

ROSS-TEMP

Service Manual

RCU-404-UF

MODULAR

CUBED

ICE MAKERS

INTRODUCTION

We have strived to produce a quality product. The design has been kept simple, thus insuring trouble-free operation.

This manual has been prepared to assist servicemen and users with information concerning installation, construction and maintenance of the ice making equipment. The problems of the serviceman and user have been given special attention in the development and engineering of our icemakers.

If you encounter a problem which is not covered in this manual, please feel free to write or call. We will be happy to assist you in any way we can.

When writing, please state the model and serial number of the machine.

Address all correspondence to:

ROSS-TEMP SERVICE DEPARTMENT
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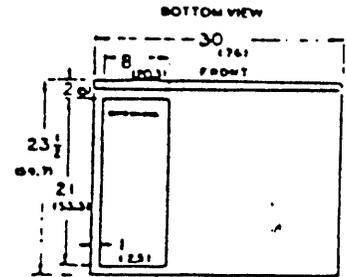
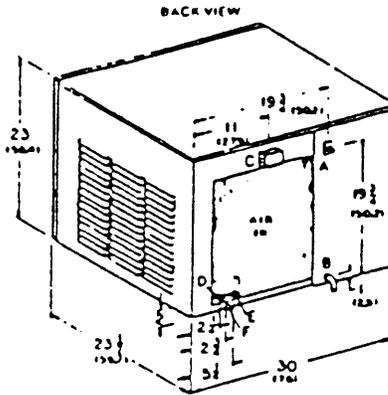
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Specifications

- A WATER INLET
- B DRAIN
- C ELECTRICAL CONNECTION
- D CONDENSER (WATER OUT) (W/C ONLY)
- E CONDENSER (WATER IN) (W/C ONLY)
- F CONDENSATE DRAIN



METRIC DIMENSIONS
SHOWN IN PARENTHESES

COMPRESSOR ELECTRICAL RATING	3/4 H.P.
COMPRESSOR MODEL	Tecumseh AJ-7465A
CONDENSER	Air or water cooled
REFRIGERANT CHARGE	Air cooled - 23 oz. R-12
	Water cooled - 27 oz. R-12
REFRIGERATION CONTROL	TXV
TXV SUPERHEAT SETTING	6°
INLET WATER SUPPLY	3/8" SAE male flare
VOLTAGE	115V 60 hz. 1 ph.
TOTAL AMP DRAW	10.0

ICE PRODUCTION CAPACITY (approximate):				
Model Number (Condenser)	Ambient Temp °F	Incoming Water Temp °F		
		50°	70°	80°
RCV-404-UF (Air Cooled)	70°	460	400	380
	80°	430	390	360
	90°	400	370	330
RCV-404-UF-W (Water Cooled)	70°	500	450	400
	80°	495	445	395
	90°	490	440	390

INSTALLATION INSTRUCTIONS

A. UNPACKING

1. Uncrate machine and/or bin by removing the staples from around the bottom of cardboard crate and lift off.
2. Remove bolts fastening the crate skid to the bottom of the unit. If auxiliary legs have been purchased for the bin, they should be installed at this time.

B. LEVELING

If legs are used, adjust the leveling legs of the storage bin until the unit is level and all four (4) legs are in solid contact with the floor. Leveling is very important to obtain proper draining and to maintain the proper level in the water pan of the ice cuber.

NOTE: If the bin is to be installed flush to the floor, the machine must be sealed to the floor with an approved mastic such as Sears #3803-0 Caulk, Dow R.T.V. 101, 102 or G. E. 731, 732. This is an N.S.F. requirement and is the responsibility of the installer.

C. UNIT LOCATION

1. Allow at least a minimum of six (6) inches at the rear and side of the ice machine for proper air circulation.
2. This unit has been designed to be installed in an indoor location which is clean and which can be adequately ventilated; the air and water temperatures should never exceed 100 degrees nor fall below 50 degrees. (Temperatures above 100 degrees will cut the ice making capacity below an economical level; temperatures below 50 degrees will cause a malfunction of thermostatic sensors.
3. The unit should be located where air circulation is not restricted. The unit should not be located near a kitchen grill. Air which contains grease vapors will deposit grease on the condenser. The condenser should always be kept clean.

D. UNIT SET-UP

1. Take off front panel of machine and remove hardware bag or service manual envelope with the water strainer enclosed.
2. Mount the ice maker to the top of the ice storage bin or adapter in the proper position over the ice drop opening. The ice maker must then be sealed both on the outside and the inside bottom edges with an approved N.S.F. mastic such as Dow Silastic #732, 734 or General Electric RTV #101, 102. This is an N.S.F. requirement and the responsibility of the installer.
3. Remove shipping tape from evaporator curtains.

INSTALLATION INSTRUCTIONS CONT'D.

E. REMOTE CONDENSERS

Not applicable

F. MAKE ELECTRICAL POWER SUPPLY CONNECTION

Requirements: 115V /60hz. 1 ph. or 220V 50hz. 1 ph. when used

REFER TO SERIAL PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM TIME DELAY FUSE SIZE.

ALL WIRING MUST CONFORM TO NATIONAL AND LOCAL ELECTRICAL CODES.

G. MAKE PLUMBING CONNECTIONS

Water supply - (Install per local codes)

The water inlet connection to the unit is a 3/8" flare male connections located at the rear of the ice machine.

NOTE: If the water pressure exceeds 50 pounds, a water pressure regulator should be installed in the water inlet line between the water shut-off valve and the strainer.

Install a reducer fitting on the shut-off valve to accommodate the water strainer, which is supplied with each ice machine and MUST be used. Install the water strainer with the arrow in the proper direction of flow and with the clean out plug down. This is very important for cleaning. Connect either 3/8" or 1/2" copper tubing between the water inlet fitting of the ice machine and the water strainer.

