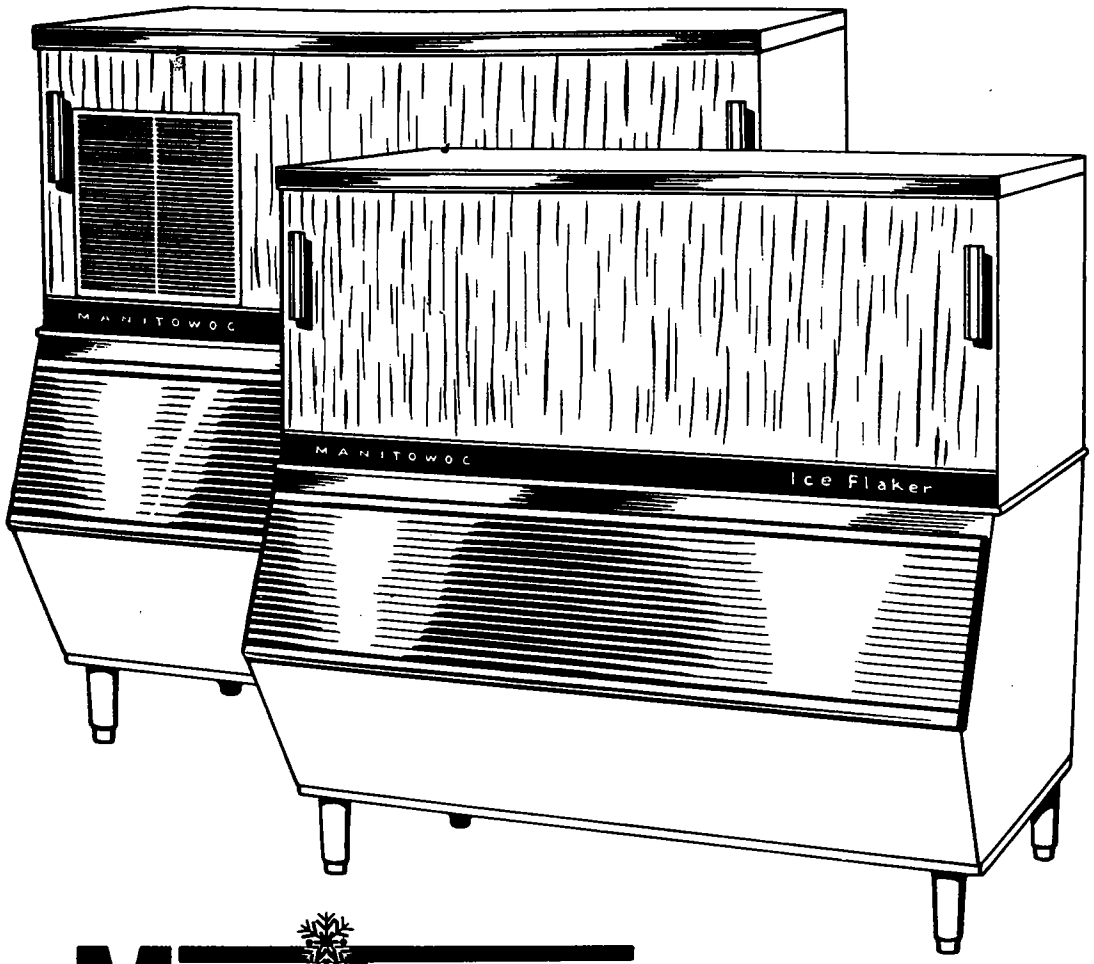


Manitowoc

ICE FLAKER
SERVICE MANUAL

Manitowoc equipment works
Division of The Manitowoc Company, Inc.,

MANITOWOC
WISCONSIN

Form No. 80-0187

MANITOWOC manufactures two types of Ice Making equipment. They are:

1. Ice Flakers to produce a fine dry crushed ice.
2. Ice Cubers, to produce crystal clear cubes, sized approximately 1-1/4x1-1/4x1-1/4 inches and diced cubes, sized approximately 3/4 x 3/4 x 3/4.

This manual covers Ice Flaker machines. Refer to Manual No. 80-0186 for Ice Cubers and Diced Cube machines.

Refer to the index section below for your convenience in installing and servicing this equipment.

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Your MANITOWOC Flaker was designed to produce ample quantities of top quality ice. It is constructed of heavy duty, commercial grade material to withstand the adverse conditions this type of equipment operates in. The ice making compartment is isolated from the machinery compartment. The ice making parts can be completely disassembled for cleaning without the use of tools. The parts are made of materials recommended by the National Sanitation Foundation for use with potable water. They are designed without cracks or crevices and with ample radiuses for easy cleaning.

Service problems should be infrequent because the only mechanical operating parts in the ice making section are the gear drive unit with auger, and the float valve. The sealed motor of the gear drive unit is protected by an internal overload device. The float valve can be disconnected and the entire assembly removed for cleaning.

The sealed condensing unit of the air cooled model is mounted with the finned condenser to the front for regular inspection and easy cleaning. The complete condensing unit pulls out for access to the compressor, fan, solenoid, condenser and water regulating valves on water cooled models. (NOTE) In ambients higher than 90 degrees it is recommended the grill covering the condenser be removed on air cooled models.

The head unit (compressor and ice making section) is separate from the seamless polyethelene lined foam insulated metal storage bin. This permits leveling up and sealing the light weight bin section to the floor before setting the heavy head unit in place. It also makes practical the removal to a service shop of the head unit should major repairs be necessary.

SERIAL AND ELECTRICAL PLATE (See Fig. 1)

The combined serial and electrical plate is located on the right end of the head unit or on the front rail below the condensing unit. Be sure to send the complete serial number (14 numbers) and the model number when calling for service or parts.

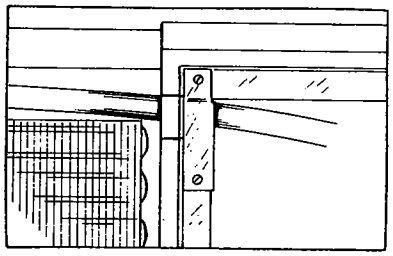
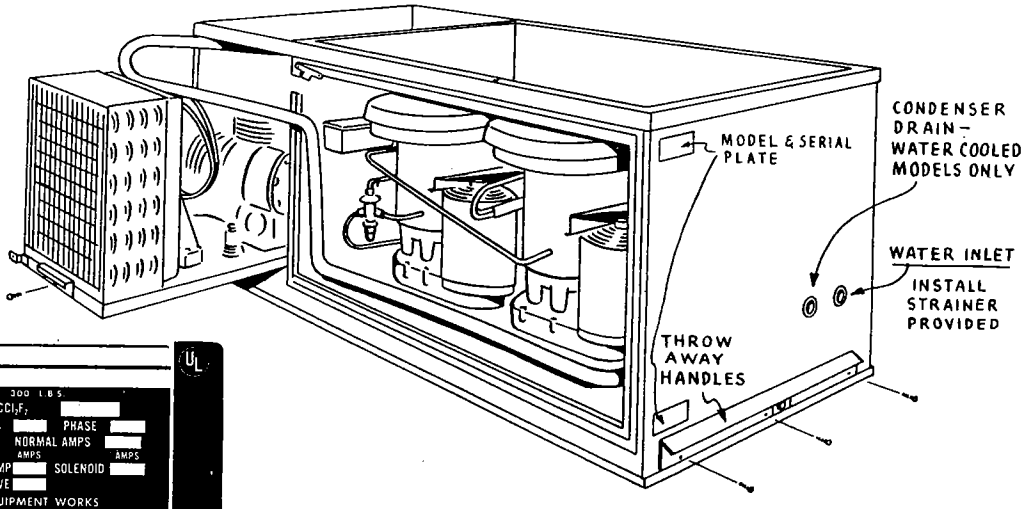


Fig. 2



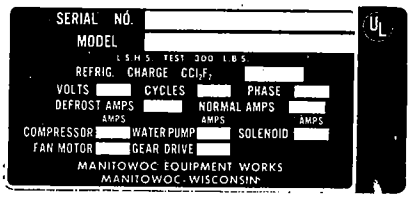


Fig. 1

UNCRATING

The bin complete with door is shipped in a corrugated carton with fold up inserts for added protection. Before opening the carton, inspect for punctures, dents, or evidence of mishandling. Notify the carrier requesting their representative be present if you suspect concealed damage. Insist that freight bills be marked. If you find the bin damaged and no external evidence, save the carton and all packaging for the carrier's inspection. Once inspection has been made, advise the carrier of the cost of repairs, loss due to discounted price or replacement cost if bin can't be salvaged.

The head unit covered with a polyethylene film is bolted to a wooden skid, and crated with an open slat type wooden crate. The open construction makes a visual inspection for damage practical before removing the crate. Lift off the crate after removing nails securing the crate to the base. We suggest leaving the unit on the skid until ready to lift it onto the bin.

LOCATION

Most models are designed to slide under a 42 inch bar or any other convenient location. For maximum efficiency pick a location away from sources of heat like radiators, ovens, other refrigeration condensing units, direct sunlight, etc. Provide space around the cabinet for air circulation. Air cooled models require a minimum of 3 inches at any louvered opening to the compressor compartment. Cabinets located in unheated areas must be protected from freezing or shut down and drained.

INSTALLING BIN (Fig. 4)

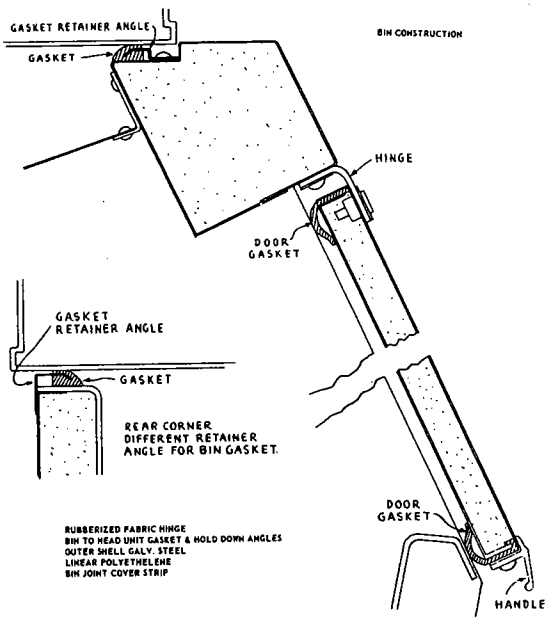
We recommend wherever possible one of the two available base leg assemblies be used. Base Leg Kit #07-0001 provides 6 inches clear space under the bin, Base Leg Kit #07-0009 provides 12 inches. Each base assembly has four sanitary adjustable feet for easy leveling and are designed to lock in place on the underside of the bin without the use of tools. Each kit comes with all parts and complete instructions.

Should space limitation make use of either base leg impractical proceed as follows to set up bin.

(a) Set bin in correct position. NOTE: Make sure any piping and wiring is in place unless there is adequate room to work around the ice maker.

(b) Use a level on the top gasketed surface and shim until bin is level. LEVELING IS IMPORTANT FOR PROPER OPERATION.

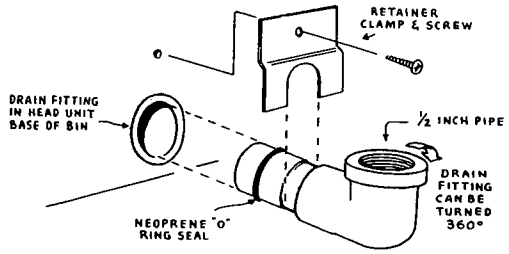
(c) Use caulking compound to seal bin to floor. (This is recommended by the National Sanitation Foundation (NSF).

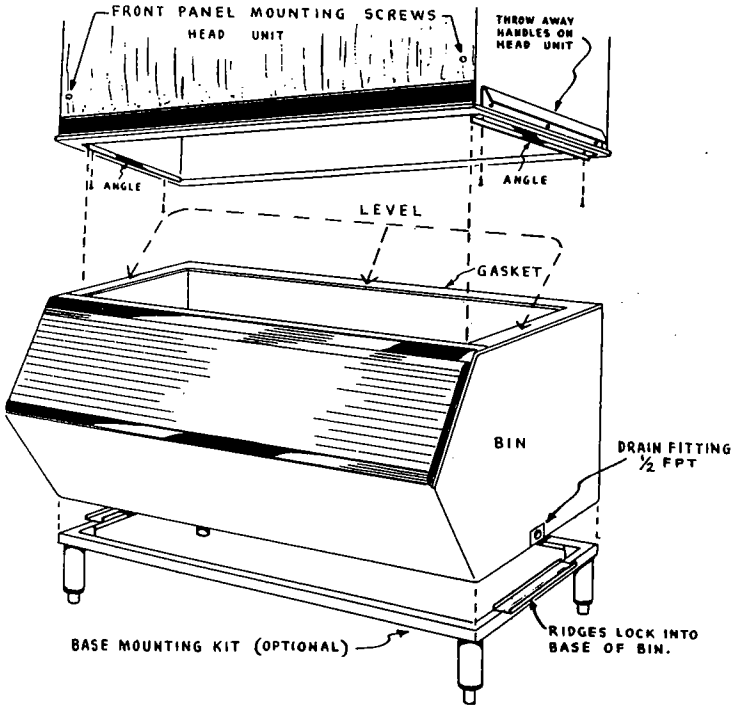


INSTALLING HEAD UNIT

Carefully clean the gasketed surfaces on the top of the bin. Remove the bolts securing the head unit to the base. Peel off the polyethylene film used to protect the underside of the head unit base, and set the head unit in place on the bin as illustrated in Fig. 4. Use screws furnished to attach the 2 positioning angles found nailed to the skids or packed inside to the underside of the head unit base. Ends of angle are correctly installed when front edges are 1" from the front of the base. If angles are installed before setting head unit on base, do not set unit on bin with angles resting on front rail. The rail will bend and disrupt door seal.

