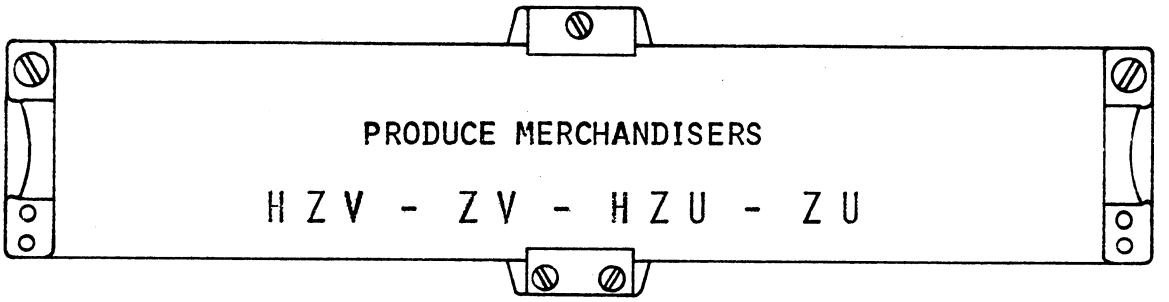
INSTALLATION & SERVICE INSTRUCTIONS

FOR MODEL(S)



please retain for future use

engineering dept. bulletin # 72-101-1

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

WARREN // Dual Jet | **SHERER // Dual Jet**

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Atlanta, Georgia 30301

KYSOR®

Marshall, Mich. 49068
West Coast Sales Office:
2118 North Main Street, Walnut Creek, Calif. 94596

DIVISIONS OF KYSOR INDUSTRIAL CORPORATION

INSTALLATION AND OPERATING INSTRUCTIONS

FOR WARREN SCULPTURED PROFILE

FRESH VEGETABLE MERCHANDISERS

The Warren Open Self-Service Vegetable Refrigerators will properly display and store fresh vegetables. Your refrigerator should be installed and operated according to the following instructions to insure its coming up to the proper standard of performance.

OUTLINE OF GENERAL DESIGN

Warren vegetable merchandisers are designed to facilitate self-service. The open top is arranged for refrigerated display so as to give maximum convenience to the customer. Self-service vegetable merchandisers give full-vision display, and articles stored are within easy reach.

These merchandisers may be installed in multi-case units with several sections to form continuous fixtures, or they may be installed individually, if so desired. Ends are removable so that additional sections may be added. All models are standard with a 74" mirrored canopy, but the ZV and ZU models are available without the canopy, if so desired. Models HZV and HZU are available with or without a refrigerated shelf.

MODEL	DESCRIPTION	SERIAL NUMBER DESIGNATION
HZV	Air Curtain Vegetable Case - 74" High	449
HZU	Non-Refrigerated Vegetable Case - 74" High	450
ZV C-74	Bottom Only Refrigerated Vegetable Case	451
ZU C-74	Non-Refrigerated Vegetable Case	452

INSTALLATION

LEVELING OF REFRIGERATOR

Your Warren Refrigerator must be perfectly level to insure proper operation of the refrigeration system and also to insure proper drainage after defrost.

Proper leveling when multiplexing can be accomplished by finding the highest point on the floor at the location of the line-up by using a level and a chalk line. Place a refrigerator at this point and use shims as needed to line the other refrigerators to this high point. Make sure sufficient shims are employed so as to prevent settling of the refrigerators.

STORE DRAFTS

Room air currents or drafts will seriously affect the operation of any open-type fixture. Make sure that fans, space heaters, or air conditioning grilles do not produce currents sufficient to move air across the fixtures. Air movements across an open fixture will cause the case temperature to be high and create defrosting difficulties. An increase in operating costs will be the result.

ELECTRICAL

ELECTRICAL CONNECTIONS

Make sure that proper voltage is supplied to your refrigerator. Check refrigerator nameplate for fan motor volts and amperes. If a canopy is furnished, use a separate fused circuit. ALL REFRIGERATORS MUST BE GROUNDED.

When multiplexing refrigerators to one electrical source, the total fan motor amperes must be added together, and proper wire size and branch circuit fuse or circuit breaker as required by the National Electric Code must be employed. THIS CIRCUIT MUST BE RUN CONTINUOUSLY AND MUST BE MARKED sufficiently to prevent the fan motors and anti-sweat heaters from being turned off accidently.

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

CHART 1

	EVAPORATOR FAN AMPS 115 VOLTS	LIGHTS 115 VOLTS	SHELF LIGHTS 115 VOLTS
ZV-8 (Without Canopy)	1.0	None	None
ZV-12 (Without Canopy)	1.5	None	None
HZV & ZV-8 (With Canopy)	1.0	2.8	1.4
HZV & ZV-12 (With Canopy)	1.5	4.2	2.1

FAN MOTORS

The fan motors employed are permanently oiled for the life of the motor and require no periodic maintenance. They are wired according to the enclosed wiring diagram and MUST RUN CONTINUOUSLY.

The fan blade will turn counterclockwise when looking into the refrigerator. The fan blade must have its rib facing the motor for proper operation.

OPERATION

For vegetable merchandisers, either a thermostat or low-pressure control can be used to obtain proper temperatures. When a condensing unit is subjected to low ambients during the winter months, a thermostat might be necessary. The thermostat bulb should be mounted in the return air close to an evaporator fan.

Chart 2 below shows approximate settings for vegetable merchandisers. Since many variables are present in each installation, such as store temperature, length of tubing runs, temperature desired in refrigerator, etc., the chart below is only a guide for the installer.

CHART 2

	REFRIGERANT	LOW-PRESSURE CUT-OUT	LOW-PRESSURE CUT-IN	THERMOSTAT CUT-OUT	THERMOSTAT CUT-IN	HIGH-PRESSURE CUT-OUT MAXIMUM
Vegetable (With Timer Defrost)	R-12	12 psi	32 psi	38°	43°	200 psi
	R-502	37 psi	72 psi	38°	43°	340 psi
Vegetable (Off-Cycle Defrost)	R-12	12 psi	36 psi	--	--	200 psi
	R-502	37 psi	80 psi	--	--	340 psi

When using thermostats, lower the low-pressure control cut-out below the setting above, so as to make sure the thermostat is the controlling device.

DEFROSTING

Since Warren vegetable refrigerators have off-cycle defrost, the evaporator fans must run continuously to circulate air through the coil and baffles to remove frost that has accumulated.

There are two types of defrosting commonly used: straight-time and time-initiate/pressure-terminate, with a fail-safe in event the pressure does not reach a pre-prescribed point within a reasonable time.

The instructions below are to be followed only when the pressure control is set not to maintain a defrost cycle on each off-cycle.

STRAIGHT-TIME

When using straight-time, the normal defrost time should be approximately 26 to 28 minutes, four times per day. When high humidity is encountered, especially in stores not air-conditioned full time, it may be necessary to increase the frequency or length of defrosts.

TIME-PRESSURE

When using time-pressure, the timer will reinstate when the suction pressure reaches the corresponding temperature of approximately 46°F. This should be sufficient to melt all ice and frost in the refrigerator and allow for proper drainage. Long suction lines in trenches with other suction lines may cause the pressure not to reach this point. In this event, the fail-safe will reinstate the compressors. The fail-safe should be set for approximately 75 minutes. The approximate terminate pressure for the 2 common refrigerators are: R-12 - 46 psi; R-502 - 90 psi.