For water cooled units, two water inlet connections are provided; one for the ice making (evaporator) section which is located on the back of the machine and is a 3/8" flared connection. The other is for the water cooled condenser. The reason for the separate water inlet connections is that some installations use a water tower for cooling the water used in the water-cooled condenser and some installations use treated water (filtered) for the ice making inlet water connection. Be sure to install water line (incoming) to the 3/8" male flare connection on the back of the unit that supplies water to the water regulating valve inside.

The setting of the water regulating valve from the factory should be 120 pounds for R-12 units and 250 pounds for R-502 units. NOTE: Always flush out water lines before starting unit. Adjustments, if necessary, should be done at installation.

H. DRAINS

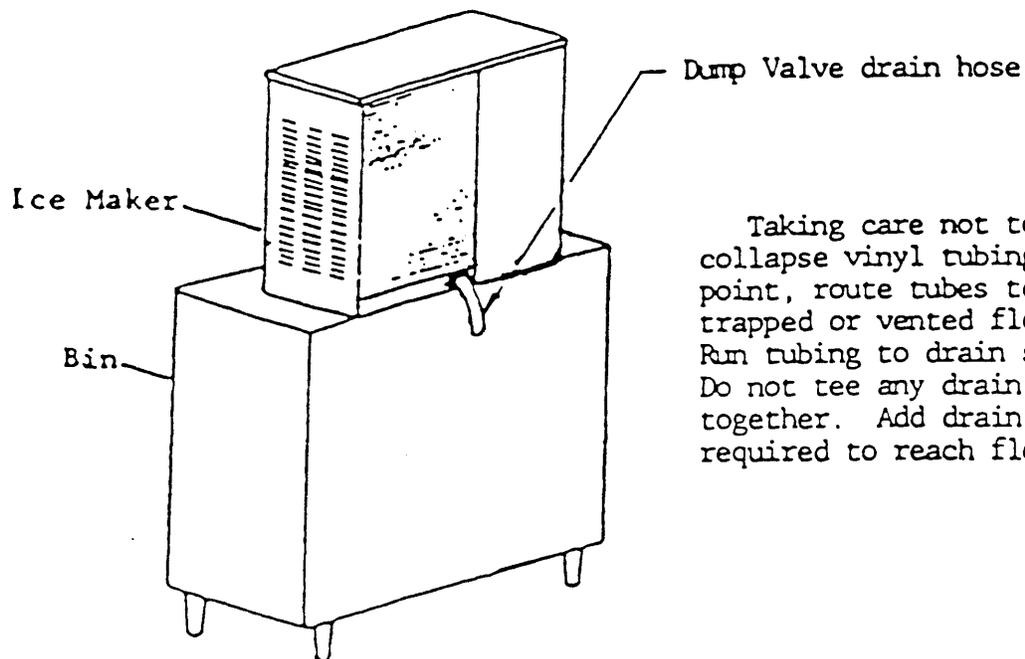
Provide a suitable trapped open drain as close as possible to the area where the ice maker is going to be installed. This may be an existing floor or a 1-1/4" trapped open drain. Two separate drain lines are required for air cooled units, one for the storage bin and one for the Dump Valve drain hose.

An additional separate drain line will be required for water cooled units from the outlet of the condenser coil to the drain. Run all gravity drain lines with a good fall to the open drain.

ALL PLUMBING MUST BE INSTALLED IN ACCORDANCE WITH LOCAL CODES.

NOTE: IN SOME CASES IT MAY BE NECESSARY TO INSULATE THE WATER SUPPLY LINE AND DRAIN LINE. CONDENSATE DRIPPING TO THE FLOOR CAN CAUSE SERIOUS STAINING OF CARPETS OR HARDWOODS.

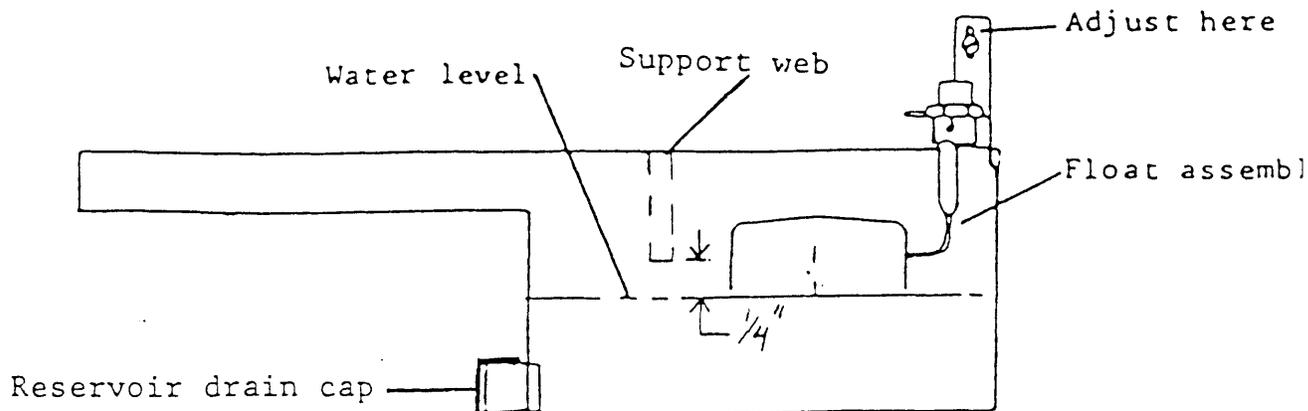
DRAIN CONNECTION INSTALLATION INSTRUCTIONS



Taking care not to kink or collapse vinyl tubing at any point, route tubes to any open, trapped or vented floor drain. Run tubing to drain separately. Do not tee any drain hoses together. Add drain tubing required to reach floor drain.

