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KYSOR // WARREN

The Leading Edge of Technology

INSTALLATION & OPERATION MANUAL

MODEL: **BQD, BRQD**

DAIRY MERCHANDISER

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

KYSOR // WARREN

DIVISION OF KYSOR INDUSTRIAL CORPORATION

1600 INDUSTRIAL BLVD., CONYERS, GEORGIA 30207 / 404•483•5600
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INSTALLATION AND OPERATING INSTRUCTIONS

FOR

BQD and BRQD

ROLL-IN DAIRY MERCHANDISERS

APPLICATION:

The Warren/Sherer models BQD and BRQD are designed to merchandise dairy products. The BQD case is designed for front loading of carts, while the BRQD is intended for rear loading of carts. The BRQD must be installed so that the service side of the case is adjacent to the dairy cooler.

Both cases can be equipped with shelves if required.

These cases are designed for display of products in an air-conditioned store where temperature and humidity are maintained at a maximum of 75°F dry bulb temperature and 55% relative humidity.

<u>MODEL</u>	<u>DESCRIPTION</u>	<u>SERIAL CODE DESIGNATION</u>
BQD-2	Front Load, 2 Bay Dairy Merchandiser	578-C
BQD-3	Front Load, 3 Bay Dairy Merchandiser	578-C
BRQD-2	Rear Load, 2 Bay Dairy Merchandiser	579-C
BRQD-3	Rear Load, 3 Bay Dairy Merchandiser	579-C

10/3/83

GENERAL

These display refrigerators may be installed individually or in a continuous line-up consisting of several 2-bay and 3-bay sections by using a joint trim kit. A plexiglass divider kit must be used between 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 "must" 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 (3) days following delivery. A claim must be filed with the carrier by the consignee for all damages.

LOCATION

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

The BRQD model must be installed in an opening provided in the dairy walk-in cooler. The space between the case and cooler opening must be sealed and trimmed by the installer.

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 line-up and are in the proper sequence. Note: THESE REFRIGERATORS ARE LINED UP AT THE FACTORY AND ARE NUMBERED. INSURE THEY ARE LINED UP IN THE FIELD IN THE SAME SEQUENCE NUMBER.

For ease of using merchandising carts, care must be taken in locating the partition legs. The spacer rails should be left in place until the case has been leveled and the partitions fastened to the floor. The spacer rails maintain the 40" spacing between each partition.

WASTE OUTLET

The waste outlet on the BRQD is 1" PVC and is stubbed out the rear top of the case. The field installed drain must then run horizontally to the end of the case and down to a floor drain.

The waste outlet on the BQD is also 1" PVC and is stubbed out behind and below the inside back panel.

A water seal is supplied with each case for field installation.

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. Never use a double water seal.
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 every three (3) 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 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.

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

REMOVAL AND CLEANING OF HONEYCOMB

Variable conditions in stores cause the cells in the honeycomb to be clogged with dust after a period of use. To insure proper operation of the fixture, it is necessary to remove the honeycomb at least once a year and thoroughly clean with warm detergent water and then rinse and blow all water from the cells. Do not replace the honeycomb until completely dry. Extreme care must be exercised in handling the honeycomb, as it is very fragile and expensive to replace. See Fig. 9 for removal instruction.

LOADING

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

At no time should the fixture be stocked beyond the load line or over the front edge of adjustable shelves. In doing so, you will seriously affect the performance which will result in higher product temperatures and increase operating costs.

Sliding curtains are used on the BRQD model and are designed for heavy traffic stores and for applications where cooler space is restricted. The curtain is fiberglass reinforced vinyl and can be cleaned with soap or detergent and water.

The curtain must be fully closed during operation.

This model also incorporates a front fan in each bay underneath the air grille to assist in circulating the refrigerated air back through the cooler.

ELECTRICAL

All field installed wiring must comply with the NATIONAL ELECTRICAL CODE AND LOCAL CODES.

ELECTRICAL RACEWAY

On these case models, field electrical connections are made in a junction box located at the top left corner at the rear of the case under the service access cover.