THE ANGLES ARE IMPORTANT TO KEEP THE HEAD UNIT FROM SHIFTING ON THE BINS. (NOTE) It may be advisable to connect power supply lines prior to installing head unit if top can't be removed when cabinet is in position.





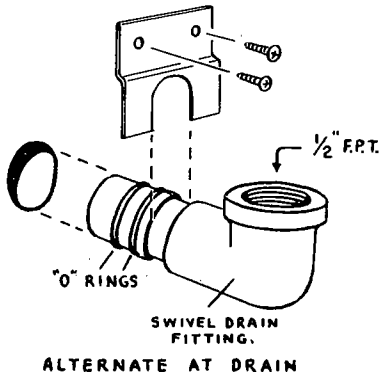


Fig. 4

POSITIONING SPREADER(S) See Fig. 5

The spreader(s) is shipped taped to the base inside of the ice making section. Remove filler strip used to protect the spreader(s) mounting bracket. The spreader(s) can now be pushed back in position until it locks in place. The spreader(s) distributes ice over a larger area but ice still tends to pyramid under the spreader(s). Knock down or spread out the ice in order to increase bin capacity.

On Flakers with a thermostatic bin control, pull the control bulb down from inside of the ice chute and clip in place on under side of the spreader. This prevents ice sliding down spreader from contacting bulb and stopping the unit before the bin is full. See Fig. 5.

Test control action by holding a handful of ice in contact with the control bulb. The unit should stop in two (2) minutes or less. See Thermostatic Bin Control - page 14. No. 1-B for delayed action in unit starting.

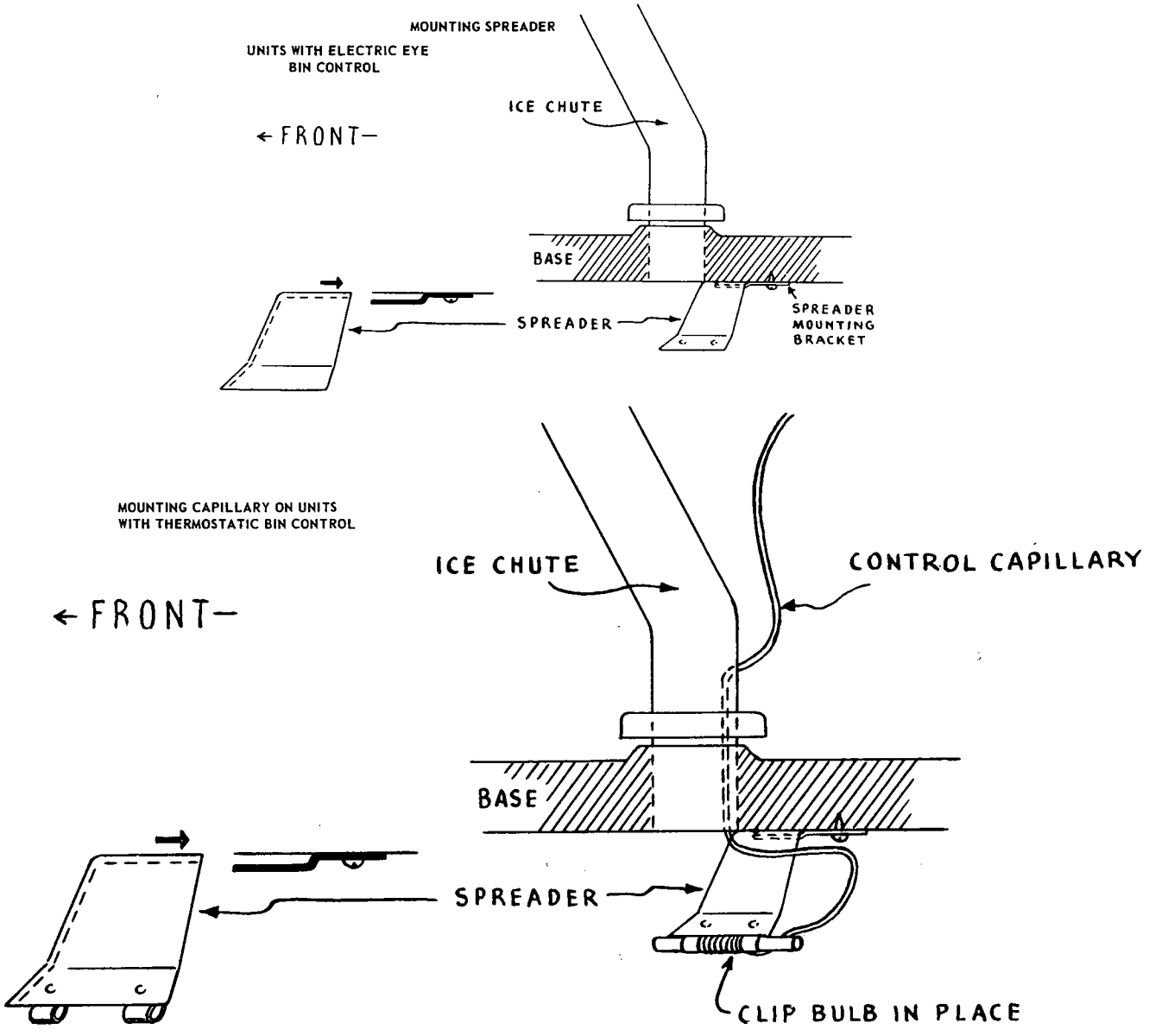


Fig. 5

FRONT PANEL REMOVAL (See Fig. 6)

Remove screws near bottom of panel. Using handles, pull panel outward at bottom and downward.

COMPRESSOR HOLD DOWN BOLTS (See Fig. 19)

Loosen front compressor hold down bolts on the 67 series. This will require removing the machine screw at the center of the condensing unit base and the tie strip over the opening where the heat exchanger passes through the center partition. The condensing unit can now be pulled out. Be sure to check for tube rattles and that fan turns freely before pushing condensing unit back in. (NOTE) On water cooled models compressor hold down bolts are accessible without pulling out unit.

WATER SUPPLY

Quality and ice making capacity are affected more by chemistry, temperature and foreign matter in supply water than any other factor. A survey made of water departments of large cities all over the country made it obvious that external filters or strainers should be installed. Such equipment is very effective in improving ice quality and reducing the frequency of cleaning out the ice making sections.

LOCATION OF FILTER SCREENS

1. External filter is packed inside the ice making section or will be found installed in water inlet connection. See Connecting Water Supply for installation.
2. The float valve has an internal screen. See Fig. 7.

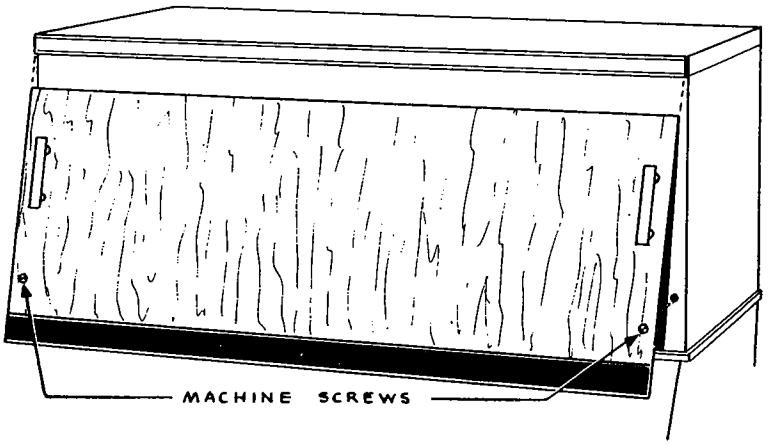


Fig. 6

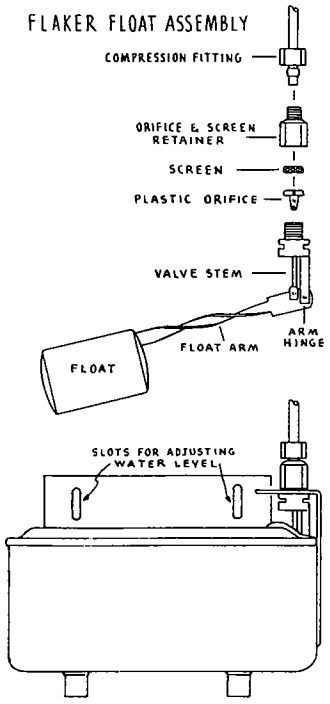


Fig. 7

CONNECTING WATER SUPPLY

A 1/2" female pipe fitting is provided on the right end of the head unit. On the water cooled models, this one connection tee's off inside, furnishing both the condenser and ice making section. If it is necessary or desirable, these parts can be supplied separately by drilling a hole and running a second line directly to condenser. Provide shut off valve in the water supply line and install the proper filter (Fig. 1) in the ice making water line positioned so screen can be removed for cleaning.

Every effort should be made to keep the water supply as cool as possible to improve ice making capacity. For example, uninsulated water lines should not be run close to heat sources or in the sun. All water lines supplying ice makers should be thoroughly flushed before connecting to machine.

DRAIN CONNECTIONS

The fiber glass bins and some head units have 1/2" FIP drain connections. New simplified separate drain connections are provided from the head unit and metal bin for connection to vented or trapped drains. Fitting may be either copper with one (1) Neoprene "O" ring, or brass with two (2) Neoprene "O" rings, and is installed by wetting "O" ring and pushing fitting into drain. Secure with one or two screws, see Fig. 4. Use standard pipe fittings to connect to the 1/2" FIP (90^{o} ell) connectors provided or copper sweat joints to connect to optional copper T (vented) connector. NOTE: Remove fittings and "O" rings before making sweat connections. The fittings provided rotate 360^{o} without removing the screw making it simple to connect drain lines. It is essential that drain connections be made so waste water can't back up into the head unit or bin. On water cooled models a separate connection is provided for discharging condenser water. All connections are labeled. See Figs. 1 and 8. We recommend covering all drains with cork insulating tape to prevent sweating. If head unit and bin drains are tied together through a "T" connection we suggest using a 3/4" pipe and a stand pipe vented to the atmosphere to prevent water traps. Drains must be at least 1/2" inside diameter and have 1-1/2" drop per 5 feet of run. If drains are not close enough to allow drop for proper drainage, or water is to be drained in a stationary sink higher than ice machine drains, use an automatic condensate disposal pump such as the model C-12 available from Eddington Metal Specialty Co., Eddington, Pennsylvania. (Check and follow local plumbing codes)

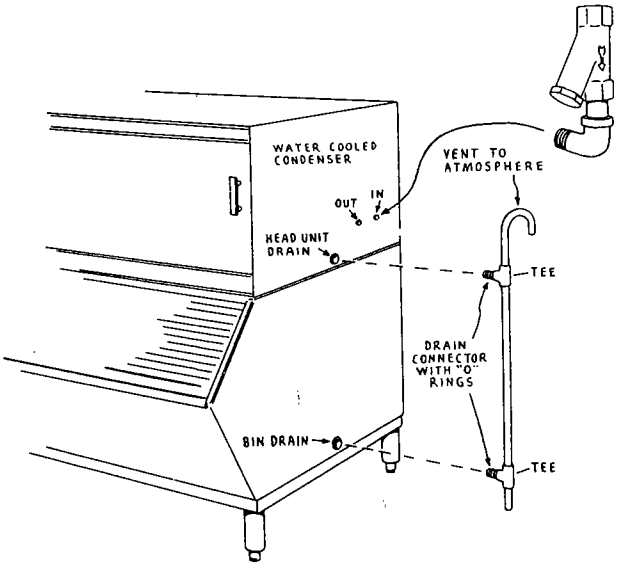


Fig. 8

GENERAL REQUIREMENT

All electrical and water supply and drain connections must conform to local codes.

ELECTRICAL CONNECTIONS

Check nameplate for correct power supply. Remove screws at each end and lift off cabinet top for access to the wiring box located on the right wall of the compressor compartment. Provisions are made to run supply leads through the rear wall of the compartment to the box. All that is necessary is to connect supply leads to bare leads in box. We recommend separate supply lines individually fused be provided for each ice maker. While a shut off switch close to the cabinet is convenient for service it should be protected from unauthorized persons. All internal wiring is complete to supply box.

