

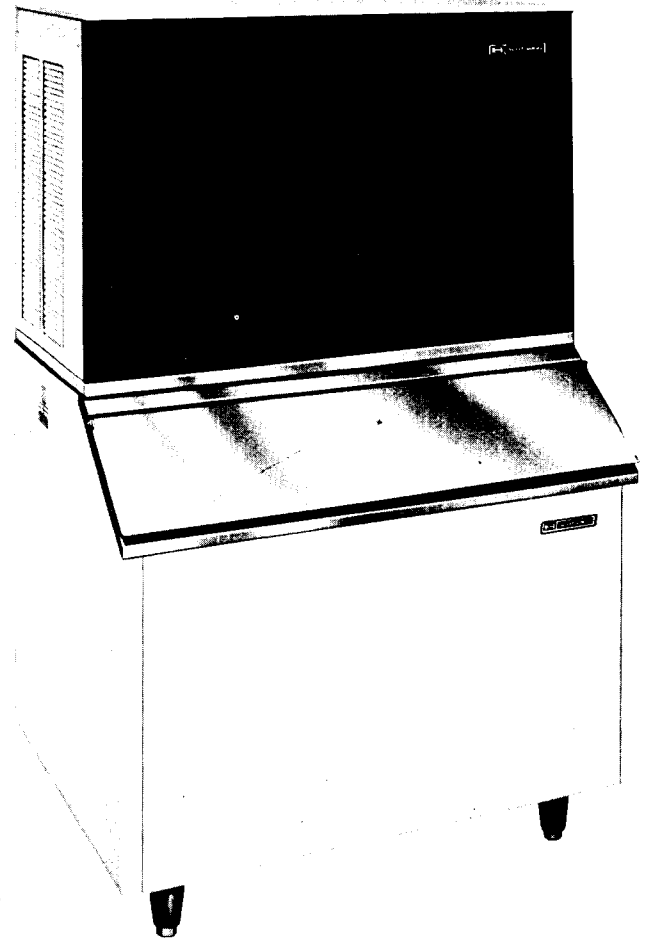
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MODULAR CUBER MC40 SERIES



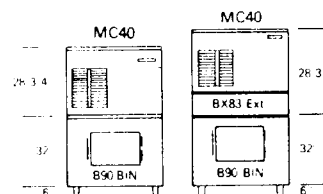
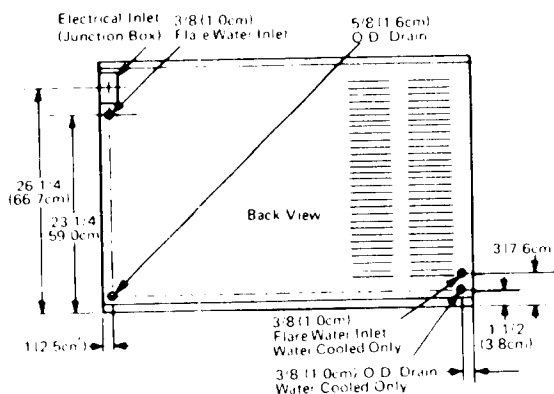
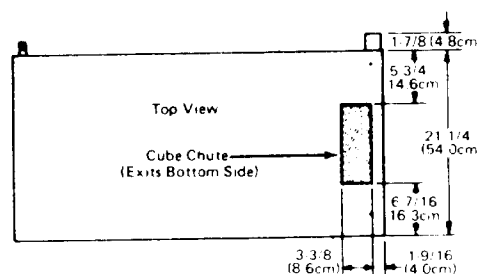
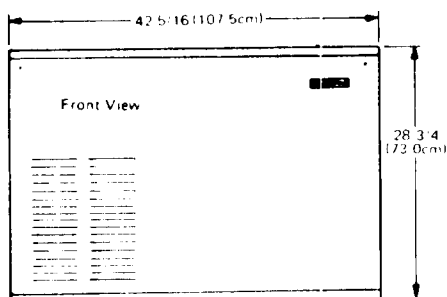
ice making capacity

Daily Ice Capacity is directly related to condenser air inlet temperature, water temperature, and age of machine. To keep your SCOTSMAN MODULAR CUBER performing at it's maximum capacity, it is necessary to perform periodic maintenance as outlined on page 46 of this manual.

MC40 modular cuber

*Capacity: Refer to Ice Making Capacity chart.
Storage Bin: The MC40 will stack onto a variety of Scotsman
Modular Bins such as the B40, B60, B80 and B90.

Height: 28-3/4" (73.0cm) Width: 42-5/16" (107.5cm)
Depth: 23-1/8" (58.8cm)
Shipping Wt: Air 346 lbs. (157 kg.) Water 336 lbs. (153 kg.)



MC40 MODULAR CUBER SPECIFICATIONS

Model	Condensing Unit	Compressor Horsepower	Finish *	Shipping Weight	
				lbs.	kg.
MC40MAE	Air	1.5	Enamel	346	157
MC40MWE	Water	1.5	Enamel	336	153
MC40SAE	Air	1.5	Enamel	346	157
MC40SWE	Water	1.5	Enamel	336	153

* Stainless steel panels available in kit form SPKMC2. Painted models have Sandalwood enamel micomatte finish, with walnut woodgrain vinyl front panel.

Basic Electricals	Circuit Ampacity	Maximum Fuse Size
Air Cooled: 115/208-230/60/1 115/208-220/60/3	26.4	25.0
	18.0	20.0
Water Cooled: 115/208-230/60/1 115/208-220/60/3	25.9	25.0
	17.5	20.0

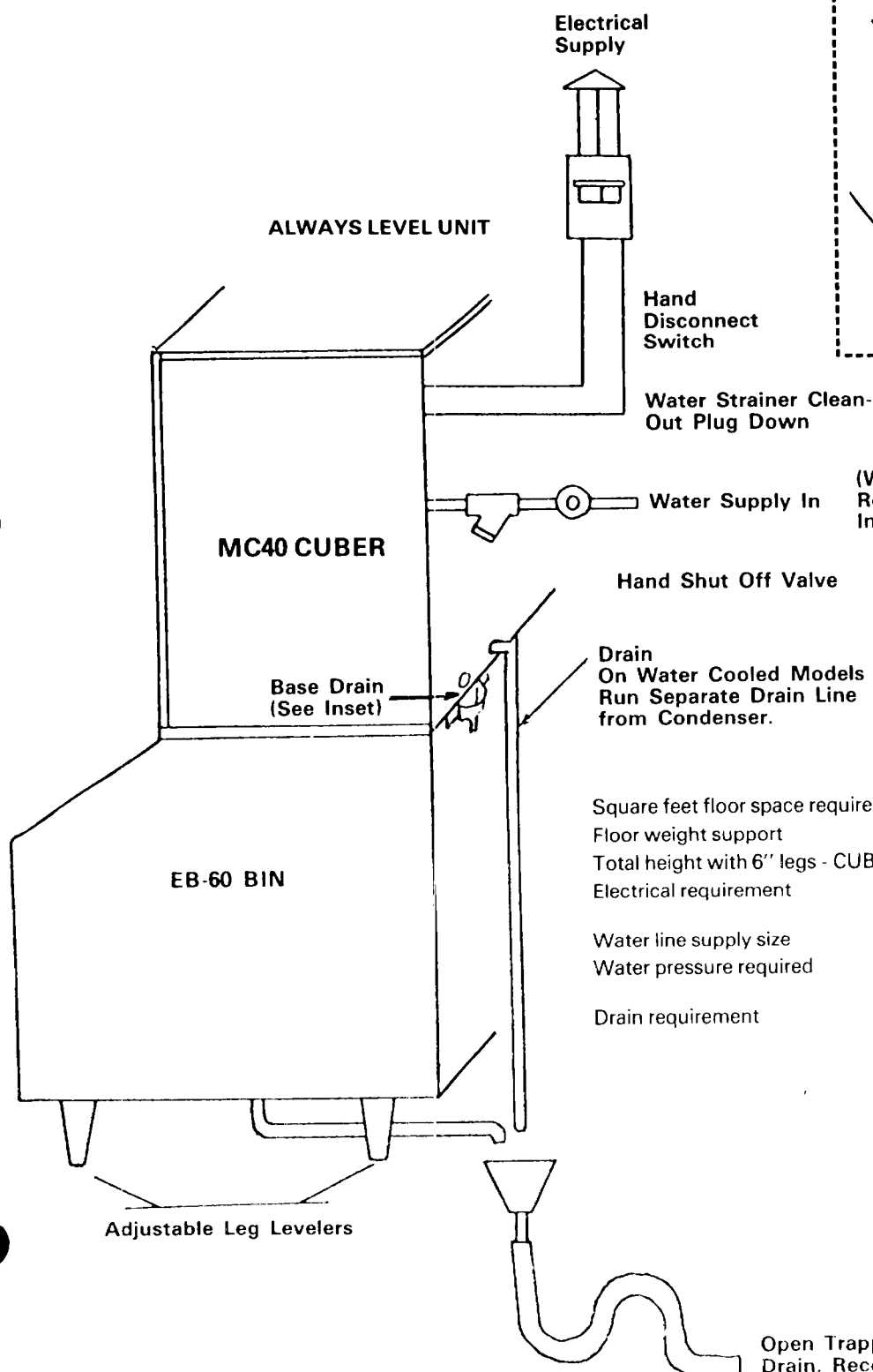
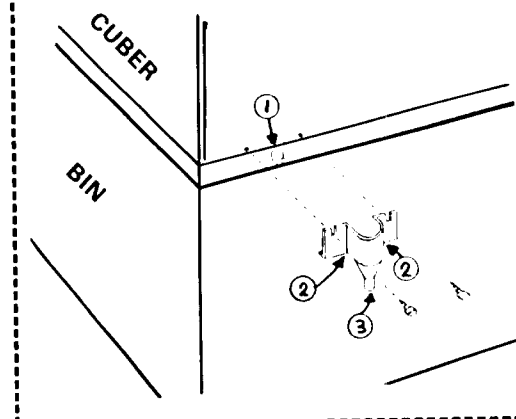
INSTALLATION INSTRUCTIONS

1. Uncrate unit using regular hammer and nail puller.
2. Remove top, front, left and right side panels (held by screws).
3. On base of machine at left and right ends are bolts that hold cuber to crate skid. Loosen the bolts to remove skid and save bolts to mount machine to SCOTSMAN Storage Bins.
4. Place unit on top of bin and secure to bin with two bolts taken out in Step 3.
5. Uncoil bin thermostat bulb and run it down thru machine base by pushing end of bulb thru plastic cap located between sump pump and freezing chamber. Next, take combination cube deflector and bulb holder, which is packed in storage bin, and install on upper right side of bin as described on Page 8.

NOTE: Regardless of what type of bin is used, It is essential that bin thermostat bulb be located in area immediately below cube chute opening of machine, in order to prevent ice from backing up into cube chute.
6. Remove shipping tapes and check tubings, wiring, capillary control, lines for rubbing or chafing, refashion as required.
7. Remove junction box from top of cube chute and install on rear of machine. Wires are provided at rear of machine for electrical hookup.
8. Check unit nameplate voltage against building source voltage to be sure they correspond. Scotsman, like most manufacturers, purchases electrical motors that are rated to operate within a 10% variance above or below nameplate ratings.
Improper voltages applied to Scotsman equipment can cause premature failures and burnouts. Failures of this type are not considered as factory fault or defect.
9. Make water connection utilizing 3/8" O.D. copper water line.
10. Use clean damp cloth to wipe out storage bin and cabinet exterior.
11. Replace all panels.
12. Check unit to be sure it is level side to side and front to rear.
13. User manual contains registration card. Fill out card completely including model and serial numbers as taken from aluminum plate found behind front service panel. Forward to Scotsman Factory.
14. Call your local authorized Scotsman Service Agency for hook-up, start-up and check out. He's listed under "Ice Making Machinery & Equipment" in your telephone book, yellow pages.

INSTALLATION INSTRUCTIONS

1. Center drain cup (2-2296-01) over drain hole in base.
2. Put a light amount of sealant at both inside corners to insure water seal, before securing to base.
3. Drain tube is 1/2" O.D. Attach suitable drain line.



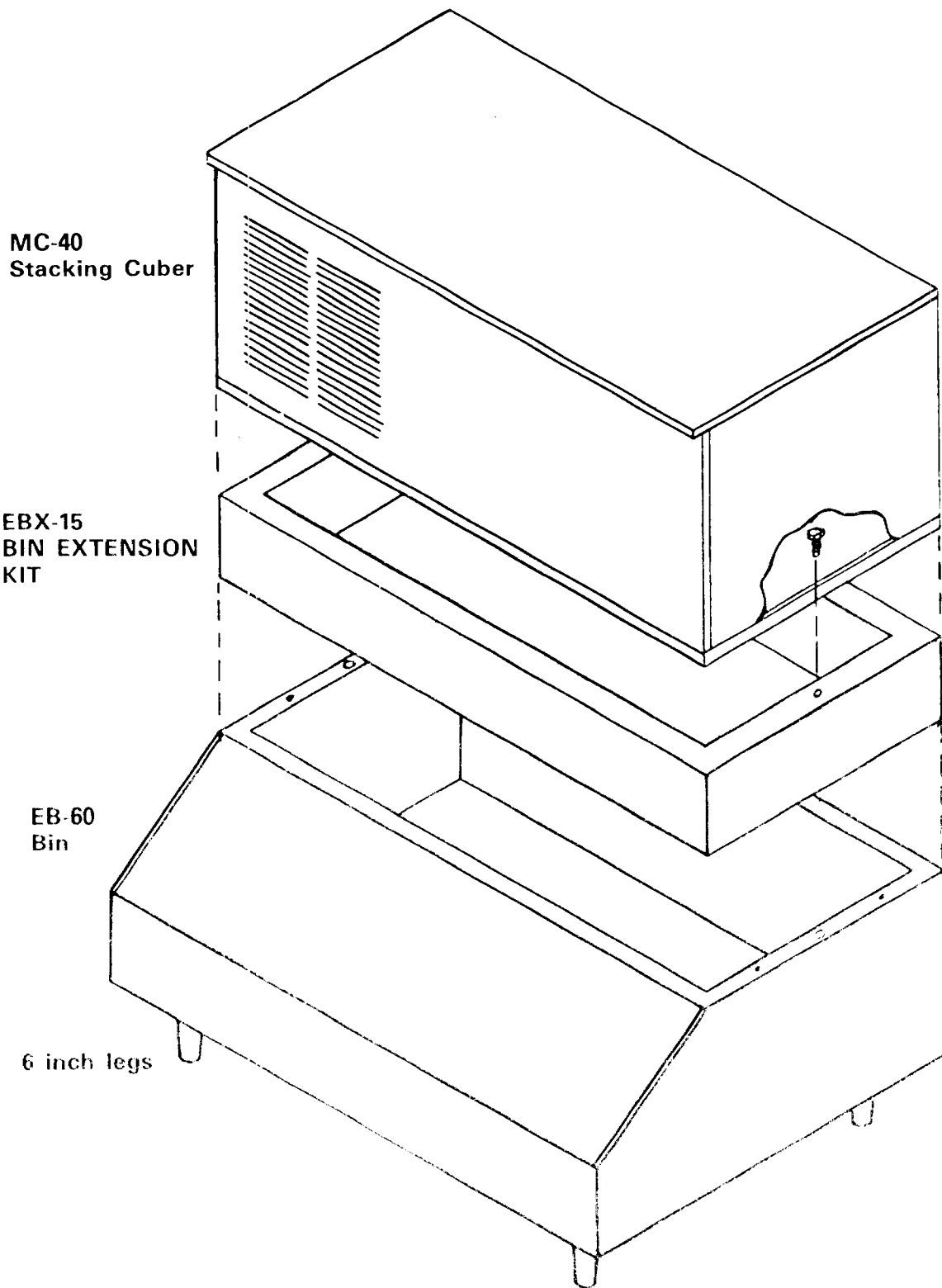
(Water Cooled Units
Require Separate Water
Inlet For Condenser)

Drain
On Water Cooled Models
Run Separate Drain Line
from Condenser.

Square feet floor space required	8.75 sq. ft.
Floor weight support	900 pounds
Total height with 6" legs - CUBER - BIN	67 inches
Electrical requirement	230/60/1 or 208-220/60/3
Water line supply size	3/8" copper, minimum
Water pressure required	20 pounds flowing pressure, minimum
Drain requirement	5/8" O.D. stub on cuber drain 1/2 N.P.T. female thread casting on bin

Open Trapped or Vented
Drain. Recommended 1/4 inch Fall
Per foot of run on drain lines.

TYPICAL INSTALLATION



WARNING: SCOTSMAN BINS ARE SPECIFICALLY ENGINEERED FOR USE WITH THE SCOTSMAN MODULAR CUBERS. USE OF OTHER THAN SCOTSMAN MANUFACTURED BIN MAY RESULT IN COMPONENT FAILURES WITHIN THE MODULAR CUBER.

