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MM-110

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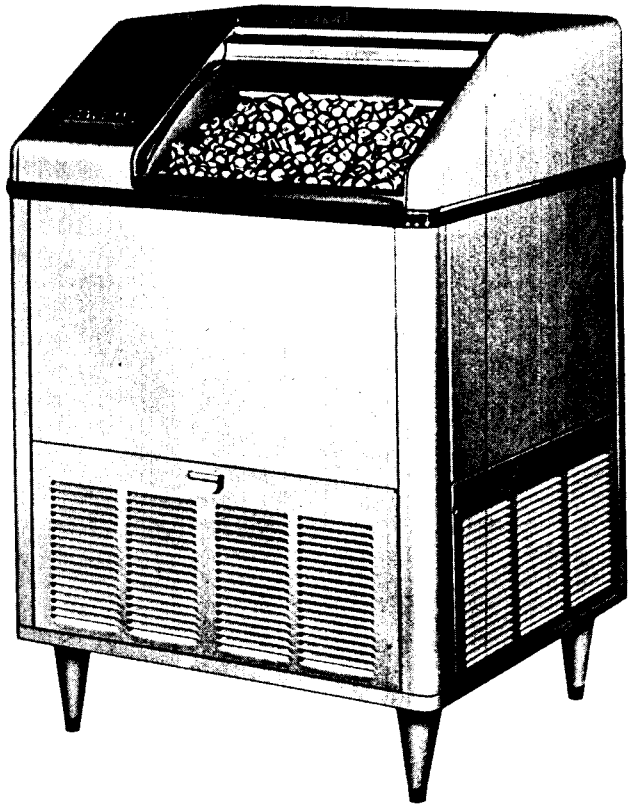
SPECIFICATIONS

	MODEL MM-110H	MODEL MM-110WH
Compressor	115/60/1 1/3 HP	115/60/1 1/3 HP
Condenser	Air Cooled	Water Cooled
Refrigerant	Refrigerant 12	Refrigerant 12
Refrigerant Charge	21 ounces	21 ounces
Power Consumption	11 Amperes	11 Amperes
Average Watt Input	115/60/1 - 730	115/60/1 - 730
Water Consumption to Produce Ice	5 Quarts per Hour	5 Quarts per Hour
Water Used by the Condensing Unit		20 Gallons per Hour Average - Varies with Water Temperature.
DIMENSIONS		
Height-with 6" Legs	45 1/2"	45 1/2"
Height - Less 6" Legs	39 1/2"	39 1/2 "
Width	34 1/8"	34 1/8"
Depth	24 1/2"	24 1/2"
WEIGHTS		
Uncrated	300 lbs.	300 lbs.
Crated	350 lbs.	350 lbs.

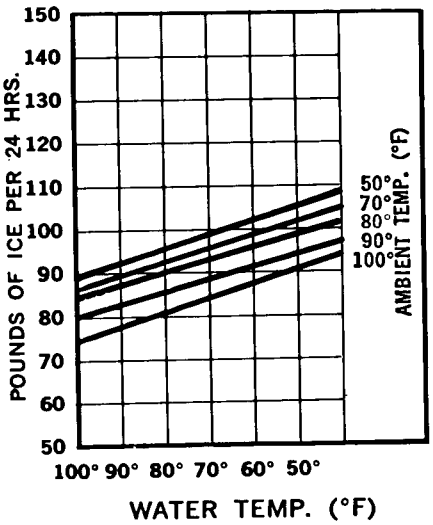
SCOTSMAN®

SUPER CUBER
MM-110
SERIES

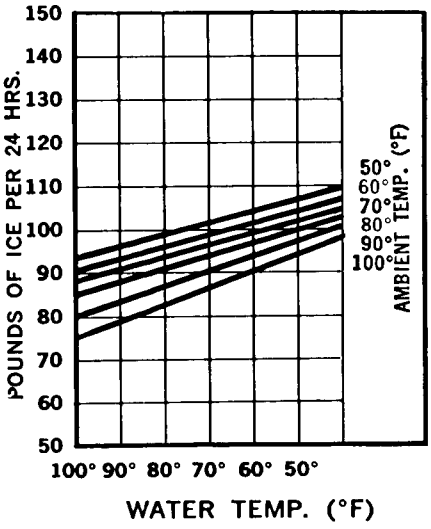


ice making capacity

Air Cooled Models

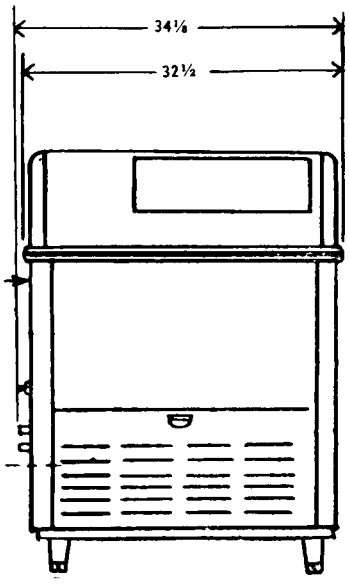


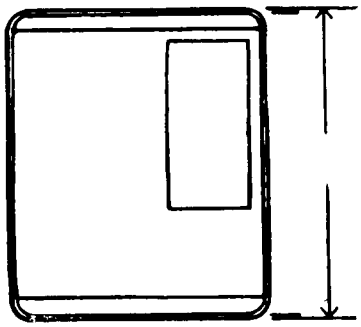
Water Cooled Models

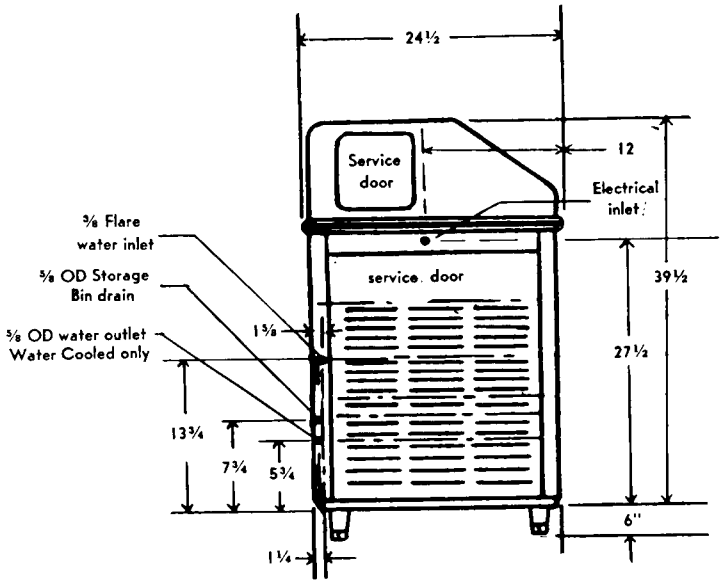


PECIFICATIONS

SUPER CUBER MM-110 SERIES	MODEL MM-110H	MODEL MM-110WH	MODEL MM-110H-SS	MODEL MM-110WH-SS
Daily capacity up to 100 lbs.	X	X	X	X
Self-contained 50 lb. capacity storage bin	X	X	X	X
Air-cooled condenser	X		X	
Water cooled condenser		X		X
Heavy duty 1/3 HP. Compressor	X	X	X	X
Standard 115 V, 60 cy, 1 ph, AC	X	X	X	X
3/8" water inlet SAE Flare	X	X	X	X
5/8" OD storage bin drain	X	X	X	X
5/8" condensate drain		X		X
Hammerloid grey exterior	X	X		
Stainless steel exterior			X	X
Stainless steel lined storage bin	X	X	X	X
45 1/2" height (with legs)	X	X	X	X
39 1/2" height (without legs)	X	X	X	X
34 1/8" width	X	X	X	X
24 1/2" depth	X	X	X	X
Approximate shipping weight	350	350	350	350







HOW IT WORKS

The new MM-110 Super Cuber incorporates the following features:

1. Discharge gas heats defrost water.
2. Water is controlled by three-way water valve.
3. 104 cubes per harvest.
4. Temperature sensing cube size control.
5. Pressure control cycles condensor fan to maintain head pressure in low ambients on air-cooled models.

The MM-110 Super Cuber resembles the SC-100 Super Cuber and incorporates many of the best features of the entire line.

The defrost water heating system is similar to the SC-300 using discharge gas to heat water and flow control to regulate flow.

The three-way water valve is the same as on SC-100 and SC-200 except for slight modification. In order to assure more rapid delivery of the defrost water from the hot gas heated tank to the platen, the solenoid flow control valve regulates flow at .75 G.P.M.

The cube chute is made of sheet stainless steel. The spray bar motor speed is 39 R.P.M. as compared to 19 R.P.M. on the SC-100.

INSTALLATION

UNCRATING OF MACHINE

1. The complete machine comes in one crate. After the crate is removed, inspect for concealed damage. Remove the bottom skid by removing all bolts. Then cut all wires holding support packing from refrigerant line. Then loosen shipping bolts on the compressor. Be sure the compressor is floating free on spring mounts. Then check all refrigerant lines for rubbing or touching other surfaces. Also check for possible transportation damage.

2. Remove all service doors and panels.

3. Remove leg packages in compartment base and install 4 legs in unit base sockets. Level unit with adjustable legs.

4. Loosen motor compressor hold down nuts until motor compressor rides freely on mounting springs.

5. Remove water strainer from storage package for installation in water supply line feeding unit.

6. Open electrical control box and prepare for hook up, use knock outs, cord connectors etc. Then check unit name plate voltage against building source voltage and make sure they correspond. Caution--Improper voltage supplied to units will void your warranty protection.

7. Make sure all service valves on the condensing unit are open and turned as far as possible to the left. Replace the valve caps after checking the valves. All Models are shipped with valves back seated.

8. Make sure that the flow of air is not impeded in any way over condenser on air-cooled models. Keep condenser clean. (Check and clean the condenser monthly.)

9. Operating room temperatures are minimum 50° F. and maximum 100° F.

10. Have the installation and warranty cards been filled out and sent to factory to insure warranty protection?

LOCATION OF THE ICE CUBE MACHINE

UNDER BAR INSTALLATIONS--Locate, if possible, so left end panel is accessible. Locate unit so proper circulation can be attained around the unit and behind it at least four inches. Provide plumbing and electrical connections so the unit can be moved out where the entire top hood can be removed and the unit can still be operated.

KITCHEN INSTALLATIONS--As a rule, the kitchen is not the most practical place to install an air-cooled condensing unit, as grease is almost always present and makes cleaning of the condensing unit difficult. Do not locate near range or steam table or other heating devices that may be used in the kitchen.

STOREROOM INSTALLATIONS--Be sure storeroom is of adequate size and properly ventilated. A small, poorly ventilated room will greatly impair the efficiency of the unit. The storeroom must be kept above 50 degrees in the winter months.

INSTALLATION

BASEMENT INSTALLATIONS--Locate machine in the coolest place. Locate the machine in a dry place. Keep away from furnace and boiler room. Keep away from service chutes and runways, also coal or other dust of any kind. If the machine is set over a floor drain, block the machine up enough to eliminate any possible damage to the machine.

LOCATE THE MACHINE SO IT CAN BE SERVICED WHEN NECESSARY. ALLOW AT LEAST FOUR INCHES OF SPACE AROUND THE MACHINE FOR CIRCULATING AIR.

IMPORTANT: ADJUST LEVELER LEGS. MACHINE MUST BE LEVEL.

WATER SUPPLY AND DRAIN CONNECTIONS.

Page 5 shows recommended water piping connections and drain facilities for Model MM-110H and MM110 WH.

WATER SUPPLY

The recommended water supply line is 1/4" 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.

The water supply line connects to the 1/4" male flare connection on cabinet left side. Use care in connecting up water line to the machine. Water supply must be installed to conform with local code.

Water connection for the MM-110 WH water-cooled units should be at least 3/8" OD copper tubing to the water-cooled condenser. One connection is made inside of cabinet for both make-up water and condenser water.

DRAIN

The recommended drain is 5/8"OD copper tubing. Sweat to drain connection (See page 5) . Must be running to open or trapped drain. If drain is a long run, allow a 1/4" pitch per foot. Drain must be be installed to conform with local code.