WIRE GAGE AND FUSETRON RATING

	115V			230 V		
Model	Wire Gauge	Air Cooled	Water Cooled	Wire Gauge	Air Cooled	Water Cooled
MAF-35	#14	15-A	15-A	#14	10-A	10-A
MAF-67	#10	25-A	25-A	#14	12-A	12-A

Replace top. Be sure you check and follow local codes.

CHECK LIST PRIOR TO STARTING UNIT

1. Hold down bolts on MAF-67 units should be loosened. See page 6.
2. All water lines supplying ice makers should be thoroughly flushed before connecting to machine.
3. Provide at least 3" clearance for air circulation at all grilles.
4. Unit must set level for proper drainage and operation of the float valve.
5. Drain retainers must be secured to prevent drains being inadvertently loosened or disconnected. (See Fig. 4)
6. All drain and water supply tubes should be wrapped with insulating material to prevent condensation dripping on floor.
7. External screen strainers furnished with unit must be installed in the ice-making water line so screen can be removed (downward) for cleaning. See Fig. 1.
8. Separate drain must be run for condenser water on water cooled units.
9. Separate drains are recommended for head unit and bin unless drain goes straight down a minimum of 6" below bin drain fitting.
10. If head unit and bin drain are plumbed directly into sewer with trap or both drains are tee'd together it is necessary to tee in a stand-pipe 1 ft. high vented to atmosphere to prevent trapping of drain water. Fig. 8. If head unit and bin drains drain into a floor sink, a stand pipe is not necessary.
11. Drains over 12 feet long should be avoided.
12. Drains must have enough drop and be wrapped with insulated tape. Refer to page 7.
13. Clean interior of bin and head unit.
14. Spreader should be installed.
15. Lift off circular cover on each ice making unit.
16. Loosen wing bolts on the metal base and slide locking bars forward. Retighten enough to hold bars open. See Figs. 10 and 11.

17. Tilt ice making assembly(s) forward enough so that packing and auger assembly can be pulled out.
18. Remove wrapping and reinstall auger. NOTE: Wet "O" ring before inserting auger. Make sure auger bottoms in coupling. Replace cover and relock assemblies in original position.
19. Remove tape securing float assembly cover and float.
20. Open water valve and allow float enclosure to fill until float valve shuts water off when chamber is 2/3 full. Bend float arm to adjust water level if required.
21. Turn toggle switch located at the top opening of the compressor compartment to the LEFT to start ice maker drive motor(s). On models equipped with electric eye bin controls allow 5 minutes for circuit to warm up and energize circuits. Unit will not start unless bin control is functioning. If unit still doesn't start refer to section on Trouble Shooting. If motor(s) run okay turn switch to extreme RIGHT position to start compressor and fan. Center position of switch shuts off entire unit. It takes from 10 to 15 minutes to start making ice.
22. Collect the first 15 minutes ice production in a pail and discard. This should prevent residue in machine and connecting lines from getting into the bin.
23. On water cooled models use gauges to check factory head pressure setting of 120 psig. A higher setting will reduce water consumption and ice making capacity. Turning the valve adjusting screw clockwise raises head pressure on the AP valve but reduces head pressure on the Penn valve. Either valve may be used.
24. Shut off water supply. Compressor should stop. Turn on water supply. Unit should restart. This is to check the high pressure cut-out of water cooled models or low pressure cut-out of air-cooled models. (NOTE) Time for unit to stop may vary from 1/2 to 5 minutes.
25. The machine is shipped with 5 or 6 shims between the auger and head unit. If wetter ice is desired, add more shims. If drier is desired, remove shims. The head unit unscrews from the auger. See Fig. 9. (NOTE) Dry ice weighs less and ice making capacity will be reduced.
26. Insert piece of paper along side ice chute to block light on units with electric eye bin control. Unit should shut off in less than 3 minutes. It should restart within 2 minutes after paper is removed.
27. Make sure that ice is dropping into the chute(s) and that no water is leaking before replacing the front cover.

On new installations residue left in water supply lines frequently plug screens a few days after starting machine. Frequency of cleaning thereafter depends on type water, etc. See pages 10 and 12 for cleaning instructions.

STARTING SYSTEM

All valves in the refrigeration system are open when the unit is shipped. Once the check list above has been completed it should only be necessary to turn the toggle switch to the right to start making ice. See Item 21 above regarding delay caused by bin control. You may hear a clattering noise when the compressor first starts. It should only last a few seconds and is caused by oil or liquid refrigerant in the cylinders. If clattering persists shut unit off for a few minutes, then restart. Repeat if necessary. While all controls are set during test operation at the factory, adjustment may be required after installation due to local conditions.

SERVICING ICE MAKING SECTION

Except for routine cleaning the ice making section has so few functional parts, little maintenance need be expected.

CLEANING (See Figs. 7, 9, 10 and 11)

1. Turn off water and turn toggle switch to center or "OFF" position. Allow 10 minutes for ice to melt.
2. Loosen wing nuts securing flaker head to base, slide locking bars forward.
3. Tilt flaker head unit far enough forward so that auger can be removed. (It pulls out from top.)
4. Loosen wing nuts on either side of ice collector pan, then lift up and twist ice collector so that opening that normally engages the chute is to the front. Set head unit back upright.
5. Remove plastic tubing to drain the float valve.
6. For "On Location" cleaning, proceed as follows:
   a. Replace plastic water line on float and replace auger.
   b. Pour cleaning solution (See 7b below for list of cleaning solutions) in float and let parts soak for 1/2 hour.
   c. Remove water line and auger and rinse parts thoroughly.
   d. Connect hose, replace auger, turn on water.
   e. Run for 10 minutes collecting ice which should be discarded. Turn machine off.
   f. Turn ice collector to its correct position engaging the ice chute and tighten wing nuts. Replace cover and start unit. (NOTE) Care should be used so as not to damage neoprene "O" ring on auger shaft. "O" ring should be wet when inserted.
7. For "Off Location" cleaning, proceed as follows:
   a. Remove compression fitting at top of float.
   b. Mark float mounting bracket with pencil so it can be replaced in its exact position. Remove screws and float. Soak in commercial solvents such as vinegar, Calgon Ice Machine Cleaner, a solution of 3 parts muriatic acid in 7 parts water, Oakite #32 or Casco Ice Machine Cleaner. All cleaning and sanitizing solutions must meet local Health Board requirements.
   c. Use bottle brush and a commercial solvent listed above as required to clean head unit tube.
   d. Clean the auger assembly by scrubbing with a plastic or non-scratching scouring pad and detergent or solvent.
   e. Rinse all parts thoroughly.
   f. Reassemble all parts and turn on water and power.
   g. Run for 10 minutes collecting ice which should be discarded. Turn machine off.
   h. Turn ice collector to its correct position engaging ice chute and tighten wing nuts. Replace cover and start unit.

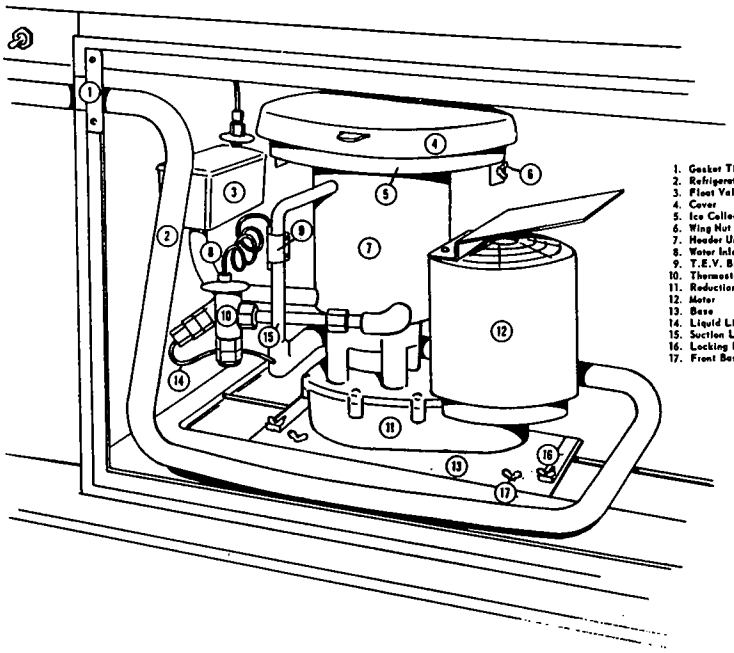


Fig. 10

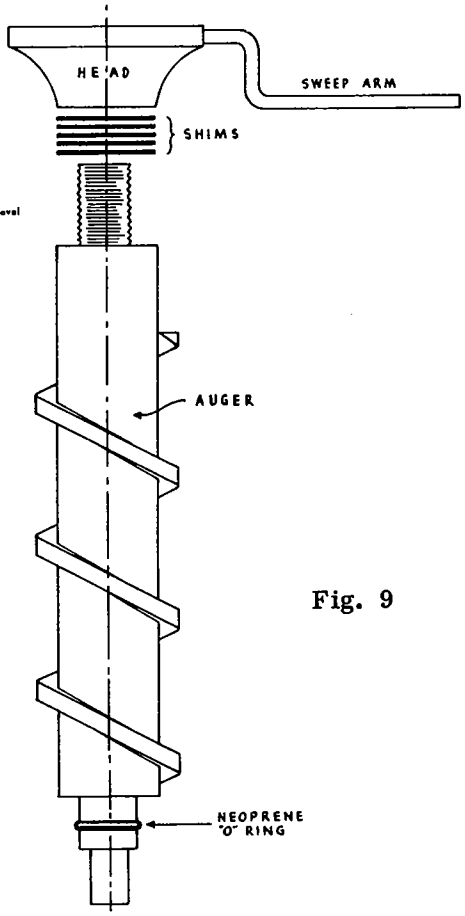


Fig. 9

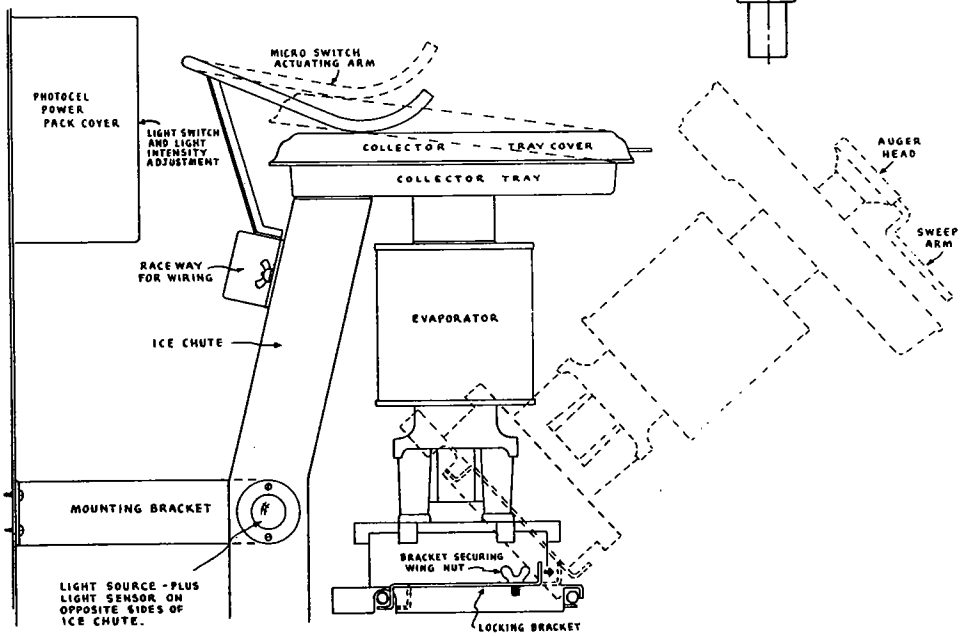
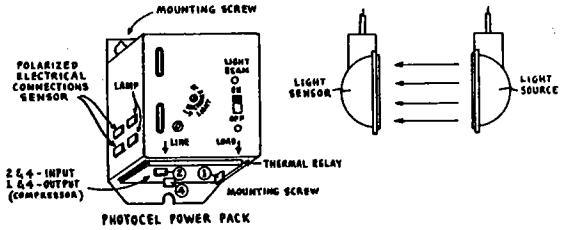


Fig. 11



CLEANING THE BASE

The one piece molded Cycolac base is easily cleaned with a non-scratching scouring pad and detergent. The tilt to the drain at the right end permits flushing with clear water to remove suds. CAUTION: Use care to avoid rinse water getting above the level of the ice chute opening and draining into the storage bin.

REMOVING FLOAT ASSEMBLY

Shut off power and water supply, remove water inlet line at nut connection at top of float, and remove plastic tubing on bottom of float. Remove the two screws on the float bracket, then remove float. Care should be taken in replacing float assembly so as to insure proper water level in auger. Marking the original location with a pencil makes replacement easy.

REFRIGERATION SYSTEM (See Figs. 12 and 13)

Liquid refrigerant is metered by the expansion valve into a coil of copper tubing tightly wrapped around the brass ice making tube. The bulb causes the valve to open letting in refrigerant when this line warms up, and closes shutting off the refrigerant when the line gets cold. Gas returning to the compressor cools the incoming liquid through the heat exchanger formed by soldering the suction and liquid lines together. The gas pressure is raised by compression in the compressor, then pumped into the condenser where heat is removed by the air or water. The removal of heat causes the gas to condense forming liquid to meter to the expansion valve. The compressor will continue to run as long as the water supply remains on and the bin thermostat is not satisfied.