REFRIGERATION

EXPANSION VALVE

The expansion valve furnished with your refrigerator has been carefully sized and set for maximum coil efficiency. The bulb is located on the outlet of the coil. This location MUST NOT BE CHANGED. Due to local conditions, adjustment of the thermostatic expansion valve may be necessary after a minimum of 6 hours operation. Do not adjust the expansion valve at this point until you have checked the inlet strainer. If adjustment is necessary, adjust valve to give frost line to ferrule hole where suction line exits the refrigerator. Adjust expansion valve 1/4 turn and wait for 30 minutes before making final check.

REFRIGERANT LINES

On Warren vegetable refrigerators, the liquid and suction lines are located in the left end of the refrigerator facing the electrical junction box. The suction line is 5/8" OD and the liquid line is 3/8" OD. The tubing faces forward so that you can use an elbow and run in either direction or if multiplexing you can use a tee. Make sure that all refrigerant lines lie as close to the refrigerator bottom as possible so as not to obstruct the return-air section of the refrigerator.

DRAIN

All Warren vegetable refrigerators are equipped with an aluminum drain with trap located in the center of the bottom. This drain is an integral part of the refrigerator and cannot be removed. The drain nipple is made of galvanized steel and is also built into the bottom. This is 1" MPT nipple.

NOTE: Special care should be taken when making drain connections, as so specified on drain tag, so as not to damage the drain or nipple.

FOAMED-IN-PLACE INSULATION

All Warren vegetable refrigerators employ Warren's permaseal insulation (polyurethane) which is of the best quality available. Care should be used in making refrigeration line connections so that the insulation does not melt or burn from the torch heat. A small 1/8" sheet of asbestos between the joint being welded and the insulation or lines should be used. A piece of copper tubing of the same size as the liquid and suction line can be heated and used to bore holes through which the refrigerant lines will exit from the refrigerator.

SPECIAL NOTE: After installation is made be sure that the holes through which the refrigeration tubing enters the refrigerators are properly plugged with brine putty or some other mastic material that will prevent the escape of cold air.

DEHYDRATION OF REFRIGERATION SYSTEM

PLEASE READ CAREFULLY BEFORE PLACING SYSTEM INTO OPERATION

1. After laying refrigerant lines, they should be blown out before making final connection at fixture or condensing unit. Use either carbon dioxide or dry nitrogen to prevent any foreign matter being left in the lines. Keep pressure below 250 pounds.

2. To prevent scaling due to brazing, dry nitrogen should be allowed to flow through lines while brazing operations are taking place.

3. After installation is complete and checked for leaks, pump a deep vacuum using a vacuum pump. DO NOT USE THE CONDENSING UNIT FOR THIS PURPOSE!!!

4. Break vacuum on system by releasing refrigerant through a dehydrator until pressure gauge reads above zero pounds. Repeat steps three and four.

5. A dehydrator should be used in the charging line when adding refrigerant.

6. A dehydrator of sufficient capacity must be installed in the liquid line before placing system into operation.

INSTRUCTIONS FOR INSTALLING 8' & 12' FRONT PANEL

1. Place "V" in bottom of front panel under flange on front rail.
2. Place top of front panel in front panel recess, located in bottom of case.
3. Place (6) #10 x 24 x 1/2" ST screws in pre-drilled holes and shift front panel from side to side until flush with end panels on both ends.

INSTRUCTIONS FOR INSTALLING WIRE BAG RACK KIT

1. Place wire bag rack on front panel as shown on bag rack Drawing #1.
2. Line up pre-drilled holes with those in front panel and secure in place using #8 x 3/4" sheet metal screws.

INSTRUCTIONS FOR INSTALLING RECESSED BAG RACK KIT

1. After installing front panel, slide bag rack into opening in front panel until bag rack stop is against front panel. Ref. Bag Rack Drawing #2.
2. Secure in place with #10 x 24 x 1/2" ST screws.

INSTRUCTIONS FOR INSTALLING BASE KICKPLATE

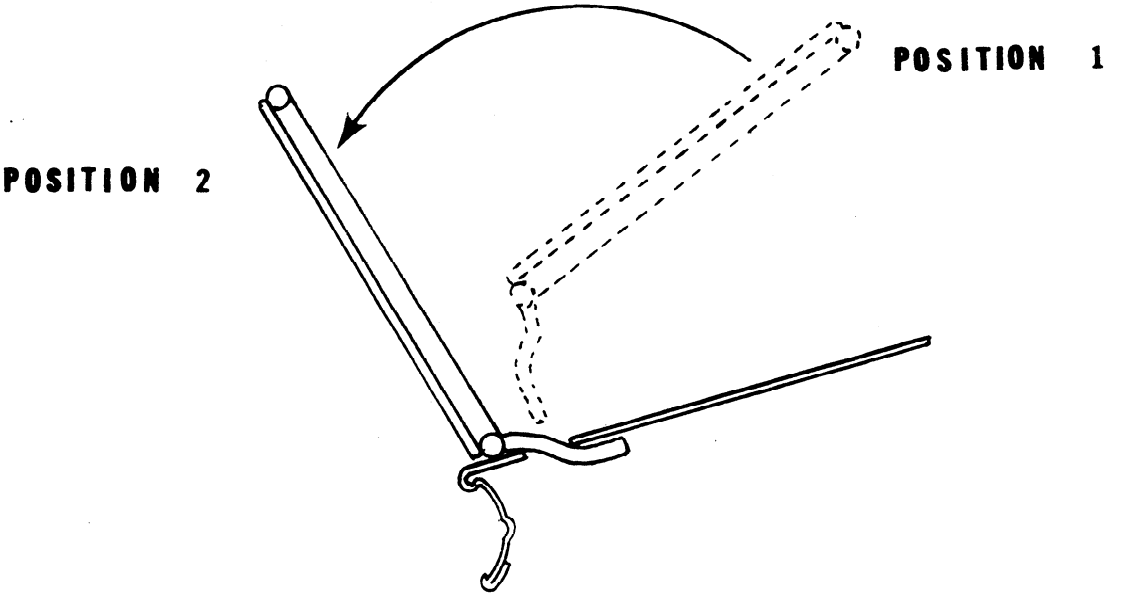
1. Place kickplate in Position "A" and slide under leg base rail until it is in Position "B".
2. Line up pre-drilled holes in kickplate with those in legs and secure in place using #10 x 24 x 1/2" black head sheet metal screws.

