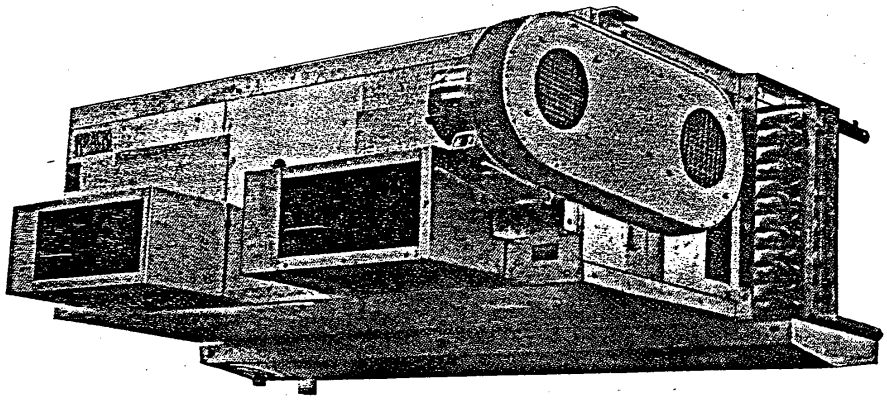
PR 1/85

INSTALLATION, OPERATION &
MAINTENANCE INSTRUCTIONS

Produce Ripening Systems



Unit Coolers Designed For Half And Full Loads
Mullion Mounted And Split Control Panels
Indoor And Outdoor Condensing Units

INSTALLATION

1. THERMAL EXPANSION VALVE

   Before hanging the unit cooler install the expansion valve and equalizer connections. All models require an external equalizer for proper expansion valve operation.

2. UNIT COOLER MOUNTING

   Mount the unit cooler level, allowing a minimum of two feet between the back and the wall. Where U.S.F. requirements must be met use 2" spacer blocks between the mounting brackets and the ceiling.

3. DRAIN LINES

   A union in the drain line is recommended for ease of installation and future servicing. The union should be located as close to the unit cooler as possible.

   The drain line should be as short and as steeply pitched as possible with a minimum pitch of 1/4" per foot.

   All drain lines should include a trap. Where multiple units are installed and share a common drain line each unit should have its own trap before it enters the common drain line.

4. WIRING THE UNIT

   Before wiring the unit check all wiring for loose connections which may develop in transit.

   Connections are made at the motor junction box located on the right front of the unit cooler.

   Fan motors may be 208/230/50-60-3 or 440/480/50-60/3 and are prelubricated for +40°F usage.

   Electric heaters are individually rated - 277V heaters are factory wired for 208/230/50-60/3 or 440/480-50-60/3.

   Wiring must comply with N.E.C. and local codes.

5. REFRIGERATION PIPING

   Following industry practices for piping, leak testing, and evacuation of the system, 150 psig is recommended for low side pressure testing.

6. PRE-STARTUP

   Check set screws and all other fasteners for tightness. Be sure thermostatic expansion valve bulb is properly located and strapped.

7. REFRIGERATION OPERATION

   Check direction of fan rotation. It should be clockwise, viewed when facing the right side of the unit.

   Adjust the expansion valve for best performance after the system has stabilized.

8. BELT GUARD

   For safety, a metal guard for the belt drive on PR units, is recommended.

9. BALL BEARINGS, SHAFT AND MOTOR

   Before start up, be sure to lubricate bearings.

   Use one of the following lubricants:

ESSO-BEACON 325
STD. OIL - SUPER MIL8723
TEXACO - ALL TEMP.
DOWN CORNING - DC44
SHELL - CY PRINA#3

Normal maintenance requires lubrication for normal service each 6 to 12 months, for severe service each 1 to 6 months.

10. MAINTENANCE

A. FAN BELT ADJUSTMENT

Tension of new belts will normally decrease rapidly after being put into service until the belts are run in. Theefore, check belt for proper tension periodically after the first day of operation.

