

CM550

TABLE OF CONTENTS

General Information and Installation

| | |
|--------------------------|---|
| For the Installer | 2 |
| For the Electrician..... | 6 |
| For the Plumber..... | 7 |
| Final Checklist | 8 |

Operation

| | |
|---------------------------------------|----|
| Start Up | 9 |
| Operation..... | 12 |
| Operation - Electrical Sequence | 14 |

Maintenance & Cleaning Instructions

| | |
|-------------------------|----|
| Icemaker..... | 17 |
| Storage Bin..... | 17 |
| Cleaning: Icemaker..... | 17 |

| | |
|-----------------------------|----|
| Component Description | 20 |
|-----------------------------|----|

| | |
|------------------------|----|
| Service Diagnosis..... | 24 |
|------------------------|----|

Adjustment Procedures

| | |
|-------------------------|----|
| Bin Thermostat | 26 |
| Cube Size Control | 27 |
| Timer & Switch | 27 |

Removal and Replacement

| | |
|-------------------------|----|
| Evaporator..... | 28 |
| Compressor..... | 28 |
| Condenser..... | 30 |
| Fan Motor | 30 |
| Cube Size Control | 31 |
| Bin Thermostat | 31 |
| Inlet Water Valve | 31 |
| Water Pump | 32 |

Parts Lists and Wiring Diagrams are located in the center of this manual, printed on yellow paper.

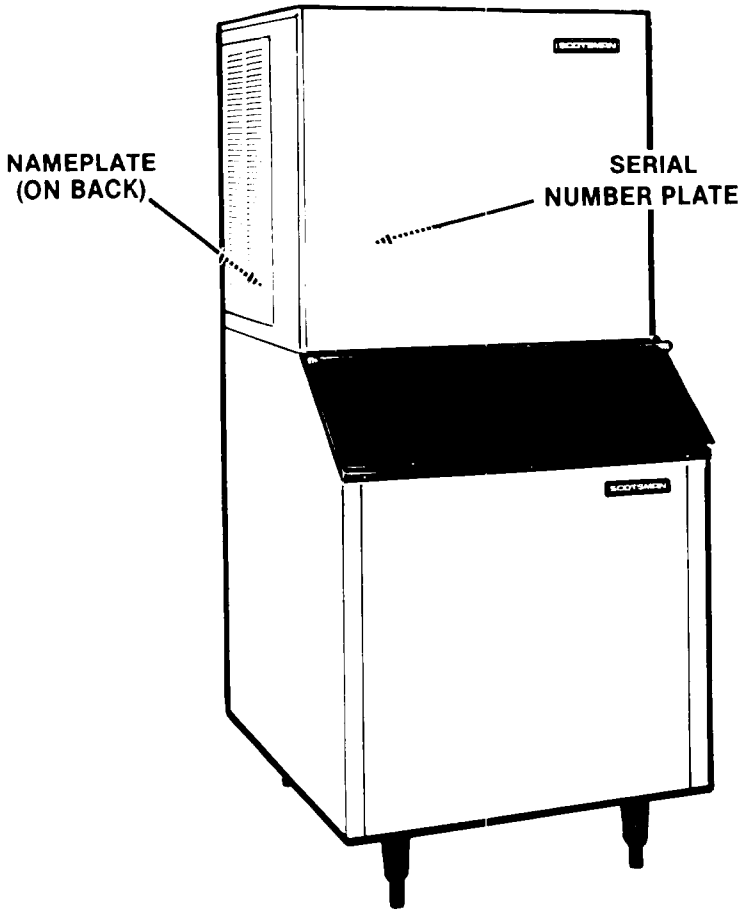
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CM550 FOR THE INSTALLER

INTRODUCTION

These instructions provide the specifications and the step-by-step procedures for the installation, start up and operation for the Scotsman Model CM550 Modular Cuber.

The Model CM550 Modular Cubers are quality designed, engineered and constructed, and are thoroughly tested icemaking systems, providing the utmost in flexibility to fit the needs of a particular user.



NAME PLATE

| | | | | |
|------------------------------|--------|---------------|------|--------|
| MODEL NUMBER | | | | |
| SERIAL NUMBER | | | | |
| A.C. SUPPLY VOLTAGE | | | | |
| MINIMUM CIRCUIT AMPACITY | WIRES | | | |
| MAXIMUM FUSE SIZE | HERTZ | | | |
| HEATER WATTS | PHASE | | | |
| REFRIGERANT | CHARGE | OZ | | |
| MOTORS | VOLTS | R.L.A./F.L.A. | W/HP | L.R.A. |
| COMPRESSOR | | | | |
| FAN | | | | |
| DRIVE | | | | |
| OTHER | | | | |
| DESIGN PRESSURE | LOW | HIGH | | |
| OR HACR TYPE CIRCUIT BREAKER | | | | |

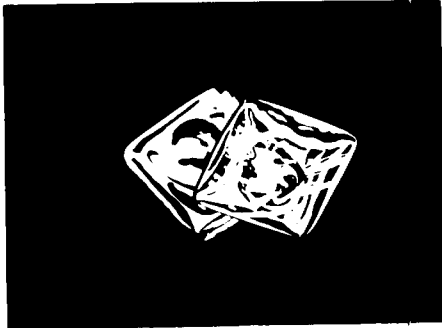
UL CSA NSF

SCOTSMAN A HOUSEHOLD INTERNATIONAL COMPANY

ALBERT LEA, MINNESOTA U.S.A.

SERIAL NUMBER PLATE

| | | |
|-------------------|--------|----|
| MODEL NUMBER | | |
| SERIAL NUMBER | | |
| VOLTS/HERTZ/PHASE | | |
| MAXIMUM FUSE SIZE | | |
| REFRIGERANT | CHARGE | OZ |



SCOTSMAN CONTOUR CUBE

This product qualifies for the following listings:

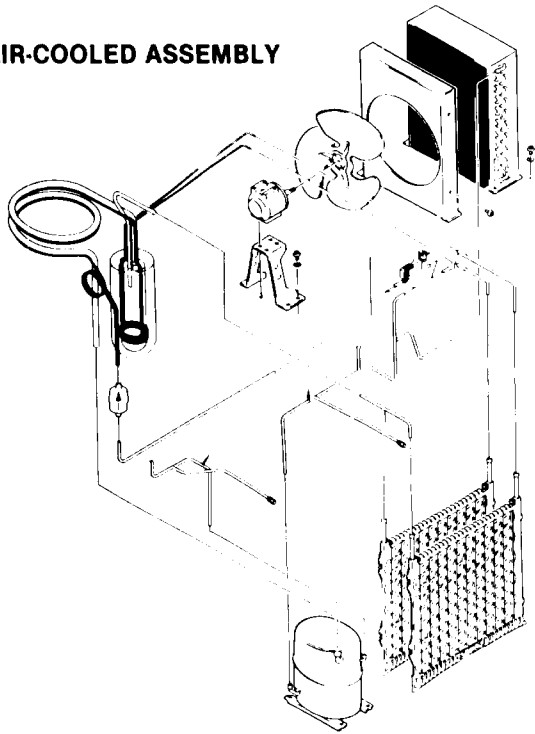


This icemaker has been engineered to our own rigid safety and performance standards. The National Sanitation Foundation (NSF) seal, signifies that it is listed with NSF and that it complies with the materials and construction standards of NSF. In addition, the Underwriters Laboratories, Inc., (UL) Listing Mark and the Canadian Standards Association (CSA) Monogram, both signify that its construction and design have been inspected and tested by them. NSF, UL and CSA inspectors also periodically examine production icemakers at the factory, to assure continued compliance.

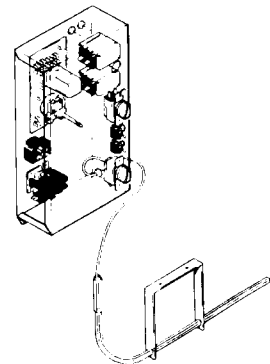
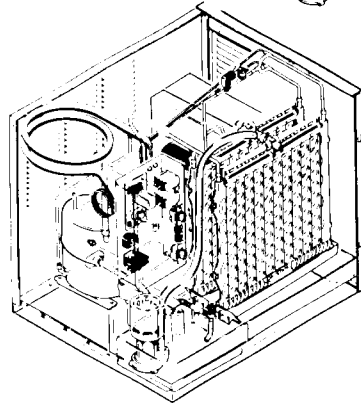
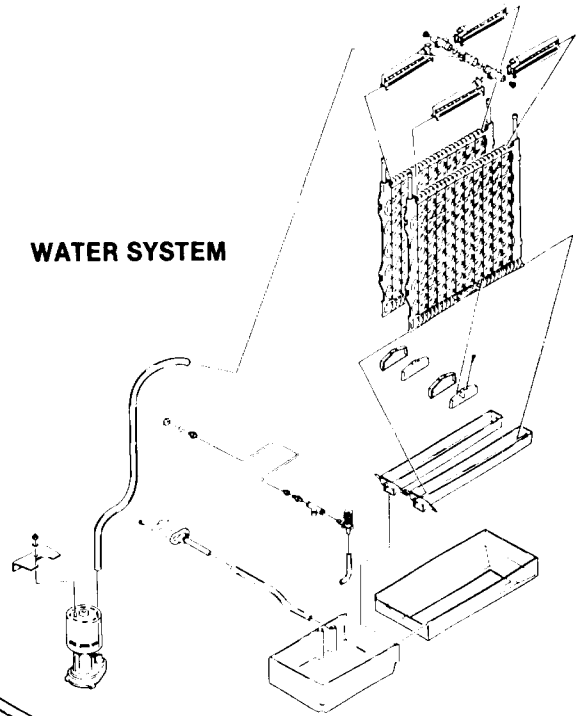
To retain the safety and performance built into this icemaker, it is important that installation and maintenance be conducted in the manner outlined in this manual.

CM550 FOR THE INSTALLER

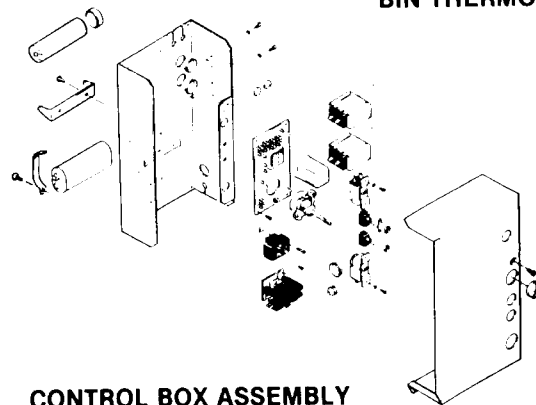
AIR-COOLED ASSEMBLY



WATER SYSTEM



BIN THERMOSTAT BRACKET



CONTROL BOX ASSEMBLY

CM550 FOR THE INSTALLER

LOCATION & LEVELING

1. Arrange for proper electric, water and drain. See instructions for the plumber and for the electrician.
2. After mounting the legs, position the ice storage bin in the selected location which should have a minimum room temperature of 50-degrees F. and maximum room temperature of 100-degrees F. Level the bin, adjusting the leg levelers in both the front to rear and side to side directions. Select a well-ventilated location for the air-cooled condenser.
3. Inspect the bin top mounting gasket which should be flat, with no wrinkles, to provide a good water seal when the Cuber is installed on top of the bin. Remove baffle from bin to gain access.
4. Install the modular cuber on top of the bin using care to be sure a good seal is made between the two cabinets. Align the holes in the bottom rear of the cabinet to mate with the two mounting straps on the top rear of the bin.
5. Use bolts and straps found in hardware package to secure the ice machine. When alignment and leveling are completed, tighten the bolts to secure the mounting straps.

STACKING INSTRUCTIONS

NOTE: This model can only be stacked onto Scotman units with the same size cabinet as itself. Earlier models are not compatible.

When stacking two units, remove the top panel from the lower icemaker. (The top removed from the lower icemaker will no longer have any function.)

Carefully lift the uncrated top unit onto the bottom one and align the two cabinets. Use of a mechanical lift is recommended for this step.

At the back of the two icemakers, bolt the upper icemaker cabinet to the lower icemaker cabinet using the mounting straps and bolts from the hardware package.

