

CU0515

INTRODUCTION

This manual provides the specifications and the step-by-step procedures for the installation, startup, operation, maintenance and cleaning for the CU0515 ice machine.

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

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Specifications

The ice machine must be installed indoors in a controlled environment.

	Minimum	Maximum
Air Temp	50°F.	95°F.
Water Temp	40°F.	100°F.
Water Pressure	20 PSI	80 PSI
Voltage	103.5	126.5

Operating the ice machine outside of the above limitations, or outdoors, is potentially damaging to the machine, and it is misuse of the machine. This may void the warranty.

Scotsman Ice Systems are designed and manufactured with the highest regard for safety and performance. They meet or exceed the standards of agencies like NSF and UL..

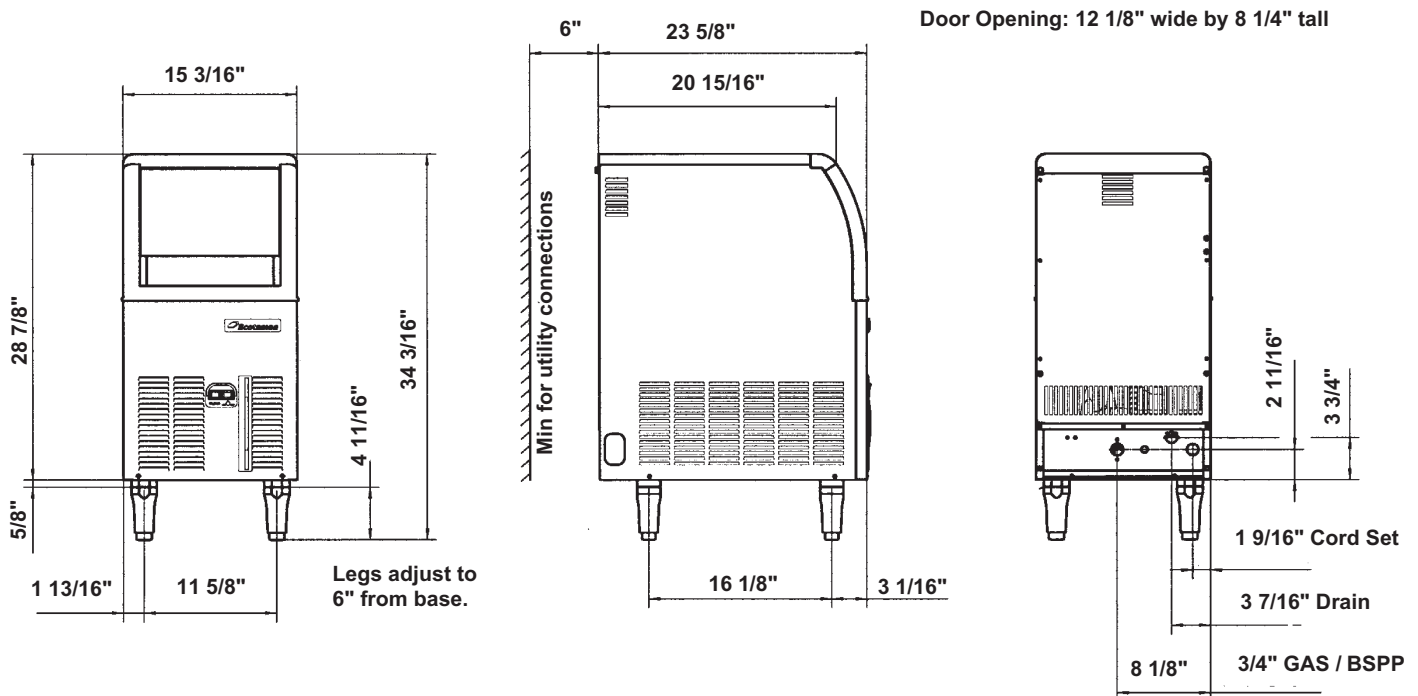
Scotsman assumes no liability or responsibility of any kind for products manufactured by Scotsman that have been altered in any way, including the use of any part and/or other components not specifically approved by Scotsman.

Scotsman reserves the right to make design changes and/or improvements at any time. Specifications and design are subject to change without notice.

UNPACKING AND INSPECTION

1. Call your authorized SCOTSMAN Distributor or Dealer for proper installation.
2. Remove the front panel of the unit and inspect for any concealed damage. Notify carrier of your claim for the concealed damage.
3. Check that refrigerant lines do not rub against or touch other lines or surfaces, and that the fan blade moves freely.
4. Check that the compressor fits snugly onto all its mounting pads.
5. Remove all internal support packing and masking tape.

Model	Electrical (volts/Hz/phase)	Fuse Size	Condenser Type	Refrigerant Charge
CU0515GA-1A	115/60/1	15	Forced Air	9.5 oz R-134a



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General Information And Installation

This model is supplied from the factory completely pre-wired and require only electrical power connections to the wire cord provided at rear of the unit.

Make sure that the ice machine is connected to its own circuit and individually fused (see data plate for maximum fuse size). This is a cord-connected unit designed for 115 volt AC power, with a maximum fuse size of 15 amps.

Low voltage can cause improper operation and may be responsible for serious damage to the overload switch and motor windings that is not covered by warranty.

NOTE. All external wiring should conform to national, state and local standards and regulations.

Check voltage on the line and the ice maker's data plate before connecting the unit. Extension cords must not be used.

