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## SPECIFICATIONS

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	SM1005A	SM1005W
Compressor	3 hp twin cylinder Semi Hermetic	3 twin cylinder Semi Hermetic
Condenser	Cleanable Air Cooled	Cleanable Water Cooled
Refrigerant	R12	R12
Refrigerant Charge	130 ounces	130 ounces
Refrigerant Control	Twin Capillary Tube	Twin Capillary Tube
Power Consumption	14.6 Amp., 3 Wire 230 V., 60 Hertz Single Phase	8.4 Amp., 3 Wire 230 V., 60 Hertz Single Phase
Water Consumption to Produce Ice	30.9 Gallons per hour	30.9 Gallons per Hour
Water used by Condenser		1 to 3 1/2 Gallons per minute. Varies With water temperature.
Companion Bin	B-700	B-700
Cube Size	Scotsman Medium cube	Scotsman Medium cube
Cubes Per Harvest	480	480
Average Operating Head Pressure	135-155 P.S.I.	140 P.S.I.
Average Operating Back Pressure	Varies 50-60 during off Cycle	5 P.S.I. End of Freezing Cycle

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### NOTE:

All Scotsman Super Cubers require neutral wire for secondary 115 volt components circuit. 3 phase cubers require 4 wire service with neutral. Special voltages upon request.

\* Model B-700 storage bins are not equipped with legs. Order leg package from Scotsman Sales Department.

# SCOTSMAN<sup>®</sup> ICE MACHINES

PRODUCT NAME:

## SCOTSMAN<sup>®</sup> CUBER MODEL 1000 SERIES

MANUFACTURER:

QUEEN PRODUCTS DIVISION  
KING-SEELEY THERMOS CO.  
ALBERT LEA, MINNESOTA 56007

SHOWN 3 QTR. SIZE

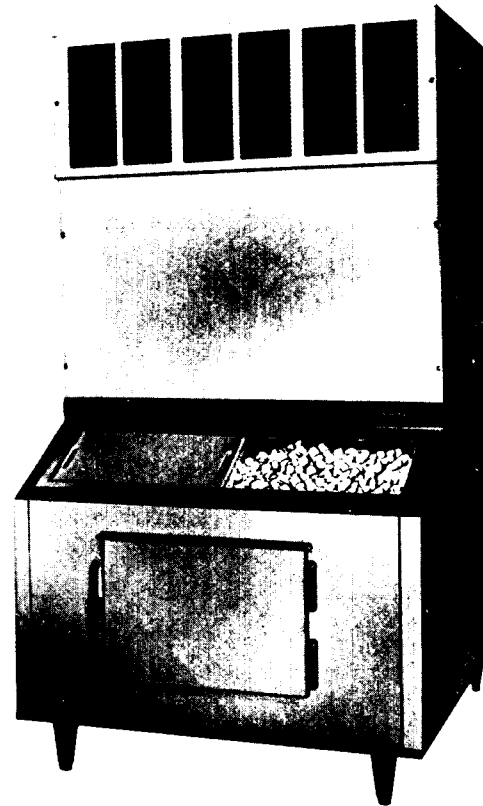
*Model SC1000  
produces  
large cubes*



*Model SM1005  
produces  
medium cubes*



*Model MM1010  
produces  
small cubes*



(ILLUSTRATED ON B700 BIN)



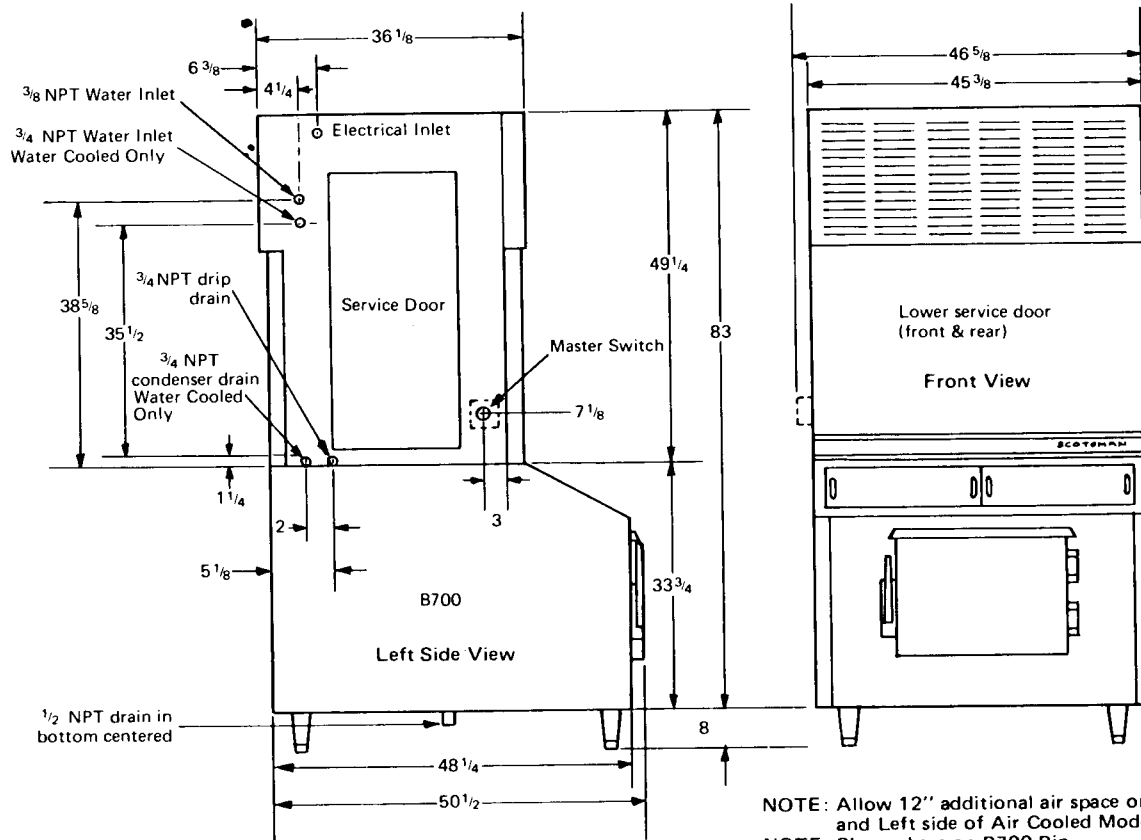
## ice making capacity

Daily Ice Capacity is directly related to condenser air inlet temperature, water temperature, and age of machine.

**NOTE:** To keep your SCOTSMAN CUBER performing at it's maximum capacity, it is necessary to perform periodic maintenance as outlined on page 45 of this manual.

## 1000 SERIES

Capacity: Refer to production chart.  
 Storage Bin: B700 Stainless Steel Lined  
 Height: 49-1/4"  
 Width: 46-5/8"  
 Depth: 36-1/8"



NOTE: Allow 12" additional air space on Top, Back and Left side of Air Cooled Models.  
 NOTE: Shown here on B700 Bin.

### SPECIFICATIONS:

Model	Condensing Unit	Compressor Horsepower	Finish (P-painted) (SS-Stainless Steel)	Shipping Weight (lbs.)	Basic Electricals	Minimum Wire Sizes (w-wire) (g-gauge)			Total Amperages			
						SC 1000	SM 1005	MM 1010	SC 1000	SM 1005	MM 1010	
SC1000HA	Air	3	P	915	Air Cooled 115/230/60/1 115/208-220/60/3	3w 10g	3w 10g	3w 10g	23.1	23.1	23.1	
SC1000HASS	Air	3	SS	915								4w 10g
SC1000WHA	Water	3	P	915		Water Cooled 115/230/60/1 115/208-220/60/3	3w 10g	3w 10g	3w 10g	20.9	20.9	
SC1000WHASS	Water	3	SS	915								4w 10g
SM1005HA	Air	3	P	915								
SM1005HASS	Air	3	SS	915								
SM1005WHA	Water	3	P	915								
SM1005WHASS	Water	3	SS	915								
MM1010HB	Air	3	P	915								
MM1010HBSS	Air	3	SS	915								
MM1010WHB	Water	3	P	915								
MM1010WHBSS	Water	3	SS	915								

Specifications subject to change without notice.

## INSTALLATION LIMITATIONS

### ELECTRICAL

1. Scotsman, like most manufacturers, purchases electrical motors that are rated to operate within 10% variance above or below nameplate ratings.
2. 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

**WARNING** — This machine is not designed for out door installations. This machine will not operate when air temperatures are below 50° F. or above 100° F.

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.

## INSTALLATION INSTRUCTIONS

The following installation instructions were written for use by an authorized tradesman only, not the user or customer. We suggest you 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

### LOCATION OF THE ICE CUBE MACHINE

1. Select a location as convenient as possible for the user.
2. Accessible to the necessary electrical and plumbing connections
3. If possible, have a minimum space of 12 inches above top and from left end panel for service.
4. A minimum of 24 inches for convenience of the user in front of the machine.
5. Room temperature--minimum of 50 degrees, maximum of 100 degrees.

ALL 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 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 the 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.

BASEMENT INSTALLATION--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 12 INCHES OF SPACE AROUND THE MACHINE FOR CIRCULATING AIR.

### UNCRATING

1. If possible, do not uncrate until equipment is in permanent location.
2. Storage bin and machine compartments are shipped in separate crates.
3. Remove hold-down bolts from skids.
4. Remove crate in usual manner for wood crating.

### PREPARATION FOR INSTALLATION

1. Inspect complete unit cabinetry for shipping damage. Notify carrier of concealed damage claims.
2. Remove all service doors and panels.
3. Loosen motor compressor hold down nuts until motor compressor rides freely on mounting springs.



### PREPARATION FOR INSTALLATION

5. Remove all masking tape and packing members from curtains and inner cube making compartments. Realign components such as sump pump or cube racks that may have shifted in transit.
6. Remove water strainer from compressor section for installation on unit or in water supply line feeding unit.
7. Open electrical control box and prepare for hook up. Use knock outs, cord connectors, etc. Then check unit nameplate voltage against building source voltage to make sure they correspond. Caution- Improper voltage applied to units will void your warranty protection.
8. Select unit location prior to hook up of water, drain and electric in accordance with local and national codes, minimum room temperatures 50° Fahrenheit. On air cooled models select well ventilated location.
9. Remove service manual from storage bin and wipe bin clean with damp cloth.

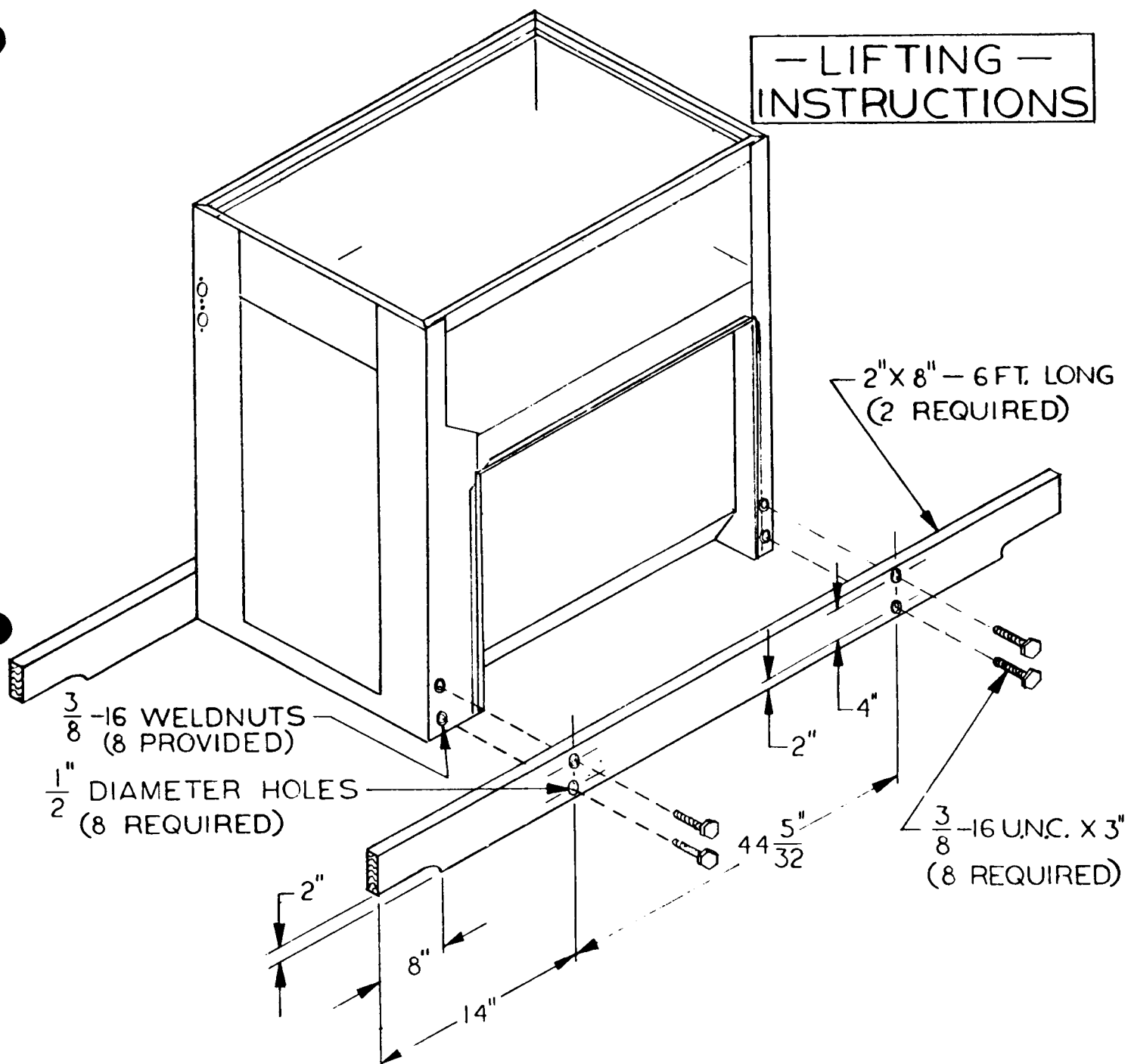
### SETTING UP MACHINE

1. Be sure floor strength is capable of 2,000 pounds in an area of 46 inches by 50 inches.
2. If ceiling height permits, use 8 inch base legs for the storage bin which will make a more convenient height for the user and allow more fall from the storage bin drain.
3. Storage bin must be absolutely level. **(THIS IS IMPORTANT)**

### PLACING MACHINE SECTION IN POSITION ON ICE STORAGE COMPARTMENT

1. Remove top and bottom doors on front and back of unit.
2. Extreme caution must be used to prevent damage to equipment or injury to the personnel.
3. Weld nuts for attaching carrying handles have been incorporated in each unit. Two in each corner of the front and back, these are 3/8" and spaced 4" x 44 5/32".
4. For carrying handles use 2 x 8's at least 6 feet. This allows 2 feet on each end for hand holds.
5. On the B-700 bin, care should be taken to avoid damaging rubber gasket around opening.