I. ADJUSTMENT OF WATER LEVEL IN RESERVOIR

With the water supply turned ON and the power supply OFF, adjust float to maintain water level $\frac{1}{2}$ " below the support web inside reservoir
(See Illustration Below)



WARNING: Ice Maker will not operate properly when water supply temperature is below 50°F or above 100°F. Water supply pressure must not exceed 50 PSI.

J. STARTING THE UNIT

After the ice cuber has been unpacked and leveled and all plumbing and electrical connections have been made, start the unit and check for proper operation.

A cuber has three separate circuits:

- A. The water circuit
- B. The refrigerant circuit
- C. The electrical circuit

1. Start checking the water circuit by making sure that there are no thread or flare joint leaks, either outside the unit or in the compressor section. Next check the water flow over the evaporator and make sure that all holes in the water distributor are open, and that there is no undue splash, or loss of water into the ice bin.

Also check to see if the float valve is functioning properly and the correct water level is being maintained. Re-adjust if necessary.

2. Check the refrigerant circuit by making sure that the condenser fan is running. (This will be evident by air noise.) Is the compressor running? (Feel the casing for vibration.) Is the evaporator getting cold?
3. Check bin-harvest switch operation. (See procedure in manual)

STACKING KIT INSTALLATION INSTRUCTIONS

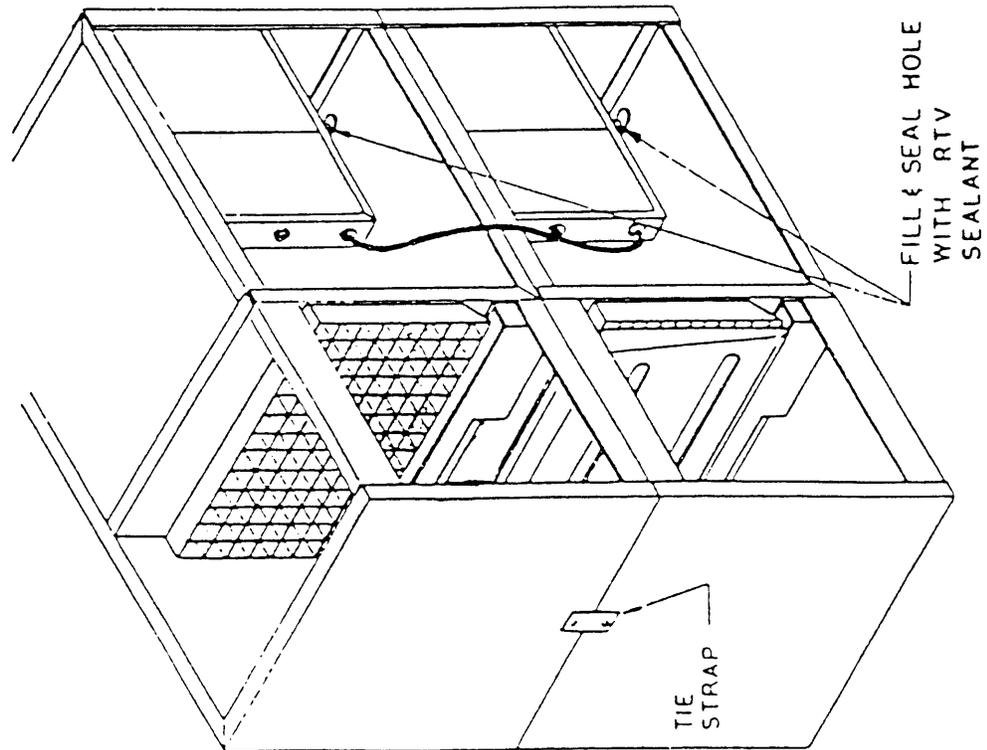
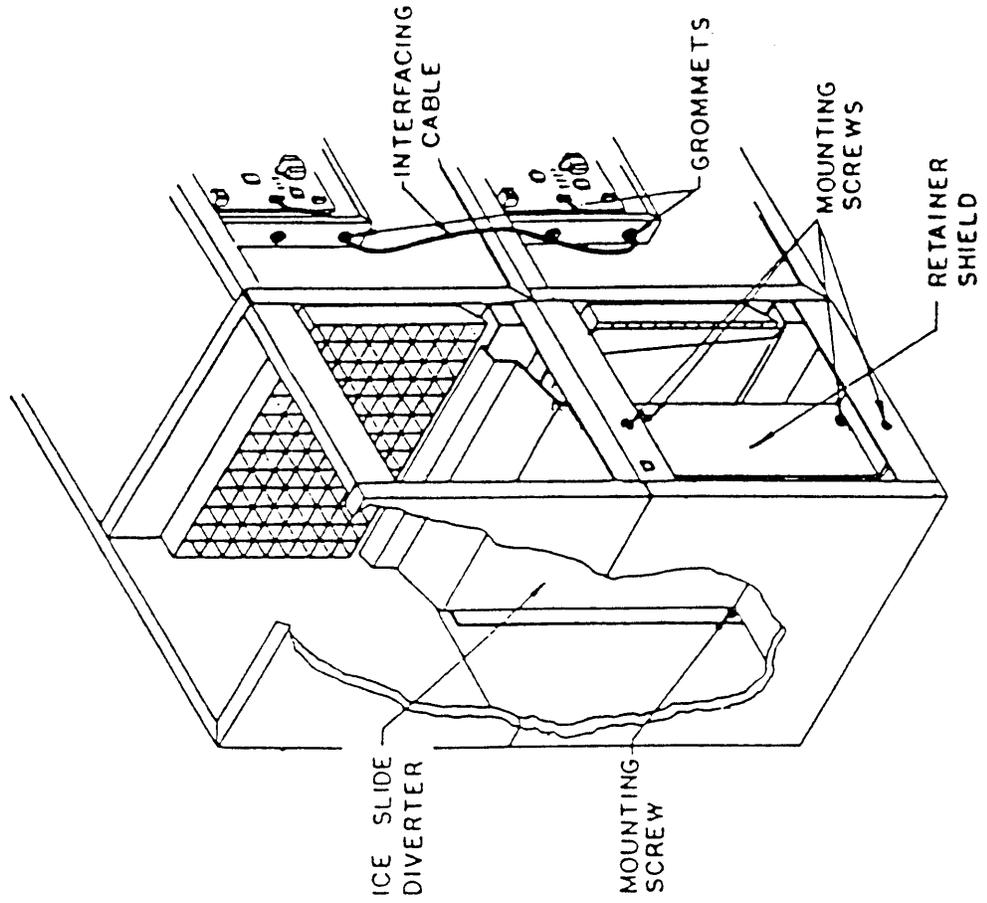
- 5 - #857 screw 8/32 x 3/8
- 2 - #39449 tie strap