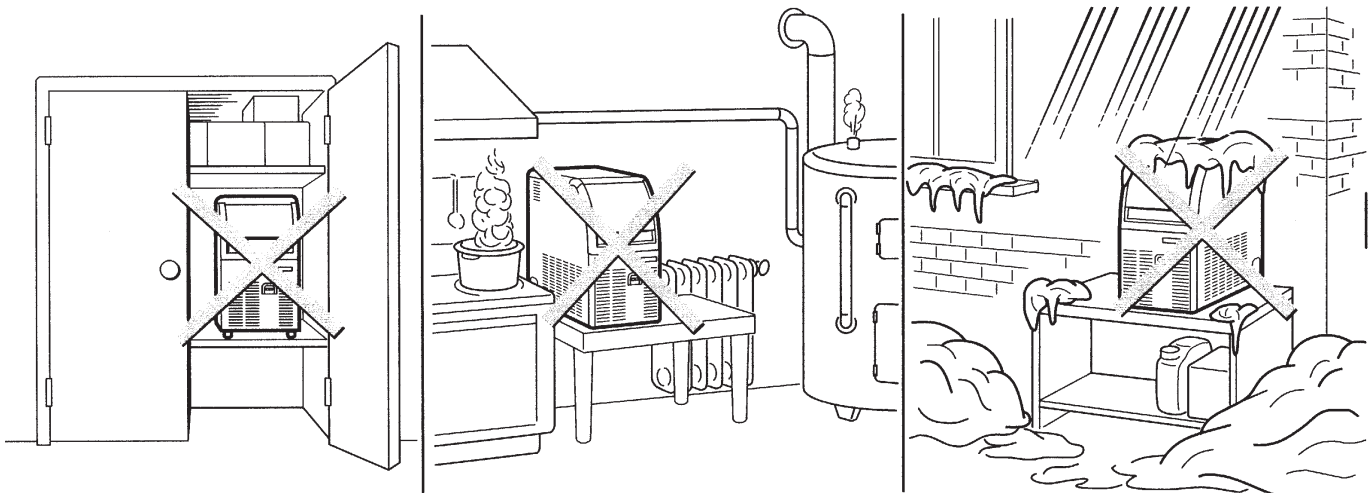
Location: If the unit is built into a cabinet with no side ventilation, the ice production will be reduced by 20% of rated capacity, restricted space of an inch or so on each side will cause a 10% reduction. Six inches of space to the left and right will allow the unit to operate satisfactorily.

The daily ice-making capacity is directly related to the condenser air inlet temperature, water temperature, conditions of the condenser air filter and age of the machine.

To keep your SCOTSMAN CUBER at peak performance levels, periodic maintenance checks must be carried out as indicated on Maintenance and Cleaning section of this manual.

Warranty

The warranty statement for this product is provided separately from this manual. Refer to it for applicable coverage. In general warranty covers defects in material or workmanship. It does not cover maintenance, corrections to installations, or situations when the machine is operated in circumstances that exceed the limitations printed in this manual.



Water Supply And Drain Connections

General

When choosing the water supply for the ice maker consideration should be given to:

- a) Length of run
- b) Water clarity and purity
- c) Adequate water supply pressure

Low water pressure, below 20 psi may cause a malfunction.

Water containing excessive minerals will tend to produce cloudy colored ice cubes, plus scale build-up on parts of the water system.

Water Supply

The recommended water supply line is a 3/8" o.d. copper tube, the water pressure must have a minimum incoming pressure of 20 psig.

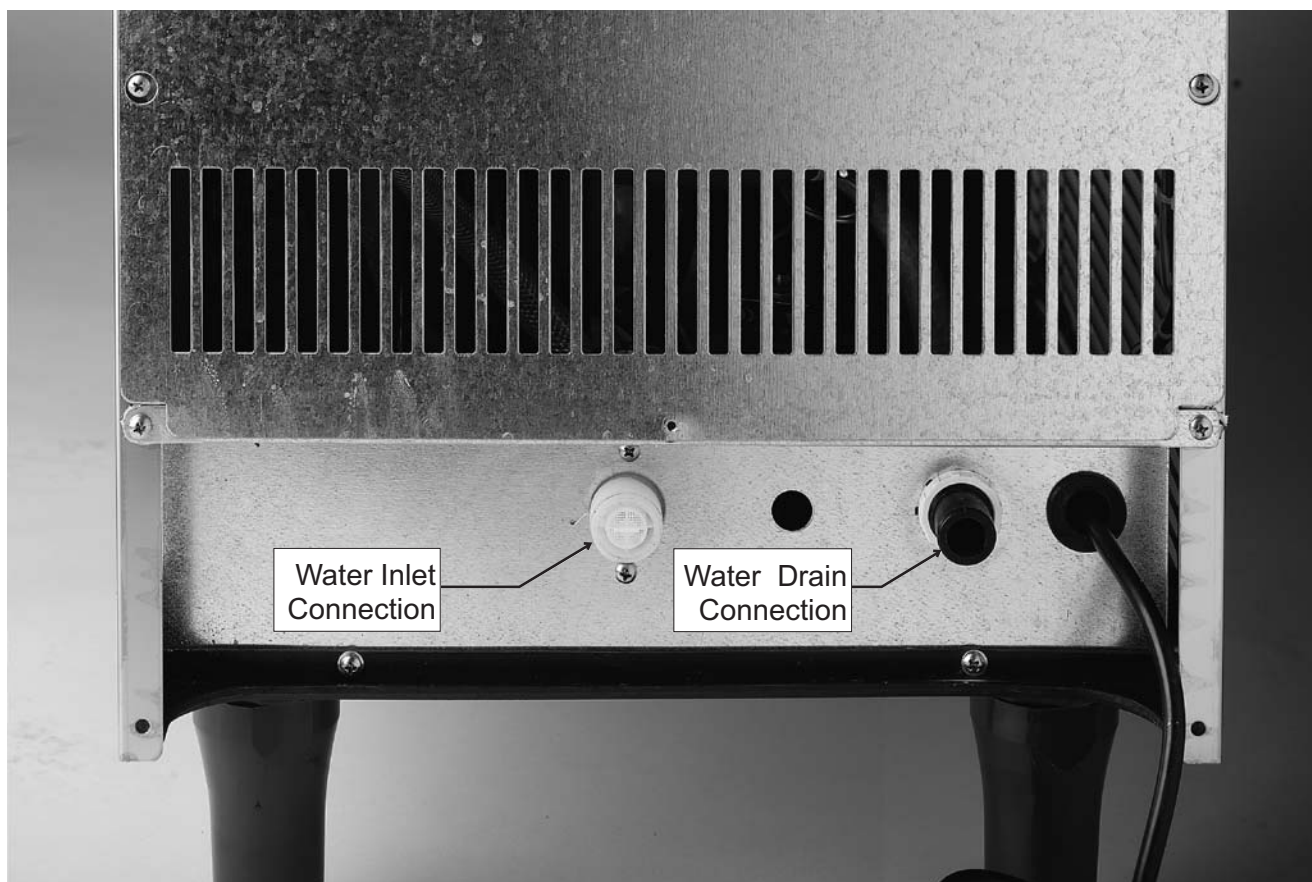
Connect the tubing to the 3/4" GAS / BSPP thread water inlet fitting at the back of the ice maker. An adapter is available, the part numbers are: F733219-03 and F640134-00.

