Hoshizaki America, Inc.

Self-Contained Crescent Cuber

Models
KM-255BAH
KM-255BWH

"A Superior Degree of Reliability"

www.hoshizaki.com

SERVICE MANUAL

Number: 73146
Issued: 1-2-2007

IMPORTANT

Only qualified service technicians should attempt to install, service or maintain this icemaker. No installation, service or maintenance should be undertaken until the technician has thoroughly read this Service Manual.

HOSHIZAKI provides this manual primarily to assist qualified service technicians in the service and maintenance of the icemaker.

Should the reader have any questions or concerns which have not been satisfactorily addressed, please call, write or send an e-mail message to the HOSHIZAKI Technical Support Department.

HOSHIZAKI AMERICA, INC.
618 Highway 74 South
Peachtree City, GA 30269

Attn: HOSHIZAKI Technical Support Department

Phone: 1-800-233-1940 Technical Service
(770) 487-2331
Fax: 1-800-843-1056
(770) 487-3360
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Web Site: www.hoshizaki.com

NOTE: To expedite assistance, all correspondence/communication MUST include the following information:

- Model Number
- Serial Number
- Complete and detailed explanation of the problem

Please review this manual. It should be read carefully before the icemaker is serviced or maintenance operations are performed. Only qualified service technicians should service and maintain the icemaker. This manual should be made available to the technician prior to service or maintenance.

CONTENTS

I. Specifications

A. Icemaker

1. KM-255BAH (air-cooled)

AC SUPPLY VOLTAGE	115/60/1			
AMPERAGE	9 A (5 Min. Freeze AT 104°F / WT 80°F)			
MINIMUM CIRCUIT AMPACITY	N/A			
MAXIMUM FUSE SIZE	N/A			
APPROXIMATE ICE PRODUCTION PER 24 HR. lbs./day (kg/day) Reference without *marks	Ambient Temp.(°F)	WATER TEMP. (°F) 50	70	90
	70	* 235 (107)	227 (103)	207 (94)
	80	229 (104)	216 (98)	191 (87)
	90	227 (103)	* 207 (94)	184 (83)
	100	211 (96)	202 (91)	163 (74)
SHAPE OF ICE	Crescent Cube			
ICE PRODUCTION PER CYCLE	4 lbs. (1.8 kg) 204 pcs.			
APPROXIMATE STORAGE CAPACITY	120 lbs.			
ELECTRIC & WATER CONSUMPTION	90/70°F		70/50°F	
ELECTRIC W (kWH/100 lbs.)	828 (9.6)		744 (7.6)	
WATER gal./24HR (gal./100 lbs.)	51 (24.7)		82 (35.0)	
EXTERIOR DIMENSIONS (WxDxH)	30" x 28" x 39" (762 x 711 x 990 mm) Includes 6" leg			
EXTERIOR FINISH	Stainless steel; Galvanized steel (rear)			
WEIGHT	Net 203 lbs. (92 kg), Shipping 220 lbs. (100 kg)			
CONNECTIONS - ELECTRIC	Cord Connection			
- WATER SUPPLY	Inlet 1/2" FPT			
- DRAIN	Outlet 3/4" FPT			
CUBE CONTROL SYSTEM	N/A (Internal programming)			
HARVESTING CONTROL SYSTEM	Hot Gas and Water, Thermistor and Timer			
ICE MAKING WATER CONTROL	Timer Controlled. Overflow Pipe			
COOLING WATER CONTROL	N/A			
BIN CONTROL SYSTEM	Mechanical Level Switch and Timer			
COMPRESSOR	Hermetic, Model SC12MLX			
CONDENSER	Air cooled, Fin and Tube type			
EVAPORATOR	Vertical type, Stainless Steel and Copper			
REFRIGERANT CONTROL	Thermostatic Expansion Valve			
REFRIGERANT CHARGE	R-404A, 1 lb. 1 oz. (475 g)			
DESIGN PRESSURE	High 467 PSIG, Low 240 PSIG			
P.C. BOARD CIRCUIT PROTECTION	High Voltage Cut-out (Internal)			
COMPRESSOR PROTECTION	Auto-reset Overload Protector (Internal)			
REFRIGERANT CIRCUIT PROTECTION	Auto-reset High Pressure Control Switch			
LOW WATER PROTECTION	Float Switch			
ACCESSORIES -SUPPLIED	Ice Scoop; 6" Leg, 4 pcs.			
-REQUIRED	N/A			
OPERATING CONDITIONS	VOLTAGE RANGE			104 - 127 V
	AMBIENT TEMP.			45 - 100° F
	WATER SUPPLY TEMP.			45 - 90° F
	WATER SUPPLY PRESSURE			10 - 113 PSIG

Note: We reserve the right to make changes in specifications and design without prior notice.