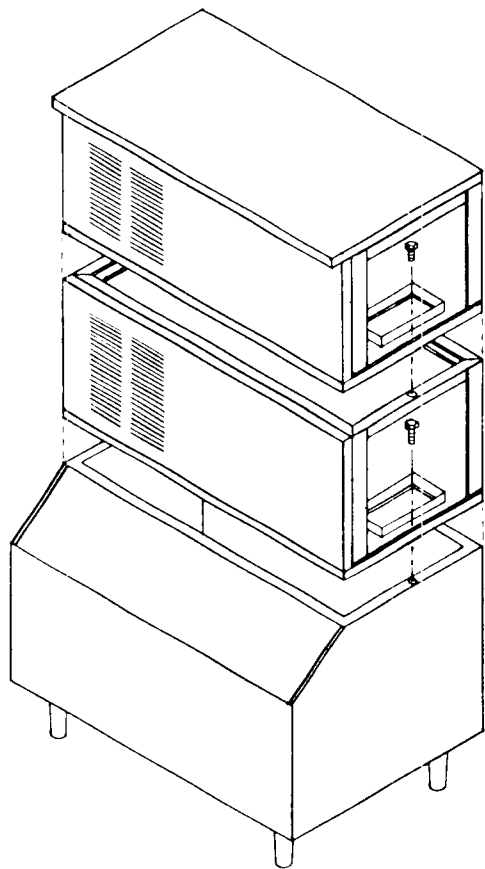


FIG. 1

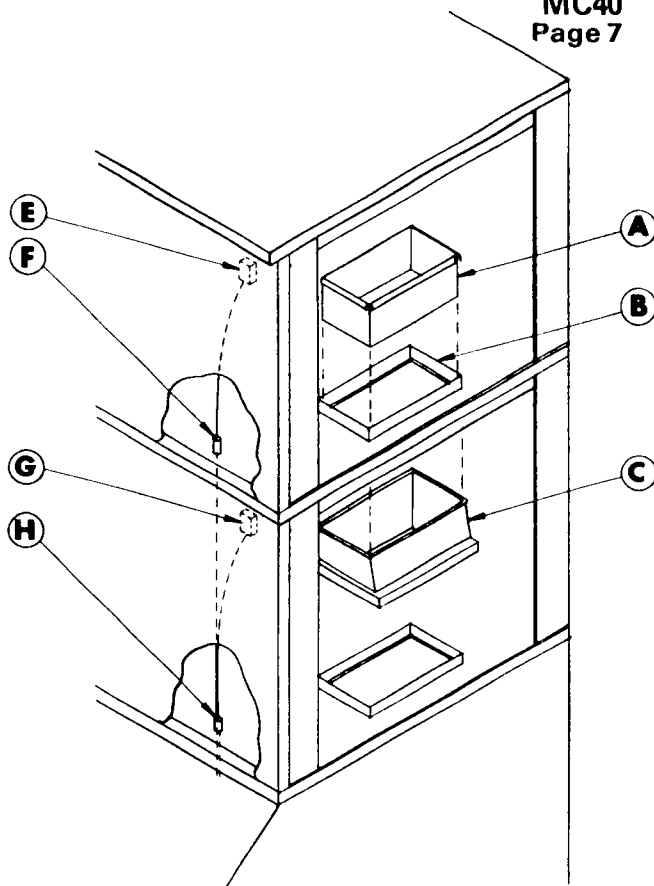


FIG. 2

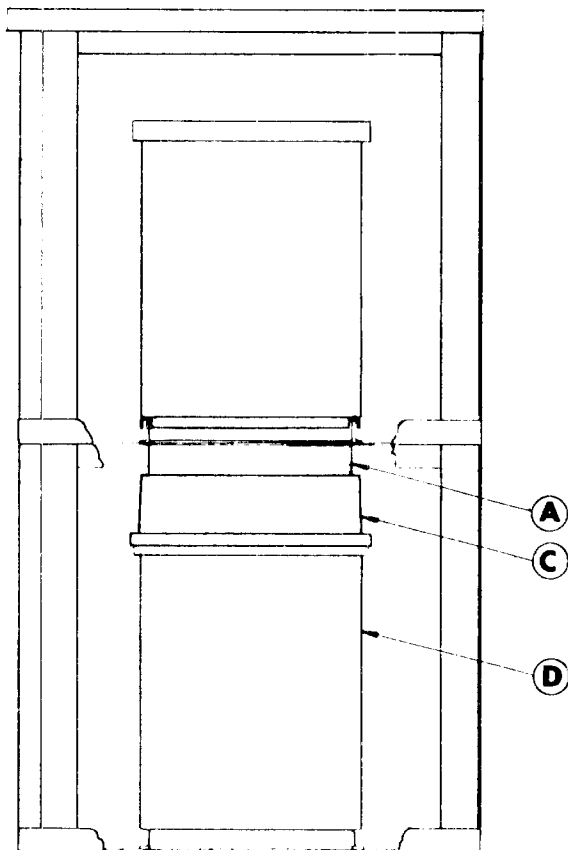


FIG. 3
COMPLETED INSTALLATION

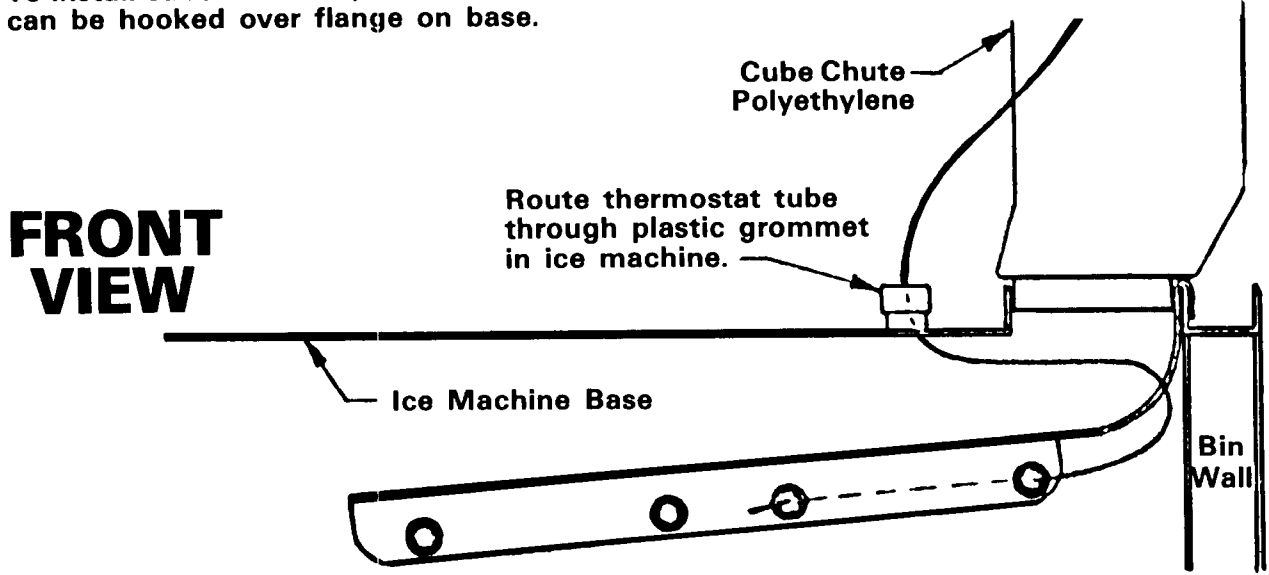
KSC1

STACKING KIT INSTRUCTIONS

1. Remove all panels from both machines. (Top panel of bottom machine may be set aside, as it is not used when machines are stacked) Remove cube chutes from both machines.
2. After mounting bottom cuber to storage bin, place upper machine directly on frame of lower machine. Bolt together with same bolts and holes used in holding machine to crate skid. Fig. 1
3. Insert stainless steel (A) thru cube opening (B) in base of upper cuber. Place stacking kit cover (C) over sleeve as shown and push to top of sleeve. (See Fig. 2)
4. Replace cube chute (D) in bottom cuber and slide cover (C) down over cube chute, as shown in Fig. 3.
5. Route upper machine thermostat bulb (E) thru cap (F) and together with lower machine thermostat bulb (G) push thru cap (H) and feed tubes into combination cube deflector and bulb holder at right side of bin. This will provide two independent ice making systems.
6. Run separate water, drain, and electrical supplies. Test and check out added cuber, ice making, thermostat function, etc.
7. Install cube chute & cover on top machine, and replace panels on both machines.

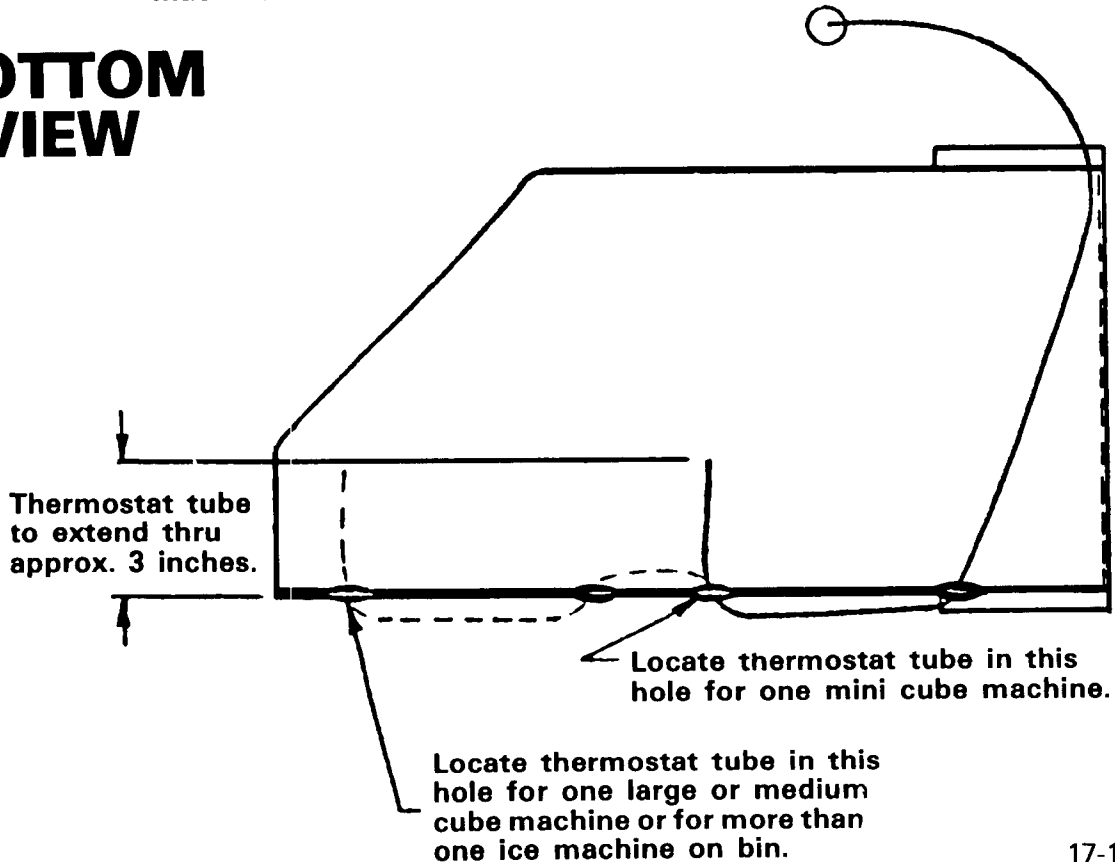
CUBE DEFLECTOR INSTALLATION INSTRUCTIONS

To install cube deflector, ice machine cube chute must be removed so cube deflector can be hooked over flange on base.



Thermostat tube to be routed along the underside of the ice machine until it is located under cube deflector.

BOTTOM VIEW



17-1274-01

CAUTION: Thermostat tube can be located in any hole for maximum bin fill. However, when located, the ice machines must shut off before cubes can back up into the cube chute or extensive damage may result.

INSTALLATION LIMITATIONS

ELECTRICAL

1. Scotsman, like most manufacturers, purchases electrical motors that are rated to operate within 10% variance above or below nameplate ratings.

Improper voltages applied to Scotsman equipment can cause premature failures and burnouts. Failures of this type are not considered as factory fault or defect.

AMBIENT

2. **WARNING** – This machine is not designed for outdoor installations. This machine will not operate when air temperatures are below 50° F. or above 100° F.

NOTE: This unit incorporates a "hot gas" defrost system, therefore, it is vitally important that the operation head pressure are in the 135-155 pound PS1 guage range. Water cooled models pose no problem since pressure can be regulated by adjustment to the water regulating valve.

Air cooled units require a minimum 50° fahrenheit ambient air, otherwise, the hot gas system will not defrost the formed ice cubes, resulting in a freeze up that will ruin the freezer section, necessitating a costly repair.

This unit was not fabricated nor intended to be installed outdoors.

WATER

3. Scotsman Ice Systems require 20 pounds flowing water pressure to operate satisfactorily. Pressures lower than 20 pounds or interruptions in the water supply can cause serious mechanical damage to this product.

This machine will not operate when water supply temperatures are below 40° F. or above 100° F.

ELECTRICAL CONNECTIONS AND CHARACTERISTICS

230 volts, 60 hertz, single phase	Air Cooled	Water Cooled
Compressor	18.2 Amperes	18.2 Amperes
Sump Motor (2)	1.3 ea. Amperes	1.3 ea. Amperes
Fan-Air Cooled Models (2)	.70 Amperes	NONE
Spray Bar Motor	.60 Amperes	.60 Amperes
TOTAL — Full Load Amperes	23.4 Amperes	22.0 Amperes

See page 3 for minimum circuit ampacity. Be certain that the Cubers are on their own circuit and individually fused. The maximum allowable voltage variation should not exceed 10 per cent of the nameplate rating even under starting conditions. Low voltage can cause erratic operation, and may be responsible for serious damage to the overload switches and motor windings.

All external wiring should conform with National State and local code requirements. Check the voltage on the line before connecting the machine.

NOTE: All Scotsman cubers require a neutral wire and a solid earth ground wire.

WATER SUPPLY AND DRAIN CONNECTIONS

WATER SUPPLY — Air Cooled Models

The recommended water supply line is 3/8" OD copper tubing for air-cooled units. Connect to a cold water supply line with regular plumbing fittings with a shut-off valve installed in an accessible place between supply line and machine. The water strainer supplied with the unit should be mounted with clean-out plug down. Locate the strainer next to the machine and the arrow in the direction of the flow.

A 3/8" male flare fitting is provided on right rear corner for convenience in hookup.

WATER SUPPLY — Water Cooled Models

Water cooled models have separate water inlet for water cooled condenser, in addition to the same plumbing required for air cooled units.

When choosing the water supply for this cuber, consideration should be given to:

- A. Length of run.
- B. Water clarity and purity.
- C. Adequate supply pressures.

Since water is the most important single ingredient in producing ice, you cannot over emphasize the three items mentioned above. Low water pressure (below 20 pounds) may cause malfunction of the Harvest Cycle. Water containing excessive minerals will tend to produce cloudy colored cubes and scale build up on parts in the water system. Water supply must be installed to conform with local code. In some cases a licensed plumber and/or plumbing permit will be required.

Heavily chlorinated water can be controlled using charcoal or carbon filters.

DRAIN: The recommended drain from the bin is 5/8 inch OD copper tubing. Must be run to an open trapped and vented drain. If drain is a long run, allow 1/4 inch pitch per foot. Drain must be installed to conform with local code. Run separate 3/8" line for condenser discharge water on water cooled models.

FINAL CHECK LIST

1. Is the unit level? (IMPORTANT)
2. Have all electrical and piping connections been made?
3. Has the voltage been tested and checked against the nameplate rating?
4. Have the compressor hold-down bolts been checked to insure the compressor is snug to its mounting pads?
5. Is the water supply valve open and the electric power properly hooked up?
6. All masking tape removed from doors, panels and inner freezer curtain?
7. Is the unit clean? Has storage bin been wiped clean with cold water cloth?
8. Has the owner been given the operating manual, and has he been instructed on how to operate the machine?
9. Has the registration form been filled out? Check for correct model and serial numbers from serial plate on unit then promptly mail card to factory.
10. Check all refrigerant and conduit lines to guard against vibrations and possible failure.
11. Is there 4" clearance behind and around unit for proper air circulation?
12. Is unit in a room where ambient temperatures are minimum 50° F. even in winter months?
13. Has water supply pressure been checked to insure at least a minimum pressure of 20 pounds?
14. Refrigerant Charge:
Air Cooled Models - 43 oz. R-12.
Water Cooled Models - 35 oz. R-12
15. Refrigerant metering device: capillary tubes (2).

INSTALLATION – START UP

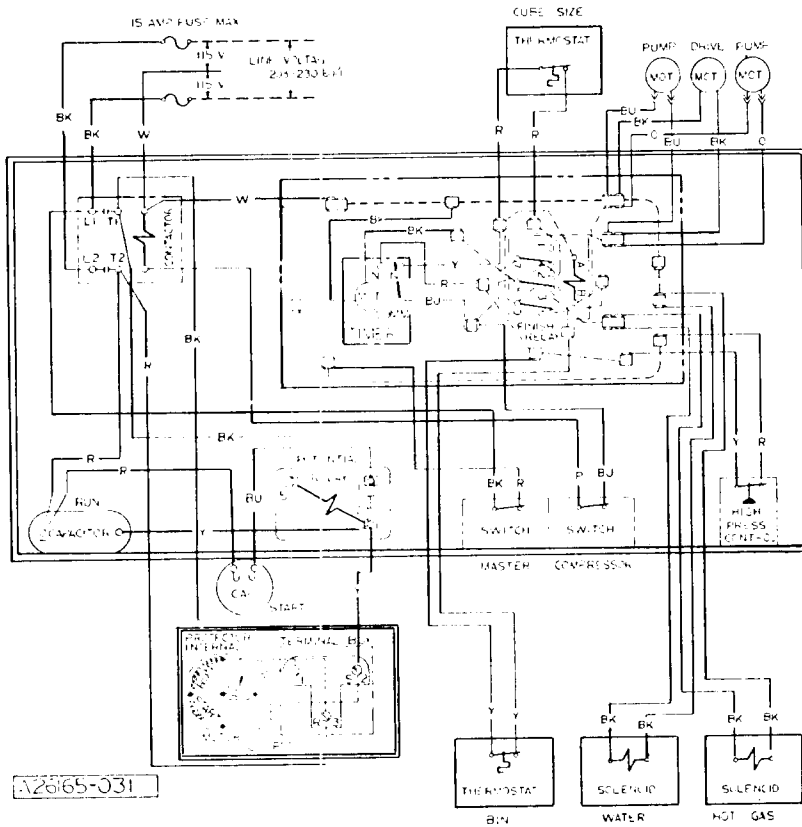
1. After water and electrical hookup is complete, turn time clock knob (protruding thru control box cover) clockwise until you hear the micro-switch actuator arm click into the cam slot. Turn master switch on. (Compressor switch should remain in off position.) At completion of harvest cycle (Approx. 3 minutes after harvest was started), rotate knob clockwise until once again harvest is initiated. At this point compressor switch should be placed in "ON" position. Unit is now ready for automatic operation.

NOTE: All cubers have two manual on-off switches. One is for motor compressor only during cleaning operation, one is master switch for complete unit.
2. When both switches are thrown "on", water inlet solenoid will be energized allowing water to enter cuber, thru solenoid and up into back side of freezer cup section. This will "fill" icemaker for the freezing cycle - Check operation of spray bar drive motor thru hood top panel. Spray bar motor should be running during harvest cycle.
3. NOTE: WATER PUMP OPERATES DURING THE DEFROST CYCLE.
Factory tests prove faster defrost and increased ice capacity by letting this pump operate continually.
4. Time clock dial does not rotate at the end of the harvest cycle; it is started later by the cube size thermostat control located in the control box.
5. Freezing time will be approximately 20 to 30 minutes in a 70 degree ambient. (Longer if above, and shorter if below.) Average complete cycle time is 25 - 35 minutes.
6. Watch first cube harvest and check to make sure that plastic curtains have not been damaged in shipment. Also that curtains do not swing back into freezer and catch on spray bar.
7. Check size of cubes made: If too small, after a second cycle, adjust cube size control to lower or colder setting - until desired cube size is reached. Normal cube size is with a 1/4" depression in crown.
8. Check texture of cubes made: Partially cloudy cubes throughout suggest unit running short of water near end of freezing, or possibly an extremely bad water condition, which would indicate use of filtering or purifying equipment. Contact SCOTSMAN - Queen Products Division, Ice Machine Service Department, Albert Lea, Minnesota, for further details.
9. With unit on harvest cycle, take a handful of cubes made and hold on storage bin thermostat bulb. Should cut unit off at end of harvest cycle. Remove ice, unit should cut back on automatically in 3 or 4 minutes. Thermostat is factory set at 35 degrees out, 39 degrees in.
10. Install gauges and check head and back pressure: air-cooled models, head pressure after twenty minutes of freezing cycle at 70 degrees ambient will be approximately 125 pounds PSI. The back pressure starts out at approximately 50 pounds PSI and gradually pulls down to approximately 4 pounds PSI just before harvest cycle. Higher ambients and dirty condenser will cause higher pressures. Water-cooled models have water regulating valves factory set at 135 pounds PSI: check reading and adjust if necessary. Back pressure will operate the same as on air-cooled models.
11. Remove gauges, replace control box cover and all service panels.
12. Instruct owner on how to operate and clean machine.