Water Drain

The recommended drain tube is a plastic or flexible tube with 18 mm (3/4") I.D. which runs to an open trapped and vented drain.

Note: Although soft, easily kinked vinyl tubing is not recommended for a drain, a short length of 3/4" ID vinyl tubing is required to connect a rigid drain tube to the 20 mm (25/32") fitting on the back of the machine.

NOTE. The water supply and the water drain must be installed to conform to the local code. In some case a licensed plumber and/or a plumbing permit is required.

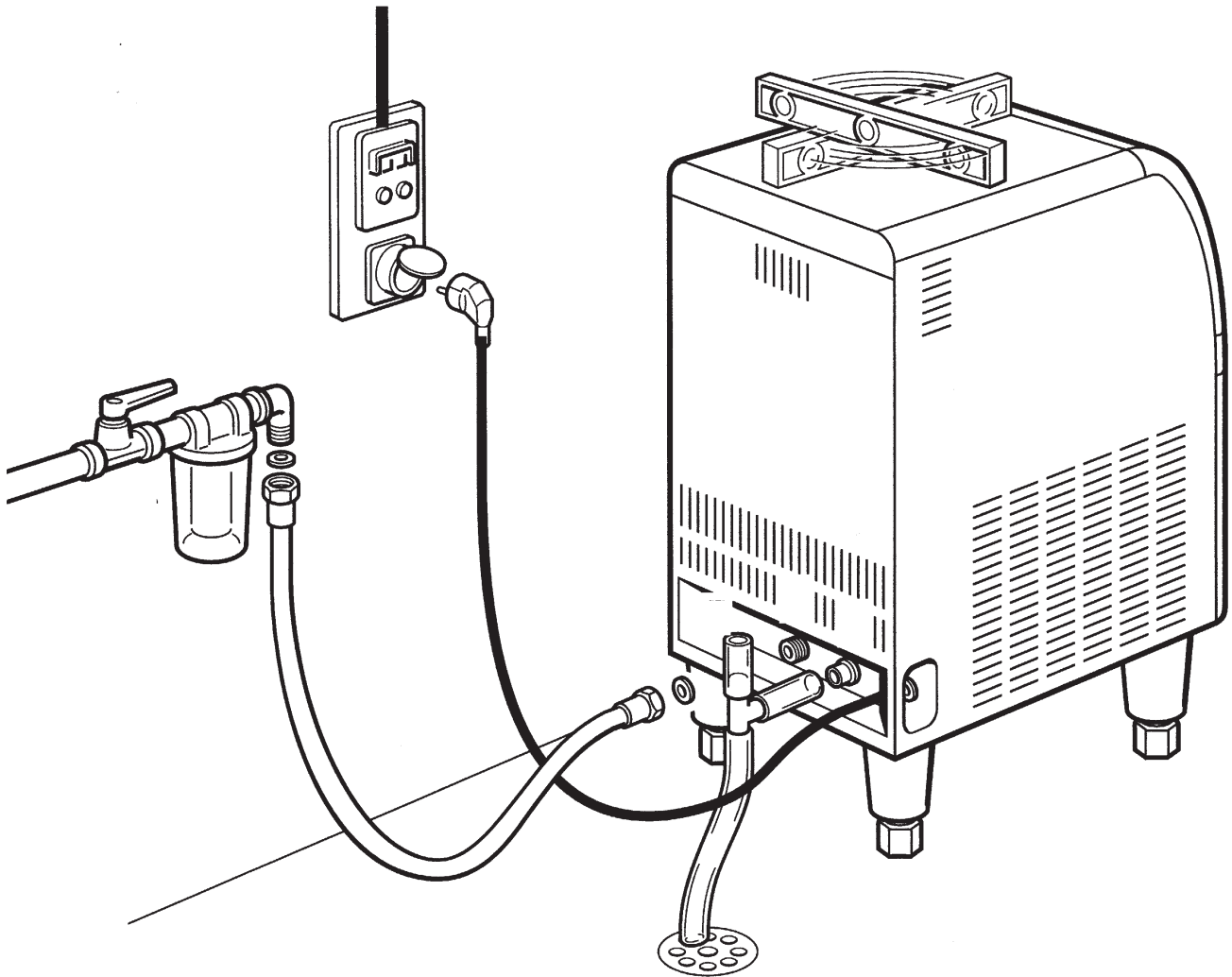


Back View of Utility Connections

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Final Check List

1. Is the unit in a room where ambient temperatures are above a minimum of 10°C (50°F) even in winter months?
2. Is there at least a 15 cm (6") clearance around the unit for proper air circulation?
3. Is the unit level? (IMPORTANT)
4. Have all the electrical and plumbing connections been made, and is the water supply shut-off valve open?
5. Has the voltage been tested and checked against the data plate rating?
6. Has the water supply pressure been checked to ensure a water pressure of at least 20 psi.
7. Check all refrigerant lines and conduit lines to guard against vibrations and possible failure.
8. Have the bolts holding the compressor down been checked to ensure that the compressor is snugly fitted onto the mounting pads?
9. Have the bin liner and cabinet been wiped clean?
10. Has the owner/user been given the User Manual and been instructed on the importance of periodic maintenance checks?
11. Has the Manufacturer's registration card been filled in properly? Check for correct model and serial number against the serial plate and mail the registration card to the factory.