B. HEATER REPLACEMENT

Before performing any electrical work, shut the electrical power to the unit off and lock it in the off position. Remove cover from heater junction box. Disconnect wiring from the heater. Remove two screws from the heater flange and pull heater towards you.

To replace, follow the procedure in reverse.

C. COIL CLEANING

When coil element becomes dirty wash with a good cleaning agent. Check with equipment distributor for a recommendation.

THERMAL OVERLOAD INSTRUCTIONS

IMPORTANT NOTE:

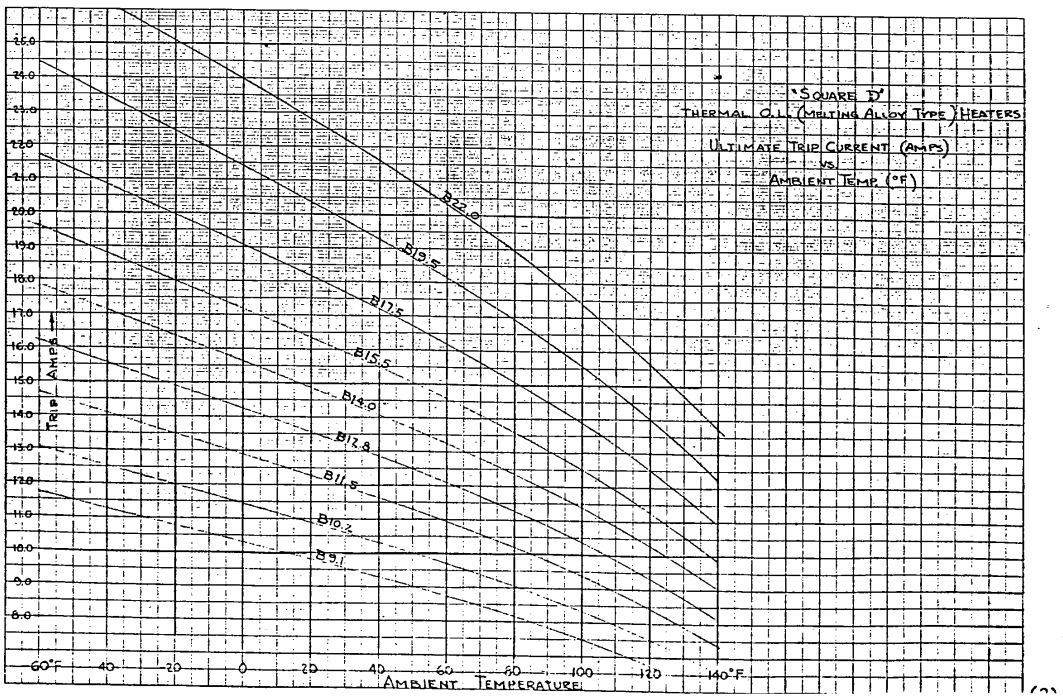
Control panel starter has thermal overload protection on three (3) legs, as determined by wiring diagram furnished with the job. This panel must be installed in a constant ambient termperature as these overloads do not compensate for ambient temperature variations.