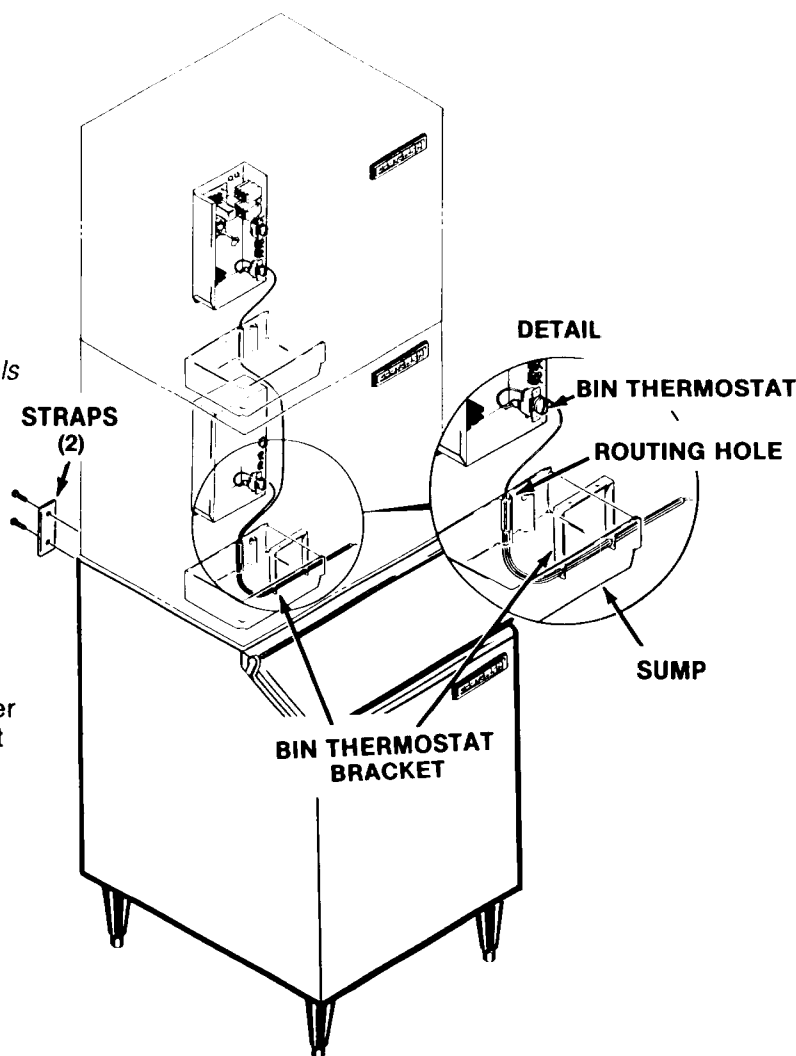
BIN THERMOSTAT INSTALLATION

1. Remove cap from bin thermostat bracket. Insert bin thermostat bracket up through routing hole in sump.
2. Attach the bin thermostat bracket to the bottom of the cuber base using the thumb screws and threaded holes provided.

3. Carefully uncoil the capillary tube to the icemaker and route the capillary tube through the routing hole provided in the sump and through the full length of the bin thermostat bracket.

NOTE: When stacking, route the bin thermostat control from the upper ice machine through the routing hole provided in the sump of the lower icemaker and through the bin thermostat control bracket.

NOTE: Extend bin thermostat capillary tube through entire length of the tubular section of the bin thermostat bracket. When properly installed, the tip of the capillary tube should be flush with the tip of the bin thermostat bracket.



CM550 FOR THE ELECTRICIAN

CONFORM TO ALL APPLICABLE CODES

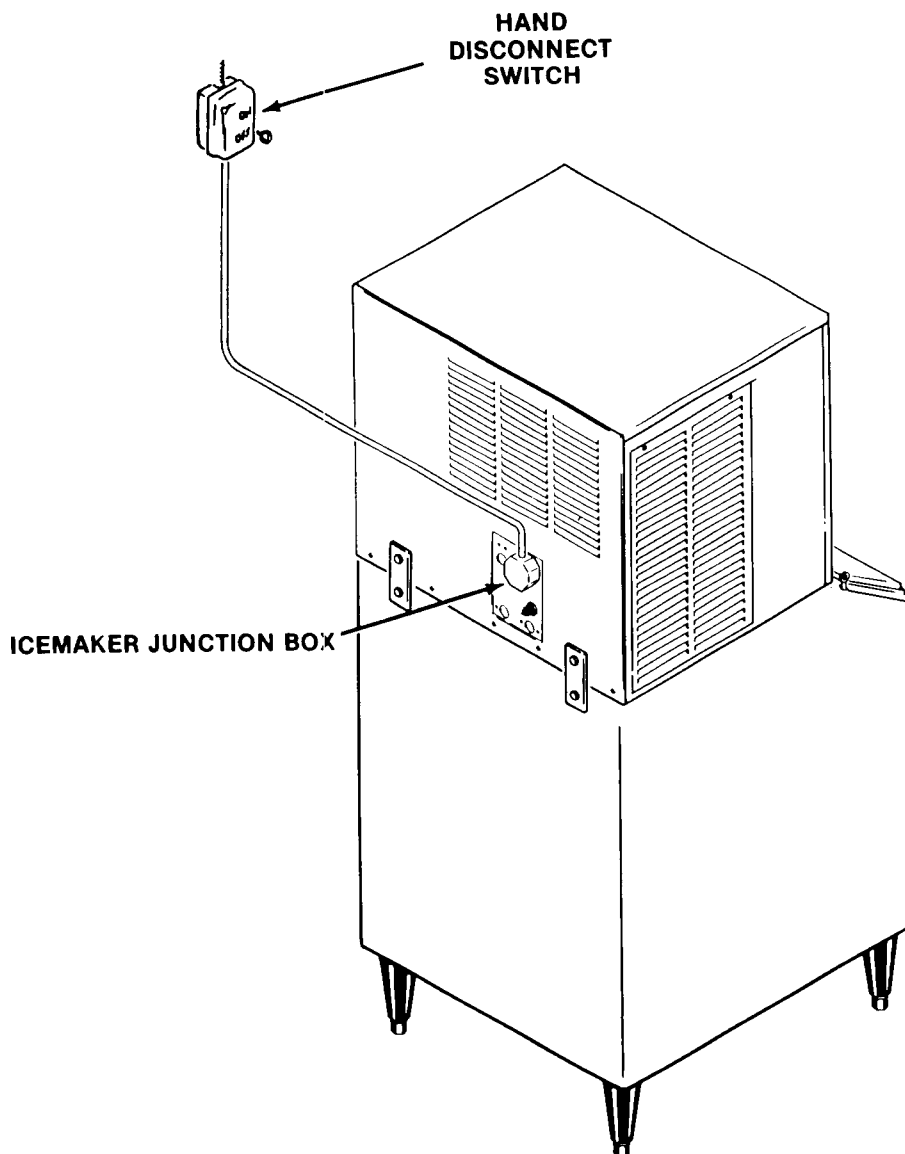
ELECTRICAL CONNECTIONS

SEE NAMEPLATE for current requirements to determine wire size to be used for electrical hookup. The cuber requires a solid chassis-to-chassis earth ground wire. See Wiring Diagram.

Be certain the cuber is connected to its own electrical circuit and individually fused. Voltage variation should not exceed ten percent of the nameplate rating, even under starting conditions. Low voltages can cause erratic operation and may be responsible for serious damage to the icemaker.

Electrical connections are made at the rear of the icemaker, inside the junction box.

All external wiring should conform to the national, state and local electrical code requirements. Usually an electrical permit and services of a licensed electrician will be required.



CM550 FOR THE PLUMBER

CONFORM TO ALL APPLICABLE CODES

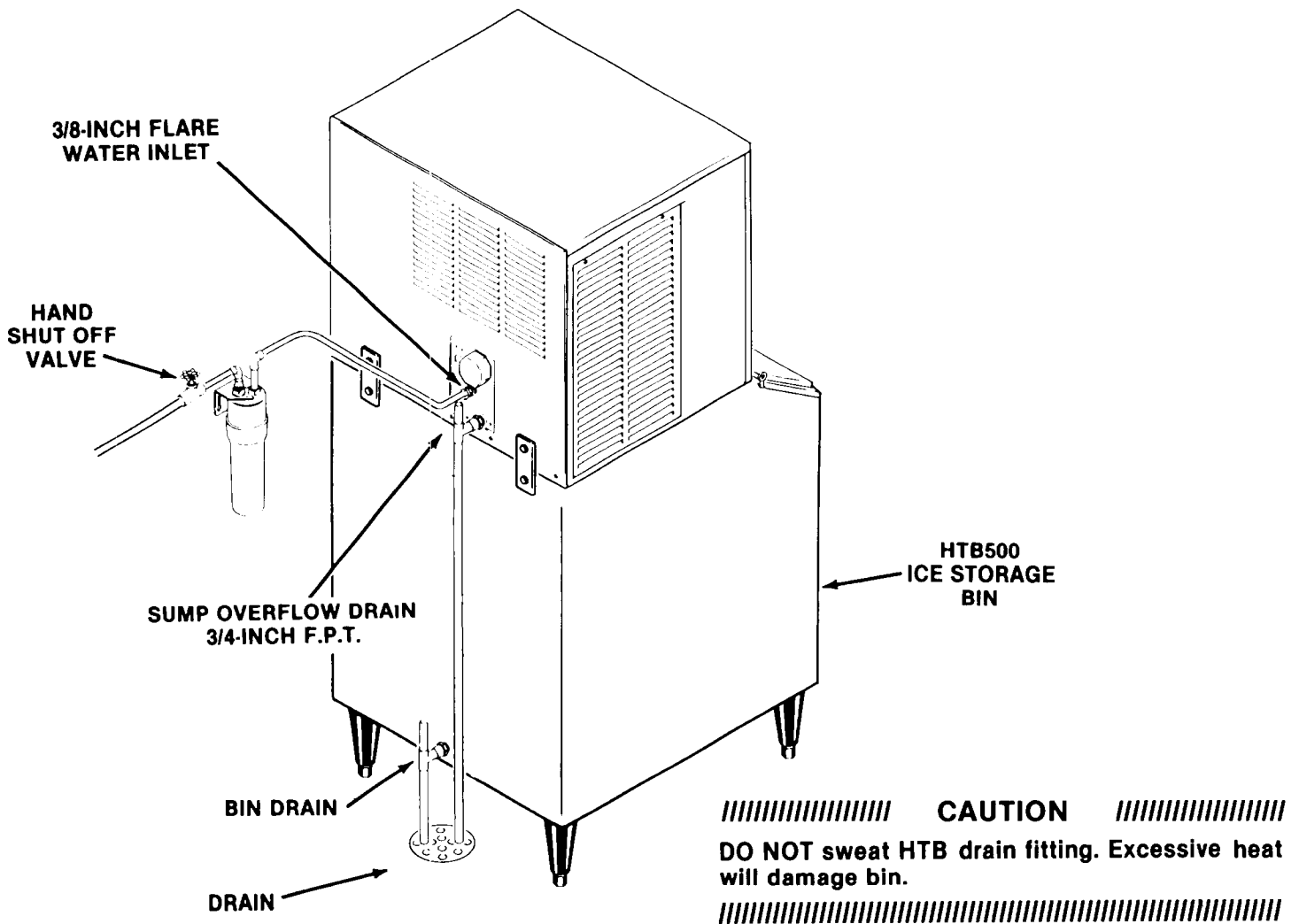
WATER SUPPLY AND DRAIN CONNECTIONS

The recommended water supply line is a 3/8-inch O.D. copper tubing with a minimum operating pressure of 20 PSIG and a maximum of 120 PSIG. Connect to cold water supply line with standard plumbing fittings, with shutoff valve installed in an accessible place between the water supply and the cuber. In some cases a plumber will be required.

DRAIN CONNECTIONS: All drains are gravity type and must have a minimum of 1/4-inch fall per foot on horizontal runs. The drains to be installed to conform with the local plumbing code. Install a vertical open vent on drain line high point to ensure good draining. The ideal drain receptacle is a trapped and vented floor drain.

Recommended bin drain is 5/8-inch O.D. copper tubing and should be vented and run separately. Insulation for high humidity areas is recommended.

The ice machine sump drain is 3/4" FPT. There must be a vent at this connection for proper sump drainage.