The parallel wiring for the fans, lights, anti-sweat heaters, and defrost heaters can be run case to case in field supplied conduit.

The conduit should be run in the fan plenum area where ferrules are provided in the false ends.

ELECTRICAL CONNECTIONS

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 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 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 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.

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

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.

ANTI-SWEAT HEATERS

These heaters are placed in the fixture to eliminate sweat forming on certain areas of fixture.

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 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 1/2 turn between adjustments and allow 10 minutes or more between adjustments. Superheat should be set to 6-8°F.

REFRIGERATION LINES

Standard refrigeration line connections are in the top of the case. The upper closure panels must be removed to gain access. Connection sizes are 1/2" liquid and 7/8" suction. The cases can be interconnected at the top through the ferrule in the end frame.

As an option, refrigerant lines can be extended to the lower rear of the case, however, with this option, the BRQD can use shelves only.

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

REFRIGERANT

R-12 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 compressor.

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 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

Please read carefully before placing system into operation. 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.

After the refrigeration system has been pressure-tested and proven leak-free, it is 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.

CONTROL DESCRIPTION

BQD

The BQD is designed to operate on an off-time defrost cycle. The defrost cycle is time initiated by the timer located on the condensing unit. While in defrost, the refrigeration is stopped and the case fans continue to operate to defrost the coil. The defrost cycle, as standard is terminated by time. Pressure termination can be used by incorporating the proper defrost time clock.

<u>Defrost (1)</u> <u>Frequency</u>	<u>Pressure Termination</u>		<u>Fail Safe (3)</u> <u>Setting</u>
	<u>R-12</u>	<u>R-502</u>	
4	45#	90#	40 min.

(1) Defrost frequency is at design conditions. Higher temperature or humidity may require more frequent defrost setting.

(2) When straight time defrost is utilized, use the time indicated.

As an option, the BQD can be provided with electric or hot gas defrost. In both of the optional defrost modes, the case fans run continuously.

When either electric or hot gas defrost is used, the cycle should be terminated by temperature. Also, hot gas defrost should only be used in conjunction with multi compressor parallel systems.

<u>Defrost (1)</u> <u>Frequency</u>	<u>Temperature (3)</u> <u>Termination</u>	<u>Fail Safe Setting</u>	
		<u>Electric</u>	<u>Hot Gas</u>
4	60°F	30 min.	20 min.

(3) Control bulb should sense case discharge air temperature.

BRQD

Since this case operates in conjunction with the dairy cooler, if off-time defrost is used, the case and cooler must be defrosted at the same time. Off-time defrost will work, however, it is slow to clear all coils. For this reason, it is recommended that hot gas or electric defrost be used on both the BRQD and the associated cooler. As with the BQD, regardless of defrost type, all case fans run continuously.

For defrost control settings, see hot gas or electric defrost recommendations in the BQD section.

CHART #1

<u>Model</u>	<u>Evaporator Fan Amps (115V)</u>	<u>Anti-Cond Heater Amps (115V)</u>	<u>Lights (Amps) (1) (115V)</u>	<u>Defrost Heater Amps (230/1)</u>
BQD-2	3.0	.5	1.6	6.5
BQD-3	4.0	.7	1.6	8.3
BRQD-2	5.0	.5	1.6	6.5
BRQD-3	7.0	.7	1.6	8.3

(1) Add .7 amps for each lighted shelf

CHART #2

Recommended Control Setting *

<u>Model</u>	<u>Refrigerant & Application</u>	<u>LP Control</u>		<u>EPR Valve</u>	<u>Thermostat Disc. Air Temp</u>	
		<u>Cut-Out</u>	<u>Cut-In</u>		<u>Cut-Out</u>	<u>Cut-In</u>
BQD/BRQD	R-12 R-502	15# 46#	28# 60#	14# 40#	24°F	28°F

*All control settings are approximate and may vary with actual job site conditions.