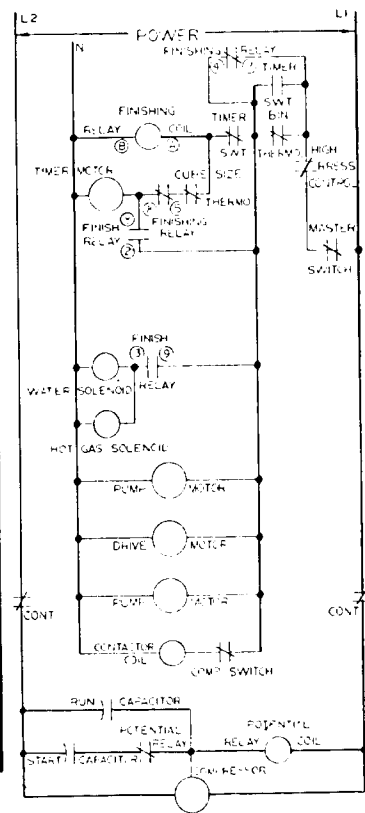
WIRING DIAGRAM
208-230-115/60/1
Water Cooled

CAUTION: MORE THAN ONE DISCONNECT MEANS MAY BE REQUIRED TO DISCONNECT ALL POWER TO THIS UNIT.

THIS UNIT MUST BE GROUNDED



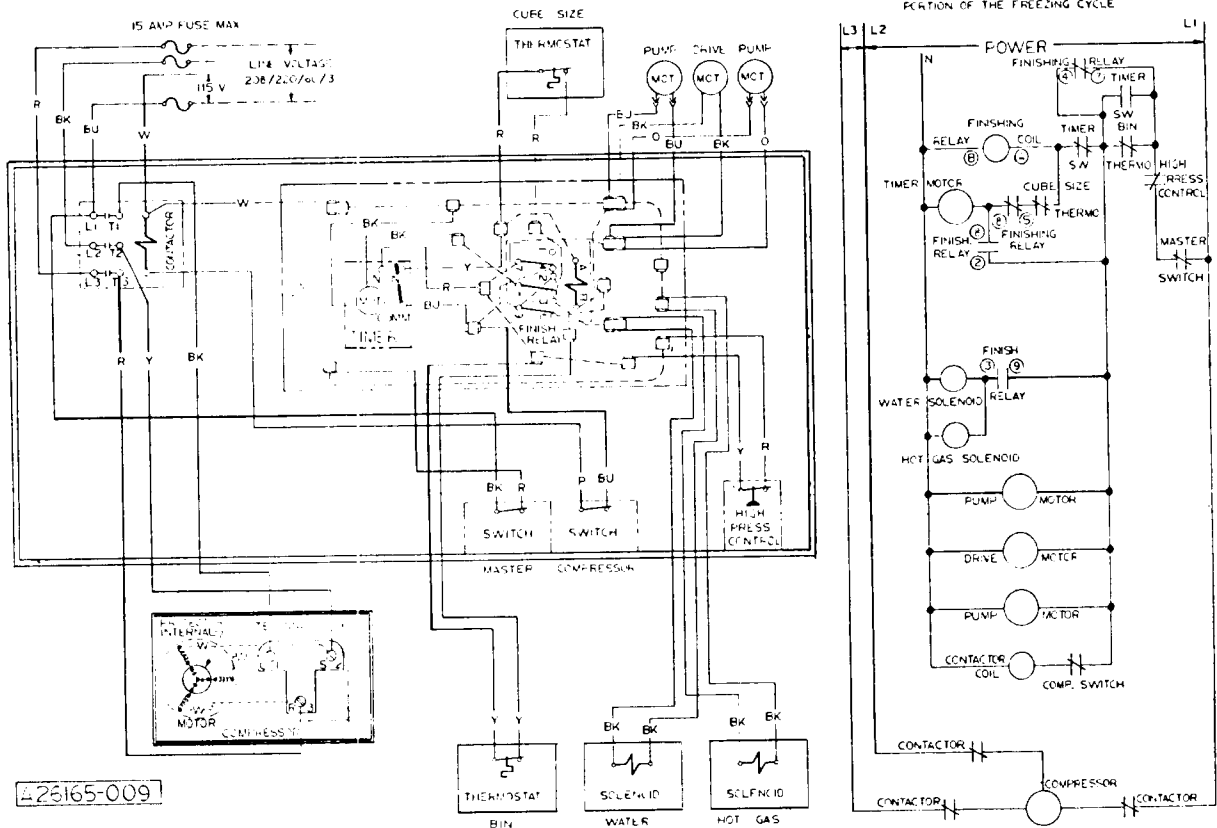
THIS UNIT SHOWN IN THE TIME PORTION OF THE FEEDING CYCLE



WIRING DIAGRAM
208-220/60/30
Water Cooled

CAUTION: MORE THAN ONE DISCONNECT MEANS MAY BE
REQUIRED TO DISCONNECT ALL POWER TO THIS UNIT.

THIS UNIT MUST
BE GROUNDED



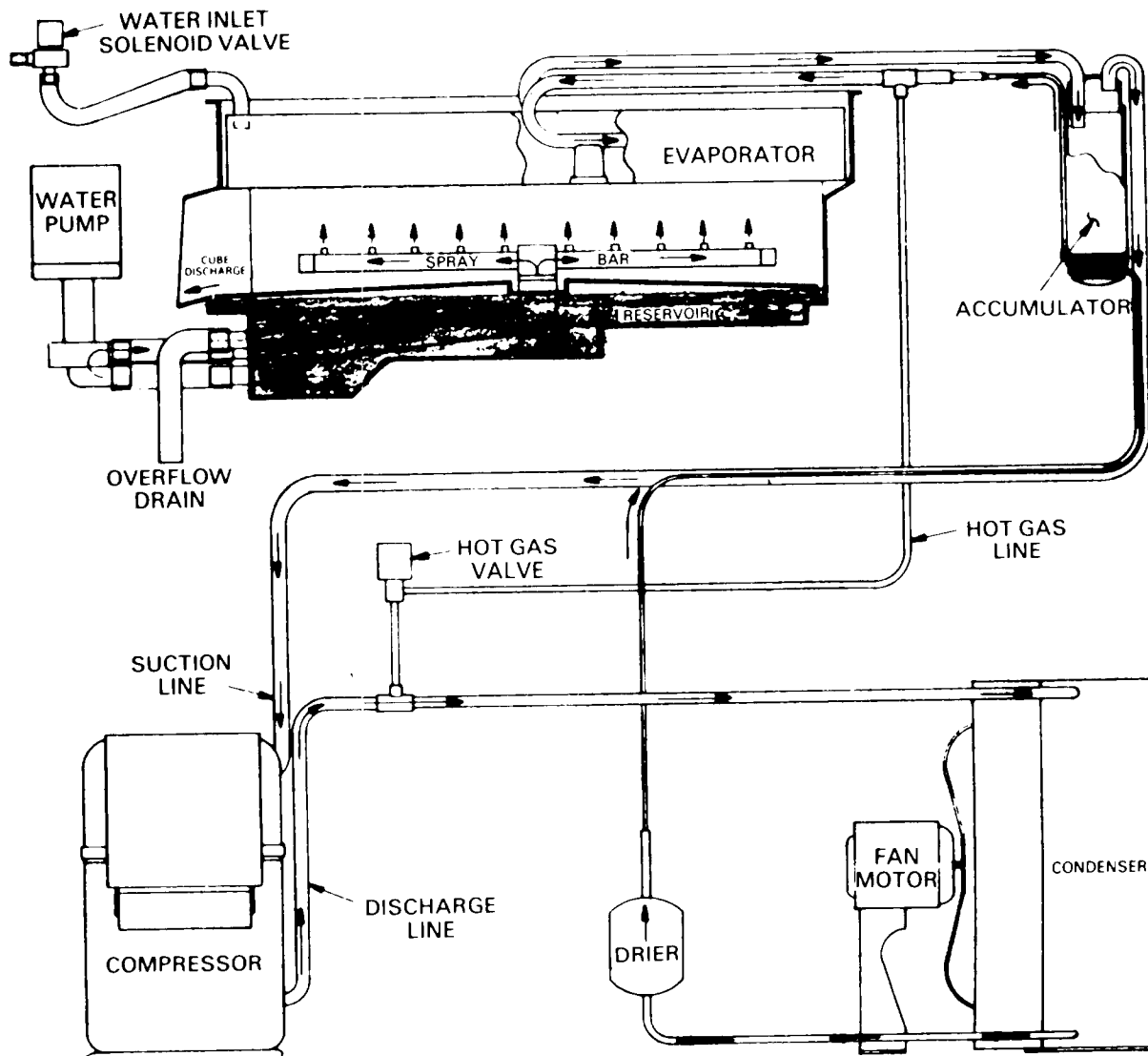
FREEZING CYCLE

As the freezing cycle starts, electrically the components operating are the compressor and fan motor, recirculating water pump and the sprayer tube drive motor.

The refrigerant circuit now seeks a 125-135 pounds head pressure. The suction or low side pressure pulls down fairly quickly to about 25 pounds at which point the ice cubes are starting to form a thin shell in cube cups. Continuing from 25 pounds slowly on down towards the finished cube pressure of approximately 5 pounds takes an average of 20-30 minutes.

During this portion of the freezing cycle the electrical brain is the reverse acting, cube size thermostat. This thermostat electrically is holding the freezing cycle components "live". When the ice cubes are about 3/4 formed, the decreasing suction pressure and temperature, activate the temperature sensing bulb of the reverse acting, cube size control, closing its contacts. This does not interrupt the freezing cycle, the closing of the cube size thermostat contacts electrically transfers the finishing of the freezing cycle to the finishing clock motor or timer as it is sometimes called. One full revolution of the timer dial is 8 minutes. However, of the total 8 minutes on the timer dial, 2 minutes are used for the defrost or harvest cycle.

This means then that after the cube size contacts close they activate the timer motor. This control takes over and continues freezing cycle for another 6 minutes with timer dial now turning. When the 6 minutes are completed, an offset in the timer dial allows a micro switch with activating arm riding on that cam to drop into the slot, electrically stopping the freezing cycle and starting the 2 minutes harvest cycle. The clock motor continues thru harvest cycle. A notch on the timer dial now lifts micro switch arm up on dial, electrically stopping harvest cycle and starts back into a new freezing cycle.



HARVEST CYCLE

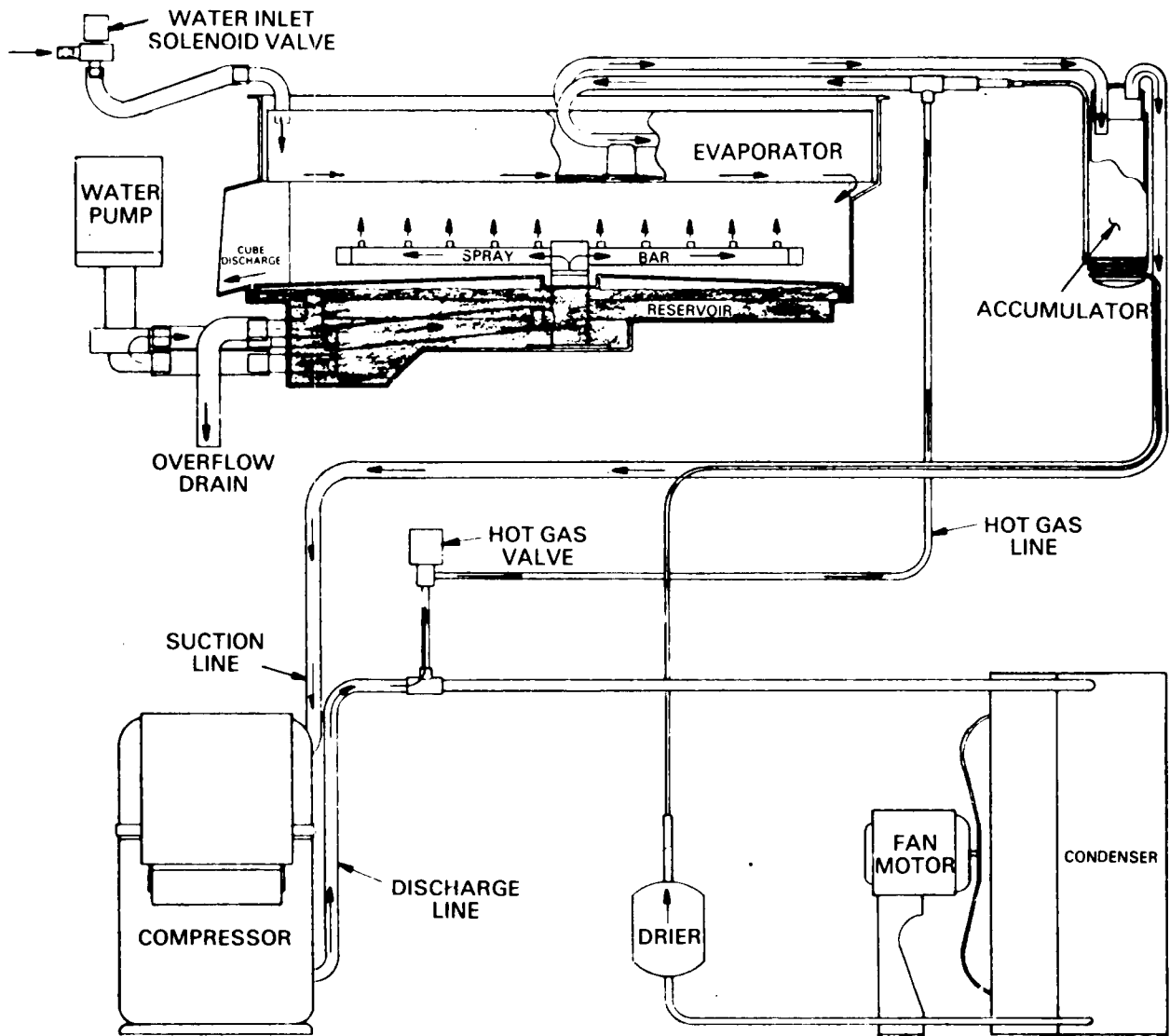
NOTE: Illustration shows single freezer for clarity. MC-40 models have two freezers, one above the other. See Page 33.

When the finishing timer reaches the last 2 minutes of its cycle, the machine defrosts with hot gas from the compressor. Electrically, the components in circuit are the compressor, fan motor, water pump, spray bar drive motor and both the water and hot gas solenoid.

The water flows from the solenoid valve, through the top of the freezing chamber, into the reservoir. The level in the reservoir is controlled by a stand pipe which directs the excess water to the drain. This overflow "washes" the mineral concentration out of the reservoir area.

The refrigerant is now following the path of least resistance. The capillary tube restricts the normal route enough to force hot, uncondensed gas from the compressor to flow through the hot gas solenoid valve. From there it passes directly into the evaporator inlet, through the coils and down the suction line to the compressor.

The cubes, which are released by the hot gas, are ejected through the chute and into the bin by the rotating spray bar. After the two minute defrost, the finishing timer switches the electrical circuit back through the cube size control and a new freezing cycle begins.



SYMPTOM	POSSIBLE CAUSE	SUGGESTED CORRECTION
Unit will not run.	<p>Blown fuse</p> <p>Bin thermostat set improperly</p> <p>Switch in Off position</p> <p>Inoperative master switch</p> <p>Timer contacts open</p>	<p>Replace fuse & check for cause of blown fuse.</p> <p>Replace.</p> <p>Turn switch to On Position.</p> <p>Replace switch</p> <p>Replace timer micro-switch</p>
Compressor cycles intermittently	<p>Low voltage</p> <p>Dirty condenser</p> <p>Air circulation blocked</p> <p>Inoperative condenser fan motor</p> <p>Non-condensable gases in system.</p>	<p>Check circuit for overloading.</p> <p>Check voltage at the supply to the building. If low, contact the power company.</p> <p>Clean with vacuum cleaner, air or stiff brush. (DO NOT use wire brush.)</p> <p>Allow sufficient air space all around unit.</p> <p>Check to see if defective, If defective, replace.</p> <p>Purge the system.</p>
Cubes too small	<p>Cube size control set too high</p> <p>Partially restricted capillary tube</p> <p>Moisture in system</p> <p>Shortage of water</p> <p>Shortage of refrigerant</p>	<p>Lower the setting. Turn towards colder.</p> <p>Blow charge, add new gas & drier, after evacuating system with suction pump.</p> <p>Same as above.</p> <p>See remedies for shortage of water.</p> <p>Check for leaks and recharge.</p>
Cloudy cubes	<p>Shortage of water</p> <p>Dirty water supply</p> <p>Accumulated impurities</p>	<p>See remedies for shortage of water.</p> <p>Use water softener or water filter.</p> <p>Use SCOTSMAN Ice Machine Cleaner.</p>
Shortage of water	<p>Water spraying out through curtains</p> <p>Water entering water tank too slowly</p> <p>Partial restrictions in water strainer.</p>	<p>Hang curtain in proper position.</p> <p>Check pressure at source - 20 lb. required. Dirt in solenoid and flow control - blow out.</p> <p>Clean Strainer.</p>
Irregular size cubes and some cloudy	<p>Some jets plugged</p> <p>Shortage of water</p> <p>Unit not level</p>	<p>Clean jets.</p> <p>See Shortage of Water</p> <p>Water overflowing air vent holes on low side burning cubes. Level as required.</p>

SYMPTOM	POSSIBLE CAUSE	SUGGESTED CORRECTION
Cubes too large	Cube size control turned too cold	Turn setting on cube size control dial towards warmer
Decreased ice capacity	<p>Inefficient compressor</p> <p>High head pressure</p> <p>Non-condensable gas in the system</p> <p>Poor Air circulation or excessively hot location</p> <p>Overcharge of refrigerant</p> <p>Partially restricted cap tube</p>	<p>Replace.</p> <p>Dirty condenser. Clean. Bad fan motor. Replace. Purge the system.</p> <p>Relocate the unit, or provide for ventilation by cutting openings.</p> <p>Correct the charge. Purge off slowly. Purge & replace charge and drier</p>
Hole washed inside cube	Water over the top of the cube cups during harvest.	Level unit.
Poor harvests	<p>Too short defrost time</p> <p>Restriction in incoming water line.</p> <p>Insufficient quantity of hot gas.</p> <p>Water solenoid valve not opening.</p> <p>Air vent holes in upper cube cups plugged</p>	<p>Check and adjust harvest cycle. Timer should be set for 2 minutes.</p> <p>Check water feed line strainer and flow reducing valve. Do not remove flow control washers.</p> <p>Cold ambient - must be 50° minimum. Faulty fan on air cooled models.</p> <p>Solenoid binding or burned out. Replace.</p> <p>Clean out holes.</p>
Unit won't Harvest.	Insufficient water pressure to ice maker.	Machine requires minimum of 20 lbs. flowing water pressure.
Excessive Water in Unit base	<p>Cube chute not positioned correctly.</p> <p>Water tubing leaking (Check during freeze & harvest cycle)</p>	<p>Reposition so that bottom edge of cube chute rests inside of cube guide soldered to the base.</p> <p>Check. Tighten or replace.</p>
Shortage of water in upper freezing chamber	Lower seal in upper freezing chamber defective.	Replace. See inlet water supply drawing in this manual.