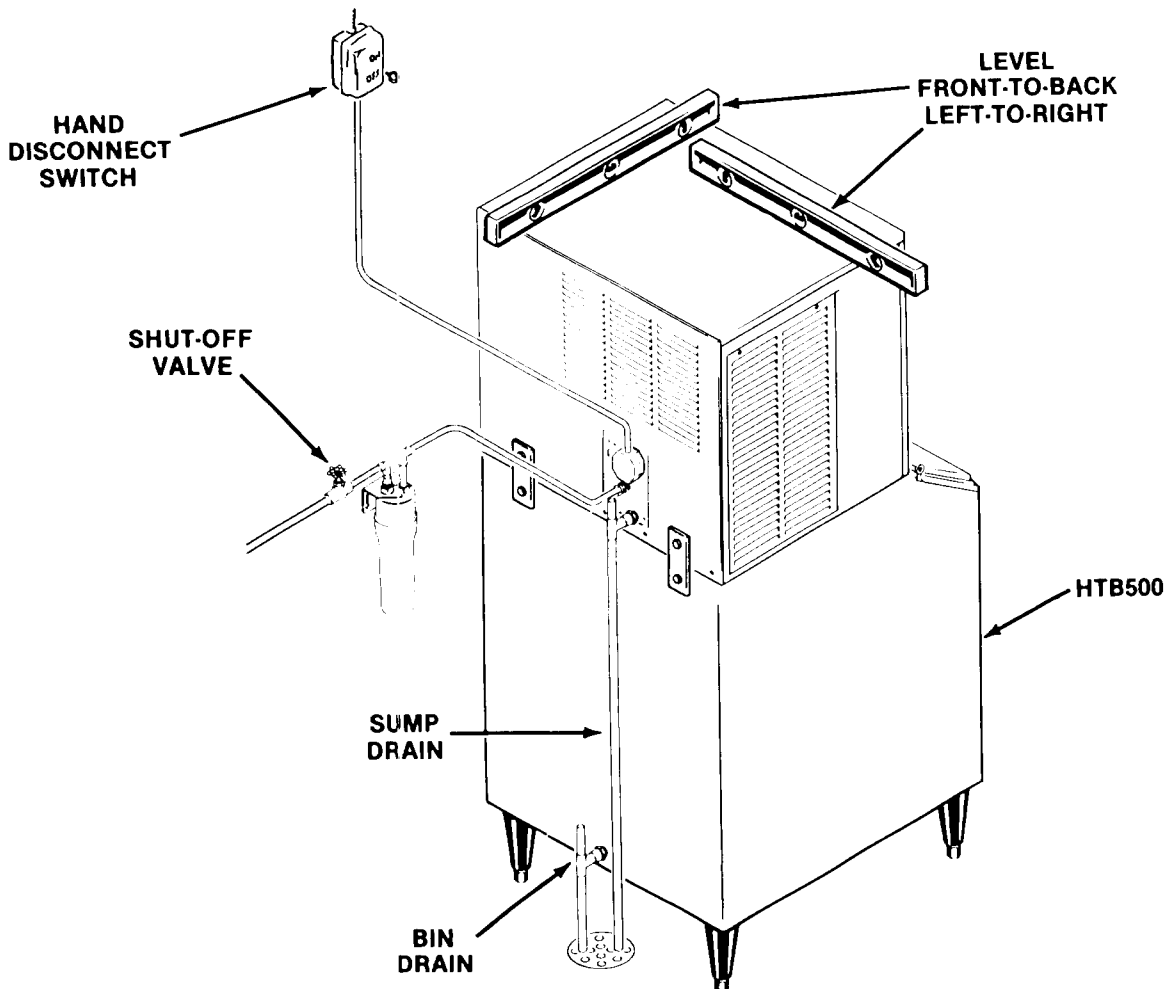


Water Supply and Drain Connection

CM550 FOR THE INSTALLER

FINAL CHECK LIST

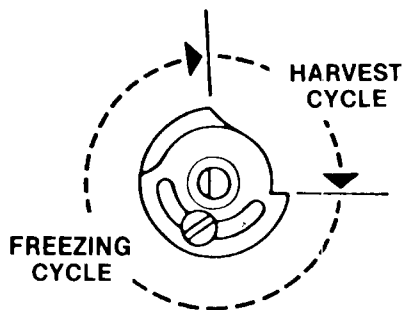
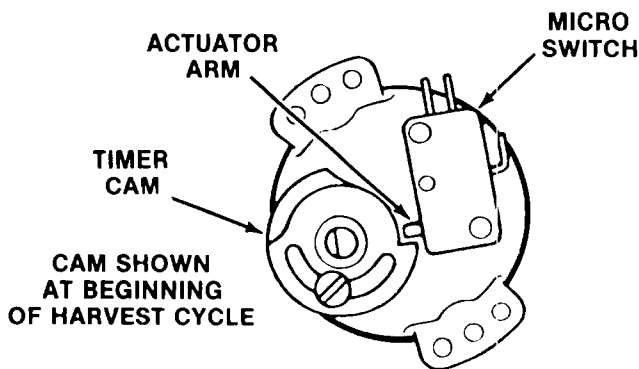
1. Is the cabinet in a room where ambient temperatures are within the minimum and maximum temperatures specified?
2. Is there at least six inches clearance at both sides of the cabinet for proper air circulation? (Air-Cooled models)
3. Has water supply pressure been checked to insure a minimum of 20 PSIG and a maximum of 120 PSIG operating pressure?
4. Is the cabinet level?
5. Check that any shipping material has been removed from inside the cabinet.
6. Has the bin thermostat and bracket been properly installed?
7. Check that the drain troughs are properly secured to the bottom of the evaporator plates.
8. Have all electrical and piping connections been made?
9. Is the water supply line shut-off valve installed and electrical wiring properly connected?
10. Check all refrigerant lines and conduit lines, to guard against vibration or rubbing and possible failure.
11. Have the bin and cabinet been wiped clean?
12. Has the Manufacturer's Registration Card been properly filled out? Check for correct model and serial numbers from Serial nameplate, then mail the completed card to the SCOTSMAN factory.
13. Has the owner/user been given the Service Manual and instructed how to operate and maintain the icemaker?
14. Has the owner been given the name and telephone number of the authorized SCOTSMAN Service Agency serving him?



CM550 START-UP

START-UP

1. Remove front panel by pulling out to unsnap.
2. Remove two screws and the control box cover.
3. Remove four thumb screws and the evaporator cover.
4. Check that the two toggle switches, the MASTER ON-OFF toggle switch and the COMPRESSOR ON-OFF toggle switch are in the OFF position, on the control box.
5. OPEN the water supply line shutoff valve.
6. Inside the control box is the shaft of the timer and the switch assembly. Rotate the shaft of the timer and switch assembly clockwise to start the timer. The timer starts when the actuator arm on the microswitch drops off outer cam into cam slot. See Timer Cam Positions. An audible click can be heard, but in a noisy area, look at the cam and switch to observe the event.



CAM SHOWN DIVIDED INTO TYPICAL FREEZING & HARVEST CYCLES

Timer Cam Positions

7. Move the master ON-OFF toggle switch, the top toggle switch, to the ON position.
8. Observe water fill cycle:

Water pump operates and water inlet solenoid valve OPENS, incoming water flows from the valve through the tubing, the reservoir fills and excess water is overflowed through the stand pipe. This cycle will take about three minutes. Timer will close the water inlet solenoid valve and the water fill cycle is complete.

Advancing the shaft of the timer and switch assembly into a new harvest cycle, restarts the timer and allows a check that: Water inlet solenoid valve OPENS and the reservoir overflows through the stand pipe. Water inlet valve CLOSES, stopping water overflow.

The water pump is operating, as seen by water moving through the tygon tube, up to the water distributor at the top of each evaporator plate, where water is uniformly dispensed and cascades down both sides of the evaporator plate and drains back into the sump assembly for recirculation.

9. Check that the water cascades down over each cube mold and into the sump.
10. When the second cycle is completed, move the compressor ON-OFF toggle switch, to the ON position.
11. Check operation of the freezing cycle:

The compressor is operating.

The icemaking process begins; feeling the metal parts of the evaporator plate reveals cold temperature, very shortly ice begins to form. Tubing will become frosted at the top of the evaporator plate.

Freezing time will range between 15 and 30 minutes. Longer time for temperatures above 70-degrees F. and shorter time required when temperatures are below 70-degrees F. Average complete cycle time is about 18 minutes.

CM550 START-UP

12. Observe second and third cube harvest.

Check size of SCOTSMAN CONTOUR CUBE

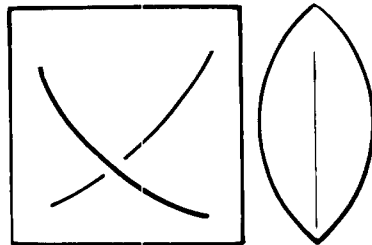
Unlike other SCOTSMAN cubes which are made in a definite molded shape, contour cubes are produced in indentations and many shapes and sizes of contour cubes may be produced — only ONE size and shape combination is correct.

An under-charged refrigeration system produces smaller cubes at the top of the evaporator plate and large cubes at the bottom. Charge system per NAMEPLATE specifications.

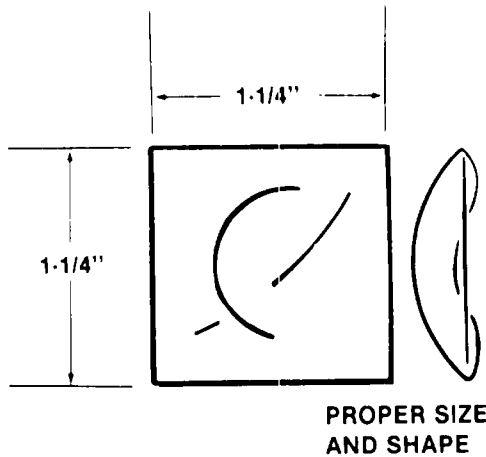
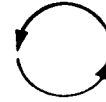
Charge Refrigeration System with REFRIGERANT 502 ONLY.

In areas where extreme problem water condition exists, filtering or purifying equipment is recommended. Contact SCOTSMAN ICE SYSTEMS, Service Department, Albert Lea, Minnesota 56007 for further details.

TOO LARGE

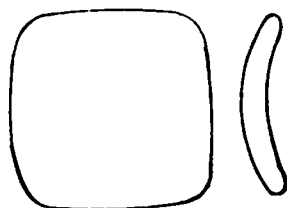


Too LARGE — may cause evaporator freeze ups. Adjust cube size control counter-clockwise to obtain smaller cubes

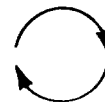


PROPER SIZE AND SHAPE of the contour cube. Icemaker operates at peak efficiency when a cube this size and shape is produced. A finely tuned system produces vertical strips of ice which easily break when they fall.

TOO SMALL



TOO SMALL. To obtain proper size cubes, adjust cube size control clockwise. May cause freeze up problems due to poor harvest.



Ice Cube Size & Shape

CM550 START-UP

ADJUSTMENT OF CUBE SIZE

To produce **SMALLER** sized ice cubes:

Locate cube size control knob, in the front of the control box.

Rotate the adjusting screw one-eighth of a turn **COUNTERCLOCKWISE** to **WARMER**.

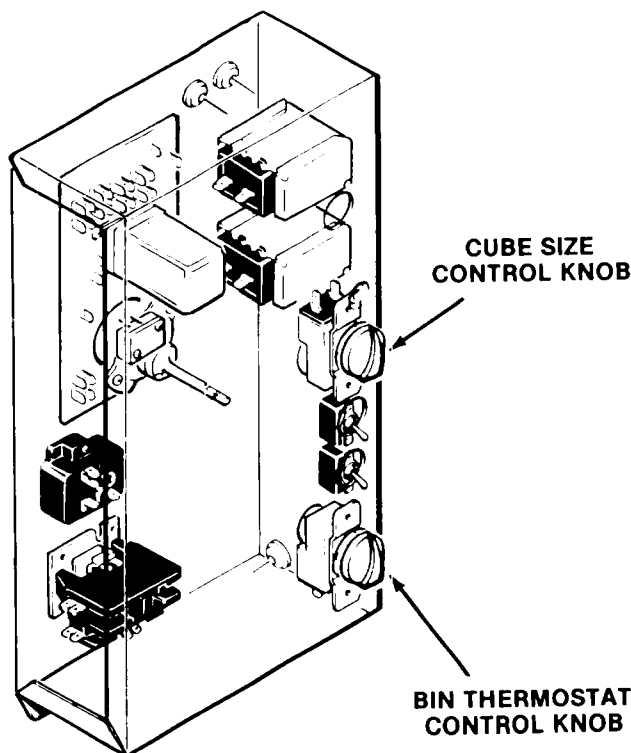
Observe size of the ice cubes in the next two ice cube harvests and adjust in one-eighth turn or less increments, until correct ice cube is achieved.

