AC30 Service Manual

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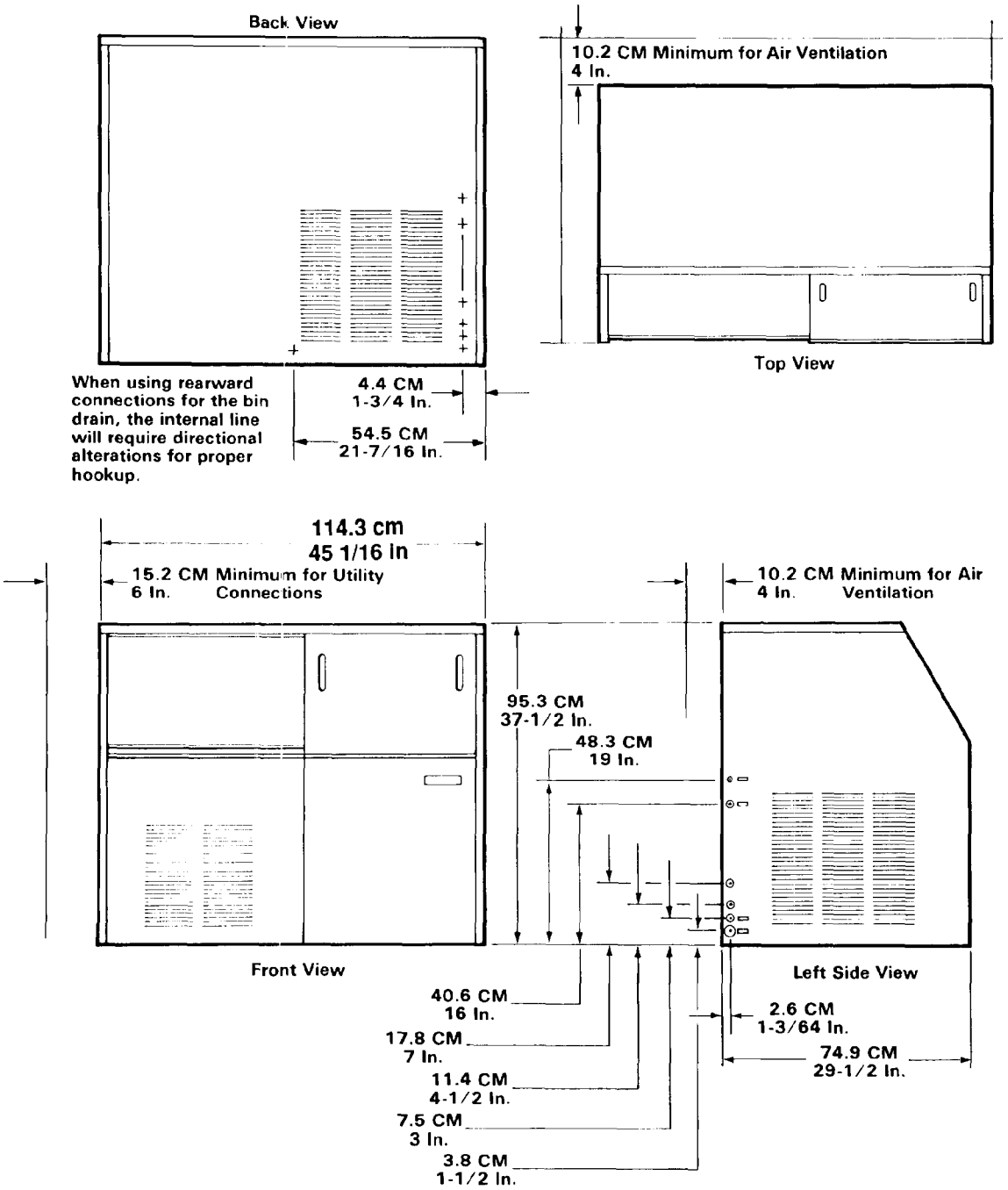
MODEL AC30



SPECIFICATIONS (Cont'd)

MODEL AC30

Air-Cooled: Model AC30

Water-Cooled: Model AC30

Electrical: 115/60/1

Est. Ship. Wt.: 350 lbs.

FRONT SERVICE ACCESS PANELS

OPTIONAL LEG KITS

KLP2E - 6-inch metal legs, Black Enamel

KLP2S - 6-inch metal legs, Nickel Plated

MODEL NUMBER		MOTORS	VOLTS	HP/WATT	F.L.A.	L.R.A.
		COMP.				
SERIAL NUMBER		DRIVE				
		FAN				
REFRIGERANT 12	HEATER					
OZ	WATTS	OTHER				
○ TEST PRESSURE 140 LO – 235 HI ○						
A.C. SUPPLY VOLTAGE			WIRES	CYCLES	PHASE	
MAXIMUM FUSE SIZE	AMPS	MINIMUM CIRCUIT AMPACITY				

SEE NAMEPLATE, shown at left, for electrical and refrigeration specifications. NAMEPLATE located on rear service panel.

Remove Left Bottom Front Panel to locate the Model Serial Number plate, shown below, on the Chassis front left vertical upright.

MODEL NUMBER	
○ SERIAL NUMBER	○

We reserve the right to make product improvements at any time. Specifications and design are subject to change without notice.

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 the NSF and that it complies with the materials and construction standards of the 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.

GENERAL INFORMATION & INSTALLATION

INTRODUCTION

This manual provides specifications and the step-by-step procedures for the installation, startup and operation, the maintenance and cleaning for the SCOTSMAN Model AC30 Automatic Cuber.

The Model AC30 Automatic Cubers are quality designed, engineered and constructed, and thoroughly tested icemaking systems, providing the utmost in flexibility to fit the needs of a particular user. Separate sections detail more specifically: General Information & Installation; Start Up Operation; Principles of Operation; Adjustment and Removal and Replacement Procedures; Maintenance and Cleaning Instructions; Service Diagnosis; Wiring Diagrams; and, the Illustrated Assemblies and Parts Lists.

DESCRIPTION

An attractive compact cabinet of textured metal with a Sandalwood enamel finish, a woodgrain upper left front panel, and a bin access door. Also, an optional stainless steel cabinet finish is available. Both cabinets have up-to-date styling, and easily removable panels for easy access to electrical and mechanical components.

SEALED REFRIGERATION SYSTEM

To provide quiet efficient operation of Icemaker, the Compressor motor is internally spring-mounted. The Compressor motor is covered by a five year parts warranty.

SELF-CONTAINED STORAGE BIN

These Automatic Cubers store their own ice supply in a heavily insulated ice storage bin, with a sliding Ice Access Door opening the front of the cabinet.

STANDARD OVERALL DIMENSIONS

The standard overall dimensions of the cabinet depth, counter top height, etc., allows the Automatic Cuber to be installed in harmony with the existing counter equipment.

UNPACKING AND INSPECTION

1. Call your authorized SCOTSMAN Distributor or Dealer, for proper installation. He's listed under ICE MAKING EQUIPMENT and MACHINERY in the yellow pages of the telephone book.
2. Visually inspect the exterior of the shipping container and skid and any severe damage noted, should be reported to the delivering carrier; and a concealed damage claim filed subject to internal inspection, with the carrier representative present.
3. Remove screws and shipping tape, and all panels, including the top, from the cabinet, and inspect for any concealed damage. Notify carrier of any concealed damage claims, as stated in step 2 above.
4. Remove all internal support packing, tape and wires, if any, in machinery compartment.
5. Check that refrigerant lines do not rub or touch lines or other surfaces, and that fan blades, if any, move freely.
6. Check that Compressors are snug on all mounting pads.
7. Remove optional Water Strainers from shipping bag, for installation in water supply line.
8. Untape and remove for installation, one plastic Base Drain and one electrical Conduit Box shipped from the factory taped to the top channel support above the Freezing Chamber.
9. Use clean, damp cloth or disposable paper wiper to wipe clean the exterior surfaces of the cabinet.
10. SEE NAMEPLATE on the rear service panel, and check that the location source voltage corresponds with the voltage specified on the nameplate.

CAUTION

Improper voltage supplied to the Icemaker will void your parts replacement program.

11. Fill in all spaces in the Manufacturer's Registration Card including: Model Number and Serial Number taken from the Model-Serial Nameplate located on the left side, front part of the Chassis base, with lower Left Front Panel removed. Forward the completed, self addressed, registration card to the SCOTSMAN factory.

LOCATION AND LEVELING

CAUTION

This Cuber is NOT designed for outdoor installations where air temperatures are below 50-degrees F., or above 100-degrees F., and water temperature is below 40degrees F. or above 100-degrees F. Extended periods of operation at temperatures exceeding these limitations will constitute misuse, under the terms of the SCOTSMAN Manufacturer's limited warranty coverage.