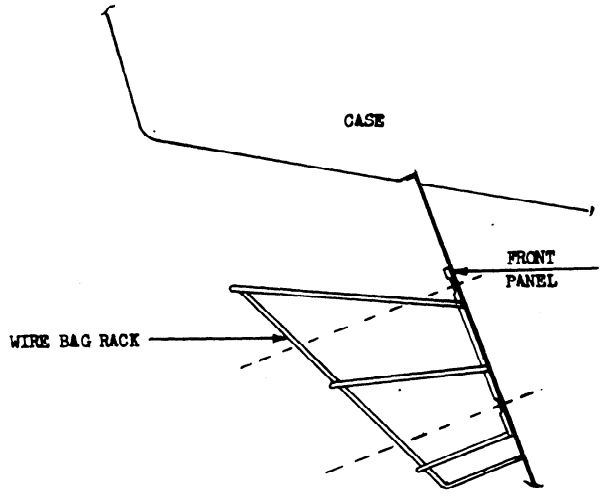
SHELF & FENCE

Optional shelf is shipped installed when ordered. However, the shelf may be removed and re-installed if so desired. To remove, lift entire shelf up until tabs clear, and lift out and away from the shelf standard. To install, insert the top tab on both shelf brackets into the slots in the shelf standards. Insert the remaining tabs and push downward to lock in position. Care must be taken to insure that the mirror edging is positioned to cover all slots not occupied by the shelf brackets. The flow of refrigerated air might be affected if the slots are left uncovered. This would also detract from the appearance of the case.

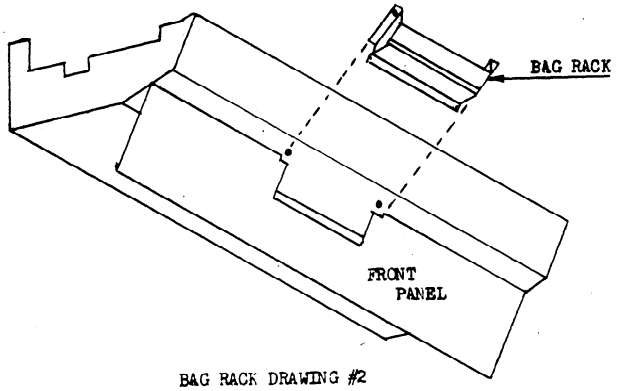
To install fence, tilt fence back as shown in View "A", Position 1 and bring forward until in Position 2.