— LIFTING —  
INSTRUCTIONS



REMOVE DOORS. BOLT THE 2" X 8"S TO THE MACHINE BY MEANS OF EIGHT  $\frac{3}{8}$  -16 U.N.C. CAP SCREWS INTO THE WELDNUTS PROVIDED IN THE FRAME.

CONDENSER WATER IN  
ON W.C. MODELS

ELECTRICAL  
CONNECTION  
EITHER SIDE

WATER INLET  
3/8" N.P.T. IN-  
STALL STRAINER  
AND HAND SHUT-  
OFF VALVE

ACCESS PANEL  
TO WATER VALVES  
SUMP PUMPS  
AND DRIVE  
LINKAGE

3/4" N.P.S. SUMP  
DRAIN

COND. DRAIN  
W.C.

ON AND OFF  
SWITCH

1/2" N.P.T. DRAIN  
BOTTOM CENTER  
OF BIN

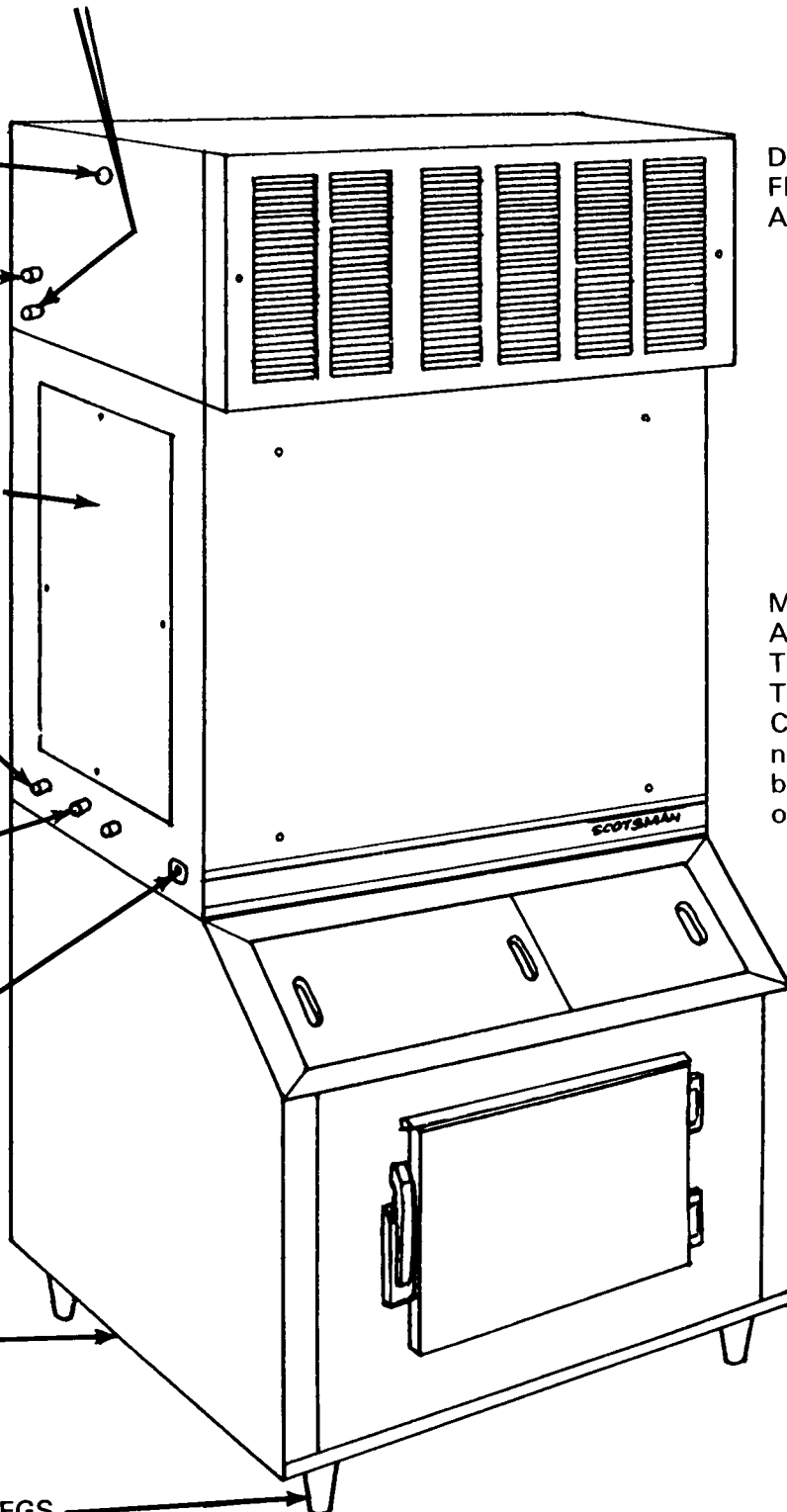
\* 8" ADJUSTABLE LEGS  
LEG LEVELERS

DO NOT OBSTRUCT  
FRONT AND BACK  
AIR LOUVERS

MAKE ALL WATER  
AND DRAIN CONNEC-  
TIONS ACCORDING  
TO LOCAL CODE  
Care should be taken  
not to damage rub-  
ber gasket around ice  
openings in B-700 bin.

**SM 1005 INSTALLATION ON B - 700 BIN**

\* LEGS OPTIONAL



## PLUMBING

1. Refer to Installation Diagram.
2. Water inlet should be 3/8" pipe or larger.
3. Strainer should be installed on outside of machine as close as possible to unit.
4. A shut-off valve either of globe or gate type should be installed next to strainer for the convenience of the service man.
5. (SM1005 is equipped with three separate drains so as to comply with all plumbing codes.)
6. Drain marked sump should be kept 3/4" in size with adequate fall which assures complete emptying of the sump tank at the end of the freezing cycle; and also with enough velocity to remove any sediment or solids which may have accumulated from the preceding batch of ice cubes.
7. Storage drain should be connected to open drain.
8. The drain from the condensor on W.C. units has a slight pressure NOTE: If outlet of connected drain is visible, it is helpful to the service man in checking condensor water valve.

## WATER SUPPLY AND DRAIN CONNECTIONS

Page 5 shows recommended water piping connections and drain facilities for Model SM1005.

### WATER SUPPLY

The water supply line is 3/8" N.P.T. for all 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.

Use care in connecting up water line to the machine. Water supply must be installed to conform with local code.

### DRAIN

The recommended drain 3/8" N.P.T. tubing. Sweat to drain connections. Must be run to open or trapped drain. If drain is a long run, allow a 1/4" pitch per foot. Drain must be installed to conform with local code. Run separate 1/2" bin drain.

### WATER TREATMENT

1. In area where vast amounts of solids and impurities are present in the water supply, it may be necessary to use some type of filtering equipment on the water that is used in the actual manufacture of the ice and not for the condenser.
2. If above condition is true, it is suggested to disconnect water regulator from present location in machine compartment and connect it to a 3/8" OD copper line which may be run to the filtering equipment. (NOTE: If water softening equipment is available in building, connect 3/8" line in soft water ahead of heater.)
3. For water treatment over and above normal local impurities, consult Service Dept., Scotsman Queen Products, Albert Lea, Minnesota.

### PLACING OF BIN THERMOSTAT BULB IN STORAGE AREA

1. When mounting SM-1005 on B-700 2 holes for fastening thermo bulb are located on the back wall of the bin.
2. Control has 12 foot cap tube. This should be brought down right front of freezing chamber, under cuber close to right side.
3. Bulb cover, gasket, and 2 buttons are packed with cuber.
4. When mounting unit on custom-built Bin bulb should be mounted close to the bottom, back, right-hand corner of the cuber.
5. Bulb should always be mounted so as to not be damaged by scoops or shovels.

### ELECTRICAL

1. **IMPORTANT:** An ice machine must be connected by competent electrician.
2. Refer to wiring diagram.
3. SM1005-4 (115-230/60/1) required 230 volt 3 wire, single phase system.
4. SM1005-9 (115-208, 220/60/3) requires 208-220 volt 4 wire, 3 phase system.
5. Compressor operates on higher voltages and component parts on 115 volts only.  
(Caution: In area where a wild phase is present in the system, it must be kept out of the low voltage circuit)
6. Electrician should be instructed to install proper disconnect switch with a solid neutral.

### ELECTRICAL CONNECTION AND CHARACTERISTICS

Standard Voltage 3 Wire 230/60/1

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

Be Certain that the cubers are on their own circuit and individually fused. The maximum allowable voltage variation should not exceed 10% 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. Do Not install 230 volt units on 208 volt supply. If necessary, use boost-buck transformer to correct voltage.

208/220/60/3 3 phase 4 wire

Wire according to diagram on machine. All wiring to be done according to local, state and National codes.

### MANUAL SWITCH

A manual switch is provided on left side of the unit for the convenience of the user when it is desired to shut the unit down for a period of time. When any electrical component parts are being removed or serviced, it is recommended that the line switch be put in the "OFF" position.

Manual switch is also located in control box for shutting off compressor while cleaning unit.

## HIGH PRESSURE CONTROL W.C. MODELS

A high pressure control is provided to shut down the complete unit in case of extremely high head pressures or interrupted water supply. Some models are equipped with a lock-out type, and the unit will remain off until the control is reset manually. (To reset, press down small plunger on top of control.) The high pressure control should be set at 185 pounds.

### START UP

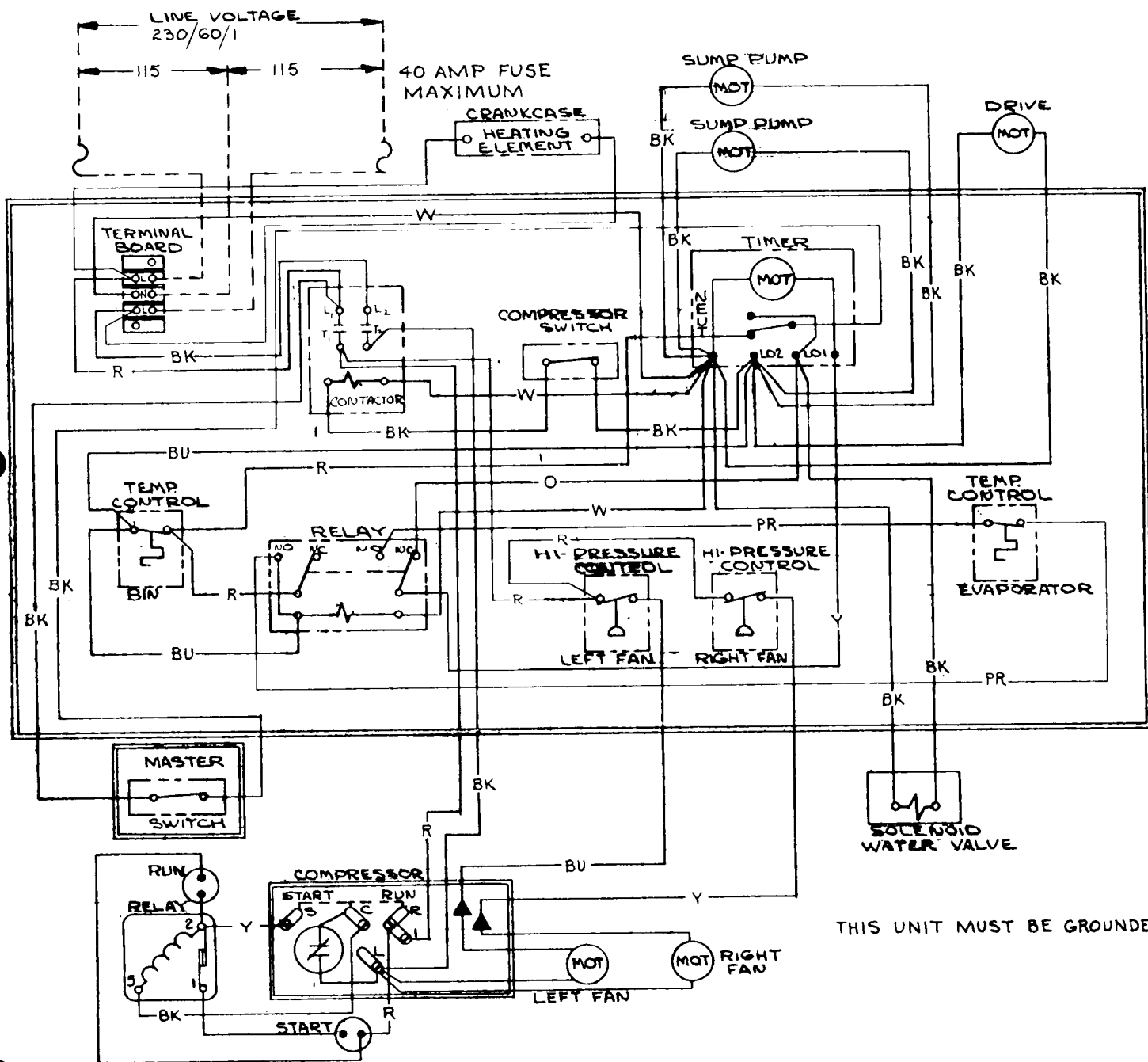
1. Make sure all service valves on the condensing unit are backseated and turned as far as possible to the left. Replace the valve caps after checking the valves.
2. Make sure that the flow of air is not impeded in any way over condenser on air-cooled models. Keep condenser clean, (Check and clean the condenser monthly.)
3. Turn on cube water supply at hand shut-off valve. Make sure water pressure does not exceed 50# p.s.i. pressure. If necessary, install water pressure regulator to reduce pressure to approximately 50 pounds.
4. Remove cover from control box, check for loose or frayed wire, then turn compressor switch to "on" position. Also on-off switch left side of 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 3 minutes. Dial pointer should be set on number 2 1/2. 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 the 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 cup.
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 25 minutes in a 70 degree ambient. (Longer if above, and shorter if below.)
9. Watch first cube harvest and check to make sure that plastic curtain has not been damaged in shipment.
10. 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, Ice Machine Service Department, Albert Lea, Minnesota, For Further Details.
11. With unit on harvest cycle, take a handful of cubes made and hold on storage bin thermostat cover. Should cut unit off in one to two minutes--remove ice; unit should cut back on automatically. Thermostat is factory set at 35° out, 39° in.
12. Install gauges and check head and back pressures; on air-cooled models, head pressure after twenty minutes of freezing cycle at 70° ambient will be approximately 150 pounds p.s.i. just before harvest cycle. Higher ambients will cause higher head pressure.
13. Remove gauges, replace control box cover and all service panels.

### 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 loosened so the compressor rides freely on its mounting springs.
5. Is the water supply valve open and the electric power on?
6. Is the water pressure adequate but not over 50# P.S.I.?
7. Is the unit clean?
8. Has the owner been given the operating manual, and has he been instructed on how to operate the machine?
9. Has the installation date been sent to the factory? This is the owner's protection as well as the sellers.
10. Check all the refrigerant and conduit lines to guard against vibration and possible failure.
11. Is there 12" 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?