1. Position the Cuber in the selected permanent location.

NOTE

Prior consideration for location site shall include:

1. *Minimum room temperature 50-degrees F. and maximum room temperature 100-degrees F.*
2. *Water inlet temperature: Minimum 40-degrees F. and maximum 100-degrees F.*
3. *Well ventilated location for air-cooled model, advising user to frequently clean Condenser, located directly behind Front Panel.*
4. *SERVICE ACCESS: Adequate space for all service connections, through the rear of the cabinet. A six inch minimum clearance at rear, left and front louvered panels, for routing cooling air drawn into and exhausted out of the compartment, to maintain proper condensing operation on air-cooled models.*

2. Level the cabinet in both the left-to-right and front-to-rear directions. The optional leveling legs can be adjusted.

ELECTRICAL CONNECTIONS

WARNING

This icemaker requires a SOLID EARTH GROUND that meets the national, state and local electrical code requirement. To prevent possible SEVERE ELECTRICAL SHOCK INJURY to individuals, or extensive damage to equipment, install an approved SOLID EARTH GROUND wire to the icemaker. SEE WIRING DIAGRAM.

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

Be certain the Cuber is connected to its own electrical circuit and individually fused. The maximum allowable 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 motor windings.

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

WATER SUPPLY AND DRAIN CONNECTIONS

A. AIR-COOLED MODELS - The recommended water supply line is a 3/8-inch O.D. copper tubing. Connect to cold water supply line with standard plumbing fittings, with a shutoff valve installed in an accessible place between the water supply and the Cuber.

An optional wire mesh strainer, when ordered, must be installed with the cleanout plug down. Locate the strainer next to the male flare water inlet fitting, at the rear of the Chassis, with the arrow on the strainer positioned in the direction of the water flow. The strainer protects against large particles of rust, scale, etc., which may be loosened in the water supply line at the time of installation.

In some cases a plumbing permit and services of a licensed plumber will be required.

CAUTION

DO NOT operate this Cuber when the water supply is shut OFF, or is BELOW the recommended 20 PSIG water pressure. Move the Master ON-OFF toggle switch on the Control Box to OFF immediately.

B. WATER-COOLED MODELS: On Water-Cooled Models, a separate cold water supply inlet line is required, to be connected to a second 3/8-inch O.D. male flare fitting lower left rear of the Chassis. Additional drain lines are required to drain the water-cooled Condenser.

C. 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 separate drain line for discharge water from the water-cooled Condenser. Install a vertical open vent on drain line to ensure good venting. The drain receptacle should be an open, trapped or vented construction. See Figure 1-1.

Recommended Bin drain is 5/8-inch O.D. copper tubing and should be vented and run separately.

FINAL CHECK LIST

1. Is the Cabinet level? (IMPORTANT)
2. Have all kits, if any, been installed?
3. Have all electrical and piping connections been made?
4. Has the voltage been tested and checked against the nameplate rating?
5. Is the water supply line shutoff valve installed and open and electrical power supply wiring properly connected?
6. All masking tape removed from doors, panels, styrofoam blocks from top of Freezing Chamber?
7. Has the Cuber and the Bin been wiped clean with clean damp cloths?
8. Have the Compressor holddown bolts been checked, to be sure the Compressor is snug on the mounting pads?
9. Has the owner/user been given the User Manual and instructed on how to operate the icemaker and the importance of periodic maintenance?
10. Has the Manufacturer's Registration Card been properly filled out? Check for correct Model and Serial numbers on the nameplate, then mail the completed card to the SCOTSMAN factory.
11. Check all refrigerant lines and conduit lines, to guard against vibration and possible failure.
12. Is there at least a six inch clearance behind and around the Cabinet, for all connections and for proper air circulation?
13. Is the Cuber in a room where ambient temperatures are a minimum of 50-degrees F. all year around?
14. Has the inlet water supply pressure been checked to ensure a minimum of 20 PSIG?
15. Has the owner been given the name and telephone number of the Authorized SCOTSMAN Distributor or Service Agency serving him?

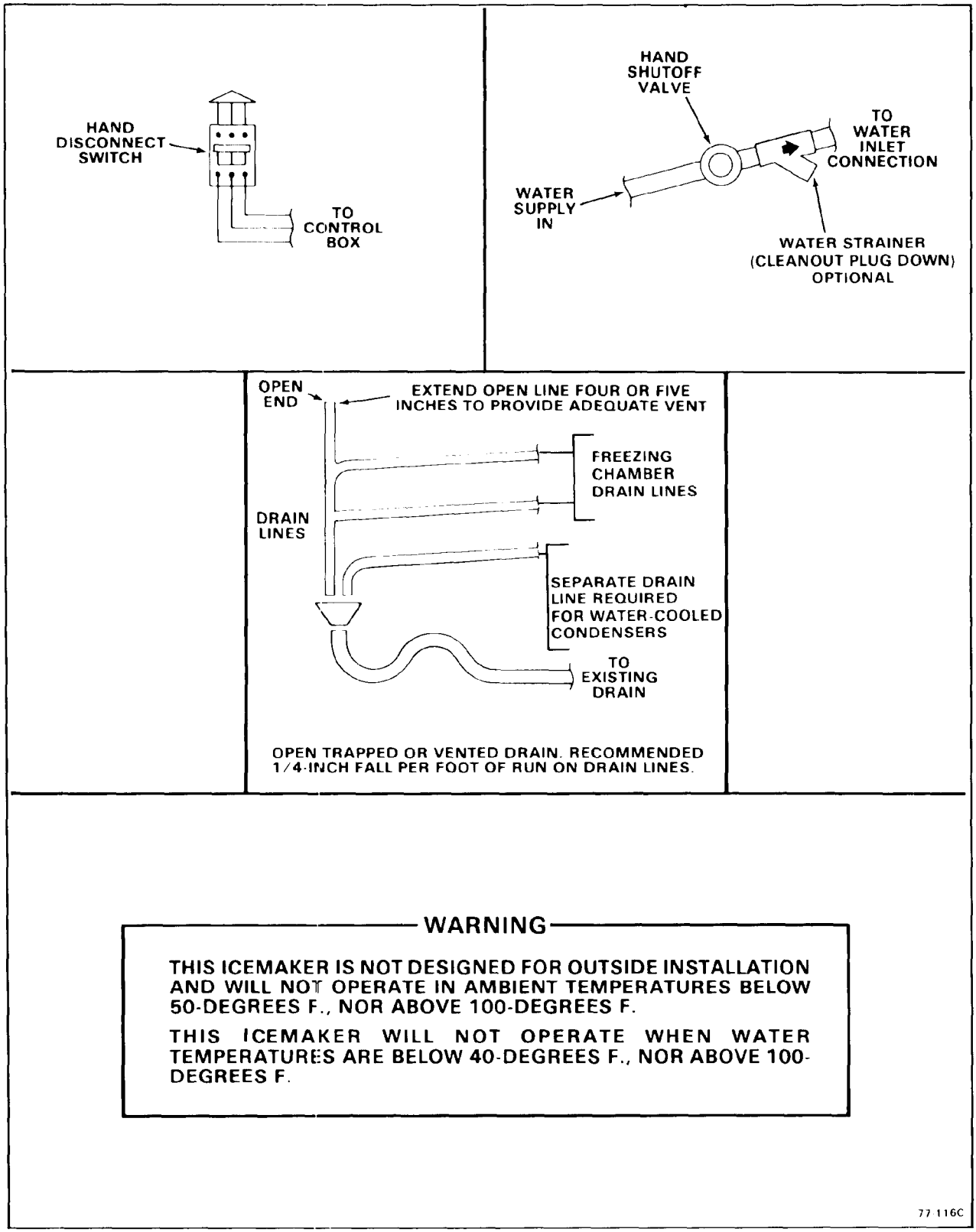


Figure 1-1. Installation Practice

OPERATING INSTRUCTIONS

START UP

1. Remove screws and the Lower Left Front Panel.
2. Check that the Master ON-OFF and Compressor ON-OFF toggle switches are OFF.
3. Rotate the shaft of the Timer & Switch Assembly protruding through the hole in the front Cover of the Control Box, CLOCKWISE, to start the Timer for filling the reservior sump in the Freezing Chamber, with water.

NOTE

Slowly rotate the shaft CLOCKWISE, until the actuator arm on the microswitch drops off of the outer cam into the cam slot. An audible click can be heard, but in a noisy area, look at the cam and switch to observe the event. See A, Figure 2-1.