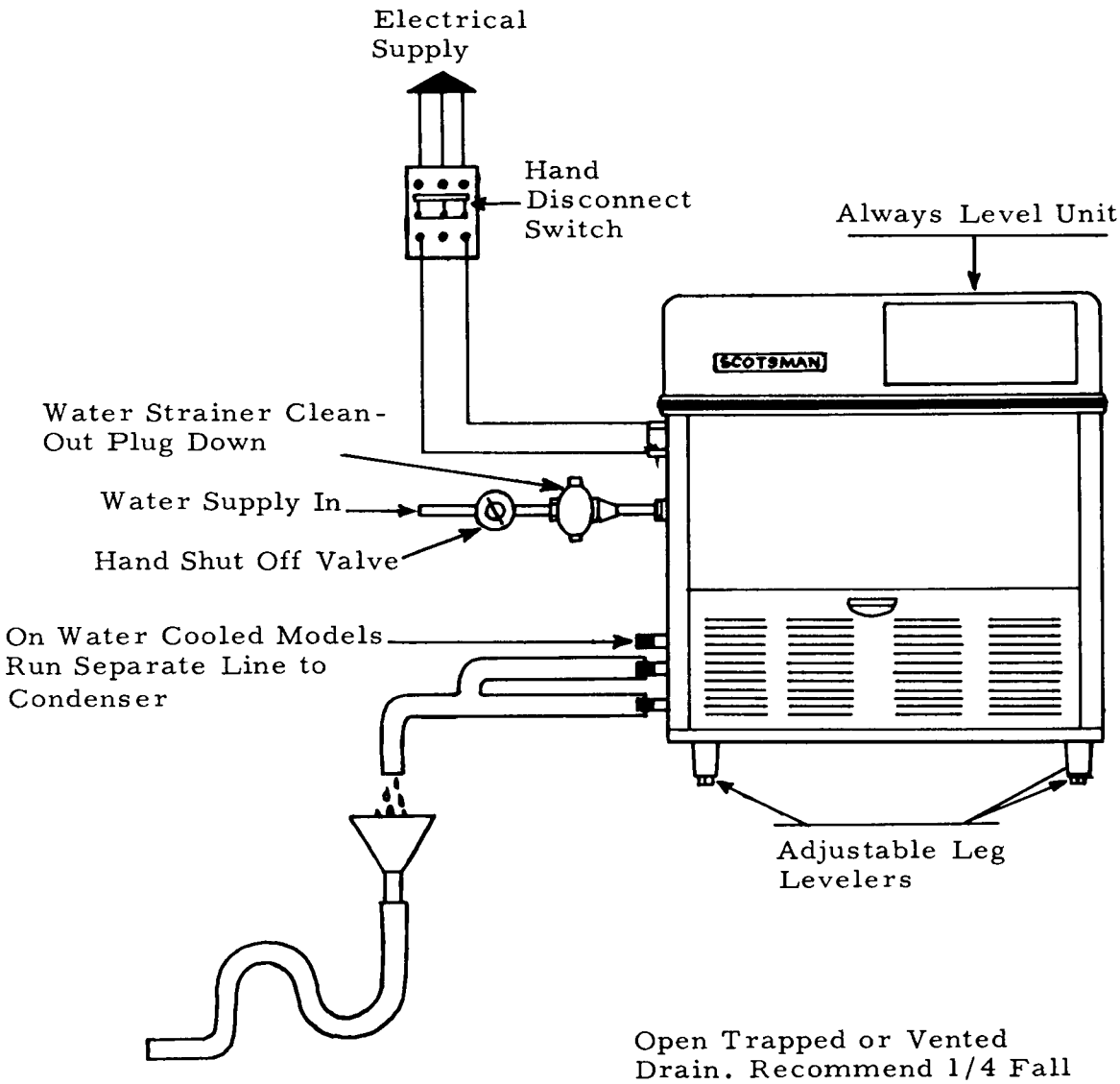
ELECTRICAL CONNECTIONS AND CHARACTERISTICS

MM-110	110-115 V, 60 Cycle	Single Phase, 11 Amps.

All external wiring should conform with National Underwriters' and local code requirements. Check the voltage on the line before connecting the machine. Model MM-110 requires 110-115 volts, 60 cycle, single phase.

The MM-110 should be wired to a 15 Amp. circuit. Be certain that the Super 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.

INSTALLATION PRACTICE



INSTALLATION

START UP

1. On all water cooled models, turn on water supply to water-cooled condenser and check for leaks in connections made.

2. Turn on cube supply at hand shut-off valve. Make sure hot water tank fills to overflow, if it does not, adjust timer lever to 2 1/2 minute setting. NOTE: Unit has built-in water flow control set to reduce flow rate to approximately .75 gallons per minute.

3. Check electrical circuit. 15 Amps. Do not connect with other appliances into one ordinary wall outlet: 115 volts required.
4. Inspect components in electrical control box, check for loose or frayed wire, then turn both manual switches to "on" position. NOTE: All "H" model cubers have two manual on-off switches. One is for motor compressor only during cleaning operation, one is master switch for complete unit.

5. Turn disc on time clock to the right just far enough for water solenoid valve to energize. Allow clock to take it through harvest cycle. This will be approximately two minutes. Dial pointer should be set on Number 2. After the compressor starts, turn the dial completely around and send it through another harvest cycle. Do this several times. This will completely flush out machine of any dust that may have accumulated in shipment.

6. After machine has been properly flushed, allow it to go into a freezing cycle - check for possible water leaks, check sump pump operation - should be running freely. Also note if jet tube travel is correct, and that none of the jets are plugged. Jet spray of water should hit the middle of the cups.

7. Time clock dial does not rotate at the end of the harvest cycle; it is started later by the cube size control located in the control box.

8. Freezing time will be approximately 18 minutes in a 70 degree ambient. (Longer if above, and shorter if below.) Average complete cycle time is 20 minutes.

9. Watch first cube harvest and check to make sure that plastic curtain has not not been damaged in shipment.

10. 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.

11. 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, Div., Ice Machine Service Department, Albert Lea, Minnesota, for futher details.

12. With unit on harvest cycle, take a handful of cubes made and hold on storage bin thermostat cover. Should cut unit off in one or two minutes - remove ice: unit should cut back on automatically. Thermostat is factory set at 35 degrees out, 39 degrees in.

13. Install gauges and check head and back pressure: air-cooled models, head pressure after twenty minutes of freezing cycle at 70^{o} 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 125 pounds PSI: check reading and adjust if necessary. Back pressure will operate the same as on air-cooled models.

14. Remove gauges, replace control box cover and all service panels.

15. Instruct owner on how to operate and clean machine.

SERVICE

CYCLE OF OPERATION - At the start of the freezing cycle, the sump tank contains enough water to make a complete batch of ice cubes, plus approximately an extra pint. When time clock closes load circuit, it starts the compressor, sump pump and spray bar motor. At the same time, it opens the circuit to clock motor. (CLOCK MOTOR DOES NOT RUN FIRST PART OF FREEZING CYCLE -- THIS IS APPROXIMATELY 15 MINUTES.)

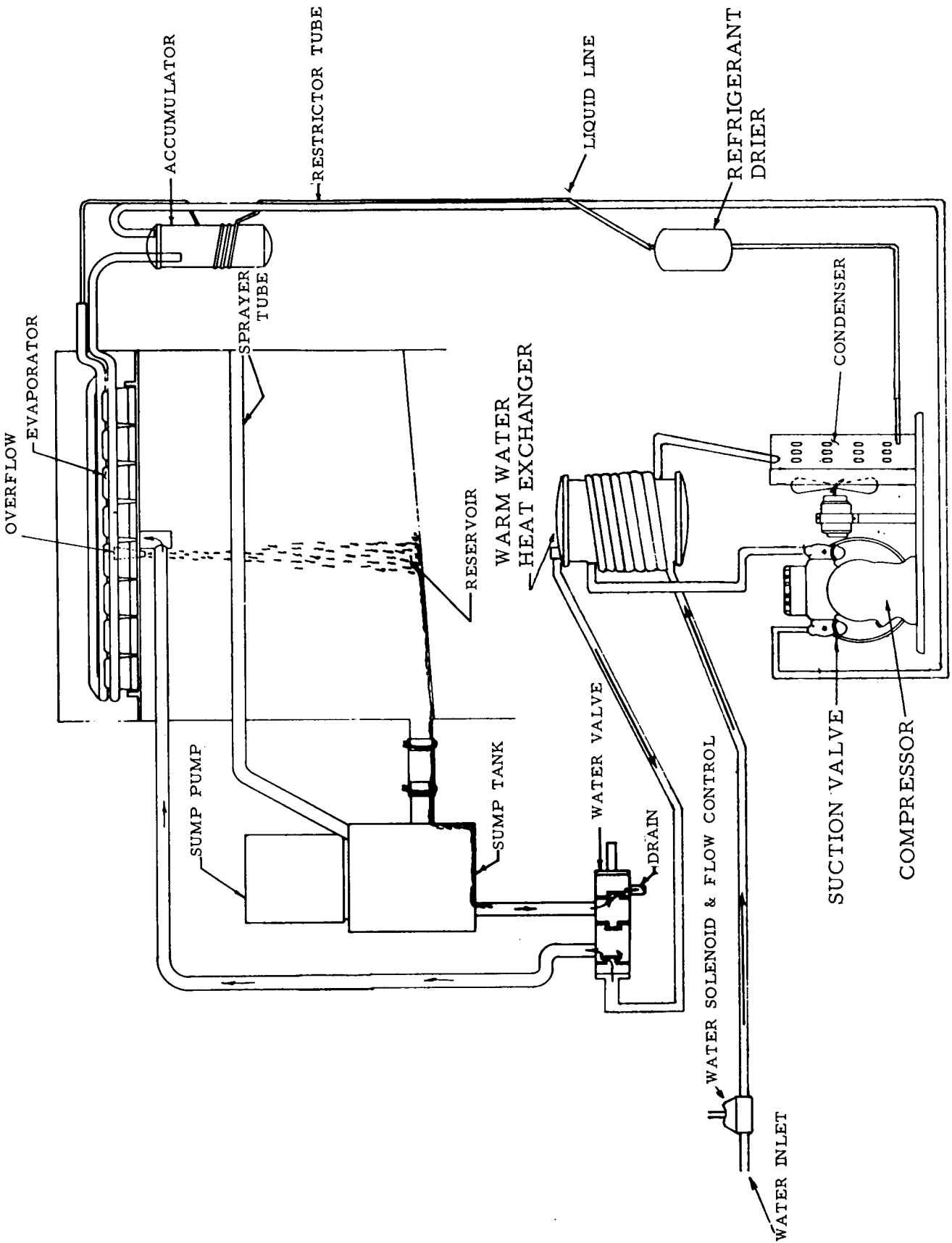
This timer has a double cam, double contacts micro-switch arrangement for carrying and directing current. After a predetermined amount of ice is frozen, the cube size control closes, actuating the time clock motor circuit which continues the freezing cycle approximately 10 more minutes. (AFTER CLOCK MOTOR STARTS, FREEZING TIME WILL BE 12 MINUTES LESS DEFROST TIME SETTING.)

At the end of the 10-minute period, time clock operated cam opens compressor, sump pump drive motor, and solenoid operated water valves. At this time, the solenoid flow control forces heated water in hot water tank to flow through three-way water valve, and into the upper cavity of the freezing chamber, and, at the same time the three-way water valve allows the surplus water from the preceding batch of ice cubes to go down the drain.