### WIRING DIAGRAM

SM1005A-4  
Air Cooled

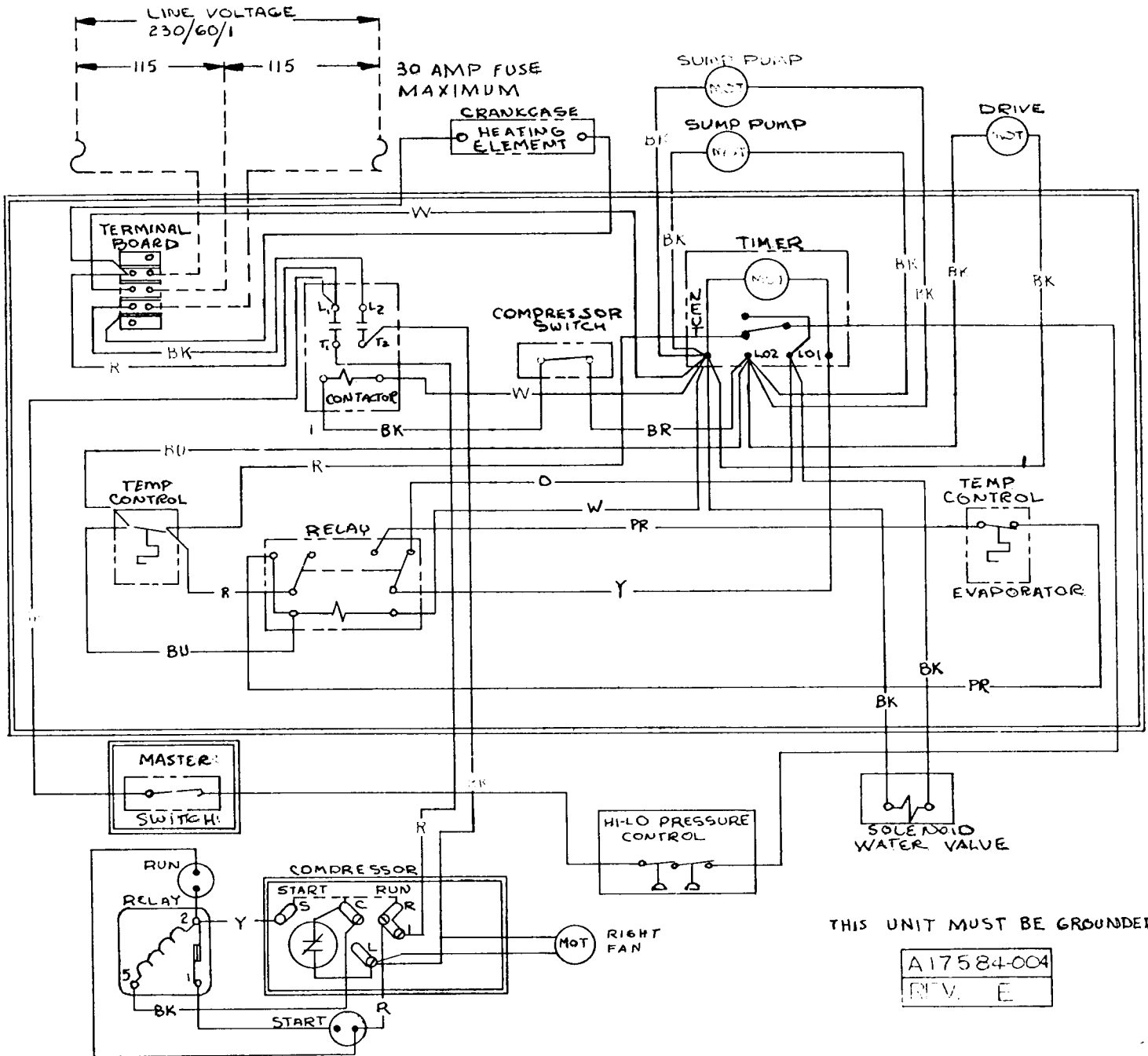


THIS UNIT MUST BE GROUNDED



### WIRING DIAGRAM

#### SM1005WA-4 Water Cooled

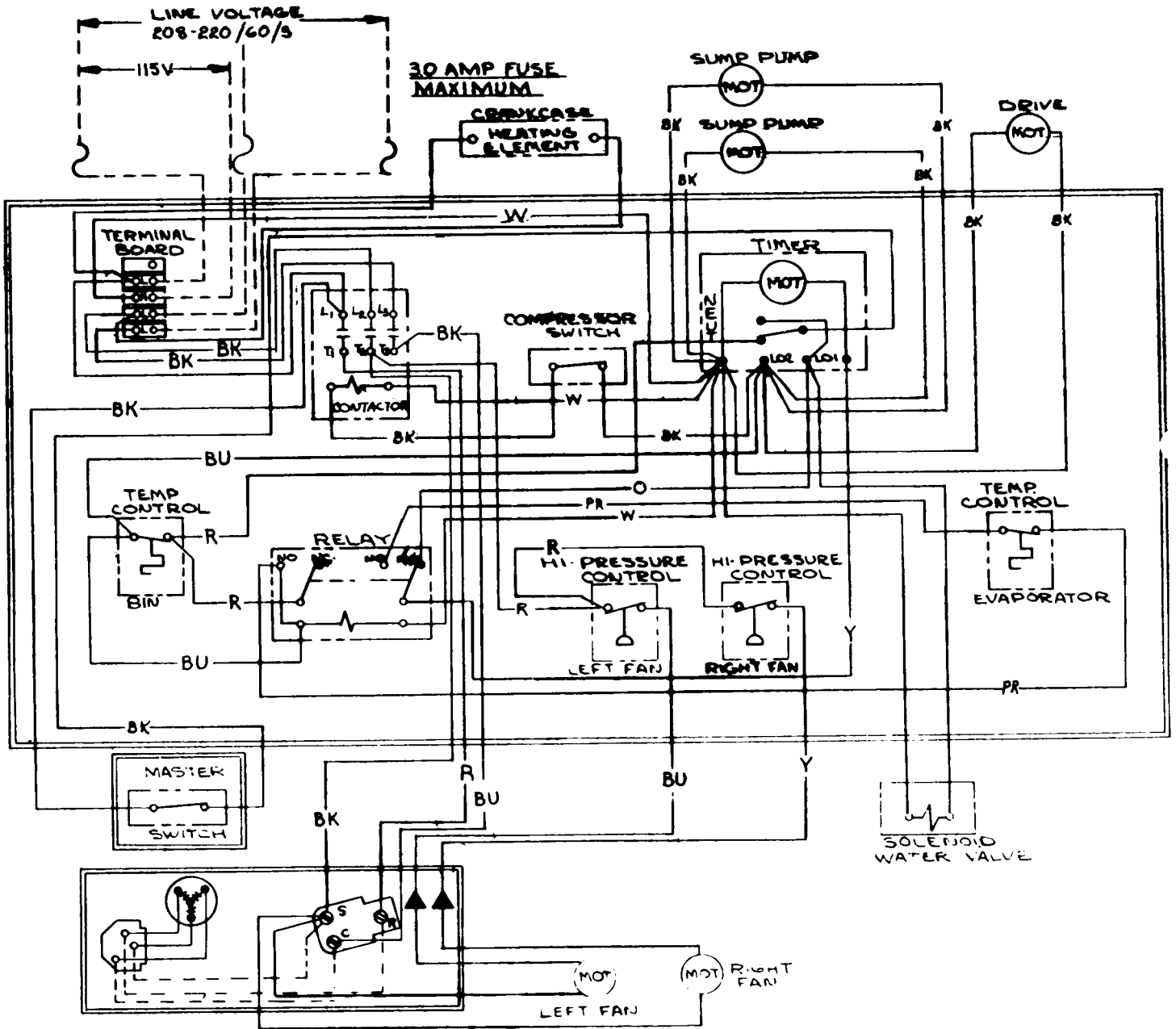


THIS UNIT MUST BE GROUNDED

A17584-004  
REV. E

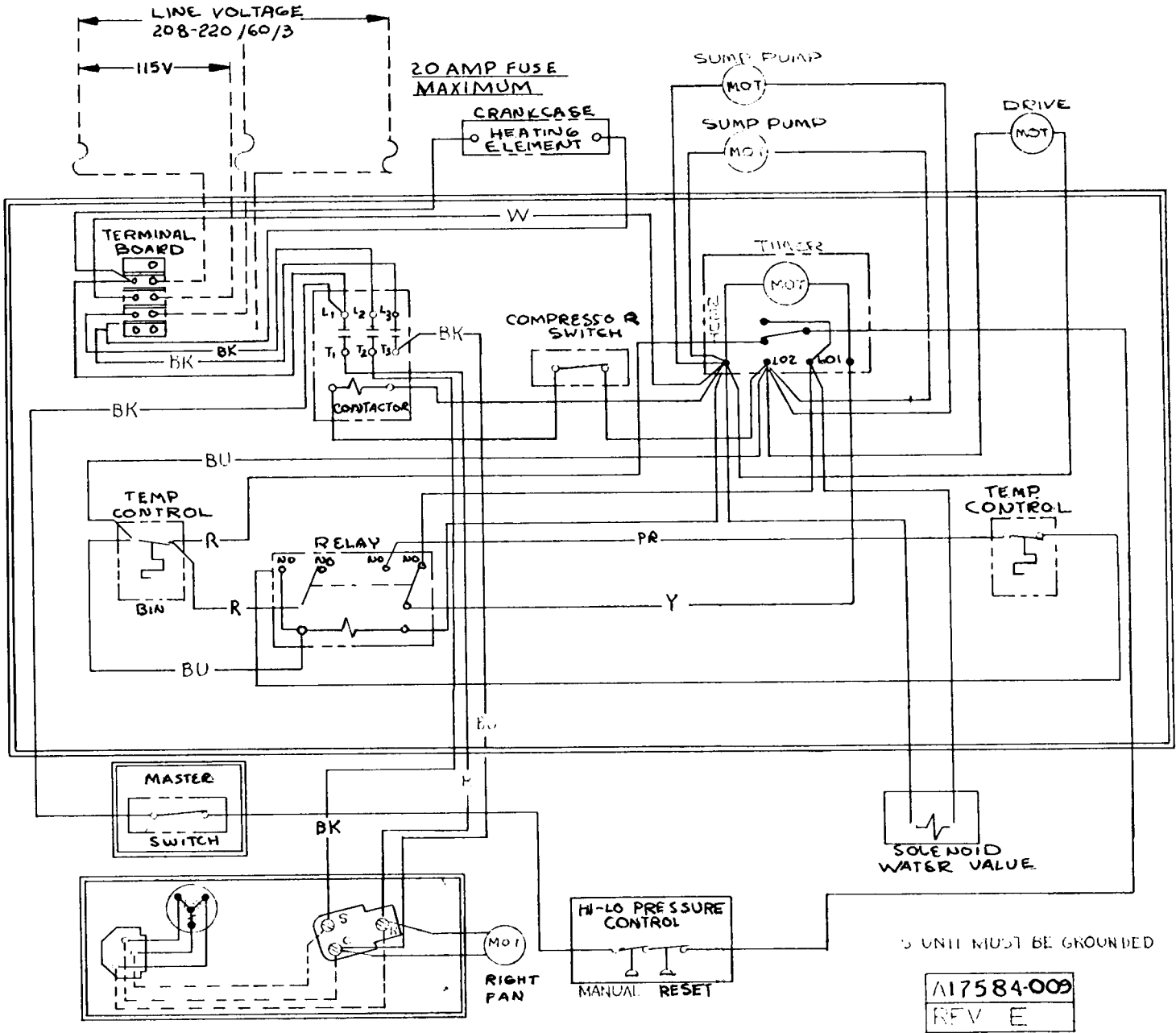
WIRING DIAGRAM

SM1005A-9  
Air Cooled

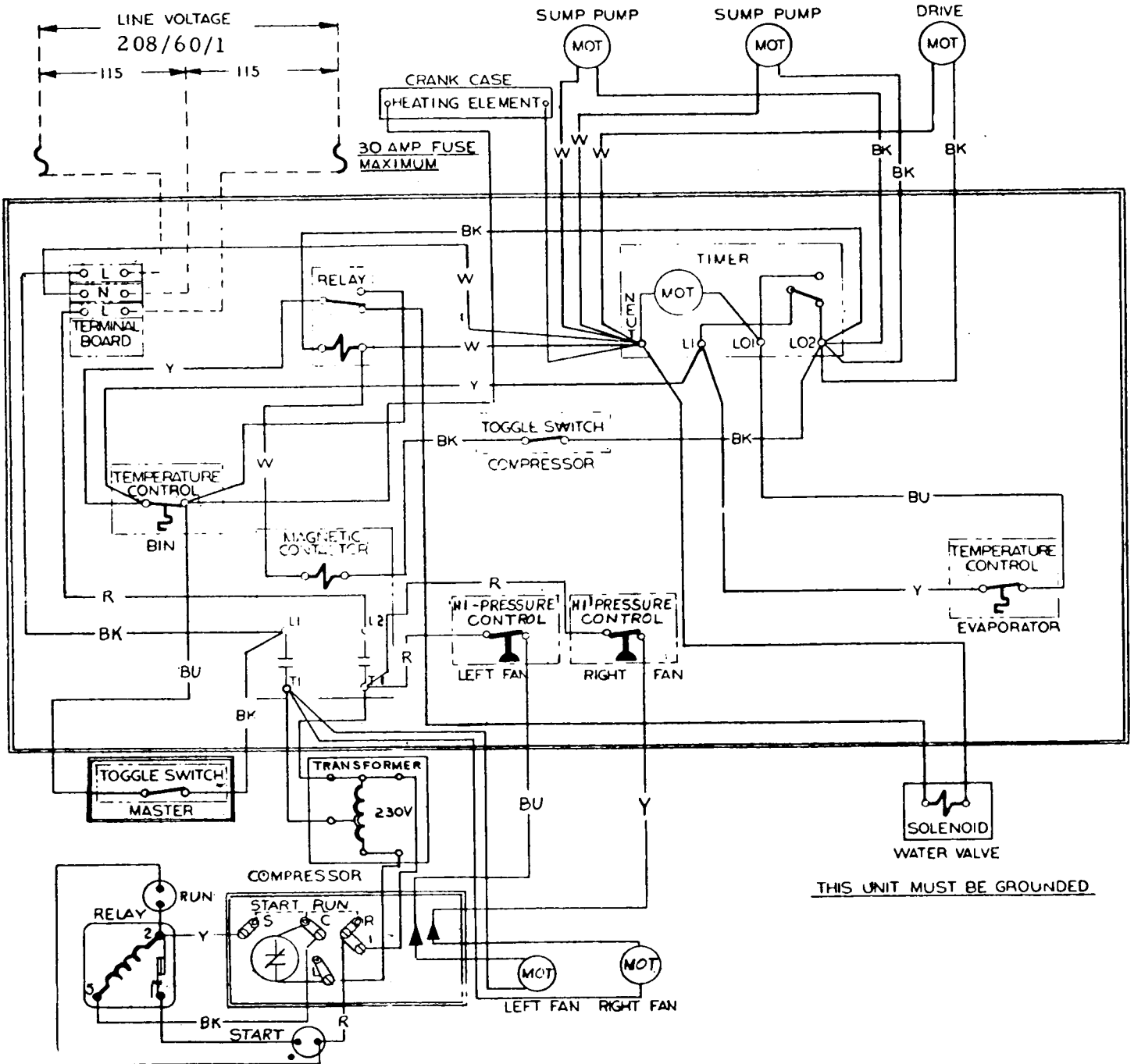


WIRING DIAGRAM

SM1005WA-9  
Water Cooled

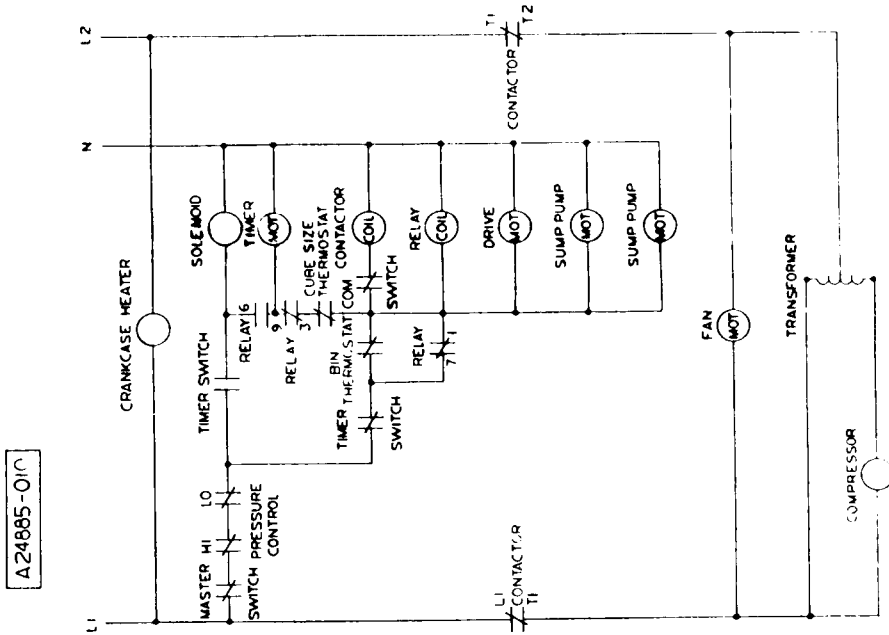


**WIRING DIAGRAM  
SM-1005 H-10  
Air Cooled**



WIRING DIAGRAM

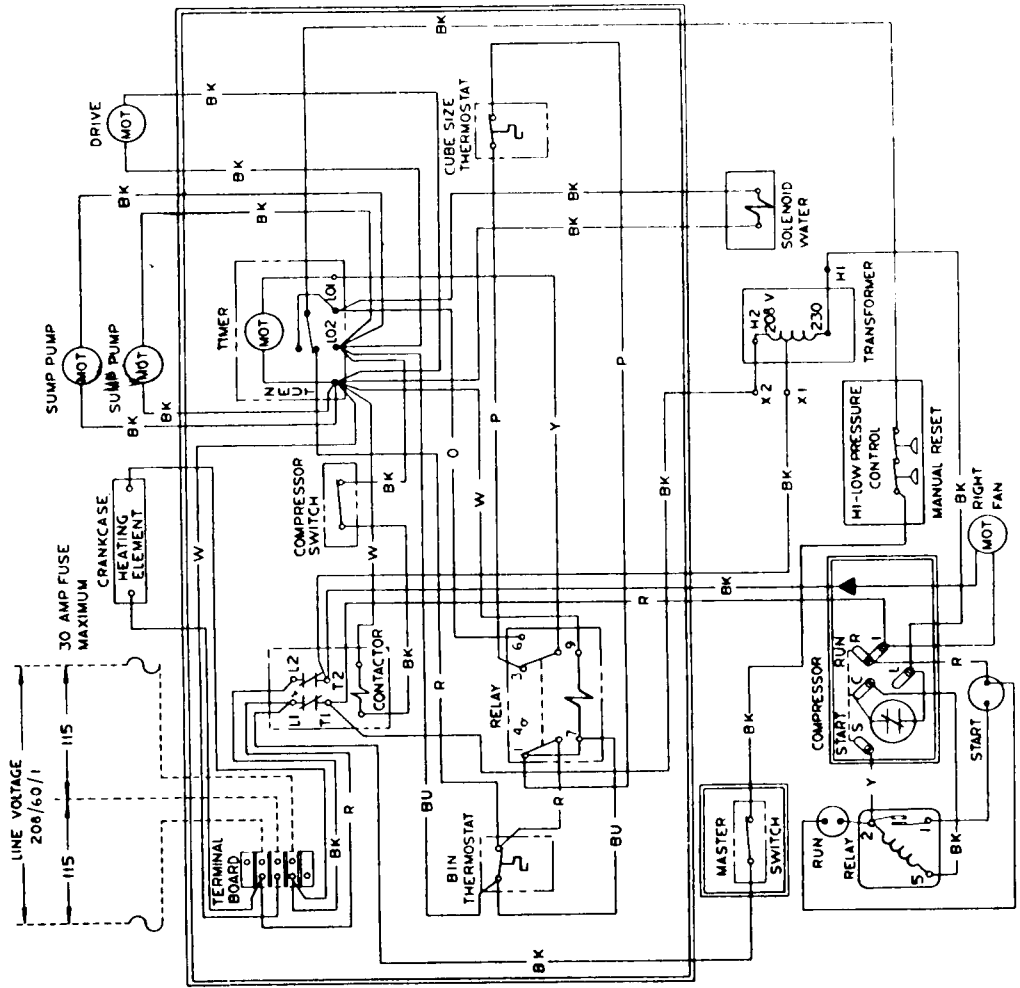
SM1005 WA-10  
Water Cooled



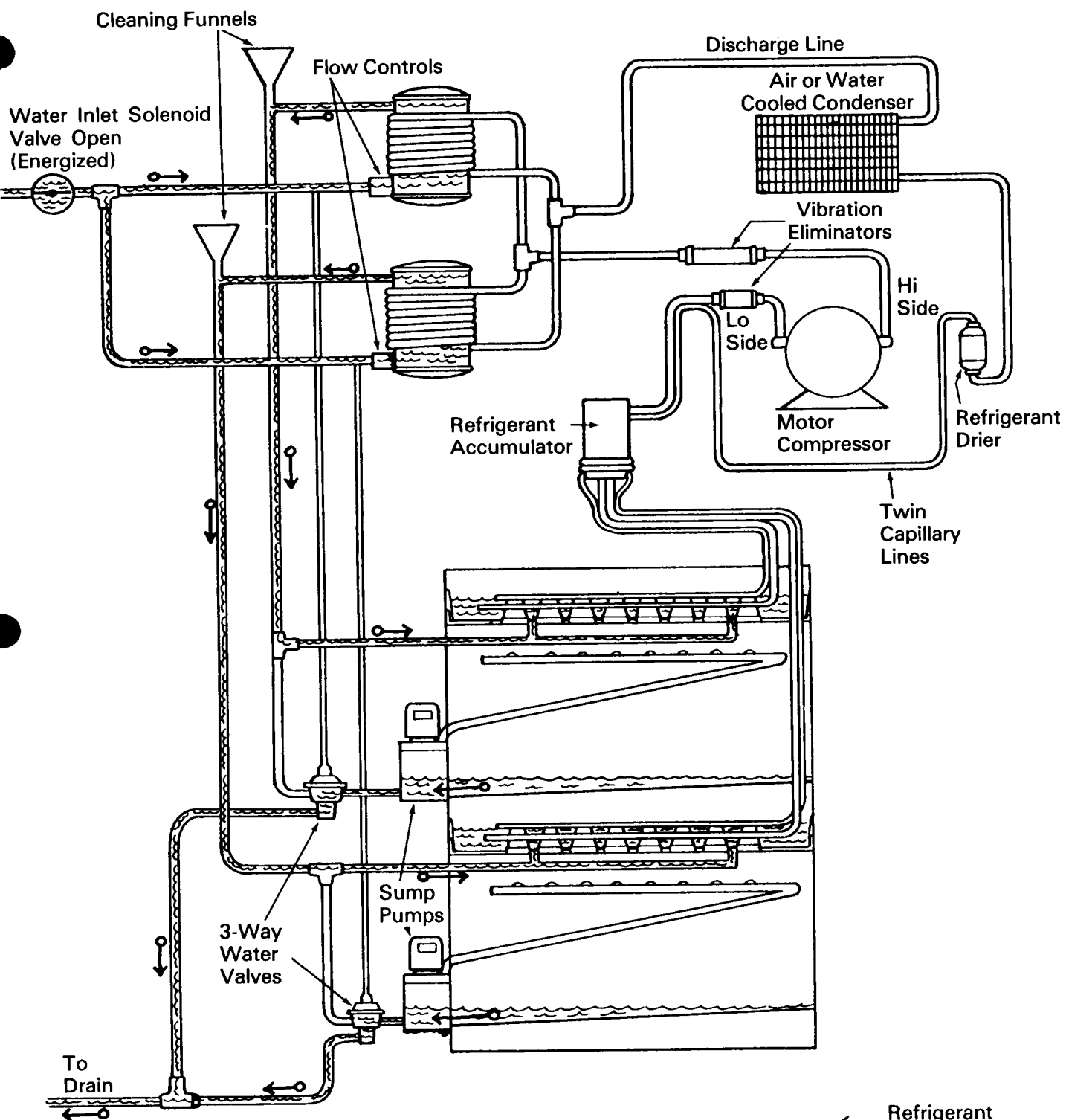
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SCHEMATIC DIAGRAM

CONTROLS SHOWN IN TIMED PORTION OF FREEZING CYCLE



WIRING DIAGRAM



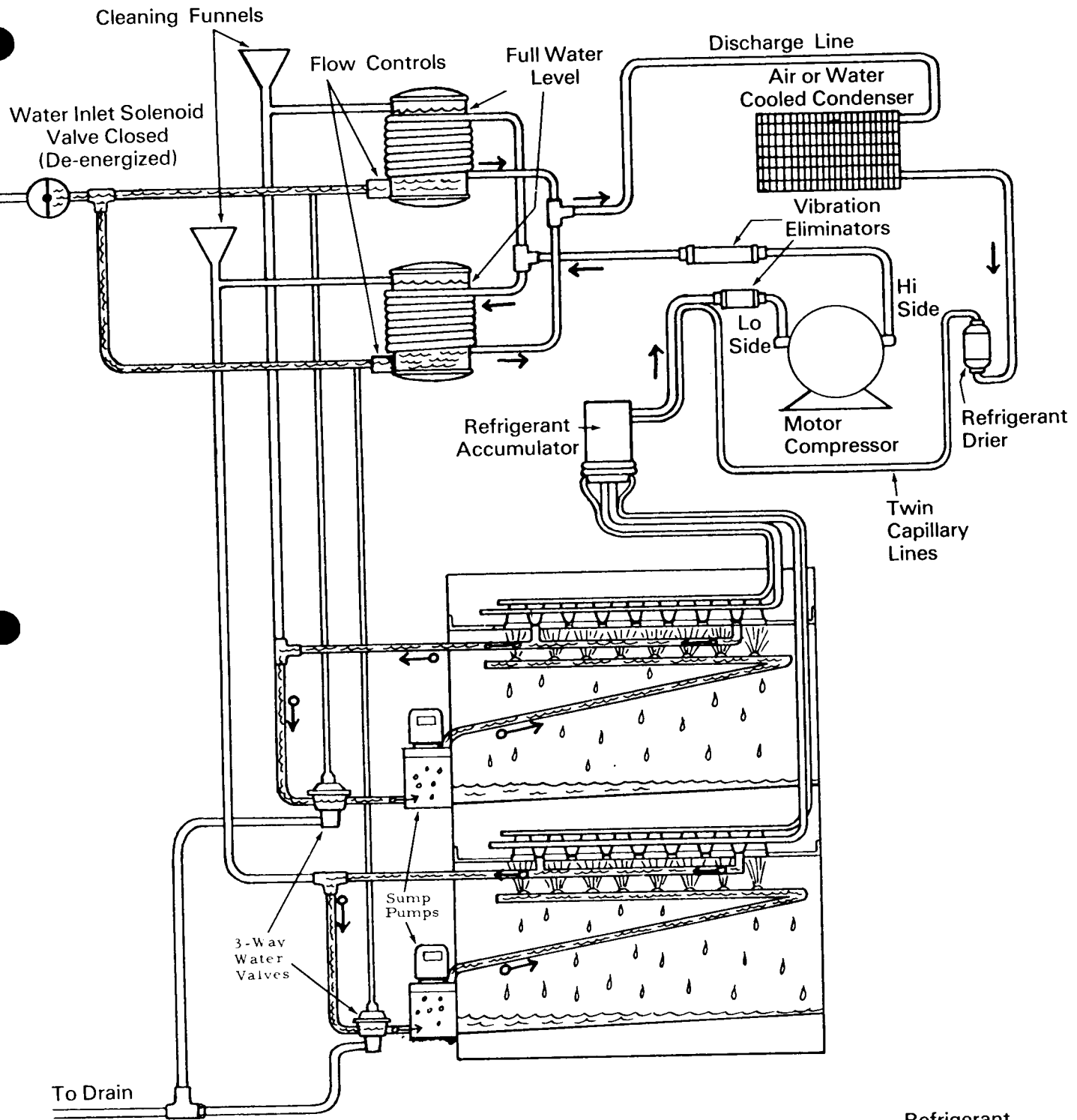
**WATER-REFRIGERANT SCHEMATIC  
SM1005  
HARVEST CYCLE**

← Refrigerant Path  
 ← Water Path  
 Compressor off During harvest.

## HARVEST CYCLE

With master switch (on left side of unit) and compressor switch (in main control box) in the on position turn timer manually to the harvest position. This energizes water inlet solenoid valve allowing water to flow thru flow controls into heat exchanger tanks. This inlet water pressure forces water out of tanks and also actuates 3-way water valves which in turn allows water to flow into upper cavity of freezing chambers and surplus water from preceeding batch of ice cubes to go down the drain. 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 controlled by the flow control device 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 into cube chute, through curtained opening into storage bin. At completion of harvest cycle, micro-switch on the timer now drops points holding defrost components in cycle and switches to freezing cycle set of contacts. Clock motor now stops and will not start until cube size control closes once more. As the new freezing cycle starts, note that our inlet solenoid closes. Since water enters heat exchanger tank on bottom and flows out through top, this insures full tank for the next cycle. The chilled water from the upper cavity flows by gravity through the water valve to the sump tank and reservoir. This water is used produce the next batch of cubes.