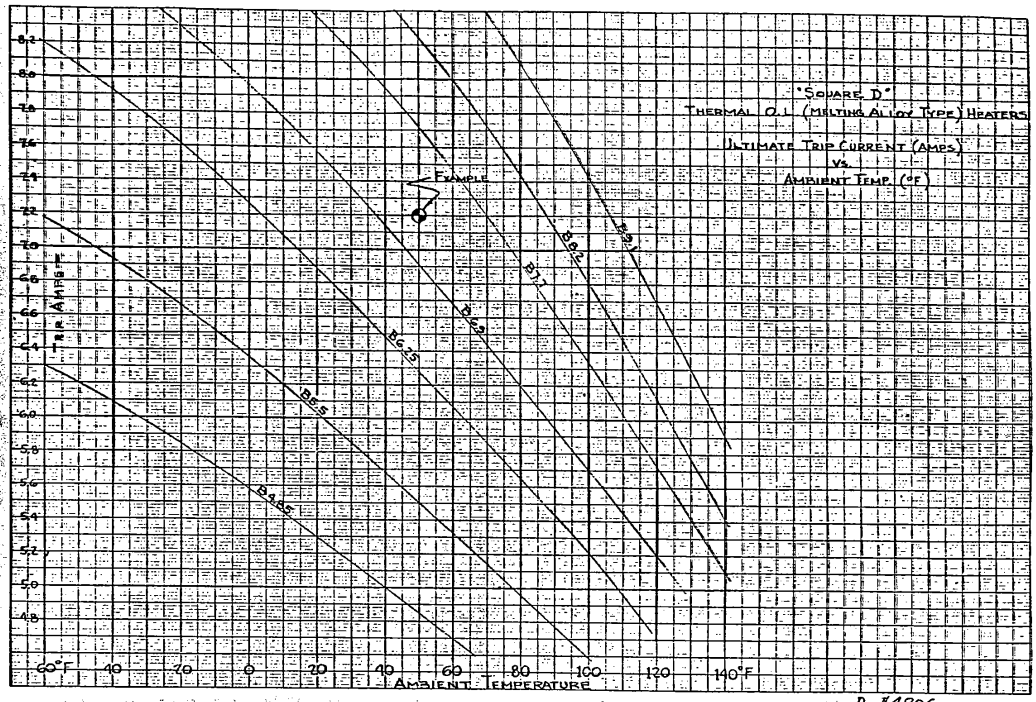
The thermal overloads provided are tentative selections. Actual thermal overloads required should be determined on the basis of the ambient temperature they will be subjected to.

To determine the correct overload sizing, use the following procedure:

1. Measure the full load amps of the motor after pulldown. Note: This amp reading will be higher than nameplate reading due to the denser, colder air.
2. Measure ambient temperature inside the control panel.
3. Select correct overload by means of the curves provided. Example: a 2 HP motor with a 6.0 nameplate amp reading reads 7.2 amps in a -20°F refrigerated room.

   The control panel is located in another refrigerated room where the actual temperature measured inside the control panel is +50°F. Use B7.7 Overloads.





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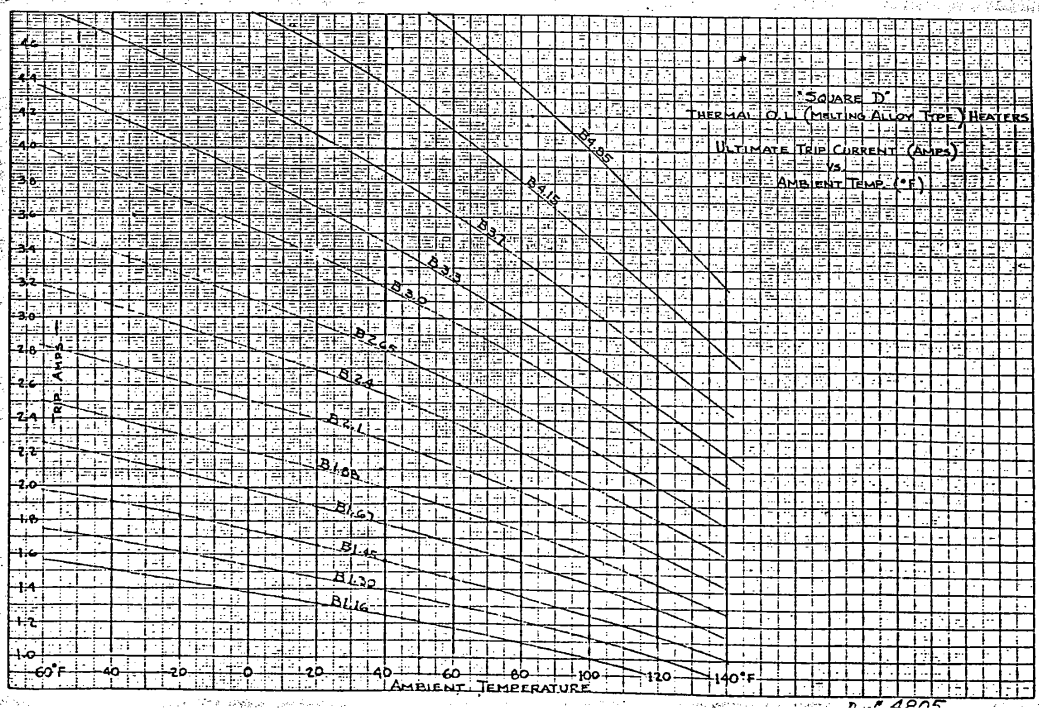