MAINTENANCE PROCEDURES SECTION

WARNING: ALL STEPS LISTED BELOW SHOULD ONLY BE STARTED WHEN WATER AND ELECTRICAL SUPPLY ARE OFF TO PREVENT ACCIDENTS.

- A. To remove cabinet top.
 - 1. Remove 4 screws in top of panel.
 - 2. Lift panel off unit.
- B. To remove cabinet front.
 - 1. Remove 2 screws in top front of panel.
 - 2. Tip top of panel back approximately 6" and lift up.
- C. To remove end panels.
 - 1. Remove 2 screws from top of panel.
 - 2. Tip top of panel back 6" and lift up.
- D. To remove water pump.
 - 1. Remove right end panel and front panel.
 - 2. Remove cube chute. (Tip top of cube chute out and lift up. When reinstalling, be sure cube chute rests inside of guide soldered to base.)
 - 3. Drain water from freezer sump tank. (Drain tube is connected to plug on pump.)
 - 4. Trace electrical leads to control box and disconnect.
 - 5. Disconnect hose clamps at pump body.
 - 6. Remove mounting bolt and mounting strap.
 - 7. Remove Pump.

NOTE: Screw clamps should be installed on pump discharge tube when unit is reassembled.

- E. To remove water inlet solenoid valve.
 - 1. Remove right end panel.
 - 2. Disconnect electrical leads.
 - 3. Disconnect water inlet line from machine.
 - 4. Remove valve.
- F. To remove flow controls.
 - 1. Remove top and front panels.
 - 2. Both controls are on common tee at rear wall and retainer junction.
 - 3. Remove 3/8" water line flow nut from top of controls.
 - 4. Pull up and remove two hose clamp connections on outlet side. Controls now free.

NOTE: This machine will not function properly with the flow washers removed. Flow washers are rated at .30 GPM for MCL-MCS models, .50 GPM for MCM models.

- G. To remove agitator motor.
 - 1. Remove front panel, right end panel and top panel if possible.
 - 2. Trace leads to control box and disconnect.
 - 3. Remove cube chute (Tip top of cube chute out and lift up. When reinstalling be certain cube chute rests inside of guide soldered to base.)
 - 4. Reach in thru curtained opening and remove spray bar by lifting upward releasing bar from center hub. Next remove drive fork from drive shaft attached to motor. (NOTE: Drive fork has left hand threads and must be removed with drive extension to motor if top panel is not removed from unit.)

5. Remove 4 screws holding drive motor to freezer top.
6. Remove drive motor.

H. To remove Cube size control.

1. Remove front panel and right end panel.
2. Remove 2 screws mounting control to corner gusset.
3. Trace capillary tube to suction line and peel back insulating tape

NOTE: Do not make any adjustments on new control until control bulb has been reinsulated to suction line.

I. To remove bin control.

1. Remove front panel and right end panel.
2. Remove 2 screws holding control to corner gusset.
3. Trace capillary tube to insure new control capillary tube is routed in same manner.

NOTE: Do not attempt to adjust this control. If storage bin is not filling to the capillary or is filling above the capillary into the cube chute, the control should be replaced.

J. To remove plastic curtain.

1. Remove right end panel.
2. Remove plastic cube chute. (Tip top of chute out and lift up. When reinstalling be certain cube chute rests inside of cube guide soldered to the base.)
3. Pull off 3 retainer clips holding curtain in place.

NOTE: When reinstalling curtain be certain the side with the extruding point is positioned towards the left of opening. Also, that the edge of the curtain lines up with the upper edge of the freezer opening.

K. To remove spray bars.

1. Remove right end panel.
2. Remove cube chute. (Tip top of cube chute out and lift up.)
3. Remove plastic curtain.
4. Reach thru ice opening and feel for spray bar.
5. Follow spray bar to center hub, turn spray bar so one end points towards curtain opening.
6. Lift straight up on spray bar, then out after spray bar comes off center hub.

NOTE: Upper spray bar must interlock on drive pins when reinstalled.

L. To remove upper freezing chamber sump tank.

1. Remove front panel and right end panel. If possible, remove top panel.
2. Remove agitator motor. NOTE: It is not necessary to disconnect electrical leads in control box.
3. Remove drive fork from spray bar drive in upper and lower freezing chambers.
4. Remove tygon tubes from pump to freezing chamber and set aside.
5. Unscrew harvest water fitting in rear right hand corner of freezing chamber assy.
6. Remove cube chute.
7. Disconnect water line from flow controls to freezers.
8. Remove 4 screws holding upper freezer to back panel. Do not remove lower four screws.
9. Remove front bracket attached to lower freezing chamber. It is not necessary to remove upper bracket from upper freezing chamber.
10. Lift whole freezing chamber up and prop in place using two 2 x 4 on edge between lower chamber and upper chamber. Remove E ring in spray bar drive shaft. (See page 34 for exact location of E ring.)
11. Remove 2 x 4's.
12. Reach in thru upper ice chute opening, lift up spray bar drive. Insert half of 5/8 ID 4-1/4 inches long to hold drive shaft up.
13. Reach right hand thru ice opening and gently force evaporator assembly up and out of freezer sump. As bottom of evaporator clears the front of freezer sump, pivot freezing chamber sump out of machine.

NOTE: When replacing the foamed plastic chamber, with a new plastic chamber, it is necessary to drill holes thru the front freezer bracket and the back panel into the bracket foamed onto the freezer assy. Drill depth must not exceed 3/8". Freezer assy should slope 3/8" down towards the ice cube opening. [

FUNCTIONAL PARTS AND MAINTENANCE

PART NAME: Spray Bar Assemblies
NUMBER: A-25480-001 Upper and Lower.
FUNCTION: These tubes act as water distributors for the ice cube cups. Each tube has jets over its length. Supply water is forced into the jet tubes by the sump pump and is directed upward in a continuous stream. Drive motor thru drive shaft rotates the spray bars to get a full coverage spray.

REPAIRABLE: Yes, on rubber tips.

MAINTENANCE: All jets should be cleaned by running Scotsman Ice Machine Cleaner through unit. This step will eliminate hand cleaning. Partially plugged jets will produce cloudy or partial cubes. Wholly plugged jet will not produce a cube in cube cups it normally covers.

PART NAME: Spray Tube Drive Linkage
NUMBER: Parts listed in parts section.
FUNCTION: Drive spray tubes during freezing cycle to produce clear cubes and also drive spray tubes during harvest cycle to eject cubes thru ice opening.

REPAIRABLE: No. replace defective parts.

MAINTENANCE:None.

PART NAME: Relay — Ameco or Potter Brumfield — 2 P.D.T.
NUMBER: 12-1879-02
FUNCTION: Relay is used as a by-pass on the bin thermostat when it tries to cut unit off on a full bin of cubes during a freezing cycle. This insures full cubes every time a harvest occurs and prevents short cycling on bin thermostat.

SETTING: Factory set.

REPAIRABLE: No. Replace when inoperative.

MAINTENANCE:Check electrical connections.

PART NAME: Bin Thermostat
NUMBER: 11-353-3
FUNCTION: To automatically cut machine off when ice level in storage bin reaches thermobulb. Automatically starts machine when ice level in bin falls below bulb location.

SETTING: Factory set.

REPAIRABLE: No. Replace when inoperative or out of adjustment.

MAINTENANCE:Check capillary for cracks or worn spots due to vibration.

NOTE: Hold an ice cube against thermostat capillary tube to check operation of the control.

PART NAME: Inlet Water Solenoid
NUMBER: 12-1434-1
FUNCTION: During freezing cycle this valve is closed, keeps water from entering sump tank and also from leaking out of tank.
During harvest or defrost cycle this valve opens and allows inlet water to pass thru flow control orifice and thence to push water across back of cup molds, to assist the hot gas in defrosting cubes.
SETTING: Factory set.
REPAIRABLE: Yes
MAINTENANCE: Flush control each six months.

PART NAME: Fan Motor - Morrill SP-B6 PEM -1
NUMBER: 12-1575-01 (115/60/1)
6 Watt - 2 per unit.
FUNCTION: Maintain proper head pressures by circulating air across air cooled condenser.
REPAIRABLE: No.
MAINTENANCE: None.

PART NAME: Water Regulating Valve (Water cooled models only)
NUMBER: 11-198 – Penn Type V46AA-12
FUNCTION: To maintain constant head pressures by regulating amount of incoming water thru water cooled condenser.
REPAIRABLE: No. however, valve can be flushed out.
MAINTENANCE: None.

PART NAME: Hermetic Motor Compressor — Copelaweld YSB4-0150-CFV-207
NUMBER: 18-4300-02 (230/60/1) or (208/60/1).
FUNCTION: Circulates and retrieves refrigerant throughout entire system.
MAINTENANCE: Keeps clean and free of dust, grease, etc.
18-4300-03 (208-220/60/3) Copelaweld YSB4-0150-TFC-202

PART NAME: Contactor

NUMBER: 12-820-1 (-4 & -10 voltage) 12-739-1 (-9 voltage)

FUNCTION: Across the line contactor used to provide protection for hi voltage compressor only. Contactor is wired so any of the controls in pilot circuit such as bin thermostat will cause contactor holding coil to drop contact points when actuated. There are no overloads or resets on this control.

SETTINGS: Factory set, no adjustments necessary.

REPAIRABLE: No. Replace.

MAINTENANCE: Check control for loose electrical connections and blow free any dust, dirt, etc.

PART NAME: Cube Size Control 11-345-02

NUMBER: 11-345-02

FUNCTION: Reverse acting temperature control, closes on temperature decrease, opens on temperature rise. Control determines length of freezing cycle and by the same token, the cube size. A lower setting on control will produce larger cubes, a higher setting, smaller cubes. This control actuates time clock motor, which then takes over balance of freezing cycle (6 minutes) and also defrosts period 2 minutes.

SETTINGS: Adjustable by screw driver slot.

REPAIRABLE: No. Replace when inoperative.

MAINTENANCE: Check electrical connections. Blow points free of dust, dirt, lint, etc.

PART NAME: Sump Pump

NUMBER: 2 per unit — 12-1930-01

FUNCTION: Recirculating pump used to pump supply water in reservoir to jet tubes during freezing cycle. and harvest cycle.

SETTING: Factory set.

REPAIRABLE: Yes, see parts breakdown.

MAINTENANCE: Flush out reservoir and sump pump intake with Scotsman ice machine cleaner.

PART NAME: Agitator Drive Motor – Merkle Korff

NUMBER: 12-1824-01

FUNCTION: This motor is used to drive the linkage mechanism which in turn drives the rotating jet spray tubes. This provides a constant spray movement to all the inverted cube molds and by so doing also aerates the water producing clear, solid Scotsman cubes. Also ejects cubes thru ice opening during harvest cycle.

SETTING: No settings on motor.

REPAIRABLE: Yes - to some extent. Not recommended although front bearings and windings could possibly be replaced by electric motor shop. Normally replace motors.

MAINTENANCE: Oil every six months or less as use indicates. Use SAE 20 oil. There are wick oil cups on the motor and a gear case slotted screw which has to be removed to add or change oil in gear case proper. Drive linkage should be inspected to insure free movement with no bindings or drag on drive motor.

PART NAME: Time-Finishing Clock — Assembled by Queen Products Div.

NUMBER: 12-1980-01

FUNCTION: Heart of cyclematic control system is the reverse acting cube size control, No. 11-345-02, and the time clock it actuates. All electrical components are connected to the time clock printed circuit board and are shunted by means of a double pole single throw micro-switch to either the freezing cycle or harvest cycle. Micro-switch is in turn actuated by a cam that is directly connected to the electric timer clock motor. Timer has 8 minute cycle, 6 minutes on freezing cycle after being cut on by low temperature control and 2 minutes on defrost cycle.

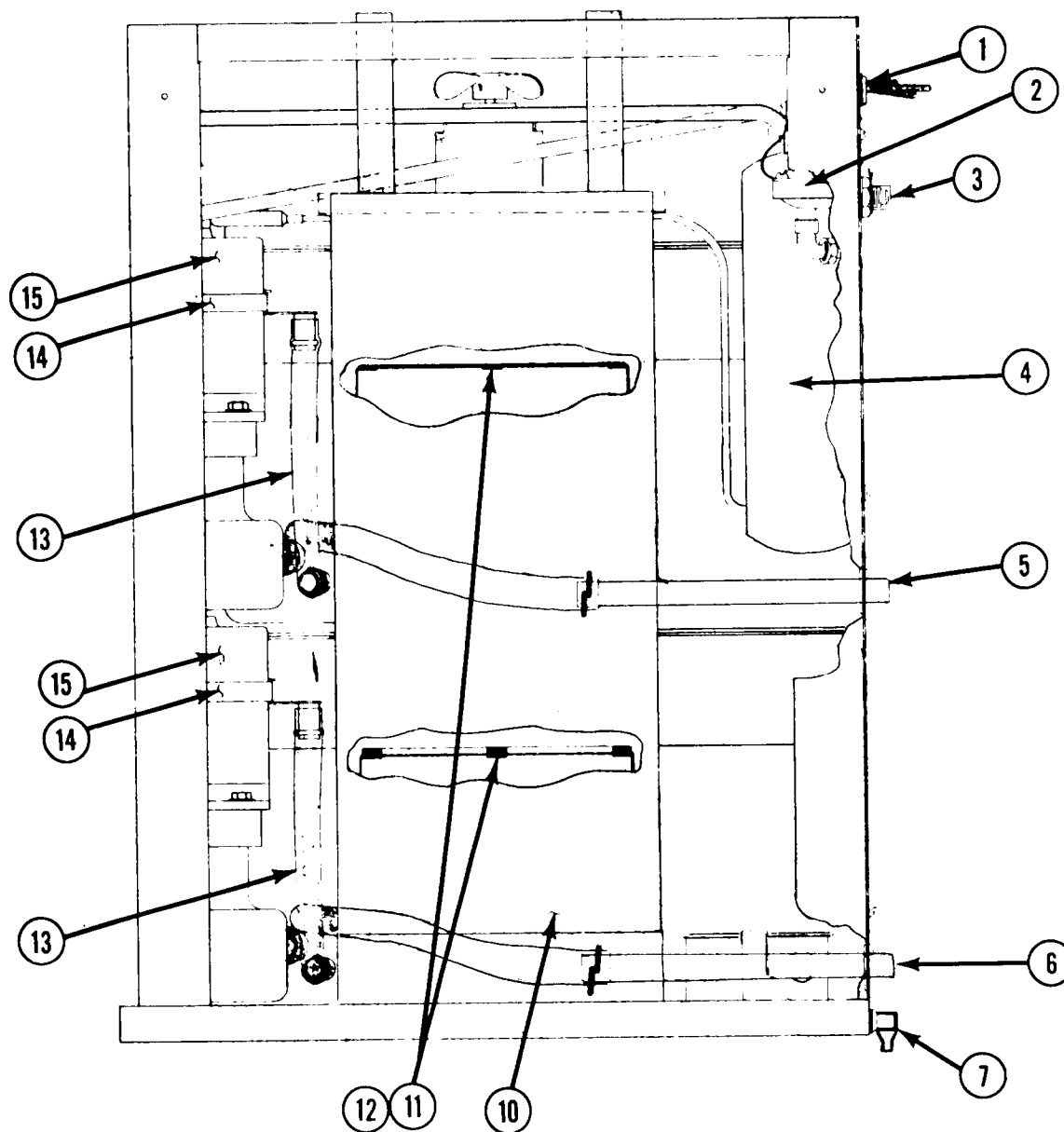
The cam assembly on the timer consists of two discs which can be adjusted to lengthen or shorten the defrost cycle.

SETTING: Normal setting for defrost is 2 minutes.

REPAIRABLE: Yes. Part No. 12-1980-01 is replaceable.

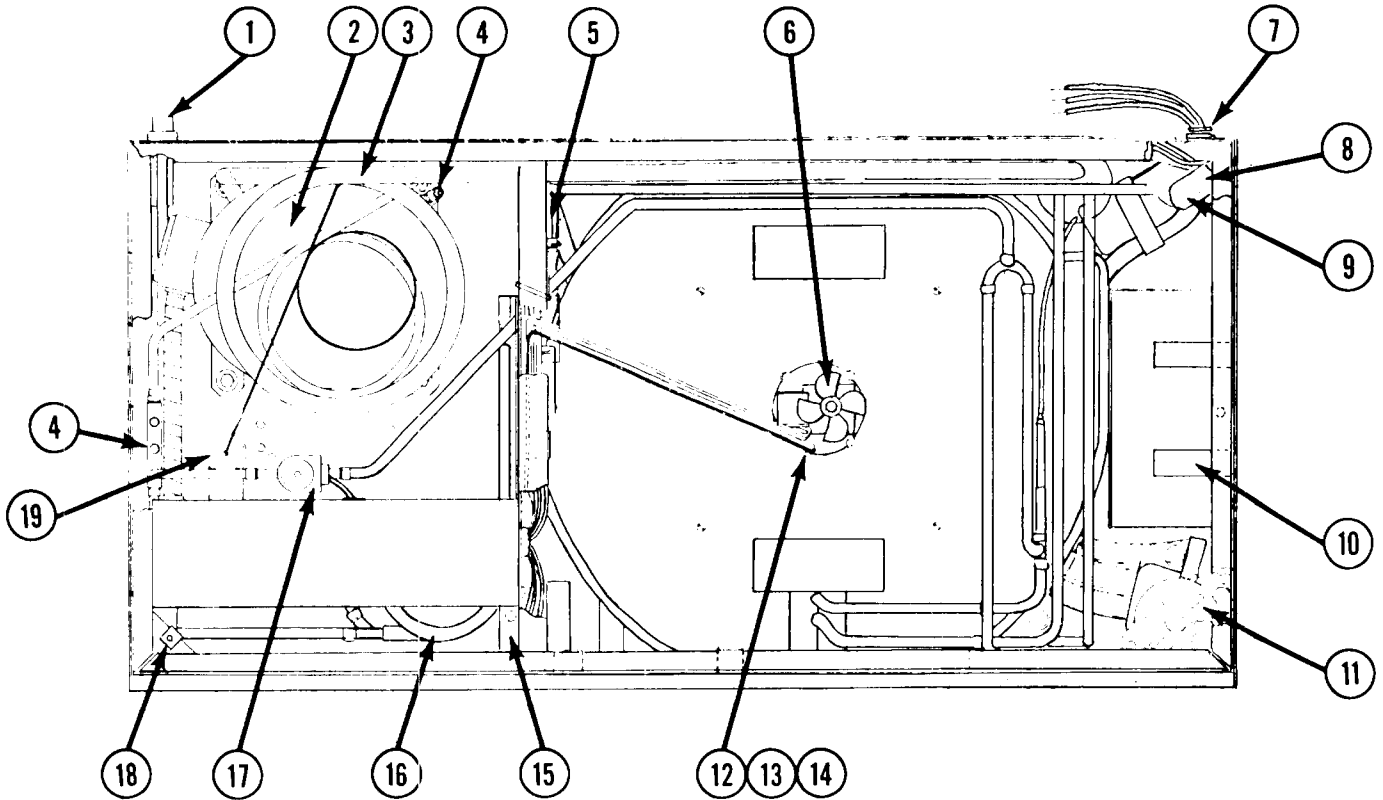
MAINTENANCE: Check all electrical connections, blow contact points free of dust, dirt, etc.