Models SM-1005 cubers have ice cube discharge chutes tapered to both front and back of unit. During a harvest, 1/2 of the cubes fall into bin through back or rear discharge chute, 1/2 through front discharge chute.



**WATER-REFRIGERANT SCHEMATIC**  
**Models SM1005**  
**freezing cycle**

← Refrigerant Path  
 ← Water Path



## FREEZING CYCLE

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

The refrigerant circuit which equalized at about 50 pounds gauge during the "off" or harvest cycle, thru the capillary refrigerant control, now rises rapidly to 135 - 150 pounds head pressure. The suction or low side pressure starting at 50 pounds 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 4 pounds takes an average of 20 - 25 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, activated 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 timers dial is 15 minutes however of the total 15 minutes only, 3 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 12 minutes with timer dial now turning. When the 12 minutes are completed, and 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 3 minutes harvest cycle - The clock motor continues thru harvest cycles. 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.

### NOTE:

Harvest water is used to make the next batch of ice, therefore on initial start up the unit must be in a defrost cycle. This can be done manually operating the timer.

---

**SERVICE ANALYSIS**


---

Symptom	Possible Cause	Suggested Correction
1. Unit will not run	Power off  Manual switch in off position  High pressure control locked out.  Ambient temperature of room too low.  Bin controls set too high.	Check main switch, fuses and wiring.  Check  Reset. (Water cooled models)  Must be above 50°.  Set approximately 35° cut out, 39° cut in.
2. Compressor cycles intermittently.	Low voltage  Air in system causing high head.  Shortage of refrigerant	Check with volt meter.  Purge system.  Check frost line and operating pressure.
3. Cubes small. (short cycle)	Cube size control not properly set.  Moisture in system  Short of water because too low setting on water supply.  Lower drain valve in sump tank leaking.  Sump tank stand pipe not properly seated.	Set control to colder  Purge charge, evacuate, change dryer. & re-charge.  Increase pressure, new lines or larger lines.  Flush or remove and clean.  Check and re-seat.
4. Cubes small. (long cycle)	Shortage of refrigerant	Check frost line and charge as required. Check for system leaks.

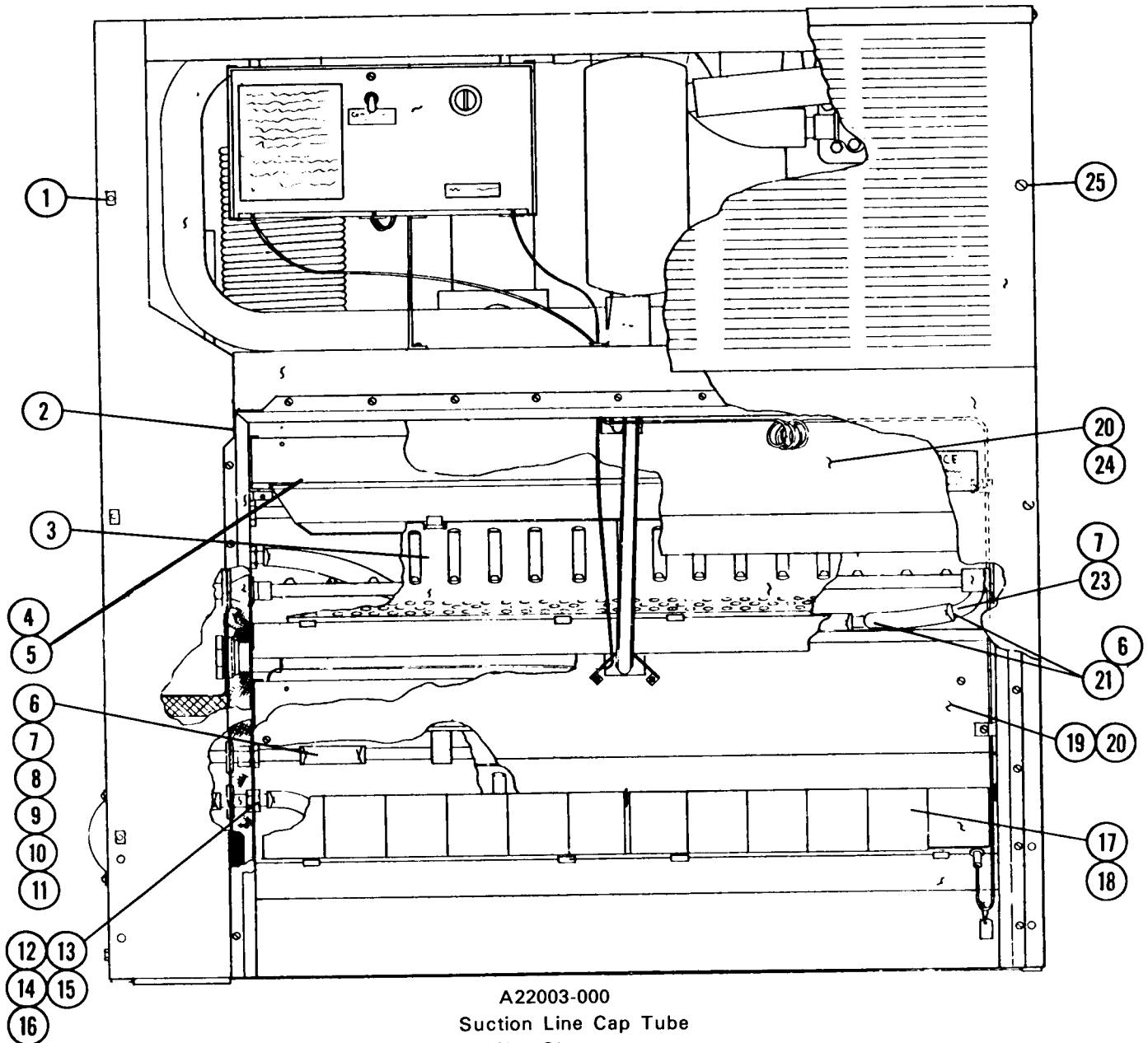
<b>SERVICE ANALYSIS</b>		
<b>Symptom</b>	<b>Possible Cause</b>	<b>Suggested Correction</b>
5. Cubes too large. (slow defrost)	Very small shortage of refrigerant.	Check frost line, charge as required
	Cube size control set too low.	Reset to warmer setting.
6. Cubes cloudy	Drain valve and sump tank leaking, loosing water.	Check during freeze cycle Jet tubes plugged, clean all jets
	Curtains damaged or binding	Repair or replace
	Restriction in incoming water	Check at strainer and flow controls
	Screen plugged on bot- tom of sump pumps.	Remove and clean
7. Irregular cubes. (some clear, some cloudy)	Clogged jets in jet tubes	Remove and clean.
	Cube slides interfering with jets	Adjust
8. Improper harvest	Time clock not set properly	Reset on 2 1/2 Minutes.
	Incoming water re- stricted.	Check water lines, etc.
	Solenoid valve leaking. (Hot water tank)	Check during freeze cycle
	Head pressure too low	Adjust regulator on water cooled units  Check fan cycling on air cooled units.

<b>SERVICE ANALYSIS</b>		
<b>Symptom</b>	<b>Possible Cause</b>	<b>Suggested Correction</b>
8. Improper harvest (Cont'd.)	Machine not level. (Allow water to stand in upper cavities and freeze.)	Level machine.
9. High head pressure	Over-charge of re- frigerant.  Air in system  Defective water regulating valve.  Burned out or stuck fan motor(s) air cooled  Water valve improperly adjusted  Incoming water restricted.	Purge  Purge  Replace  Replace or oil as needed  Readjust to desired head. Water cooled models 135# p.s.i.  Check screens, lines, etc.
10. High suction	Dirty or plugged con- denser. Air cooled.  Inefficient Compressor  Overcharge of refrig- erant.	Blow condenser clean  Check with gauges and re- place valve plate if necessary  Check frost line and high back pressures purge off excess.
11. Low suction pres- sure.	Restricted dryer.  Moisture in system.	Check back pressure and re- place drier if necessary  Blow charge, replace drier evacuate system and re- charge per nameplate specs.

<b>SERVICE ANALYSIS</b>		
<b>Symptom</b>	<b>Possible Cause</b>	<b>Suggested Correction</b>
11. Low suction pressure. (Cont'd.)	Extreme shortage of refrigerant.	Add refrigerant. Check and correct system leaks.
	Ambient temperatures too low. Air cooled	Increase ambient to minimum 50° F.
12. Unit noisy.	Hold-down bolts on compressor not loosened.	Turn up until unit is free.
	Refrigerant lines vibrating.	Straighten
	Compressor short of oil.	Check oil level. Proper level 1 1/2 inches below crankcase port, or 1/2 of sight glass bullseye on compressor.
	High head pressures.	Check with gauges. Purge if necessary.
	Shroud touching fan blades on air cooled models.	Reposition shroud

# SM 1005

## Front View

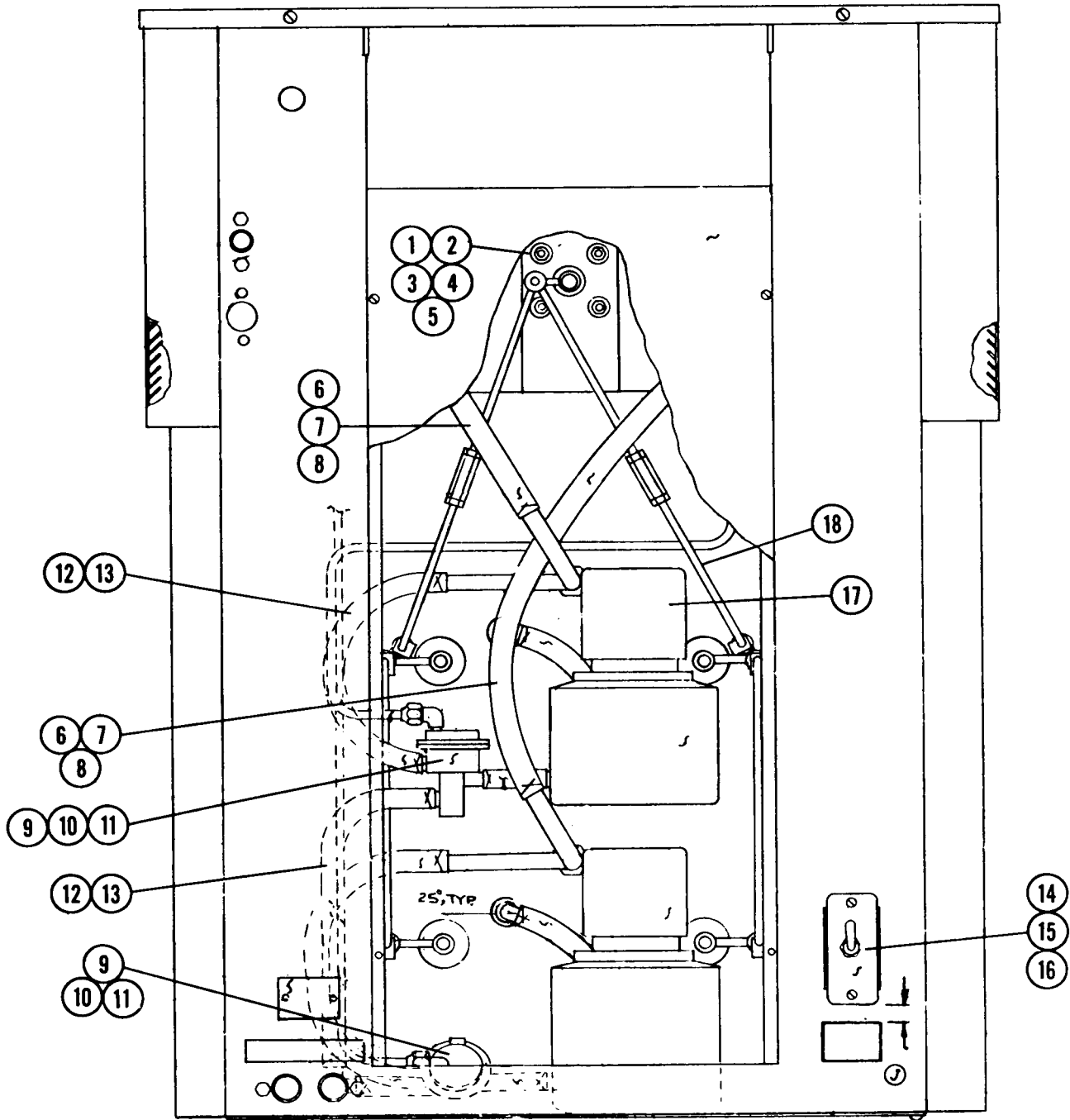


A22003-000  
Suction Line Cap Tube  
Not Shown

ITEM NO.	PART NO.	NAME	ITEM NO.	PART NO.	NAME
1.	03-1029-00	Nut (2 reqd.)	16.	13-0169-00	Grommet
2.	A18165-000	Door Gasket (2 reqd.)	17.	A17243-00	Curtain Assy. (4 reqd)
3.	A21003-000	Chutes (8 reqd.)	18.	03-0727-00	Thumb Screw (curtain)
4.	A20934-000	Platen & Cup Assy. (2 reqd.)	19.	A17604-000	Face Plate, Lower
5.	13-0691-00	Rubber Cupholder only (2 reqd.)	20.	03-1404-10	S.S. Screws 03-1404-10
6.	13-0674-07	Tygon 3/4" I.D. Per Foot	21.	02-0536-01	Hose Clamps
7.	02-1358-00	Hose Clamps 3/4"	22.		TEE 5/8x5/8x3/4
8.	A18004-000	Inlet Water Assy.	23.	13-0674-06	Tygon Tube 5/8" Per ft.
9.	13-0617-02	"O" Ring	24.	A17603-000	Face Plate, Upper
10.	13-0327-00	Grommet	25.	03-1418-22	Screws (12 reqd.)
11.	A13796-000	Inlet, Inner Assy.			IN PACKAGE
12.	A18174-000	Inlet, Spray Bar		A19555-000	Bulb Cover
13.	A18172-000	Nut, Inlet Tube		13-0590-00	Gasket
14.	A18173-000	"O" Ring Nut		A16108-000	Bulb Holder Buttons
15.	13-0617-05	"O" Ring.			