2. KM-255BWH (water-cooled)

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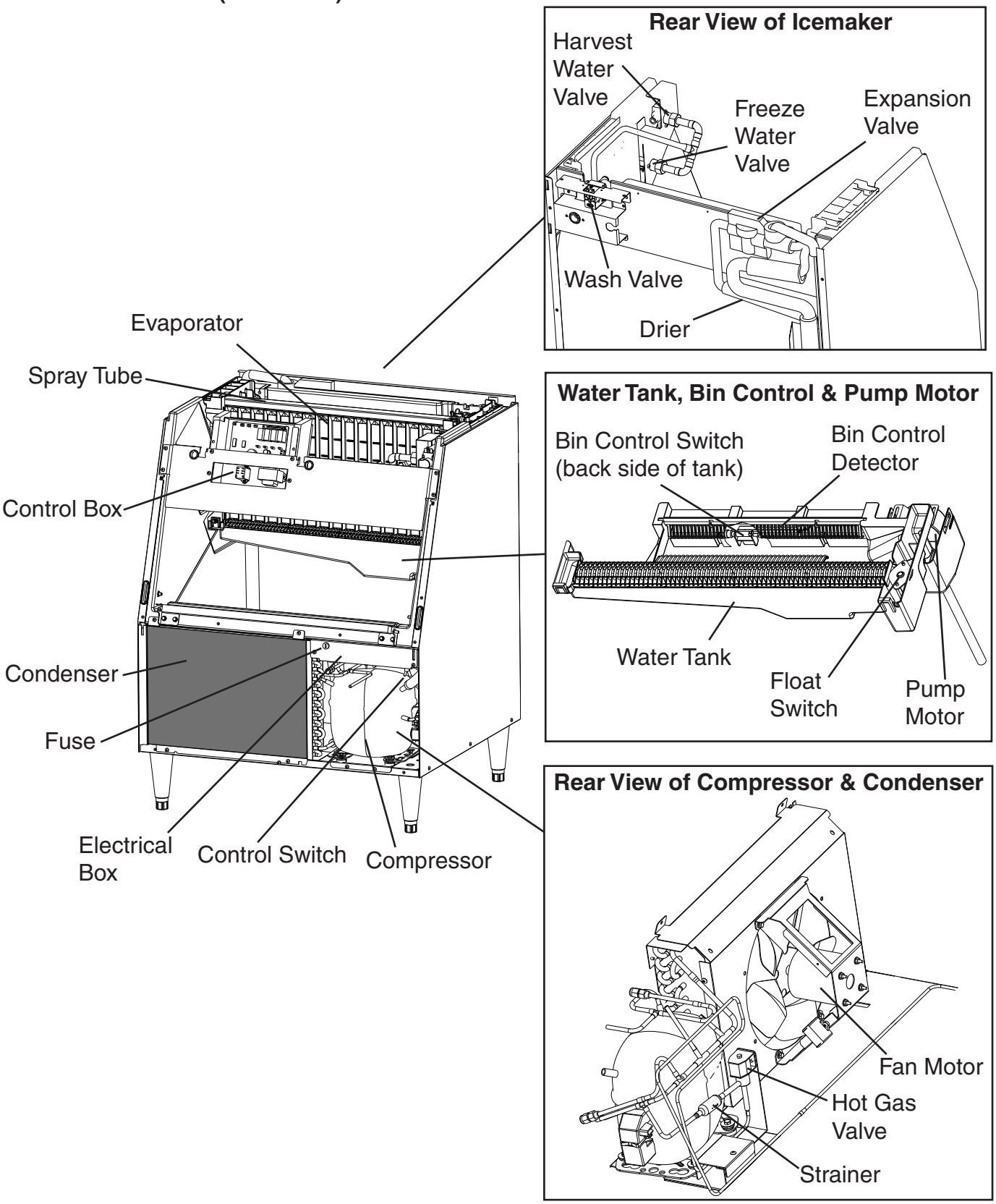
Note: We reserve the right to make changes in specifications and design without prior notice.