VIEW A

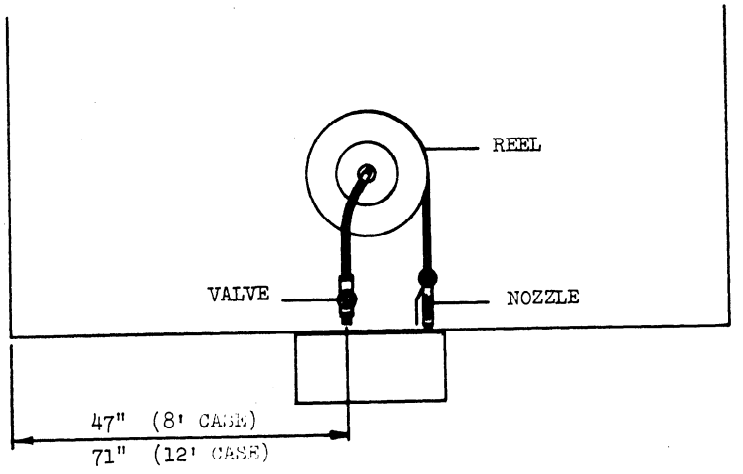




BAG RACK DRAWING #1
WIRE TYPE



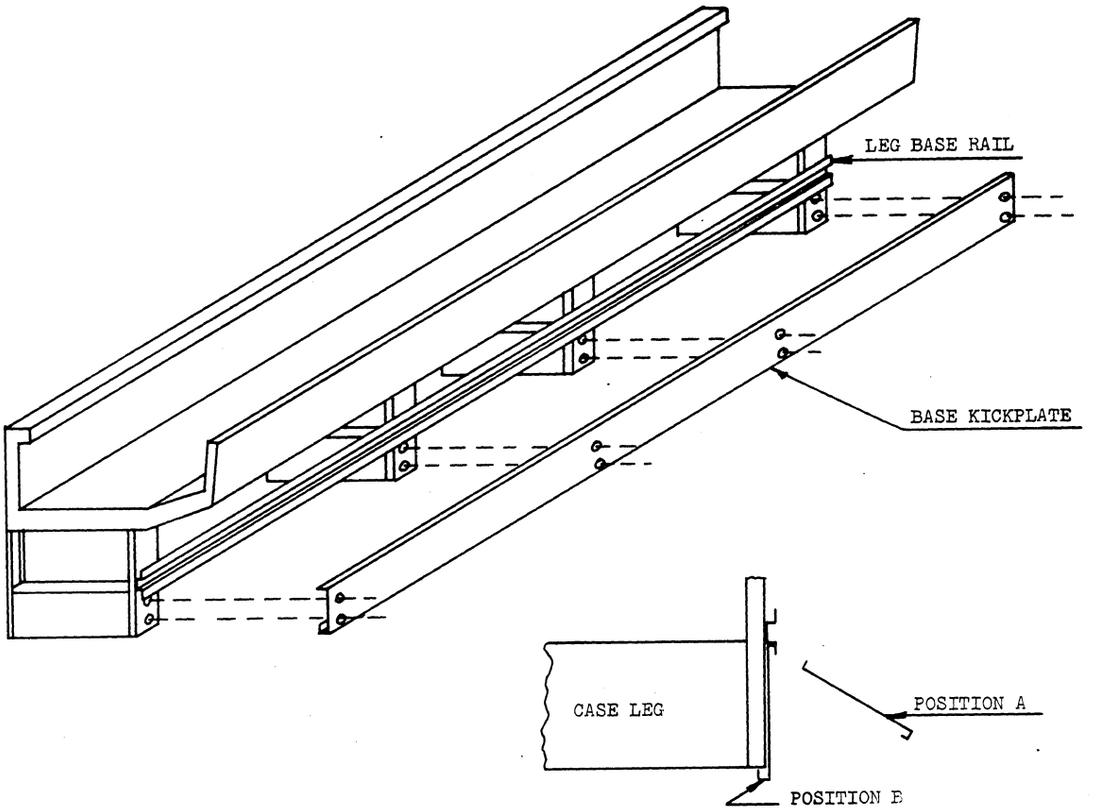
BAG RACK DRAWING #2
RECESSED TYPE



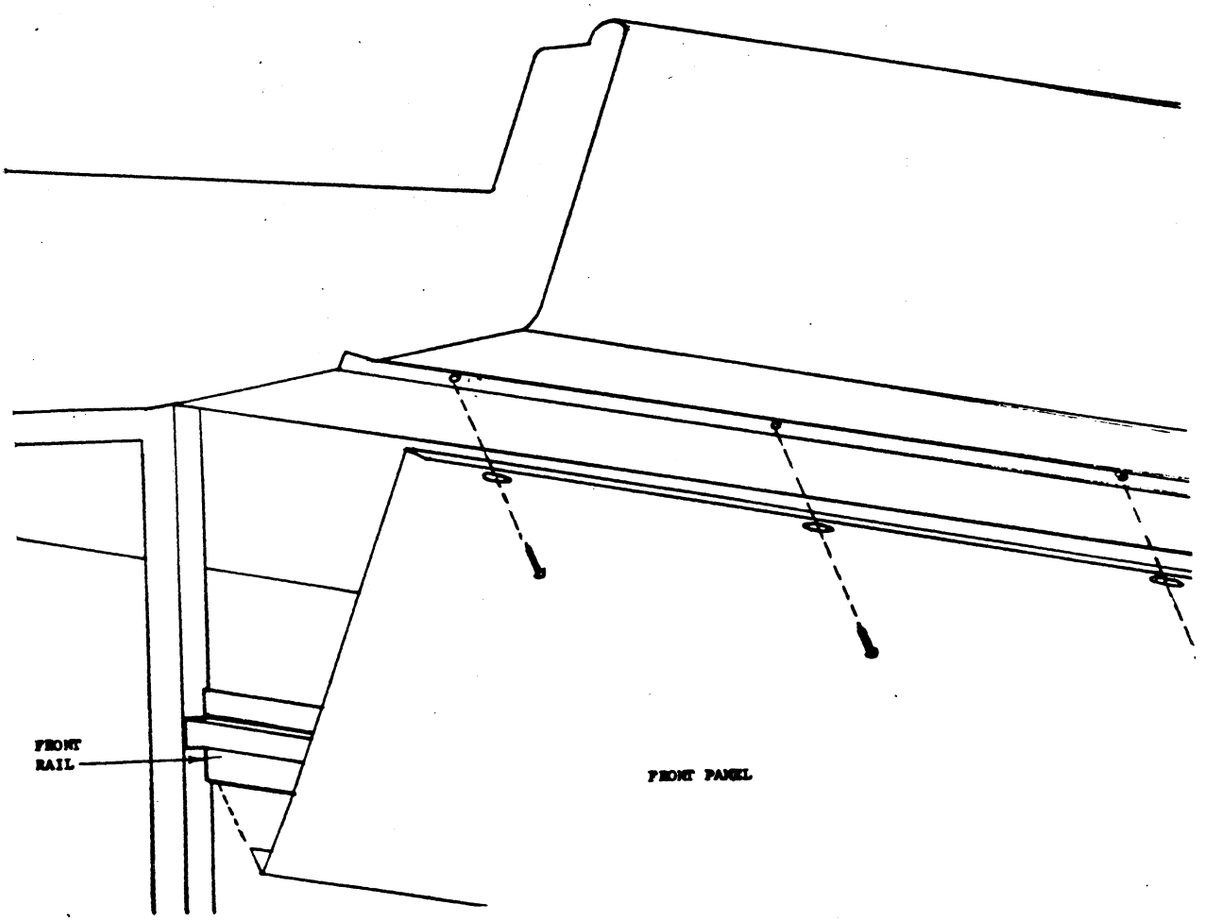
WATER SPRAY

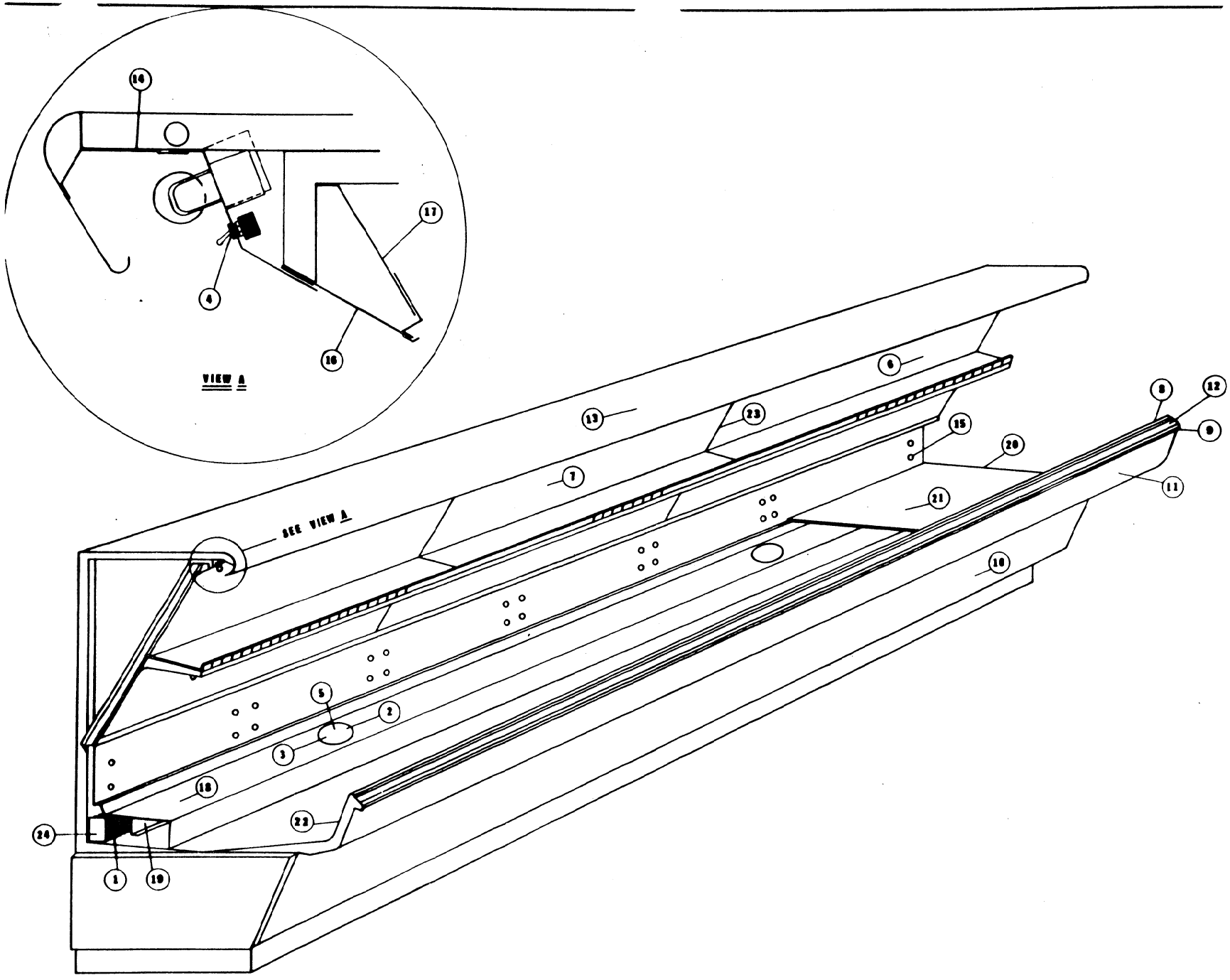
- TOP VIEW -

CONNECT WATER LINE SOURCE TO
OPEN SIDE OF VALVE BEFORE
FRONT PANEL IS INSTALLED.