# SM 1005

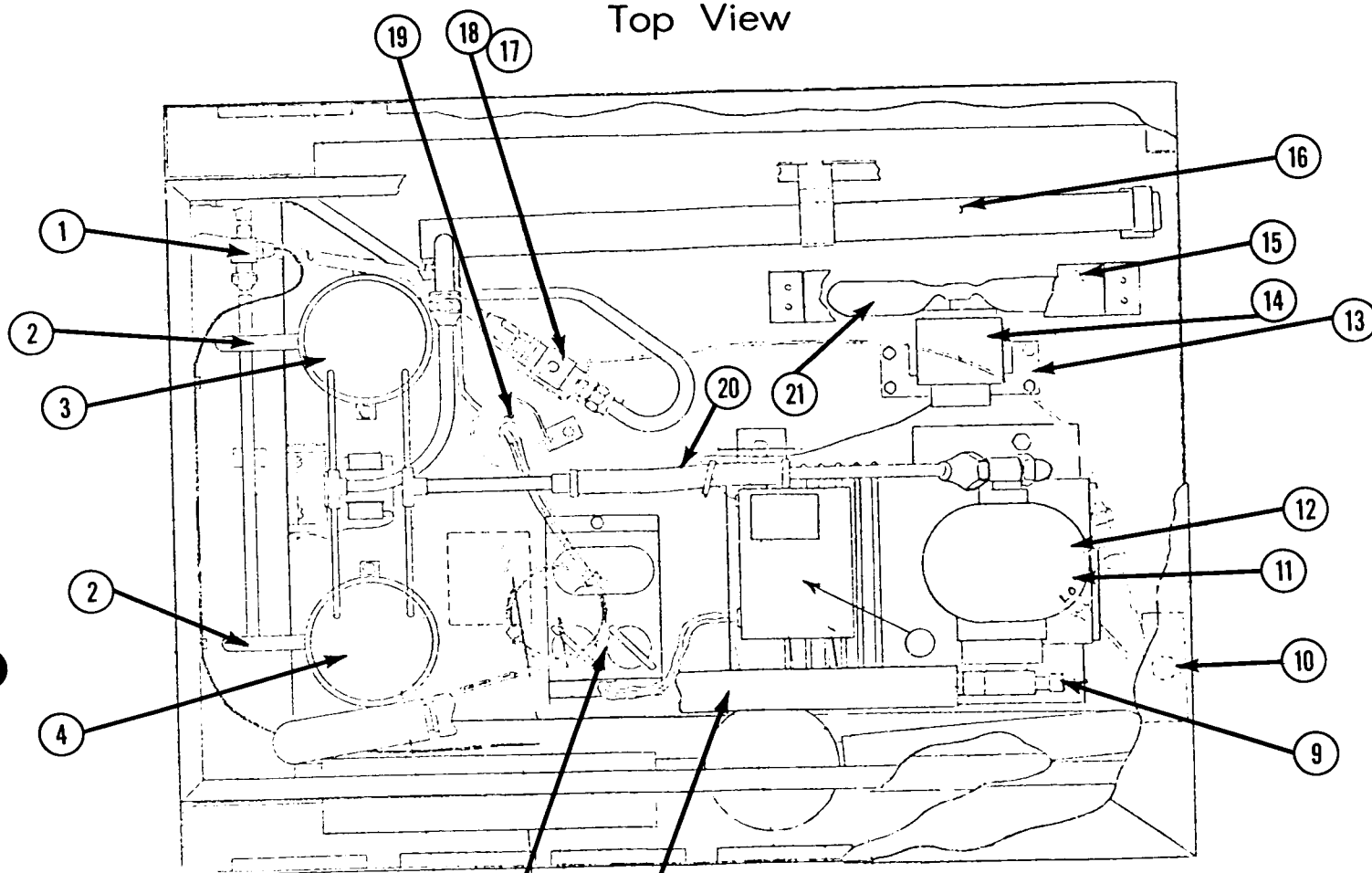
## Left Side View



ITEM NO.	PART NO.	NAME	ITEM NO.	PART NO.	NAME
1.	A23372-001	Drive Motor	9.	A19722-000	3 way Water Valve
2.	13-0100-00	Grommet (4 reqd.)	10.	03-1403-28	Screws (4 reqd.)
3.	03-1403-22	Screw (4 reqd.)	11.	03-1417-05	Lockwashers (4 reqd.)
4.	03-1406-03	Nut (4 reqd.)	12.	02-0536-00	Hose Clamp
5.	03-1407-05	Washer (8 reqd.)	13.	03-0674-16	Tygon Hose 7/16 per ft.
6.	13-0674-07	Hose 3/8" I.D. per foot	14.	12-0426-00	Switch
7.	02-1358-01	Hose Clamps 3/4"	16.	03-1403-17	Screw
8.		Tank Outlet	17.	12-1395-01	Sump Pump
				A17569-000	Drive Linkage Complete

## SM 1005, WATER COOLED

### Top View

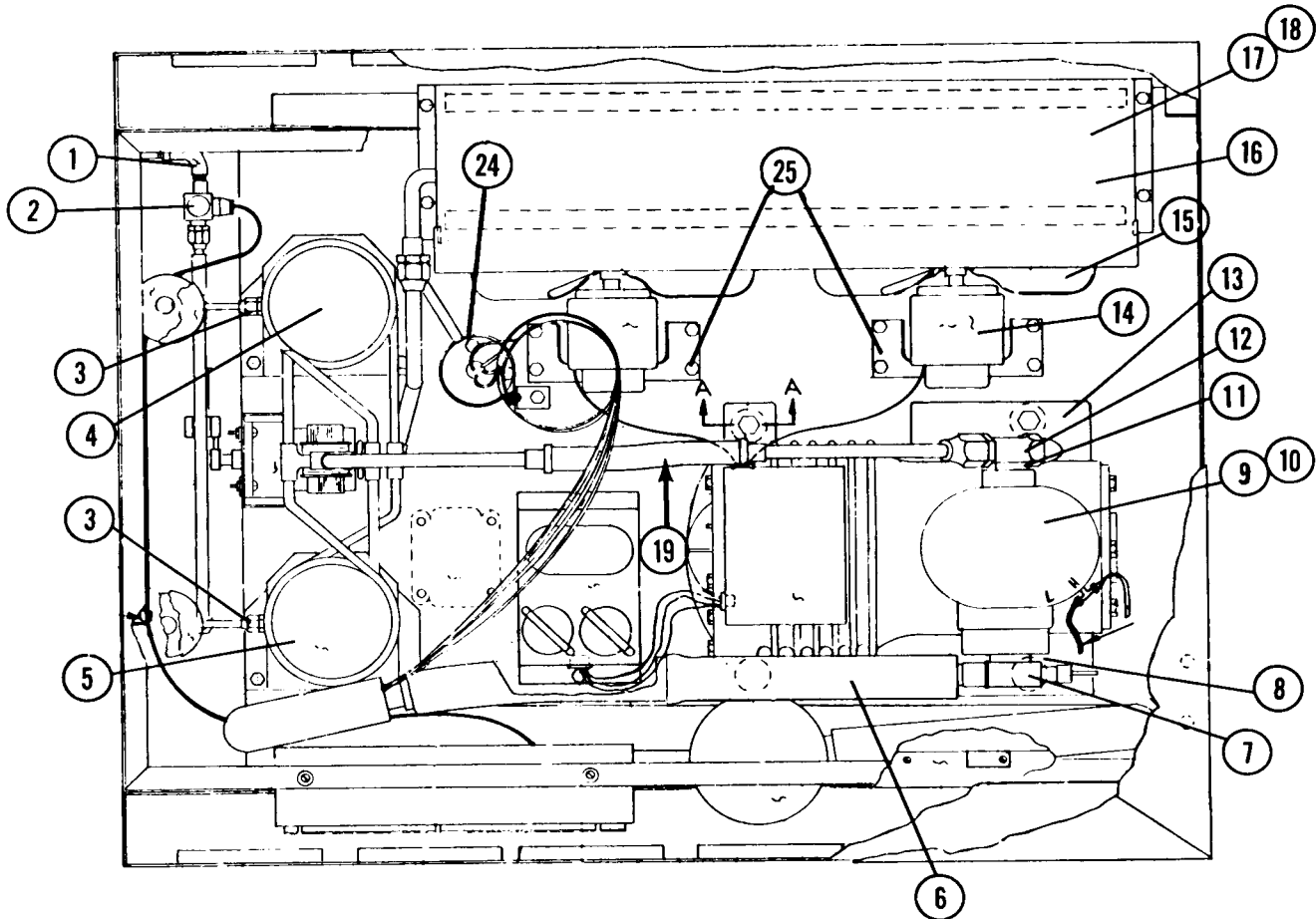


ITEM NO.	PART NO.	NAME
1.	120621G1	Solenoid Valve
2.	A21237-002	Flow Control
3.	A17836-000	Rear Water Tank
4.	A17837-000	Front Water Tank
5.	18-1901-27	Starting Capacitor
6.	187405-00	Overload
7.	18-1903-26	Relay
8.	16-0326-00	Flexible Line
9.	18-1410-00	Suction Service Valve
10.	11-0286-00	HI-LO Press Control
11.	18-1400-02	Compressor 115/230/60/1
	18-1400-03	Compressor 115/208/220/60/3
	18-1400-02	Compressor 115/208/60/1

ITEM NO.	PART NO.	NAME
12.	18-1415-00	Valve Plate Kit
13.	18-1421-00	Fan Bracket
14.	18-0788-02	Fan Motor 115/230/60/1
	18-0788-07	Fan Motor 115/208/220/60/3
15.	A24927-001	Fan Shroud
16.	18-1422-00	Condenser
17.	11-0198-01	Water Regulating Valve
18.	A18500-000	Regulator Bracket
19.	02-0822-00	Dryer
20.	16-024700	Vibration Eliminator
21.	18-0787-00	Fan Blade



## SM 1005, AIR COOLED Top View

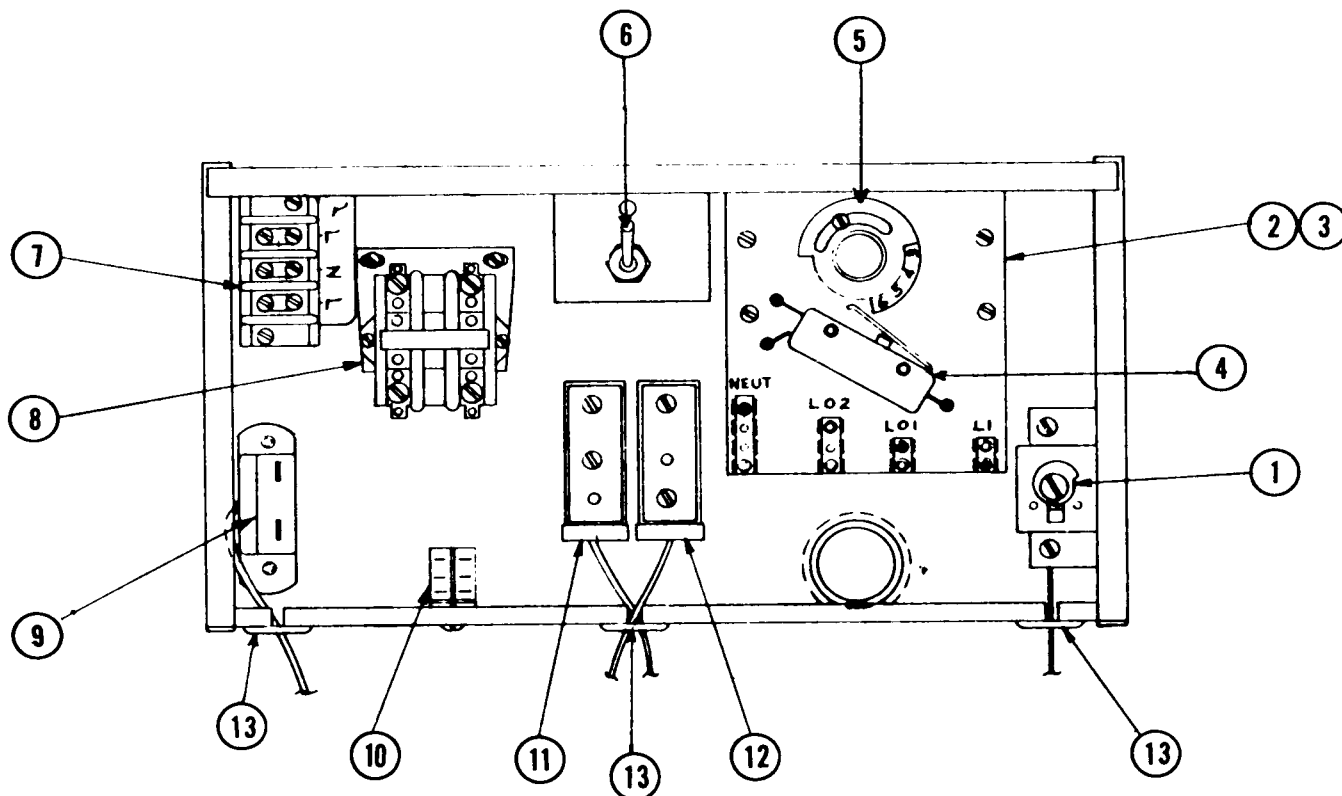


ITEM NO.	PART NO.	NAME
1.		Street Elbow
2.	12-0621G1	Solenoid Valve
3.	A21237-01	Flow Control
4.	A17836-000	Rear Water Tank
5.	A17837-000	Front Water Tank
6.	16-0326-00	Flexible Line
7.	18-1410-00	Suction Serv. Valve
8.	18-0736-00	Suction Serv. Valve Gasket
9.	18-1400-02	Compressor 230/60/1
	18-1400-03	Compressor 208/230/60/1
10.	18-1411-00	Valve Plate Kit
11.	18-1411-00	Discharge Serv. Valve

ITEM NO.	PART NO.	NAME
12.	18-0242-00	Discharge Valve Gasket
13.	18-1929-01	Crank Case Heater*
14.	18-0788-02	Fan Motor
15.	18-0787-00	Fan Blade
16.	18-0399-01	Condensor
17.	A13860-000	Shroud Assy.
18.	03-1404-15	Shroud Fasteners (6)
19.	16-0247-00	Vibration Eliminator
20.	18-1405-00	Overload
21.	19-1901-26	Starting Capacitor
22.	18-1902-20	Running Capacitor 13/52
23.	18-1903-26	Relay
24.	02-0822-00	Dryer
25.	18-1421-00	Fan Motor Bracket