To produce **LARGER** ice cubes:

Locate cube size control on the front of the control box

Rotate the adjusting screw one-eighth of a turn **CLOCKWISE** to **COLDER**.

Observe size of ice cubes in the next two cube harvests and adjust in one-eighth turn or less increments, until correct ice cube size is achieved.



ROTATE ADJUSTMENT KNOB COUNTER-CLOCKWISE TO PRODUCE SMALLER CUBES.

ROTATE ADJUSTMENT KNOB CLOCKWISE TO PRODUCE LARGER CUBES.

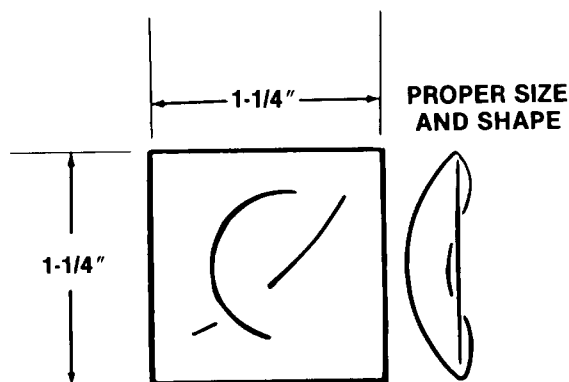
BIN THERMOSTAT OPERATION

Check texture of ice cubes; when partially cloudy throughout, suggests icemaker is operating short of water; or, possibly an extreme problem water condition exists, where filtering or purifying equipment is recommended. Contact **SCOTSMAN ICE SYSTEMS**, Service Department, Albert Lea, Minnesota 56007 for further details. See **SERVICE DIGNOSIS** chart, for shortage of water symptoms and corrections.

13. With the icemaker in the harvest cycle, hold ice against the bin thermostat control bulb to test shutoff, which should cause the icemaker to shut **OFF** at the **END OF THE HARVEST CYCLE**.

Within minutes after the ice is removed from the sensing bulb, the bulb will warm up and cause the icemaker to restart. This control is factory set and should not be reset until testing is performed.

14. Replace control box cover and all cabinet panels and screws.
15. Thoroughly explain to the owner/user the significant specifications of the icemaker, the start up and operation, going through the procedures in the operating instructions. Answer all questions about the icemaker by the owner; and inform the owner of the name and telephone number of the authorized **SCOTSMAN** Distributor, or service agency serving him.



CM550 OPERATION

OPERATION

FREEZING CYCLE

Water from the sump assembly is pumped to the water distributor system, at the top of each evaporator plate. From the water distributor the water cascades by gravity over all cells of the plate and to the sump assembly below, for recirculation. At the beginning of the freezing cycle, the electrical circuit is completed to the compressor and the water pump. The water pump operates continuously, through both the freezing cycle and the harvest cycle.

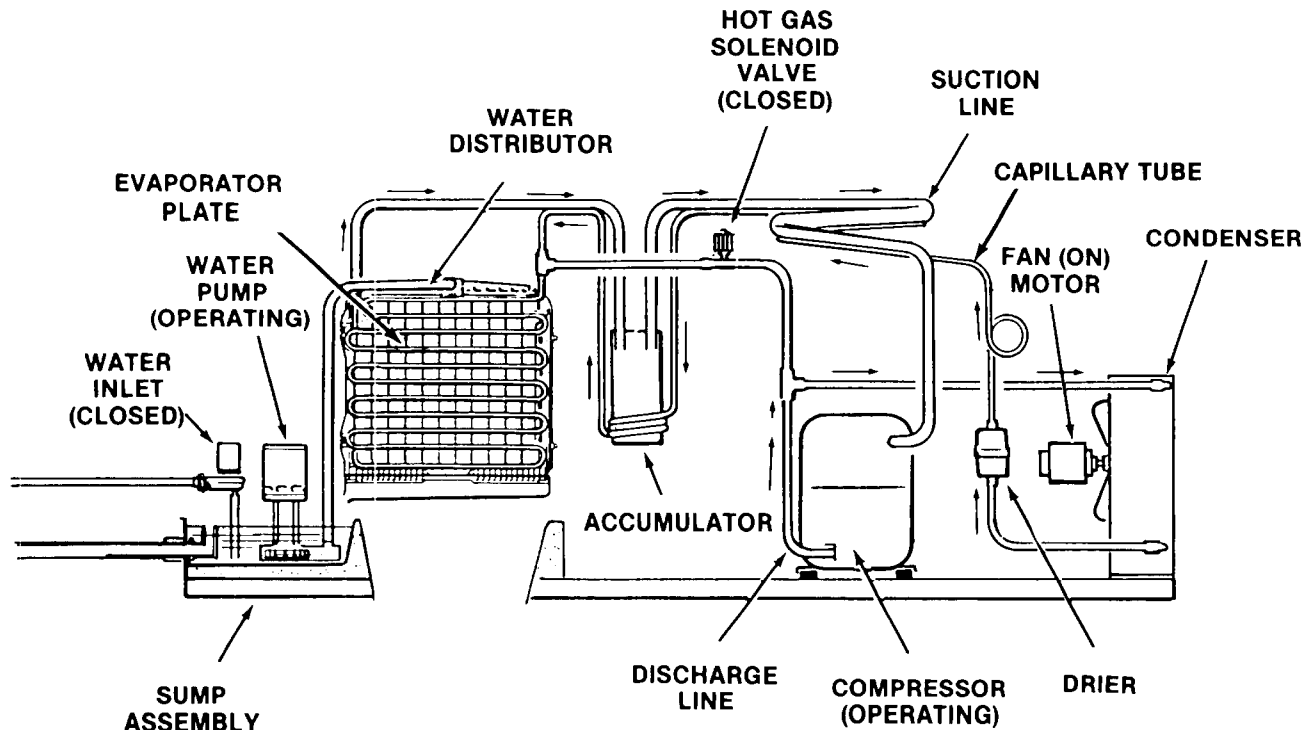
In the compressor, gaseous refrigerant is compressed and discharged into the condenser, as a high pressure, high temperature gas. The refrigerant is cooled by either air or water, and condenses into a high pressure, medium temperature liquid. This liquid refrigerant then passes through a small capillary tube, where the temperature and pressure of the liquid refrigerant are lowered and it next enters the evaporator plates. The refrigerant is warmed by

the water cascading over the Evaporator plate and begins to boil off and become a gas. The refrigerant next travels through the accumulator and the heat exchange area of the suction line where any remaining liquid refrigerant boils off and returns to the compressor as a low pressure, low temperature gas, and the cycle starts again.

During the freezing cycle, the hot gas solenoid valve is CLOSED and the water inlet solenoid valve is CLOSED.

When the ice cubes are partially formed, the cube size control will sense the temperature at which it is preset to CLOSE. This will complete the electrical circuit to the timer. The timer then controls the remainder of the freezing cycle.

The timer will keep the icemaker operating in the freezing cycle for a selected length of time. This will give the ice cubes time to fully form. After that selected length of time, the timer will switch the icemaker into the harvest cycle, through the contacts of the timer assembly microswitch.



Freezing Cycle

CM550 OPERATION

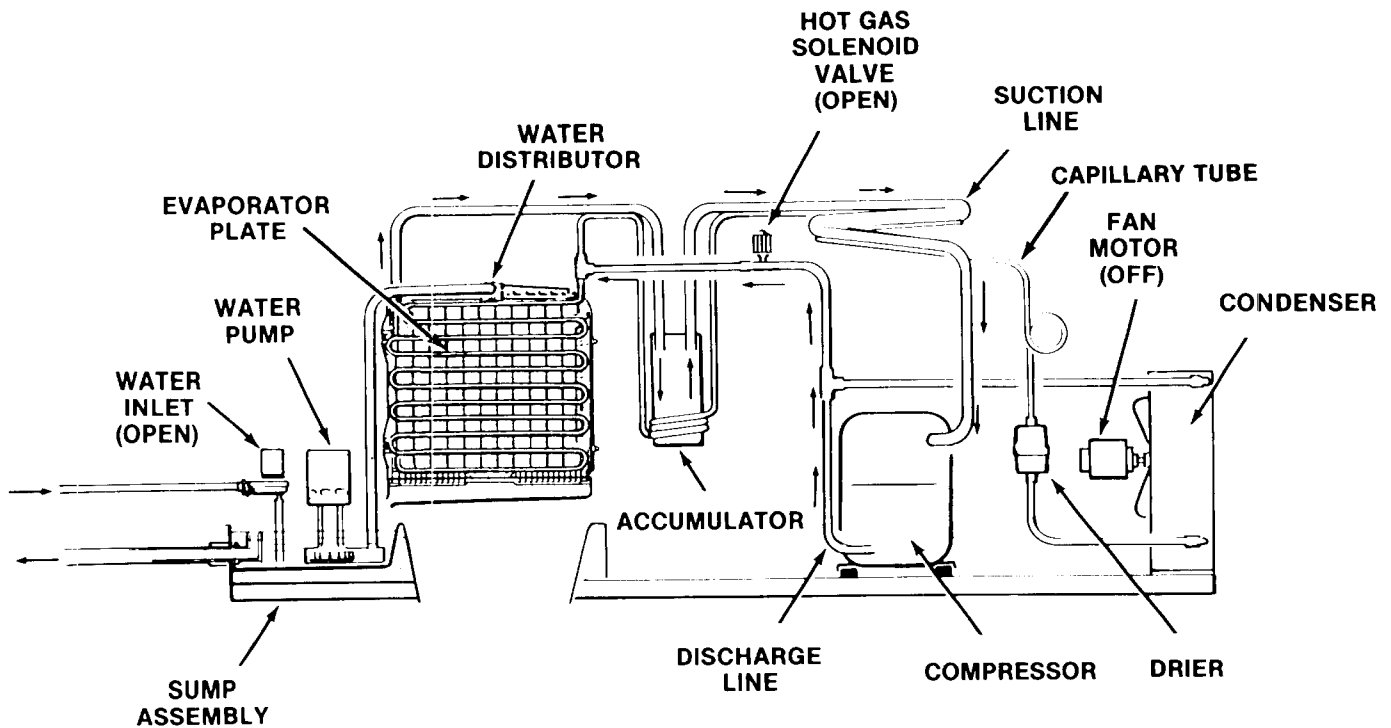
HARVEST CYCLE - HOT GAS BYPASS

When the timer switches the icemaker into the harvest cycle, high pressure, high temperature gas refrigerant being discharged from the compressor is diverted from the condenser through the hot gas solenoid valve into each evaporator plate. During this cycle, the gaseous refrigerant bypasses the condenser and the capillary tube.

In the electrical circuit, both the compressor and the water pump are operating and the hot gas solenoid valve is energized and OPEN and the water inlet solenoid valve is OPEN.

The finished ice cubes are released from the sides of each evaporator plate, by the warming effect of the hot gas condensing in each evaporator plate and the water cascading over the ice cubes. The released ice cubes drop into the ice storage bin below.

At the end of the harvest cycle, the timer cam will push the actuator arm to the microswitch IN. If the bin thermostat is still CLOSED, a whole new cycle will begin. If the bin thermostat is OPEN, the icemaker will shut OFF, at this time.



Harvest Cycle

CM550 OPERATION - ELECTRICAL SEQUENCE

The following charts illustrate which switches and which components are ON or OFF during a particular phase of the icemaking cycle.

Refer to the wiring diagram for a reference. Remember, the wiring diagram shows the unit as it is in the Timed Freeze Cycle.

BEGINNING FREEZE

| ELECTRICAL COMPONENTS (LOADS) | ON | OFF |
|--------------------------------------|-----------|------------|
| Compressor | X | |
| *Fan Motor (Air-cooled only) | X | |
| Hot Gas Valve | | X |
| Inlet Water Valve | | X |
| P.C. Board Relay Coil | X | |
| Timer | | X |
| Water Pump | X | |

| SWITCHES | ON | OFF |
|-------------------------|-----------|------------|
| Bin Thermostat | X | |
| Cube Size Thermostat | | X |
| Toggle - Master | X | |
| Toggle - Compressor | X | |
| H.P. Control | X | |
| Timer Micro Switch N.C. | X | |
| Timer Micro Switch N.O. | X | |
| Hi Temp Switch | X | |

At the beginning of the freeze cycle the timer is not turning, but the icemaker is refrigerating the water starting to turn the water into ice.