12. Has the owner been given the name and the phone number of the authorized SCOTSMAN Service Agency serving him?



Connect Power, Water and Drain. Level the cabinet.

Operating Instructions

Start Up

After having correctly installed the ice maker and completed the plumbing and electrical connections, perform the following "Start-up" procedure.

A. Remove the condenser air filter then remove the front panel, Locate the cleaning switch on the control box.

B. Switch the cleaning switch to the cleaning position. This will close the electrical circuit to the water inlet valve and to the hot gas valve

C. Switch the power ON and push the green button switch. Unit will start up in charging cycle mode. During this cycle the components energized are:

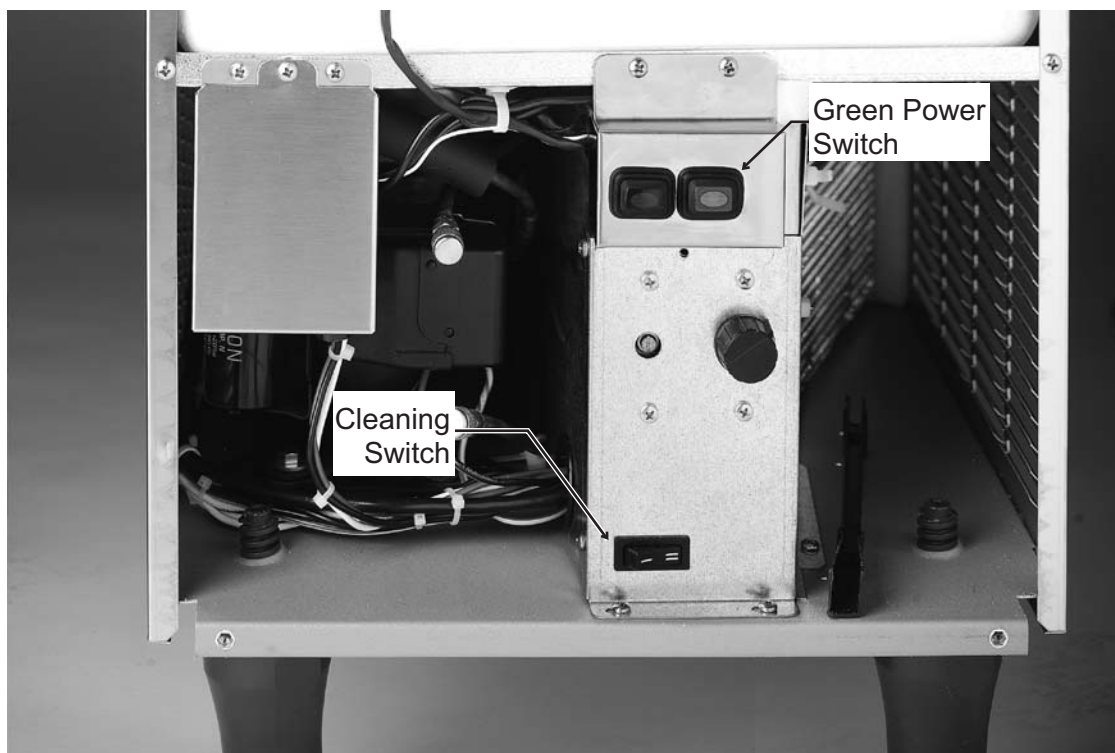
- Water Inlet Solenoid Valve
- Hot Gas Solenoid Valve
- Water Pump
- Fan Motor

D. Operate the unit in the water charging cycle for about three/quarter minutes till water flows out from the drain hose, then move the cleaning switch to the operation position.

NOTE. During the charging cycle, the water inlet solenoid valve is energized. The water flows through the valve to the back side of the evaporator platen and then down to fill up the ice machine sump for the next freezing cycle.



Air Filter Removal



Front View With Front Panel Removed

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Operational Checks

E. The unit now starts its first freezing cycle with the following components in operation:

- Compressor
- Water Pump
- Fan Motor

F. Look through the ice discharge opening and confirm that the spray system is correctly seated and that the water jets uniformly reach the interior of the inverted cup molds; also make sure that the plastic curtain is hanging freely and excessive water is not flowing through it.