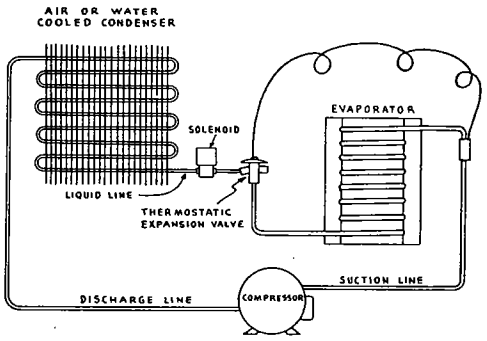


Fig. 12

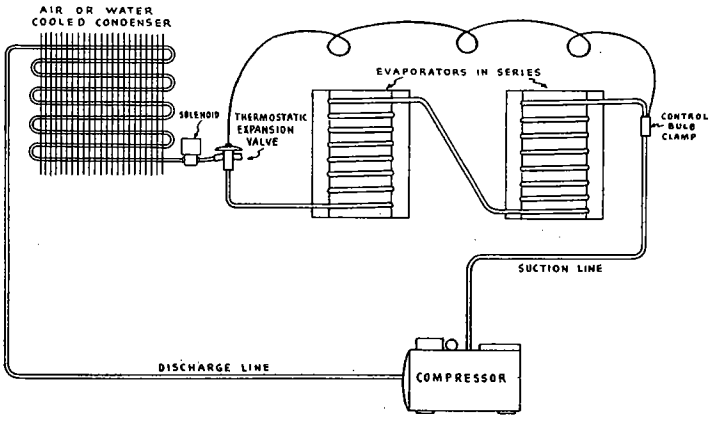


Fig. 13

ICE MAKING CYCLE

Water freezes to the inner surfaces of the brass evaporator column. The rotating auger shaves off a thin layer which it carries up to the top edge of the column. The flakes are compressed by the head as they pass through the opening into the collector tray. A revolving sweep arm pushes the flakes into the tube leading to the storage bin. Water maintains the same level in the float chamber and the evaporator assembly. Be sure there are no air bubbles or kinks in the plastic tube(s) connecting the float and evaporator.

FLAKER DRIVE

The ice making auger revolves at a constant rate of 6 RPM driven by the gear reduction unit. A brass collar is secured to the shaft of the drive unit with a pin through both. The square shaft of the auger bottoms in the square hole in the top of the brass collar. See Fig. 14. A splined stainless steel coupling is optional.

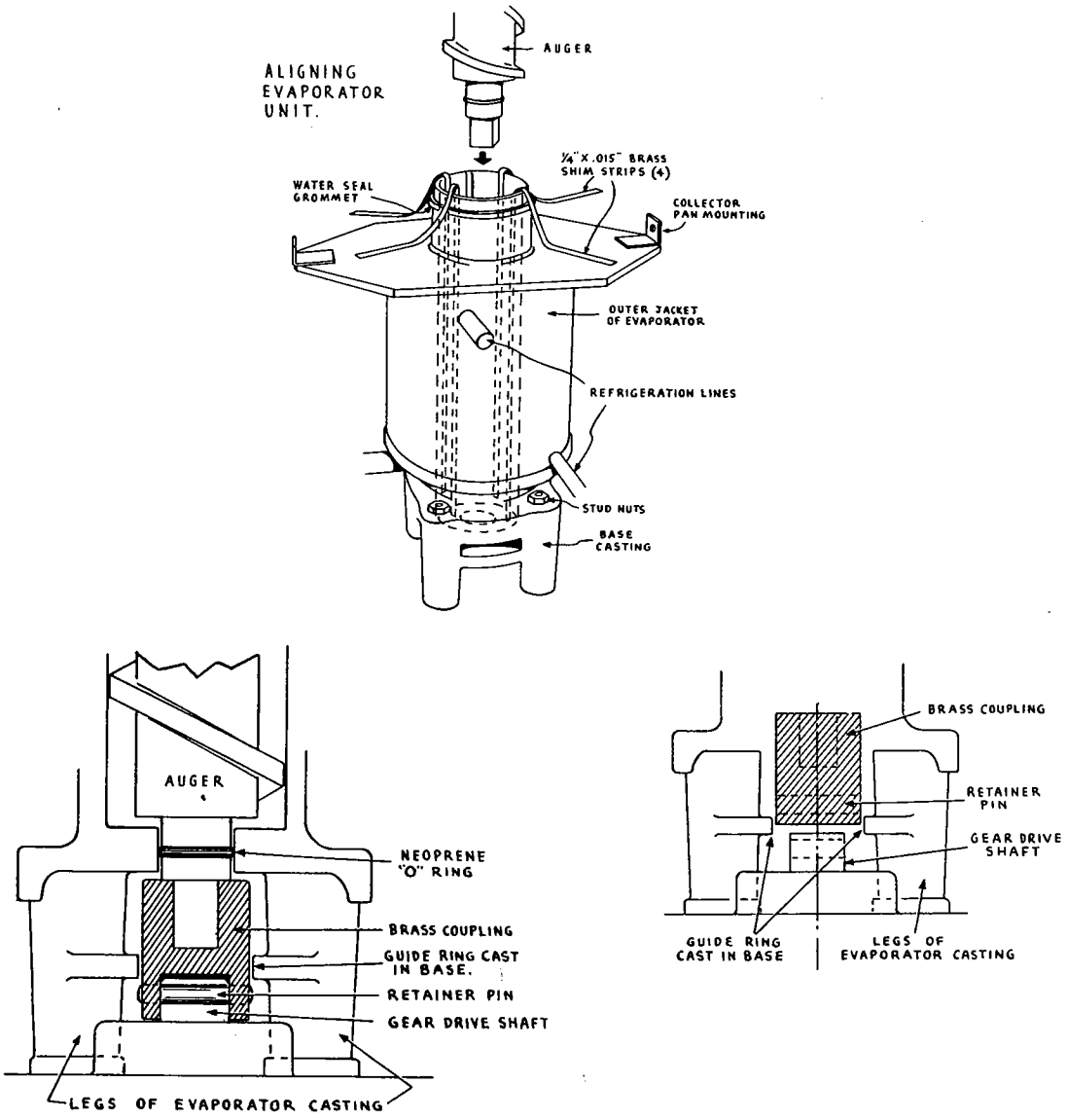


Fig. 14

The gear assembly and motor are a single unit factory assembled and lifetime lubricated. Because of the special tools required, no attempt should be made to disassemble or lubricate the gear drive. Should service be required, return original and request an exchange unit. See Changing Gear Drive Unit on page 30.

The weight of the auger rides on the thrust bearing in the gear box. 1/4" below auger blades is a Neoprene "O" ring which makes the water seal between the auger shaft and the brass casing. There is .040" diameter or .020" radius clearance between the auger and the brass tube. When the water starts to freeze it centers the auger, the ice acting as the upper bearing.

A harvest arm is attached to the auger head to push ice to the ice chute. The stainless steel auger head squeezes or compresses the ice, eliminating the free water. If a soft wet ice is desired, as for snow cones, washers may be added between the head and auger. See Fig. 9.

A grommet around the top of the brass ice making tube makes a water tight seal to the ice collector pan.

The ice chute is fastened by a wing nut to a channel running the length of the freezing compartment behind the header unit and can be removed without removing the top of the cabinet.

The water level in the brass tube can be changed by loosening the two screws securing the float assembly bracket and raising or lowering the float assembly as needed to bring water level to 1-1/8" below top of brass tube.

CONTROL FUNCTIONS AND SETTINGS

I. Thermostatic Bin Control. Ranco Type A-10, See Fig. 15.

No Adjustment from front knob	Cut In	Cut Out
	45^{o}	34^{o}

Range Adjustment
Remove fiber cover.
Turn screw C. C. W. to set range colder
Range-Changes both "CUT-IN" and "CUT-OUT"

Differential Adjustment
Is on terminal end.
Turn C. C. W. to widen differential. Differential affect "CUT-IN" only.

a. When the ice builds up in the bin and covers the sensing element of the bin control, the normally open solenoid closes, shutting off the flow of refrigerant to the evaporator.

b. The compressor keeps running, pumping down the unit until the suction pressure reaches around five psig. The entire system is then shut off by the low pressure control and will not start until the suction pressures reach 34 to 37 psig. This eliminates short cycling and the unit trying to start with the auger frozen. Because suction pressure drops when the water supply is interrupted, the low pressure switch protects the air-cooled models against interruptions in the water supply.

II. Electric Eye Bin Control - Ranco E-20. See Fig. 11.

Starting with Serial No. 37100356516101 the Flakers use an Electric Eye Bin level Control.

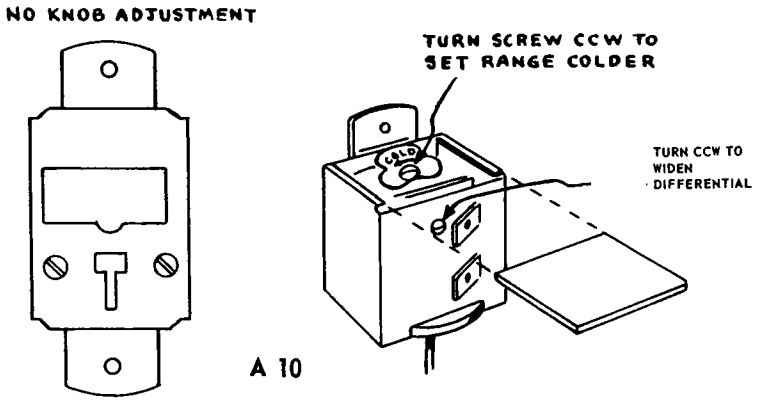


Fig. 15

The Electric Eye consists of a Lamp assembly, Part No. 23-0046, Sensor assembly, Part No. 23-0047, and Power assembly, Part No. 23-0045. The Power assembly incorporates an ON-OFF switch and Light Intensity Switch on the face of it, and Thermal Relay at the bottom. The power Assembly has either 115 or 230 volts A. C. input and 14 volts D. C. output. The electrical connections on the Power Assembly for the Light and Sensor assemblies are polarized. Care should be exercised to connect the proper leads to the right terminals if any parts are changed. (See 6-A, Page 17.)

The Photocel Power Pack of the Electric Eye is mounted on the rear wall to the left in the ice making compartment, encased in a protective cover. If the Light Beam switch is in the "ON" position, the Lamp beam strikes the Sensor assembly, and the parallel light beam is uninterrupted, the control should function properly.

OPERATION

A. The light beam is directed through the ice chute just above the base. When ice pyramids up into the ice chute, this beam of light is broken and the electrical circuit supplying the solenoid in the liquid line is broken. It takes about 2 minutes for the bin control to react. This time delay prevents nuisance trips due to chips of ice falling through the light beam or by flickering of the lamp. The ON-OFF switch should be ON during operation.

B. (See No. I "B" on Page 14)

C. Adjust Light Intensity switch CCW for brighter light, and CW for dimmer. The light should be just bright enough to operate as full bright shortens the life of the bulb. Life expectancy of this control is a minimum of 100,000 operations. Lamp replacement required approximately every 4 years.

D. There is a 2 to 5 minute delay in starting the ice flaker while the Electric Eye light warms up.
NOTE: The compressor may start, run a short period, then shut off when system if first energized due to lack of warm up.

The low pressure control restarts the unit when the auger temperature is above freezing. This delay may be five (5) to thirty (30) minutes.

FUNCTIONAL CHECK

1. Interrupt parallel light beam with cardboard or hand. Lamp should visibly dim,

then brighten when interruption is removed.

2. If lamp does not dim and brighten when checked, possible causes and corrections are:
   - A. Incorrect alignment of Lamp and Sensor.
     - a. Align opposite and facing each other so beam strikes Sensor.
   - B. Defective Sensor assembly.
     - a. Replace assembly
   - C. Defective Power assembly
     - a. Replace assembly.

3. If the lamp does not burn, possible causes and corrections are:
   - A. Burned out bulb.
     - a. Replace with new bulb Manitowoc Part No. 25-0154. (A No. 1474 or No. 1487 bulb may be purchased locally at a radio or electronic supply house.)

   To replace bulb, proceed as follows:
   1. Tip out head unit and remove ice chute as previously described.
   2. Remove nuts and bolts that secure Lamp assembly to mounting bracket then remove assembly.
   3. Bend back rubber retainer to remove glass face.
   4. Unscrew bulb to replace.
   5. Assemble parts in reverse order.

   - B. Defective Lamp assembly
     - a. Replace assembly as follows:
       1. Follow steps (1) and (2) above (replacing bulb).
       2. Remove cover and Power assembly.
       3. Disconnect Lamp assembly wiring at quick disconnects on left side of Power assembly. NOTE. Terminals are polarized so be sure to put quick disconnects on proper terminals. (See 6-A, page 17)
       4. Replace parts in reverse order.

   - C. Power not on.
     - a. Turn on line power.
     - b. Check line fuses
     - c. Turn on switch or Power assembly.