MC40 AIR AND WATER COOLED
Right End View



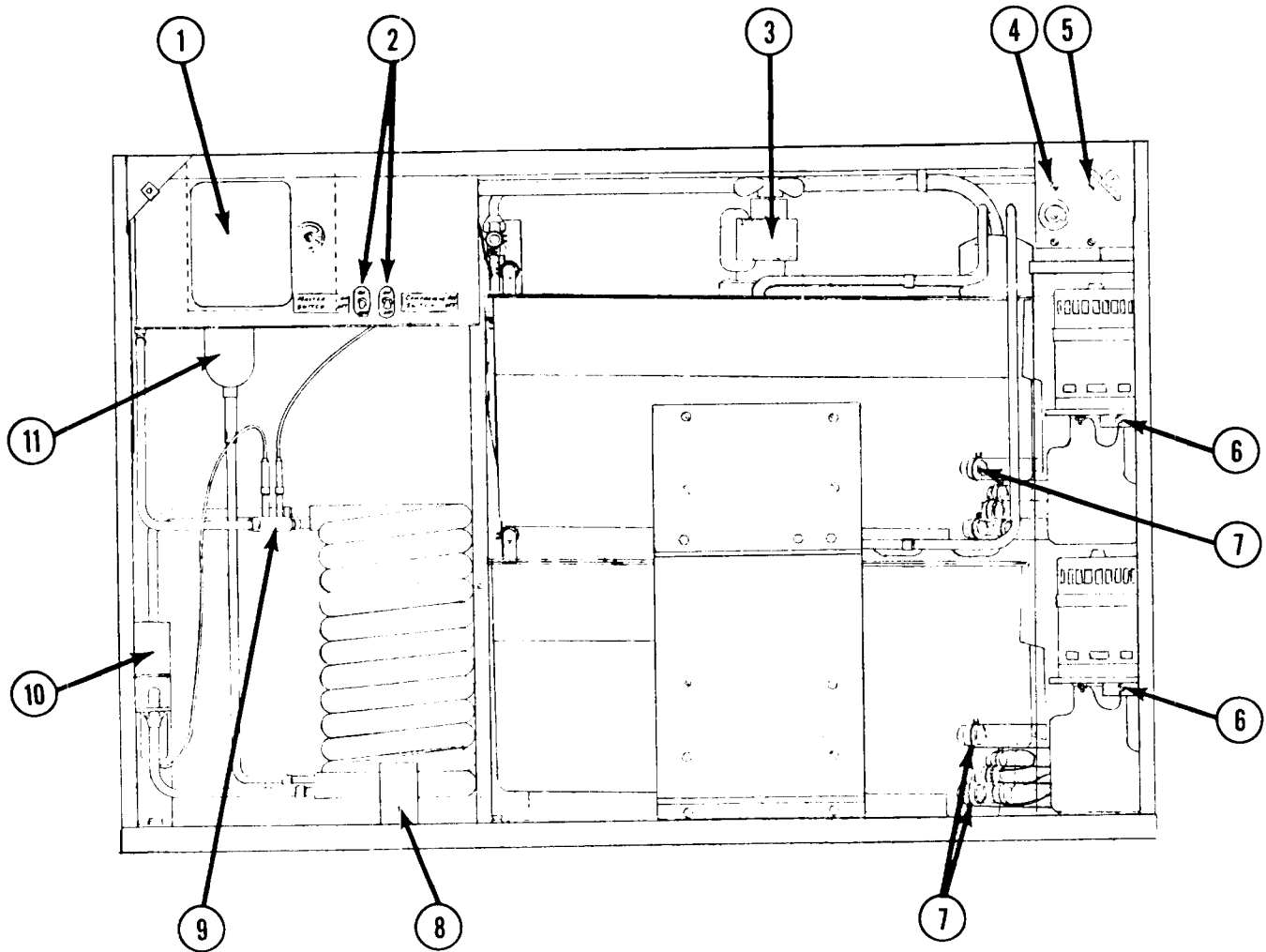
ITEM NO.	PART NO.	DESCRIPTION
1.		Electrical Supply
2.	12-1434-1	Water Inlet Solenoid
3.		Water Hook-up
4.		Refrigerant Accumulator
5.		Upper Freezer Drain
6.		Lower Freezer Drain
7.	2-2296-01	Base Drain Cup
10.	2-2149-01	Cube Chute
11.	2-2038-01	Upper-Lower Curtain
12.	3-1526-01	Curtain Clips
13.		Freezer Drain -- Cleaning
14.	2-706	Pump Clamp
15.	12-1930-01	Water Pump

MC40 WATER COOLED
TOP VIEW



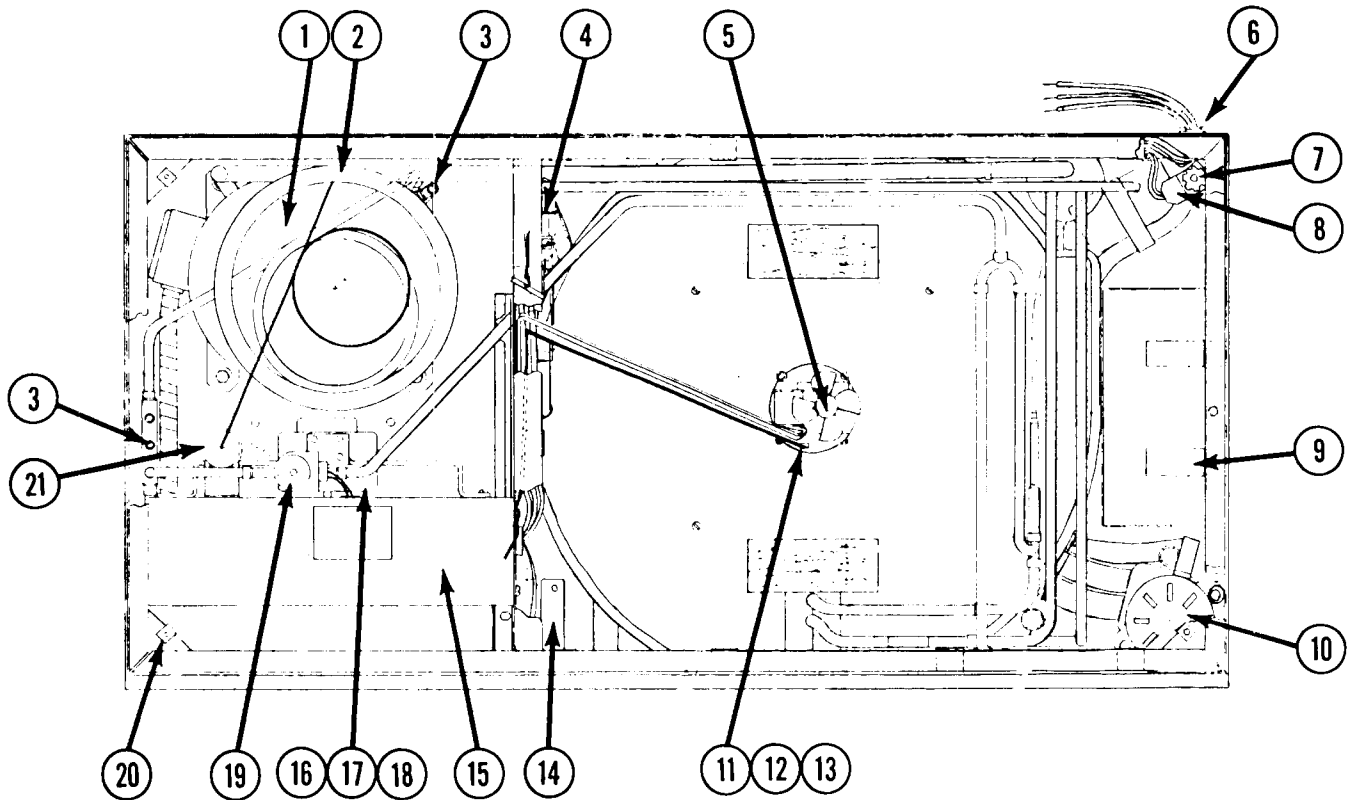
ITEM	PART NO.	DESCRIPTION
1.	Connections	Water In-Out From Condenser
2.	18-4300-02	Compressor 230 or 208/60/1
3.		Suction Line
4.	16-0563-00	Schrader Valve Cap
4.	16-0560-00	Schrader Valve Core
5.	A-25213-002	Flow Controls .30 GPM MCL-MCS
5.	A-25213-001	Flow Controls .50 GPM MCM
6.	12-0675-25	Fan Blade
7.		Water In — Ice Making
8.	12-1434	Water Inlet Solenoid
9.	12-1589-01	Solenoid Cord - Cap.
10.	2-2149-01	Cube Chute
11.	12-1930-01	Water Pump
12.	12-1824-01	Agitator Motor
13.	3-1404-28	Motor Screws 4/Unit
14.	13-176	Motor Gasket
15.		Model - Serial # Plate
16.	18-3306-02	W.C. Condenser
17.	12-2023-01	Hot Gas Solenoid
18.	3-1423-02	Speed Nut
19.	2-0677-01	Drier

MC40 WATER COOLED
FRONT VIEW



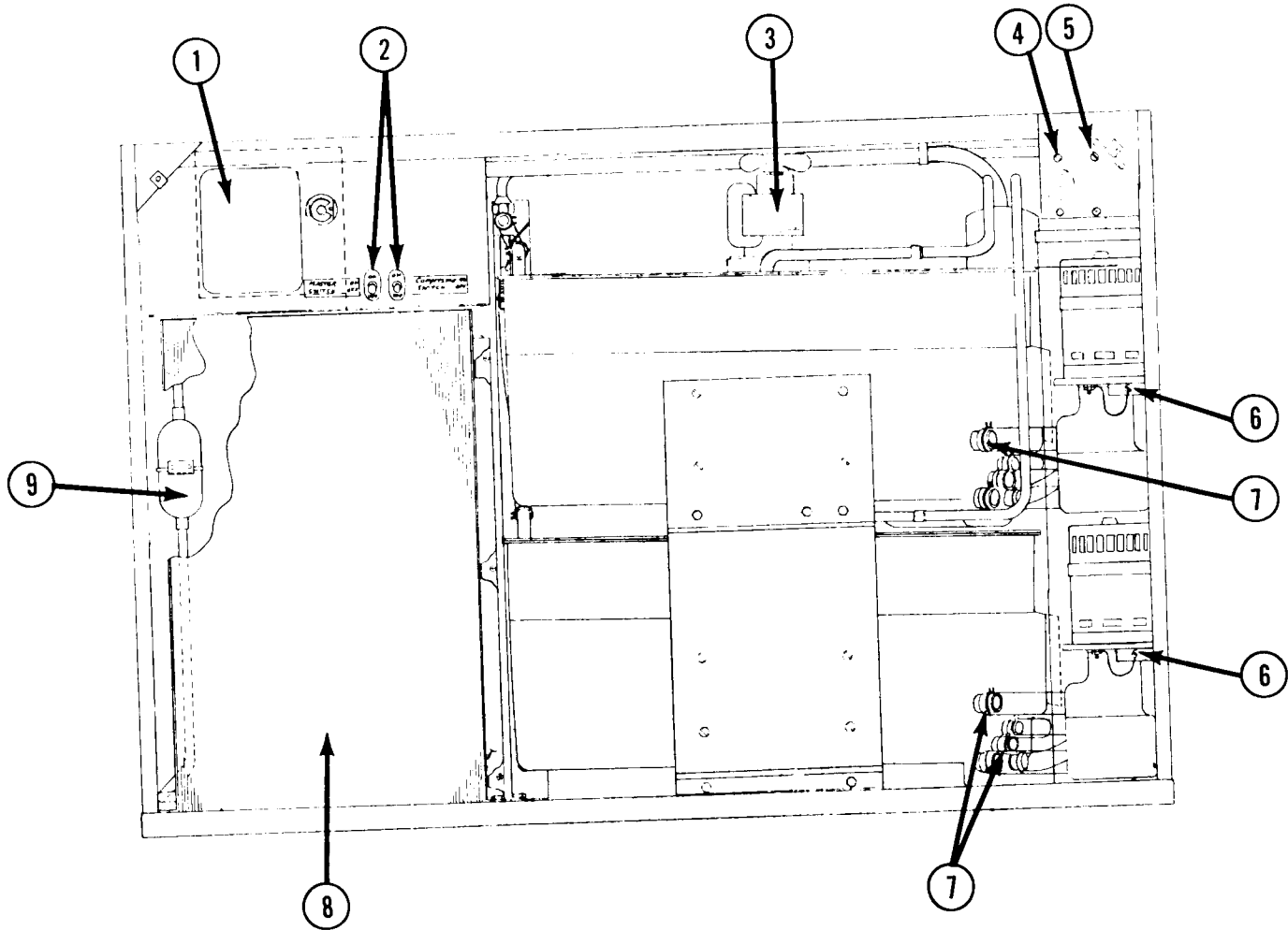
ITEM	PART NO.	DESCRIPTION
1.		Cleaning Instructions
2.	12-426	On-Off Switches
3.	12-1824-01	Agitator Motor
4.	11-345-02	Cube Size Control
5.	11-353-03	Bin Thermostat
6.	12-1930-01	Water Pump
7.	2-1358	Hose Clamps
8.	18-3306-02	Water Cooled Condenser
9.		Processing Tubing
10.	11-198-02	Water Regulating Valve
11.	2-0677-01	Drier

MC40 AIR COOLED
TOP VIEW



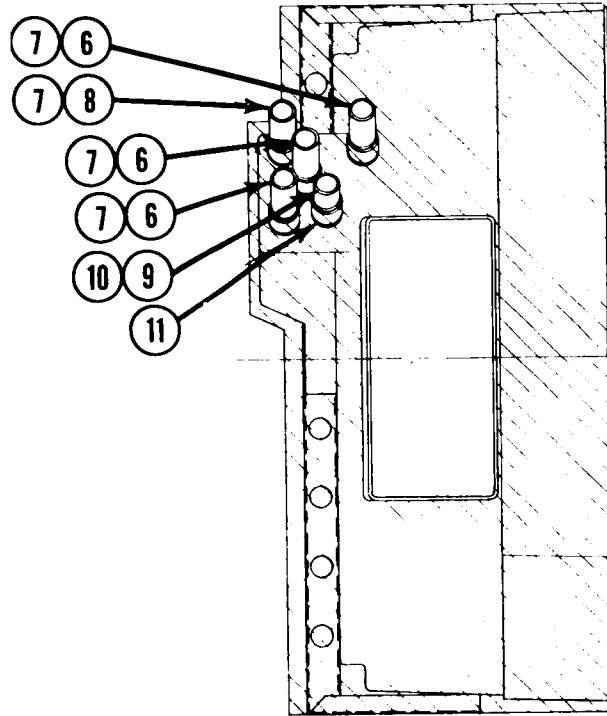
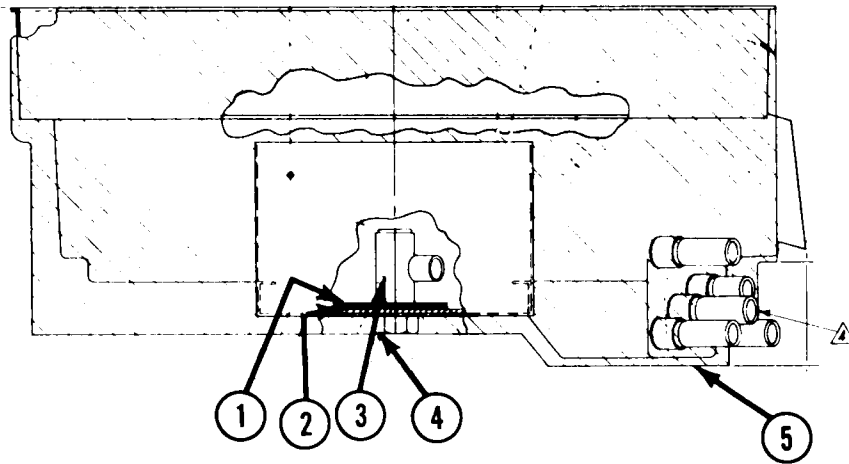
ITEM	PART NO.	DESCRIPTION
1.	18-4300-02	Compressor 208 or 220/60/1
2.		Suction Line
3.	16-0563-00	Schrader Valve Cap
3.	16-0560-00	Schrader Valve Core
4.	A-25213-002	Flow Controls .30 GPM MCL - MCS
4.	A-25213-001	Flow Controls .50 GPM MCM
5.	12-0675-25	Fan Blade
6.		Water In - Ice Making
7.	12-1434	Water Inlet Solenoid
8.	12-1589-01	Solenoid Cord - Cap
9.	2-2149-01	Cube Chute
10.	12-1930-01	Water Pump
11.	12-1824-01	Agitator Motor
12.	3-1404-28	Motor screws 4/Unit
13.	13-176	Motor Gasket
14.		Model - Serial # Plate
15.	18-3709-01	Air Cooled Condenser
16.	12-1575-01	Fan Motor 2/Unit
17.	18-0231-00	Fan Blade 2/Unit
18.	A-26174-001	Fan Motor Mount 2/Unit
19.	12-2023-01	Hot Gas Solenoid
20.	3-1423-02	Speed Nut
21.	2-0677-01	Drier