PARTS LIST

BQD BRQD

<u>Ref. No.</u> <u>(Fig. 1)</u>	<u>Description</u>	<u>2 Bay</u>	<u>3 Bay</u>
1	Canopy Front Panel	51C12-37	51C14-34
2	Lamp Ballast	10D10-27	10D10-27
3	Canopy Lamp	10A10-42	10A10-41
	Lamp Holder	10B11-19; 10B11-20	10B11-19; 10B11-20
4	Light Switch	10J10-30	10J10-30
6	Front Panel Assy	54A12-52	54A12-52
7	Fan Wiring Harness	10M10-81	10M10-82
8	42" Lead Harness	10M10-14	10M10-14
9	Fan Motor (16W)	9A10-32	9A10-32
10	Fan Blades (OU-1020-5)	9B10-23	9B10-23
11	Expansion Valves (R-12)	3A11-23	3A12-21
12	Expansion Valves (R-502)	3A11-25	3A12-22
13	Heater Extrusion Assy	81C10-69	81C10-69
14	Junction Box	10E11-23	10E11-23
15	Junction Box Cover	10E12-11	10E12-11
16	Evaporator Coil	5A20-23	5A20-22
17	Honeycomb	13A15-14	13A15-14
18	Lag Bolt Supt. Angle	54V11-109	54V11-109
20	Guidance System BQD	54Y10-18	54Y10-18

BRQD Only

	Lower Fan Motor (5W)	9A10-17	9A10-17
	Lower Fan Blade (OU-740-5)	9B10-27	9B10-27
	Curtain(1/Bay)	13A10-39	13A10-39
	Track	62G13-55	62G13-55
	Roller	17A11-21	17A11-21
	Guidance System	61J11-10	61J11-10
	Center Track Slide	17A11-16	17A11-16

INSTRUCTIONS FOR REMOVING HONEYCOMB FOR CLEANING

- I. Remove Honeycomb #1 as follows:
 - a. Remove Honeycomb Retainer "A".
 - b. Remove White Vinyl Spring "B", using pliers if necessary.
 - c. Remove Honeycomb.
- II. Remove Honeycomb #2 as follows:
 - a. Remove Honeycomb Retainers "C".
 - b. Remove White Vinyl Spring "D".
 - c. Remove Honeycomb.
- III. Re-install Honeycombs in reverse order of above.