   - D. Defective switch (open)
     - a. Replace Power assembly.
   - E. Defective light intensity adjustment rheostat.
     - a. Replace Power assembly.
   - F. Defective Power assembly.
     - a. Replace Power assembly

4. With the Light and Sensor assemblies working as listed above, the thermal relay should start the compressor after a nominal delay of 2 to 5 minutes. If the compressor does not start, possible causes and corrections are:
   - A. Check line voltage.
     - a. Voltage should be between 115 or 230 volts $\pm$ 10%.
   - B. If line voltage is OK, Power assembly thermal relay is bad.
     - a. Change Power assembly.

5. If the compressor does not shut off after a nominal delay when the ice bin is full, possible causes and corrections are:
   A. Defective relay.
      a. Replace Power assembly.
   B. Defective Sensor
      a. Replace Sensor assembly in same manner as changing Lamp assembly.

6. To change Power assembly, remove cover, then assembly from wall. Quick disconnects are on left side of assembly. Be sure to connect wiring to proper connections as terminals are polarized.
   a. Tin plated quick connect goes on ribbed lead and brass quick connect goes on plain lead of Sensor and Lamp assemblies.

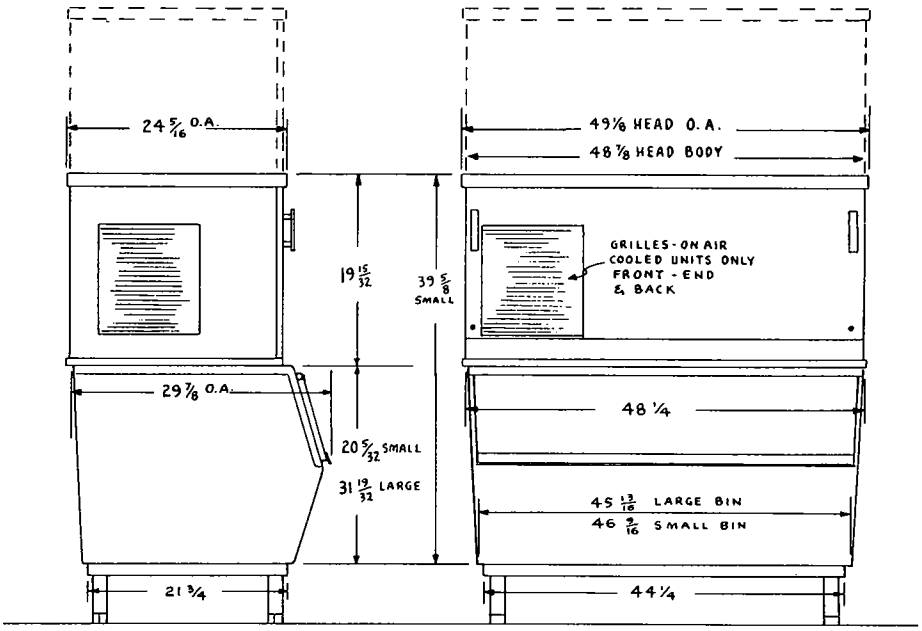


Fig. 16

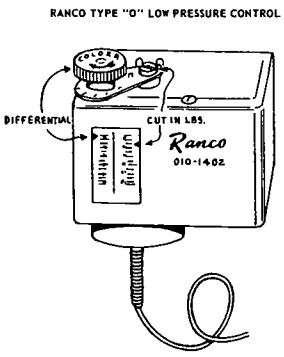


Fig. 17

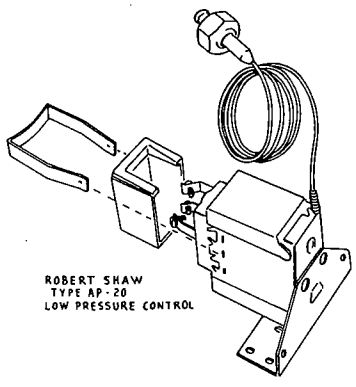


Fig. 18

III. Low Pressure Control - Either Ranco Type "O" or Robert Shaw Type AP20. See Figs. 17 and 18.

This control cuts out at about 5 psig and cuts in automatically at about 35 psig. Controls are factory set and should not require adjustment.

IV. High Pressure Cut-Out - Ranco Type G-23.

Operation of any water cooled job is automatically stopped any time the discharge pressure reaches 195#. It automatically restarts when pressures drop to 145#. Control is not adjustable.

V. Safety switch for top of ice collector. See Figs. 11 and 19.

a. A micro switch actuated by an arm extending over the lid of the ice collector shuts off the entire system if the ice backs into the head due to malfunction of the electric eye or thermostatic bin control, or accidental blocking of the ice chute. Once ice melts or passes through the chute the lid should close and the system restart. Tray may or may not reposition itself after it is raised. Be sure cover is in place while checking unit operation.

b. Adjust switch arm as follows:
   1. Loosen Allen set screw of collar on rod in micro switch enclosure.
   2. With rod in position on ice collector pan lid, move collar until switch points close.
   3. Tighten Allen set screw and try arm manually, readjusting as needed.

VI. Low Pressure Cut-Out -Ranco Type G-20 (Optional on air cooled models).

Factory set to stop compressor when water pressure drops below 7 psig. Restarts compressor when water pressure reaches 14 psig. (Non-adjustable)

VII. Main Power Toggle Switch.

The main power toggle switch is located on a panel above the condensing unit. Center position is OFF. Left position runs the flaker drive unit. Right position runs the compressor, fan motor, and flaker drive.

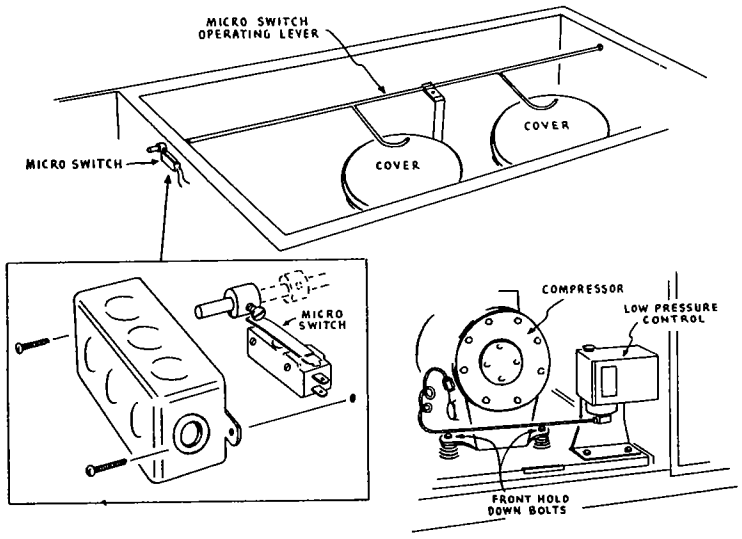


Fig. 19

CHECKING COMPRESSOR

Front seat the suction service valve. Adjust water valve or block condenser until head pressure is at least 150 psig. Suction pressure should pull down to 25 inches of vacuum in a few minutes and hold vacuum three to five minutes. If pressure rises immediately, replace valve plate on the MAF-67 Models, or change the compressor on the MAF-35 Models.

Check compressor motor for electrical continuity and open or grounded circuits. If you find any, replace the compressor. If not, proceed as follows: If compressor won't start connect test set (Fig. 33) to compressor terminals. Depress starting button (not over 5 seconds). When compressor starts, release button. Compressor should continue to run. If compressor won't start or keep running, replace it. If it starts and keeps running determine by process of elimination whether to replace the relay, overload, or capacitor. Do not overlook the possibility of a defective wire.

CHANGING COMPRESSORS

1. 1/3 H. P. Copelaweld on MAF-35. See Figs. 20, 21, 22 and 23.

   Shut off power supply. Attach gauge manifold to service valves and bleed off charge. Unsolder or cut lines on compressor. Disconnect wiring and change compressor either resoldering lines or using flare fitting. For burned out compressor, see Cleaning Contaminated Systems. Replace drier, leak check, evacuate and charge system.

2. Copelematic on MAF-67. See Figs. 24 and 25.

   Shut off power supply. Attach gauge manifold to high and low side service valves. If compressor is not burned out and system not contaminated, service valves may be front seated, the wiring disconnected, the compressor body changed and refrigerant added if needed. If the compressor is burned out, bleed off charge, disconnect wiring, change the compressor and clean complete system.

See next paragraphs for Cleaning Contaminated Systems, Evacuations and Charging System.

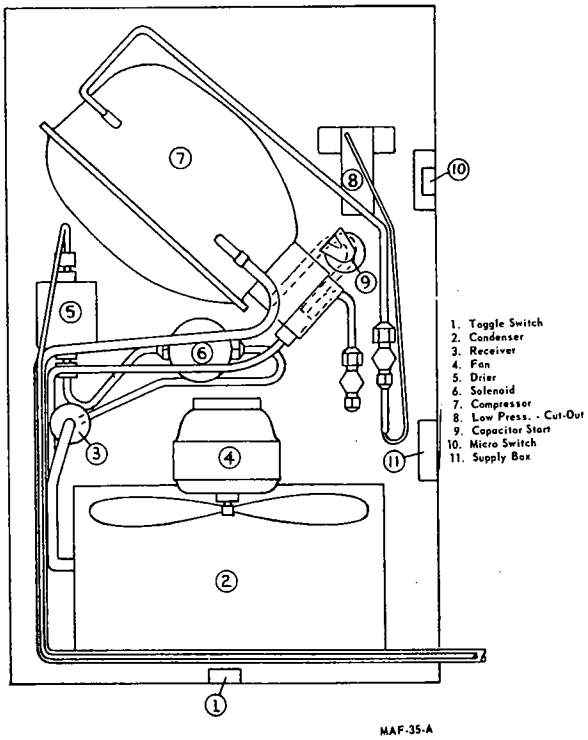


Fig. 20

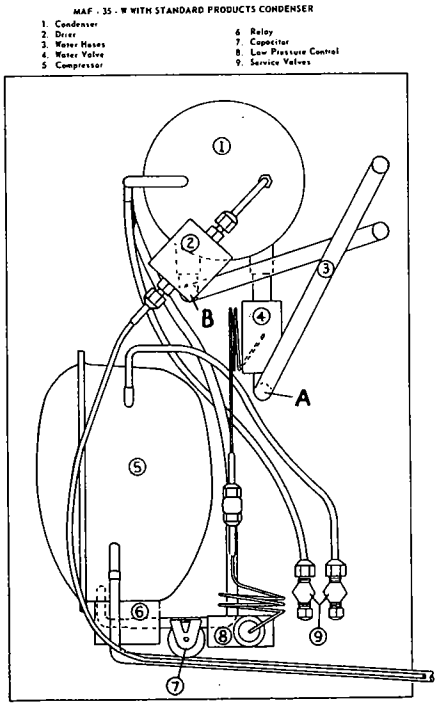


Fig. 21

MAF - 35 - W WITH HALSTED-MITCHELL CONDENSER

1. Condenser
2. Water Regulating Valve
3. Compressor
4. Capacitor
5. Low Pressure Cut-Out
6. High Pressure Cut-Out
7. Service Valves
8. Micro Switch
9. Supply Box
10. Toggle Switch
11. Solenoid
12. Drier

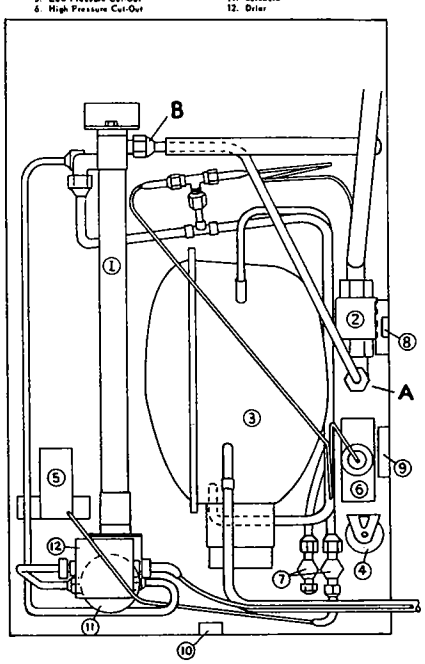


Fig. 22

MAF - 35 - W
HALSTED-MITCHELL CONDENSER WITH ALTERNATE CONNECTIONS

1. Condenser
2. Water Regulating Valve
3. Compressor
4. Capacitor
5. Low Pressure Cut-Out
6. High Pressure Cut-Out
7. Service Valves
8. Micro Switch
9. Supply Box
10. Toggle Switch
11. Solenoid
12. Drier

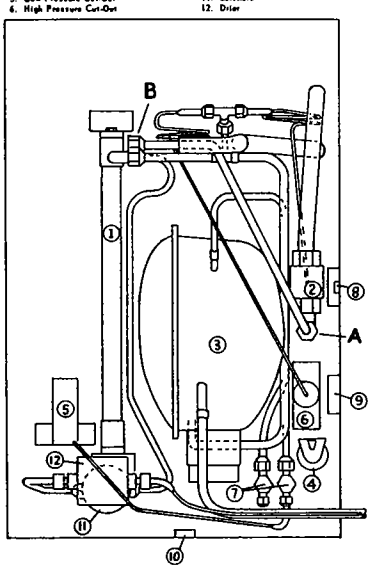


Fig. 23

MAF - 67 - A

1. Condenser
2. Fan
3. Solenoid
4. Drier
5. Compressor
6. Receiver
7. Low Press. Cut-Out
8. Micro Switch
9. Toggle Switch
10. Supply Box