4. Move the Master ON-OFF toggle switch, to the ON position.

NOTE

Observe that the Water Inlet Solenoid valve OPENS and inlet water flows from the valves through tubing and can be seen flowing to the Defrost Water Tube, at the top rear of the Freezing Chamber, where the water then flows around the inverted ice cube cups and drains into the Freezing Chamber sump. Excess water is overflowed through the standpipe and drain tube. This cycle will take about three minutes, when the Timer will CLOSE the Water Inlet Solenoid Valve.

5. Repeat step 3.
6. After completion of the second Harvest Cycle, move the Compressor ON-OFF toggle switch to the ON position.

NOTE

1. *During START UP, advancing two Harvest Cycles, allows a check that: the Water Inlet Solenoid Valve operates properly; inlet water can be observed flowing; the sump is filled with water in preparation for the Freezing Cycle; and, checks the function of the overflow and drains.*
2. *The Water Pump operates during the defrost Harvest Cycle. Factory testing proved faster defrost and increased ice capacity with continuous operation of the Water Pump.*

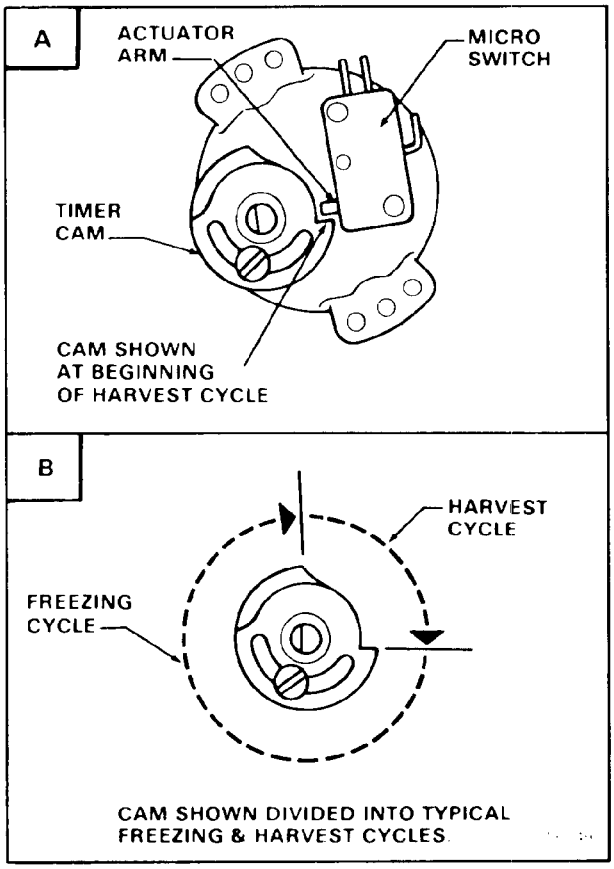


Figure 2-1. Timer Cam Positions.

7. Check that the plastic Curtain hangs evenly and vertically, to prevent loss of water during the Freezing Cycle.

NOTE

The Timer dial does not rotate at the end of the Harvest Cycle, it is started later by the Cube Size Control, in the Control Box.

8. Check operation of Freezing Cycle:
   a. Compressor is operating.
   b. Agitator Motor is operating, as seen by Fan rotating on top of Freezing Chamber.
   c. Water Pump is operating, as seen at Tygon Tubes on Pump and looking at water being sprayed into inverted ice cube cups, from

rotating Spray Bars, seen inside Freezing Chamber.

d. Icemaking process begins: feeling inside ice cube cups reveals cold temperatures and very shortly ice begins to form.

NOTE

Freezing time will range between 17 to 25 minutes in a 70-degree F. ambient temperature. Longer time, for temperatures above 70-degrees F. and shorter time required when temperatures are below 70-degrees F. Average complete cycle range is about 20 to 30 minutes.

CAUTION

DO NOT operate this Icemaker when the water supply is shut OFF, or is BELOW the recommended 20 PSIG water pressure. Move the Master ON-OFF toggle switch to OFF, immediately.

9. Observe first ice cube harvest:

   a. Check size of ice cubes; when too small after a second harvest, refer to procedure IV-II, for adjustment to Cube Size Control to increase size of ice cubes.

NOTE

Normal cube size is with a one-quarter inch depression in the crown.

   b. Check texture of ice cubes: when partially cloudy throughout, suggests icemaker operating short of water, near end of freezing cycle, or possibly an extreme problem water condition, where in filtering or purifying equipment is recommended. Contact SCOTSMAN - Queen Products Division, Service Department, Albert Lea., Minnesota, for further details.

10. 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.

NOTE

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. Normal setting is about 35-degrees F. CUT-OUT and 39-degrees F. CUT-IN.

11. Install refrigerant service gauges on the high side and low side Schrader valve fittings and check the Compressor head pressure and back pressure.

NOTE

1. *Air-Cooled Models: Head pressure after 20 minutes of Freezing Cycle, at 70-degrees F. ambient temperature, will be about 135 PSIG. The back pressure equalizes during hot gas defrost and gradually pulls down to about four PSIG, just before Harvest Cycle. Higher ambient temperatures and dirty Condenser will cause higher pressure.*
2. *Water-Cooled Models: Water Regulator Valves are factory set at 135 PSIG. Check the gauge indication and adjust, if necessary. Back pressure will operate the same as Air-Cooled Models.*

12. Replace Control Box Cover and all service panels.
13. Remove refrigerant service gauges.
14. 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.

PRINCIPLES OF OPERATION - How It Works

FREEZING CYCLE

Water from the sump in the reservior of the Freezing Chamber is pumped to a rotating Spray Bar Assembly, which is powered by the Agitator Motor drivemotor on top of the Freezing Chamber. The Spray Bar Assembly has jets though which water is uniformly sprayed into the inverted ice cube cup molds of the Freezing Chamber Evaporator. See Figure 3-1. At the beginning of the Freeze Cycle, the electrical circuit is completed to the Compressor, Water Pump, and the coil of the Finish Relay. The Water Pump operates continuously during the Freeze Cycle, through contacts of the Finish Relay. In Water-Cooled models water also flows through the Condenser and out the drain. While in the Condenser, water removes heat from the refrigerant and allows the refrigerant to condense from a gas to a liquid.

Refrigerant is compressed in the Compressor and discharged into the Condensor as a high pressure, high temperature gas. The refrigerant is cooled and condensed by either air or water and condenses to a high pressure, high temperature liquid. This liquid refrigerant, then passes through a small capillary tube where the temperature and pressure of the liquid refrigerant are lowered. The low pressure, low temperature liquid refrigerant, then enters the Evaporator. The refrigerant is warmed by the water being sprayed against the Evaporator and begins to boil off, to become a gas. The refrigerant next travels through the Accumulator, where any remaining liquid refrigerant then returns to the Compressor as a low pressure, low temperature gas, and the cycle starts again.

During the Freezing Cycle, both the Water Inlet Solenoid Valve and the Hot Gas Solenoid Valve are CLOSED.

When the ice cubes are about three-quarters formed, the Cube Size Control bulb located on the suction line coming out of the Evaporator

