CAP LIGHT AMPS 8 ft. - .73 12 ft. - 1.13

* On Back to Back installations add 1.3 amps per 8' case and 1.9 amps per 12' case to side of line-up w/back to back anti-sweat heater installed.

CHART TWO

RECOMMENDED CONTROL SETTINGS

Refrigerant	Cut-Out	Cut-In	EPR Valve	Thermostat Discharge Air Temperature
Frozen Food R-502 R-22	12 psig 7 psig	18 psig 12 psig	15 psig 10 psig	-10 deg.F -10 deg.F
Ice Cream R-502 R-22	6 psig 3 psig	12 psig 7 psig	N/A N/A	-20 deg.F -20 deg.F

DEFROST PERIOD

Number of Periods	Termination	Fail Safe Setting
		Electric Hot Gas
1/24 hours	45 degF fixed	60 min.
1/24 hours	65 degF fixed	40 min.

NOTE: THESE CASES ARE SUPPLIED WITH DEFROST TERMINATION CONTROLS AS DESCRIBED IN THE DEFROST SECTION. THESE CONTROLS MUST BE WIRED TO THE TRIP SOLENOID ON THE DEFROST CLOCK.

- ~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 proper 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 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 line-up. Liquid lines on systems on <u>hot gas</u> 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 Armaflex or equal on low temp cases to provide maximum of 65 Deg. superheated gas back to the compressor and prevent condensation in exposed areas. Insulate suction lines on medium temp cases with 1/2" thick insulation in exposed areas to prevent condensate drippage.
- ~6. Suction and liquid lines should never be taped or soldered together. Adequate heat exchanger is provided in the case.
- ~7. Refrigeration lines should never be placed in the ground unless they are protected against moisture and electrolysis attack.
- ~8. Always slope suction lines <u>down</u> toward 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.

-10-

- 10. Use long radius ells and avoid 45 Deg. ells.
- 11. Provide expansion loops in suction lines on systems on hot gas defrost. See Engineering Bulletin #85-204-3 for detail.
- 12. Strap and support tubing to prevent excessive line vibration and noise.
- 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. Avoid the use of "bull head" tees in suction lines. An example is where 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 line with an inverted trap.



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XL1-CUALKING AND LINE-UP Bolt diagram for joining cases



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



DIVISION OF KYSOR INDUSTRIAL CORPORATION

P.O. Box C 1600 Industrial Blvd. Conyers, Georgia 30207 404 483-5600

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.

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 continential United States.

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

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.
- 6. To labor cost for replacement of parts, or for freight or shipping expenses.
- 7. 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 this 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.