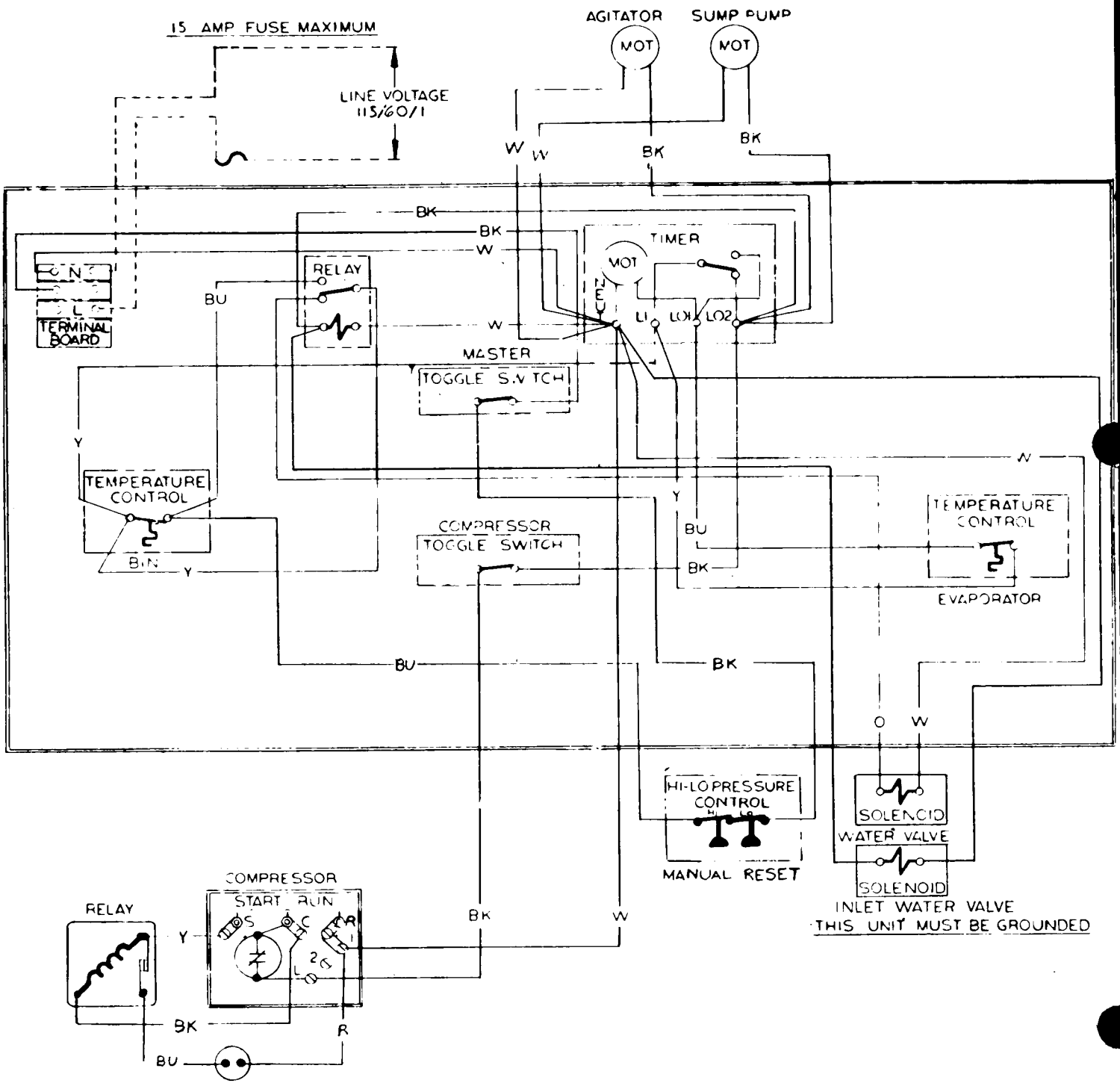
The hot water from the water tank flows into the rubber platen holding the cups and by conduction on back of cups causes cubes to defrost. The platen cavity is completely filled up to the overflow point, and continues to overflow while in the defrost cycle; the amount of this water running over the overflow pipe is predetermined by the flow control orifice in the flow control and the length of harvest time setting on the time clock; overflow water goes down the drain also.

Meanwhile, cubes being released from the cups drop by gravity unto cube chute, thence through curtained opening into storage bin. Clock motor now stops and will not start until cube size control closes once more. As freezing cycle starts the solenoid-operated water valves are de-energized, thus isolating water in the heat exchanger tank for next defrost period. The chilled water from the upper cavity flows by gravity through the water valve to the sump tank and reservoir. This water is used to produce the next batch of cubes.