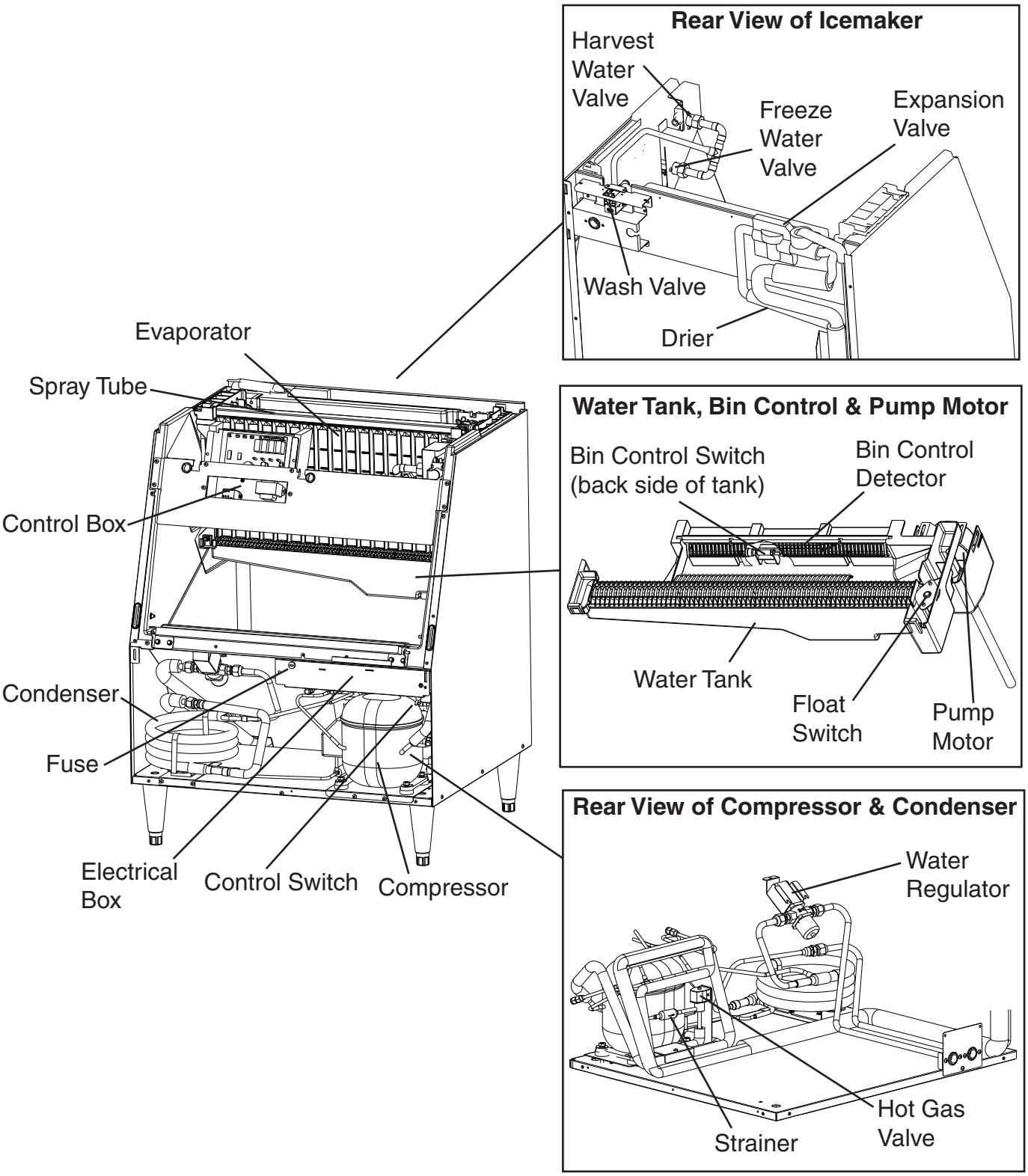
II. General Information

A. Construction

1. KM-255BAH (air-cooled)



2. KM-255BWH (water-cooled)



B. Sequence of Operation

The steps in the sequence are as outlined below. When power is supplied, the red LED on the control board comes on. A 5 second delay occurs at startup. Note that the order of the green LEDs from the outer edge of the board is 1, 4, 3, 2.