MC40 AIR COOLED
FRONT VIEW



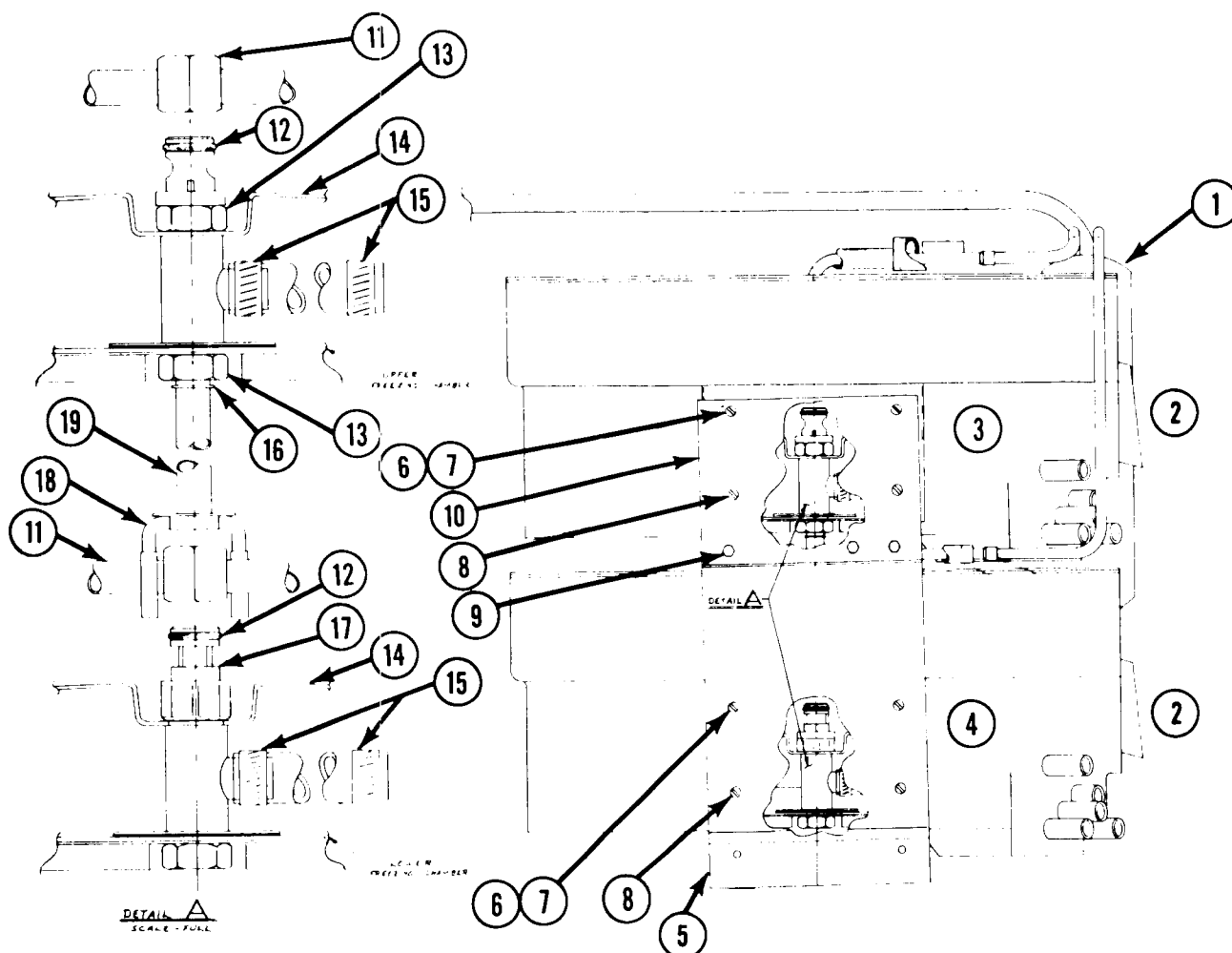
ITEM	PART NO.	DESCRIPTION
1.		Cleaning Instructions
2.	12-426	On-Off Switches
3.	12-1824-01	Agitator Motor
4.	11-345-02	Cube Size Control
5.	11-353-03	Bin Thermostat
6.	12-1930-01	Water Pump
7.	2-1358	Hose Clamps
8.	18-3709-01	Air Cooled Condenser
9.	02-0677-01	Drier

FREEZER CHAMBER – SUMP



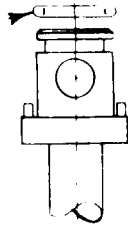
ITEM NO.	PART NO.	DESCRIPTION
1.	A-23827-01	Metal Plate Support
2.	3-1409-11	Rubber Washer
3.	2-2121-01	Water Inlet Housing
4.	2-2122-01	Plug Nut
5.		Foam Insulation
6.	2-2080-01	Tube - Male
7.	2-2081-01	Tube - Female
8.	2-2082-01	Tube - Pump Pick-up Position With Opening Down
9.	2-2125-01	90° Standpipe - Position up
10.	A-24379-01	Tube - Female
11.	13-617-02	O-Rings - 5/Unit

COMPLETE FREEZER ASSEMBLY
MC40 Models



ITEM NO.	PART NO.	DESCRIPTION
1.		Suction Cap Tube Line
2.		Cube Chute Openings
3.		Upper Freezer
4.		Lower Freezer
5.	A-24500-01	Front Lower Mount Plate
6.	3-1404-18	Screw
7.	3-1417-05	Lock Washer
8.	3-1360-00	Screw
9.	3-571-00	Screw
10.	A-24502-01	Front Upper Mount Plate
11.	A-25480-1	Spray Bar
12.	13-617-25	O-Ring
13.	A-23910-01	Bushing Seal Assembly
14.	2-2028-01	Inner Pan
15.	2-179	Screw Clamp
16.	3-1559-01	E-Ring
17.	2-2120-01	Spray Bar Bearing
18.	2-2194-01	Drive Fork
19.	A-24518-01	Drive Water Tube

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②

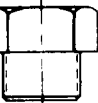


Grove for "E" Ring.

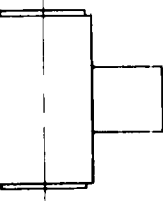
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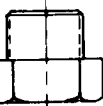
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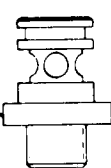
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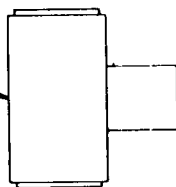
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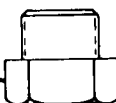
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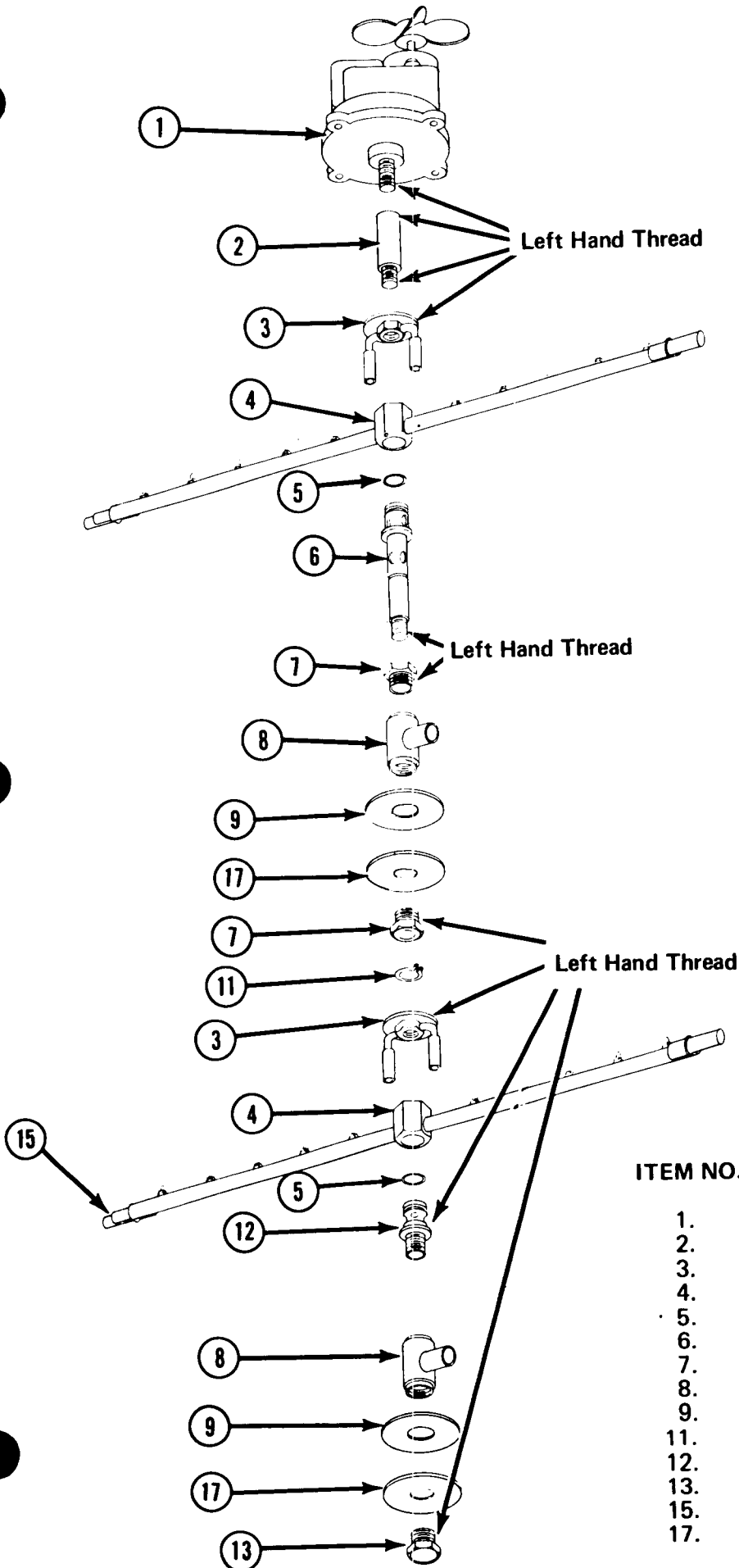


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INLET WATER SUPPLY ASSEMBLY

ITEM NO.	PART NO.	DESCRIPTION
1.	13-0617-25	"O" Ring
2.	A24518-001	Water Tube Fab. Ass'y
3.	13-0168-00	Water Seal
4.	A23910-001	Nut-Bushing Ass'y with Seal (Left Hand Thread)
5.	2-2121-01	Inlet Housing Fab. Ass'y (Left Hand Threads)
6.	2-2120-01	Jet Bearing (Left Hand Thread)
7.	2-2122-01	Bottom Plug (Left Hand Thread)

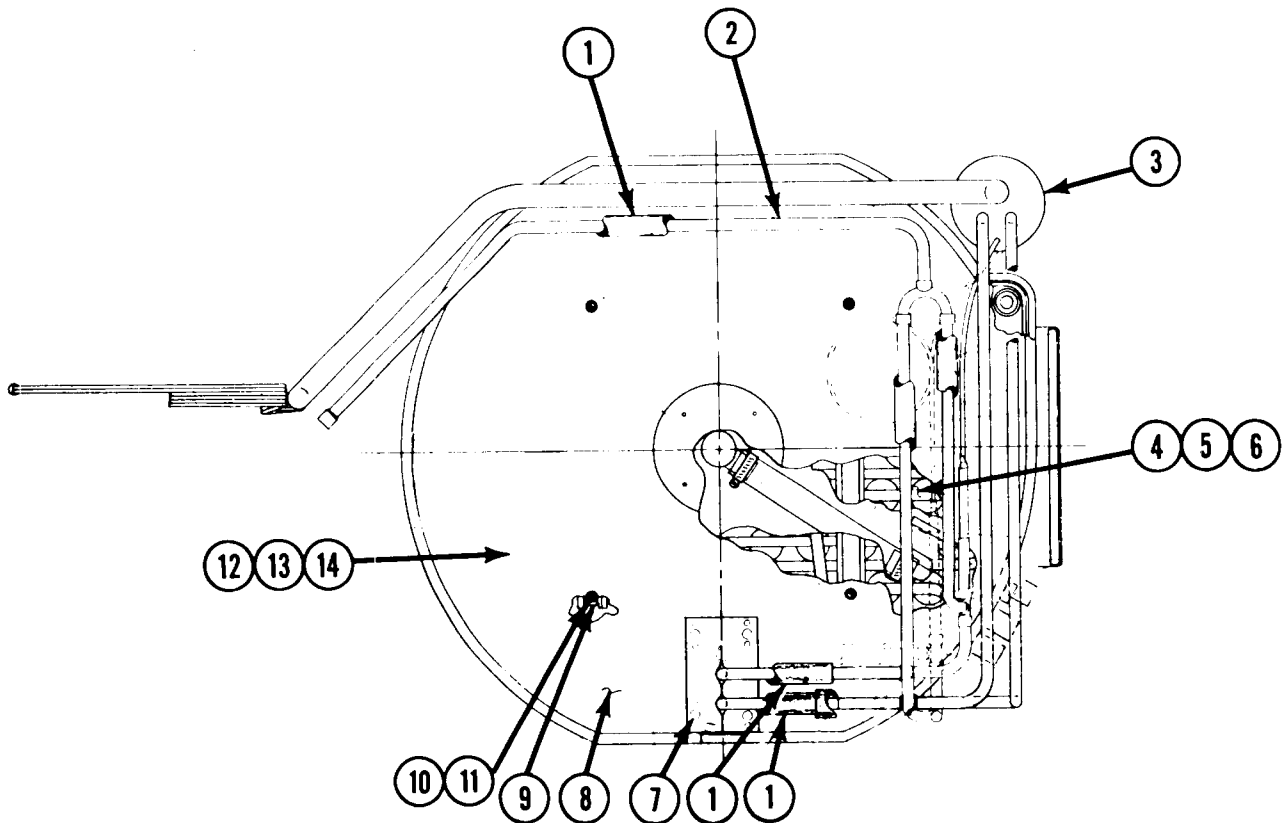


MC40 CUBER
DUAL DRIVE ASSEMBLY

All thread are left hand.

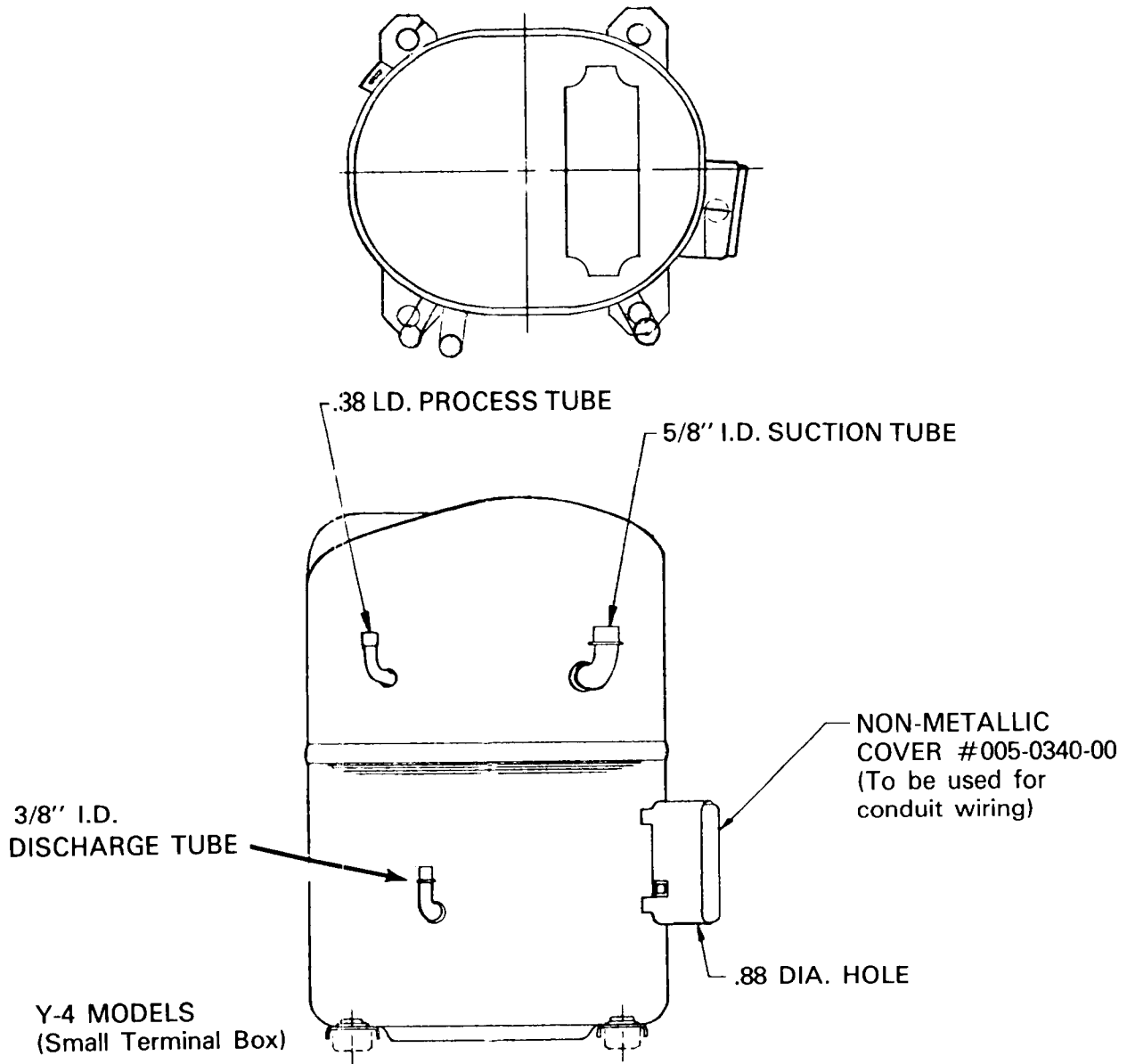
ITEM NO.	PART NO.	NAME
1.	12-1824-01	Agitator - Drive Motor
2.	A-23830-01	Drive Shaft - Upper
3.	2-2194-01	Drive Fork
4.	A-25480-1	Spray Bar
5.	13-0617-25	O-Ring
6.	A24518-001	Water Tube Fab. Ass'y
7.	A-23910-001	Nut-Bushing Ass'y
8.	2-2121-01	Inlet Housing Ass'y
9.	A-23827-001	Support Plate
11.	3-1559-01	Retainer Ring
12.	2-2120-01	Jet Bearing Shaft
13.	2-2122-01	Bottom Pan Plug
15.	13-0653-00	Rubber Tips
17.	03-1409-11	Rubber Washer

FREEZER ASSEMBLY MC40



ITEM NO.	PART NO.	DESCRIPTION
1.		Rubber Insulation
2.		Hot Gas Line
3.	A-25234-01	Cap Tube - Suction Line Assembly
4.	A-23803-01	Cup Platen For MC40 S
5.	A-23880-01	Cup Platen For MC40 M
6.	A-24129-01	Cup Platen For MC40 L
7.	2-2065-02	Hole Plug
8.	2-2124-01	Cover Insulation
9.	3-1422-04	Speed Nut
10.	A-24830-01	Centering Washer
11.	3-1404-10	ST ST Screw
12.	13-756-01	Rubber Cupholder MC40 S
13.	13-757-01	Rubber Cupholder MC40 M
14.	13-758-01	Rubber Cupholder MC40 L