(\*) Not Shown

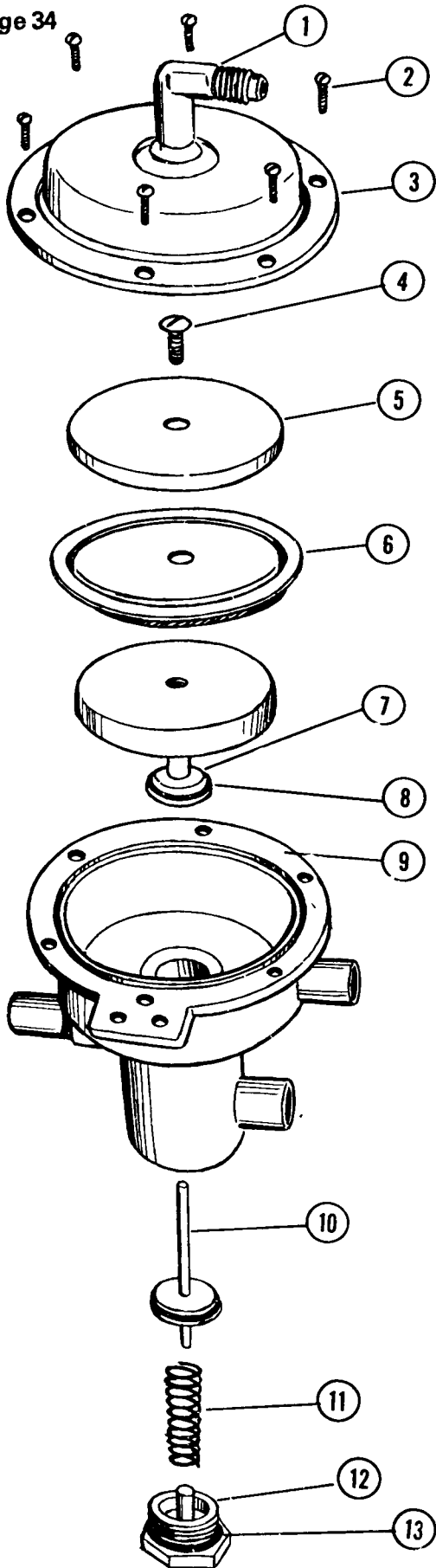
## CONTROL BOX ASSEMBLY



PART NO.	ITEM NO.	NAME
1.	11-0370-00	Cube Size Control
2.	A19070-021	Timer Motor Only*
3.	A25923-00	Timer Assembly Complete
4.	12-1480-06	Micro Switch
5.	02-1651-00	Cam Assembly
6.	12-0426-00	Switch
7.	12-0813-00	Terminal Block
8.	12-0820-01	Contactator 230 V 60 Cy 1 Ph
9.	11-0353-01	Bin Thermostat
10.	12-1645-00	Relay
11.	11-0342-00	Left Fan Control
12.	11-0343-00	Right Fan Control
13.	13-0124-00	Grommet
8.	12-0739-01	Contactator 208-220V 60 Cy 3 Ph *

\* Not Shown

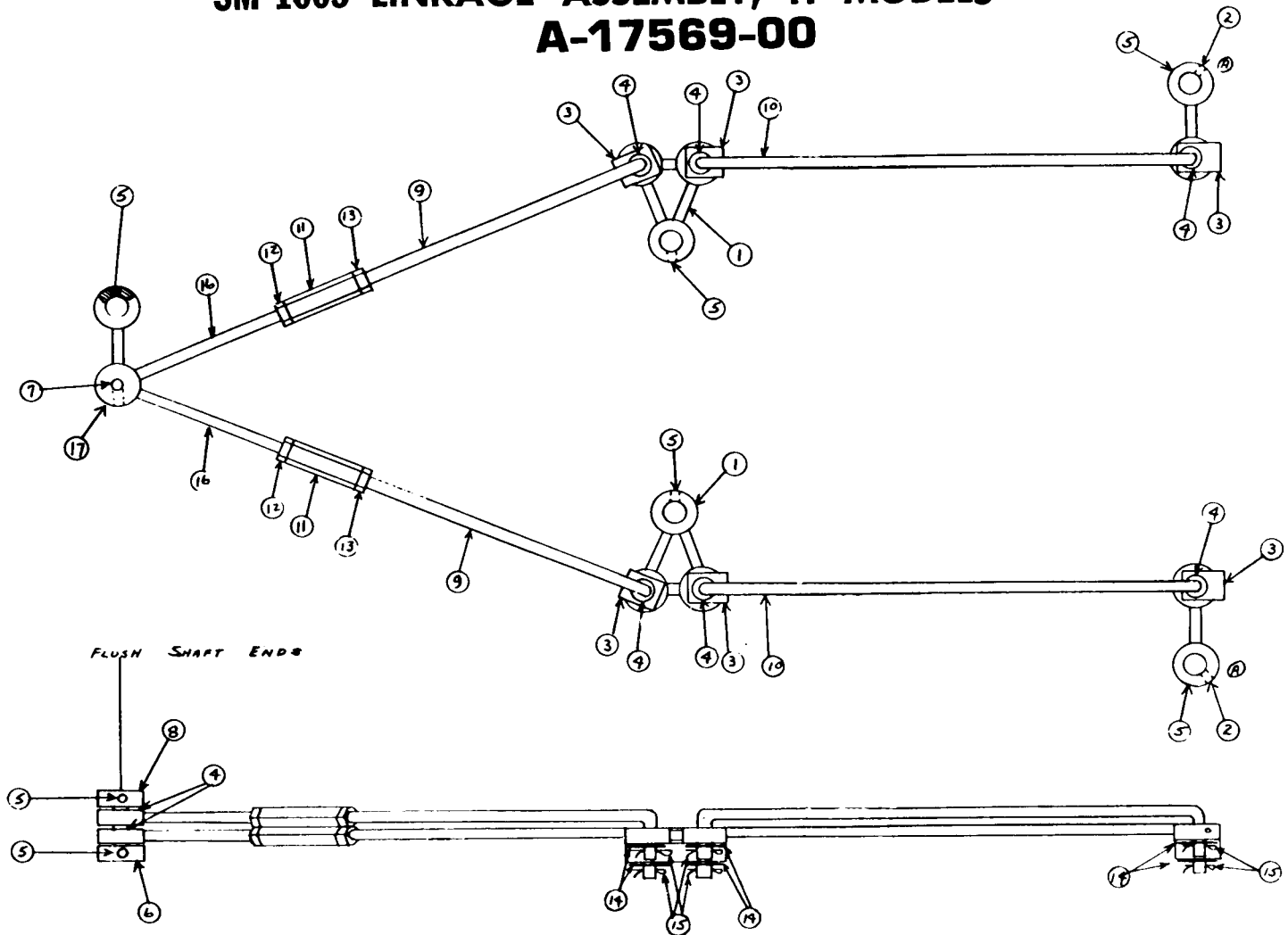
# 3-WAY WATER VALVE SM 1005



ITEM NO.	PART NO.	NAME
1.	16-0190-00	Elbow
2.	03-1403-06	Screws
3.	A18192-000	Valve Cover
4.	13-1506-01	Screw
5.	A18312-000	Diaphragm Cover
6.	13-0606-00	Rolling Diaphragm
7.	A17941-000	Plunger Assy.
8.	13-0617-01	"O" Ring
9.	A17947-000	Valve Body
10.	A17942-000	Plunger Assy.
11.	02-1545-00	Spring
12.	A17937-000	Valve Cap Bottom
13.	13-0617-02 A19722-000	"O" Ring Valve Complete

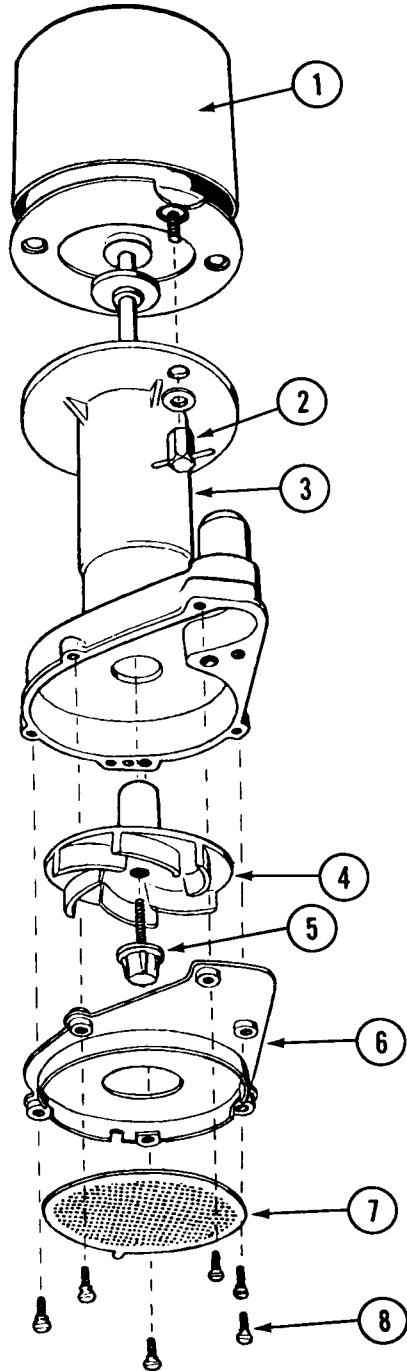
# SM 1005 LINKAGE ASSEMBLY, H MODELS

## A-17569-00



ITEM NO.	PART NO.	NAME
1.	A17233-000	Double Drive Arm
2.	A17232-000	Drive Arm
3.	S07558-000	Bearing Clip
4.	02-0654-01	Bearing
5.	03-0431-00	Set Screw
6.	A18948-000	Motor Drive Arm
7.	A13849-000	Shaft
8.	A13848-000	Arm End
9.	S07938-000	Right Linkage
10.	A17568-000	Lower Linkage
11.	S07936-000	Linkage Coupling
12.	S07937-000	Left Linkage Nut
13.	03-1407-05	Washer
14.	03-0396-01	Cotter Pin
15.	A13850-000	Linkage Upper Assy.
16.	A18948-000	Motor Drive Arm

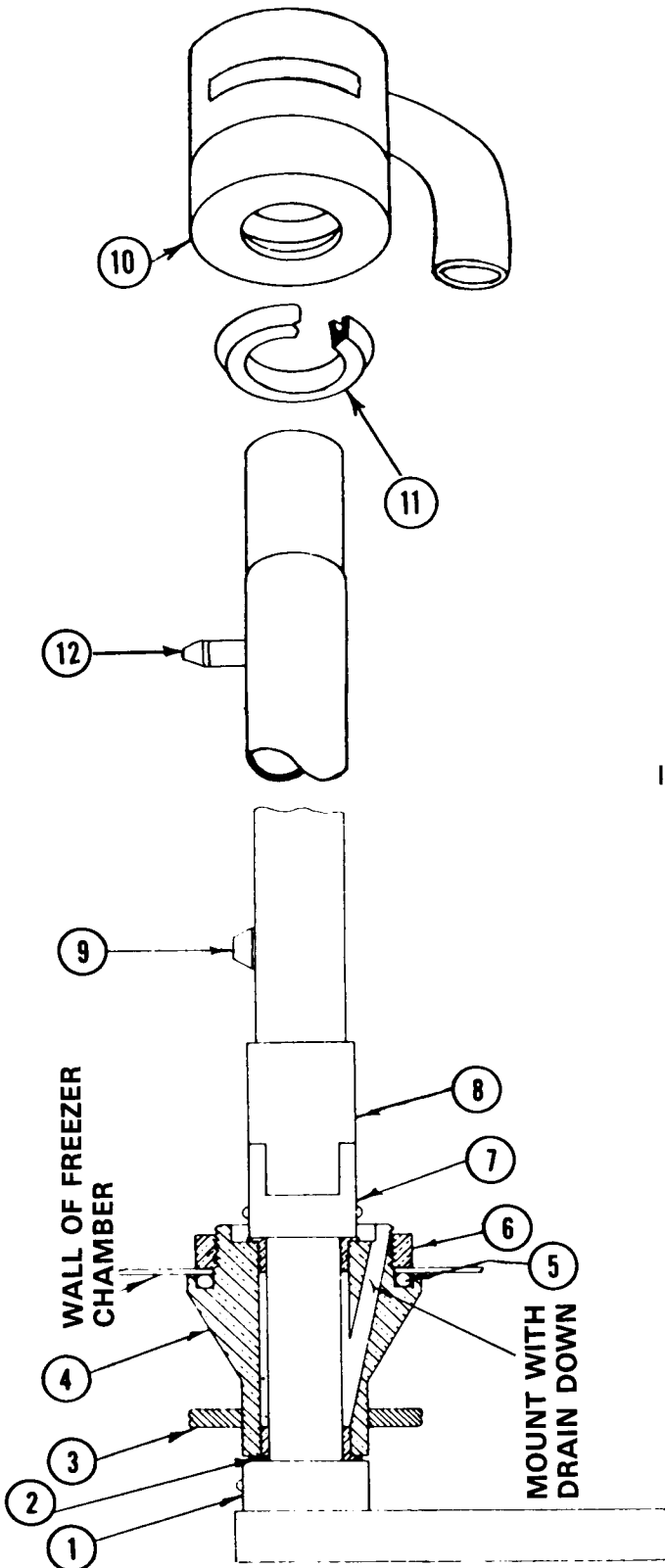
## SUMP PUMP SM1005



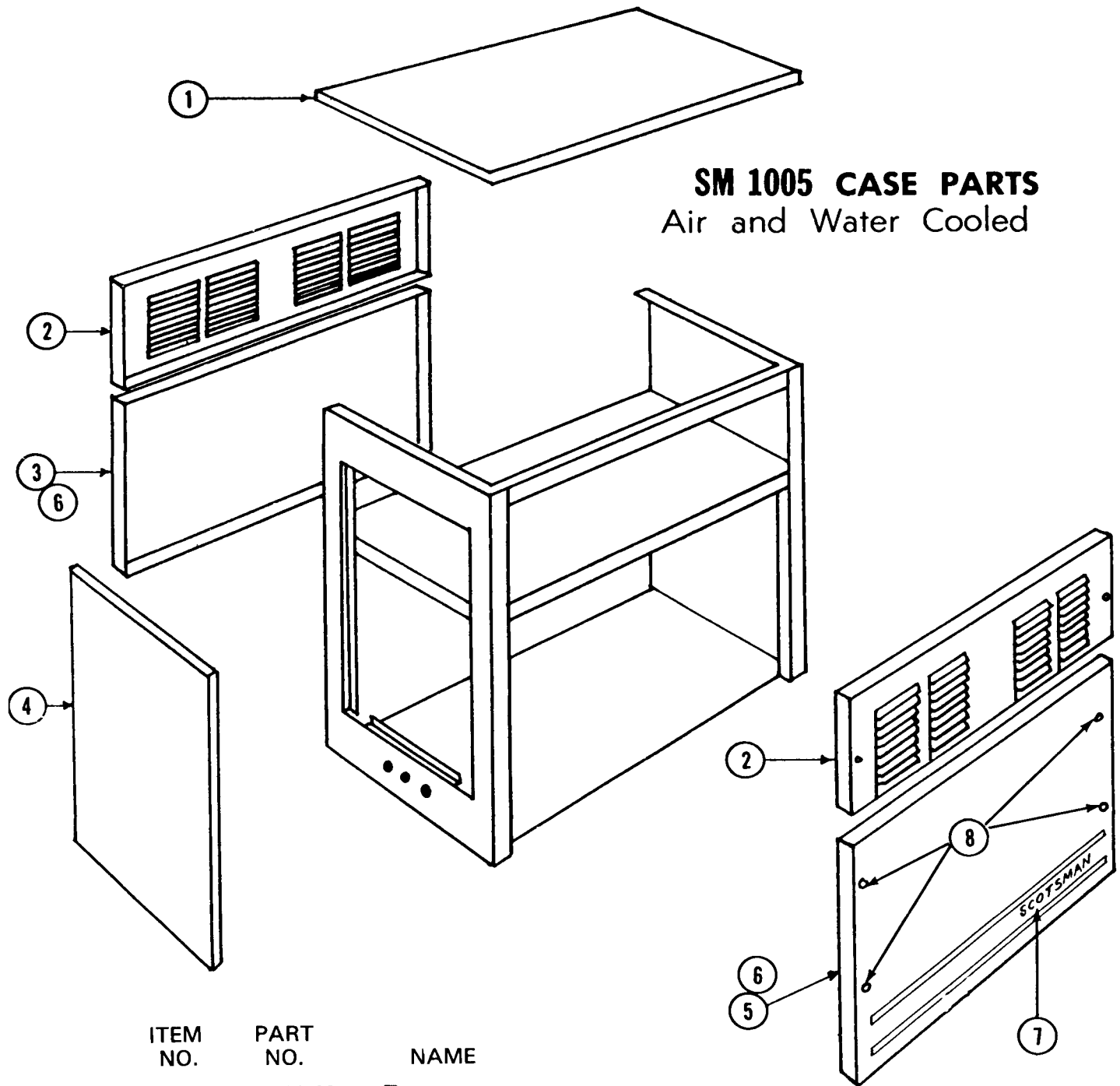
ITEM NO.	PART NO.	NAME
1.	12-1395-32	Motor Only
2.	12-1351-32	Wing Hex Nuts
3.	12-1351-30	Pump Body
4.	12-1351-21	Impellar and Spring
5.	12-1351-31	Impellar Screw and Gasket
6.	12-1351-27	Bottom Inlet Plate
7.	12-1351-26	Inlet Screen
8.	12-1351-29	Wing Screws
	12-1395-01	Complete Pump