1. One Minute Fill Cycle

LED 4 is on. FWV opens and the fill period begins. After 1 minute, the board checks for a closed LF/S. If LF/S is closed, the harvest cycle begins. If not, FWV will remain energized through additional 1 minute cycles until water enters the sump and LF/S closes. This serves as a low water safety to protect the water pump.

2. Initial Harvest Cycle

LEDs 1, 4 and 2 are on. FWV closes, HGV opens, water valve relay energizes and HWV opens, Comp energizes, and harvest begins. The control board monitors the warming of the evaporator via the thermistor located on the suction line. When the thermistor reaches 48°F (9°C), the control board reads a 3.9 kΩ signal from the thermistor and turns harvest termination over to the adjustable harvest timer which is factory set for normal conditions. The timer has settings of 60, 90, 120, and 180 seconds (S4 dip switch 1 & 2). When the harvest timer completes its count down, the harvest cycle is complete and the freeze cycle starts. The minimum total time allowed by the board for a complete harvest cycle is 2 minutes. HWV is open during harvest for a maximum of 6 minutes or the length of harvest minus 50 seconds, whichever is shorter. PM energizes and runs for the last 50 seconds of harvest. At the end of harvest, the control board checks the position of LF/S and proceeds to the freeze cycle if it is closed or calls for a 1-minute fill if it is open.

3. Freeze Cycle

LED 1 is on. Comp and PM continue to run, FMS energizes, HGV closes, water valve relay de-energizes and HWV closes, and the freeze cycle starts. For the first 5 minutes the control board will not accept a signal from LF/S. This 5 minute minimum freeze acts as a short cycle protection. At the end of 5 minutes, LF/S assumes control. As ice builds on the evaporator, the water level in the sump lowers and UF/S opens. 15 seconds after UF/S opens, FWV opens (LED 4 is on when FWV is open) and allows water in. After UF/S closes again, FWV closes 3 seconds later. This continues until the tank has refilled the number of times determined by the refill counter (S5 dip switch is factory set - do not adjust). The KM-255BAH and KM-255BWH refill 10 times. After the final refill, the freeze continues until LF/S opens and terminates the freeze cycle.

Note: After the first freeze following startup and every 10th cycle thereafter, LEDs 1, 3, and 2 come on between freeze and harvest. Comp continues to run, HGV opens and FMS de-energizes. PM stops for 2 seconds. PM restarts and runs for 10 seconds.

4. Normal Harvest Cycle

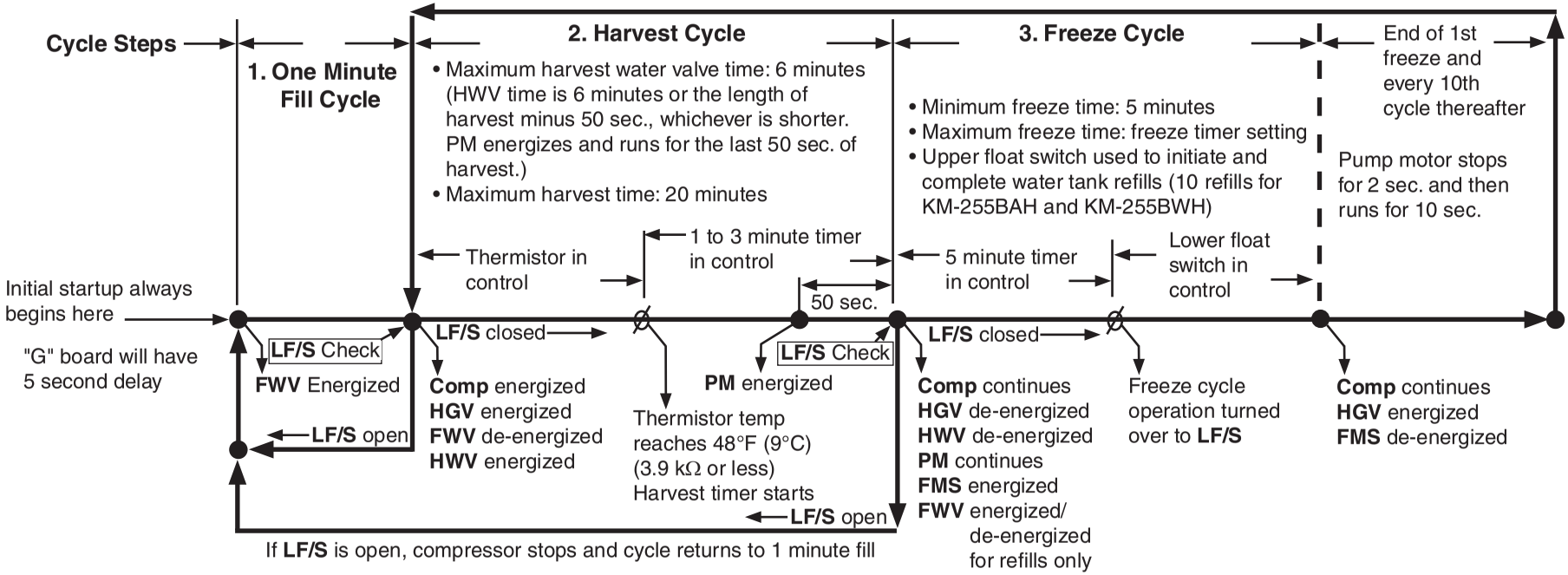
LEDs 1, 4 and 2 are on. Comp continues to run, HGV opens, water valve relay energizes and HWV opens. As the evaporator warms, the thermistor reaches 48°F (9°C). The control board then receives the thermistor's 3.9 kΩ signal and starts the harvest timer. When the harvest timer completes its count down, the harvest cycle is complete and the next freeze cycle starts. The minimum total time allowed by the board for a complete harvest cycle is 2 minutes. HWV is open during harvest for a maximum of 6 minutes or