COPELAWELD COMPRESSOR



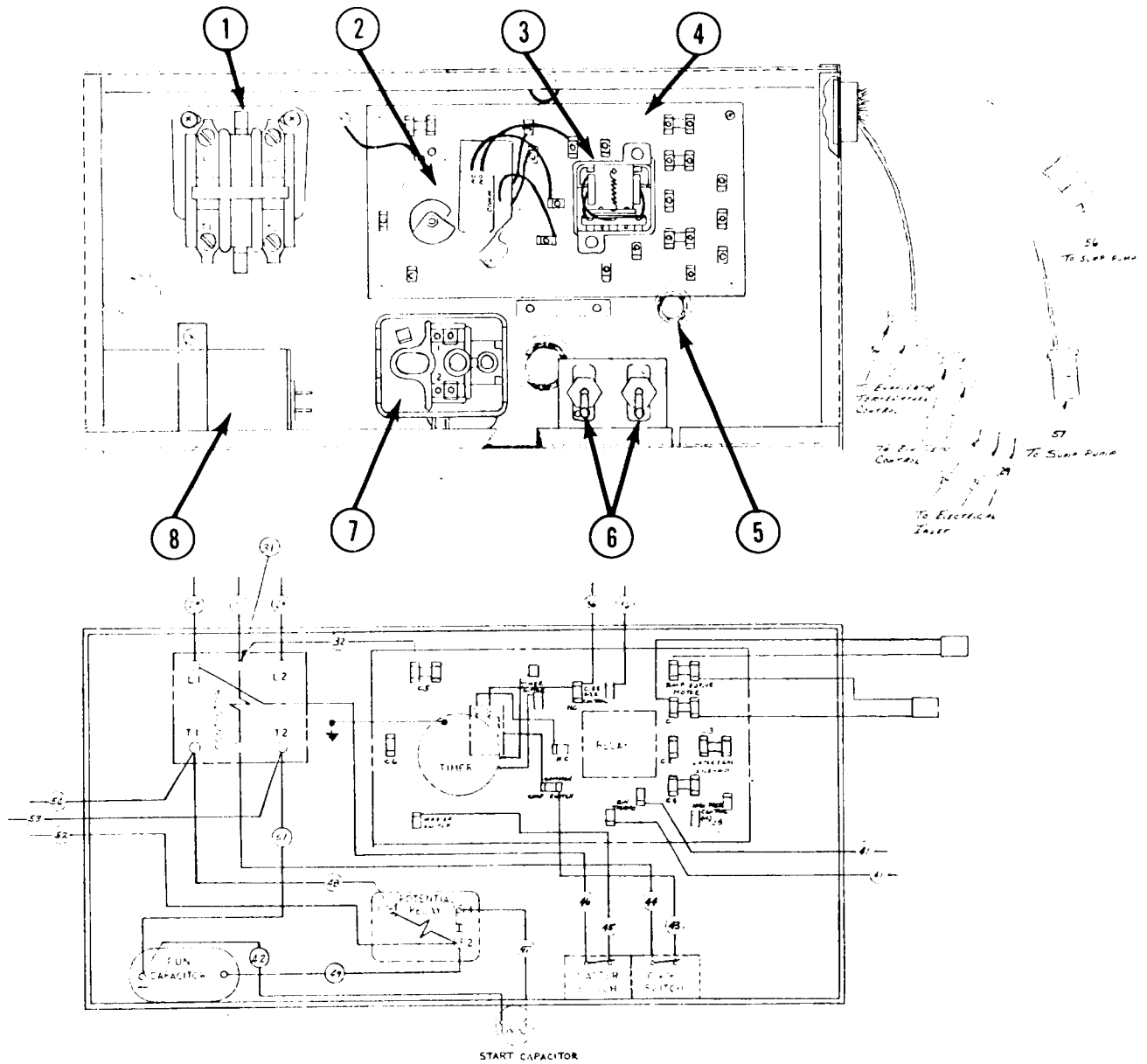
**208/60/1 or 230/60/1
Air or Water Cooled**

- | | |
|------------|---------------------------------|
| 18-4300-02 | Compressor Cope # YSB4-0150-CFV |
| 18-1903-34 | Potential Relay |
| 18-1902-45 | Capacitor — Run |
| 18-1901-23 | Capacitor — Start |

**208-220/60/3
Air or Water Cooled**

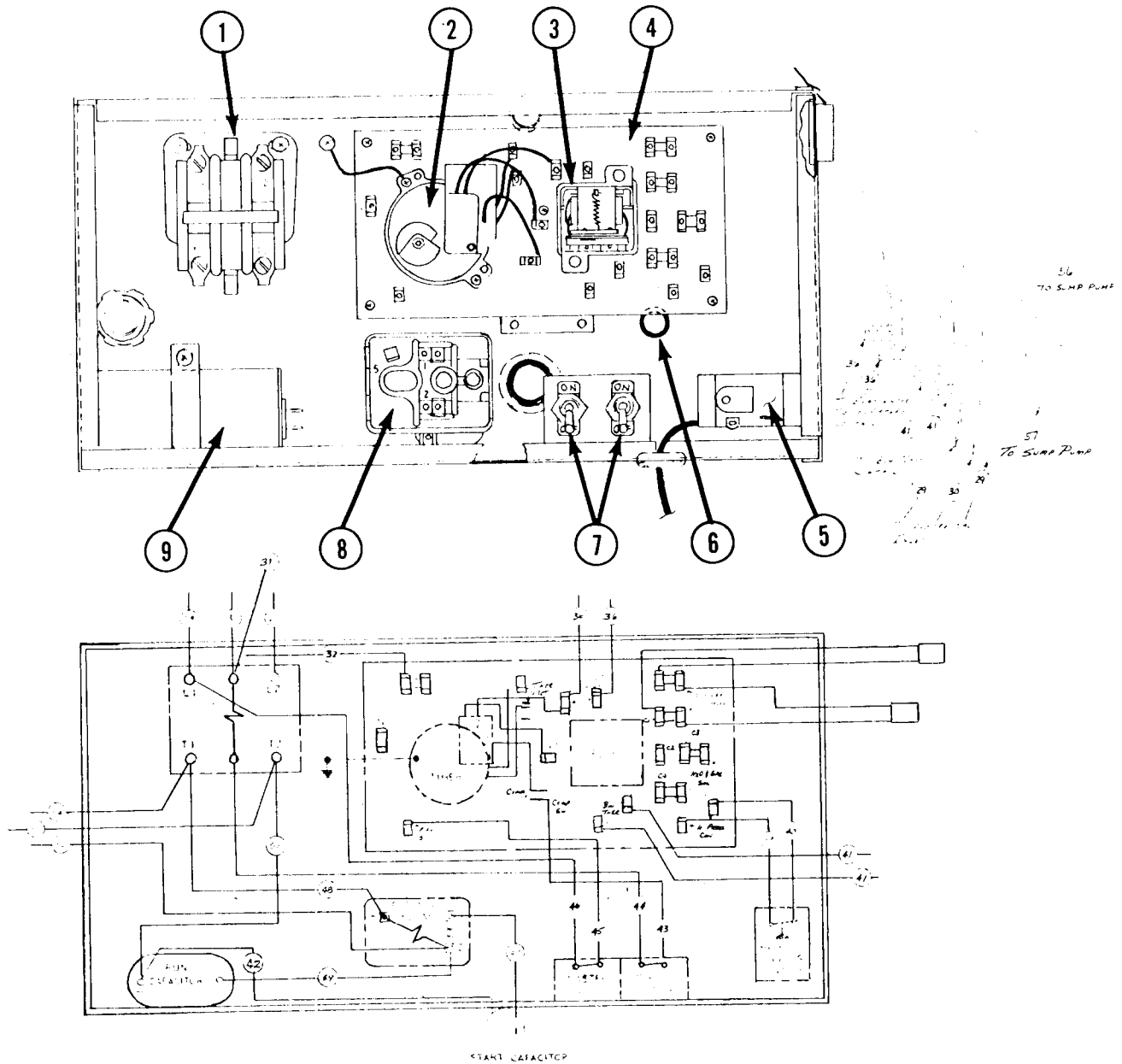
- | | |
|------------|-----------------------------------|
| 18-4300-03 | Compressor — Cope # YSB4-0150-TFC |
|------------|-----------------------------------|

CONTROL BOX — AIR COOLED
208-230/60/1



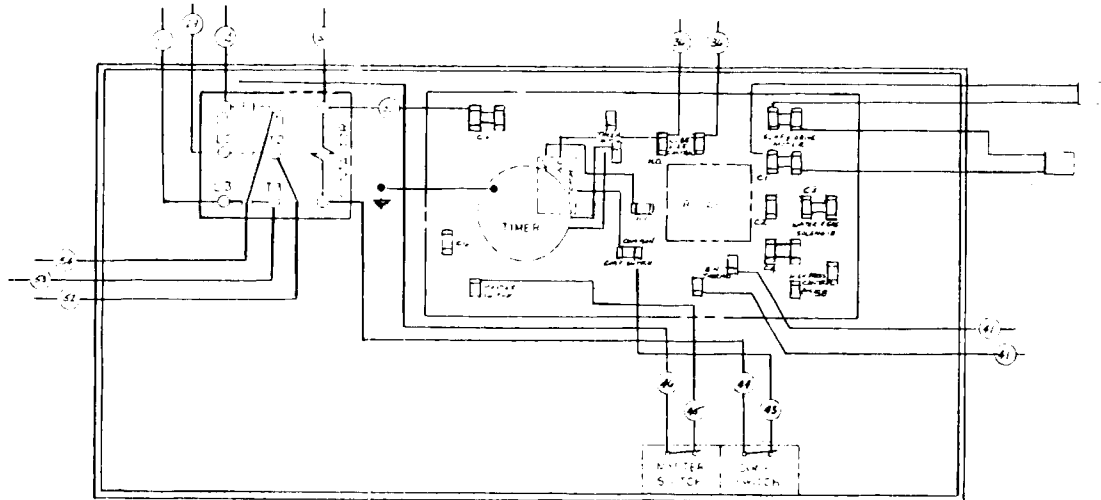
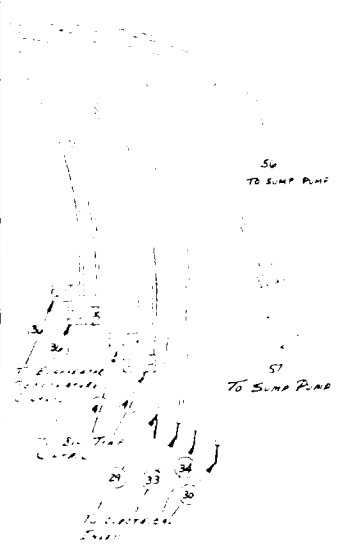
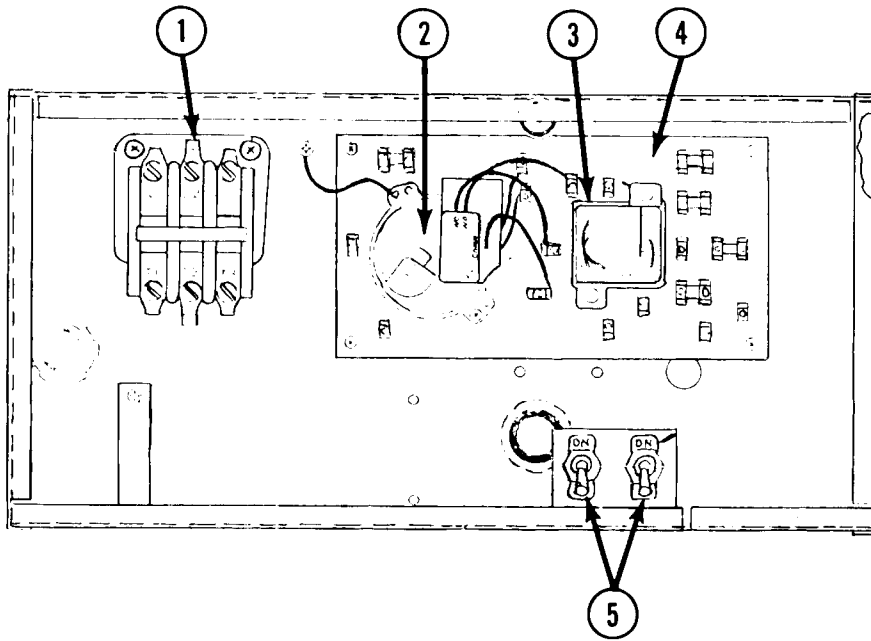
ITEM	PART NO.	DESCRIPTION
1.	12-820-01	Contactors
2.	12-1980-01	Timer
3.	12-1879-02	Relay
4.	12-1912-01	P.C. Board
5.	18-1901-23	Capacitor Start (On Back of Control Box)
6.	12-426-01	On - Off Switches
7.	18-1903-34	Relay - Compressor
8.	18-1902-45	Capacitor — Run

CONTROL BOX — WATER COOLED
208-220/60/1



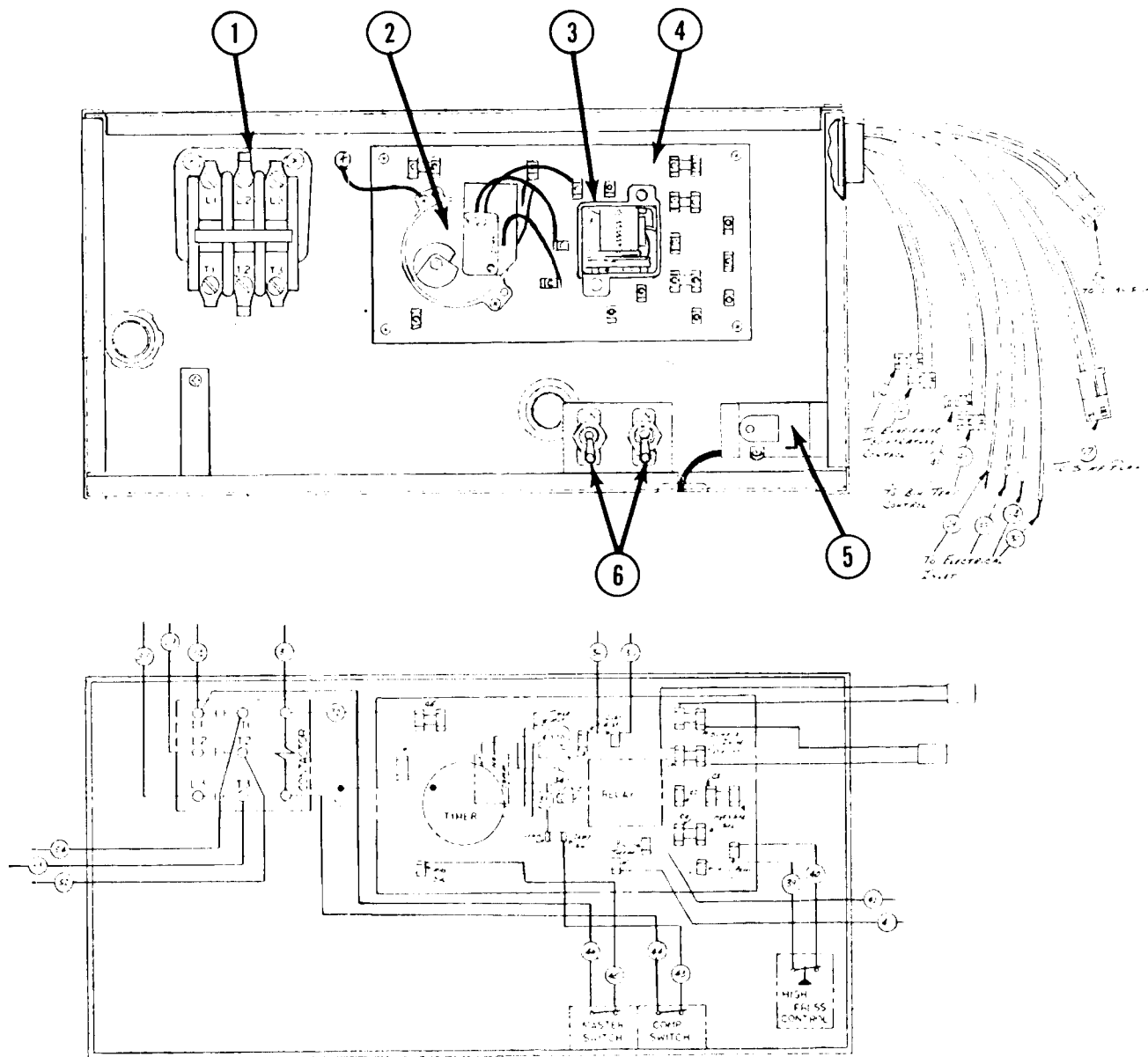
ITEM	PART NO.	DESCRIPTION
1.	12-820-01	Contactor
2.	12-1980-01	Timer
3.	12-1879-02	Relay
4.	12-1912-01	P.C. Board
5.	11-0388-02	Hi Pressure Control
6.	18-1901-23	Capacitor Start (On Back of Control Box)
7.	12-0426-01	On - Off Switches
8.	18-1903-34	Relay - Compressor
9.	18-1902-45	Capacitor - Run