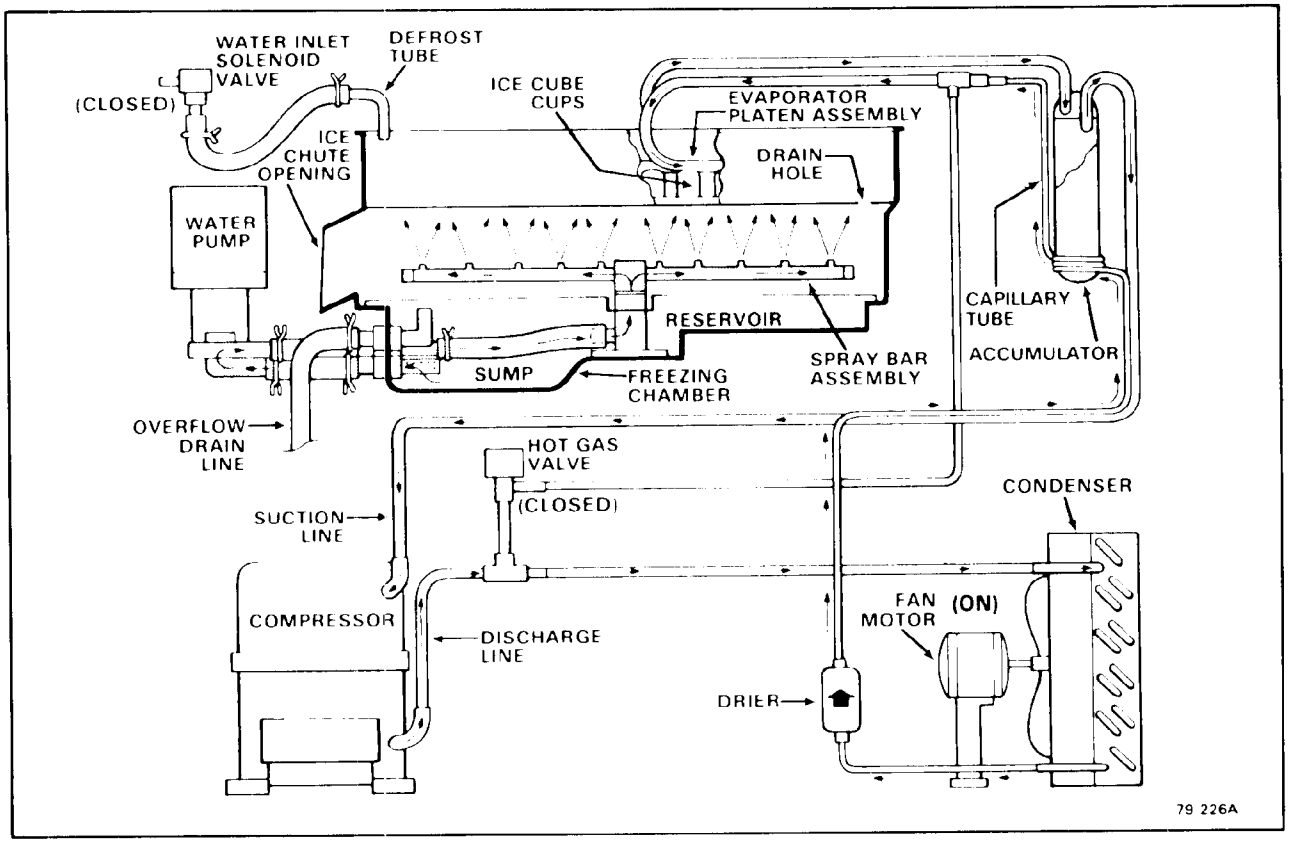


Figure 3-1. Freezing Cycle.

platen assembly, will sense the temperature at which it is preset to CLOSE. This will complete the electical circuit to the Timer. The Timer then controls the remainder of the cycle.

The Timer will keep the Icemaker operating in the Freezing Cycle for the next six minutes. This will give the cubes time to fully form. After six minutes, the Timer will switch the Icemaker into the Harvest Cycle, through the contacts of the Timer Assembly microswitch.

HARVEST CYCLE

When the Timer switches the Icemaker into the Harvest Cycle, hot gas being discharged from the Compressor is diverted from the Condenser through the Hot Gas Solenoid Valve into the Evaporator. During this cycle, the hot gas circulates from the Compressor to the Evaporator and back again, bypassing the Condenser and capillary tube. In the electrical circuit, the Compressor is operating and both the Water Inlet Solenoid Valve and the Hot Gas Solenoid Valve are energized. See Figure 3-2.

Opening the Water Inlet Solenoid Valve, allows a fresh water supply to be discharged into the top of the Evaporator platen assembly. The finished ice cubes are released from the Evaporator, by the warming effect of the hot gas flowing through the Evaporator tubes and the water flow around the ice cube molds. The released ice cubes drop into the inner bottom of the Freezing Chamber and are pushed by the rotating Spray Bar Assembly out the inclined ice chute opening, down the Cube Spout and into the ice storage bin. At the end of the Harvest Cycle, the Timer cam will push the actuator arm of 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.

COMPONENT DESCRIPTIONS

A. BIN THERMOSTAT CONTROL

The bracket mounted Bin Thermostat Control is located on the left side of the Insulation Retainer in the front upper middle of the Chassis. The sensing capillary tube of the control is routed into the ice storage Bin. The capillary tube is threaded through the grommeted hole and into the thermostat Bulb Cover. 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.

NOTE

Altitude adjustment should ONLY be performed on Icemakers installed at 2000-foot level locations and

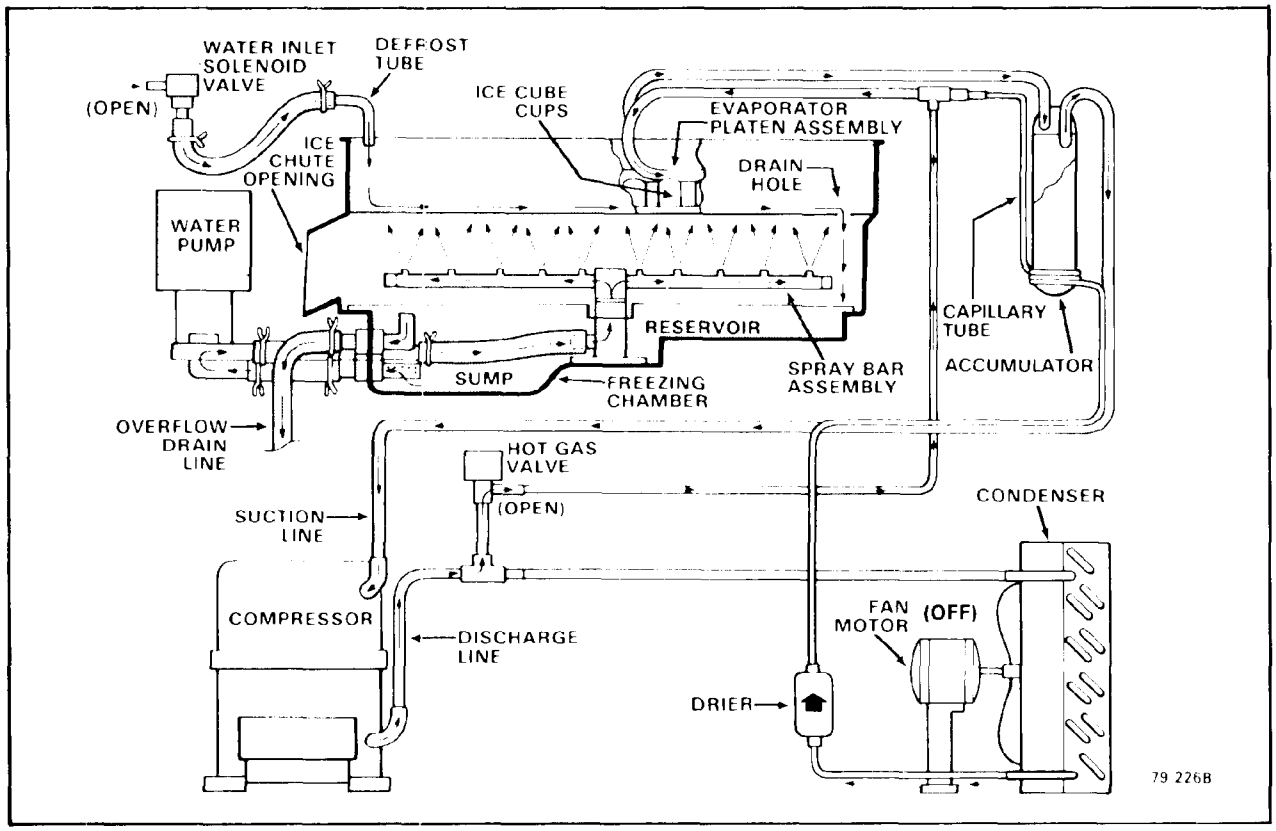


Figure 3-2. Harvest Cycle.

ABOVE, and adjust only in increments of one-fourth turn of a screw at a time.

B. COMPRESSOR START RELAY

The Compressor Start Relay functions to carry the Compressor line current. The relay is wired so any control in the pilot circuit, such as the Bin Thermostat, Low Pressure and High Pressure Controls, etc., will cause the relay holding coil to be de-energized, when the control contact OPENS, thereby breaking the circuit to the Compressor through the relay points.

C. 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 temperature, of either ambient air or inlet water, 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.

NOTE

Be sure to refer to procedure IV-II, Adjustment of the Cube Size Control, BEFORE attempting to adjust the control.

D. FINISH 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.

E. FINISHING TIMER - Timer & Switch Assembly

The function of the Finishing Timer begins when activated by the Cube Size Control. The Timer controls a fifteen minute dual function: eleven and one-half minutes are programmed to finish freezing the ice cubes and the final three and one-half minute portion is for the defrost operation and harvest of the ice cubes. All electrical circuitry is connected through the printed circuit board and the Finishing 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 timer as required.

F. HIGH PRESSURE CONTROL - Air-Cooled Model

The air-cooled models use a high pressure control to cycle the fan during harvest. On at 170 PSIG, and off at 130 PSIG.