CM550 OPERATION - ELECTRICAL SEQUENCE

TIMED FREEZE

| ELECTRICAL COMPONENTS (LOADS) | ON | OFF |
|-------------------------------|----|-----|
| Compressor | X | |
| *Fan Motor (Air-cooled only) | X | X |
| Hot Gas Valve | | X |
| Inlet Water Valve | | X |
| P.C. Board Relay Coil | X | |
| Timer | X | |
| Water Pump | X | |

| SWITCHES | ON | OFF |
|----------------------------|----|-----|
| Bin Thermostat | X | |
| Cube Size Thermostat | X | |
| Toggle Switch - Master | X | |
| Toggle Switch - Compressor | X | |
| H.P. Control | X | |
| Timer Micro Switch N.C. | X | |
| Timer Micro Switch N.O. | X | |
| Hi Temp Switch | X | |

After the icemaker has cooled the water and formed some ice on the evaporator, the evaporator will have gotten cold enough to have the cube size control close. All this does is start and run the timer.

HARVEST

| ELECTRICAL COMPONENTS (LOADS) | ON | OFF |
|-------------------------------|----|-----|
| Compressor | X | |
| *Fan Motor (Air-cooled only) | | X |
| Hot Gas Valve | X | |
| Inlet Water Valve | X | |
| P.C. Board Relay Coil | | X |
| Timer | X | |
| Water Pump | X | |

| SWITCHES | ON | OFF |
|----------------------------|----|-----|
| Bin Thermostat | X | |
| Cube Size Thermostat | | X |
| Toggle Switch - Master | X | |
| Toggle Switch - Compressor | X | |
| H.P. Control | X | |
| Timer Micro Switch N.C. | X | |
| Timer Micro Switch N.O. | X | |
| Hi Temp Switch | X | |

The timer has now turned far enough so that the micro-switch plunger has dropped into the gap in the cam, this breaks the circuit to the relay in the P.C. Board - and that puts the machine into the Harvest cycle, where the hot gas valve and inlet water valve have opened to harvest the ice. When ice is on the bin control, it will open and at the end of the harvest cycle shut off the machine.

CM550 SERVICE SPECIFICATIONS

In servicing a machine, it is often useful to compare that individual unit's operating characteristics to those of a normally operating machine. The numbers and facts listed on this page are for NEW, CLEAN machines.

Use these numbers as a guideline only.

COMPONENT

| | | |
|---|---------------------------------------|---------------------------------------|
| Timer: 1 revolution of the cam, in minutes | 8 | |
| Harvest Time, preset, in minutes | 2-1/4 | |
| Inlet Water Valve, water flow in g.p.m. | 3/4 | |
| | Close | Open |
| Cube Size Thermostat, Reverse Acting, Temperature Range . . (+15 ⁰ F. to +2 ⁰ F.) | | n/a |
| Bin Thermostat Temperature Range | 38.5 ⁰ - 43.5 ⁰ | 33.5 ⁰ - 38.5 ⁰ |
| High Pressure Safety Switch, PSIG | manual | 450 |

OPERATING CHARACTERISTICS

This model is air cooled only, and during the freezing cycle, the discharge pressure will slowly decline as the unit forms ice on the evaporators. At the same time the suction pressure is also dropping, reaching it's lowest point at the end of the freeze cycle. Compressor amps experience a similar decline.

The ice per cycle is 5.5 to 6 pounds.

The values listed are representative of values seen at a wide range of air and water temperatures and are for a normal cube size. When comparing these figures to field data, allow a variation from each end of the range given.

During the harvest or defrost cycle, the suction pressure goes up dramatically with the opening of the hot gas by pass valve. The discharge pressure falls when this happens. The fan is OFF during the harvest cycle. Compressor amps reach their peak during harvest.

After servicing refrigeration system, always torque the access valve caps to 60-75 inch pounds.

Freeze Cycle:

For example, with conditions at 70⁰F. air, and 50⁰F. water, the discharge pressure will decline from about 225 at the beginning to 180 by the end. Suction pressure at the end of freeze will be about 28 PSIG.

Freeze cycle time will be about 14-15 minutes.

Compressor amps 5 minutes into the freeze cycle will be about 15.5.

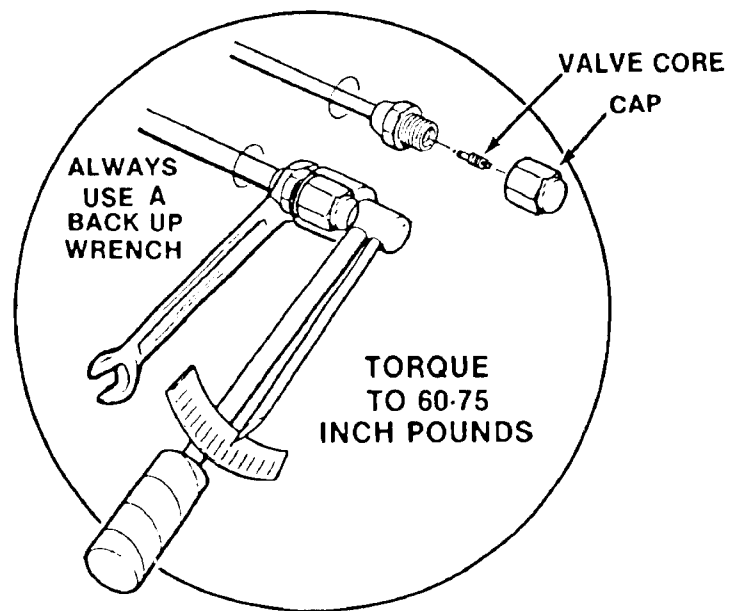
At 90⁰/70⁰, the discharge pressures will go from about 300 down to 240. Suction pressure will be about 28 PSIG at the end of the 18-19 minute freeze cycle.

Harvest Cycle:

Discharge pressure at 70⁰/50⁰ will be about 105-125, and suction pressure will be around 95-100 PSIG.

At 90⁰/70⁰, discharge pressure will be about 140. Suction pressure will be about 130 PSIG.

Peak amp draw during harvest: 17.4.



CM550 MAINTENANCE & CLEANING INSTRUCTIONS

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A Scotsman Ice System represents a sizable investment of time and money in any company's business. In order to receive the best return for that investment, it MUST receive periodic maintenance.

It is the USER'S RESPONSIBILITY to see that the unit is properly maintained. It is always preferable, and less costly in the long run, to avoid possible down time by keeping it clean; adjusting it as needed; and by replacing worn parts before they can cause failure. The following is a list of recommended maintenance that will help keep the machine running with a minimum of problems.

Maintenance and Cleaning should be scheduled at a minimum of twice per year.

////////////////////////////////////

ICEMAKER

THE FOLLOWING MAINTENANCE SHOULD BE SCHEDULED AT LEAST TWO TIMES PER YEAR ON THIS ICEMAKER. CALL YOUR AUTHORIZED SCOTSMAN SERVICE AGENCY.

1. Check and clean or service any optional water treatment devices, if any.
 2. Clean the water strainer.
 3. On air cooled models, clean the air cooled condenser. Do not use a wire brush. Vacuum or blow out any dust in the fins of the condenser: the condenser is only clean when light can be seen through the fins.
 4. Check that the cabinet is level in the side to side and front to back directions.
 5. Clean the water system, evaporator plates and sump assembly, using a solution of Scotsman Ice Machine Cleaner. Refer to CLEANING - Ice maker.
- Cleaning requirements vary according to local water conditions and to how much the machine runs. Continuous check of the clarity and shape of the ice cubes, with a visual inspection of the water system parts, evaporator parts and the reservoir will indicate if more frequent cleaning is needed.
6. Check and tighten all bolts and screws.
 7. Check for water leaks and make corrections.
 8. Check that the bin thermostat operates correctly: holding ice on the thermostat control tube in the bin should cause the icemaker to shut off at the end of the harvest cycle. After the ice is removed, the icemaker should restart within a few minutes.
 9. Check cube size, adjust if required.
 10. Check harvest time, adjust if required.

ICE STORAGE BIN

The interior liner of the bin is in contact with a food product: **Ice**. The storage bin must be **cleaned** regularly to maintain a **sanitary** environment. Once a week cleaning with soap and water, a hot water rinse and an air dry is a basic procedure.

Every 90 days, the liner should be sanitized with a commercial ice machine sanitizer, according to the directions of the sanitizer, or with a solution of household bleach and water:

1. Mix the bleach and water using the ratio of two ounces of bleach to two gallons of water.
2. Wipe all interior surfaces of the ice storage bin with the bleach and water.
3. Allow to air dry.

CLEANING: ICEMAKER

1. Remove front panel.
2. Switch the compressor switch to OFF. Switch the master switch to OFF.
3. Remove 4 thumbscrews and the front liner.
4. Twist forward and remove the front drain trough, and switch the master switch to ON, pumping the water from the reservoir into the bin. Replace the drain trough.
5. Mix 8 ounces of Scotsman Ice Machine Cleaner with 1 gallon of warm (95⁰F. - 115⁰F.) water and pour into the reservoir until full.

////////////////////////////////////**WARNING**////////////////////////////////////

Scotsman Ice Machine Cleaner contains Phosphoric and Hydroxyacetic acids. These compounds are corrosive and may cause burns. If swallowed, DO NOT induce vomiting. Give large amounts of water or milk. Call Physician immediately. In case of external contact, flush with water. KEEP OUT OF THE REACH OF CHILDREN.

////////////////////////////////////

CM550 MAINTENANCE & CLEANING INSTRUCTIONS

6. Let the unit operate for 30 minutes with the compressor off, then switch the unit off.

7. Remove the front drain trough again.

8. Switch on the master switch to pump water from the sump into the bin. Continue to add fresh water to flush residual cleaner from the system. Switch the master switch off.

9. Wash the plastic and stainless liners of the freezer section with a solution of household bleach (1 ounce of bleach to 1 gallon of water) and warm (95⁰F.-115⁰F.) water. Allow to air dry.

10. Replace the drain trough and front liner.

11. Switch the master and compressor switches back on.

12. Replace the front panel

13. Check the next batch of cubes to make sure all of the acid taste is gone.

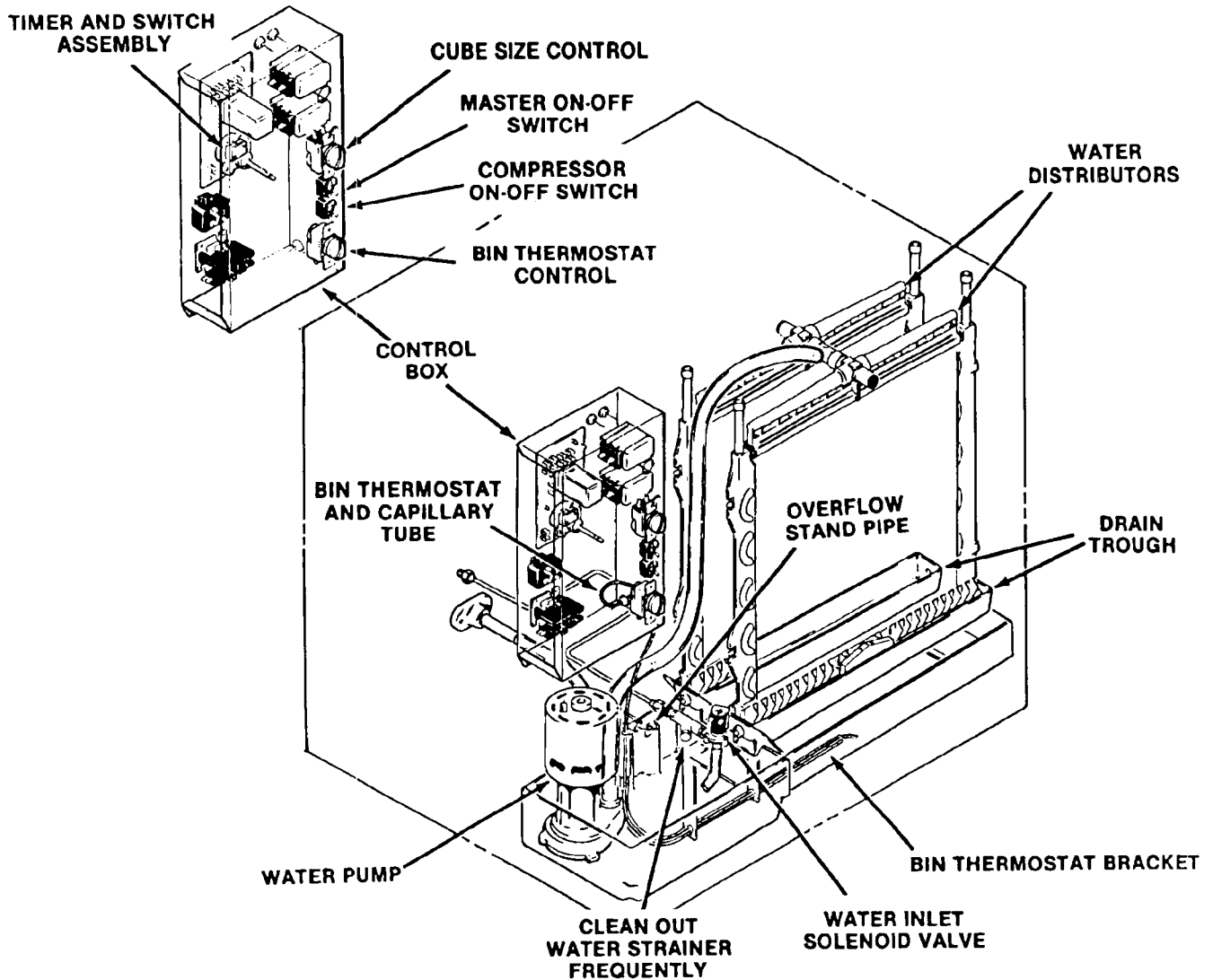
////////////////////CAUTION////////////////////////////////////