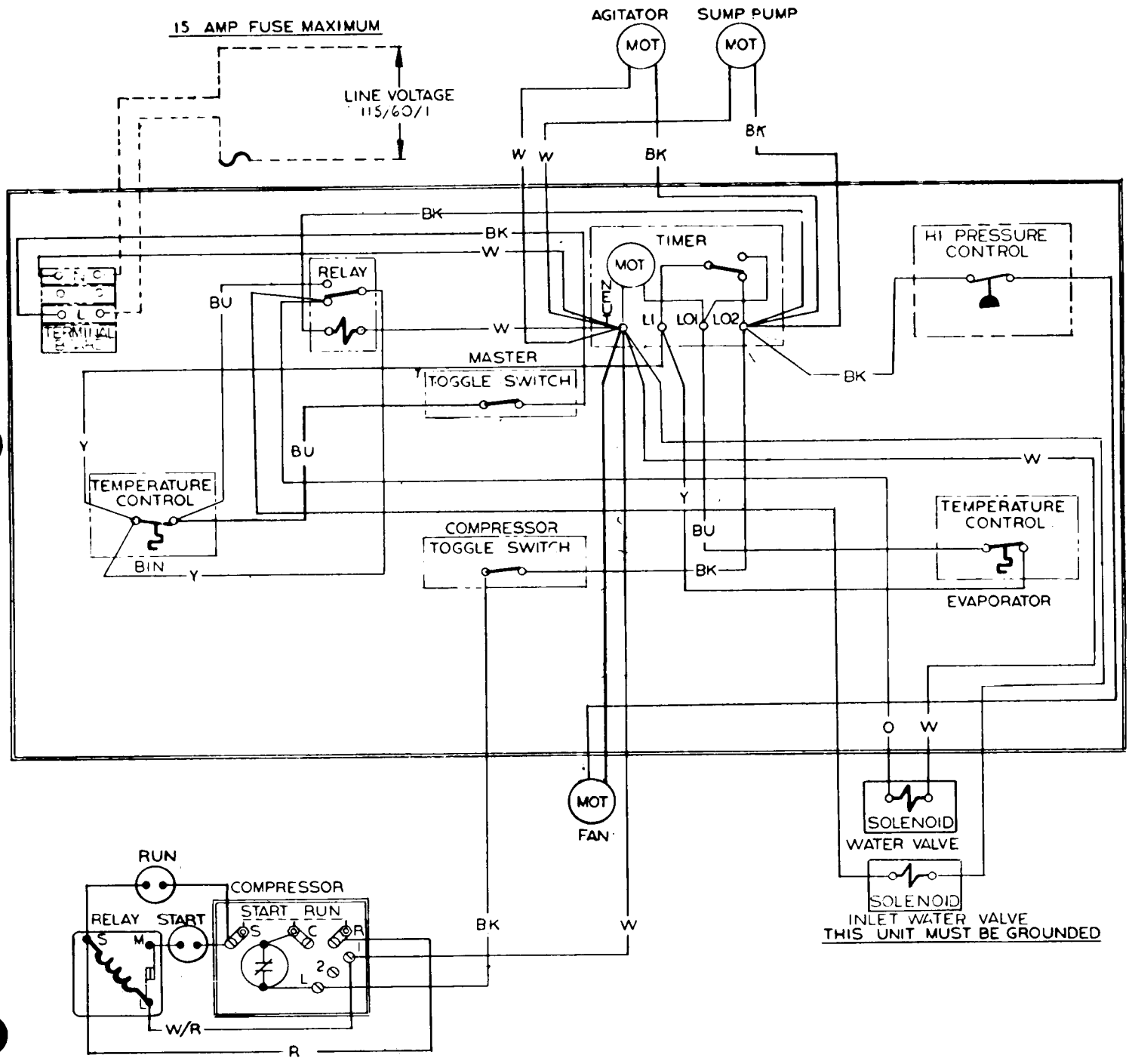
WATER - - REFRIGERANT SCHEMATIC



WIRING DIAGRAM
WATER - COOLED

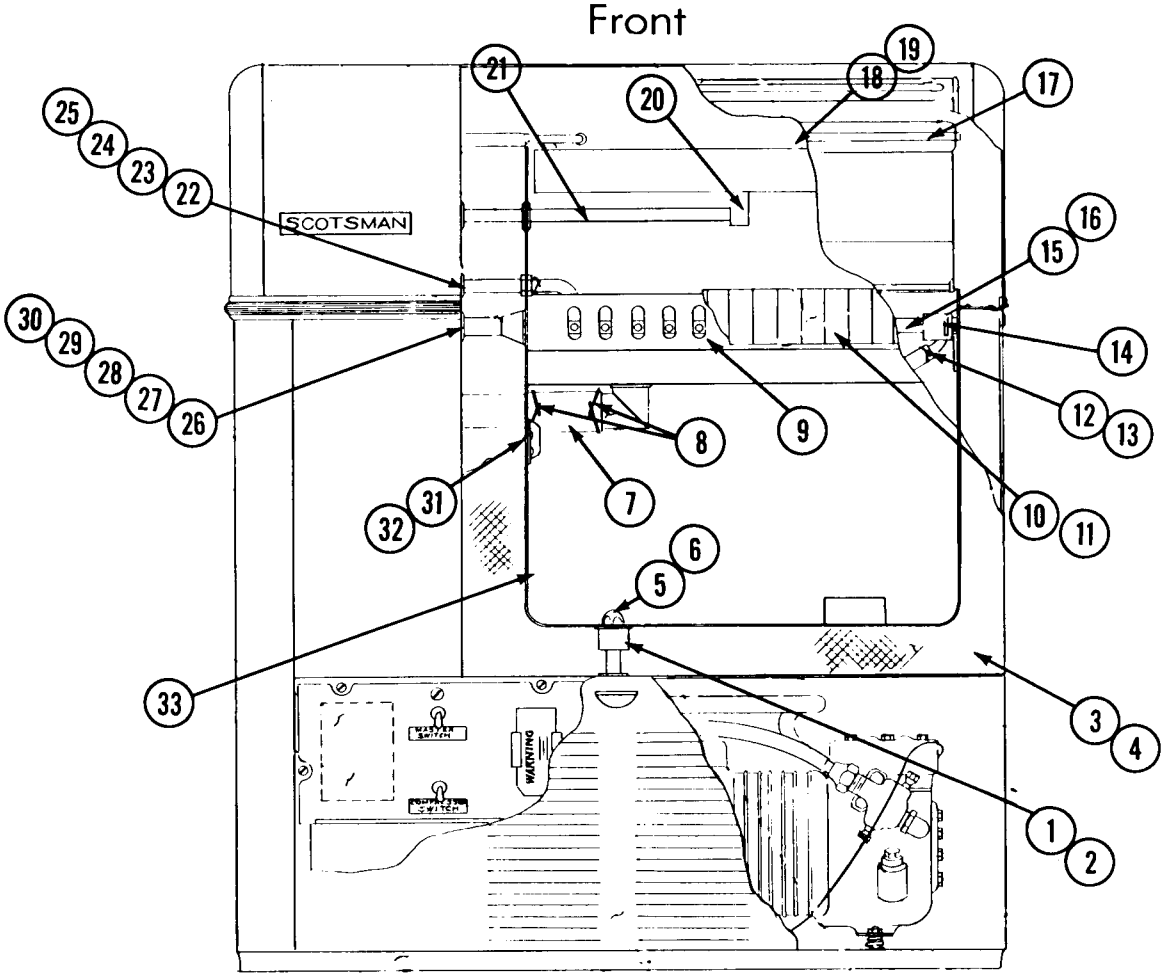


WIRING DIAGRAM
AIR - COOLED



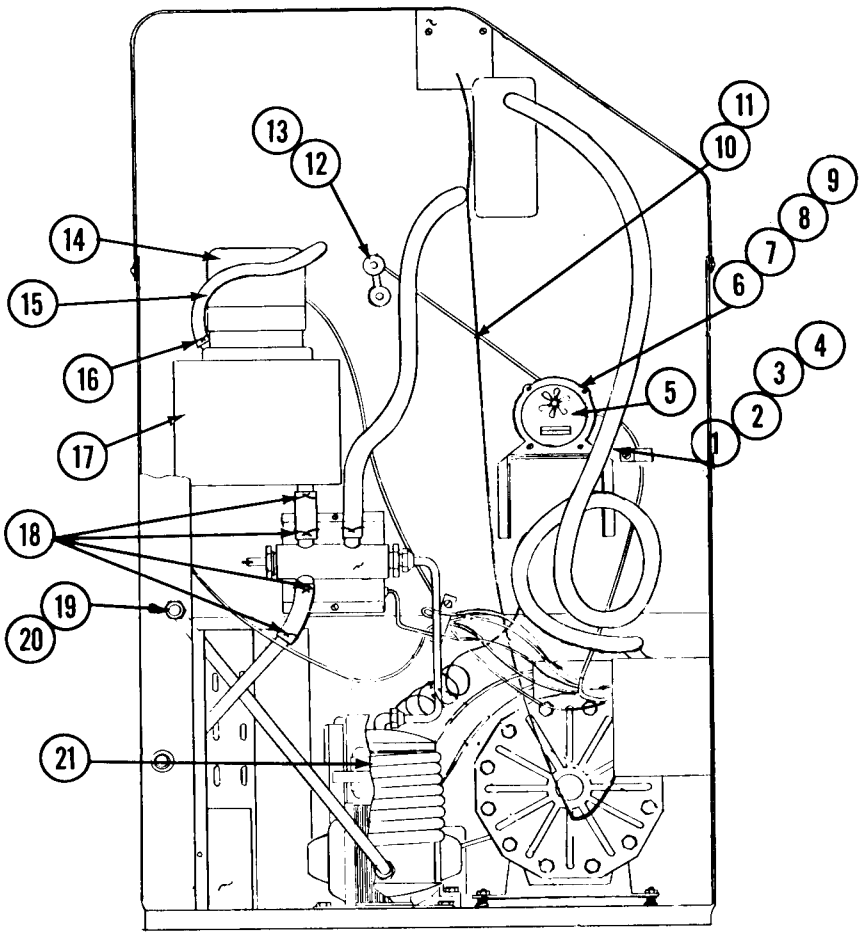
MM-110H COMPLETE UNIT

Front



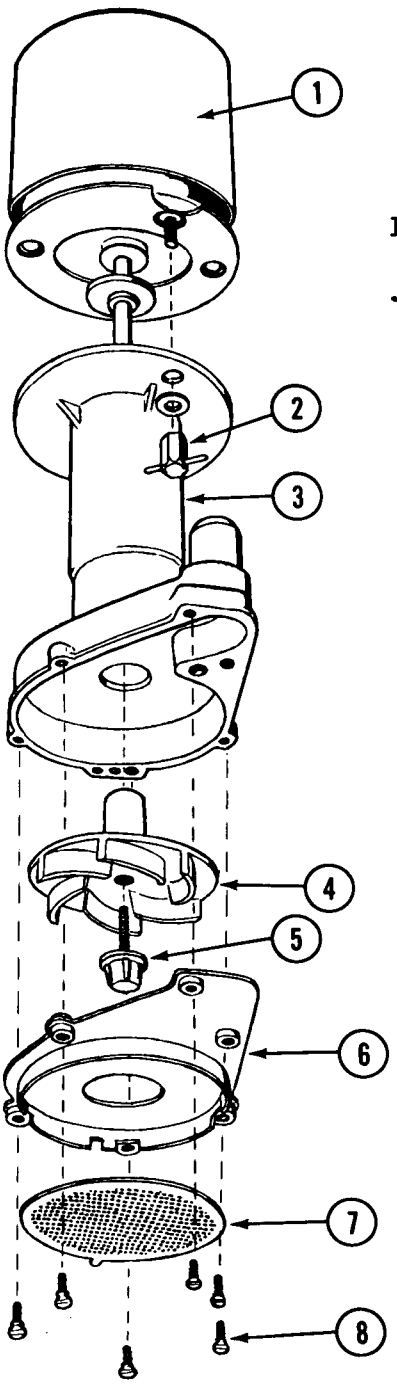
ITEM NO.	PART NO.	NAME
1.	A-18102	Drain Ass'y
2.	2-530	"O" Ring
3.	A-15721-1	Insulation Bottom
4.	A-16246	Insulation Layout
5.	A-18090	Drain Fitting (Male)
6.	A-6448	Drain Strainer
7.	5-170-2	Tygon Hose
8.	2-537-1	Clamps (2 reqd.)
9.	A-16412	Cube Chute
10.	A-16439	Curtain Assy
11.	3-727	Thumb Screw (2)
12.	2-536-1	Clamp
13.	5-179	Tygon Tube
14.	A-16963	End Bearing Ass'y
15.	A-16432	Sprayer Tube
16.	S-6907	Jets
17.	2-1489	Plastic Insul. Cover
18.	A-16415-2	Freezer & Acc. Assy.
19.	13-573	Rubber Cupholder
20.	S-7434	Adapter
21.	A-16437	Inlet Tube
22.	A-16970	Inlet Tube
23.	2-541	"O" Ring
24.	S-9965	"O" Ring Nut
25.	13-125	Grommet
26.	S-8887	Drive Bearing Support
27.	S-7639	Drive Journal Ass'y
28.	S-7635	Nut
29.	3-606	Fiber Washer
30.	13-169	Grommet
31.	A-15759	Bulb Cover
32.	13-590	Bulb Gasket
33.	A-16133	Storage and Reservoir Assy
34.	13-168	U-Cup for A-16963

MM-110H COMPLETE UNIT
Left Side



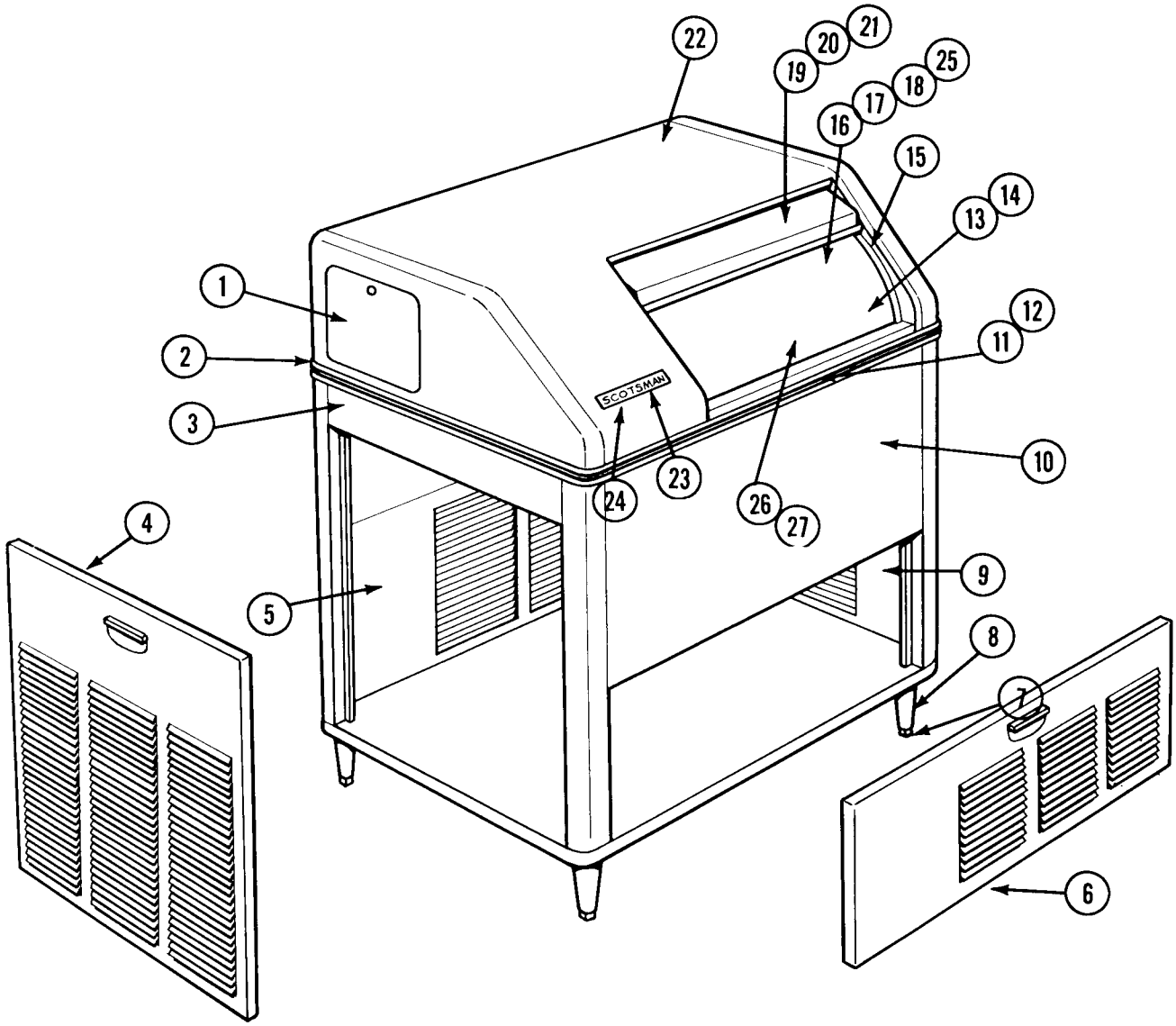
ITEM NO.	PART NO.	NAME
1.	3-08	Screw
2.	3-88	Lockwasher
3.	3-298	Washer
4.	3-61	Nut
5.	12-1346-1	Drive Motor
6.	S-7128	Driven Arm
7.	A-7033	Bearing
8.	S-7558	Bearing Clip
9.	3-341	Set Screw
10.	S-7132	Linkage Rod
11.	A-6726	Linkage Complete
12.	A-6462	Driver Arm
13.	S-7130	Collar
14.	12-418-1	Sump Pump
15.	5-179	Tygon Tube
16.	2-536-1	Hose Clamp
17.	A-8515	Sump tank
18.	2-536	Hose Clamps
19.	12-621E-1	Solenoid
20.	12-621-31	Flow Control only
21.	A-17140	Cond. Tank Assy

MM-110H SUMP PUMP



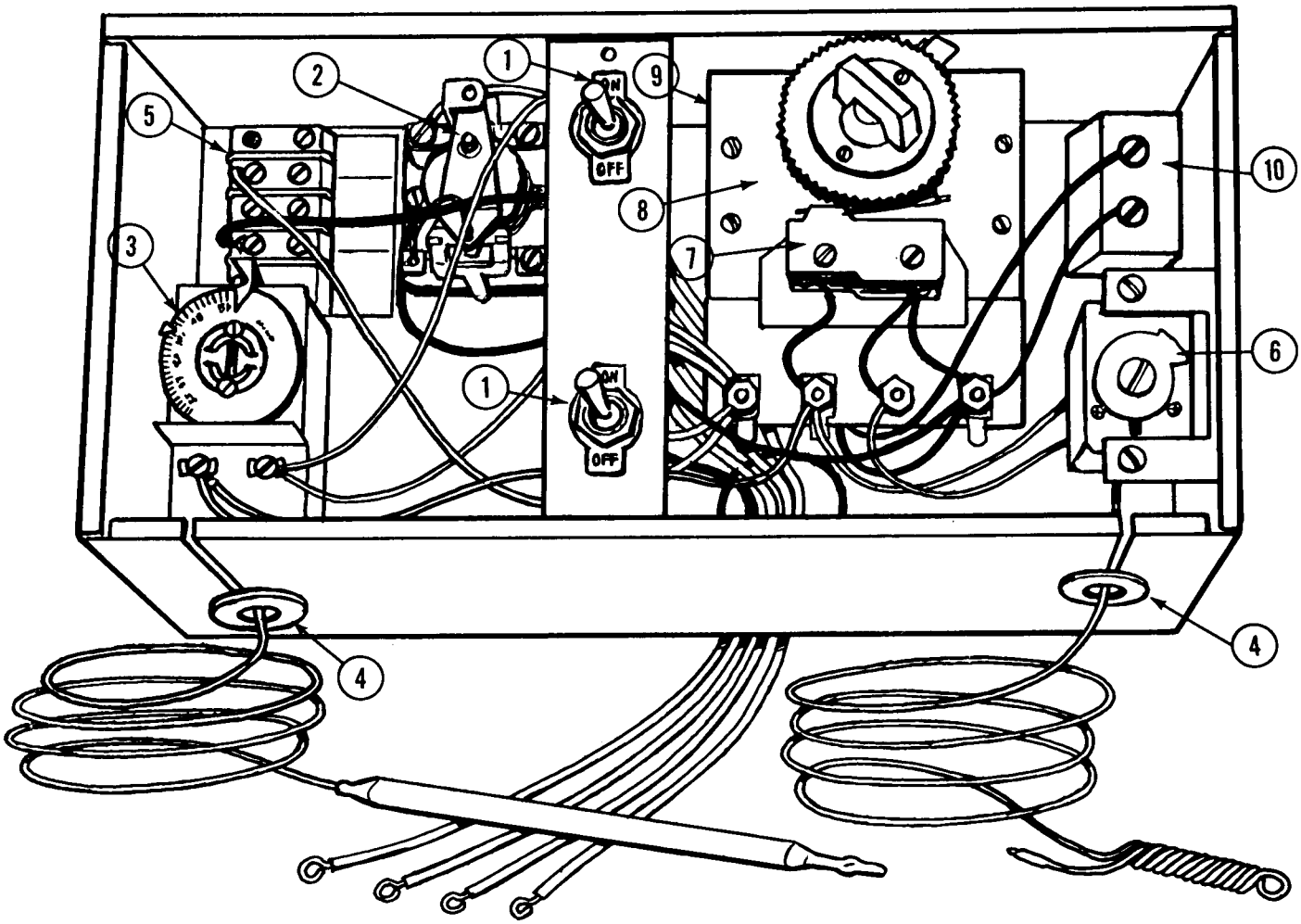
ITEM NO.	PART NO.	NAME
1.	12-1351-22	Motor Only
2.	12-1351-32	Wing Hex Nuts
3.	12-418-30	Pump Body
4.	12-1351-21	Impellar and Spring
5.	12-1351-31	Impellar Screw and Gasket
6.	12-1351-27	Bottom Inlet Plate
7.	12-1351-26	Inlet Screen
8.	12-1351-29	Wing Screws
	12-418-1	Complete Pump