**SM1005 SPRAY TUBE AND  
SPRAY TUBE DRIVE ASSEMBLY**

4 per Unit



ITEM NO.	PART NO.	NAME
1.	S07130-000	Collar
2.	02-0438-00	Flange Bearing
3.	13-0169-00	Frommet
4.	S08887000	Drive Bearing Support
5.	13-0617-33	"O" Ring
6.	S07635-000	Nut
7.	A13837-000	Driving Journal Assy.
8.	A17563-000	Sprayer Tube
9.	02-1803-000	Jet
10.	A16963-000	End Bearing Assy.
11.	13-0168-00	"U" Cup



**SM 1005 CASE PARTS**  
Air and Water Cooled

ITEM NO.	PART NO.	NAME
1.	A-17990-08	Top
2.	A17988-08	Upper Door
3.	A-17684-02	Rear Lower Door
4.	A-17710-08	Left Door
5.	A-17663-000	Front Lower Door
6.	02-1548-00	Plastic Door Liner
7.	15-0474-01	Emblem Decal
8.	03-1418-22	Screws (26 Req'd)

## SERVICE-COMPLETE UNIT

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

### TO REMOVE SUMP PUMP

1. Remove left access panel. (4 screws)
2. Loosen hose clamp on sump pump discharge tube.
3. Pull sump pump out.
4. Pull wire from pump to control box.
5. Replace pump in reverse of above. Note: Always try new pump in shop before putting on the job.

### TO REMOVE DRIVE MOTOR

1. Remove left side panel.
2. Loosen set screw on drive journal arm to motor.
3. Take 4 nuts loose on mounting bracket to motor, including the four rubber grommets.
4. Pull electrical cord from control box receptacle.
5. Install new motor in reverse of above.
6. Check and adjust spray bar travel as required.

### TO REMOVE SPRAY TUBE ASSEMBLY

1. Remove lower front door.
2. Remove plastic curtain and cube chutes.
3. Lift right end of spray bar out of holder. This loosens spray bar, also the tygon tubing connection and elbow.
4. Pull tygon tubing and stationary elbow off this end of spray tube. (Has rubber O-Ring sealer).

### TO REMOVE WATER INLET SOLENOID/FLOW CONTROL

1. Remove cabinet top.
2. Pull electrical leads from spade terminals on top of solenoid.
3. Loosen the 3/8" S.A.E. flare nut on outlet side of valve.
4. Unscrew entire valve body assembly from its pipe fitting on inlet side.
5. Replace in reverse of above.

### 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.
4. Loosen all head bolts and tap 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.



## **SERVICE COMPLETE UNIT (Continued)**

### **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, or 1/2 of sight glass.
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 if necessary.

### **TO REPLACE SILENT 3-WAY WATER VALVES**

1. Remove left side access panel
2. Remove 2 screws from mounting bracket.
3. Remove top 1/4" flare fitting.
4. Remove 3 hose clamps.
5. Replace in reverse.

## FUNCTIONAL PARTS AND MAINTENANCE

- PART NAME:** Relay Ameco or Potter Brumfield 2 P.D.T.
- NUMBER:** 12-1645-00
- 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.....Cutler Hammer
- NUMBER:** 11-0353-01
- 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° out, 39° in.
- REPAIRABLE:** No. Replace when inoperative. If out of warranty it can be sent in through your local refrigeration supply dealers and relaced for a small percentage of original cost.
- MAINTENANCE:** Check capillary for cracks or worn spots due to vibration..  
Hold a small handfull of ice on thermostat bulb to check operation of control. Tighten electrical connections.
- PART NAME:** Inlet Water Solenoid
- NUMBER:** 12-0621-G1
- 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 orifice and thence to push warm water out of heat exchanger tank into back of cups molds, performing the defrost.
- SETTING:** Factory set.
- REPAIRABLE:** Yes
- MAINTENANCE:** Flush control each six months.

## FUNCTIONAL PARTS AND MAINTENANCE

- PART NAME:** Drive Motor
- NUMBER:** A23392-001
- 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 setting on motor.
- REPAIRABLE:** Yes--to some extent. Not recommended although front bearings and windings could possibly be replaced by electric motor shop. Normally replace out of warranty motors.
- MAINTENANCE:** Drive linkage should be inspected to insure free movement with no binding or drag on drive motor.
- PART NAME:** Time-Finishing Clock Manufactured by Queen Products Div.
- NUMER:** A25923-001
- FUNCTION:** Heart of cyclematic control system is the reverse acting cube size control, No. 11-370, 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 pole single throw micro-switch to either the freezing cycle or harvest cycle. Micro-switch is in turn actuated by a plastic cam that is directly connected to the electric timer clock motor. Timer has 15 minute cycle, 12 minutes on freezing cycle after being cut on by lo temperature control and 3 minutes on defrost cycle.
- The cam assembly on the timer consists of two plastic discs which can be adjusted to lengthen or shorten the defrost cycle.
- SETTING:** Normal setting for defrost is on No. 2 1/2 which is 3 minutes..
- REPAIRABLE:** Yes, Micro-switch, part No. 12-1480-00, Timer motor, part No. A19070-021 and cam Ass'y part No. 02-1651-00 are replaceable.
- MAINTENANCE:** Check all electrical connections, Blow contact point free of dust, dirt, etc.

**FUNCTIONAL PARTS AND MAINTENANCE**

**PART NAME:** Reverse Acting Cube Size Control

**NUMBER:** 11-0370-00

**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, Part No. A-25923-00 which then takes over balance of freezing cycle and also defrost period.

**SETTING:** Turn dial clockwise to lower setting.

**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 12-1395-01

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

**SETTING:** Factory set.

**REPAIRABLE:** Motor only available part no. 12-1395-32

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

**FUNCTIONAL PARTS AND MAINTENANCE**

PART NAME: Control Hi-Pressure Penn  
NUMBER: 11-0342-06  
FUNCTION: To control one condenser fan motor between pressures of 170 lbs. and 150 lbs.  
SETTING: Factory set.  
REPAIRABLE: No.  
MAINTENANCE: None.

PART NAME: Control Hi-Pressure Penn  
NUMBER: 11-0343-00  
FUNTION: To control one condenser fan motor between pressures of 155 lbs. and 135 lbs.  
SETTING: Factory set.  
REPAIRABLE: No  
MAINTENANCE: None

PART NAME: 3 way valve  
NUMBER: A-19722-000  
FUNCTION: To route water for freezing and harvest cycles. Incoming water pressure during harvest flexes rubber diaphragm against valve stem assy. which opens and closes necessary ports. Stem is spring loaded for return to position during freezing cycle.  
SETTING: None  
REPAIRABLE: Yes, diaphragm, "O" ring and spring replacable.  
MAINTENANCE: Flush during maintenance cleaning.

## MAINTENANCE INSTRUCTION FOR SCOTSMAN CUBERS

THE FOLLOWING MAINTENANCE MUST BE ACCOMPLISHED TWO (2) TIMES PER YEAR ON ALL SCOTSMAN CUBERS. CALL YOU AUTHORIZED SCOTSMAN SERVICE DEPARTMENT.

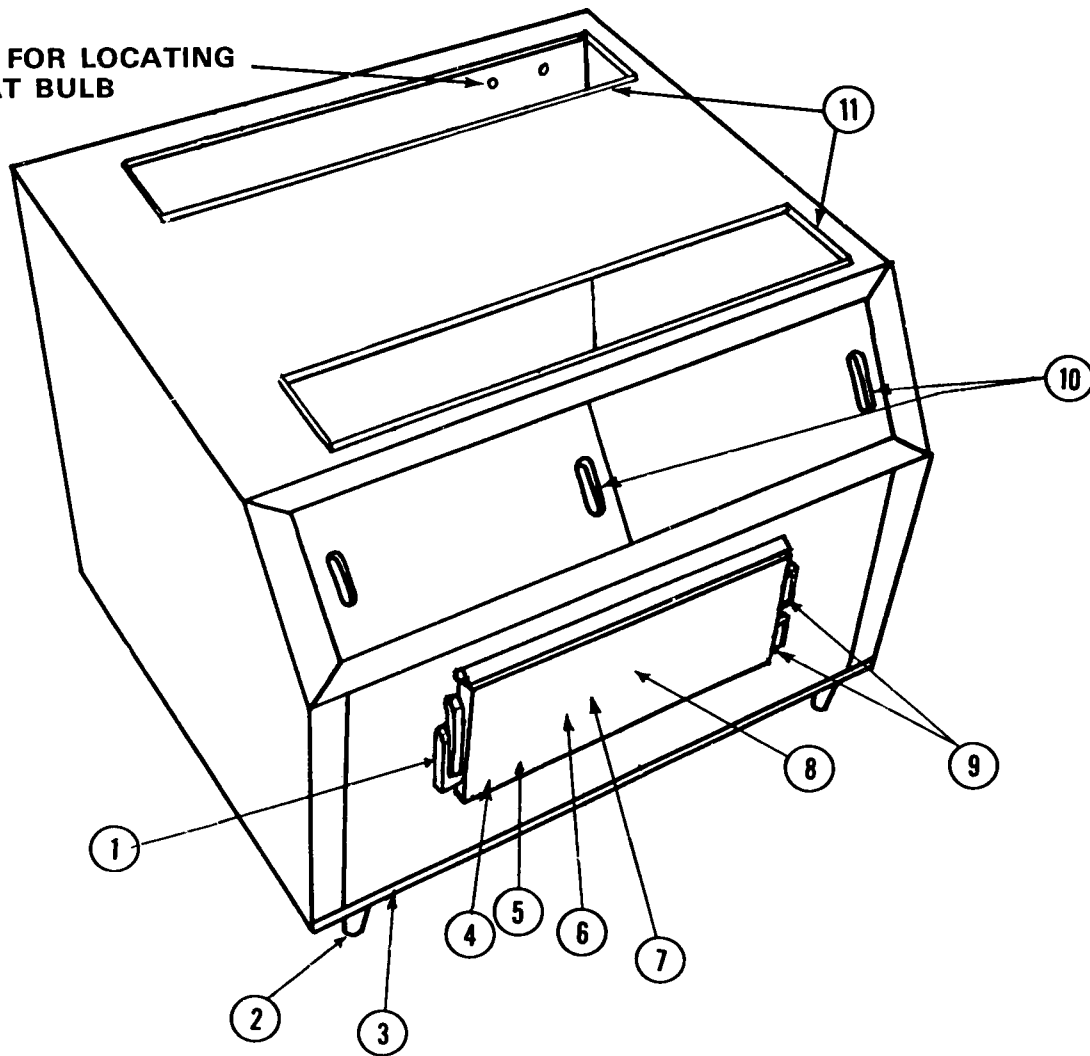
1. Clean air-cooled condenser. This is to be done frequently with the machine shut off.
2. Clean evaporator, sump tank and screen, using Scotsman Ice Machine Cleaner or equivalent..
3. Remove jet tube and manually clean jets by unscrewing jets.
4. Check curtain assembly.
5. Tighten all electrical connections.
6. Tighten all bolts.
7. Check water supply. Clean and flush flow control. Clean water strainer
8. Oil jet tubes drive motor three (3) places. Use SAE 20 oil-2 oil sups, 1 crank case screw covered opening.
9. Oil condenser fan motor. Punch sealed cap or remove screws where possible.
10. Check for refrigeration leaks.
11. Check for water leaks. Tighten drain line connections.
12. Check size and condition of cubes. Adjust as required. See Service Analysis Section.
13. Check bin thermostat setting. Factory set as 35° out, 39° in.

## CLEANING INSTRUCTIONS FOR SCOTSMAN ICE MACHINES MODELS SC1000 AND SM1005

1. Remove front access doors.
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 the time clock knob clockwise until the arrow on the knob is pointing to the hole in the control box cover.
4. Locate the two funnels which are directly under the top cover on the left end of the machine. Remove the metal covers from the funnels. Immediately after the arrow and the hole are lined up as described in Step #3, pour 24 ounces of "Scotsman Ice Machine Cleaner" into each funnel.
5. Let unit finish cube harvest cycle and start into freezing cycle. This will be approximately 5 minutes after step #3. At this time turn off the compressor switch.
6. 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.
7. 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 arrow and the hole are lined up until the next harvest cycle is done manually.
8. Turn the compressor switch back on.
9. Check each new batch of cubes until they are clear and until acid taste has been removed from cubes.
10. 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.
11. Use a damp cloth to wipe off curtains and inside of storage bin.
12. Replace all access doors.
13. Unit is now ready for continued automatic operation.

## B-700 STORAGE BIN FOR SM 1005 CUBER

WELD NUTS FOR LOCATING  
THERMOSTAT BULB



ITEM NO.	PART. NO.	NAME
1.	02-1568-00	Latch & Strike
2.	KLP2	Leg (4 reqd) - Optional - Not With Bin
3.	NOT AVAILABLE	Moulding
4.	A15114-000	Baffle*
5.	A17342-000	Spill Door*
6.	02-1000-00	Door Liner*
7.	13-264-00	Door Gasket*
8.	A18300-05	Door Assy. Complete with Hardware--grey
9.	A18300-002	Door Assy. Stainless Steel
9.	02-1569-00	Hinges
10.	02-1529-00	Sliding door Plastic 2/unit
	A-18770-000	Sliding Door Stainless Steel
11.	02-1544-000	Gasket

\* Not Shown