DO NOT use ice cubes produced from the cleaning solution. Be sure none remain in the bin

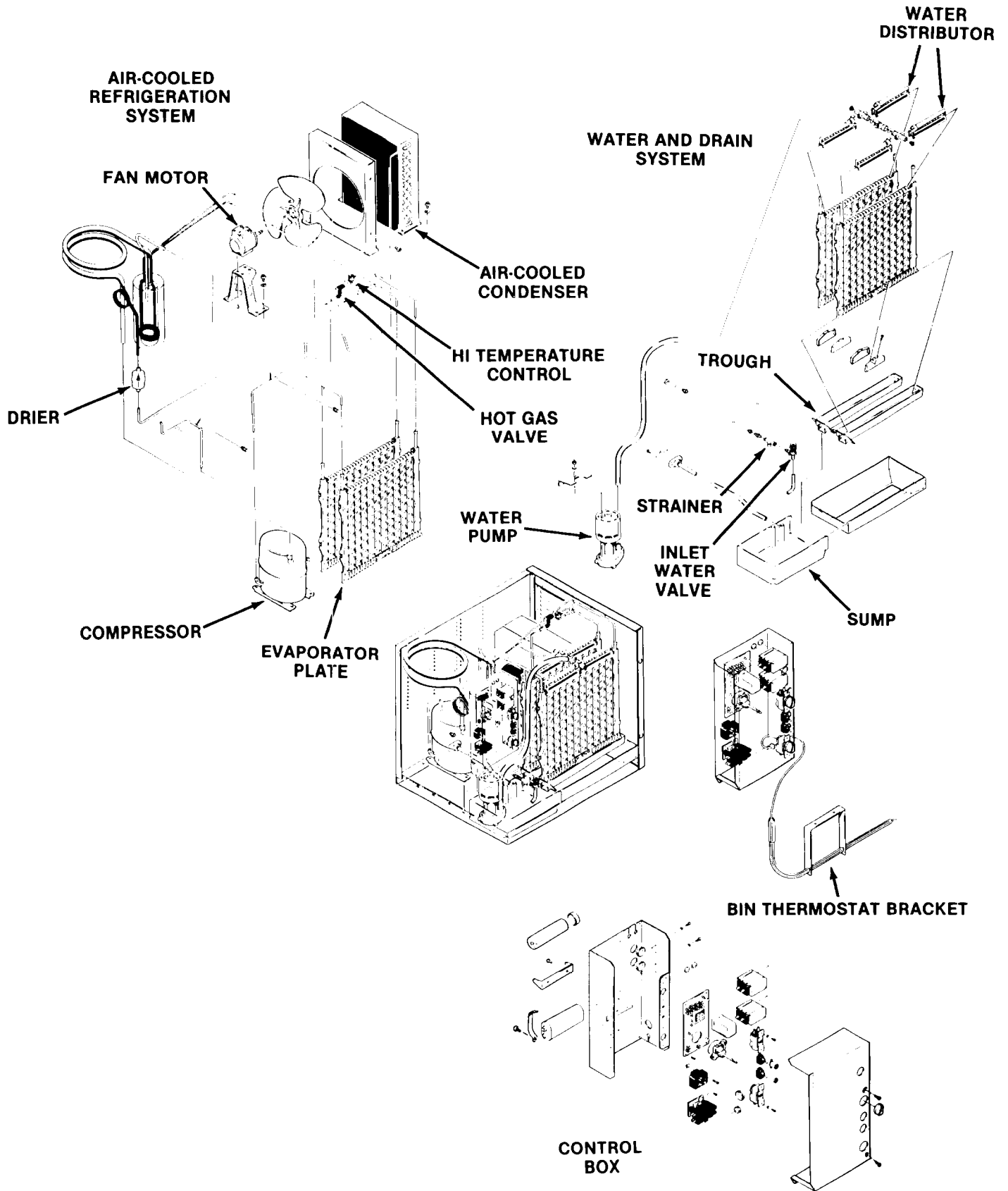
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14. Pour hot water into the storage bin to melt the cubes and also clean out the bin drain.

15. The unit is now ready for continued automatic operation.



CM550 COMPONENT DESCRIPTION



CM550 COMPONENT DESCRIPTION

BIN THERMOSTAT CONTROL

The bin thermostat is located on the front edge of the control box with an accessible knob on the front. The sensing capillary tube is routed from the control out the side of the control box down and across the front edge of the sump and down into the bin thermostat bracket. The bin thermostat control functions to automatically shut OFF the icemaker, when the ice storage bin is filled and ice contacts the capillary tube. It also signals the RESTART of the icemaker, when the capillary tube starts to warm up, after ice has been removed from the bin.

Bin thermostat control adjustment should ONLY be performed on icemakers installed in extreme warm or cold locations and adjust only in increments of one eighth turn at a time.

COMPRESSOR CONTACTOR

The compressor contactor functions to carry the compressor line current. The contactor is wired so any control in the pilot circuit, such as the bin thermostat, and high pressure controls, etc., will cause the contactor holding coil to be de-energized, when the control contact OPENS, thereby breaking the circuit to the compressor.

CUBE SIZE CONTROL

The temperature sensing cube size control affects the length of the freezing cycle prior to initiating the finishing timer. The cube size control closes its contacts when the evaporator reaches a preset temperature, starting the finishing timer. A variation in either ambient air or incoming water temperature will affect the efficiency of the refrigeration system. This will vary the length of time it takes the evaporator to reach the temperature at which the cube size control is preset to CLOSE; which, in turn, will affect the overall cycle time.

See *Cube Size Adjustment* BEFORE attempting to adjust the control.

RELAY

The multi-function, three pole, double-throw, plug-in relay is installed directly into a receptacle on the printed circuit board in the control box. The relay functions in part to by-pass the bin thermostat control to prevent the icemaker from shutting OFF, when a filled-bin condition occurs during the freezing cycle. The by-pass action serves to ensure full-sized ice cubes with each harvest cycle; and, to prevent short cycling on the bin thermostat control.

TIMER — Timer & Switch Assembly

The function of the timer begins when activated by the cube size control. The outer surface, or large diameter lobe of the timer cam, determines the timer cycle for finish freezing of the ice cubes, while the inner surface, or small diameter lobe, determines the time cycle for the harvest sequence. All electrical circuitry is connected through the printed circuit board and the timer and shunted by the single-pole, double-throw microswitch to either the freezing cycle or the harvest cycle. The microswitch is actuated by a cam assembly directly connected to the timer motor. The timer cam can be adjusted to vary the defrost line, as required. One complete rotation of the cam will take eight minutes. Harvest is preset at two and one-fourth minutes.

HIGH PRESSURE SAFETY CONTROL

This is a manual reset control that shuts down the icemaker, should the discharge pressure ever reach 450 PSIG on air-cooled

CM550 COMPONENT DESCRIPTION

WATER INLET SOLENOID VALVE

The water inlet solenoid valve functions to fill the sump assembly with water and overflow out the overflow standpipe located at the bottom of the sump. This action fills and rinses the sump during each harvest cycle. The flow rate is .75 g.p.m.

WATER DISTRIBUTION SYSTEM

The water distribution system functions to evenly supply water to all cells of the evaporator plates. The water pump pumps water from the sump up the vertical tygon tube to the tee. From there water is channeled through the water manifold to the water distributors, above each evaporator plate, and from six holes within each distributor, water flows to the cells of each side of the evaporator plates. Gravity flow returns the unfrozen excess portion of water to the sump reservoir for recirculation.

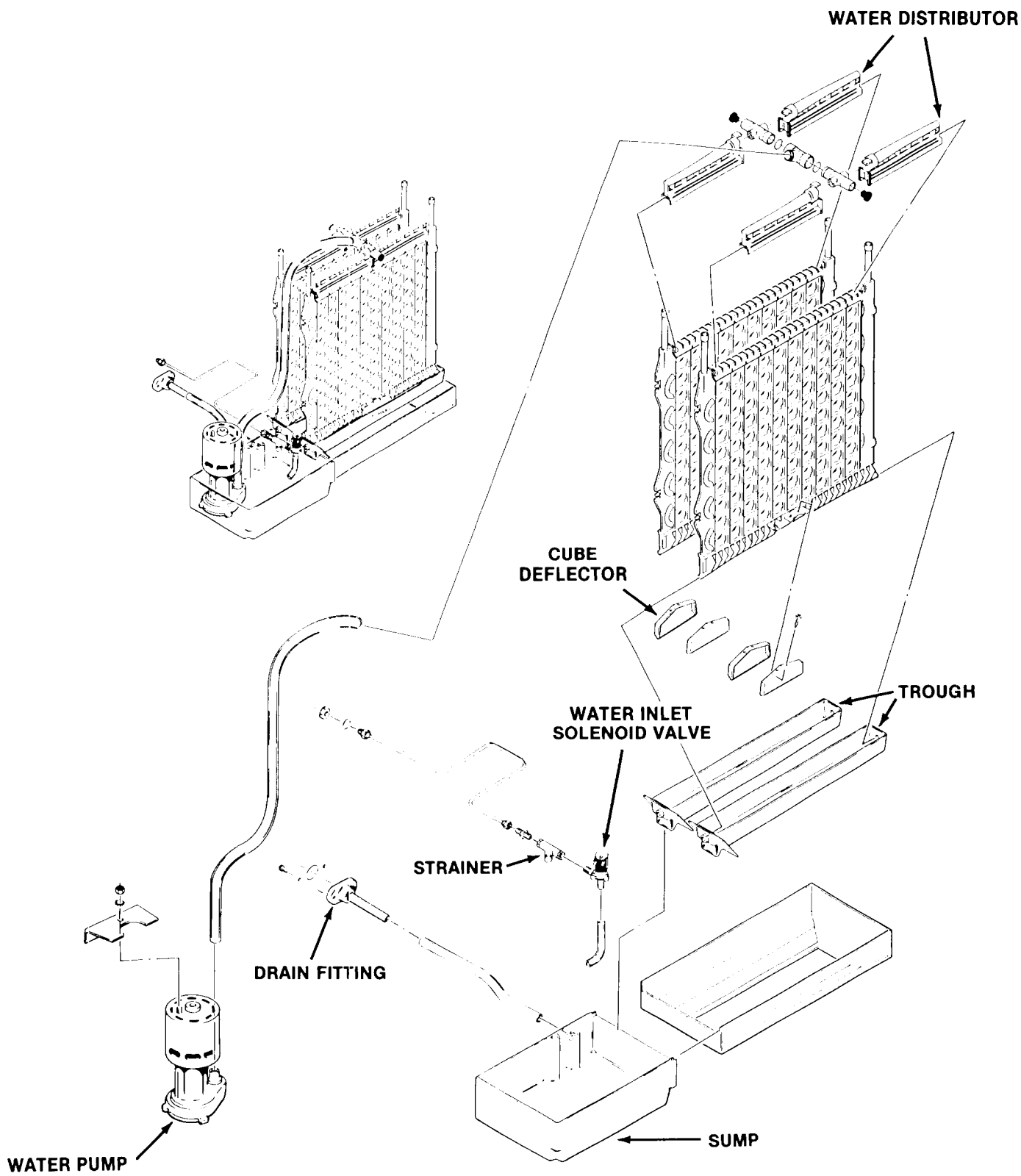
HOT GAS SOLENOID VALVE

The hot gas solenoid valve functions only during the harvest cycle, to divert the hot discharge gas from the compressor, bypassing the condenser and capillary tube, for direct flow in the evaporator plates to release ice cubes from the ice cube molds. The hot gas solenoid valve is comprised of two parts, the body & plunger and the coil & frame assemblies. Installed in the discharge line of the compressor, the energized solenoid coil lifts the valve stem within the valve body, to cause the hot discharge gas to be diverted when the finishing timer has advanced to the start of the harvest cycle.