G. During the freeze cycle, the evaporator will remove heat from the water sprayed into the ice making molds and warm air will be discharged from the cabinet.

H. When the evaporator temperature reaches a preset value the evaporator thermostat or cube size control changes its contacts; the freezing cycle ends and starts the defrost or harvest cycle.

Freezing time will range between 20 and 22 minutes in a 70°F ambient temperature. Longer time for temperature above, shorter when below. Average complete cycle range is about 23 to 25 minutes.

I. Check, during the first defrost/harvest cycle, that the incoming water flows correctly into the sump to re-fill it and the surplus overflows through the overflow drain tube.

J. Check the size and shape of the ice cubes just released. Right size must have a small depression about 3/16" in their crown. If not, wait for the second defrost/harvest cycle before performing any adjustment.

K. If required, adjust the length of the freezing cycle by turning the knob of the cube size control or evaporator thermostat located in front of the control box until the correct ice cube size is achieved.

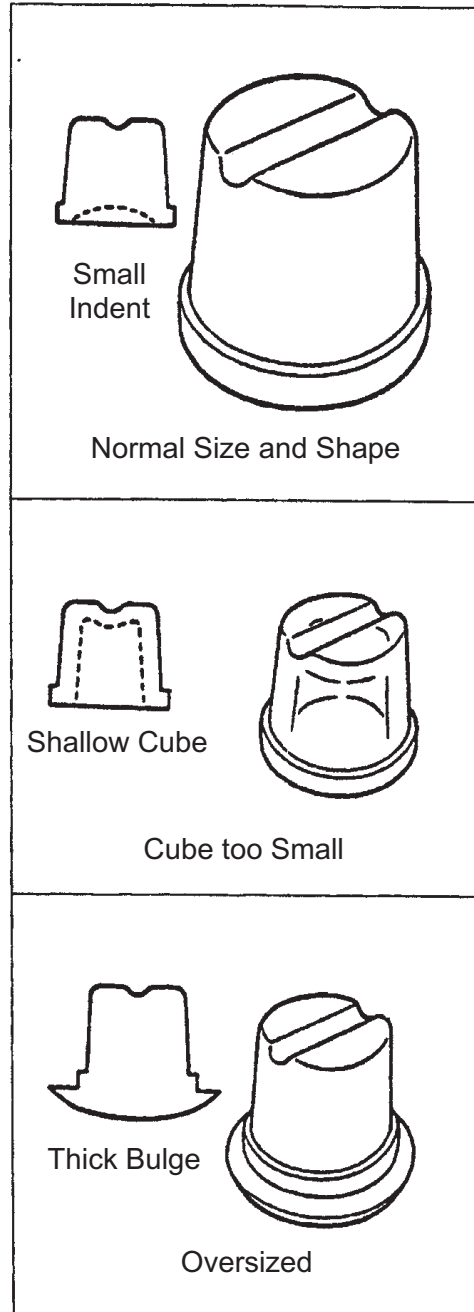
If the ice cubes are shallow and cloudy, it is possible that the ice maker runs short of water during the end of the freezing cycle or, the quality of the supplied water requires the use of an appropriate water filter or conditioner.

L. During the defrost or harvest cycle hold a handful of ice cubes against the bulb of the storage bin thermostat; the ice machine switch OFF in about one-two minutes.

Remove the ice from the storage bin thermostat. The ice maker should restart automatically in three-four minutes.

NOTE. The bin thermostat is factory set at 1°C (35°F) OUT and 4°C (39°F) IN.

M. Re-attach the front panel, then instruct the owner/user on the general operation of the ice machine and about the cleaning and care it requires.



Component Description

Water Pump

The water pump operates continually throughout the freezing cycle. The pump forces the water from the sump to the spray system and through the spray nozzles so it sprays into the inverted cup molds to be frozen into crystal clear ice cubes.

Water Inlet Solenoid Valve

The water inlet solenoid valve is energized only during the defrost cycle. When energized it allows a metered amount of incoming water to flow over the evaporator cavity to assist the hot gas in defrosting the ice cubes.

The water running over the evaporator cavity drops by gravity, through the weep holes of the platen, into the sump.

Hot Gas Solenoid Valve

The hot gas solenoid valve consists basically in two parts: the valve body and the valve coil. Located on the hot gas line, this valve is energized by the contacts 3-2 of the evaporator thermostat during the defrost cycle.

During the defrost cycle the hot gas valve coil is activated so to attract the hot gas valve piston in order to give way to the hot gas discharged from compressor to flow directly into the evaporator serpentine to defrost the formed ice cubes.

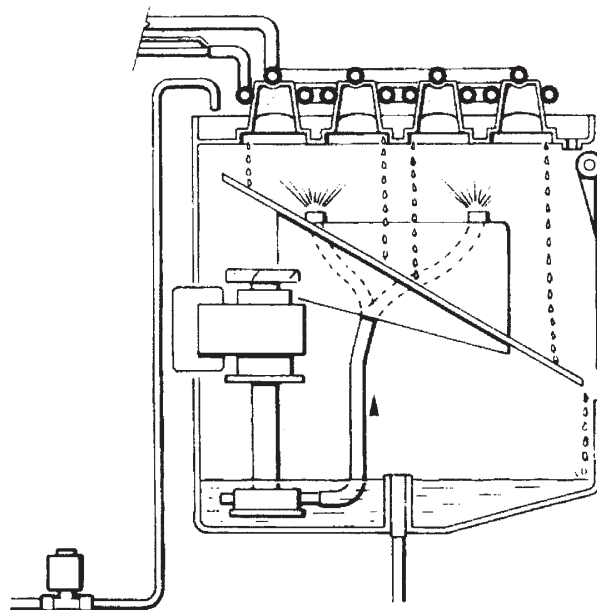
Bin Thermostat

The bin thermostat control body is located in the front of control box behind the front louvered panel.