LEG BASE RAIL
BASE KICKPLATE

CASE LEG
POSITION A
POSITION B


FRONT
RAIL
FRONT PANEL

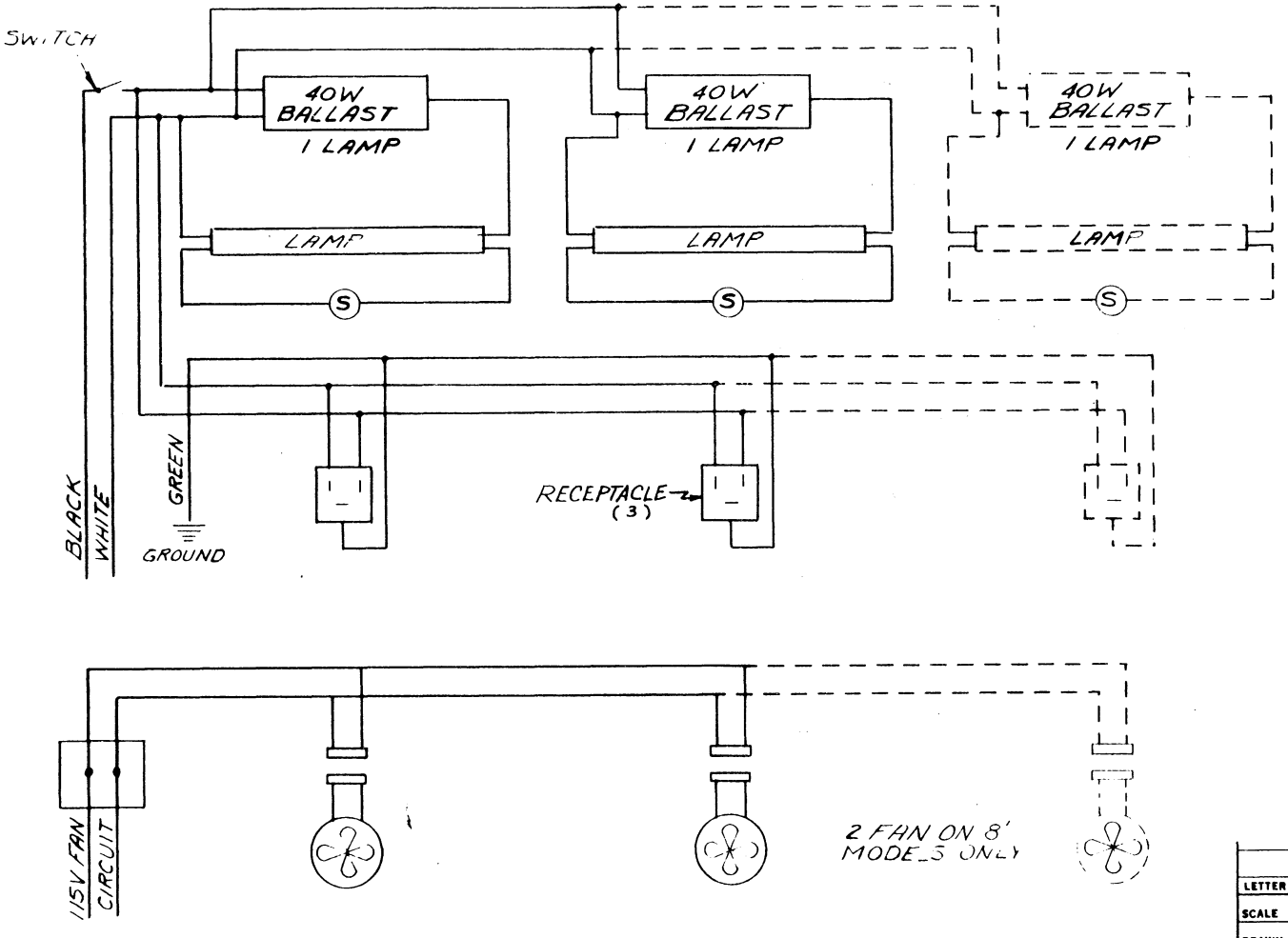


LETTER	REVISED
SCALE	TITLE
DRAWN N JONES	

PARTS LIST

HZV-ZV

DESCRIPTION	REF. NO.	PART NO. 8' CASE	PART NO. 12' CASE
EXPANSION VALVE	1	3A10-17	3A11-18
FAN BLADE	2	9B10-22	9B10-22
FAN MOTOR	3	9A10-17	9A10-17
LIGHT SWITCH	4	10J10-12	10J10-12
WIRING HARNESS	5	10M10-66	10M10-65
END MIRROR	6	14E10-33	14E10-33
CENTER MIRROR	7	--------	14E10-34
THERMOPANE BASE TRIM	8	15J11-10	15J11-12
COLOR BAND BUMPER TRIM	9	15J11-16	15J11-18
LOWER FRONT PANEL	10	51A12-41	51A14-37
UPPER FRONT PANEL	11	51A12-43	51A14-36
COLOR BAND	12	51A17-33	51A19-33
CANOPY FRONT PANEL	13	52E17-11	52H17-11
UPPER FRONT INSIDE CANOPY PANEL	14	52E17-12	52H17-12
BACK BAFFLE	15	54H28-64	54H30-51
UPPER AIR GRILLE	16	54J12-72	54J14-62
UPPER AIR BAFFLE	17	54J12-73	54J14-61
PLENUM CHAMBER	18	54N12-182	54N14-148
COIL COVER	19	54N12-183	54N14-149
PLENUM END COVER	20	54N15-148	54N15-148
DECK PAN	21	54N18-40	54N18-40
FRONT BAFFLE	22	56B10-66	56B10-67
MIRROR EDGING	23	73F14-28	73F14-28
EVAPORATOR COIL	24	86C14-41	86E14-31



DOTTED FOR 12' ONLY

LETTER	REVISED	DATE	BY

SCALE	TITLE WIRING DIAGRAM FOR HEV-8'S 12'	
DRAWN W JONES	THE WARREN COMPANY INCORPORATED ATLANTA 1, GEORGIA	DRAWING NUMBER EB 115 14
APPROVED		
DATE		

Cases		LINEAR FEET	80° Store	COMPRESSOR SIZE						LINE SIZES								ELECTRICAL DATA							
										R-12				R-502				DEFROST AMPS				115V. AMPS			
				SAH			SWH			0-75'		75'-150'		0-75'		75'-150'		230V. 1PH		208V. 3PH		Fans & A.cw		Lights	
8	12		BTUH Req'd.	FC		RC	FC		RC	L	S	L	S	L	S	L	S	AMPS	Wire	AMPS	Wire	AMPS	Wire	AMPS	Wire
1		8	6050	100		-	100		-	3/8	7/8	3/8	7/8	3/8	7/8	3/8	7/8					1.0	14	1.4	14
	1	12	9075	150		-	150		-				1 1/8			1/2						1.5	14	2.1	14
2		16	12100	200		210	200		-		1 1/8	1/2		1/2			1 1/8					2.0	14	2.8	14
1	1	20	15125	300		210	200		210	1/2					1 1/8							2.5	14	3.5	14
	2	24	18150	300		310	300		310							5/8						3.0	14	4.2	14
2	1	28	21175	300		310	300		310			5/8	1 3/8									3.5	14	4.9	14
1	2	32	24200	500		310	500		310		1 3/8			5/8			1 3/8					4.0	14	5.6	14
	3	36	27225	500		410	500		410													4.5	14	6.3	14
2	2	40	30250	500		510	500		410	5/8					1 3/8							5.0	14	7.0	14
1	3	44	33275	550		510	500		410				1 5/8									5.5	14	7.7	14
	4	48	36300	550		560	550		510							7/8						6.0	14	8.4	14
2	3	52	39325	750		560	750		510								1 5/8					6.5	14	9.1	14
1	4	56	42350	750		560	750		560		1 5/8	7/8										7.0	14	9.8	14
	5	60	45375	750		560	750		560					7/8								7.5	14	10.5	14
2	4	64	48400	780		760	750		560						1 5/8							8.0	14	11.2	14
1	5	68	51425	780		760	780		760													8.5	14	11.9	14
	6	72	54450	780		790	780		760	7/8			2 1/8									9.0	14	12.6	14
2	5	76	57475	1000		790	780		760													9.5	14	13.3	14
1	6	80	60500	1000		790	1000		760													10.0	14	14.0	14
	7	84	63525	1000		1010	1000		790								2 1/8					10.5	14	14.7	14
2	6	88	66550	1500		1010	1000		790													11.0	14	15.4	12
1	7	92	69575	1500		1010	1000		1010		2 1/8											11.5	14	16.1	12
	8	96	72600	1500		1010	1500		1010													12.0	14	16.8	12