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INDUSTRIAL ENGINEERING & EQUIPMENT COMPANY

INSTALLATION, OPERATING AND MAINTENANCE INSTRUCTIONS FOR INDEECO BLAST COIL HEATERS

APPLICATION INFORMATION

1. Follow the procedure given on the reverse side of this sheet to find the minimum air velocity for safe operation. At least this minimum velocity must be provided at all points over the heater face area. Failure to meet this requirement may result in serious damage or nuisance thermal cutout tripping.

2. The maximum air inlet temperature for open coil heaters is 100° F. and for finned tubular heaters, 80° F.

3. The heater must be located at least 48" from any grills, registers, filters, abrupt duct size changes, humidifiers, air conditioning or air handling units, or any other change or obstructions in the duct which may result in nonuniform airflow. Duct elbows or turns must be located at least 4' from the inlet of the heater and 2' from the outlet of the heater. Sufficient working space must be provided per paragraph 110-16 or NEC.

4. These duct heaters are not intended for installation in series in the airstream; the heaters are designed for use only as a single unit within a duct with the exception of Series ZUA, XUA, TFZUA, TFLZUA, TFXUA and TFLXUA, which are designed for stacked installation for use as a single unit within a duct. (See Fig. No. 3)

MECHANICAL INSTALLATION

1. Heater terminal outlet box should not be enclosed. Heaters with expanded metal terminal box covers must be installed in a position where air passing out of the terminal box does not enter into confined areas of the building structure (such as a space behind a false ceiling, a hollow space in a wall, etc.)

2. All heaters are suitable for installation with zero spacing between the duct and combustible surfaces.

3. The heater must be installed in the correct position as shown by the arrows in the terminal box.

4. Sufficient clearance for convection cooling must be allowed for all heaters with built-in Solitech Power Controllers. Provide at least 5 inches of free air space above and below cooling fins extending from heater terminal box.

5. The air duct should be installed in accordance with the standards of the National Fire Protection Association for installation of air conditioning and ventilating systems of other than residence type (Pamphlet No. 90A) and residence type warm air heating and air conditioning systems (Pamphlet No. 90B).

6. For proper operation of heaters equipped with a built-in airflow switch, a minimum of .07" WC of static pressure is required in the duct system and the velocity pickup tube for the airflow switch must be pointed in the proper direction. When the heater is installed on the downstream or positive pressure side of the air moving fan, the arrow on the mounting flange of the pickup tube must point in the same direction as the airflow. When the heater is installed on the upstream or negative pressure side of the air moving fan, the arrow must point in the direction opposite to the airflow. If incorrectly installed, remove the two screws holding the pickup tube in place, rotate 180° and reinstall. See separate instruction sheet for installation of heaters supplied with a remote pick-up tube.

FOR FLANGE TYPE HEATERS ONLY: (See Fig. No. 1)

7. Provide flanges on the duct to match the heater flanges, both on the entering and leaving air sides.

8. Attach the duct flanges to the heater flanges with bolts or sheet metal screws.

FOR SLIP-IN TYPE HEATERS ONLY: (See Fig. No. 2)

9. Cut a hole in the side of the duct to accommodate the body of the heater (excluding terminal box). This hole should be 1/8" larger than the heater frame.

10. Slip the heater into the duct and attach the back of the terminal box to the duct with sheet metal screws.

FOR STACKED TYPE HEATERS ONLY: (See Fig. No. 3)

11. The heaters with catalog prefix ZUA, XUA, TFZUA, TFLZUA, TFXUA, or TFLXUA must be stacked as indicated in Fig. No. 3.