STRAINER

A water strainer is located in the potable water inlet tube before the water inlet solenoid valve. Clean the water strainer frequently.

CM550 COMPONENT DESCRIPTION



**CLEAN OUT
WATER STRAINER
FREQUENTLY**

CM550 SERVICE DIAGNOSIS

The service diagnosis section is for use in aiding the serviceman in diagnosing a particular problem for pin-pointing the area in which the problem lies, thus an ever available reference for proper corrective action.

The following chart lists corrective actions for the causes of known symptoms of certain problems that can occur in the icemaking-refrigeration system.

ICEMAKING - REFRIGERATION SYSTEM

| SYMPTOM | POSSIBLE CAUSE | CORRECTION |
|--------------------------------------|---|---|
| Irregular size cubes some cloudy. | Some distributor holes plugged. | Clean distributor holes. |
| | Shortage of water. | Clean water sump. See shortage of water CORRECTION. |
| | Unit not level. | Level cabinet, as required. |
| Cubes too large. | Dirty air-cooled condenser. | Clean condenser. |
| | Cube size control set too cold. | Rotate cube size control dial toward WARMER. |
| Cubes too small. | Cube size control set too warm. | Rotate cube size control dial toward COLDER. |
| | Partially restricted capillary tube. (Kinked, pinched off, etc.) | Replace heat exchange assembly. |
| | Moisture in refrigeration system. | Blow refrigerant charge; replace drier; evacuate system; add proper refrigerant charge. |
| Cloudy cubes. | Shortage of water. | See shortage of water SYMPTOM. |
| | Dirty water supply. | Check water quality and install water purification system. |
| | Accumulated impurities. | Use SCOTSMAN Ice Machine Cleaner and clean icemaker. |
| Shortage of water. | Short harvest cycle. | Adjust cam of timer and switch assembly. |
| | Water leak in sump area or off evaporator plate. | Locate Leak and correct condition. |
| | Partial restriction in water inlet strainer or inlet water valve. | Clean or replace strainer or valve. |
| | Water pressure too low. | Check for 20 PSI flowing water. Restore pressure. |

CM550 SERVICE DIAGNOSIS

| SYMPTOM | POSSIBLE CAUSE | CORRECTION |
|--|--|--|
| Decreased ice capacity. | High head pressure, result of dirty condenser or faulty fan motor, | Clean condenser. Repair or replace fan motor |
| | Non-condensable gas in the system | Purge the system, evacuate and recharge per nameplate requirements. |
| | Poor air circulation or extreme hot location. | Relocate the cabinet; or provide ventilation. |
| | Overcharge of refrigerant. | Evacuate and recharge per nameplate. |
| | Hot gas solenoid valve leaking. Partially restricted capillary tube. Defective compressor. | Replace valve. See cubes too small CORRECTION. Replace compressor. |
| Poor harvests. Icemaker does not harvest. | Too short defrost time. | Check and adjust harvest cycle. |
| | Restriction in water inlet line. | Check strainer and inlet water valve. |
| | Hot gas solenoid does not open. Binds or burned out. | Replace solenoid, coil or valve as applicable. |
| | Undercharge of refrigerant. | Charge to nameplate requirements. |
| | Water pressure too low. | Check for 20 PSI flowing water. Restore pressure. |
| Cube size too large or too small. | Adjust size with cube size control. | |
| Compressor cycles intermittently. | Low voltage. | Check for circuit overload. Check building supply voltage, if low, contact power company. |
| | Dirty condenser. | Clean condenser with vacuum cleaner or brush. DO NOT USE A WIRE BRUSH. |
| | Air circulation blocked. | Locate cabinet with adequate air space for proper air flow. |
| | Defective fan motor. | Replace fan motor. |
| | Non-condensable gases in system. | Purge the system and recharge per nameplate requirements. |
| Icemaker will not operate. | Blown fuse in line. | Replace fuse and check for cause. |
| | Master switch in OFF position. | Set switch to ON position. |
| | Faulty master switch. | Replace switch. |
| | Timer contacts open. | Replace timer microswitch. |
| | Faulty bin thermo. | Replace. |
| Off on high head pressure safety switch. | Air-Cooled - condenser not getting air. | |

CM550 ADJUSTMENT PROCEDURES

ADJUSTMENT OF THE BIN THERMOSTAT CONTROL.

The control for the bin thermostat is the temperature control, located in the front of the control box.

The bin thermostat control requires adjustment only if the icemaker shuts off prematurely. Turn adjusting knob, in 1/8 turn or less increments, in the appropriate direction until the icemaker shuts OFF.

Remove ice from the capillary bulb; then, place warm hand on the capillary bulb to restart the icemaker.

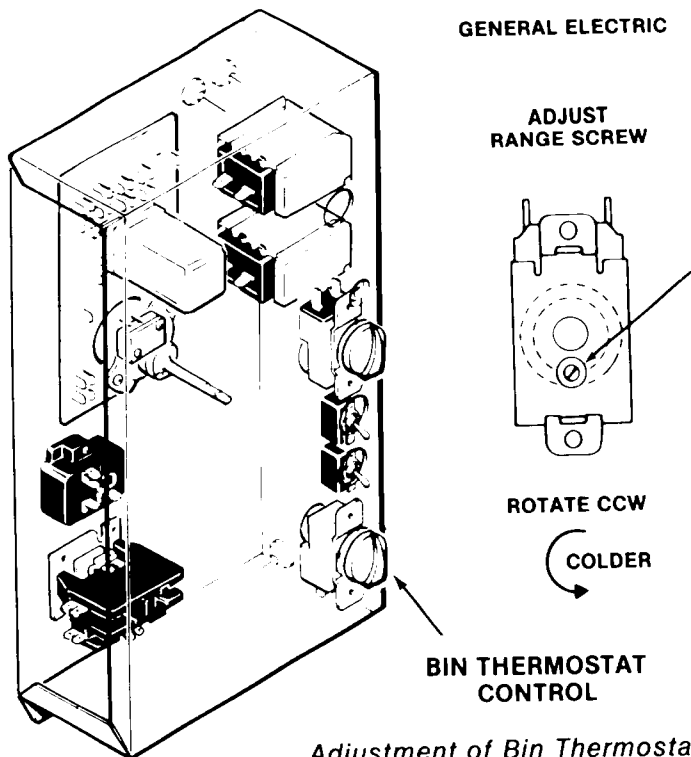
Place handful of ice against the capillary bulb and observe that the icemaker should shut OFF. (Only at the end of harvest).

//////////////////// CAUTION //////////////////////

The adjusting screws on the temperature control device have very sensitive response to adjustment. **DO NOT** attempt to adjust the screw until after thoroughly reading and understanding the instructions and illustrations. Over-adjusting or erratic guessing, can foul the instrument and cause ultimate delay and part replacement, WHICH COULD HAVE BEEN PREVENTED.



ALTITUDE ADJUSTMENT over 2,000 feet above sea level only



CM550 ADJUSTMENT PROCEDURES

ADJUSTMENT OF THE CUBE SIZE CONTROL

CAUTION

BEFORE performing actual adjustments to the cube size control, check other possible causes for cube size problems, refer to SERVICE DIAGNOSIS for problem review and analysis. DO NOT perform adjustment when a new cube size control is installed, until the control bulb has been properly installed in the tube well, on the evaporator outlet tube and the icemaker has progressed through several complete freezing and harvest cycles, to observe size and quality of ice cubes freezing and harvest cycles, and whether or not a cube size problem exists.

As a reverse acting temperature control, adjustment on the cube size control is performed to cause either larger sized ice cubes or smaller sized ice cubes to be produced.

To produce LARGER sized ice cubes:

1. Locate the cube size control, on the front of the control box.
2. Rotate the adjusting knob one-eighth of a turn CLOCKWISE toward COLDER.
3. Observe size of ice cubes in next two ice cube harvests and repeat step 2 above, in one-eighth turn increments, until correct ice cube size is achieved.

To produce SMALLER sized ice cubes:

1. Locate the cube size control, on the front of the control box.
2. Rotate the adjusting knob one-eighth of a turn COUNTERCLOCKWISE toward warmer.
3. Observe size of ice cubes in next two ice cube harvests and adjust in one-eighth turn increments, until correct ice cube size is achieved.

ADJUSTMENT OF THE TIMER & SWITCH ASSEMBLY

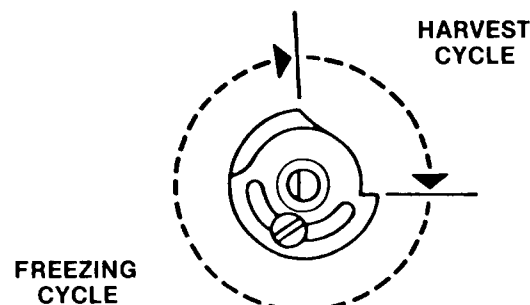
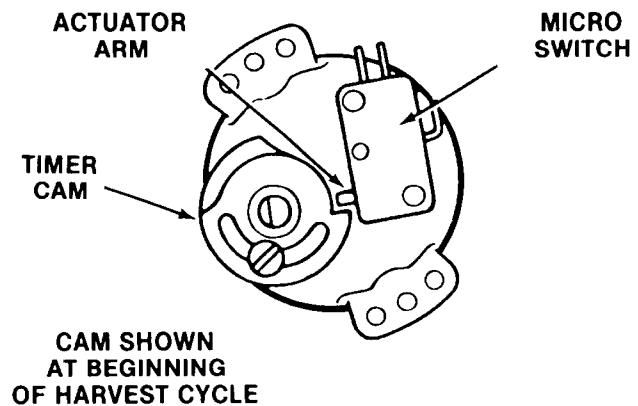
The timer and switch assembly if factory set, so one complete revolution of the cam on the timer represents eight minutes. Five and one-half minutes comprise the freezing cycle event during cam rotation, and the final two and one-half minutes program the defrost and harvest cycle. Rotating the shaft of the timer cam CLOCKWISE will allow positioning the actuator arm of the microswitch on the cam at the selected start position for either the freezing cycle or harvest cycle, as required in the cleaning instructions.

WARNING

Disconnect electrical power supply to icemaker whenever adjustment procedures are performed.

To adjust the timer & switch assembly:

- A. HARVEST CYCLE: Slowly rotate the shaft of the timer and switch assembly, located in the control box, CLOCKWISE, until the actuator arm on the microswitch initiates the harvest cycle. An audible click can be heard, but in a noisy area, look at the cam and switch to observe the event.
- B. FREEZING CYCLE: Slowly rotate the shaft of the timer and switch assembly, located in the control box, CLOCKWISE, until the actuator arm on the microswitch initiates the freezing cycle.
- C. The length of the harvest cycle can be changed by loosening the adjustment screw on the cam. The normal setting is two and one-quarter minutes, as set at the factory. It is important that the length of the harvest cycle allow enough time for all the ice cubes to fall from the evaporator. Too short of a time will cause the evaporator to freeze up and stop ejecting ice into the bin. Too much time wastes icemaking capacity, energy and water. Adjustment of the harvest cycle may require a corresponding adjustment of the cube size control.



CM550 REMOVAL AND REPLACEMENT PROCEDURES

//////////////////// WARNING //////////////////////

Be sure the electrical power supply circuit breaker and the inlet water supply are OFF, BEFORE starting any of the following REMOVAL AND REPLACEMENT procedures as a precaution to prevent possible personal injury or damage to equipment.

////////////////////////////////////

REMOVAL AND REPLACEMENT OF THE DRIER

To remove the drier:

1. Pull out to unsnap catches and remove the front panel.
2. Remove screws and remove left side access panel.
3. Bleed off or blow the refrigerant charge through the Schrader valve.
4. Unsolder refrigeration lines at both ends of the drier, and remove the drier.