- 1 - #39450 ice slide diverter
- 1 - #39454 retainer shield assembly
- 1 - #39379 interface cable

PLEASE SEE ILLUSTRATIONS FOR REFERENCE FOR THE FOLLOWING INSTALL PROCEDURE

1. After the bottom unit of the stack has been positioned on the bin, the sealing gasket supplied with second unit must be cemented to the base. Nearly any adhesive can be used, however it should not be water soluble. This is an N.S.F. requirement and the responsibility of the installer.
2. Remove the top and front panels from both units.
3. Mount the unit on top of the bottom one of the stack. (It is not recommended to stack more than one unit.)
4. Remove evaporator curtain cover.
5. N/A
6. Put the ice slide diverter through the top unit evaporator section and hook over the front edge of the top unit water reservoir.
7. Secure ice slide diverter to the back wall of the lower unit with a provided screw.
8. Insert the retainer shield from the front of the lower unit evaporator section and align the holes to the diverter and support bracket and secure with the screws provided.
9. Remove electrical box covers from both unit.
10. Remove lowest grommet from the left side of each electrical box .
11. Insert the interface cable through each hole and insert into the split grommets. Note, the cable will fall across the front of both machines with the front covering the cable.
12. Reinstall grommets into electrical box.
13. Plug the interface cable end into the open middle left socket on each solid state board being careful to make sure of a good connection.
14. Replace electrical box covers.
15. Plug the weld nut hole found to the right of the compressor with RTV sealant.
16. Remove the screws from both sides of both units and insert the tie straps. Reinstall screws.
17. When reinstalling the front panels, take care in the positioning of the interface cable.

STACKING KIT ILLUSTRATION



ELECTRICAL CIRCUIT SEQUENCE OF OPERATION

An L.E.D. digit display mounted on the solid state control board will show a status number 0,1,2,4, & 6 and a decimal point to indicate what is happening in the operation of the unit.

The electrical sequence of operation you will see on the digit display for a normal ice making cycle will be as follows:

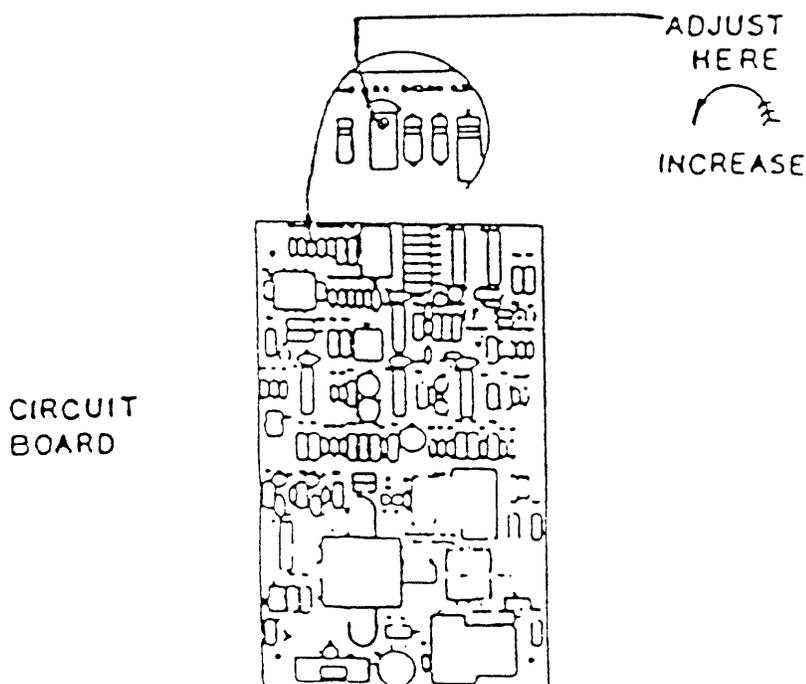
The status number 0 will be shown telling you the unit is making ice. The solid state control DELAYS the start of the water pump until the evaporator temperatures reaches 20° F. Approximately six minutes after the start up in the freeze cycle a decimal point will appear to the lower right of the "0" to tell you that the evaporator sensor has been switched on. After the evaporator temperature has pulled down low enough for the correct amount of ice to be on the evaporator, the decimal point will begin to flash and stay flashing for approximately 20 seconds. If evaporator stays below the set point, the harvest cycle will start. A number "1" on the digit display will indicate that the machine is in its harvest cycle with the hot gas valve open. The water pump continues to operate and the water dump solenoid valve is now open. The water pump shuts off approximately 15 seconds later after the water reservoir is pumped out.