G. HIGH PRESSURE CONTROL - Water-Cooled Model

The High Pressure Control, a safety control, is factory set at 250 PSIG. The control functions as a precautionary device, to shut OFF electrical power to the Icemaker, should a loss of water occur to the water-cooled Condenser. In addition to being a manual reset Control, there is an adjusting screw for raising or lowering the CUT-IN pressure.

H. 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 to the Evaporator Platen Assembly to release ice cubes from the inverted 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.

I. SPRAY BAR ASSEMBLY

The Spray Bar Assembly is rotated by the Agitator Motor, a small drivemotor mounted on top of the Freezing Chamber; and, designed to channel recirculating water to small jets for uniformly spraying water into the inverted ice cube cups. The Celcon material, used in fabricating the Spray Bar parts, is not subject to chemical attack by either acidic or alkaline materials at low temperatures or at high temperatures. Because of the smooth non-porous surface of the Celcon material Spray Bar, foreign materials have difficulty trying to adhere to these surfaces, thereby, reducing the usual frequency of cleaning procedures.

NOTE

Refer to procedure V-III, CLEANING - Icemaker; and, for problems requiring removal of parts refer to procedure IV-XV, for details for removing the Spray Bar Assembly.

J. WATER INLET SOLENOID VALVE

The Water Inlet Solenoid Valve functions only during the Harvest Cycle, when it is energized to permit a metered, one-half gallon-per-minute rate of incoming water, to flow through the Defrost Tube onto the top of the plastic Platen Assembly, assisting in the harvest of the ice cubes. The water drains through holes in the Platen Assembly into the Reservior in the lower section of the Freezing Chamber; and there, the water is recirculated through the Water Pump for return to the Spray Bars.

K. WATER REGULATOR VALVE - Water-Cooled Model

The Water Regulator Valve functions to maintain a constant Compressor head pressure, by regulating the amount of incoming water flow through the Condenser, on water-cooled models. The valve operates through the refrigeration system high side pressure. Rotating the adjusting screw, located on top of the valve, can INCREASE or DECREASE the water flow through the water-cooled Condenser, which in turn, will DECREASE or INCREASE the Compressor head pressure.

NOTE

When installing a replacement Water Regulator Valve, be sure the replacement valve is installed with the arrow positioned in the direction of the water flow.

REFRIGERANT CHARGE

MODEL	AC30 Refrig. Chg.
Air-Cooled	22 oz. R-12 (Approx.)
Water-Cooled	22 oz. R-12 (Approx.)

NOTE

Always CHECK NAMEPLATE on individual Icemaker for specific refrigerant charge, BEFORE charging the refrigeration system. The above listed refrigerant charges are approximate charges for the AC30 Cubers, however it is important to CHECK NAMEPLATE for each Icemaker, especially when there are different Compressors.

ADJUSTMENT & REMOVAL & REPLACEMENT

The procedures provided in this Section are arranged in alphabetical order, to make specific Adjustment and Removal and Replacement information easy to locate.

Read the instructions thoroughly before performing any Adjustment or Removal and Replacement Procedures.

ADJUSTMENT OF THE BIN THERMOSTAT CONTROL

The bracket mounted control for the Bin Thermostat is the Temperature Control, located on the left side of the Insulation Retainer in the front upper middle of the Chassis.

See Figure 4-1 for location and direction of rotation, clockwise (CW) or counterclockwise (CCW), of the adjusting screws on the Temperature Control, the adjustment is to be performed.

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 following instructions and illustration. Over-adjusting or erratic guessing, can foul the instrument and cause ultimate delay and part replacement, WHICH COULD HAVE BEEN PREVENTED.

ADJUSTMENT OF THE CUBE SIZE CONTROL

CAUTION

BEFORE performing actual adjustment to the Cube Size Control, check other possible causes for

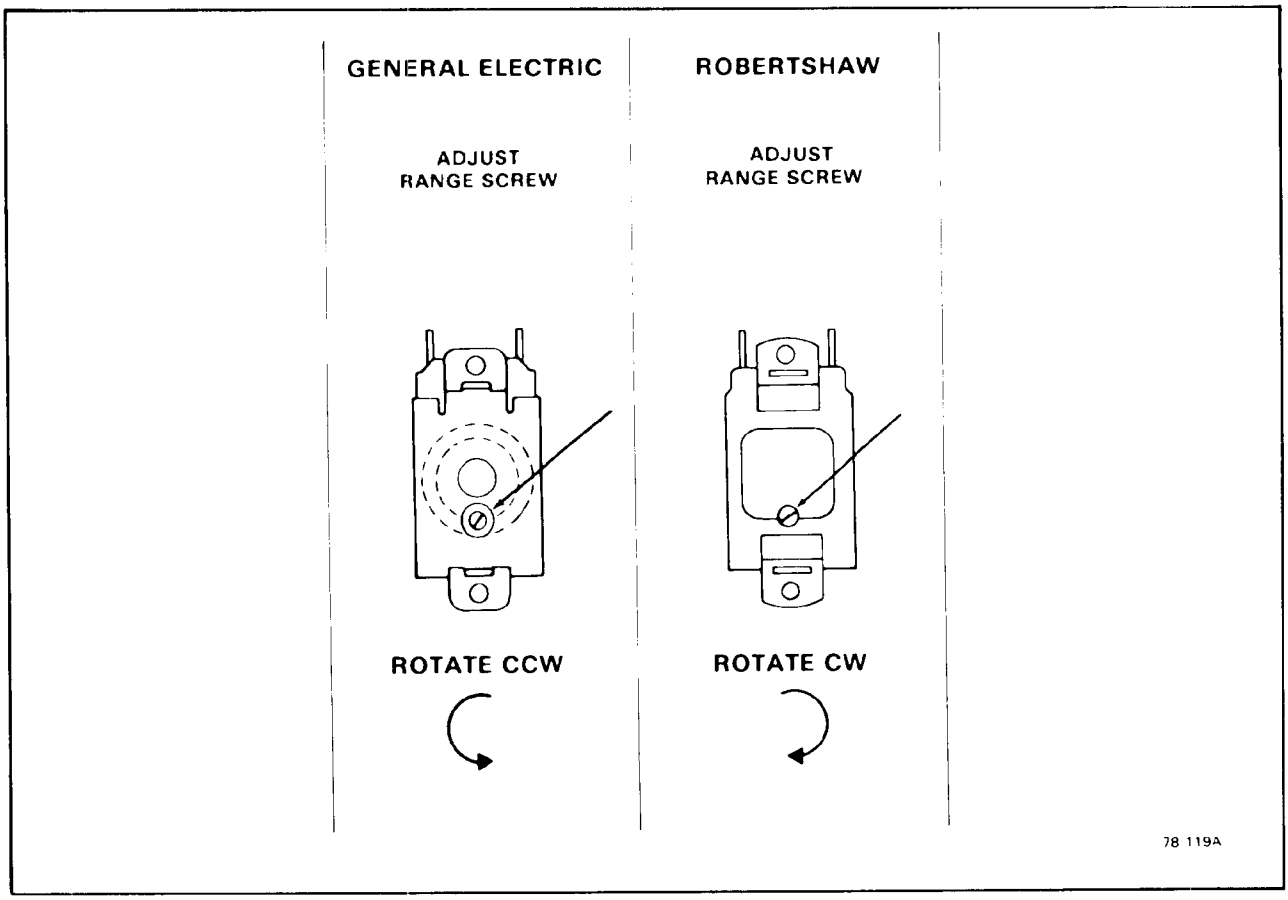


Figure 4-1. Adjustment of the Temperature Control.

cube size problems, refer to Section VI, 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 refrigerant tube of the Platen Assembly and the Icemaker has progressed through several complete freezing and harvest cycles, to observe size and quality of ice cubes and whether or not a cube size problem exists.

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

A. To Produce LARGER Sized Ice Cubes:

1. Locate the Cube Size Control, in the left side of the gusset in the front upper corner of the Chassis frame.
2. Rotate the adjusting screw one-eighth of a turn CLOCKWISE toward COLDER.
3. Observe size of ice cubes in the next two ice cube harvests and repeat step 2 above, in one-eighth turn increments, until desired ice cube size is achieved.

B. To Produce SMALLER Sized Ice Cubes:

1. Locate the Cube Size Control, in the left side of the gusset in the front upper corner of the Chassis frame.
2. Rotate the adjusting screw one-eighth of a turn COUNTERCLOCKWISE toward WARMER.
3. Observe size of ice cubes in next two ice cube harvests and repeat step 2 above, in one-eighth turn increments, until desired ice cube side is achieved.