the length of harvest minus 50 seconds, whichever is shorter. PM energizes and runs for the last 50 seconds of harvest. At the end of harvest, the control board checks the position of LF/S and proceeds to the freeze cycle if it is closed or calls for a 1-minute fill if it is open.

The unit continues to cycle through freeze and harvest cycles until the bin control activates and shuts the unit down.

Legend: **Comp**–compressor; **FMS**–self-contained fan motor; **FWV**–freeze water valve; **HGV**–hot gas valve; **HWV**–harvest water valve; **LF/S**–lower float switch; **PM**–pump motor; **UF/S**–upper float switch

KM-255BAH and KM-255BWH Sequence Flow Chart and Component Operation



Legend:
Comp - compressor
FMS - self-contained fan motor
FWV - freeze water valve
HGV - hot gas valve
HWV - harvest water valve
LF/S - lower float switch
PM - pump motor
UF/S - upper float switch

Components Energized when the Control Switch is in the WASH Position

The WASH position on the control switch is used when cleaning and sanitizing the machine. When in the WASH position, power is supplied to the pump motor and the wash valve. This allows cleaner and sanitizer to flow over both the inside and outside of the evaporator plate assembly.

C. Control Board

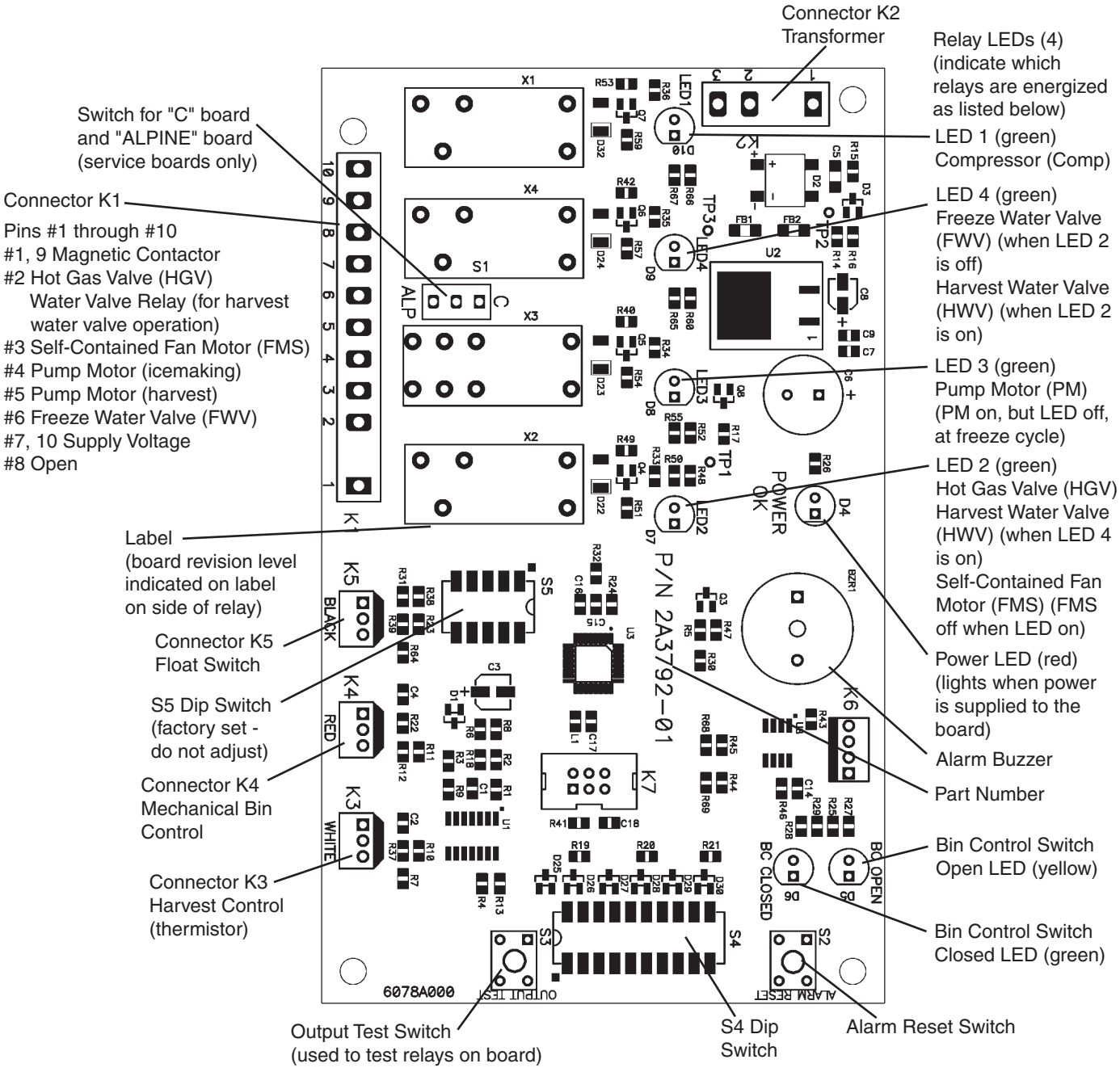
- A HOSHIZAKI exclusive solid-state control is employed in KM-255BAH and KM-255BWH Self-Contained Crescent Cubers.
- All models are pretested and factory-adjusted.

CAUTION

1. Fragile, handle very carefully.
2. A control board contains integrated circuits, which are susceptible to failure due to static discharge. It is especially important to touch the metal part of the unit when handling or replacing the board.
3. Do not touch the electronic devices on the board or the back of the board to prevent damage to the board.