PLEASE NOTE: During the freeze cycle in low ambient condition the condenser fan motor will be cycled on and off through the condenser sensor and solid state control board. The fan cycling pressures in relation to the temperatures sensed will be approximately 110# for cut out and 150# for cut in of the fan motor.

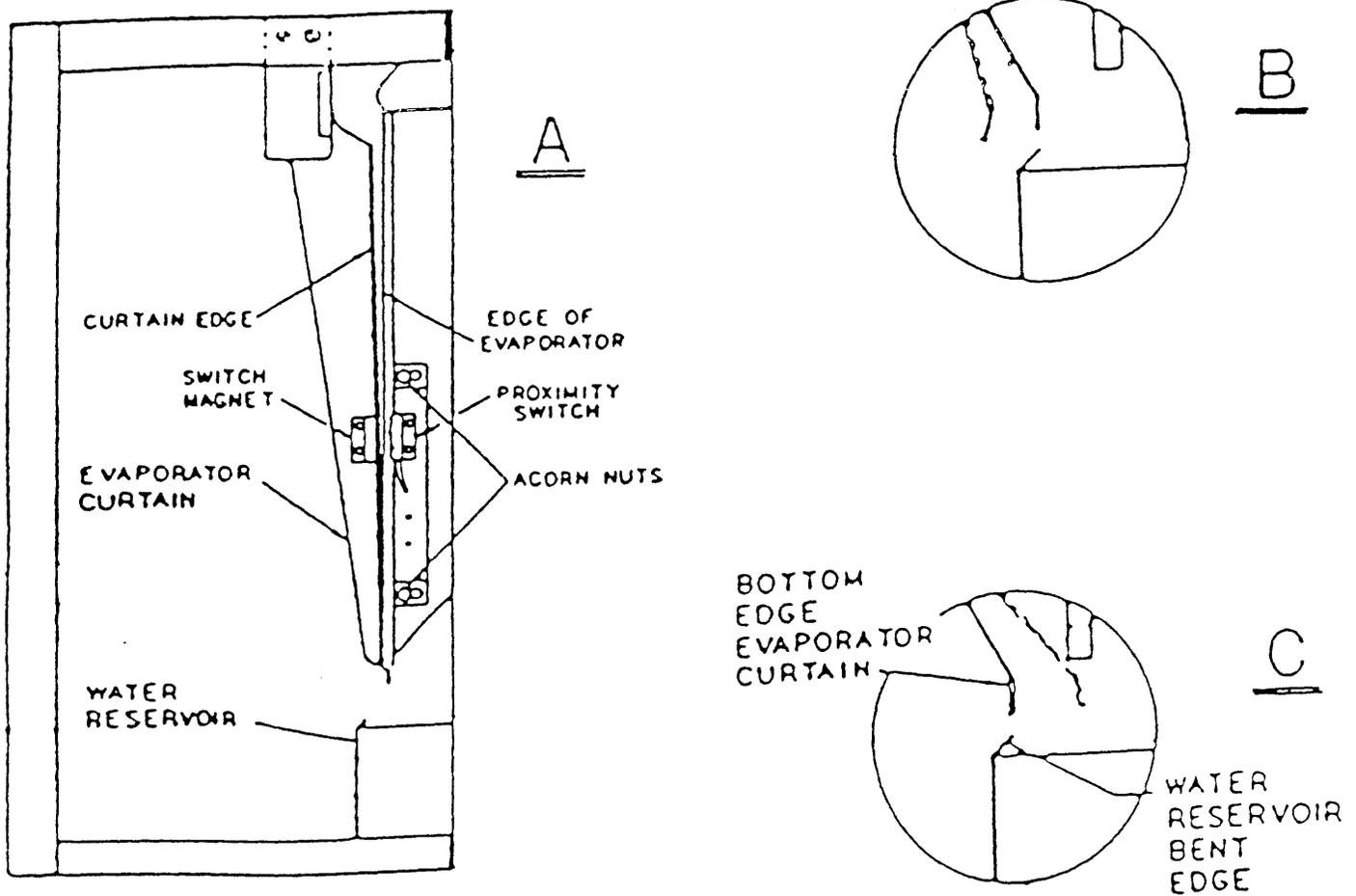
ADJUSTMENT FOR ICE BRIDGE THICKNESS

An ice bridge connecting all cubes is necessary for a proper harvest or discharge of cubes from the evaporator.

To increase ice "bridge" thickness carefully turn adjustment screw counter clockwise no more than one turn at a time. Wait and check thickness before re-adjusting.