NOTES:

1. COMPRESSOR RECOMMENDATIONS ARE BASED ON AIR-CONDITIONED STORES HAVING A MAXIMUM OF 80° AMBIENT AND 55% R.H.
2. SAH (AIR-COOLED UNITS) ARE BASED ON 90° AIR ENTERING CONDENSER. SWH (WATER-COOLED UNITS) ARE BASED ON 75° WATER ENTERING CONDENSER. WHEN USING REMOTE CONDENSER COMBINING UNITS "RAH", USE BTU REQUIREMENTS OF "SAH".
3. SUFFIX ON UNITS ARE AS FOLLOWS: LOW-TEMPERATURE--"FL"--REFRIGERANT-12; "BL", "BZL"--REFRIGERANT-22; "RL", "RLZ"--REFRIGERANT-502. "BZL" AND "RBL" ARE TWO-STAGE COMPRESSORS. MEDIUM TEMPERATURE--"FC"--REFRIGERANT-12; "RC"--REFRIGERANT-502.
4. CAUTION! THESE RECOMMENDATIONS ARE BASED ON THE LIMITING CONDITIONS OUTLINED ABOVE. SINCE CONDITIONS MAY VARY FROM THE ABOVE, WE SUGGEST THAT PERSONS USING THESE RECOMMENDATIONS DO SO AT THEIR OWN DISCRETION AND RISK. WE CAN ASSUME NO LIABILITY FOR RESULTS OBTAINED AS A CONSEQUENCE OF APPLICATIONS OUTSIDE OF WARREN'S CONTROL.
5. RISERS--IN THE SUCTION LINE ANY ELEVATION AS MUCH AS SIX FEET OR MORE MUST HAVE THE SUCTION LINE REDUCED TO THE NEXT SMALLER SIZE. ALL RISERS MUST HAVE AN OIL TRAP INSTALLED AT THE BOTTOM.
6. EQUIVALENT LENGTH IS LENGTH FROM COMPRESSOR TO REFRIGERATOR FURTHEST FROM COMPRESSOR PLUS 4' FOR EACH FITTING IN MAIN TRUNK LINE. USING THIS EQUIVALENT LENGTH, SELECT SIZE OF MAIN TRUNK LINE FROM CHART ABOVE. FOR BRANCH LINES REDUCE TO NEXT SMALLEST LINE SIZE FOR SECOND CASE, NEXT SMALLEST SIZE FOR THIRD CASE, ETC., BUT ALWAYS MAINTAIN AT LEAST ONE SIZE LARGER THAN CASE OUTLET EXCEPT FOR REFRIGERATOR FURTHEST FROM COMPRESSOR. IT IS NOT NECESSARY TO RUN THE LARGE TUBING INTO REFRIGERATOR ITSELF, MERELY TO THE TUBING FERRULE ENTRANCE.
7. EXPOSED SUCTION LINES SHOULD BE INSULATED TO PREVENT CONDENSATE DRIP.
8. ELECTRICAL WIRE SIZES ARE BASED ON AMERICAN WIRE GUAGE FOR 100 FEET OF THERMOPLASTIC TYPE T & TW.
9. LIGHTS--AMPERAGE LISTED IS FOR STANDARD LIGHTING. WHERE EXTRA LIGHTS ARE USED CHECK NAMEPLATE DATA.
10. DEFROST VOLTS--FOR 208V/1-PHASE, MULTIPLY 230V AMPS BY 0.9.

    FOR 220V/1-PHASE, MULTIPLY 230V AMPS BY 0.95.

    FOR 220V/3-PHASE, MULTIPLY 208V AMPS BY 1.06.

    THREE PHASE AMPERAGE (A/LEG) IS THE MAXIMUM PER LEG.

ENG. FORM 68-357-80-9
9-26-68

WARREN REFRIGERANT LINES & ELECTRICAL DATA

80° STORE

BTU DATA BASED ON +15° SUCTION. CALCULATE TOTAL LENGTH OF LINES AND THEN ADD 4' FOR EACH FITTING.

COMPRESSOR SIZE CHART

AIR-CURTAIN PRODUCE

MODEL(S) HZV

CASES		LINEAR FEET	90° Store BTUH REQ'D.	COMPRESSOR SIZE						LINE SIZES								ELECTRICAL DATA							
				SAH			SWH			R-12				R-502				DEFROST AMPS				115V. AMPS			
										0-75'		75'-150'		0-75'		75'-150'		230V. 1PH		208V. 3PH		Fans & A-ow		Lights	
S	12			FC		RC	FC		RC	L	S	L	S	L	S	L	S	AMPS	Wire	AMPS	Wire	AMPS	Wire	AMPS	Wire
1		8	8520	150		-	100		-	3/8	7/8	3/8	7/8	3/8	7/8	1/2	7/8					1.0	14	1.4	14
	1	12	12760	200		210	200		210	1/2	1 1/8	1/2	1 1/8	1/2	↓	↓	1 1/8					1.5	14	2.1	14
2		16	17040	300		310	300		210	↓	↓	↓	↓	↓	1 1/8	↓	↓					2.0	14	2.8	14
1	1	20	21300	300		310	300		310	↓	↓	5/8	1 3/8	↓	↓	5/8	↓					2.5	14	3.5	14
	2	24	25560	500		410	500		310	↓	1 3/8	↓	↓	5/8	↓	↓	1 3/8					3.0	14	4.2	14
2	1	28	29820	500		410	500		410	5/8	↓	↓	↓	↓	1 3/8	↓	↓					3.5	14	4.9	14
1	2	32	34080	550		510	500		510	↓	↓	↓	1 5/8	↓	↓	↓	↓					4.0	14	5.6	14
	3	36	38340	750		560	550		510	↓	↓	↓	↓	↓	↓	7/8	↓					4.5	14	6.3	14
2	2	40	42600	750		560	750		560	↓	1 5/8	7/8	↓	↓	↓	↓	1 5/8					5.0	14	7.0	14
1	3	44	46860	780		760	750		560	↓	↓	↓	↓	7/8	↓	↓	↓					5.5	14	7.7	14
	4	48	51120	780		760	780		760	↓	↓	↓	↓	↓	1 5/8	↓	↓					6.0	14	8.4	14
2	3	52	55380	780		790	780		760	7/8	↓	↓	2 1/8	↓	↓	↓	↓					6.5	14	9.1	14
1	4	56	59640	1000		790	1000		760	↓	↓	↓	↓	↓	↓	↓	↓					7.0	14	9.8	14
	5	60	63900	1000		1010	1000		790	↓	↓	↓	↓	↓	↓	↓	2 1/8					7.5	14	10.5	14
2	4	64	68160	1500		1010	1000		790	↓	2 1/8	↓	↓	↓	↓	↓	↓					8.0	14	11.2	14
1	5	68	72420	1500		1010	1500		1010	↓	↓	↓	↓	↓	↓	↓	↓					8.5	14	11.9	14
	6	72	76680	1500		1010	1500		1010	↓	↓	↓	↓	↓	↓	↓	↓					9.0	14	12.6	14
2	5	76																							
1	6	80																							
	7	84																							
2	6	88																							
1	7	92																							
	8	96																							