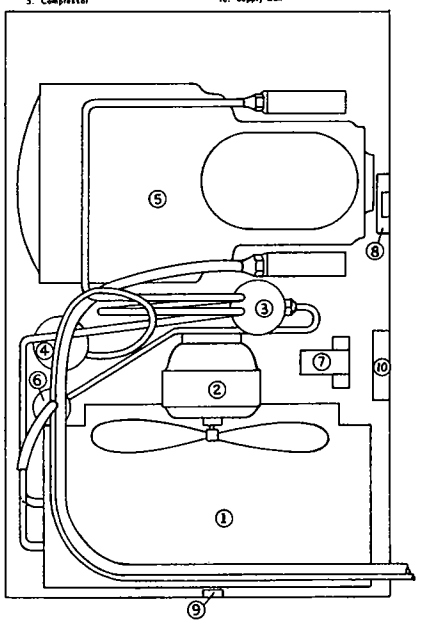


Fig. 24

MAF - 67 - W

1. Condenser
2. Water Regulating Valve
3. Solenoid
4. Drier
5. Compressor
6. High Press. Cut-Out
7. Low Press. Cut-Out
8. Micro Switch
9. Supply Box
10. Toggle Switch

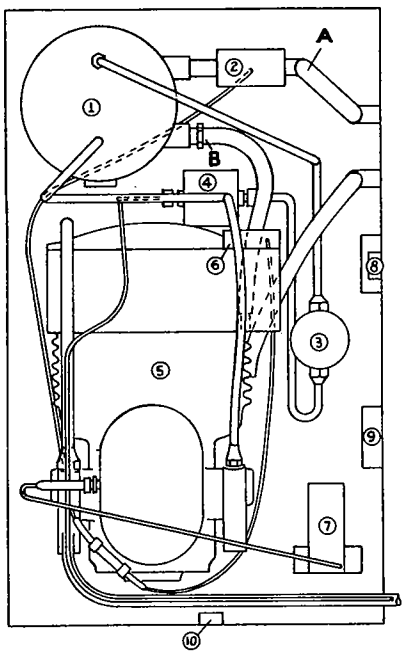


Fig. 25

CLEANING CONTAMINATED SYSTEM

Remove Compressor. Flush liquid freon (F-11 preferred) through the system. Remove the original dryer and install a clean up type dryer. Install replacement compressor and evacuate the system thoroughly for at least one hour. After 24 hours operation replace clean up dryer with new regular dryer.

EVACUATING AND CHARGING

Run system long enough to heat up compressor slightly (10 minutes). Connect evacuating tubes to the high and low side service valves using a manifold or T connections for high and low side gauges. Turn valves in, two full turns. Replace valve caps. Run separate evacuating pump for at least one hour. Connect a service drum to the low side service valve through the manifold or by back seating both service valves and removing the evacuating tube. After opening valve on tank, crack line at compressor to bleed off air, then retighten. Open service valves and allow gas to enter system until pressure in tank and system equalize. Start compressor and by closing off (front seating) the suction service valve draw gas into the system. Use calibrated charging cylinder, or weigh proper charge into drum as listed in Table 1 page 31.

CHANGING DRYER

Discharge system through service valve ports. Remove original dryer, then quickly unseal the replacement and install, check for leaks, then evacuate and recharge system.

CHANGING EXPANSION VALVE

Discharge system through service valve ports. Unclamp bulb and disconnect flared fittings. Make sure parts are dry to keep moisture out of system. Install replacement expansion valve exactly as original was installed. Replace dryer, then check for leaks and evacuate and recharge system.

SETTING SUPERHEAT

The replacement valve is factory set for 8 degrees superheat and should normally require no adjustment. Should adjustment be required determine which valve system has, and proceed as follows:

ALCO MODEL B1/2FW55

This valve cannot be adjusted and should be replaced if defective.

DETROIT MODEL 717

Thermostatic expansion valve internally adjustable. When it is necessary to change the superheat setting in the field, the adjustment can be made through the inlet connection. Remove the strainer and insert an Allen set screw wrench into the adjustment nut. One turn of the superheat adjustment changes the setting approximately four degrees. Looking into the bottom of the valve, turning the adjustment screw clockwise increases the superheat setting.

CONTROL CO. OF AMERICAN AP207C

Remove bottom cap and turn stem clockwise to increase superheat and counterclockwise to decrease superheat.

REPLACING WATER REGULATING VALVE

1.

1. Shut off water supply and drain system.
2. Front seat both service valves on the Copelmatic units and only the gas in the compressor head and capillary line to the water valve will be lost.
3. Disconnect water pipe and bellows flare tube connections. Install replacement as original was installed, vertically with bellows down.
4. Open service valves and water supply. Check for leaks.
5. Add gas if necessary.

SETTING WATER REGULATING VALVE (Factory setting 120 lbs.) See Fig. 26.

The capillary connection to the compressor dome causes a rise in head pressure to open the water valve allowing more cooling water into the condenser which reduces the head pressure. The reduced head pressure causes the valve to reduce the flow of cooling water. The valve action maintains head pressure at a constant level.

On the Penn No. 246 water valve, the head pressure can be raised by turning the adjusting screw counter-clockwise, and lowered by turning the adjusting screw clockwise. On the A-P No. 65A water valve, the head pressure can be raised by turning the adjusting screw clockwise, and lowered by turning the adjusting screw counter-clockwise. Once set, the valve should need no further adjusting. (NOTE) Water usage can be reduced by setting valve for a higher head pressure, but ice making capacity will be reduced. To manually flush the Penn valve, insert screwdrivers or similar tools under both sides of main spring, and lift upwards.

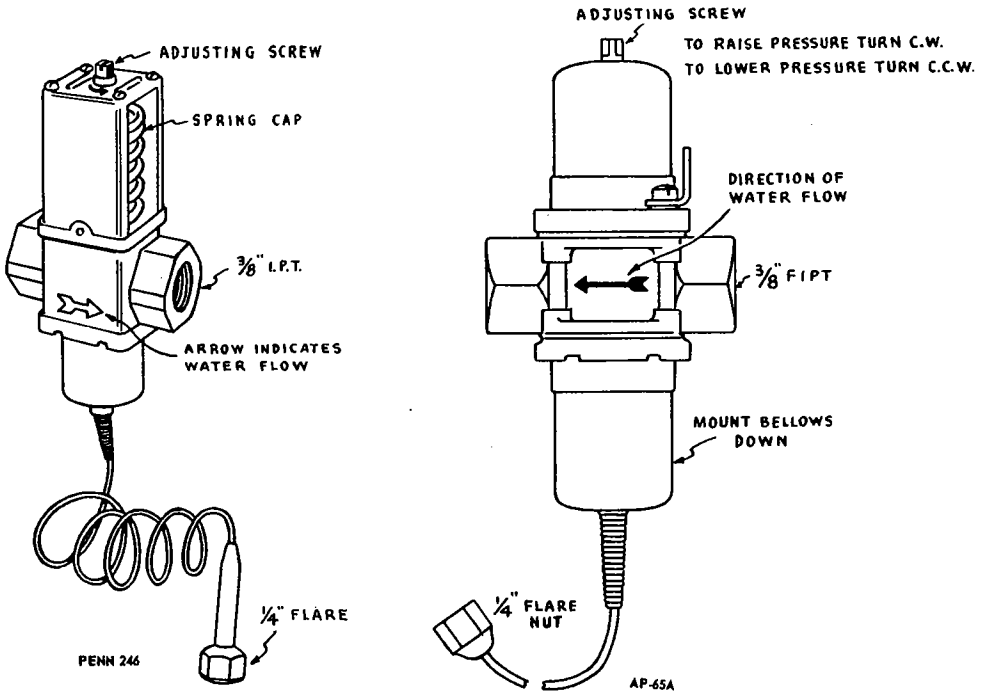


Fig. 26

WATER COOLED CONDENSER

A. Operation

Water cooled condensers lose efficiency due to a build up of mineral deposits on the inner surfaces, and periodically have to be cleaned. Frequency of cleaning will vary with local water conditions. The symptoms of a limed-up condenser are loss of ice capacity, the necessity for adjusting water valve for more water flow and inability to maintain normal operating head pressures. See Table 1. For proper operation of water valve, see Page 31. See Table 1 for normal water outlet temperature.

B. Cleaning

Upon ascertaining that condenser needs cleaning, proceed as follows: Shut off water supply, disconnect lines at A and B. See Figs. 21, 22, 23 and 25, Pages 19 and 20. On the American Standard condenser pump a solution of three parts muriatic acid and seven parts water or commercial solvent through condenser until lime and scale is removed. On the Halstead-Mitchell condenser the manifolds can be removed, and the water tubes rodded out. Flush thoroughly with fresh water after cleaning, then re-assemble.

SOLENOID VALVE - (AP-67FS2 or AP-R291-A)

During the ice making or running times the solenoid is energized and open, and is de-energized and closed when the bin control stops the ice making. To change valve body, shut off power supply, attach gauge manifold to service valves and bleed off charge. Disconnect wiring and flare nuts, and change solenoid. Replace drier, leak check, evacuate and charge system.