MM-110H CASE AND HOOD ASSY



ITEM NO.	PART NO.	NAME
1.	A-6530	Top Side Door
2.	A-6509	Rear Trim Strip
3.	A-17191	Case Panel Left
4.	S-9405	Door, Left
5.	A-16563	Door, Back
6.	A-15789	Door Front
7.	8-522	Leg Levelers
8.	A-15803	Leg
9.	A-16561	Door, Right
10.	A-18131	Case Assy
11.	A-6510	Front Trim Strip
12.	15-324	Plastic trim(per ft.)
13.	A-16133	Storage Bin Assy
14.	A-16246	Insulation Layout
15.	A-16208	Track Assy
16.	A-18102	Storage Drain Assy.
17.	A-18090	Drain Fitting(Male)
18.	A-6448	Drain Strainer
19.	A-15559	Sliding Door
20.	3-640	Door Glides
21.	A-16209	Door Catch
22.	A-18158	Case Hood
23.	15-156	Emblem
24.	3-271	Speed Nut
25.	2-530	"O" Ring Drain
26.	A-15759	Bulb Cover
27.	13-590	Bulb Gasket

MM-110H CONTROL BOX ASSY



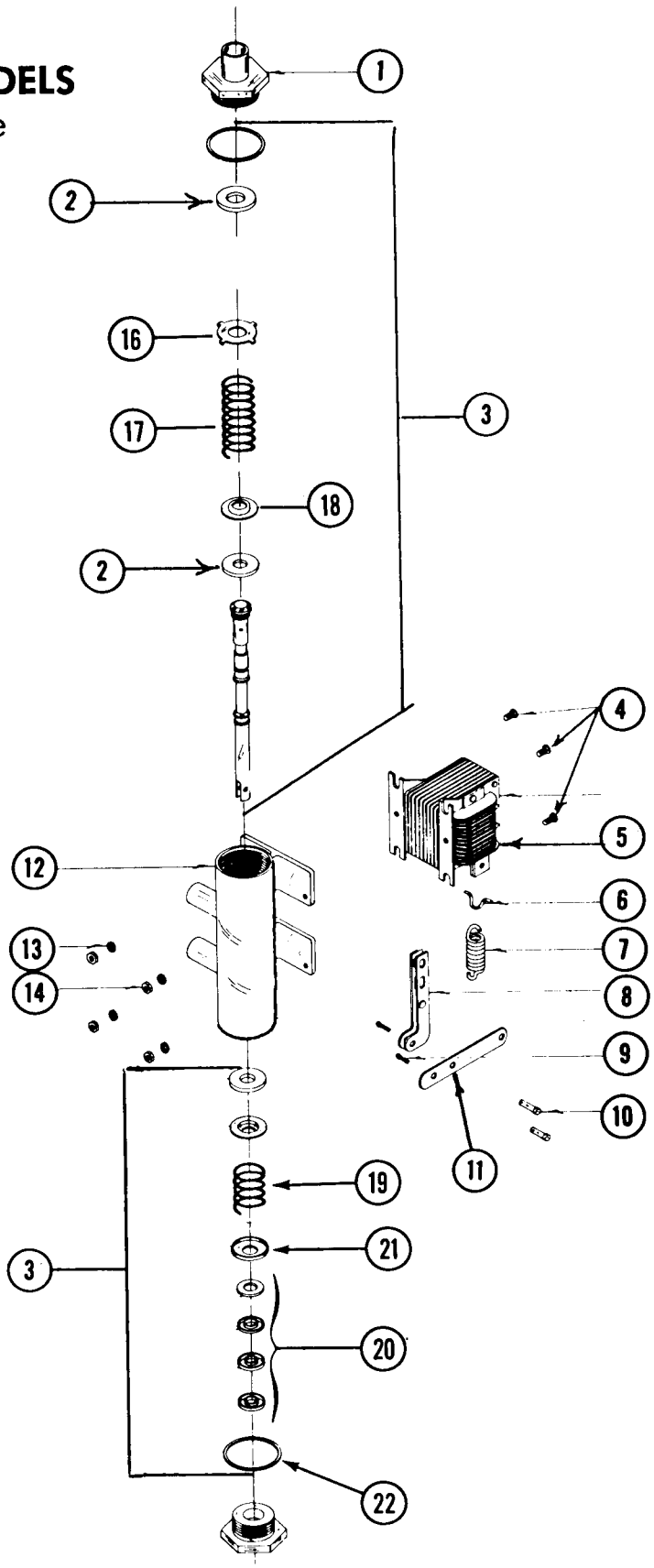
ITEM NO.	PART NO.	NAME
1.	12-426	Switches
2.	12-419	Relay
3.	11-99-1	Bin Control
4.	13-124	Grommet
5.	12-813	Terminal Block
6.	11-351	Cube Size Control
7.	12-645-20	Micro Switch only
8.	12-645-1	Complete Timer
9.	12-367	Timer Motor only
10.	11-352	High Pressure Fan Control

MM-110 H and F MODELS
3Way Water Valve

ITEM NO.	PART NO.	NAME
1.	A-17173	Value Inlet Cap
2.	13-148	Ruber Valve Seat (3 per unit)
3.	A-8139-20	All Items covered by No. 3 Are included in repair Kit)
4.	3-165	Machine Screw
5.	12-2481-1	Solenoid
6.	S-8995	Solenoid Pin
7.	2-420	Spring
8.	S-6928	Arm Support Ass'y
9.	3-396-1	Cotter Keys (2 required)
10.	S-7973	Pins (2 required)
11.	S-6932	Valve Arm
12.	S-8151	Valve Body
13.	3-88	Washer (4 required)
14.	3-61	Nut (4 required)
16.	2-557	Valve Stem Guide
17.	2-419	Compression Spring
18.	S-6924	Valve Seat Washer
19.	2-418	Spring
20.	2-424	Packing
21.	S-6931	Packing Washer
22.	3-570	Fiber Washer
	A-17174	Complete Valve

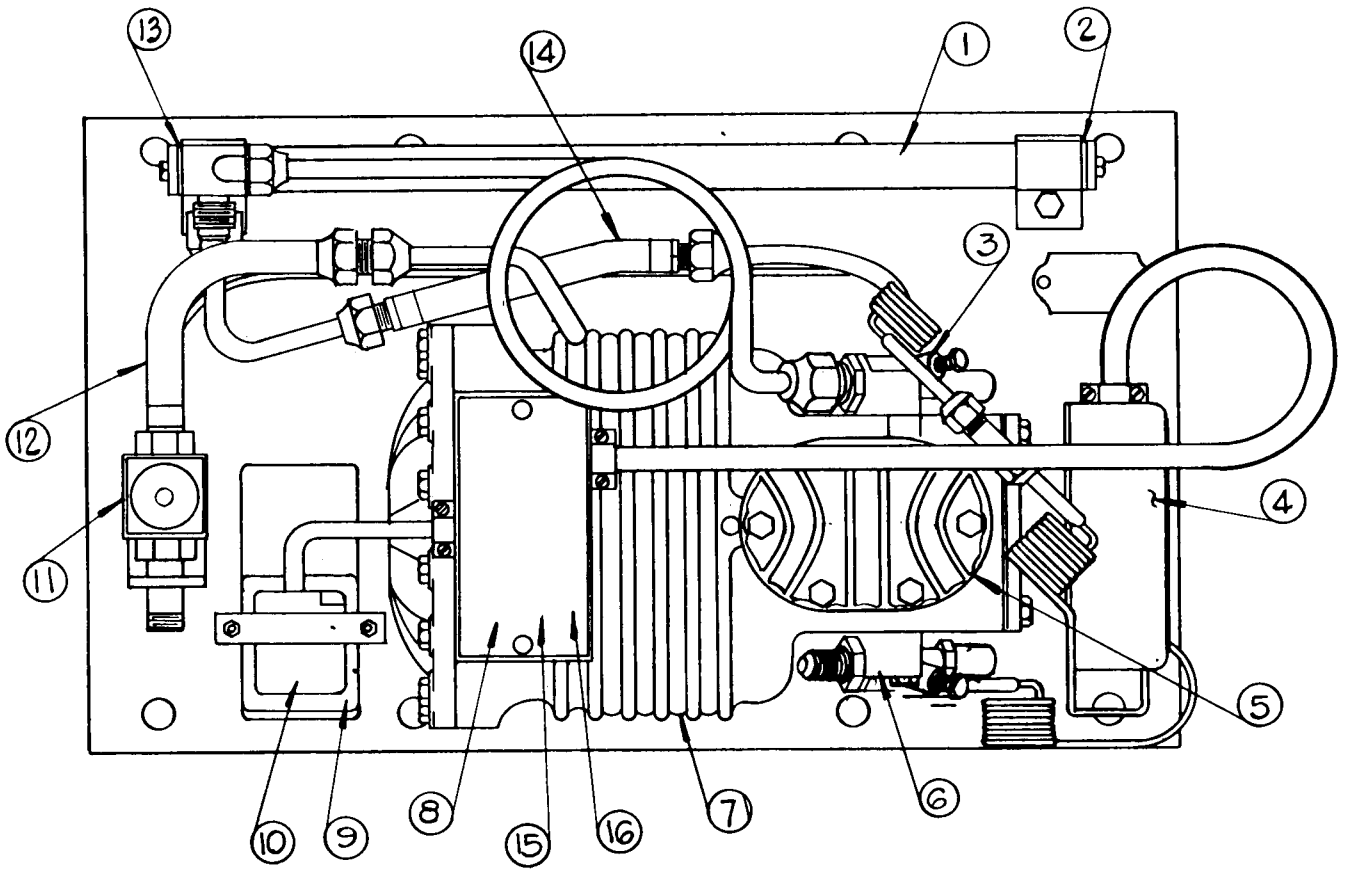
NOTE:

Complete A-8139-20 kit will be substituted on order for stem only.