CONTROL BOX — AIR COOLED
208-220/60/3

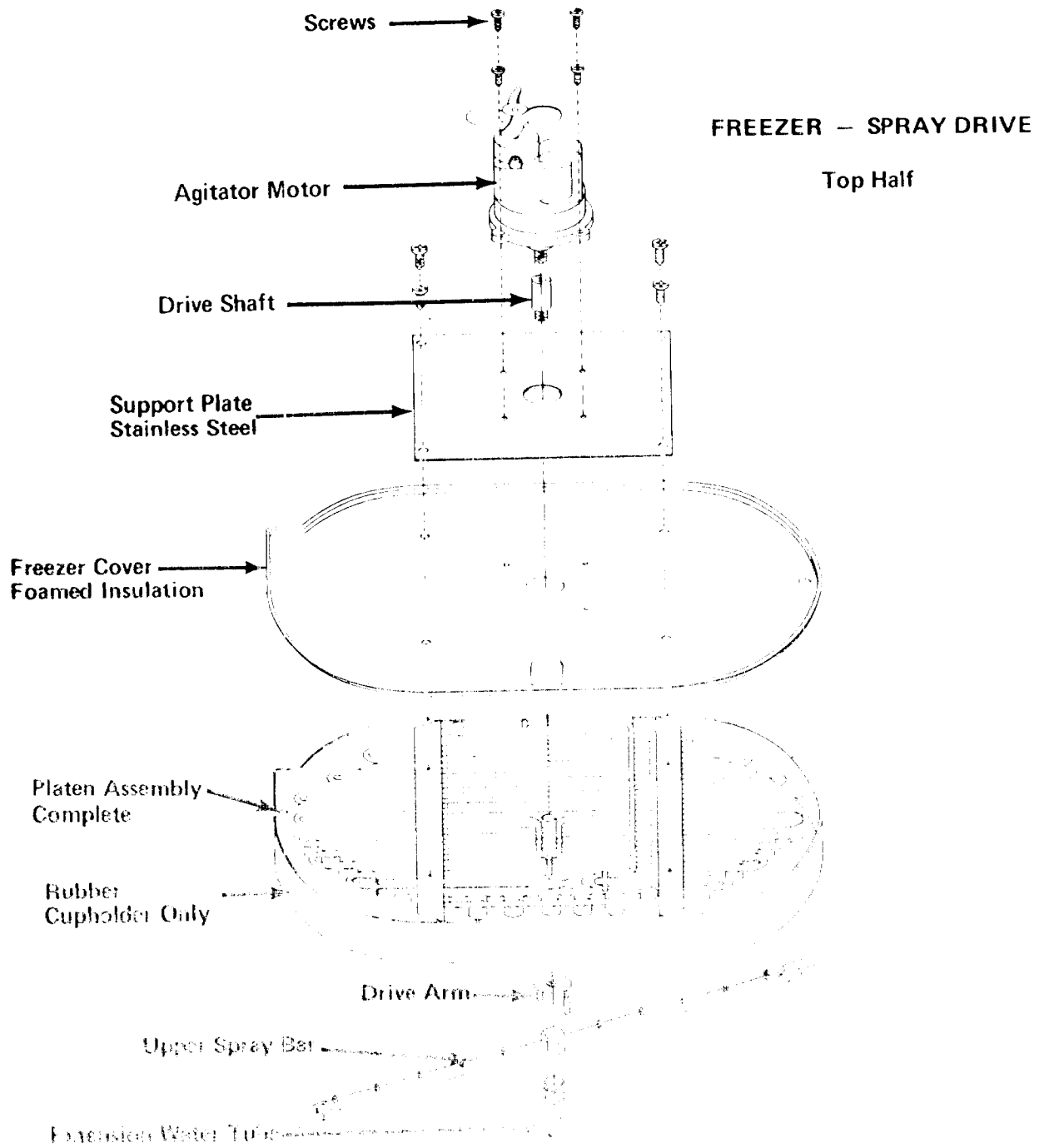


- | | | |
|----|------------|-------------------|
| 1. | 12-0739-01 | Contactor |
| 2. | 12-1980-01 | Timer |
| 3. | 12-1879-02 | Relay |
| 4. | 12-1912-01 | P.C. Board |
| 5. | 12-0426-01 | On - Off Switches |

CONTROL BOX – WATER COOLED
208-220/60/3



ITEM	PART NO.	DESCRIPTION
1.	12-0739-01	Contactor
2.	12-1980-01	Timer
3.	12-1879-02	Relay
4.	12-1912-01	P.C. Board
5.	11-0388-02	Hi Pressure Control
6.	12-0426-01	On - Off Switches



PS-1-75
2-15-75

TO: ALL MASTER MANUAL HOLDERS

SUBJECT: WATER PUMP ASSEMBLY
12-1849 and 12-1930

It is impractical to replace the Motor only or the Pump Body on these Water Pumps at the field level.

In the assembly procedure of the Motor and Body, it is necessary that the motor be centered properly to avoid damage to the impeller.

The supplier of these pumps uses special tools in assembly to center the motor body correctly.

On page (44) forty-four is a listing of the replacement parts that are available and can be replaced on these pumps at the field level.

These pumps 12-1849 and 12-1930 are identical except for the length and design of the electrical leads.

12-1849 60" electrical leads with 1/4" quick connect ends.

12-1930 6" electrical lead with pin plug connection

Wire assemblies used with 12-1930 pump.

12-1940-02 12" electrical lead with pin plug socket

Usage: AC30

12-1940-02 40" electrical lead with pin plug socket

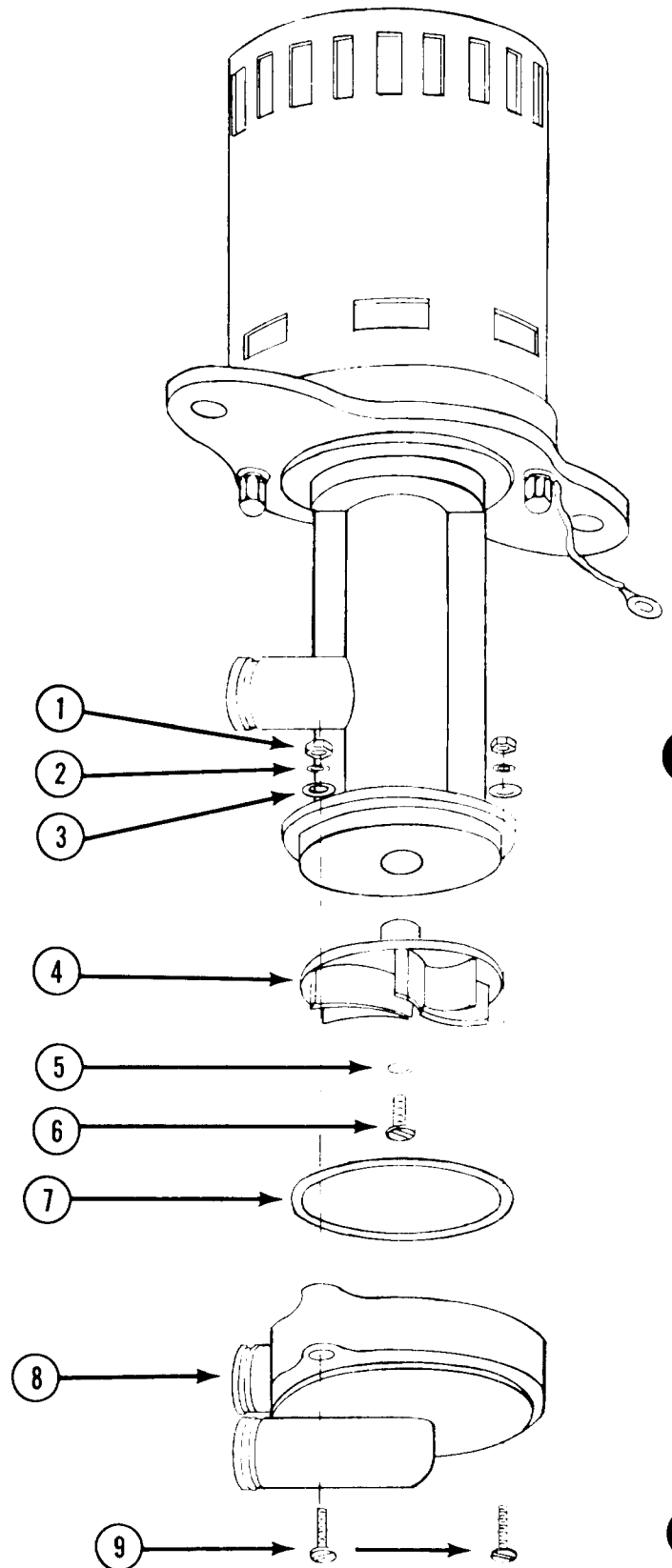
Usage: MC25 and Top Chamber MC35

12-1940-03 50" electrical lead with pin plug socket

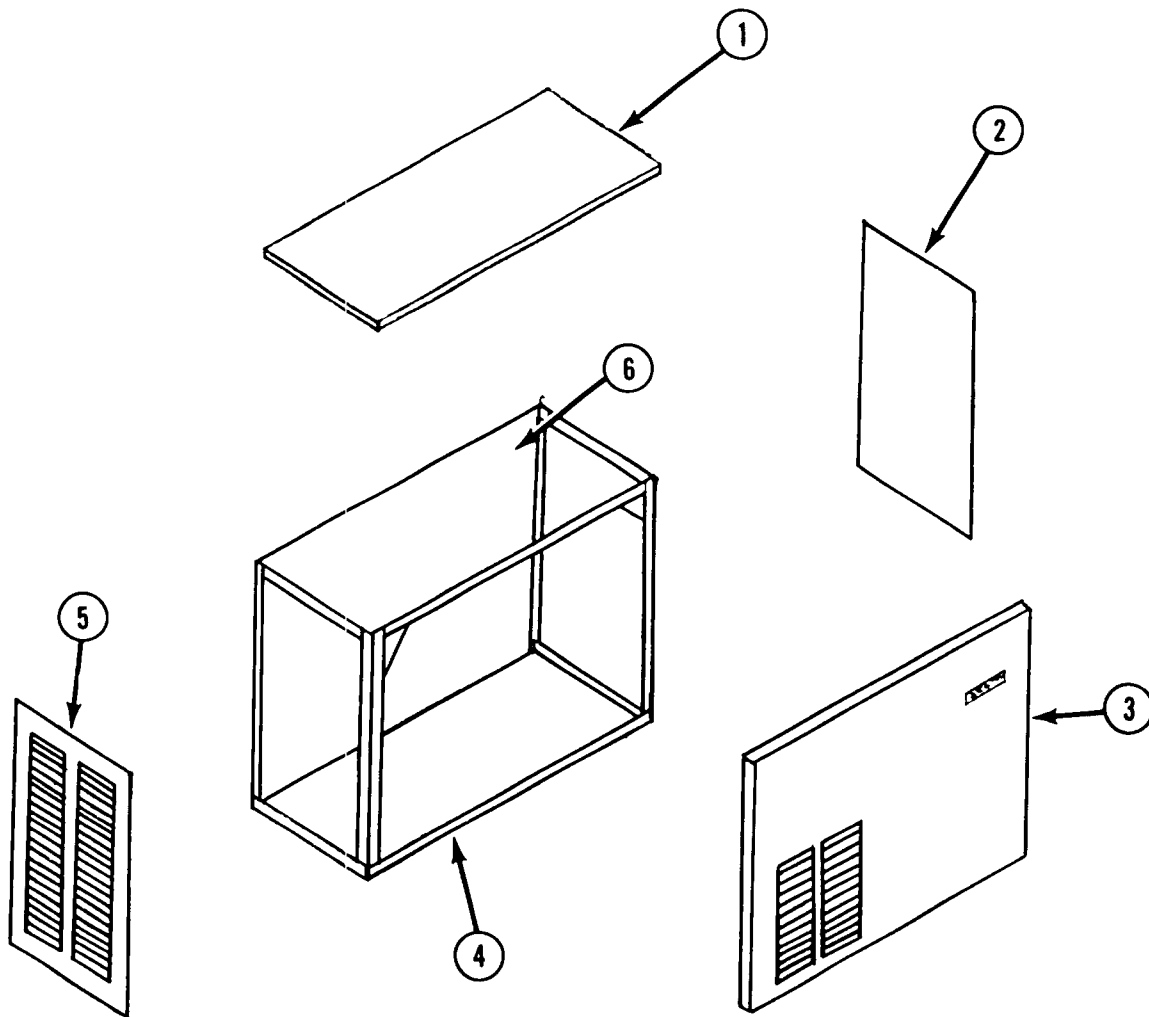
Usage: MC35 Lower Chamber

COMPLETE WATER PUMP
115/60/1
12-1930-01

ITEM NO.	PART NO.	DESCRIPTION
1.	12-1849-54	Nut (Hex)
2.	12-1849-55	Washer
3.	12-1849-56	Washer
4.	12-1849-57	Impeller
5.	12-1849-58	Lockwasher
6.	12-1849-59	Screw
7.	12-1849-60	O-Ring
8.	12-1849-61	Pump Housing
9.	12-1849-62	Screw



CABINET PARTS



	Enamel	Stainless Steel
1. Top Panel	A23784-001	A23784-002
2. Panel, Right Side	A23900-001	A23900-002
3. Panel, Front	A26183-001 Vinyl	A26183-002
4. Cabinet Assy.	A26179-001	A26179-001
5. Panel left side	A23899-001	A23899-002
6. Back Panel	Fixed	A-25274-001

*Panel Conversion Kit (Enamel to Stainless Steel) (Kit Includes Items 1, 2, 3, 5 and 6) – Part No. KPCS-2A.

MAINTENANCE INSTRUCTION FOR SCOTSMAN CUBERS

THE FOLLOWING MAINTENANCE SHOULD BE SCHEDULED EACH (6) SIX MONTHS ON ALL SCOTSMAN CUBERS. CALL YOUR AUTHORIZED SCOTSMAN SERVICE DEPARTMENT.

1. Clean air-cooled condenser; This is to be done frequently with the machine shut off.
2. Clean water system and evaporator, sump tank and screen, using Scotsman Ice Machine Cleaner or equivalent.
3. Remove jet tube and manually clean jets.
4. Check curtain assembly.
5. Tighten all electrical connections.
6. Tighten all bolts.
7. Check water supply. Check water pressure flow through flow control. Clean water strainer.
8. Oil jet tubes drive motor. Use SAE 20 oil.
9. Oil Condenser fan motor. Punch sealed cap or remove screws where possible.
10. Check for refrigeration leaks with halide torch.
11. Check for water leaks. Tighten drain line connections.
12. Check size and condition of cubes. Adjust as required.
13. Check bin thermostat setting. Factory set at 35 degrees out, 39 degrees in.

PRODEDURE FOR USE OF SCOTSMAN ICE MACHINE CLEANER

1. Remove front panel, right side panel, and cube chute.
2. Locate control box with time clock knob protruding thru cover. Turn master and compressor switches to off position.
3. Start unit thru harvest cycle manually. This is done by slowly turning time clock knob clockwise until you hear the micro-switch actuator arm drop into the cam slot.
4. Locate and remove defrost water tube which protrudes thru each freezing chamber cover at top left of freezing chamber.
5. For each freezing chamber, dilute 16 ozs. of Scotsman Ice Machine Cleaner in 11 pints of fresh hot potable water in a clean container. Pour this cleaning solution into freezing chamber thru defrost tube hole. Replace defrost tubes and IMMEDIATELY TURN ON MASTER SWITCH.
6. Let unit operate normally for 20 minutes into the freezing cycle. No ice will be made because the compressor is not in operation.
7. At the end of this time, rotate the timer knob until the harvest cycle starts again. Allow the machine to run normally thru this harvest cycle. When the harvest has been completed, then rotate knob manually thru the freeze cycle until the harvest cycle starts once again. Do this 3 times. Cube chute and curtain(s) should be washed in solution of household bleach and water. (1 oz. of bleach in 1 gal. of water)
8. Turn the compressor switch back on. Use a damp cloth to wipe off curtain(s) and cube chute. Place cube chute and curtain(s) in position.
9. Check each new batch of cubes until they are clear and until acid taste has been removed from cubes.
10. Pour hot water in storage bin to melt the cubes and thereby clean the bin and drains with the same solution that has just cleaned the unit.
11. Replace all doors.
12. Unit is now ready for continued automatic operation.

CARE OF STAINLESS STEEL STORAGE BIN LINERS

All commercial grades of stainless steel will corrode or rust when in contact with certain chemicals or salts. **One element that attacks stainless readily, is chlorine**, and most compounds of chlorine, such as hydrochloric acid, and certain salts containing chlorine. The "speed" with which this corrosion takes place depends on the concentration of the chlorine, and the length of time it is left in contact with the stainless steel.

ICE BIN LINER RUSTING

In many ice bin applications, **a rust stain, or brown deposit, will appear at the top of the side and rear walls of the bin liner, and also on any exposed stainless parts inside the bin, which do not normally get covered with ice; such as stainless steel door back pans.** The lower portions of the liner walls usually stay clean if the bin is being used regularly, due to the "washing" action of the ice and meltage water draining down these walls. This brown staining on the liner may appear more rapidly in some installations than other, depending on the way the ice is being made in the ice machine, and the water conditions.

This staining or rusting, can come from basically two sources:

1. **Foreign materials** -- For example, many ice machine casings are made of painted steel. **If this steel should be exposed at the joint where the ice machine sits on the bin, it could rust**, and the rust stain could "drip" down the liner walls. Also, particles of plain steel could fall down into the bin and, in turn, start rusting.
2. **Materials expelled during ice making** — Practically all icemakers produce clear ice by "freezing out the impurities" normally found in tap water. Chlorine gas, other gases and solids, are expelled during the making of ice. Being heavier than air, these foreign materials drop down into the bin through the same opening that the ice enters the bin. (This oftentimes explains why this staining is more noticeable on an installation where the opening on the bottom of the ice machine is quite large). **The chlorine gas will combine with water vapor and condense on the liner walls as a mild hydrochloric acid.** Above the normal ice level, this never gets removed by the action of the ice, and will eventually form a brown stain.

CLEANING OF A STAINLESS STEEL BIN LINER

Because the brown staining or rusting is due to expelled material during ice-making, **every bin liner should be cleaned periodically**, to prevent this staining from causing pitting of the stainless steel. The time between cleanings will depend on the water conditions, type of ice machine, etc. **It may be necessary only every 3 to 6 months.**

1. **General Cleaning** — When the staining is light, it can usually be removed by washing with ordinary cleaning powder, such as Bon-Ami, or Copper-Glo, and water. (Do not use cleaners that contain bleaching agents, as most of these are compounds of chlorine.) After cleaning, rinse thoroughly with clear water.

It may be necessary to use a stainless steel wool to remove bad stains. **DO NOT USE** plain steel wool, as the steel particles will get imbedded in the liner and cause more serious rusting.

2. **Cleaning of heavy deposits**—If the liner has not been cleaned for a long time, and heavy deposits and pitting have occurred, a chemical cleaner may be necessary. Several of these are as follows:

Oakite No. 33, Oakite Products, Inc., 19 Rector St., New York, N.Y. Texo No. 12, and Texo-NY, Texo Corp., 2200 Dana Ave. Cincinnati 7, Ohio. Metalprep No. 10, Nelson Chem. Co., 6564 Benson St., Detroit 7, Mich, Dilac, Diversey Corp., 1820 Roscoe St., Chicago 13, Illinois.

A solution of one part cleaner and two parts water is used. First, wash the bin liner thoroughly with water and soap as described above. Then simply swab the solution on the area to be cleaned, and allow to stand for about 20 minutes. Rinse with clear water. If this doesn't completely remove the deposit, repeat the procedure.

Synthetic rubber gloves should be used by the operator, and goggles and aprons are advisable even though the solution is relatively nonhazardous.

These cleaners may possibly harm paint, wood, or fabrics, They will probably cause a dull grey color on galvanized steel and should not be allowed to remain long in contact with rubber. Therefore, provision should be made to avoid contact with such materials when cleaning stainless.

3. **Protection of Stainless Steel against further staining** — After the stainless steel has been cleaned, installations where the staining is recurring so frequently, the surface should be rejuvenated. This process restores the characterisitic to the surface of the stainless, that best prevents corrosion.

First, be sure that the liner is clean and is thoroughly rinsed with water. Then use a nitric acid solution of two parts water to one part nitric acid (by volume). Swab this on the liner and allow to stand for about 30 minutes. Rinse the liner with clean water. This will then provide maximum corrosion resistance.