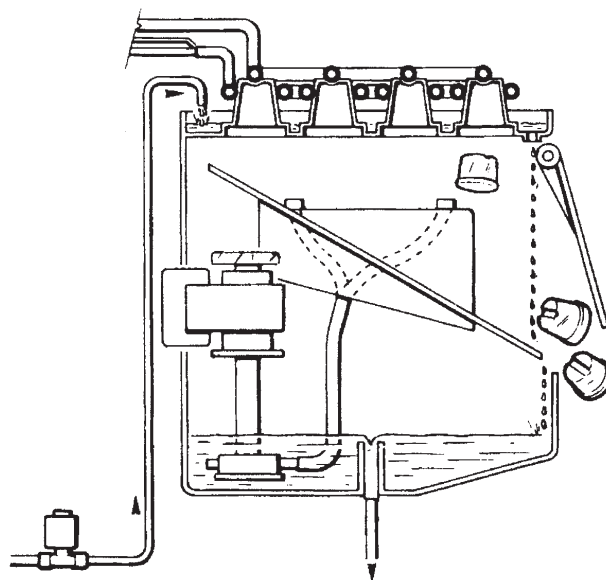
The thermostat sensing tube is located into a bulb holder on the side wall of the ice storage bin where it automatically shuts the ice machine OFF when in contact with the ice and re-starts the ice machine when the ice is removed. Factory settings are 1°C (35°F) OUT and 4°C (39°F) IN.

Cube Size Control (Evaporator Thermostat)

The cube size control (evaporator thermostat) body is located in the front of control box behind the front louvered panel; it's basically a reverse acting temperature control which closes contacts 3-2 when its temperature decreases and closes the opposite contacts 3-4 when the temperature rises.



Water Circuit, Freeze Cycle



Water Circuit, Harvest Cycle

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Operation - Electrical Sequence

The following charts illustrate which switches and components are ON or OFF during the two phases of the icemaking cycle.

Refer to the wiring diagram for reference.

FREEZING CYCLE

Electrical components	ON	OFF
Compressor	•	
Water Pump	•	
Fan Motor	•	
Hot Gas Valve		•
Inlet Water Valve		•
Electrical Controls	CLOSE	OPEN
Evaporator Thermostat (contacts 3-4)	•	
Evaporator Thermostat (contacts 3-2)		•
Bin Thermostat	•	

HARVEST CYCLE

Electrical components	ON	OFF
Compressor	•	
Water Pump		•
Fan Motor (Air cooled only)		•
Hot Gas Valve	•	
Inlet Water Valve	•	
Electrical Controls	CLOSE	OPEN
Evaporator Thermostat (contacts 3-4)		•
Evaporator Thermostat (contacts 3-2)	•	
Bin Thermostat	•	

Freeze Cycle

Average Discharge Pressure

- A/C: 100 to 155 PSIG

Suction Pressure

- End Freeze Cycle: 0 to 1.5 PSIG

Refrigerant Metering Device:

- Capillary tube

Refrigerant Charge (R-134a)

- 9.5 oz.

The thermostat sensing bulb is located into a plastic tube (bulb holder) secured by two clips directly to the evaporator serpentine. This control determines the length of the freezing cycle and correspondingly the size of the cubes.

A lower setting will produce a larger cube (oversize) while a higher setting a smaller cuber (shallow size).

When closed on contacts 3-2 it activates the defrost or harvest cycle components. The cube size control is pre-set at the factory (knob in the black dot position) and doesn't require any adjustment when the ambient temperature remains between 15 and 30°C (60 and 90°F).

Cycle Times:

Listed information is for new, clean machines in a stabilized situation. Some unit to unit and cycle to cycle variation is normal.

90°F/70°F (32°C/21°C)

Freezing time: 20 to 21 minutes

Harvest time: 1:15 to 1:30 minutes

Total time: 21:30 to 23 minutes

Weight: 1 lb

Water Drain: 1 qt. water

70°F/50°F (21°C/15°C)

Freezing time: 17:30 to 18 minutes

Harvest time: 1:30 to 1:45 minutes

Total time: 19 to 19:30 minutes

Weight: 1 lb

Water Drain: 1.6 qt. water.

Fan Motor

The fan motor is electrically connected in parallel to the water pump and it operates continuously only during the freezing cycle keeping the proper head pressure by circulating air through the condenser fins.

Compressor

The hermetic compressor is used to circulate refrigerant throughout the entire system. It compresses the low pressure refrigerant vapor causing its temperature to rise and become high pressure hot vapor (hot gas) which is then released through the discharge valve.

Water Spray System

Sprays the water into each individual cup to be frozen into ice.

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Cleaning Switch

Located on the bottom side of the control box, it is used to energize the water inlet and the hot gas valves to fill the sump of the machine with water when needed.

Green Master Switch Push Button

Located in the front of the machine it's used to switch ON and OFF the unit by pushing its green push button. When ON, its green light is ON.

Red Alarm/Re-Set Push Button

Located in the front of the machine (just beside the Master Switch) it works in conjunction with the Cleaning Remind Board and it's activated when:

1. ON steady with machine in OFF mode
Condensing temperature is higher then 70°C or 158°F. (air cooled version)
2. Blinking twice and repeat with machine in OFF mode
Condenser sensor out of order.
3. ON steady with machine in ON mode
Condenser air filter needs to be cleaned.
4. Slow blinking with machine in ON mode.
Water system needs to be cleaned.