CONDENSING UNIT

⅓ HP Water Cooled, Copeland thru "H" models



ITEM NO.	PART NO.	NAME
1.	18-259	Condenser
2.	18-262	Plain Gasket
3.	18-237	Discharge Service Valve
4.	11-286	High-Pressure Control
5.	18-222	Valve Plate & Gasket Kit Assembly(*)
6.	18-237	Suction Service Valve
7.	18-257	Motor Compressor 115/60/1 WC
8.	18-240	Klixon (overload)(*)
9.	18-1901-4	Starting Capacitor
10.	18-1903-4	Relay

(*) Not Shown

ITEM NO.	PART NO.	NAME
11.	11-198	Water Valve
12.	18-260	Compressor to Valve Water Hose
13.	18-263	Manifold Gasket
14.	18-261	Compressor to Condenser water hose
15.	18-270	Terminal Board (*)
16.	18-241	Terminal Ass'y

NOTE: Old Style

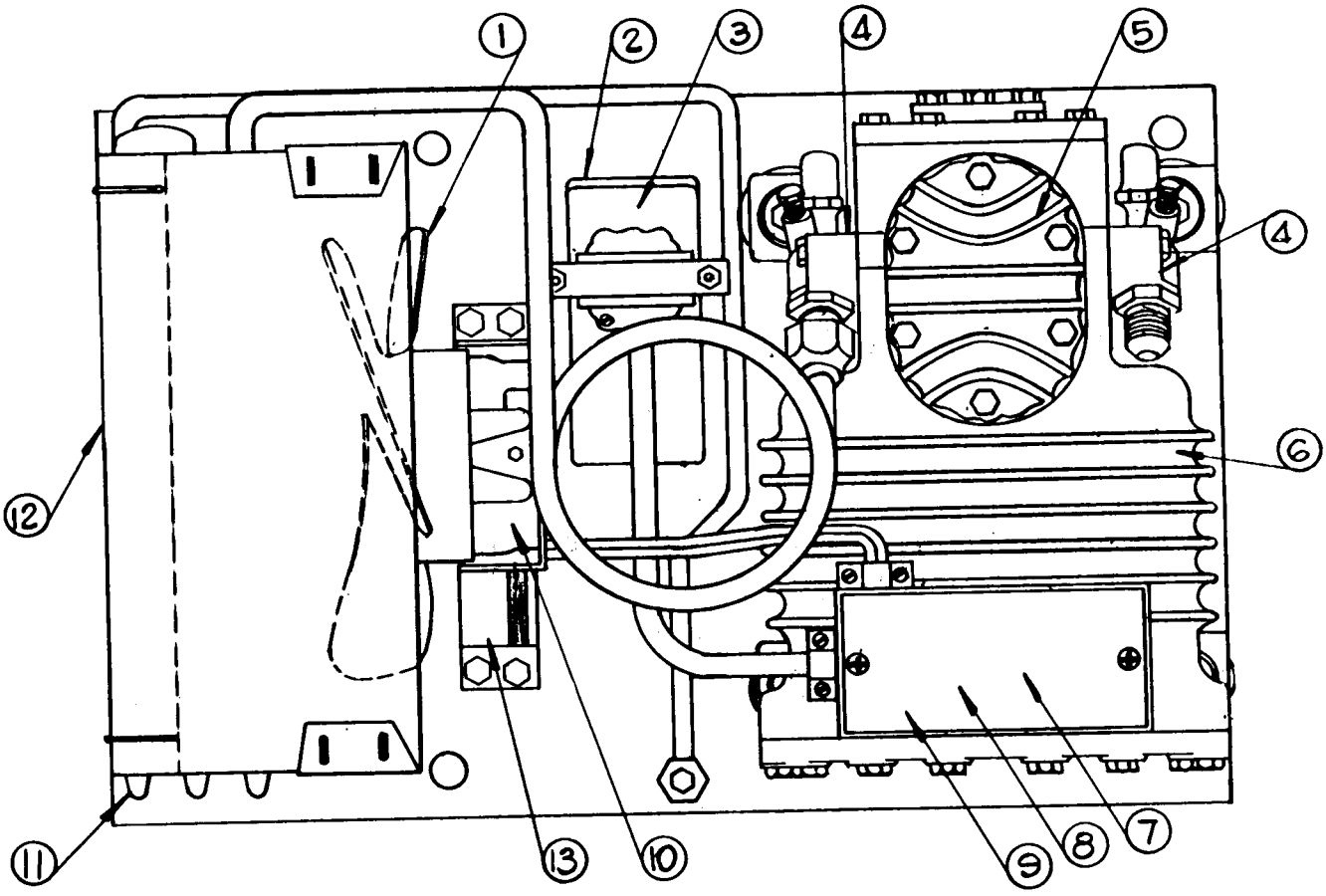
18-228	Starting Cap
18-227	Relay

NOTE:

Not available as a complete mounted Ass'y.

CONDENSING UNIT

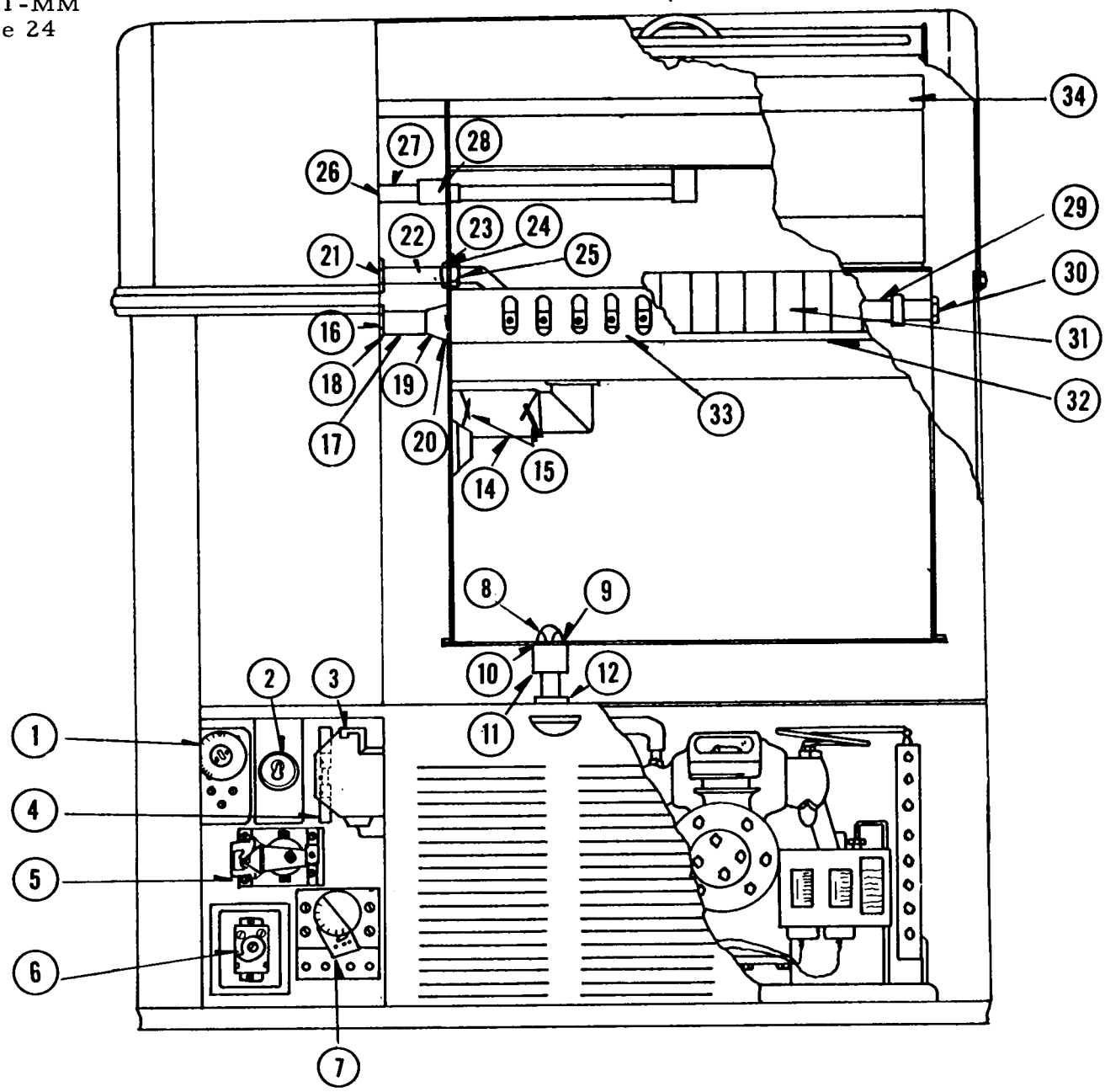
⅓ HP Air Cooled, Copeland
Used thru "H" models



ITEM NO.	PART NO.	NAME
1.	18-231	Fan Blade
2.	18-1901-4	Starting Capacitor
3.	18-1903-4	Relay
4.	18-237	Suction & Discharge
5.	18-222	Valve Plate & Gasket Kit
6.	18-221	Motor Compressor 115/60/1 AC
7.	18-240	Overload Klixon
8.	18-241	Terminal Ass'y (*)
9.	18-270	Terminal Board (*)
10.	18-150-1	Fan Motor
11.	18-234	Condenser
12.	A-12109	Shroud
13.	18-422	Fan Motor Bracket
NOTE:	18-228	Start Cap
Old Style	18-227	Relay

NOTE:
Not available as a complete mounted ass'y.

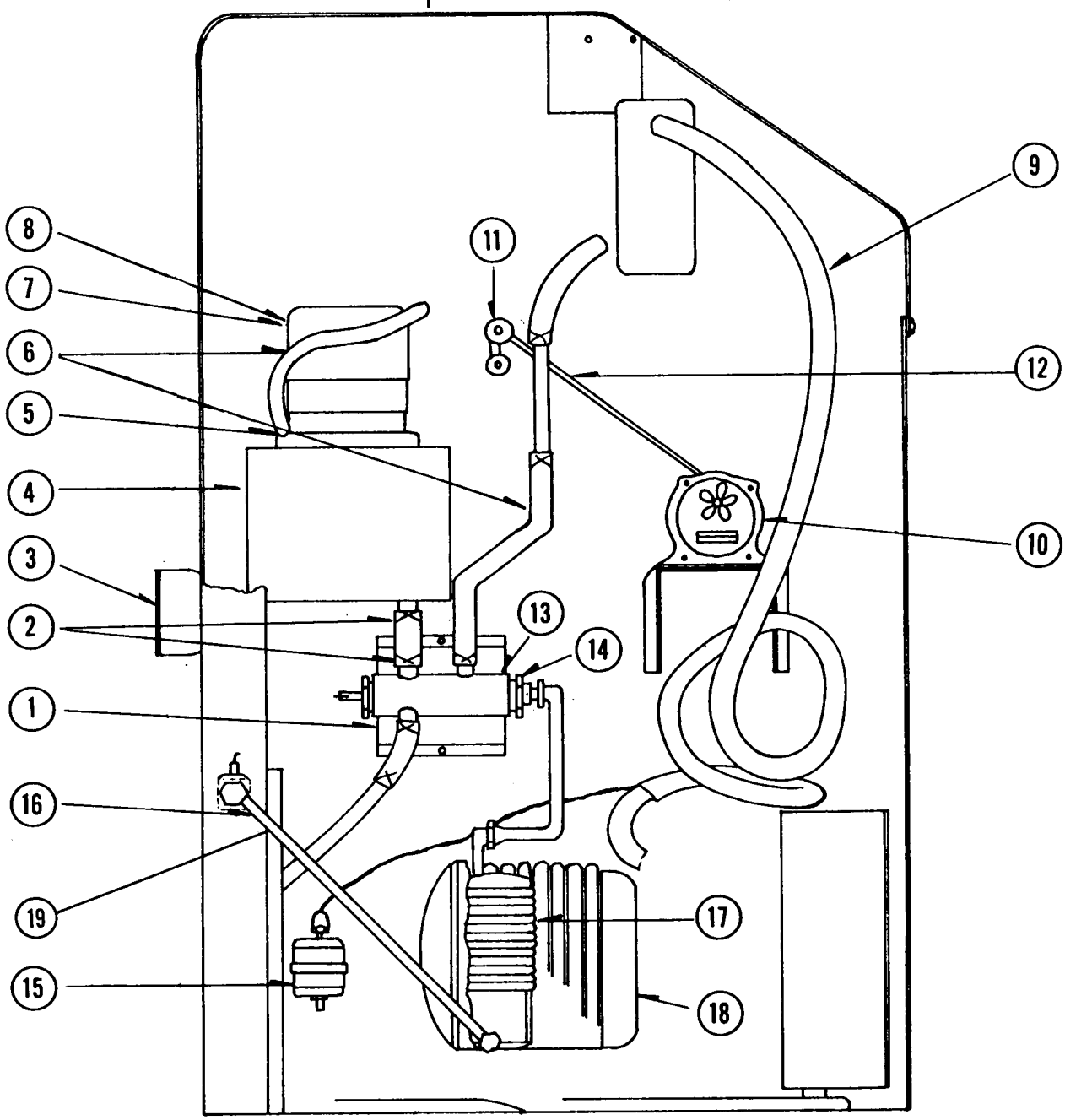
MM-110 up to "H" models



ITEM NO.	PART NO.	NAME
1.	11-99-1	Bin Control
2.	12-426	Switch
3.	11-352	Hi-Press Control
4.	12-257	Triple Receptacle
5.	12-419	Relay
6.	11-351	Cube Size Control
7.	12-645-1	Timer
8.	A-6448	Drain Strainer
9.	A-18090	Drain Fitting(Male)
10.	2-530	"O" Ring
11.	A-18102	Drain Fitting
12.	13-125	Grommet
14.	5-170-2	Hose Tygon
15.	2-537	Clamps
16.	S-7639	Driving Journal Assy
17.	S-8887	Drive Bearing Support

ITEM NO.	PART NO.	NAME
18.	13-169	Grommet
19.	3-606	Fiber Washer
20.	S-7635	Nut
21.	13-125.	Grommet
22.	A-16970	Inlet Pipe Assy
23.	A-16970	Nut
24.	2-541	"O" Ring
25.	S-9965	Nut for "O" Ring
26.	13-125	Grommet
27.	A-16437	Inlet Pipe Assy
28.	13-3	Grommet
29.	A-16432	Sprayer Tube
30.	A-16963	End Bearing Assy
31.	A-16439	**Curtain Assembly**
32.	3-727	Wing Screw (curtain)
33.	A-16412	Cube Chute Assy
34.	2-1489	**Insulation Panel**