ADJUSTMENT AND CHECK-OUT
FOR HARVEST - BIN SWITCHES



CHECKOUT PROCEUDRE

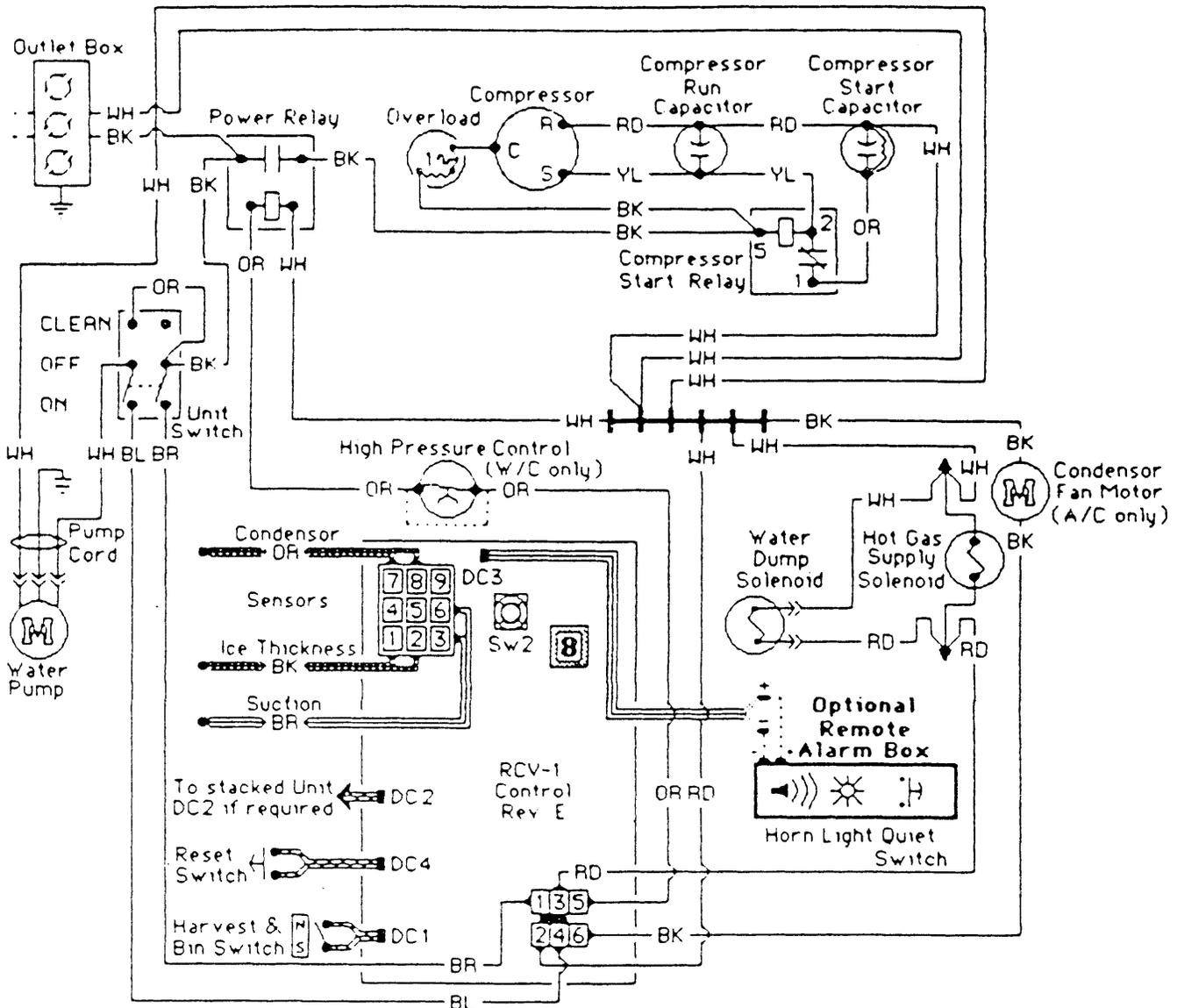
Turn on the ice machine and move the evaporator curtain(s) away from the evaporator(s). The ice machine should then shutoff in approximately 8 seconds. (See detail A&B)

Slowly let the evaporator curtain(s) move back toward the evaporator(s) until the bottom edge of the curtain(s) is at least at the bent edge of the water reservoir or closer to the evaporator. With the curtain(s) at that position, the machines should start. (See detail C)

ADJUSTMENT PROCEDURE

If adjustment is necessary, loosen acorn nuts and move proximity switch closer to the curtain(s) and make sure the curtain is properly mounted. (See detail A)

Re-check per above procedure.



RCU-404-UF & -W

115 VOLTS 60 HZ
Ross
 temp

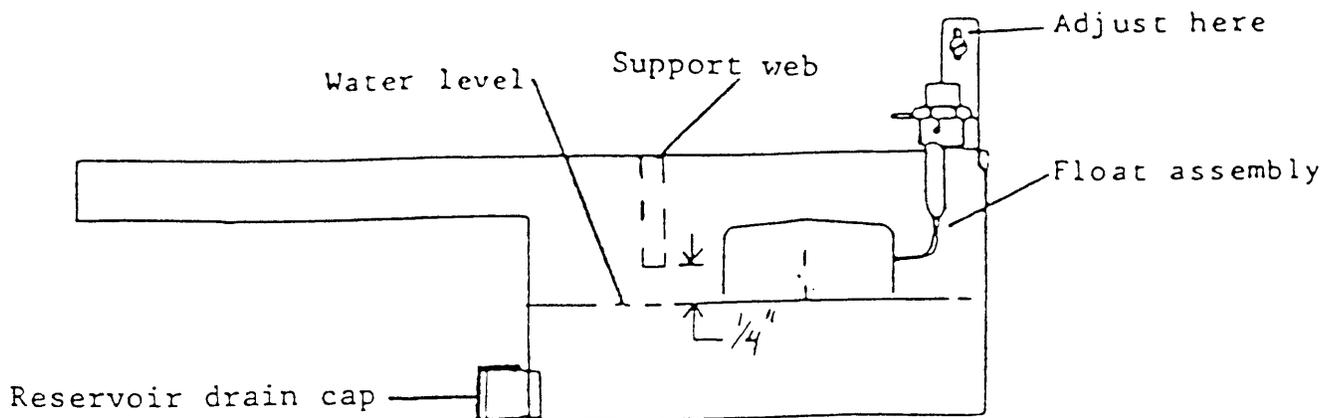
Note The solid state control *DELAYS* the start of the water pump until the evaporator temperature reaches 20° F.