ADJUSTMENT OF THE TIMER & SWITCH ASSEMBLY

The Timer & Switch Assembly is factory set, so that one complete revolution of the cam on the Timer represents fifteen minutes. Eleven and one-half minutes comprise the freezing cycle event during cam rotation, and the final three 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, during the START UP procedures and in the CLEANING instructions. Rotating the shaft COUNTER-CLOCKWISE will unscrew the shaft from the threaded stud on the Timer Cam.

To Adjust the Timer Switch Assembly:

A. HARVEST CYCLE: Slowly rotate the shaft of the Timer & Switch Assembly, located in the hole in the front of the Control Box Cover, CLOCKWISE, until the actuator arm on the microswitch drops off of the outer cam into the cam slot. An audible click can be heard, but in a noisy area, look at the cam and switch to observe the event. See Figure 4-2.

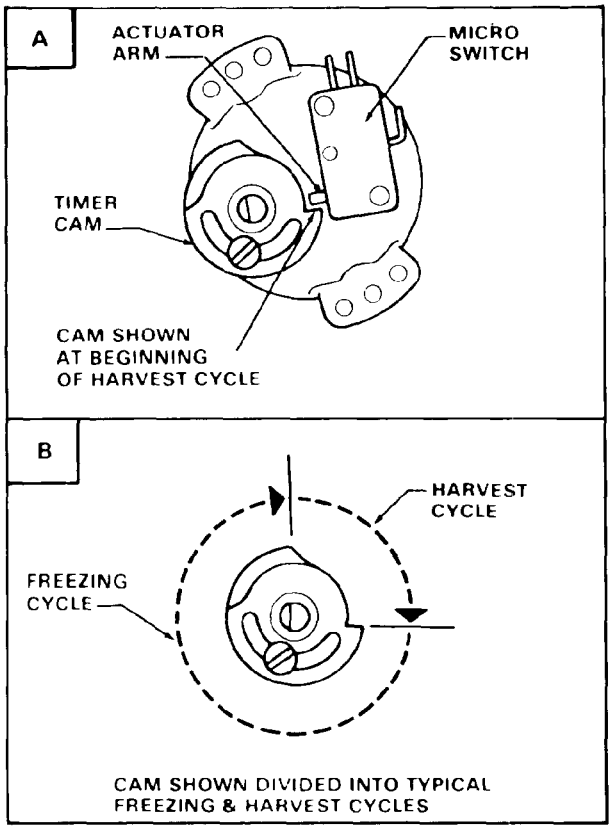


Figure 4-2. Adjustment of the Timer & Switch Assembly.

B. FREEZING CYCLE: Slowly rotate the shaft of the Timer & Switch Assembly, located in the hole in the front of the Control Box Cover, CLOCKWISE, until the actuator arm on the microswitch rides up out of the cam slot to the start of the surface of the outer cam.

ADJUSTMENT OF THE WATER REGULATOR ASSEMBLY — WATER-COOLED MODELS

The correct Compressor head pressure on Water-Cooled Models is 135 PSIG. Adjusting the Water Regulator Valve increases or decreases the rate of flow of water, through the Water-Cooled Condenser; which increases or decreases the affected temperature/pressure of the Compressor head pressure. INCREASED water flow, results in DECREASED or LOWER head pressure; while, DECREASED water flow, results in INCREASED or HIGHER head pressure.

To adjust the Water Regulator Assembly:

A. To INCREASE the head pressure: Rotate the adjusting screw IN, or CLOCKWISE.

B. To DECREASE the head pressure: Rotate the adjusting screw OUT or COUNTER-CLOCKWISE.

C. Check change in Compressor head pressure, and repeat step A or B as necessary, to achieve desired operating head pressure.

WARNING

Be sure the electrical power supply and the 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 AGITATOR MOTOR ASSEMBLY

NOTE

The Agitator Motor in the AC30 Cuber, is installed on top of the Freezing Chamber.

A. To remove the Agitator Motor Assembly:

1. Remove screws and the Top Panel and Front Panel to gain access to the Agitator Motor.
2. Remove three U-Type Clips and the plastic Curtain Assembly.
3. Reach through the ice chute opening in the Freezing Chamber and feel for the Spray Bar.
4. Move hand to the center hub and rotate the Spray Bar, so one end is aligned with the ice chute opening.
5. Lift the Spray Bar up, off of the jet bearing hub, then, remove the Spray Bar through the ice chute opening.
6. Disconnect electrical leads and ground wire from terminals on the Agitator Motor.
7. Reach through the same ice chute opening, as before, and grasp the top Drive Fork with one hand, and the Agitator Motor Fan, on top of the Freezing Chamber, with the other hand. See Figure 4-3.
8. Hold the Fan blades still and rotate the left-handed thread Drive Fork to the right, COUNTERCLOCKWISE, and unscrew the Drive Fork from the Agitator Motor.

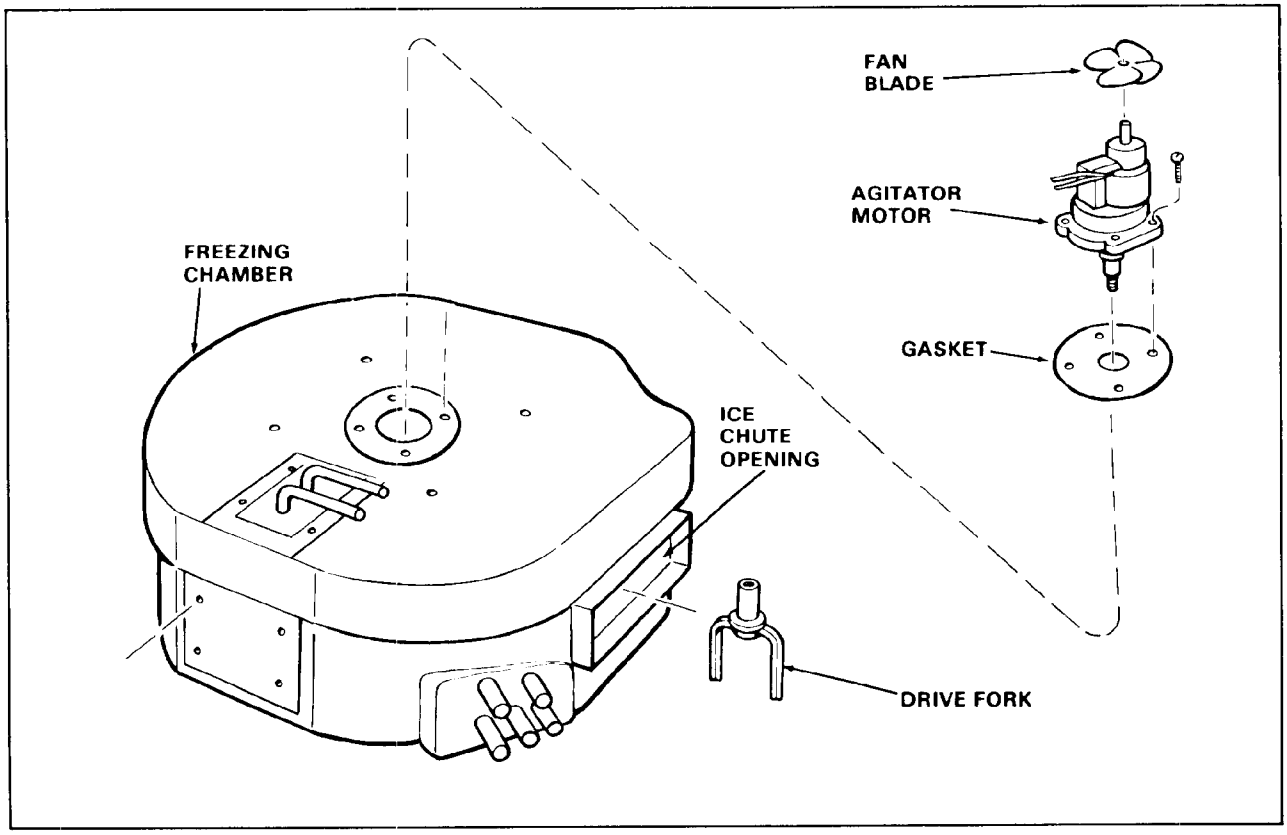


Figure 4-3. Removal of the Agitator Motor Assembly.