In the first case the machine can be Re-Set by pushing and holding the Red Alarm Re-Set Button for 5 seconds till the Red Light is OFF.

In the second case, first replace the condenser sensor then, push and hold the Red Re-Set Button for 5 seconds.

Cleaning Reminder PC Board

Located on the front left side of the machine, it works in conjunction with the condenser sensor and the Red Alarm Re-Set Push Button.

It consists of

- Printed Circuit Board with a step down transformer (115V - 12V)
- Relay
- Dip Switch with two keys
- Jumper for the set up of the Cut OFF/Alarm condensing temperature (70oC 158oF.- jumper OUT - for air cooled)
- green four wire connector for power IN and OUT

- Red socket for the Water Level Sensor (future use)
- Black socket for the Condenser Sensor and
- White socket for the Red Alarm Re-Set Push Button

The main function of this PC Board is to switch the machine OFF when the condensing temperature is too high or signal the need for cleaning the condenser air filter or the water system. The time between the signal for the cleaning of the water system can be modified according to the setting of the two Dip Switches as below:

Time	1	2
1 Month	On	On
3 Months	Off	On
6 Months	On	Off
1 Year	Off	Off

Once the water system has been cleaned, push and hold the Red Alarm Re-Set Button for more then 20 seconds until it starts to blink. That will reset the control.

Condenser Air Filter

It is located in front of the air cooled condenser. It can be removed by pulling it through the opening in the front panel for cleaning or replacing. A lower plastic guide, installed inside the unit, is used for the correct sliding and location of the air filter.

Condenser Sensor

The condenser temperature sensor probe, located within the condenser fins detects the condenser temperature variations and signals them by supplying current, at low voltage, to the P.C. BOARD.

In case the condenser temperature rises and reaches 70°C (160°F) – the control system will cause an immediate and total stop of the machine's operation.

Service Diagnosis

SYMPTOM	POSSIBLE CAUSE	SUGGESTED CORRECTION
Unit will not run	Blown fuse	Replace fuse & check for cause of blown fuse.
	Main switch in OFF position	Turn switch to ON position
	Bin thermostat set improperly	Adjust rotating its setting screw
	Loose electrical connections	Check wiring
Red Alarm light ON	Too Hi Condensing Temperature	Reset the machine (Push & hold the Reset Button for 5 seconds) and check for reason why
Red Alarm light Blinking Twice	Condenser sensor out of order	Replace it and repeat
Compressor cycles intermittently	Low voltage	Check circuit for overloading
		Check voltage at the supply to the building. If low, contact the power company
	Non-condensable gas in system	Purge the system
	Dirty condenser	Clean with vacuum cleaner, air or stiff brush. (DO NOT use wire brush).
	Air circulation blocked	Allow sufficient air space all around unit.
Compressor starting device loose wires	Check for loose wires in starting device.	
Cubes too small	Cube size control set improperly	Check and adjust for proper operation.
	Capillary tube partially restricted	Recover charge, add new gas & drier, after evacuating system with vacuum pump.
	Moisture in the system	Same as above.
	Shortage of water	See remedies for shortage of water.
	Shortage of refrigerant	Check for leaks & recharge.
Cloudy cubes	Shortage of water	See remedies for shortage of water.
	Dirty water supply	Use water softener or water filter.
	Accumulated impurities	Use SCOTSMAN Ice Machine scale remover.
Shortage of water.	Water spilling out through curtain	Check or replace curtain.
	Water solenoid valve not opening	Replace valve.
	Water leak in sump area	Locate and repair.
	Water flow control plugged	Remove and clean.

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Service Diagnosis

SYMPTOM	POSSIBLE CAUSE	SUGGESTED CORRECTION
Irregular cubes size & some cloudy	Some jets plugged	Remove jet cover and clean.
	Shortage of water	See shortage of water.
	Unit not leveled	Level as required.
	Poor pumping	Check and/or replace the water pump.
Cubes too large	Cube size control set improperly	Check and adjust for proper operation.
Decreased ice capacity	Inefficient compressor	Replace.
	Leaky water valve	Repair or replace.
	Non-condensable gas in system	Purge the system.
	Poor air circulation or excessive hot location	Relocate the unit or provide for more ventilation.
	Overcharge of refrigerant	Correct the charge.
	Capillary tube partially restricted	Recover charge, add new gas & drier, after evacuating system with vacuum pump.
	Undercharge of refrigerant	Charge to data plate indication.
	Discharge head pressure too high	See incorrect discharge pressure.
	Clogged air filter	Clean or replace.
Poor harvest	Restriction in incoming water line	Check water valve strainer and flow control. If necessary enlarge the flow control orifice.
	Too short defrost time	Check temperature control. Replace if necessary.
	Cube size control set for too large	Re-set cube size control.
	Water inlet valve not opening	Valve coil with open winding. Replace valve.
	Hot gas valve orifice restricted	Replace hot gas valve assy.
	Air vented holes in mold cups plugged	Clean out holes.
	Discharge head pressure too low	See incorrect discharge pressure
Unit won't harvest	Inoperative cube size control	Replace cube size control
	Hot gas valve not opening	Valve coil with open winding. Replace valve.
	Water solenoid valve not opening	Valve coil with open winding. Replace valve.
Incorrect discharge pressure	Dirty air filter	Clean or replace.
	Inoperative hi press control	Replace.
Excessive water in unit base	Water tubing leaking Check.	Tighten or replace.