IMPORTANT White and black connector blocks are "KEYED" and **MUST** be inserted correctly on circuit board. **DO NOT USE FORCE.**

PART NO. 41001
 ARTWORK NO. 50551
 REV. E

SANITIZING AND CLEANING PROCEDURE

1. Remove front panel to gain access to the on-off-clean switch.
2. Push switch to "clean" and allow the ice on the evaporator to release or melt away.
3. Remove all ice from storage bin.
4. Mix a sanitizing solution of 1/4 oz. "Calgon Ice Machine Sanitizer" to one gallon of water. Using a non-metallic bristle brush scrub the following:
 - a. Inside surfaces of ice bin including top and door.
 - b. Inside surfaces of the icemaker to include evaporator section in the ice machine including the top, front panel and evaporator splash curtain.
 - c. Make sure splash curtain is correctly positioned.
5. Add 2 oz. of "Calgon Nickel-Safe Ice Machine Cleaner" directly into water reservoir. Circulate for approximately 45 minutes.
6. Remove cap from reservoir drain and allow cleaner to drain away. Replace cap.
7. Fill reservoir with clean fresh water, circulate for approximately 1 minute. Remove cap from reservoir drain and allow water to drain away. Repeat three times.
8. Flush all waste water from ice storage bin with clean fresh water.
9. Push switch from "clean" to "on" position.
10. Replace front panel.



Automatic ice-making machines can quit working for any number of reasons, mechanical, electrical or faulty refrigeration, but water problems foul them up faster than almost anything else. While ice machines vary in design, you can apply these water treatment tips to all of them.

1. START WITH THE WATER

The mineral content of water varies in different areas and as the chart shows, high hardness and alkalinity counts combine to form insoluble calcium carbonate or lime scale. If this condition is constant, the intake water must be treated constantly to prevent scale formation in the ice machine.

2. PREVENT LIME SCALE FORMATION

We recommend the installation of a Calgon Micromet Feeder on the incoming water line. No. X-8B Feeder is recommended for ice machines with a capacity of 400-450 lbs. per day. Fill the feeder with 6R Micromet, the slowly soluble poly-phosphate which lasts six months before renewing the 8-oz. charge.

Constant treatment with 6R Micromet will control lime scale and prevent minerals from sticking to the freezing surfaces in ice machines. Result - smooth movement of ice slabs, good harvest of ice cubes, efficient, automatic production.

3. REMOVE OBJECTIONABLE TASTE OR ODOR

If the bad taste or odor is traceable to the water source, install a Calgon Fine Carbon Filter to the incoming water line. The No. 1-1/2B Fine Carbon Filter is ideal for machines making up to 500 pounds of ice per day and will remove bad taste, odors, and problems caused by chlorine in the water supply. In some instances, slime growths may cause odor problems and these growths can be removed by the use of liquid ice machine cleaner.

4. SERVICE REGULARLY

A service program to clean the ice machine at regular intervals and check on filter and feeder charges is important. In the long run, it will assure adequate water treatment, reduce emergency calls and aid in the trouble-free performance of automatic ice making machines.

W I N T E R S T O R A G E

If the unit is to be stored in an area where the temperature will drop below freezing, it is most important that all water lines be drained to prevent them from freezing and possible rupture.

To blow out the water line, disconnect the water supply at the cabinet inlet and use air pressure to force the water into the water reservoir pan. This can then be removed from the water pan.

C L E A N I N G T H E C O N D E N S E R

In order to produce at full capacity, the refrigeration condenser must be kept clean. The frequency of cleaning will be determined by surrounding condition. A good maintenance plan calls for an inspection at least every two months.

Remove the lower front panel of the machine. With a vacuum cleaner, remove all accumulated dust and lint that has adhered to the finned condenser.

CAUTION: CONDENSER COOLING FINS ARE SHARP. USE CARE WHEN CLEANING.

1. If the condenser is being cleaned from the back of the machine, remove all accumulated dust, dirt etc., that has adhered to the finned surface with a vacuum cleaner.
2. If the unit is being cleaned from the front, remove lower panel, turn the power switch off and blow through the finned surface of the condenser past the fan blade to remove accumulated dust, etc.

STATUS INDICATOR

<u>STATUS</u>	<u>EXPLANATION</u>	<u>POSSIBLE CAUSE</u>
0	Unit is in freeze cycle, making ice, no problems.	
1	Unit is in harvest cycle, ice should drop shortly, no problems.	
2	Indicates a full bin condition, unit off, water curtain being held open with ice.	If "2" is shown but bin isn't full, check for individual cube holding curtain open. Harvest Bin switch not adjusted properly.
4	Unit <u>OFF</u> due to suction line not pulling down to at least 40°F. Manual reset required.	Low on refrigerant. Defective TXV. Compressor defective or inefficient. Defective power relay, won't close. Defective start relay, won't start compressor. Low voltage to compressor no start. Defective C.P.R. valve. Defective sensor (brown wire). <u>SENSOR NOT INSULATED PROPERLY.</u>
6	Unit is <u>OFF</u> due to condenser temperature climbing too high. Manual reset required.	Dirty condenser. Defective fan motor blade.* Gross overcharge. Extremely high ambient temperature, above 120°F. Defective sensor (orange wire).**
Decimal Point OFF	Indicates that all sensors, except condenser, are switched off for first six minutes of freeze cycle.	Normal time delay, approximately 6 minutes.
Decimal Point ON	Indicates that evaporator and suction line sensors have switched "ON".	
Decimal Point FLASHING	Indicates evaporator temperature has pulled down and unit will go into harvest after time delay.	Normal time delay of approximately 20 seconds before harvest cycle begins.