FOR HEATERS TO BE INSTALLED IN FIBER GLASS DUCTS:

12. Write factory for special instructions. Note that the fiber glass duct material itself must be UL listed.

FOR HEATERS TO BE INSTALLED IN INTERIOR INSULATED DUCTS:

13. All slip-in type heaters are suitable for installation in ducts with up to 1" of interior insulation as long as they have been sized for the dimensions inside the insulation. The heaters are not suitable for insulation depths of greater than 1" unless a special construction has been ordered. Flange type heaters are only suitable for installation in insulated ducts if specially ordered for this application.

ELECTRICAL INSTALLATION

14. Follow the wiring diagram on the inside of the terminal box.

15. Supply connections must be made with copper wiring rated for 75° C. minimum. Use aluminum wire only when specifically called for on accompanying wiring diagram.

16. If supply connections are for 250 volts or greater, all wiring must be insulated for 600 volts.

17. When making line connections to heater element terminals FOR FINNED TUBULAR BLAST COILS ONLY, apply a 1/4" wrench to flat section of terminal immediately below threads. Otherwise damage to terminal may result.

18. Supply conductors for heaters rated less than 50 KW, must be sized at 125% of rated load. On heaters rated 50 KW and more, the supply conductors may be sized at 100% of rated load, if indicated on the wiring diagram. The line current for either a single or three phase load is calculated as follows:

$$\text{Single Phase Line Current} = \frac{KW \times 1000}{\text{Voltage}}$$

$$\text{Three Phase Line Current} = \frac{KW \times 1000}{\text{Voltage} \times 1.73}$$

19. The following table shows the maximum current for **75°C. Copper wire with not more than 3 conductors in a raceway. It is based on the 1984 National Electrical Code table 310-16. The amperages shown are for 125% and 100% wire sizing. If there are more than 3 conductors in a raceway, derate these amperages per note 8 to Table 310-16.**

AMPS		Wire Size	AMPS		Wire Size	AMPS		Wire Size
125%	100%	AWG/MCM	125%	100%	AWG/MCM	125%	100%	AWG/MCM
12		14	80	100	3	184	230	4/0
16		12	92	115	2	204	255	250
24		10	104	130	1	228	285	300
40		8	120	150	0	248	310	350
52	65	6	140	175	2/0	268	335	400
68	85	4	160	200	3/0	304	380	500

20. When connecting heaters with more than one stage, wire stage No. 1 so that it is the first stage on and the last stage off. Heaters with built-in PE switches must follow this rule also. The stage number will be indicated on the front of each PE switch.

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continued installation etc.

21. The heater must be wired so that it cannot operate unless air is flowing over it. This can be accomplished by using a built-in airflow switch, a built-in fan relay or any of several other methods. See the accompanying wiring diagram for the method used with this heater and provide appropriate interlock wiring as illustrated.

22. National Electrical Code and Underwriters Laboratories require the heater manufacturer to supply 1) over-current protection where heater total current exceeds 48 amperes and 2) any contactors required for proper functioning of temperature limiting controls. Where these devices are not included in the heater terminal box of a U.L. listed heater, they are supplied in a remote U.L. listed panel board shown on the wiring diagram.

23. If not supplied as part of this heater, install a line disconnect switch or main circuit breaker in accordance with the National Electrical Code. Depending upon the heater's location and accessibility, a built-in disconnect switch may meet this requirement.

24. All electrical connections in the heater, including both field and factory made connections, should be checked for tightness before operating the heater. In addition, after a short period of operation, all connections should again be checked for tightness.

25. If heater is wired to a heating-cooling thermostat, use a thermostat with isolating circuits to prevent possible inter-connection of Class 2 outputs.

INSTALLATION DRAWINGS

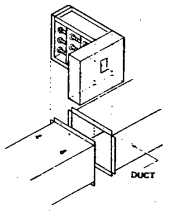

Fig. 1—Installation drawing of flanged heater.