9. Remove four screws and lift the Agitator Motor out of the top of the Freezing Chamber.

B. To replace the Agitator Motor Assembly, reverse the removal procedure.

REMOVAL AND REPLACEMENT OF THE BIN THERMOSTAT CONTROL

A. To remove the Bin Thermostat Control:

1. Remove screws and the Top Panel and the Ice Access Door to gain access to the Bin Thermostat Control.
2. Carefully remove the capillary tube from the Bulb Cover holes on the front of the Cube Spout.
3. Carefully withdraw the capillary tube from the Bin, up through the Grommet.
4. Remove electrical leads from the Bin Thermostat Control.
5. Remove screws and the Bin Thermostat Control from the Bracket.

B. To replace the Bin Thermostat Control, reverse the removal procedures.

REMOVAL AND REPLACEMENT OF THE COMPRESSOR ASSEMBLY

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.

A. To remove the Compressor Assembly:

1. Remove screws and the Top, Front and Left Side Panels.
2. Bleed off or blow the refrigerant charge through the Schrader valve.
3. Remove the cover from the terminal box on the Compressor; then, remove three screws and electrical leads from the Compressor.
4. Unsolder the refrigerant suction line and the discharge line from the Compressor.
5. Unsolder the process header from the Compressor and retain for installation on the replacement Compressor.
6. Remove four bolts and washers which secure the Compressor to the Chassis mounting base.
7. Remove the Compressor from the Cabinet.

B. To replace the Compressor Assembly, reverse the removal procedure.

REMOVAL AND REPLACEMENT OF THE CONDENSER - AIR-COOLED MODELS

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.

A. To remove the Condenser:

1. Remove screws and the Left Side Panel and Front Panel.
2. Bleed off or blow the refrigerant charge through the Schrader valve.
3. Unsolder and disconnect refrigerant lines from the Condenser.
4. Unsolder and remove the Drier from the refrigerant lines connecting to the Condenser.
5. Remove screws, lockwashers and the Condenser from the Chassis base.

B. To replace the Air-Cooled Condenser, reverse the removal procedure.

REMOVAL AND REPLACEMENT OF THE CONDENSER - WATER-COOLED MODELS

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.

A. To remove the Condenser:

1. Remove screws and the Front Panel.
2. Bleed off or blow the refrigerant charge through the Schrader valve.
3. Check to be sure building source water inlet supply shutoff valve to rear of Chassis is OFF.
4. Disconnect water inlet supply line at the left bottom rear of Chassis.
5. Disconnect Water-Cooled Condenser inlet water line at the Water Regulator Assembly outlet fitting.
6. Unsolder the refrigerant capillary tube at the Drier.
7. Unsolder the Compressor discharge line, at the top of the Water-Cooled Condenser.
8. Unsolder the Condenser water outlet line, at the top of the Water-Cooled Condenser.
9. Remove two screws and washers and the Water-Cooled Condenser from the Cabinet.

B. To replace the Water-Cooled Condenser, reverse the removal procedures.

REMOVAL AND REPLACEMENT OF THE CUBE SIZE CONTROL

A. To remove the Cube Size Control:

1. Remove screws and the Left Lower and Upper Front Panels to gain access to the Cube Size Control, in the Control Box.
2. Trace capillary Tube, from the Cube Size Control, to the refrigerant suction line on the Evaporator Platen Assembly; then peel back the insulation.
3. Remove clips and the coiled capillary tube bulb out of the Freezer section of the Cabinet.
4. Remove electrical leads from the Cube Size Control.
5. Remove screws and the Cube Size Control.

B. To replace the Cube Size Control, reverse the removal procedure.

REMOVAL AND REPLACEMENT OF THE CURTAIN ASSEMBLY

A. To remove the Curtain Assembly:

1. Slide the Ice Access Door OPEN, to gain access to the Curtain Assembly to be removed.

NOTE

After removing the Curtain Assembly in the next step, note the irregular end of the plastic stiffener of the Curtain Assembly is installed at the left side of the opening.

2. Reach into the Cube Spout to feel and remove three U-Type Clips and the plastic Curtain Assembly from the top lip of the ice chute opening.

B. To replace the Curtain Assembly, reverse the removal procedure.

NOTE

Be sure to install the replacement Curtain Assembly with the irregular end of the plastic stiffener positioned at the left side of the ice chute opening; and, the edge of the Curtain is dressed evenly with the top lip of the ice chute opening and secured with three U-Type Clips. The thin, clear plastic sheet of the curtain should hang down evenly.

REMOVAL AND REPLACEMENT OF THE DRIER

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.

A. To remove the Drier:

1. Remove screws and the Lower Left Front Panel.
2. Bleed off or blow the refrigerant charge through the Schrader valve.
3. Remove the Drier Bracket attaching the Drier to the Chassis.
4. Unsolder refrigeration lines at both ends of the Drier.

B. To replace the Drier:

CAUTION

1. **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.**
2. **Be sure the replacement Drier is installed with the arrow positioned in the direction of the refrigerant flow.**

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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.
3. Secure Drier to Drier Bracket with a Cable Tie.
4. Purge the system and check for leaks.
5. Thoroughly evacuate the system to remove moisture and non-condensables.
6. Charge the system with refrigerant, by weight. SEE NAMEPLATE.
7. Replace and attach the Lower Left Front Panel.

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

A. To remove the Fan Motor Assembly:

1. Remove screws and the Left Side Panel.
2. Disconnect the two electrical leads from the Fan Motor at the Control Box Assembly.
3. Remove screws and the Fan Motor Assembly; and remove the Fan Motor and Bracket from the Chassis base.
4. Remove the Fan Blade from the Fan Motor.
5. Remove screws and lockwashers and separate the Fan Motor from the Fan Motor Bracket.

B. To replace the Fan Motor Assembly, reverse the removal procedure.

NOTE

Be sure to replace the Fan Blade with the hub of the Fan Blade facing the Fan Motor, to ensure airflow is toward the Fan Motor.

REMOVAL AND REPLACEMENT OF THE FREEZING CHAMBER

A. To remove the Freezing Chamber:

1. Remove screws and the Top Panel, Left Front Panel and the Left Side and Rear Panels to gain access to the Freezing Chamber.
2. Remove Thumb Screws and the plastic Cube Spout.
3. Remove three U-Type Clips and the plastic Curtain Assembly.
4. Reach through the ice chute opening in the Freezing Chamber and feel for the Spray Bar.
5. Move hand to the center hub and rotate the Spray Bar, so one end is aligned with the ice chute opening.
6. Lift the Spray Bar up, off of the jet bearing hub, then, remove the Spray Bar through the ice chute opening.
7. Disconnect electrical leads and ground wire from terminals on the Agitator Motor.
8. Reach through the ice chute opening, as before, and grasp the Drive Fork with one hand, and the Agitator Motor Fan on top of the Freezing Chamber, with the other hand.
9. Hold the Fan Blades still and rotate the left-handed thread Drive Fork to the right, COUNTERCLOCKWISE, and unscrew the Drive Fork from the Agitator Motor.
10. Remove four screws and lift out the Agitator Motor.
11. Remove hose clamps and work loose four Tygon Tubes from the Freezing Chamber, three from the Water Pump and one drain tube.
12. Carefully lift the Platen and Cover Assembly, and tie off or use a board to support and give ample space to allow removal of the Freezing Chamber.
13. Remove screws and the Freezer Mount Plates.
14. Carefully work the Freezing Chamber out of the Chassis.

B. To replace the Freezing Chamber, reverse the removal procedure.

REMOVAL AND REPLACEMENT OF THE SPRAY BAR

A. To remove the Spray Bar Assembly:

1. Slide the Ice Access Door OPEN, to gain access to the Spray Bar.
2. Remove three U-Type Clips and the plastic Curtain Assembly.
3. Reach through the ice chute opening in the Freezing Chamber and feel for the Spray Bar.
4. Move hand to the center hub and rotate the Spray Bar, so one end is aligned with the ice chute opening.
5. Lift the Spray Bar up, off of the jet bearing hub, then, remove the Spray Bar through the ice chute opening.

B. To replace the Spray Bar, reverse the removal procedure.

REMOVAL AND REPLACEMENT OF THE WATER PUMP ASSEMBLY

A. To remove the Water Pump Assembly:

1. Remove screws and the Left Side Moulding Strip and the Left Lower and Upper Front Panels.
2. Remove one screw and one end of the green ground wire from the Water Pump Bracket.
3. Remove two screws and washers attaching the Water Pump Assembly to the Water Pump Bracket.
4. Remove three hose clamps connecting the three Tygon Tubes to the Freezing Chamber; then, lift the Water Pump Assembly off of the Water Pump Bracket and work loose the three attached Tygon Tubes from the Freezing Chamber.

B. To replace the Water Pump Assembly, reverse the removal procedure.

REMOVAL AND REPLACEMENT OF THE WATER REGULATOR ASSEMBLY - WATER-COOLED MODELS

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.