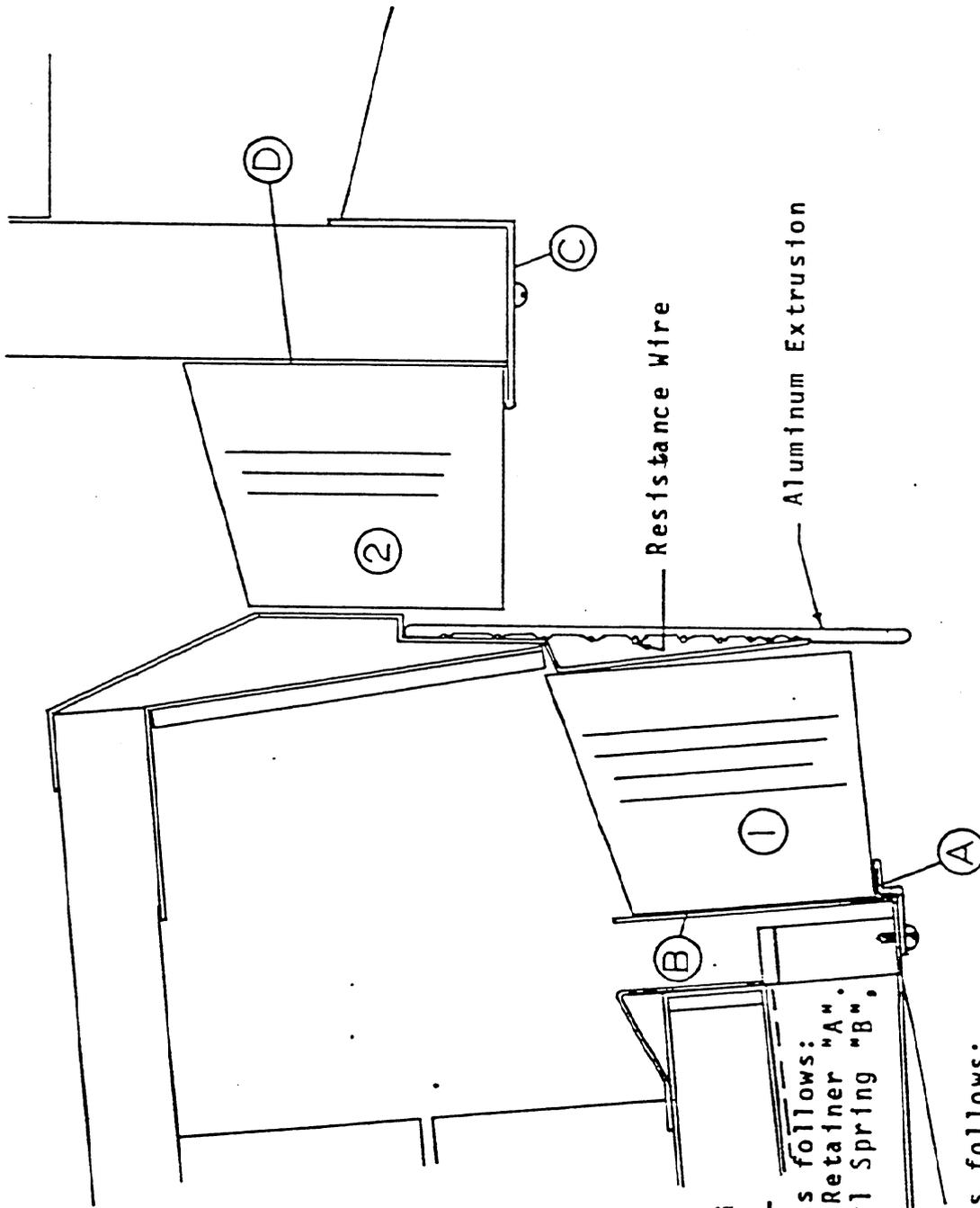