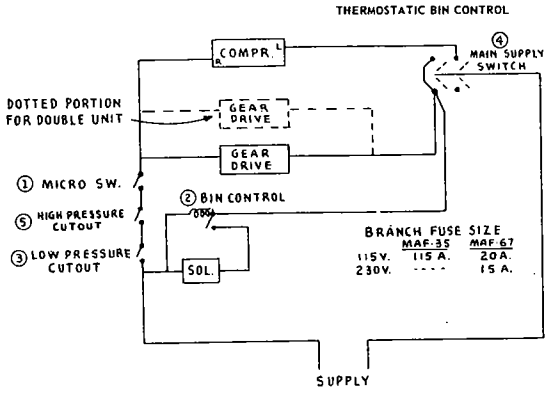


Fig. 28

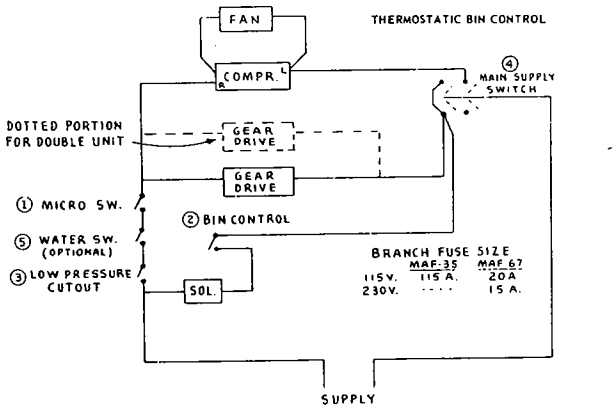


Fig. 27

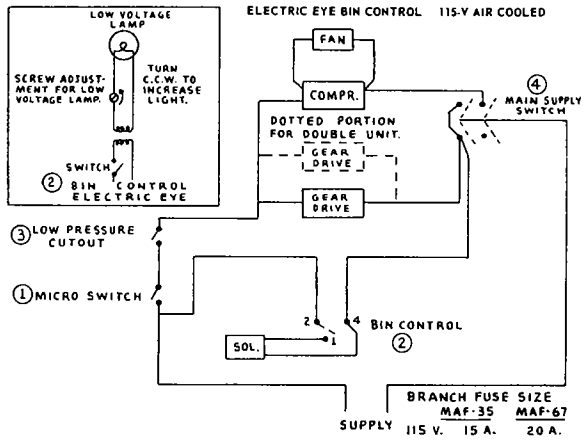


Fig. 29

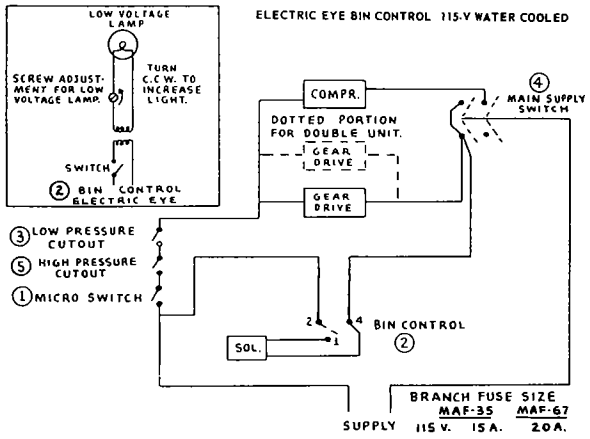


Fig. 30

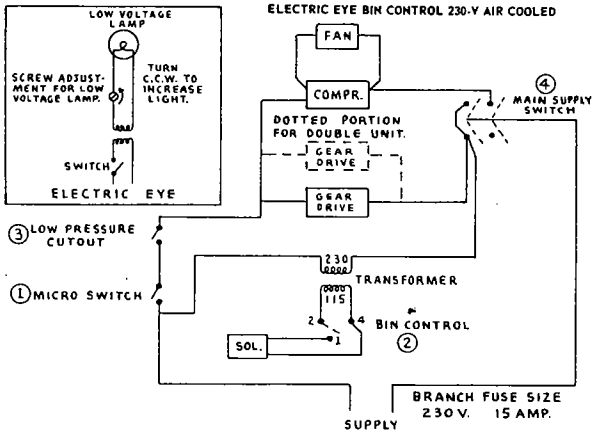


Fig. 31

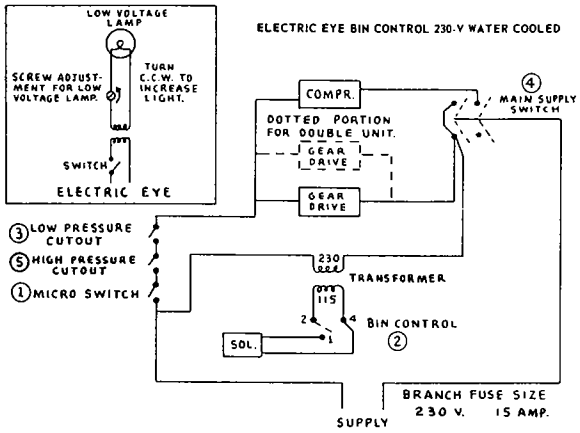

LOW VOLTAGE LAMP
SCREW ADJUSTMENT FOR LOW VOLTAGE LAMP.
TURN C.C.W. TO INCREASE LIGHT.
SWITCH
ELECTRIC EYE
ELECTRIC EYE BIN CONTROL 230-V WATER COOLED
COMPR.
DOTTED PORTION FOR DOUBLE UNIT.
GEAR DRIVE
GEAR DRIVE
4 MAIN SUPPLY SWITCH
3 LOW PRESSURE CUTOUT
5 HIGH PRESSURE CUTOUT
1 MICRO SWITCH
230
TRANSFORMER
115
2
4
BIN CONTROL
2
SOL.
1
BRANCH FUSE SIZE
230 V. 15 AMP.
SUPPLY

Fig. 32

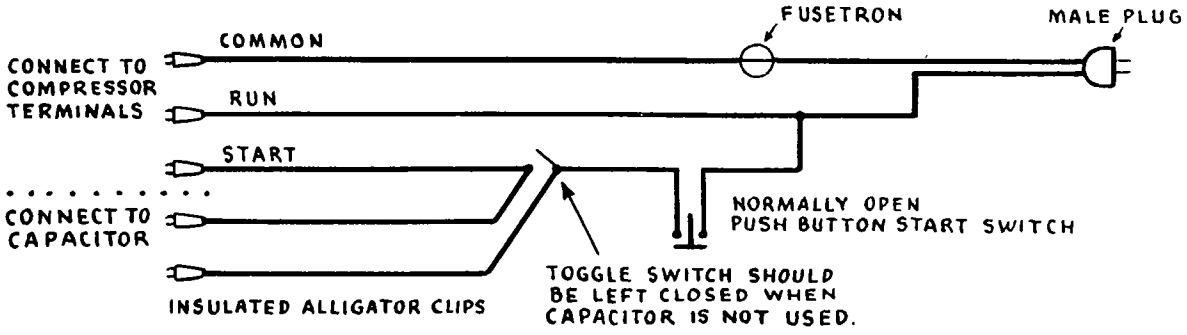

FUSETRON
MALE PLUG
COMMON
CONNECT TO COMPRESSOR TERMINALS
RUN
START
CONNECT TO CAPACITOR
NORMALLY OPEN PUSH BUTTON START SWITCH
TOGGLE SWITCH SHOULD BE LEFT CLOSED WHEN CAPACITOR IS NOT USED.
INSULATED ALLIGATOR CLIPS

Fig. 33

TROUBLE SHOOTING

Complaint	Possible Causes	Corrections
Unit won't run	a. Main switch off	a. Turn on
	b. No power to unit	a. Turn on switch b. Replace fuse c. Repair broken wires
	c. Water supply turned off	a. Turn on valve b. Repair or clean out blocked supply line.
	d. Out on bin control	a. Wait for pressure in system to reach 35 psig. (When evaporator defrosts) b. Replace defective bin control or bin control parts.
	e. Out on Micro switch	a. Make sure lid of collector pan is down and switch arm is resting on it. b. Adjust switch arm.
	f. Out on low pressure control	a. Wait for evaporator to defrost and pressure in system to reach 35 psig. b. Remove any obstruction in water supply
	g. Solenoid off	a. Main switch must be on b. Make sure bin control is not open c. Replace defective solenoid coil.
Insufficient Ice	a. Condenser air restricted	a. Clean condenser b. Remove inlet grill c. Move unit or obstructions to get more air.
	b. Condenser water insufficient	a. Adjust water valve b. Flush water valve c. Clean condenser
	c. Inlet water too warm	a. Move supply line from heat sources b. Get larger capacity head unit c. Install pre-chiller to cool inlet water
	d. Defective condenser fan motor	a. Lubricate or replace fan motor

Complaint	Possible Causes	Correction
	e. Unit short of gas	a. Find and repair leak, then add gas.
	f. Bin control malfunction	a. Adjust or replace control
	g. Low pressure control malfunction	a. Adjust or replace control
	h. Inefficient compressor	a. Change valve plate b. Replace compressor c. Correct low voltage
	i. Expansion valve malfunction	a. Clean b. Reset super heat on adjustable valves c. Replace
	j. Undersized head unit	a. Replace with larger head unit b. Get second unit
	k. Door loose or off	a. Replace or tighten b. Readjust
Power Consumption High	a. Insufficent air supply	a. Clean condenser b. Remove obstruction c. Replace fan motor d. Move to cooler location
	b. Water supply warm	a. Install pre-cooler b. Relocate supply line
	c. Condensing temperature high	a. Reset water valve b. Power flush and clean water valve c. Reduce water temperature d. Clean condenser
	d. Heavy usage	a. Provide excess storage and produce during slack periods b. Get larger head unit c. Install pre-chiller
Using too much water	a. "O" ring on auger leaking	a. Replace "O" ring
	b. Defective water valve	a. Clean and readjust valve b. Replace valve
	c. Inefficient condenser (On water cooled models)	a. Clean out lime deposits b. Reset water valve c. Replace condenser
	d. High Ambient	a. Relocate unit b. Provide more air circulation

Complaint	Possible Causes	Correction
	e. Cycling too often	a. Reset thermostatic bin control b. Short of refrigerant and shutting off on pressure control. Repair leak and recharge.
	f. Water leak	a. Find leak and repair
	g. Float valve incorrectly set	a. Adjust float level
Compressor Cycles on Overload	a. Insufficent water	a. Clean and reset water valve b. Clean condenser c. Increase size of supply line d. Repair kinked supply line e. Clean water strainer f. Clean float valve
	b. High water temperature	a. Install pre-chiller b. Relocate water lines
	c. Defective overload	a. Replace
	d. Defective relay	b. Replace
	e. Defective capacitor	a. Replace
	f. Air in system	a. Determine cause and repair b. Evacuate and recharge
	g. Tight compressor	a. Replace
	h. Compressor short of oil	a. Add oil
	i. Fan motor stuck	a. Lubricate b. Replace fan motor c. Remove obstruction
	j. Low voltage	a. Check wire size of supply b. Run separate lines
Noisy	a. Chattering water valve	a. Clean and reset b. Change valve
	b. High head pressure 1. On water cooled units	a. Clean and reset water valve b. Replace water valve c. Clean condenser
	2. On air cooled units	a. Change fan motor b. Clean condenser c. Check clearance at grills
	c. Water level low	a. Reset float level
	d. Trap in water line from float to header unit causing air bubbles	a. Remove trap by making gradual drop in line

Complaint	Possible Causes	Correction
	e. Compressing ice too much	a. Add shim between head and auger
Wet Soft Ice	a. Water level high	a. Lower float assembly b. Adjust float
	b. Excess clearance between top of tube and head	a. Remove spacers
Hard Ice and Unit Squeaks	a. Insufficient clearance between top of tube and head.	a. Add spacers
	b. Water level low	a. Raise float assembly b. Adjust float
	c. Water supply line kinked or has air bubbles in it	a. Straighten tube so it pitches downhill all the way into base of evaporator
	d. Tube needs cleaning	a. See "Cleaning Page 10
Compressor runs but gear motor does not	a. Check for power to motor	
	b. Bad toggle switch	a. Replace switch
	c. Damaged wiring	a. Check out and replace
	d. Thermal overload in motor bad	a. Replace motor and gear drive unit
Compressor and gear motor run, but auger does not turn	a. Broken shaft on auger	a. Replace auger and coupling
	b. Sheared pin on brass coupling	a. Replace pin and/or coupling
	c. Broken pin on drive shaft inside reduction gear unit	a. Replace motor gear drive unit

CHANGING GEAR DRIVE UNIT (Figs. 10, 11 and 14)

1. Shut off power and water supply. Remove front panel and disconnect gear drive motor.
2. (a) If room is available above head unit, remove top and tip micro switch arm back out of the way.
   (b) If room is not available above head unit, loosen wing bolts on the metal base, and slide locking bars forward. Retighten to hold bars open. Tilt ice making assembly forward and put block under base plate to hold unit in the tipped out position.
3. Lift off ice collector pan lid, loosen wing nuts on either side of ice collector pan and lift off.
4. Remove auger.
5. Remove 4 nuts securing evaporator base casting to reduction gear housing.
6. Remove self tapping machine screws from front and rear "Z" clamps that hold gear drive unit on base plate.
7. Raise or pull out evaporator assembly high enough to clear the 4 studs on the gear housing, then remove gear drive and motor assembly. CAUTION: If unit is tipped out, use care in removing "Z" clamps as gear drive and motor assembly is quite heavy.
8. Gently tap out shear pin in brass drive coupling using a back up wedge or weight on opposite side to prevent bearing damage on gear drive shaft. CAUTION: Do not run drill through hole in coupling or shaft, as holes are precisely sized.
9. Assemble brass coupling on drive shaft of new unit and gently tap shear pin into position flush on each side, using same procedure and care as on removal.
10. Using outside power, check rotation of gear drive shaft. The normal rotation of the shaft is counter-clockwise, looking at the top. In case the motor manufacturer wired the motor with the wrong rotation, reverse the red and black leads.
11. Remove 4 studs from old unit and screw into place on new unit.
12. Replace gear drive and motor assembly on base plate and secure with "Z" clamps.
13. Set evaporator assembly back into position, tighten nuts on studs finger tight, then back off nuts 1/2 turn.
14. Insert the four (4) 1/4"x.015" brass shims equadistant between the 4 grooves cut in the evaporator tube and not more than 1/8" up from the bottom.
15. Insert auger to align evaporator assembly with brass coupling then tighten nuts on base casting studs.
16. Remove auger, shims, then reassemble all parts in reverse order of removal except shims.

REPLACING EVAPORATOR ASSEMBLY (Figs. 10, 11 and 14)

1. Shut off power and water supply and remove front panel.
2. Follow steps 2, 3 and 4 of Changing Gear Drive Unit.
3. Remove insulating tape on refrigeration lines from evaporator outward 6".
4. Attach gauge manifold and bleed off charge.
5. Cut or unsolder lines at evaporator.
6. Remove 4 nuts securing evaporator base casting to reduction gear housing and lift off evaporator assembly.
7. Follow steps 13, 14, 15 and 16 of Changing Gear Drive Unit.
8. Swage refrigeration lines, connect, and solder gas tight.
9. Install new drier, leak check, evacuate and charge system.
10. Replace insulating tape on lines.