NOTES:

1. COMPRESSOR RECOMMENDATIONS ARE BASED ON STORES HAVING A MAXIMUM OF 90° AMBIENT AND 60% R.H.
2. SAH(AIR-COOLED UNITS) ARE BASED ON 90° AIR ENTERING CONDENSER. SWH (WATER-COOLED UNITS) ARE BASED ON 75° WATER ENTERING CONDENSER. WHEN USING REMOTE CONDENSER CONDENSING UNITS "RAH", USE BTU REQUIREMENTS OF "SAH".
3. SUFFIX ON UNITS ARE AS FOLLOWS: LOW-TEMPERATURE--"FL"--REFRIGERANT-12; "RL", "RAL"--REFRIGERANT-22; "RL", "RAL"--REFRIGERANT-502. "BBL" AND "RBL" ARE TWO-STAGE COMPRESSORS. MEDIUM TEMPERATURE--"FC"--REFRIGERANT-12; "RC"-- REFRIGERANT-502.
4. CAUTION! THESE RECOMMENDATIONS ARE BASED ON THE LIMITING CONDITIONS OUTLINED ABOVE. SINCE CONDITIONS MAY VARY FROM THE ABOVE, WE SUGGEST THAT PERSONS USING THESE RECOMMENDATIONS DO SO AT THEIR OWN DISCRETION AND RISK. WE CAN ASSUME NO LIABILITY FOR RESULTS OBTAINED AS A CONSEQUENCE OF APPLICATIONS OUTSIDE OF WARREN'S CONTROL.
5. RISERS--IN THE SUCTION LINE ANY ELEVATION AS MUCH AS SIX FEET OR MORE MUST HAVE THE SUCTION LINE REDUCED TO THE NEXT SMALLER SIZE. ALL RISERS MUST HAVE AN OIL TRAP INSTALLED AT THE BOTTOM.
6. EQUIVALENT LENGTH IS LENGTH FROM COMPRESSOR TO REFRIGERATOR FURTHEST FROM COMPRESSOR PLUS 4' FOR EACH FITTING IN MAIN TRUNK LINE. USING THIS EQUIVALENT LENGTH, SELECT SIZE OF MAIN TRUNK LINE FROM CHART ABOVE. FOR BRANCH LINES REDUCE TO NEXT SMALLEST LINE SIZE FOR SECOND CASE; NEXT SMALLEST SIZE FOR THIRD CASE; ETC., BUT ALWAYS MAINTAIN AT LEAST ONE SIZE LARGER THAN CASE OUTLET EXCEPT FOR REFRIGERATOR FURTHEST FROM COMPRESSOR. IT IS NOT NECESSARY TO RUN THE LARGE TUBING INTO REFRIGERATOR ITSELF, MERELY TO THE TUBING FERRULE ENTRANCE.
7. EXPOSED SUCTION LINES SHOULD BE INSULATED TO PREVENT CONDENSATE DRIP.
8. ELECTRICAL WIRE SIZES ARE BASED ON AMERICAN WIRE GUAGE FOR 100 FEET OF THERMOPLASTIC TYPE T & TW.
9. LIGHTS--AMPERAGE LISTED IS FOR STANDARD LIGHTING. WHERE EXTRA LIGHTS ARE USED CHECK NAMEPLATE DATA.
10. DEFROST VOLTS: FOR 208V/1-PHASE, MULTIPLY 230V AMPS BY 0.9.

    FOR 220V/1-PHASE, MULTIPLY 230V AMPS BY 0.95.

    FOR 220V/3-PHASE, MULTIPLY 208V AMPS BY 1.06.

    THREE PHASE AMPERAGE (A/LEG) IS THE MAXIMUM PER LEG.

ENG. FORM 68-357-90-9
9-26-68

WARREN REFRIGERANT LINES & ELECTRICAL DATA

90° STORE

BTU DATA BASED ON +15° SUCTION. CALCULATE TOTAL LENGTH OF LINES AND THEN ADD 4' FOR EACH FITTING.

COMPRESSOR SIZE CHART

AIR-CURTAIN PRODUCE

MODEL(S) NZV

CASES		LINEAR FEET	80° Store BTUH Req'D.	COMPRESSOR SIZE						LINE SIZES								ELECTRICAL DATA							
				SAH			SWH			R-12				R-502				DEFROST AMPS				115V. AMPS			
										0-75'		75'-150'		0-75'		75'-150'		230V. 1PH		208V. 3PH		Fans & A.sw		Lights	
8	12			FC		RC	FC		RC	L	S	L	S	L	S	L	S	AMPS	Wire	AMPS	Wire	AMPS	Wire	AMPS	Wire
1		8	3400	50			50			3/8	7/8	3/8	7/8	3/8	7/8	3/8	7/8					.5	14	1.4	14
	1	12	5100	70			70															1.0	14	2.1	14
2		16	6800	100			100															1.0	14	2.8	14
1	1	20	8500	150			100										1/2					1.5	14	3.5	14
	2	24	10200	150			150					1/2	1 1/8	1/2								2.0	14	4.2	14
2	1	28	11900	200		210	200		210		1 1/8						1 1/8					2.0	14	4.9	14
1	2	32	13600	200		210	200		210	1/2												2.5	14	5.6	14
	3	36	15300	300		210	200		210						1 1/8							3.0	14	6.3	14
2	2	40	17000	300		310	300		210													3.0	14	7.0	14
1	3	44	18700	300		310	300		310				1 3/8				5/8					3.5	14	7.7	14
	4	48	20400	300		310	300		310													4.0	14	8.4	14
2	3	52	22100	300		310	300		310			5/8					1 3/8					4.0	14	9.1	14
1	4	56	23800	500		310	300		310		1 3/8											4.5	14	9.8	14
	5	60	25500	500		410	500		310					5/8								5.0	14	10.5	14
2	4	64	27200	500		410	500		410													5.0	14	11.2	14
1	5	68	28900	500		410	500		410	5/8					1 3/8							5.5	14	11.9	14
	6	72	30600	500		510	500		410													6.0	14	12.6	14
2	5	76	32300	500		510	500		410													6.0	14	13.3	14
1	6	80	34000	550		510	500		510				1 5/8									6.5	14	14.0	14
	7	84	35700	550		510	550		510													7.0	14	14.7	14
2	6	88	37400	750		560	550		510								7/8					7.0	14	15.4	12
1	7	92	39100	750		560	750		510								1 5/8					7.5	14	16.1	12
	8	96	40800	750		560	750		560													8.0	14	16.8	12

NOTES:

1. COMPRESSOR RECOMMENDATIONS ARE BASED ON AIR-CONDITIONED STORES HAVING A MAXIMUM OF 80° AMBIENT AND 55% R.H.
2. SAH (AIR-COOLED UNITS) ARE BASED ON 90° AIR ENTERING CONDENSER. SWH (WATER-COOLED UNITS) ARE BASED ON 75° WATER ENTERING CONDENSER. WHEN USING REMOTE CONDENSER CONDENSING UNITS "RAH", USE BTU REQUIREMENTS OF "SAH".
3. SUFFIX ON UNITS ARE AS FOLLOWS: LOW-TEMPERATURE--"FL"--REFRIGERANT-12; "BL", "B2L"--REFRIGERANT-22; "RL", "R2L"--REFRIGERANT-502. "B2L" AND "R2L" ARE TWO-STAGE COMPRESSORS. MEDIUM TEMPERATURE--"FC"--REFRIGERANT-12; "RC"--REFRIGERANT-502.
4. CAUTION! THESE RECOMMENDATIONS ARE BASED ON THE LIMITING CONDITIONS OUTLINED ABOVE. SINCE CONDITIONS MAY VARY FROM THE ABOVE, WE SUGGEST THAT PERSONS USING THESE RECOMMENDATIONS DO SO AT THEIR OWN DISCRETION AND RISK. WE CAN ASSUME NO LIABILITY FOR RESULTS OBTAINED AS A CONSEQUENCE OF APPLICATIONS OUTSIDE OF WARREN'S CONTROL.
5. RISERS--IN THE SUCTION LINE ANY ELEVATION AS MUCH AS SIX FEET OR MORE MUST HAVE THE SUCTION LINE REDUCED TO THE NEXT SMALLER SIZE. ALL RISERS MUST HAVE AN OIL TRAP INSTALLED AT THE BOTTOM.
6. EQUIVALENT LENGTH IS LENGTH FROM COMPRESSOR TO REFRIGERATOR FURTHEST FROM COMPRESSOR PLUS 4' FOR EACH FITTING IN MAIN TRUNK LINE. USING THIS EQUIVALENT LENGTH, SELECT SIZE OF MAIN TRUNK LINE FROM CHART ABOVE. FOR BRANCH LINES REDUCE TO NEXT SMALLEST LINE SIZE FOR SECOND CASE; NEXT SMALLEST SIZE FOR THIRD CASE; ETC., BUT ALWAYS MAINTAIN AT LEAST ONE SIZE LARGER THAN CASE OUTLET EXCEPT FOR REFRIGERATOR FURTHEST FROM COMPRESSOR. IT IS NOT NECESSARY TO RUN THE LARGE TUBING INTO REFRIGERATOR ITSELF, MERELY TO THE TUBING FERRULE ENTRANCE.
7. EXPOSED SUCTION LINES SHOULD BE INSULATED TO PREVENT CONDENSATE DRIP.
8. ELECTRICAL WIRE SIZES ARE BASED ON AMERICAN WIRE GUAGE FOR 100 FEET OF THERMOPLASTIC TYPE T & TW.
9. LIGHTS--AMPERAGE LISTED IS FOR STANDARD LIGHTING. WHERE EXTRA LIGHTS ARE USED CHECK NAMEPLATE DATA.
10. DEFROST VOLTS--FOR 208V/1-PHASE, MULTIPLY 230V AMPS BY 0.9.

    FOR 220V/1-PHASE, MULTIPLY 230V AMPS BY 0.95.

    FOR 220V/3-PHASE, MULTIPLY 208V AMPS BY 1.06.

    THREE PHASE AMPERAGE (A/LEG) IS THE MAXIMUM PER LEG.

ENG. FORM 65-301-80-4

WARREN REFRIGERANT LINES & ELECTRICAL DATA

80° STORE

BTU DATA BASED ON +15° SUCTION. CALCULATE TOTAL LENGTH OF LINES AND THEN ADD 4' FOR EACH FITTING.

COMPRESSOR SIZE CHART

SELF-SERVICE
VEGETABLE MERCHANDISER

MODEL(S) ZV

CASES		LINEAR FEET	90° Store BTUH REQ'D.	COMPRESSOR SIZE						LINE SIZES								ELECTRICAL DATA							
				SAH			SWH			R-12				R-502				DEFROST AMPS				115V. AMPS			
										0-75'		75'-150'		0-75'		75'-150'		230V. 1PH		208V. 3PH		Fans & A.cur		Lights	
8	12			FC		RC	FC		RC	L	S	L	S	L	S	L	S	AMPS	Wire	AMPS	Wire	AMPS	Wire	AMPS	Wire
1		8	3910	70			70			3/8	7/8	3/8	7/8	3/8	7/8	3/8	7/8					.5	14	1.4	14
	1	12	5760	100			100															1.0	14	2.1	14
2		16	7820	150			100									1/2						1.0	14	2.8	14
1	1	20	9670	150			150					1/2	1 1/8	1/2								1.5	14	3.5	14
	2	24	11520	200		210	150		210		1 1/8						1 1/8					2.0	14	4.2	14
2	1	28	13580	200		210	200		210	1/2												2.0	14	4.9	14
1	2	32	15430	300		210	200		210						1 1/8							2.5	14	5.6	14
	3	36	17280	300		310	300		210													3.0	14	6.3	14
2	2	40	19340	300		310	300		310				1 3/8			5/8						3.0	14	7.0	14
1	3	44	21190	300		310	300		310			5/8										3.5	14	7.7	14
	4	48	23040	500		310	300		310													4.0	14	8.4	14
2	3	52	25100	500		410	500		310		1 3/8			5/8								4.0	14	9.1	14
1	4	56	26950	500		410	500		410													4.5	14	9.8	14
	5	60	28800	500		410	500		410	5/8												5.0	14	10.5	14
2	4	64	30860	500		510	500		410						1 3/8							5.0	14	11.2	14
1	5	68	32710	550		510	500		410													5.5	14	11.9	14
	6	72	34560	550		510	550		510				1 5/8									6.0	14	12.6	14
2	5	76	36620	750		560	550		510							7/8						6.0	14	13.3	14
1	6	80	38470	750		560	550		510													6.5	14	14.0	14
	7	84	40320	750		560	750		510													7.0	14	14.7	14
2	6	88	42380	750		560	750		560		1 5/8	7/8										7.0	14	15.4	12
1	7	92	44230	750		560	750		560													7.5	14	16.1	12
	8	96	46060	750		760	750		560					7/8								8.0	14	16.8	12

NOTES:

1. COMPRESSOR RECOMMENDATIONS ARE BASED ON STORES HAVING A MAXIMUM OF 90° AMBIENT AND 60% R.H.
2. SAH(AIR-COOLED UNITS) ARE BASED ON 90° AIR ENTERING CONDENSER. SWH (WATER-COOLED UNITS) ARE BASED ON 75° WATER ENTERING CONDENSER. WHEN USING REMOTE CONDENSER CONDENSING UNITS "RAH", USE BTU REQUIREMENTS OF "SAH".
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ENG. FORM 65-301-90-4

WARREN REFRIGERANT LINES & ELECTRICAL DATA

90° STORE

BTU DATA BASED ON +15° SUCTION. CALCULATE TOTAL LENGTH OF LINES AND THEN ADD 4' FOR EACH FITTING.

COMPRESSOR SIZE CHART

SELF-SERVICE
VEGETABLE MERCHANDISER
MODEL(S) ZV