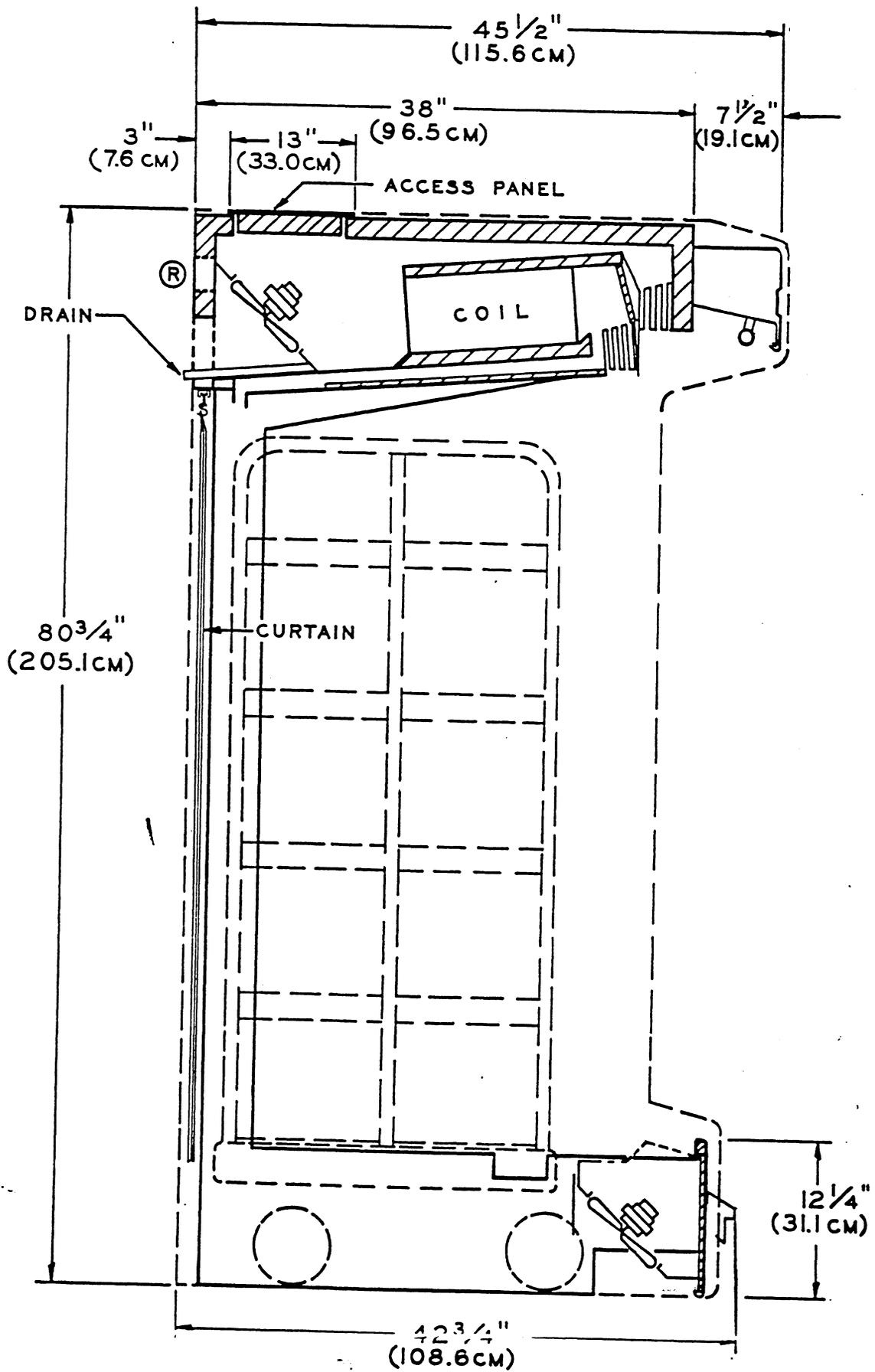