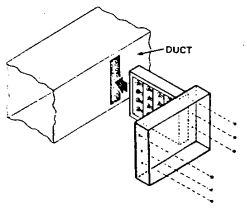

Fig. 2—Installation drawing of slip-in heater.

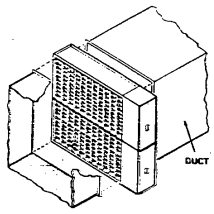

Fig. 3—Installation drawing of two stacked sections in a duct.

AIR FLOW REQUIREMENTS

Calculate watts per square foot of duct area as: $\frac{\text{heater nameplate watts.}}{\text{duct area (Sq. Ft.)}}$

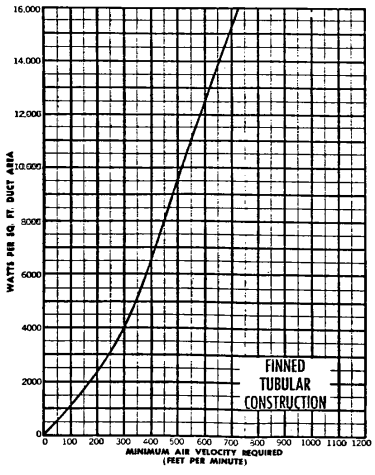

Fig. 4

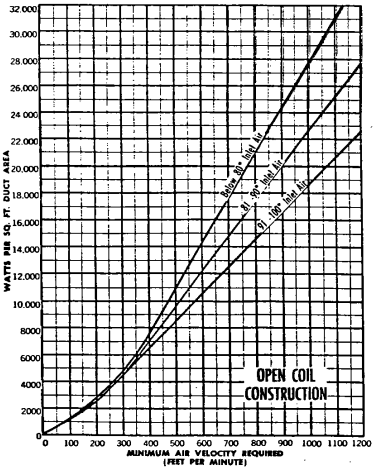

Fig. 5

OPERATION & MAINTENANCE

NOTICE: ALL SOURCES OF SUPPLY MUST BE DISCONNECTED BEFORE WORKING ON THIS EQUIPMENT.

To operate this heater make sure all associated control equipment is on, energize main supply disconnect and set controlling thermostat above ambient temperature. This heater is equipped with automatic and manual reset temperature limiting controls. If it fails to operate, make sure manual resets are operative by pushing reset buttons.

The only routine maintenance required is to check all electrical connections, including field and factory made connections, for tightness at least once each year or operating season. In addition, of course, any filters in the airstream must be kept clean so that adequate airflow is maintained.

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COLUMBUS ELECTRIC

INSTRUCTIONS
AIR FLOW SWITCH — MODEL RH-1

This switch may be used to sense duct static pressure or to prove blower is running and performs as an interlock to assure proper air movement when equipment is on and running.

The device is gravity sensitive and must be installed in a vertical position.

Mounting: The RH-1 Air Flow Switch may be used to sense pressure or vacuum or differentials of pressure or vacuum. Mount the control vertically on duct or equipment using sheet metal screws. Connect ¼" tubing to Air Flow Switch using connectors as provided. Insert other end of tubing into area to be sensed. A pitot tube, part no. 1729, may be ordered when plastic tubing is used. When a pitot tube is used face the pitot tube opening toward the blower.

Setting: The Operate Point is factory set at .05 ± .02" W.C. The differential is .04. The switch will operate at .05 and reset before .01.

Wiring: When pressure is applied to the high side of the Air Flow Switch or vacuum applied to the low side an internal diaphragm moves against and operates the lever of the snap switch. When the Air Flow Switch is at rest (not operating) the snap switch contacts are in the closed position. This is normal and typical of snap switches. The normally closed terminal of the snap switch is closest to the tube or fitting end of the Air Flow Switch. The middle terminal of the snap switch is the normally open terminal and the terminal farthest from the tube end is common. When the Air Flow switch is at rest the snap switch is in the normally closed position. The action of the diaphragm on the snap switch is the same when pressure or vacuum are being controlled or sensed. The wiring from the Air Flow Switch to other devices depends upon the application but in all cases the switch action is from N.C. position to N.O. position when the diaphragm of the Air Flow Switch is moved internally against the switch lever. External wiring must be guided accordingly.