MM-110
up to "H" Models

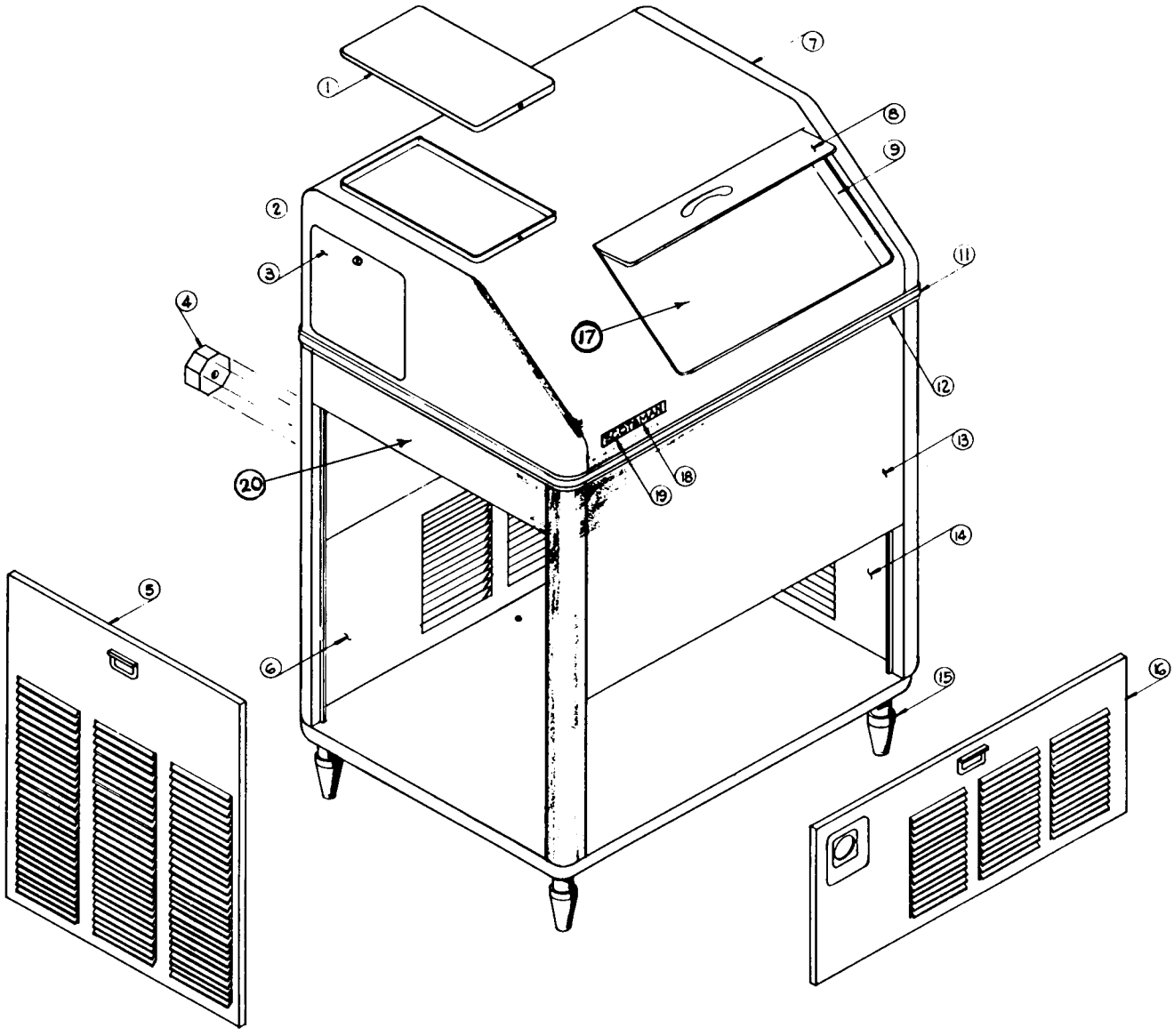


ITEM NO.	PART NO.	NAME
1.	A-17174	Valve (less Solenoid & Mounting
2.	2-536	Hose Clamps
3.	S-8417	Outlet Box
4.	A-8515	Sump Tank with Cover
5.	3-552	Wing Nuts
6.	5-179	Tygon Tubing
7.	12-418-1	Sump Pump
8.	12-418-22	Sump Pump Motor only
9.	A-16415	Freezer & Suction line Assy.

ITEM NO.	PART NO.	NAME
10.	12-1346-1	Drive Motor
11.	A-6726	Linkage Assy Complete
12.	S-7132	Linkage Rod
13.	12-248-1	Solenoid
14.	A-8139-20	Valve Repair Kit
15.	2-350	Drier
16.	12-621E-1	Solenoid
17.	A-17141	Condensor Tank Assy
18.	18-221	Motor Compr.
19.	12-621-31	Flow Control only

MM-110 CASE AND HOOD ASSY

up to "H" Models



ITEM NO.	PART NO.	NAME
1.	A-7714	Top Hood Panel
2.	A-6509	Moulding Strip Rear*
3.	A-6530	Top Side Door Ass 'y
4.	S-8417	Junction Box and Cover
5.	S-9405	Left Side Door Assembly
6.	A-6514	Back Door Ass'y
7.	A-17170	Hood Ass'y
8.	S-6237	Sliding Door
9.	S-7710	Door Slide Ass'y Moulding Strip
11.	A-6510	Front
12.	15-324	Plastic Insert
13.	A-16421	Case Assembly
14.	S-7165	Right Side Door Assembly
15.	A-12405-1	Leg(4)
16.	A-9716	Front Door Ass'y
17.	A-16423	Storage & Reservoir Assembly
18.	15-156	Emblem
19.	3-271	Speed Nut

(*) Not Shown

PART NAME: Three-way water valve.

NUMBER: A-17174

SETTING: None. Factory set.

REPAIRABLE: Yes. Order A-8139-20 valve repair kit.

MAINTENANCE: Valve and entire unit should be cleaned with ice machine cleaner every six months. In many localities heavy scale accumulation will lodge in valve and hold rubber seats open. This will either let warm water seep into sump freezer supply and cause long freezing cycle or else it will let sump freezer supply seep down drain and cause shortage of cube supply water. This results in short cycles, partial cubes and cloudy cubes. Manually flushing valve will also help in many cases.

PART NAME: Agitator Drive Motor Merkle Korff

NUMBER: 12-1346-1

FUNCTION: This motor is used to drive the linkage mechanism which in turn drives the oscillating 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.

SETTING: No settings on motor, motor mount is slotted allowing adjust to correct jet spray arm travel.

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 two 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 in spected to insure free movement with no bindings or drag on drive motor.

PART NAME: Timer

NUMBER: 12-645-1

FUNCTION: Heart of the cyclematic control system is the cube size control Part No. 11-351 and the time clock it actuates. All electrical components are connected to the time clock terminal board and are shunted by means of a double contact point arrangement to either the freezing cycle or harvest cycle. Contact points are in turn actuated by two cams that are directly connected to the electric timer clock motor. Timer has 12-minute cycle, ten minutes on freezing cycle after being cut on by cube size control and two minutes on defrost cycle. Time clock face has numerals to 7 on half the face. Each numeral represents a minute period. Face also has a lever beneath it which can be moved to lengthen or shorten defrost period.

SETTING: Normal settings for defrost is on No. 2 which is two minutes.

FUNCTIONAL PARTS AND MAINTENANCE

REPAIRABLE: Yes. Micro-switch only, Part No. 12-645-20, are replaceable as well as timer clock motor only, Part No. 12-367.

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

PART NAME: Cube size control.

NUMBER: 11-351

FUNCTION: Evaporator temperature sensing 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, Part No. 12-645-1 which takes over balance of freezing cycle and also defrost period.

SETTING: Factory set -- turn right for increased cube size. Turn left for decreased cube size.

REPAIRABLE: No. Replace when inoperative.

MAINTENANCE: Check electrical connections.

PART NAME: Solenoid Soreng

NUMBER: 12-248-1

FUNCTION: Solenoid is mounted directly on water valve body. Since present continuous duty solenoid does not have a built-in stop, care should be taken to see that the plunger cannot leave the coil when installed on earlier model machines. Adequate stops are present in the housing of the solenoid but may require bending or adjusting. An electrically operated solenoid which is used to open and close the water valve through mechanical linkage. Solenoid is a continuous duty type.

SETTING: Solenoid itself requires no adjustment, however, linkage should be adjusted so that solenoid can make positive contact when energized and core will leave field when de-energized.

REPAIRABLE: No. Replace when inoperative.

MAINTENANCE: Solenoid proper requires no maintenance, but care should be exercised to insure proper voltage to coil to avert burn-outs. Mechanical linkage can be oiled and adjusted to prevent drag on solenoid. Many solenoid burn-outs are caused indirectly such as a sticking time clock which will keep solenoid energized for long periods of time.

PART NAME: Sump Pump Graymills-Hartell

NUMBER: 12-418-1

FUNCTION: Recirculating pump used to pump supply water in sump tank to jet tubes during freezing cycle.

FUNCTIONAL PARTS AND MAINTENANCE

SETTING: Factory set.

REPAIRABLE: Yes. Oilite sleeve type bearings may be replaced, motors rewound, impeller blades replaced. Gray-mills pumps have oilers. Hartell ball bearings pumps do not.

MAINTENANCE: Motors require oiling every three months on the sleeve bearings. Use SAE 20 oil in the oiling cups provided. Many pumps returned to the factory as defective are merely in need of oil and are re-operated by oiling the sleeve bearings.

Cleaning a stuck motor with carbon tetrachloride or equivalent will re-activate the majority of the motors returned for this reason. Sleeve bearings may be flushed clean, and re-oiled with SAE 20 oil and perform as new.

PART NAME: High pressure control.

NUMBER: 11-352

FUNCTION: Controls head pressure at low ambients. Will cut out fan motor upon drop in head pressure.

SETTING: Factory set.

REPAIRABLE: No. Replace.

MAINTENANCE: Check electrical connections for loose wires.

Refrigerant	R-12
Refrigerant Charge	21 ounces R-12
Refrigerant Control	Capillary Tube
Cubes per harvest	104

FUNCTIONAL PARTS AND MAINTENANCE

PART NAME:	Relay	Potter & Brumfield	Type PR5AX
NUMBER:	12-419		
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 and blow points free of lint or dirt.		
PART NAME:	Temperature Control Storage Bin	White Rodgers	
NUMBER:	11-99-1		
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:	These controls have adjustable differential. Setting on range dial should be 35^{o} out, 39^{o} in.		
REPAIRABLE:	No. Replace when inoperative. If out of warranty it can be sent in through your local refrigeration supply dealers and repaired or replaced for a small percentage of original cost.		
MAINTENANCE:	Remove cover, check points for corresion or arcing every six months. Blow control free of bugs, dirt, etc. Check capillary for cracks or worn spots due to vibration. Hold a small handful of ice on thermostat bulb to check operation of control. Tighten electrical connections.		
PART NAME:	Inlet Water Solenoid/Flow Control		
NUMBER:	12-621E-1		
FUNCTION:	During freezing cycle this valve is closed, keeps water from entering heat exchanger tank and also from leaking out of tank. During harvest or defrost cycle this valve opens and allows inlet water to pass to flow control orfice and thence to push warm water out of heat exchanger tank through 3-way water valve into back of cups molds, performing the defrost.		
SETTING:	Factory set.		
REPAIRABLE:	Yes		
MAINTENANCE:	Flush control each six months.		

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

To remove cabinet top or Hood.

1. Remove two back end screws in rear moulding strip
2. Pull out black insert tape concealing screws.
3. Remove balance of screws in moulding strips.
4. Lift hood straight up.

To remove Sump Pump.

1. Remove hood left end panel.
2. Remove hose clamp on pump discharge line.
3. Loosen two brass wing nuts holding pump in position.
4. Pull out plug-in type cord which leads to control box.
5. Lift pump straight up and out through left side opening.

To remove Agitator Motor.

1. Disconnect plug-in at the control box.
2. Loosen the Allen set screw on driver crank arm and remove the drive arm.
3. Remove the four hold-down screws and remove the motor.

To remove the jet tube assembly.