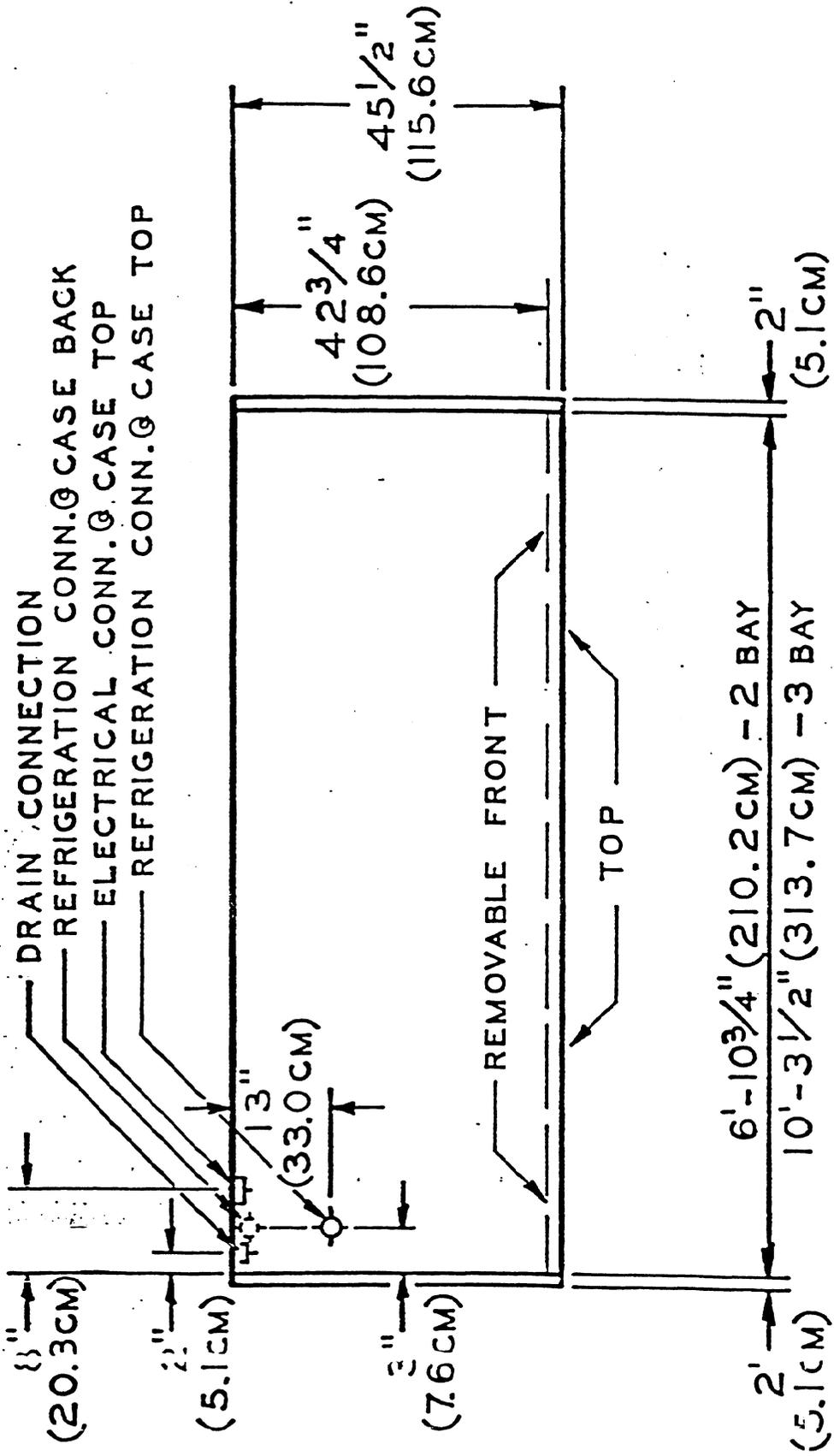
Figure 9

A	REDRAWN	REVISED	9-27-71	G&P
LETTER			DATE	BY
DATE	1-21-71	TITLE		
SCALE	NONE	INSTRUCTIONS FOR REMOVING HONEYCOMB AND REPLACING ANTI-SWEAT		
DRAWN	G&P	THE WARREN COMPANY-ATLANTA, GEORGIA		
APPD.	<i>JB</i>	DIVISION OF KYSOR INDUSTRIAL CORPORATION		
				DRAWING NUMBER
				PA-12892-A