FOR MANUAL RESET - PUSH MASTER SWITCH TO "OFF" - WAIT 10 SECONDS - PUSH TO "ON"
OR PUSH RESET BUTTON

Not applicable to Water-Cooled units.

** Not applicable to Remote units.

TROUBLE SHOOTING THE SOLID STATE

CONTROL BOARD

To determine if the circuit board and sensors are functioning correctly under all operating parameters, the adverse conditions must be simulated to check out the digital display status numbers.

PROCEDURE

- To check #6 - Block condenser fan blade on start up. Condenser should get hot within two minutes and shut unit off on #6, condenser too hot.
- To check #4 - Remove suction line sensor from thermowell anytime during freeze cycle. Machine should shut off on #4, suction line too warm when the evaporator temperature gets low enough to start the harvest cycle.
- To check #2 - Hold water curtain open anytime after unit goes into harvest. Machine should shut down within approximately 8 seconds on #2, full bin.
- To check #1 - Push defrost button anytime during freeze cycle and unit should go into harvest. #1 indicates a harvest cycle, no problems.
- To check #0 - A "0" indicates that the unit is in the freeze cycle and there are no problems.

PLEASE NOTE: In rare cases a "0" can be displayed on the control board and the compressor not running in water cooled and remote air cooled machines. If this occurs, the manual reset high pressure control will be open and must be reset for proper operation. The control is located in the upper rear, right corner of the compressor compartment.

After reset, check out the machine for the possible causes of the problem.

TROUBLESHOOTING THE SENSORS

1. Turn off power to machine.
2. Remove the front panel and electrical box cover of the machine.
3. Cut the suspected sensor wire at least six inches from the thermowell in which it is located.
4. Remove the sensor from the thermowell.
5. Carefully separate the wires and strip the insulation off the end.
6. Pack a glass or container with ice and add some water to make an ice-water solution. Check the temperature of the ice water with an accurate thermometer. Ice water must be 32⁰ F.
7. Insert the sensor into the ice water and soak for a minimum of two minutes.
8. With a zerod ohmmeter measure the resistance across the two wires of the sensor lead. It should read 2815 ohms + or -10% (281 ohms).

NOTE: If the above ohm reading is not within the range stated, the sensor is bad and should be replaced.

RECONNECTION OF A GOOD OR REPLACEMENT SENSOR AFTER TROUBLESHOOTING

1. Carefully separate the wires of the sensor leads coming from the solid state control and strip the insulation off the end of each wire.
2. Reconnect the sensor leads and twist the stripped ends tightly. Secure with the proper sized wire nuts.
3. Tape all the wire nut connections to insulate connections from each other.

REMOVAL OF SOLID STATE CONTROL FROM MACHINE

CAUTION: THE CIRCUIT BOARD IS FRAGILE, HANDLE WITH CARE.

1. Turn off power to machine.
2. Remove front panel.
3. Remove electrical box left front cover.
4. Disconnect the through wire plug connections from circuit board.
5. Carefully lift any corner of the circuit board while pinching closed the top part of the plastic "stand off" support with needle nose pliers. The circuit board has to be gradually worked up over all five of the "stand off" supports. The circuit board will not "pop off" until all supports have been pinched closed and the board is then holding them in that position.

REINSTALLATION OF SOLID STATE CONTROL

1. Align all holes in the circuit board over the plastic stand-off supports.
2. Carefully push downward at all hole locations until board seats on all the stand-off supports. (Sometimes a snap will be heard as this seating takes place.)
3. After the circuit board is seated, carefully connect the three plugs to the circuit board. Note: Plug connects are polarized, make sure the plug is inserted correctly.

PARTS LIST

<u>ILLUS.</u> <u>NO.</u>	<u>DESCRIPTION</u>	<u>PART NO.</u> <u>RCV-404</u>
1	Control, circuit board	40974
2	Switch, on-off-clean	23836
3	Relay, compressor start	21547
4	Relay, power	40980
5	Capacitor, compressor start	21544
6	Capacitor, compressor run	28632
7	Drier	21850
8	N/A	N/A
9	Valve, Schrader	20654
	Core, Schrader valve	21214
	Cap, Schrader valve	23988
10	Compressor	22620
11	Motor, condenser fan	25242
12	Blade, condenser fan	23527
13	N/A	N/A
14	Condenser	25266
15	Sensor, condenser temp.	38703
16	Pump, water	41011
17	Valve, thermostatic expansion	41415
18	Sensor, suction line temp.	38703
19	Valve, hot gas	9214
20	Tube, water pan to pump inlet	38790
21	Cap, reservoir drain	45681
22	Reservoir, water	41448
23	Float and valve	21924
24	Bracket, float & valve	45922
25	Hose, pump	45680
26	Tee	987
27	Hose :	43412
28	Orifice, restrictor	29784
29	Evaporator	45905
30	End cap	22279
31	Distributor, water	43056
32	Cover, evaporator	45907
33	Bracket, front cover mount	43530
34	Condenser coil, water cooled	22429
35	Valve, water regulating	1211
36	Bracket, back cover mount	38743
37	Valve, water dump solenoid	42297
38	Switch, harvest-bin proximity	43446
39	N/A	N/A
40	N/A	N/A
41	N/A	N/A
42	N/A	N/A
43	N/A	N/A
44	N/A	N/A
45	N/A	N/A
46	N/A	N/A
47	N/A	N/A
48	N/A	N/A
49	Control, high pressure (water cooled)	7024
50	Sensor, evaporator	38703
51	Switch, reset	42680
52	Splash guard	41464

ILLUSTRATED PARTS BREAKDOWN