Maintenance And Cleaning Instructions

GENERAL

The periods and the 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 and ambient conditions and the ice volume produced; and, each ice machine must be maintained individually, in accordance with its particular location requirements.

Ice Machine

The following maintenance should be scheduled at least two times per year on these ice machines.

1. Check and/or replace the water filter (if used).
2. Check that the ice machine is leveled in side to side and in front to rear directions.
3. 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.
4. Check size, condition and texture of ice cubes. Perform adjustment of cube size control as required.
5. Check the bin thermostat to test shut-off.

Put a scoop full of ice cubes in contact with the bin thermostat bulb for at least one minute.

This should cause the ice maker to shut off. Within few seconds after the removal of the ice from bin thermostat bulb, the ice machine restarts.

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

6. Check for refrigerant leaks.

NOTE. Standard equipped with an air condenser filter as well as a Cleaning Reminder Board to remind to the end user the need for the cleaning of the air filter or of the water system (Red Alarm Light ON Steady or Blinking respectively with machine in operation).

Clean - Replace Of Air Condenser Filter

1. Withdraw the air filter from the front through the opening of the front panel.
2. Remove the front panel.
3. Blow pressurized air on the opposite direction of the condenser air flow so to remove the dust accumulated. If pressurized air is not available, use tap water always in the counter flow air direction. Once cleaned shake it so to remove most of the accumulated water, then dry it using an hair dryer.

NOTE. In case the air filter strainer is damaged replace it with a new one.

4. Return the front panel to its normal position.
5. Install filter by pushing it through the front panel opening.

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Cleaning Water System

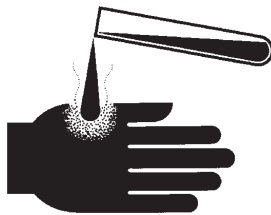
1. Remove the ice from the bin.
2. Remove the air filter and then the front panel.
3. Rotate control knob counter clockwise to the Off position.
4. Turn off the water supply to the ice machine.
5. Remove top panel.
6. Remove plastic panel (evaporator cover) that covers evaporator section.
7. Remove clamp and drain cap from the bottom of the reservoir, allow all the water to drain out.



Remove Drain Cap

8. Return the drain cap and clamp to their original positions.
9. Mix approximately 3 ounces (1/10 liter) of Scotsman Clear 1 Scale Remover with 1.5 quarts (1.5 liter) of warm (95-115°F.) potable water, and pour this solution over the evaporator section (bright metal tubing and inverted cups in white plastic tray at the top of the ice machine).

CAUTION



Ice machine cleaner contains acids. Acids can cause burns. If concentrated cleaner comes in contact with skin, flush with water. If swallowed, do NOT induce vomiting. Give large amounts of water or milk. Call Physician immediately. Keep out of the reach of children.

10. Return the evaporator cover removed in step 6 to its normal position.
11. Rotate the control knob to the Normal position.



Pour Scale Remover Over The Evaporator Section

12. Operate the machine with the cleaning toggle switch in the Operation position for 5 minutes.
 13. Switch the cleaning toggle switch to the Cleaning position and operate the machine for 1 minute.
 14. Repeat steps 12 and 13 three times. After the third time rotate the control knob counter clockwise to the Off position.
 15. Remove evaporator cover. Pour hot water over the entire surface of the evaporator section. Return evaporator cover to its original position.
 16. Pour hot water into the bin to melt any ice produced during cleaning, and to clean out the drain. Wipe the interior of the bin with mild soap and hot water, rinse with cold water.
- To sanitize, mix a locally approved sanitizer solution and perform steps 17-31. A possible sanitizer solution may be obtained by mixing 1 ounce of household bleach with 2 gallons of warm (95-115°F) water.
17. Remove plastic panel (evaporator cover) that covers evaporator section.
 18. Remove clamp and drain cap from the bottom of the reservoir, allow all the water to drain out.
 19. Return the drain cap and clamp to their original positions.
 20. Pour sanitizer solution over the evaporator section (bright metal tubing and inverted cups in white plastic tray at the top of the ice machine).
 21. Spray or wash the bottom of the evaporator cover and the edges of the evaporator section with the sanitizing solution.

22. Return the evaporator cover removed in step 17 to its normal position.
23. Rotate the control knob to the Normal position.
24. Operate the machine with the cleaning toggle switch in the Operation position for 4 minutes.
25. Switch the cleaning toggle switch to the Cleaning position and operate the machine for 1 minute.
26. Repeat steps 23 and 24 five times. After the fifth time rotate the control knob counter clockwise to the Off position.
27. Remove evaporator cover. Pour sanitizer solution over the entire surface of the evaporator section and wash or spray the evaporator cover bottom with sanitizer. Return evaporator cover to its original position.
28. Remove curtain, remove clamp and drain cap from the bottom of the reservoir, allow all the water to drain out. Return the drain cap and clamp to their original positions.

29. Thoroughly spray or wipe the interior of the ice storage bin, bottom of the evaporator cover and the spray platform with the sanitizing solution.
30. Completely immerse the curtain in the sanitizing solution.
31. Return the evaporator cover and curtain to their original positions.
32. Reconnect water supply.
33. Rotate control knob to its original position. Switch the cleaning toggle switch to the Cleaning position for two minutes and then switch it to the Operation position. Operate the machine until one batch of ice has been released into the bin. Pour warm water over the ice to melt it.
34. Return the front panel to its original position and secure with the original screws.



Remove Thumb Screw Holding Curtain



Remove Curtain



SCOTSMAN ICE SYSTEMS

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17-3188-01