1. Remove the plastic curtain assembly.
2. Remove the cube rack.
3. Lift the right end of the jet tube straight up and slide the other end out of the driving slot.

To replace cube size thermostat.

1. Lift out sliding storage bin door.
2. Lift up and out on plastic cover over cube section at top of bin area.
3. Remove plastic strip lying over left cup section. This will expose copper tube well soldered to top of refrigerant coil.
4. Pig tail end of cube size thermostat is held in well by a light friction fit. Push pigtail out of well.
5. Tie a strong "Fish Cord" on end of pigtail to help in replacing new thermostat.
6. Remove hood top left service door, both bottom front and left side service doors.
7. Remove electrical control box cover.
8. Remove two screws holding (Ranco) control body from mounting bracket - Pull free from control box.
9. With new control in hand, pull 3 electric leads off old control and connect to new control on same terminals.
10. Pull control capillary and body towards outside left cabinet. At the same time guide pigtail end in bin through storage bin wall retainer opening.
11. After pigtail end clears retainer opening, control is free.
12. Tie "Fish Cord" from old control on new and pull pigtail through opening in reverse procedure.
13. Reassemble balance of steps reverse order.

SERVICE - COMPLETE UNIT

To remove solenoid-operated three way water valve.

1. Remove left side service panel.
2. Drain all water from unit, disconnect power and water.
3. Remove three clamps holding tygon tubing to valve.
4. Loosen flare connection at right end of valve.
5. Remove two hex head cap screws holding water valve housing to cabinet and drop straight down. Lead-in wire to solenoid has plug-in terminal.

To replace storage bin door

1. Lift door up and slide back approximately six inches.
2. Lift up on underside of door and pull straight out and toward you.
3. Replace door in reverse procedure.

To replace motor compressor valve plate

1. Install compound gauge in suction service valve port and close suction service valve by turning valve stem all the way in (Front Seated.)
2. Operate motor compressor until gauge reading reaches zero. Turn off unit.
3. Front seat discharge service valve.
4. Loosen all head bolts and tap head lightly with rubber-faced or plastic hammer to break loose.
5. Remove head, defective valve plate and any gasket material that may have stuck to head or compressor body.
6. Install new valve plate with all new gaskets as provided, tightening each head bolt a little at a time until all are snug.
7. Remove port gauge plug from discharge valve and crack open suction side letting gas purge off trapped air from head. Install hi-side gauge in this port, back up both service valve stems and check around valve plate for refrigerant leaks.
8. Start unit, noting head and back pressures. If normal, let run until compressor gets warm. Tighten all head bolts once more, and again check for leaks.

To replace the compressor

1. Front seat both suction service valve and discharge service valve on the compressor.
2. Disconnect the wiring from the compressor.
3. Remove the bolts holding the service valve to the motor compressor body.
4. Remove the compressor hold-down nuts and lift the compressor out of the unit.
5. Reverse steps 1 through 4 in replacing the compressor.
6. Check the compressor for oil before connecting the oil lines. Should be 2 inches down from the top of the oil plug hole.
7. Remove the gauge port plug from the discharge service valve. Crack the suction service valve slightly, allowing some gas to escape out the gauge port of the discharge valve. When you have thoroughly purged the compressor, replace the plug and open all valves. It may be necessary to charge the unit because some of the gas was lost when the defective compressor was removed. Check and charge is necessary.

SERVICE ANALYSIS

SYMPTON	POSSIBLE CAUSE	SUGGESTED CORRECTION
Shortage of water	Water spraying out through curtains	Replace broken curtains if any broken. Adjust travel of jet tube if spraying too far forward.
	Three-Way water valve leaking	Check the valve for foreign matter. Check valve seats and replace if necessary.
	Water entering hot water tank too slowly	Check pressure at source-20# required. Dirt in solenoid and flow control- blow out.
		Partial restrictions in water strainer. Clean Strainer.
Irregular size cubes and some cloudy	Some jets plugged	Clean jets.
	Shortage of water	See Shortage of Water
	Cube Chute in path of spray	Reposition cube chute.
	Unit not level	Water overflowing air vent holes on low side burning cubes. Level as required.
Cubes too large	Cube size control set low	Raise setting on cube size control.
Decreased ice capacity	Inefficient compressor	Replace .
	Leaky water valve	Replace or repair.
	High head pressure	Dirty condenser. Clean. Bad fan motor. Replace. Non-condensable gas in the system: purge the system. Too hot a location with poor circulation:
		relocate the unit, or provide for ventilation by cutting openings; Overcharge of refrigerant. Correct the charge.
	Partially restricted cap tube	Purge & replace charge and drier
Hole washed inside cube	Water over the top of the cube cups during harvest	Level unit.

SERVICE ANALYSIS

SYMPTOM	POSSIBLE CAUSE	SUGGESTED CORRECTION
Unit will not run.	Blown fuse	Replace fuse & check for cause of blown fuse.
	Bin thermostat set too high	Adjust thermostat. Set between 35° out to 39 degrees in.
	Switch in Off position	Turn switch to On position.
	Inoperative master switch	Replace switch
	Timer contacts open	Replace timer contacts.
Compresser cycles intermittently	Low voltage	Check circuit for overloading. Check voltage at the supply to the building. If low, contact the power company.
	Dirty condenser	Clean with vacuum cleaner, air or stiff brush. (Do NOT use wire brush.)
	Air circulation blocked	Allow sufficient air space all around unit.
	Inoperative condenser fan motor	Check to see if defective. If defective, replace.
	Non-condensable gases in system	Purge the system.
Cubes too small	Cube size control set too high	Lower the setting. Turn towards colder.
	Partially restricted capillary	Blow charge, add new gas & drier.
	Moisture in system	Replace the dryer.
	Shortage of water	See remedies for shortage of water.
	Shortage of refrigerant	Check for leaks and recharge.
Cloudy cubes	Shortage of water	See remedies for shortage of water.
	Dirty water supply	Use water softener or water filter.
	Restricted drain on pump	Clean pump strainer.
	Accumulated impurities	Use SCOTSMAN Ice Machine Cleaner.
Poor harvests	Too short defrost time	Check and adjust harvest cycle. Timer should be set between 2 or 2 1/2.
	Restriction in incoming water	Check water feed line strainer and flow reducing valve. To give greater water flow increasing defrost time.
	Insufficient quantity of hot water	Cold ambient - must be 50° minimum faulty fan control on aircooled models.
	Solenoid valve not opening the water valve	Solenoid binding or burned out. Replace.
	Air vent holes in upper cube cups plugged	Clean out holes.

THE FOLLOWING MAINTENANCE SHOULD BE COMPLETED TWO (2) TIMES PER YEAR ON ALL SCOTSMAN SUPER CUBERS.

1. Clean air-cooled condenser. This is to be done frequently with the machine shut off.
2. Clean hot water tank and evaporator, sump tank and screen, using Scotsman Ice Machine Cleaner or equivalent.
3. Remove jet tube and manually clean jets by unscrewing jets.
4. Check curtain assembly.
5. Tighten all electrical connections.
6. Tighten all bolts.
7. Check water supply. Minimum pressure of 20# is required. Clean Water strainer.
8. Oil jet tubes drive motor three (3) places. Use SAE 20 oil - 2 oil cups, 1 crank case screw covered opening.
9. Oil sump pump motor. Necessary to remove pump on some models. Use SAE 20 oil. Two 90° oilers are capped with rubber protectors.

CLEANING INSTRUCTIONS FOR SCOTSMAN ICE MACHINES MODELS MM110H

1. Remove front access door.
2. Locate control box with time clock knob protruding thru cover.
3. Put unit through a harvest cycle manually. This may be done by turning time clock knob clockwise until a loud snap is heard.
4. Let unit finish harvest cycle and start into freezing cycle. This will be approzimately 5 minutes after the loud snap in Step # 3 is heard. At this time turn the compressor switch off, off, the lower of the two switches in the control box.
5. Locate the sump reservoir which is in the storage bin area and directly behind the ice discharge chute. This discharge chute is covered by a series of white plastic curtains which are free to swing out into the storage bin. Pour 4 ounces (half bottle) of "Scotsman Ice Cleaner" into platen.
6. Locate insulation panel which is directly above platen. Lift insulation panel, pour the remaining 4 ounces of "Scotsman Ice Machine Cleaner" in platen.
7. Let unit operate normally for 10 - 15 minutes into the freezing cycle. No ice will be made because the motor compressor is not in operation
8. At the end of this time put the unit through 2 or 3 harvest cycles manually to allow fresh make up water to clean out remaining solution. Each time waiting approximately 5 minutes after the loud snap until the next harvest cycle is done manually.
9. Turn the compressor switch back on.
10. Check each new batch of cubes until they are clear and until acid taste has been removed from cubes.
11. Put hot water in storage bin to melt the cubes and thereby clean the drains with the same solution that has just cleaned the unit.
12. Use a damp cloth to wipe off curtains and inside of storage bin.
13. Replace all access doors .
14. Unit is now ready for continued automatic operation.

PARTS LIST - MM-110

1. CABINET PARTS

Case Hood Assembly	A-18158
Sliding Door Glides	3-640
Hood Side Door	A-6530
Door Slide Track	A-16208
Sliding Door	A-15559
Door Catch	A-16209
Emblem	15-156
Moulding Strip - Rear	A-6509
Moulding Strip - Front	A-6510
Cabinet Front Service Door	A-15789
Cabinet Right Side Service Door	A-16561
Cabinet Rear Service Door	A-16563
Cabinet Left Side Service Door	S-9405

2. CONTROL BOX - ELECTRICAL COMPONENTS

Timer Assembly	12-645-1
Timer Micro-Switch	12-645-20
Head Pressure Control	11-352
Cube Size Control	11-351
On-Off Switch	12-426
Bin Thermostat	11-99-1
Complete Cube Relay	12-419

3. CONDENSING UNITS AND REFIRGERANT CIRCUIT

	AIR-COOLED	WATER-COOLED
Freezer and HX Ass'y Complete	A-16415-2	Same
Suction HX and Accumulator Line	A-6123	Same
Drier	2-350	Same
Motor Compressor 115/60/1	18-221	18-257
Valve Plate and Gasket Kit	18-222	Same
Cylinder Head	18-225	Same
Relay	18-227	18-1903-4
Starting Capacitor	18-228	18-1901-4
Fan Motor	18-150-1	
Fan Blade	18-231	
Condenser	18-234	18-259
Shroud for Condenser	A-12109	
Klixon Overload (for units not inherent protected)	18-240	Same
Replaceable Terminal Assembly	18-241	Same
Terminal Board	18-270	Same
Compressor to water valve hose		18-260
Compressor to condenser hose		18-261
Plain Gasket for 18-259		18-262
Manifold Gasket for 18-259		18-263
Manual re-set dual pressure control		11-286
Water Regulating Valve		11-198

4. HOT WATER TANK

Hot Water Tank Complete	A-17140

5. WATER VALVE

3 - Way Water Valve less Solenoid	A-17174
Solenoid	12-248-1
Replacement Rubber Valve Seats	13-148
Water Valve Repair Kit	A-8139-20
Solenoid Pull Spring 1 1/2 inches	2-420
Solenoid Pull Key	S-8995

6. WATER CIRCUIT

Inlet Water Strainer	16-162
Inlet Water Solenoid	12-621E-1
Sump Pump Assembly	12-418-1
Sump Pump Motor only	12-1351-2
Sump Tank Assembly, insulated	A-8515
Flow Control only	12-621-31
Sprayer Tube Assembly	A-16432
Sprayer Tube Jet only	S-6907
End Bearing, water inlet to sprayer tube A-16963	A-16963
U-cup for A-16963 End Bearing	13-168

7. DRIVE MOTOR AND LINKAGE

Drive Motor	12-1346-1
Drive Linkage assembly	A-6726
Driver Arm Assembly	A-6462
Linkage Rod	S-7132
Drive Arm Assembly	S-7128
Drive Bearing Support	S-8887
Driving Journal	S-7639

8. STORAGE BIN AND COMPONENTS

"O" Ring	2-530
Drain Fitting (Male)	A-18090
Drain, Strainer	A-6448
Valve Drain Tube (Female)	A-18102
Bin Thermostat Bulb Cover	A-15759
Bin thermostat Bulb Gasket	13-590
Cube Chute	A-16412
Curtain Assembly	A-16439
Curtain Thumb Screws	3-727

MISCELLANEOUS

Ice Scoop	2-540
Plastic Trim Insert - Per Foot	15-324