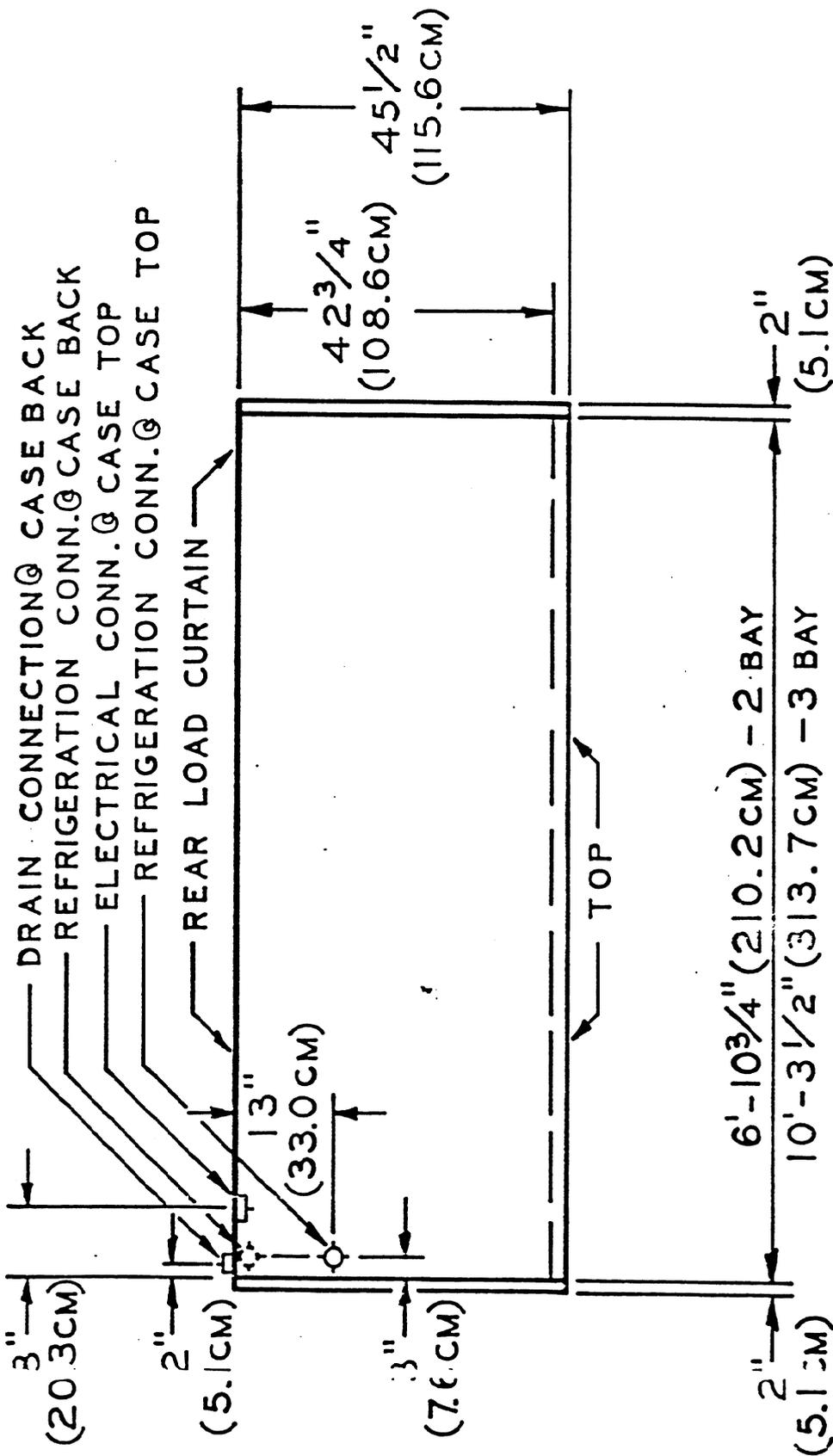


NOTE: MODEL BRQD W/BOSSY CART

LETTER	Revised	TITLE	CROSS SECTION
DATE	3-7-78	MODEL BRQD	
SCALE	1/8" = 1"		
DRAWN	[Signature]		
REVISOR	[Signature]		
DATE	8/9/81		
BY	[Signature]		