The controls have been tested also for non-inductive rating of 15 amp. at 277 VAC. At this, over 2000 VA rating, not displayed on the control, the switch may be used for applications where spacings are acceptable.

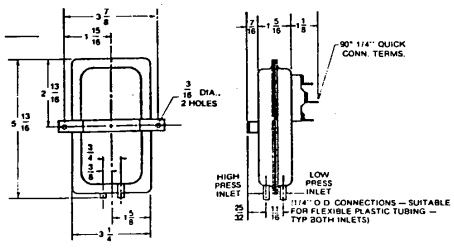
Not more than ½ PSI may be applied to the device

May be operated in the temp range of −40° to 180° F.

Electrical Rating: 300 VA pilot duty at 125-277 VAC
15 AMP resistive at 125
¼ HP at 125 VAC
½ HP at 250 VAC
490 — VA pilot duty at 250 VAC

UL recognition no. MH-10196

3076-4



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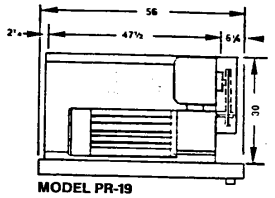
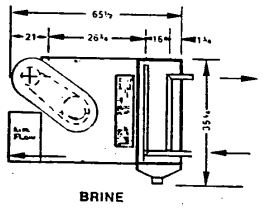
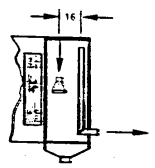
DIMENSIONS



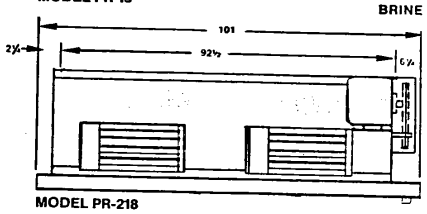
MODEL PR-19



BRINE

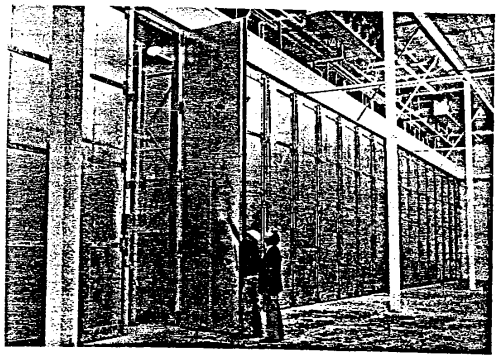


DIRECT EXPANSION

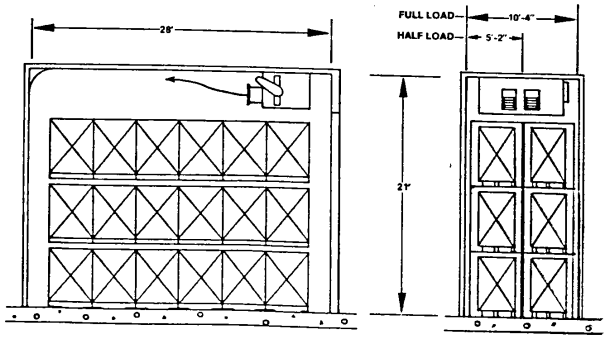


MODEL PR-218

6 HANGERS REQ'D—1⅛ DIA. HOLES
DRAINS ARE 1¼ F.P.T.



Ripening Room unit coolers are designed for gas tight rooms with approximate dimensions as shown. Even though high air circulation produces little room temperature variation, fruit in the warmer return air stream ripens first. Unit coolers are located 24 inches from the wall above doors to position this fruit for easy early removal.