A. To remove the Water Regulator Assembly:

1. Remove screws and the Left Side Panel and the Left Lower Front Panel.
2. Check to be sure building source water inlet supply shutoff valve to rear of Chassis is OFF.

3. Bleed off or blow the refrigerant charge through the Schrader valve.

4. Disconnect the water inlet supply line at the left bottom side of the Chassis.

5. Disconnect water line at the inlet and outlet fittings on the Water Regulator Assembly.

6. Unsolder the Water Regulator Valve capillary tube from the Compressor refrigerant discharge line.

7. Remove two screws and the Water Regulator Assembly from the Chassis Base.

B. To replace the Water Regulator Assembly, reverse the removal procedure.

MAINTENANCE & CLEANING INSTRUCTIONS

GENERAL

The periods and procedures for maintenance and cleaning are given as guides and are not to be construed as absolute or invariable. Cleaning especially will vary, depending upon local water conditions and the ice volume produced; and, each icemaker must be maintained individually, in accordance with its own particular location requirements.

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 water line Strainers.
2. Check that the Icemaker cabinet is level, in side-to-side and front-to-rear directions.
3. Clean the water system Evaporator, Freezing Chamber Reservoir and Spray Bars, using a solution of SCOTSMAN Ice Machine Cleaner. Refer to procedure V-III, CLEANING-Icemaker.

NOTE

Cleaning requirements vary according to local water conditions and individual user operation. Continuous check of the clarity of ice cubes and visual inspection of the Spray Bar parts before and after cleaning will indicate frequency and procedure to be followed in local areas.

4. Check that plastic curtain hangs down evenly within the opening at the front of the Freezing Chamber.
5. Check and tighten all bolts.
6. Check and tighten all electrical connections.
7. Check Hot Gas Solenoid Valve for correct operation and high pressure controls for cut-in and cut-out pressures.
8. With Icemaker and Fan Motor OFF on Air-Cooled Models, clean Condenser, using vacuum cleaner, whisk broom or brush. Instruct customer to clean frequently.
9. Check that Fan Blades move freely, are not touching any surfaces and are not bent or out of balance.
10. Check for refrigerant leaks and tighten line connections.
11. Check for water leaks and tighten drain line connections. Pour water down Bin drain line to be sure that drain line is open and clear.
12. Check size, condition and texture of ice cubes. Perform adjustments as required. Refer to procedure IV-II.
13. Check Bin Thermostat Control bulb to test shutoff. With the Icemaker in the Harvest Cycle, place ice on the bulb, which should cause the Icemaker to shut OFF at the end of the Harvest Cycle.

NOTE

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. Normal setting is about 35-degrees F. CUT-OUT and 40-degrees F. CUT-IN.

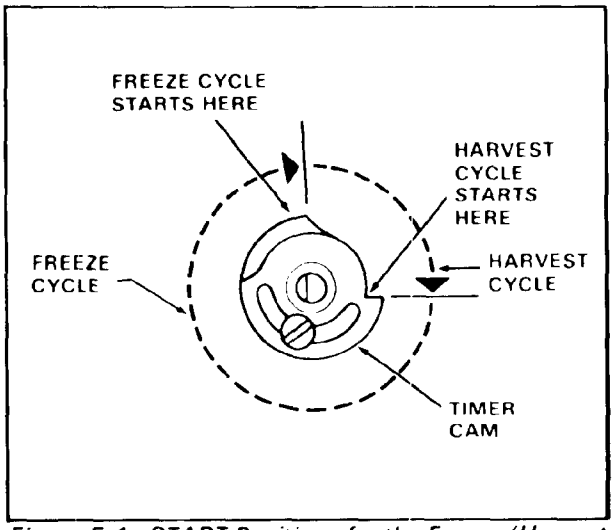

Figure 5-1. START Positions for the Freeze/Harvest Cycles.

CLEANING - Icemaker

1. Remove screws and the Left Upper Front Panel and Top Panel.
2. Move the Master ON-OFF toggle switch and the Compressor ON-OFF toggle switch, on the Control Box, to the OFF postions.
3. Slowly rotate the shaft of the Timer & Switch Assembly, protruding through the hole in the front of the Control Box Cover, until you hear an audible click as the microswitch actuator arm drops into the cam slot, the START position of the Harvest Cycle, then stop. See Figure 5-1.

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.

4. Prepare the following cleaning solution: Mix 16-ounces of SCOTSMAN Ice Machine Cleaner with eleven pints of fresh, potable water in a clean container.
5. Pour the prepared cleaning solution into the Freezing Chamber through the cube chute opening.
6. Allow the icemaking system to operate normally for twenty minutes into the Freezing Cycle.

NOTE

NO ICE CUBES will be made, because the Compressor has been switched OFF.

7. At the end of twenty minutes, rotate the shaft of the Timer & Switch Assembly, CLOCKWISE, to start a second Harvest Cycle. See Figure 5-1.
8. Allow the icemaking system to operate normally through the Harvest Cycle; then when the Harvest Cycle is completed, rotate the Timer again THROUGH the Freezing Cycle to START another Harvest Cycle. Perform this Harvest Cycle operation three times.

NOTE

During each Harvest Cycle, fresh inlet water is introduced into the water system and acts to rinse all water-related parts and to wash away most mineral concentration through the drain.

9. Wash the Curtain Assembly and the Cube Spout in a solution of one ounce of household bleach in one gallon of water.
10. Using a clean, damp cloth or disposable paper wiper, wipe off the Curtain Assembly and the Cube Spout.
11. Move the Compressor ON-OFF toggle switch, on the Control Box, to the ON position.
12. Replace the Curtain Assembly and the Cube Spout.
13. Check each ice cube harvest, until the ice cubes are clear and the acid taste is eliminated.

CAUTION

DO NOT USE ice cubes produced from the cleaning solution. Be sure none remains in the Bin.

14. Pour hot water over ice cubes in the Bin, to melt the ice cubes and allow the same cleaning solution to be used to thoroughly wash the inner surfaces of the Bin and the solution to help clean the drain lines as it drains. Rinse inner surfaces of Bin.
15. Replace all panels removed.
16. Clean and sanitize the interior Bin surfaces each week.

SERVICE DIAGNOSIS

The Service Diagnosis Section is for use in aiding the service man 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 charts list 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 and some cloudy.	Some jets plugged. Shortage of water. Unit not level. Water overflowing vent holes on low side, burning cubes.	Clean jets. See Shortage of water CORRECTION. Level cabinet, as required.
Cubes too large.	Cube Size Control set too cold.	Rotate Cube Size Control dial toward WARMER.
Cubes too small.	Cube Size Control set too warm. Partially restricted capillary tube. Moisture in system. Shortage of water. Loss of refrigerant.	Rotate Cube Size Control dial toward COLDER. Blow refrigerant charge; replace drier; evacuate system, add refrigerant charge. Same as above CORRECTION. See Shortage of water CORRECTION. Check for refrigerant leaks, correct leaks; recharge system.
Cloudy Cubes.	Shortage of water. Dirty water supply. Accumulated impurities.	See Shortage of water CORRECTION. Install water filter or softener. Use SCOTSMAN Ice Machine Cleaner.
Shortage of water.	Water spraying out through curtain. Water solenoid not opening. Water leak in sump area. Partial restrictions in water strainer.	Hang curtain in proper position. Repair or replace solenoid. Locate leak and repair or correct condition. Clean or replace strainer.

SYMPTOM	POSSIBLE CAUSE	CORRECTION
Decreased ice capacity.	Defective compressor.	Replace compressor.
	Leaky water valve.	Repair or replace valve.
	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.
	Poor circulation or extreme hot location.	Relocate the cabinet; or provide ventilation by cutting openings.
	Overcharge of refrigerant.	Slowly purge off to correct charge.
	Hot gas solenoid valve leaking.	Replace valve.
Poor harvest.	Too short defrost time.	Check and adjust harvest cycle. Check Timer two-minute setting.
	Restriction in water inlet line.	Check strainer and flow check valve. DO NOT remove flow control washers.
	Hot gas solenoid does not open.	Binds or burned out. Replace.
	Plugged air vent holes in upper part of cube cups.	Clean out air vent holes.
Icemaker does not harvest.	Water pressure too low.	Check for 20 PSI flowing water.
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 WIRE BRUSH.
	Air circulation blocked.	Locate cabinet with adequate air space for proper air flow.
	Defective Fan Motor.	Replace Fan Motor.
	Non-condensable gasses in the system.	Purge the system.
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.
Hole washed inside ice cube.	Water over the top of cube cups during harvest cycle.	Check and re-level the cabinet.