To replace the drier:

//////////////////// CAUTION //////////////////////

If the factory seal is broken on the replacement drier, exposing it to the atmosphere more than a few minutes, the drier will absorb moisture from the atmosphere and lose substantial ability for moisture removal.

Be sure the replacement drier is installed with the arrow positioned in the direction of the refrigerant flow.

////////////////////////////////////

1. Remove the factory seals from the replacement drier and install the drier in the refrigerant lines with the arrow positioned in the direction of the refrigerant flow.
2. Solder the drier into the lines, two places, taking precautions to NOT OVERHEAT the drier body, during installation soldering.
3. Purge the system and check for leaks.
4. Thoroughly evacuate the system to remove moisture and non-condensables.
5. Charge the system with refrigerant, by weight. SEE NAMEPLATE.
6. Replace and attach the left side panel.

//////////////////// NOTE //////////////////////

Always install a replacement drier, anytime the sealed refrigeration system is opened. Do not replace the drier until all other repair or replacement has been completed.

REMOVAL AND REPLACEMENT OF THE EVAPORATOR PLATE ASSEMBLY

1. Remove the front and top panels.
2. Bleed off or blow the refrigerant charge through the Schrader valve.
3. Disconnect Tygon water inlet tube(s), at the water manifold tee(s), above the evaporator plates.
4. Unsnap the sump assembly from the lower left and right attachment points on each evaporator plate.
5. Slide the water distributor tubes about 1/8-inch along the top of the evaporator plate to be removed, until the left water distributor tube can be lifted upward.
6. Lift the end of the water distributor tube and slide the distributors toward the left along the top of the evaporator plate, until the flexible right notch is cleared.
7. Unsnap and disconnect each left and right water distributor tube from the water manifold section.

//////////////////// CAUTION //////////////////////

Use EXTRA PRECAUTION to protect the plastic parts during the next step to unsolder the refrigerant lines, two places, at the top of the evaporator plate. Position wet cloths over top of plates, as well as over the plastic liner at the rear, or sides, to prevent accidental heat damage, or possible fire from torch flame.

////////////////////////////////////

8. Unsolder and remove the refrigerant lines at the top of the evaporator plate to be replaced.
9. Remove nuts at left of the evaporator then, loosen the braces just enough to remove the evaporator plate. Temporarily replace the braces, to support the remaining evaporator plate.

To replace the evaporator plate, reverse the removal procedures. See Nameplate. Weigh in proper charge of R-502.

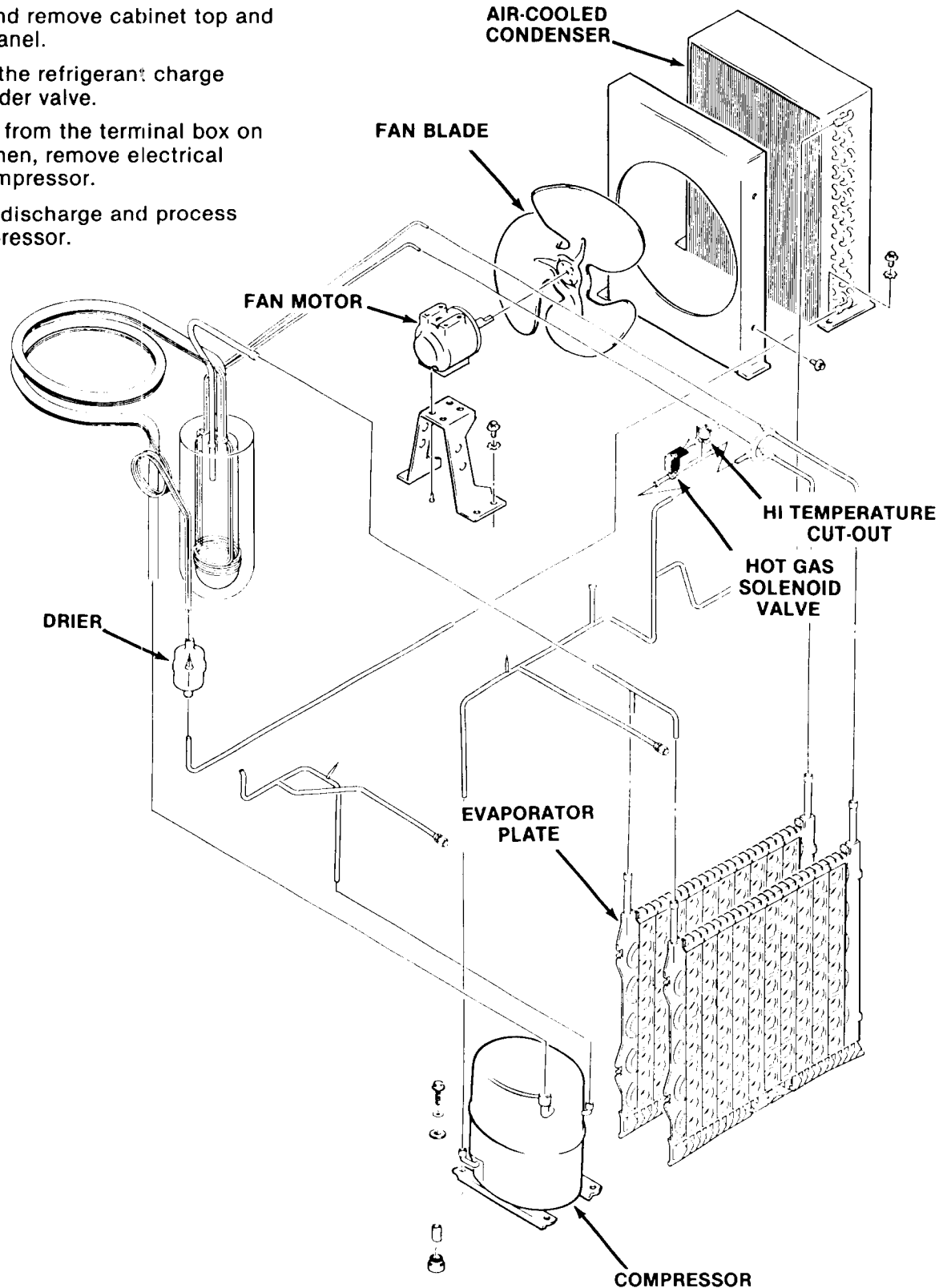
CM550 REMOVAL AND REPLACEMENT PROCEDURES

REMOVAL AND REPLACEMENT OF THE COMPRESSOR ASSEMBLY

To remove the compressor assembly:

1. Pull out to unsnap catches and remove the front panel.
2. Remove screws and remove cabinet top and left side access panel.
3. Bleed off or blow the refrigerant charge through the Schrader valve.
4. Remove the cover from the terminal box on the compressor; then, remove electrical leads from the compressor.
5. Unsolder suction, discharge and process header from compressor.

6. Remove four bolts and washers which secure the compressor to the chassis mounting base.
7. Remove the compressor from the cabinet.



CM550 REMOVAL AND REPLACEMENT PROCEDURES

//////////////////// WARNING //////////////////////

Disconnect electrical power supply to icemaker whenever adjustment procedures are performed.

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REMOVAL AND REPLACEMENT OF THE CONDENSER — AIR-COOLED MODELS

To remove the condenser:

1. Pull out to unsnap catches and remove the front panel.
2. Remove screws and remove cabinet top and right service side panels.
3. Bleed off or blow the refrigerant charge through the Schrader valve.
4. Unsolder and disconnect refrigerant lines from the condenser.
5. Unsolder and remove the drier from the refrigerant lines connecting to the condenser.
6. Remove screws, lockwashers and the condenser from the chassis base.

To replace the air-cooled condenser, reverse the removal procedure.

REMOVAL AND REPLACEMENT OF THE FAN MOTOR — AIR-COOLED MODELS

To remove the fan motor assembly:

1. Pull out to unsnap catches and remove the front panel.
2. Remove unit top or left side panel.
3. Disconnect the two electrical leads, from the fan motor, at the control box assembly.

Before next step, measure or make accurate mental note of the distance the fan blades extend beyond the fan shroud, so during replacement the correct distance is maintained.

4. Remove screws and the fan motor and bracket assembly; and remove the fan motor and bracket from the chassis base.
5. Loosen set screws on the fan blade and remove the fan blade from the fan motor. Mark or note position of the blade on the shaft of the fan motor, for replacement.
6. Remove screws and lockwasher and separate the fan motor from the fan motor bracket.

To replace the fan motor assembly, reverse the removal procedure.

Be sure to replace the fan blade with the hub of the fan blade facing the fan motor, to ensure air flow is toward the fan motor; and, is set at marked location on shaft and setscrews tightened on the FLAT part of the shaft of the fan motor.

////////////////////////////////////

Always install a replacement drier, anytime the sealed refrigeration system is opened. Do not replace the drier until all other repair or replacement has been completed.

NOTE

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Thoroughly evacuate the system to remove moisture and non-condensables.

CM550 REMOVAL AND REPLACEMENT PROCEDURES

////////// WARNING //////////

Disconnect electrical power supply to icemaker whenever adjustment procedures are performed.

//////////

REMOVAL AND REPLACEMENT OF THE CUBE SIZE CONTROL

To remove the cube size control:

1. Remove front panel.
2. Remove cover from control box.
3. Trace capillary tube, from the cube size control to the refrigerant suction line.
4. Remove the coiled capillary tube bulb from the tube well on the suction line.
5. Remove electrical leads from the cube size control.
6. Remove screws and the cube size control.

To replace the cube size control, reverse the removal procedure.

REMOVAL AND REPLACEMENT OF THE WATER DISTRIBUTOR TUBES AND MANIFOLD TUBES

To remove the water distributor tube and manifold tube:

1. Pull out to unsnap catches and remove the front panel.
2. Remove 4 thumb screws and remove the evaporator cover.
3. Slide the water distributor tube to the left about 1/8-inch along the top of the evaporator plate, until the water distributor tube can be unsnapped from the flexible notch and lifted upward to the right side.
4. Unsnap and disconnect water distributor tubes from the water manifold section.

To replace the water distributor tubes and manifold tubes, reverse the removal procedure. BE SURE the notches in the water manifold tubes properly engage the alignment keys in the tee.

BE SURE the water distributor tube is securely fastened at the notch at both sides of the evaporator plate.

Check identical attachment for the left water distributor tube and notch; also, that the distributor/manifold connections at the top center of each evaporator plate is snug against the top of the plate.

REMOVAL AND REPLACEMENT OF THE BIN THERMOSTAT CONTROL

To remove the bin thermostat control:

1. Remove front panel.
2. Remove screws and the control box cover.
3. Remove wire leads from the bin thermostat control.
4. Unthread the capillary tube and remove from the bin thermostat control bracket at the bottom right side of the evaporator section.
5. Remove the two screws attaching the bin thermostat control to the side of the control box; then, carefully pull the capillary tube out of the evaporator section. Carefully remove the bin thermostat control and capillary tube from the control box.

To replace the bin thermostat control, reverse the removal procedure.

REMOVAL AND REPLACEMENT OF THE INLET WATER SOLENOID VALVE ASSEMBLY

To remove the inlet water solenoid valve assembly:

1. Shut OFF water supply to machine.
2. Remove screws and pull the water solenoid valve out to gain access.
3. Loosen and remove inlet water line fitting from the inlet water solenoid valve assembly.
4. Remove inlet water Tygon tubing from the water solenoid valve.

To replace the inlet water valve assembly, reverse the removal procedures.

////////// NOTE //////////

Always install a replacement drier, anytime the sealed refrigeration system is opened. Do not replace the drier until all other repair or replacement has been completed.

CM550 REMOVAL AND REPLACEMENT PROCEDURES

//////////////////// **WARNING** //////////////////////
Disconnect electrical power supply to icemaker
whenever adjustment procedures are performed.
////////////////////////////////////

REMOVAL AND REPLACEMENT OF THE WATER PUMP ASSEMBLY

To remove the water pump assembly:

1. Pull out to unsnap catches and remove the front panel.
2. Remove the Tygon tube to the pump assembly.
3. Disconnect electrical leads from the water pump assembly.
4. Loosen thumbscrew, loosen Phillips headscrew, lift pump up and remove from unit.
5. Remove one nut and mounting bracket from top of water pump.

To replace the water pump assembly, reverse the removal procedure.