SPECIFICATIONS

CAPACITY DATA—DIRECT EXPANSION MODELS

ROOM SIZE	BOXES	DESIGN TOTAL BTUH	DIRECT EXPANSION HALOCARBON MODELS	UNIT CAPACITY BTUH SENSIBLE 15°TD 60 DB—45 SST 55 DB—40 SST	UNIT CAPACITY BTUH TOTAL 10°TD 85% RH 60 DB—50 SST 55 DB—45 SST	HP	COND UNIT CAPACITY 110°F COND TEMP R22 REFRIGERANT 40°SST	45° SST	50° SST
HALF	432	34560	PR-194-3-DXF	30000	36000	3	37000	41000	45000
	540	43200	PR-196-3-DXF	42000	48000	3	37000	41000	45000
	540	47700	PR-196-5-DXF	42000	48000	5	62000	69000	76000
FULL	864	69120	PR-2184-5-DXF	60000	72000	5	62000	69000	76000
	1080	86400	PR-2186-5-DXF	84000	96000	7½	87000	97000	107000
	1080	92400	PR-2186-7½-DXF	84000	96000	7½	87000	97000	107000

CAPACITY DATA—BRINE MODELS

ROOM SIZE	BOXES	DESIGN TOTAL BTUH	BRINE MODELS	20% WT ETHYLENE GLYCOL 60 DB—45 ENT TEMP 55 DB—40 ENT TEMP GPM	ΔP—PSI	RISE—°F	WATER 55 DB—40 ENT TEMP GPM	ΔP—PSI	RISE—°F
HALF	540	43200	PR-196-3-B	14	3.0	6.5	12	1.7	7.2
	540	47700	PR-196-5-B	16	3.8	6.3	14	2.2	6.8
FULL	1080	86400	PR-2186-5-B	28	3.7	6.5	24	2.1	7.2
	1080	92400	PR-2186-7½-B	30	4.2	6.5	26	2.5	7.1

PHYSICAL DATA

MODEL SERIES	CFM	FAN MOTOR BHP	ROW DEPTH	COIL DATA FACE AREA SQFT	COIL DATA TOTAL SURFACE SQFT	COIL DATA INT VOL CUFT	SHIP WT LBS CU/AL	SHIP WT LBS STEEL	DXF LIQ—SUCT ODS	CONNECTIONS BRINE IN—OUT ODS	CONNECTIONS DXA LIQ—SUCT FPT—MPT	CONNECTIONS BTA LIQ—SUCT MPT
PR-194-3	6900	3	4	9.3	536	0.6	785	1000		—		
PR-196-3	6700	3	6	9.3	804	0.9	835	1175	⅝-1⅛	1⅜	½-¾	½-1
PR-196-5	9000	5	6	9.3	804	0.9	855	1200		1⅜		
PR-2184-5	15000	5	4	18.6	1072	1.2	1150	1530		—		
PR-2186-5	14500	5	6	18.6	1608	1.8	1240	1880	⅞-1⅜	1⅜	½-1	¾-1¼
PR-2186-7½	17000	7½	6	18.6	1608	1.8	1280	1920		1⅜		

DESIGN HEATING LOAD

Basis—Raise the temperature of the maximum number of boxes at a rate not exceeding 1° F per hour. Ripening cycles do not require heat unless the load is below prescribed temperature requirements. Approximately half the required heat is provided by blower motors (3000 BTUH/HP—0.9 KW/HP).

DESIGN REFRIGERATION LOAD

Basis—80 BTUH per box with a pulldown rate of 1° F per hour. Boxes per pallet may vary. Design load is the total of sensible and latent. Natural transpiration of fruit, within airtight rooms, contributes to high humidity required for proper ripening. Unit coolers have capacity to maintain room conditions with 15° F dry coil TD and 10° F wet coil TD.

BRINE APPLICATION

Large distribution centers with central refrigeration plants generally use ethylene glycol brine as the refrigerant. Shell and tube chillers maintain 40 to 45° F leaving brine temp. Motorized two or three-way valves control ON-OFF flow to the unit coolers. Chillers are normally provided with EPR and adequate freeze-up protection. 20% by weight ethylene glycol, having a freezing point of 17° F, is recommended for 20° F SST systems.