SPECIFICATIONS FOR FLAKER

TABLE I

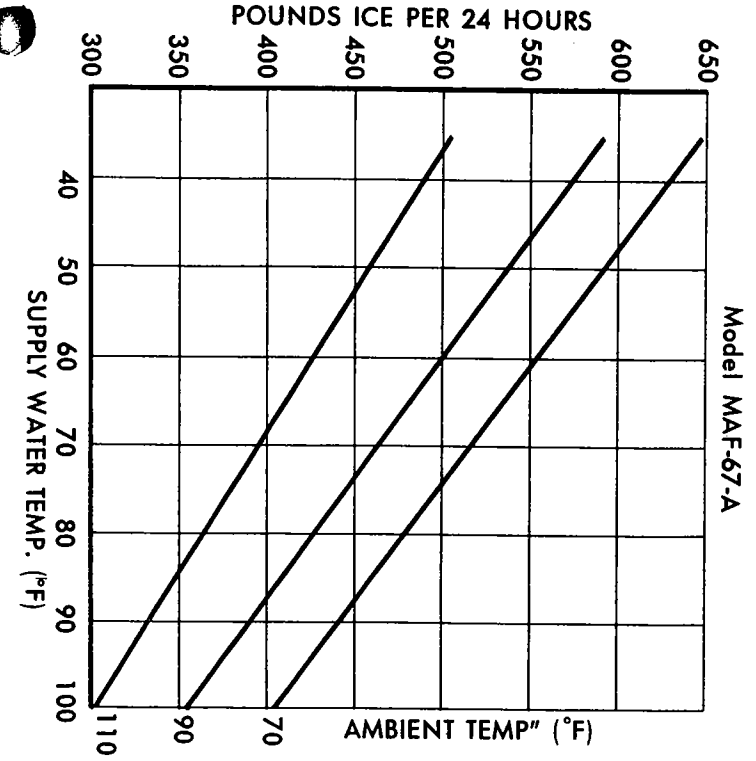
PART		MAF 35A	MAF35W	MAF67A	MAF65W
Compressor	115-60-1	S-33-CS	S-33-CS	Cop. KAM2-0050-1AA	Cop. KWM2-0050-1AA
Winding Resistance Common to Run		1.55 Ohms	1.55 Ohms	0.79 Ohms	0.79 Ohms
Winding Resistance Common to Start		4.46 Ohms	4.46 Ohms	2.30 Ohms	2.30 Ohms
Start Capacitor Rating		189-210 mfd 125 vac	189-210 mfd 125-60-1 vac	430-516 mfd 125- vac	430-516 mfd 125- vac
Compressor	230-60-1			Cop. KAM2-0050-1AB	Cop. KWM2-0050-1AB
Winding Resistance Common to Run				3.8 Ohms	3.8 Ohms
Winding Resistance Common to Start				9.8 Ohms	9.8 Ohms
Start Capacitor Rating				108-120 mfd. 220 vac.	108-120 mfd. 220 vac.
Fan Model 54W		SPA6		SPA6 SPA9	
Fan Amps	115-60-1	0.56		0.56 0.85	
	230-60-1			0.28 0.45	
Fan Winding Resist.	115-60-1	44 Ohms		22 Ohms	
	230-60-1			95 Ohms	
Gear Drive Unit	1/4 H.P.				
Normal Amps	115-60-1	5.4-A	5.4-A	10.8-Both Motors	10.8-A Both Motors
	230-60-1			2.7-A ea. motor, 5.4 Both	2.7-A ea. motor, 5.4 Both
Winding Resist.	115-60-1	1.4 Ohms	1.4 Ohms	Each Motor 1.4 Ohms	Each Motor 1.4 Ohms
	230-60-1			Each Motor 6.4 Ohms	Each Motor 6.4 Ohms
Gear Drive Unit 1/6 H.P.					
Normal Amps	115-60-1	4.4 Amps	4.4 Amps	4.4 Amps ea. 8.8 Total	4.4 Amps ea. 8.8 Total
	230-60-1	1.9 Amps	1.9 Amps	1.9 Amps ea.-3.4 Total	1.9 Amps ea.-3.4 Total
Winding Resist.	115-60-1	14.9 Ohms	14.9 Ohms	14.9 Ohms each motor	14.9 Ohms each motor
	230-60-1	59.6 Ohms	59.6 Ohms	59.6 Ohms each motor	59.6 Ohms each motor
Refrigerant Charge	oz. R-12	12 oz.	12 oz.	19 oz.	19 oz.
Normal Amps	115 V.	9.5 to 10.0	8.5 to 9.2	16.5 to 17.5	15.0 to 17.0
Normal Amps	230 V.	4.8 to 5.0	4.3 to 4.6	8.3 to 8.8	7.5 to 8.5
Room Temperature		70 90 110	70 90 110	70 90 110	70 90 110
Head Pressure	Max.	105 140 185	107 107 107	125 167 208	120 120 120
	Min.	101 138 180	100 100 100	120 161 203	118 118 118
Suction Pressure	Max.	10 11 13	11 11 11	11 13 15	12 12 12
	Min.	9 10 12	9 9 9	10 12 13	10 10 10
Temp. Cond. Outlet Water			100°		100°
Solenoid	115V	1.0 Amps 10 Watts	1.0 Amps 10 Watts	1.0 Amps 10 Watts	1.0 Amps 10 Watts
Amps & Watts	230 V			.5 Amps 10 Watts	.5 Amps 10 Watts
Solenoid	115 V	86 Ohms	86 Ohms	86 Ohms	86 Ohms
Winding Resistance	230 V			344 Ohms	344 Ohms

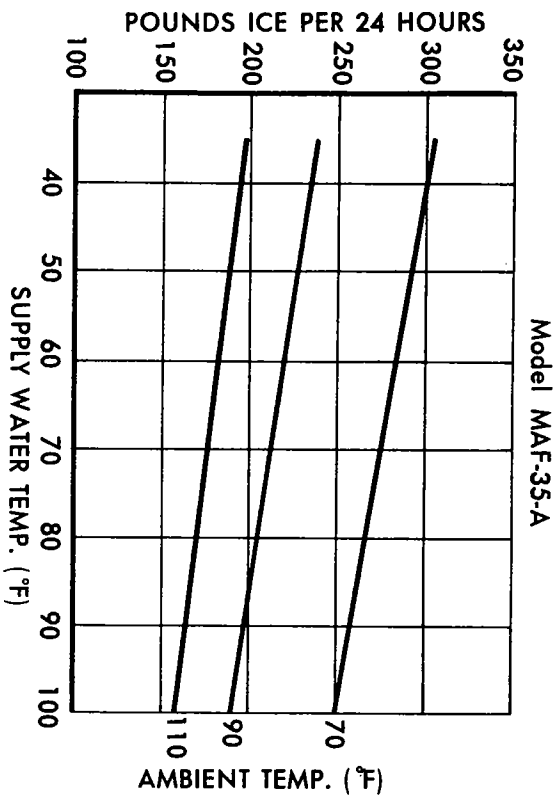
TABLE II

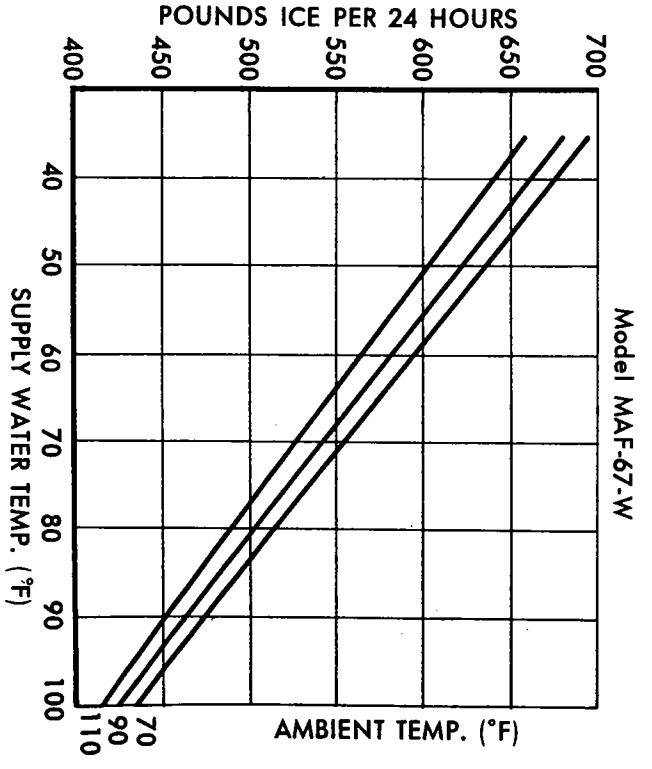
REFRIGERATION SYSTEM PARTS

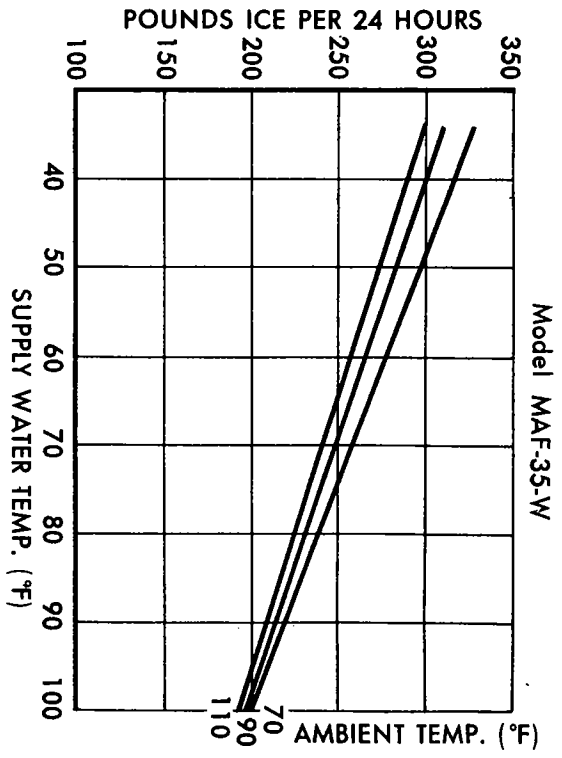
		VOLTAGE	MAF35A	MAF35W	MAF67A	MAF67W
Compressor		115	14-0108	14-0108	14-0101	14-0089
Compressor		230			14-0102	14-0103
Relay		115	15-0158	15-0158	15-0154	15-0154
Relay		230			15-0161	15-0161
Starting Capacitor		115	15-0156	15-0156	15-0153	15-0153
Starting Capacitor		230			15-0163	15-0163
Overload Protector		115	(In Relay)	(In Relay)	15-0144	15-0144
Overload Protector		230			15-0132	15-0132
Fan Motor		115	24-0131		24-0132	
Fan Motor		230			24-0134	
Dryer (Drymaster Mod. 8)			12-3004	12-3004	12-3004	12-3004
Water Valve - PENN. No. 246 or AP No. 65A				13-6040		13-6040
Therm. Exp. Valve AP-207-C 1/2 Ton			13-6053	13-6053	13-6053	13-6053
Bin Controls	Thermostatic - RANCO-A-10		23-5053	23-5053	23-5053	23-5053
	Electric Eye - RANCO-E-20	115	23-0042	23-0042	23-0042	23-0042
	Electric Eye - RANCO-E-20	230			23-0043	23-0043
	Power Assy. (14-V Output)	115	23-0045	23-0045	23-0045	23-0045
	Power Assy. (14-V Output)	230			23-0048	23-0048
	Lamp Assy.		23-0046	23-0046	23-0046	23-0046
	Sensor Assy.		23-0047	23-0047	23-0047	23-0047
	Quick Connect - Tin Plated		25-0152	25-0152	25-0152	25-0152
	Quick Connect - Brass		20-0153	25-0153	25-0153	25-0153
	Bulb (#1487 - 14 V)		25-0154	25-0154	25-0154	25-0154
	Transformer - GE9T51Y3 230 Input, 115 Output		24-0173	24-0173	24-0173	24-0173
High Pressure - Cut-Out RANCO G-23				23-5045		23-5045
Low Pressure - Cut-out RANCO G-20 (Optional)			23-5052		23-5052	
Low Pressure Switch - RANCO "O" or ROBERT SHAW AP-20			24-0168	24-0168	24-0168	24-0168
Toggle Switch - DPDT- Center OFF			23-0033	23-0033	23-0033	23-0033
Float Valve			13-6050	13-6050	13-6050	13-6050
Micro Switch - Cherry E13-00H			23-0039	23-0039	23-0039	23-0039
Flaker Motor and Reduction Gear Assembly	1/4 H. P.	115	24-0080	24-0080	24-0080	24-0080
Flaker Motor and Reduction Gear Assembly	1/4 H. P.	230			24-0098	24-0098
Flaker Motor and Reduction Gear Assembly	1/6 H. P.	115	24-0141	24-0141	24-0141	24-0141
Flaker Motor and Reduction Gear Assembly	1/6 H. P.	230			24-0142	24-0142
Solenoid AP R-291		115	24-0176	24-0176	24-0176	24-0176
Solenoid AP R-291		230	24-0177	24-0177	24-0177	24-0177
"O" Ring Auger Shaft			43-0094	43-0094	43-0094	43-0094
"O" Ring Drain Adapter			43-0113	43-0113	43-0113	43-0113
Drain Adapter			13-0033	13-0033	13-0033	13-0033
Compression Valve (Water Supply)			13-6056	13-6056	13-6056	13-6056
Condenser - Air			11-5010		11-5009	
Condenser - Water J-51 or J-98				11-0014		11-0014

TABLE III


POUNDS ICE PER 24 HOURS
300 350 400 450 500 550 600 650
SUPPLY WATER TEMP. (°F)
40 50 60 70 80 90 100
AMBIENT TEMP" (°F)
110 90 70
Model MAF-67-A


POUNDS ICE PER 24 HOURS
100 150 200 250 300 350
SUPPLY WATER TEMP. (°F)
40 50 60 70 80 90 100
AMBIENT TEMP. (°F)
110 90 70
Model MAF-35-A


POUNDS ICE PER 24 HOURS
400 450 500 550 600 650 700
SUPPLY WATER TEMP. (°F)
40 50 60 70 80 90 100
AMBIENT TEMP. (°F)
70 90 110
Model MAF-67-W


POUNDS ICE PER 24 HOURS
100 150 200 250 300 350
SUPPLY WATER TEMP. (°F)
40 50 60 70 80 90 100
AMBIENT TEMP. (°F)
70 90 110
Model MAF-35-W