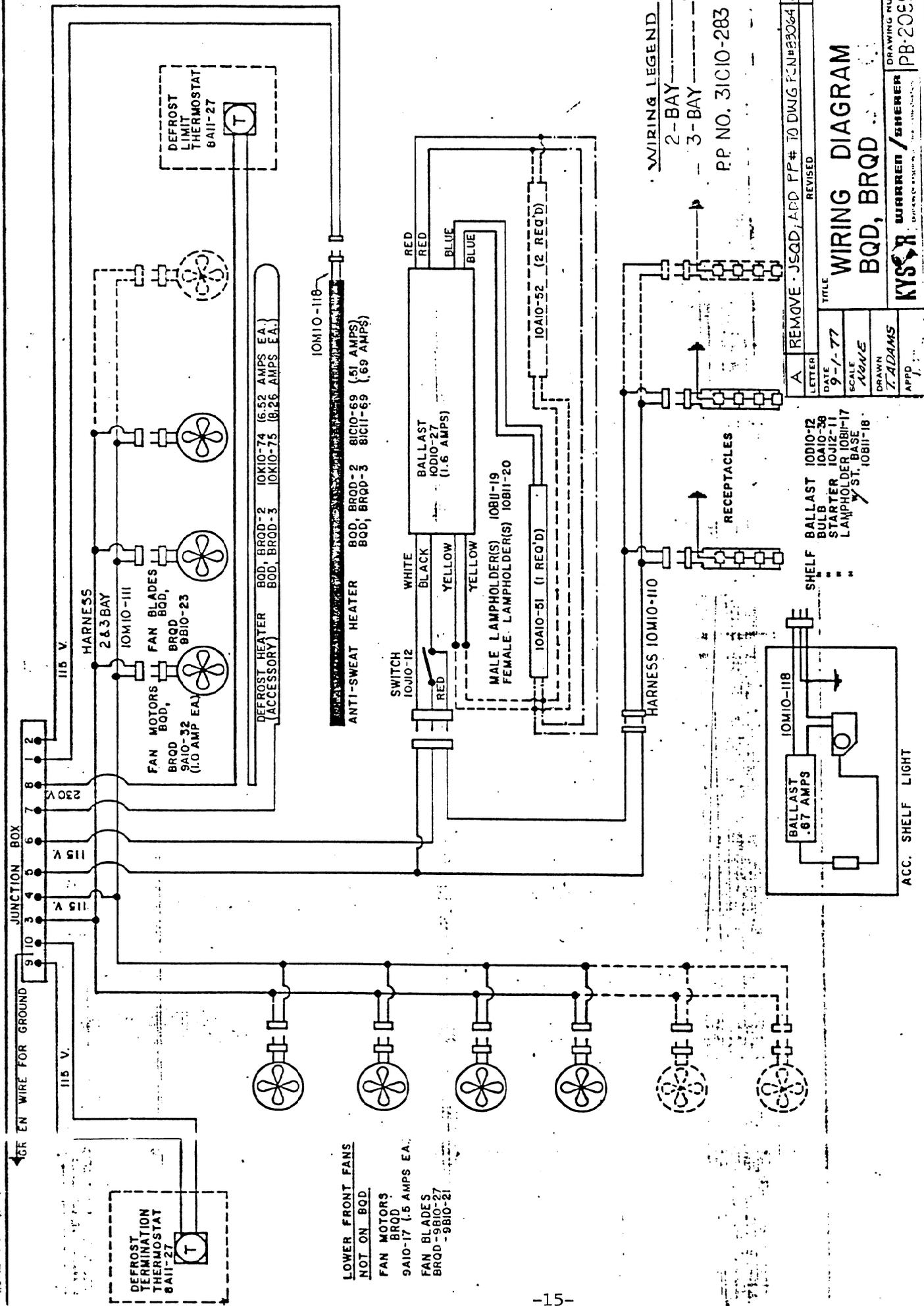


LETTER	REVISED	DATE	BY
TITLE		3-7-78	
PLAN VIEW		SCALE	1/2" = 1'-0"
MODEL BQD		DRAWN	<i>[Signature]</i>
DRAWING NUMBER			



LETTER	REVISED	DATE	BY
DATE		TITLE	
3-7-78		PLAN VIEW	
SCALE		MODEL BRQD	
1/2" = 1'-0"			
DRAWN			
APPD.			
		DRAWING NUMBER	
		SA-78531	

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LETTER	REVISION	DATE	SCALE	DRAWN	APPRO	TITLE
A	REMOVE JSQD, ADD PP# 70 DWG FCN#3064	9-1-77	AS SHOWN	T. ADAMS		WIRING DIAGRAM BQD, BRQD

KYSOR WARRER / SHERER
 DRAWING NUMBER PB-208947

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 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 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 Armaflex or equal on low temp cases to provide maximum of 65° sub-cooled 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 down 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 risors, 4' or longer. Use a double "P" trap for each 20' of risors. "P" traps should be the same size as the horizontal line. Consult the technical manual or legend sheet for proper size risors.
10. Use long radius ells and avoid 45° 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. 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.

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

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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 continental United States.

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.

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.