4. Do not change wiring and connections. Do not misconnect K3, K4 and K5, because the same connector is used for the thermistor, float switch and mechanical bin control.
5. Always replace the whole board assembly if it goes bad.
6. Do not short out power supply to test for voltage.

1. Control Board Layout

Control Products "G" Control Board



Control Board	
Part Number	2A3792-01 (factory); **2A3792-02 (service)**

2. Features

a) Maximum Water Supply Period – 6 minutes

The harvest water valve will be open during harvest for 6 minutes or the length of harvest minus 50 seconds, whichever is shorter.

b) Harvest Backup Timer and Freeze Timer

The harvest backup timer shuts down the icemaker if, for two cycles in a row, the harvest cycle takes more than 20 minutes to complete. The control board will signal this problem using 2 beeps every 3 seconds.

The freeze timer shuts down the icemaker if, for two cycles in a row, the freeze cycle takes longer than the time specified to complete. The control board will signal this problem using 3 beeps every 3 seconds. The time is factory set using S4 dip switch 9 & 10.

The reset button on the control board must be pressed with power on to reset either of these safeties.

c) High Temperature Safety

The temperature of the suction line in the refrigeration circuit is limited by the high temperature safety. This protects the unit from excessively high temperatures. If the evaporator temperature rises above 127 ± 7°F (53 ± 4°C), the control board reads a .804 kΩ signal from the thermistor and operates the safety. This shuts down the circuit and the icemaker automatically stops.

The control board will signal this problem using 1 beep every 3 seconds. The reset button on the control board must be pressed with power on to reset the safety.

d) Low Water Safety

The control board checks the position of the lower float switch at the end of the initial one minute water fill cycle and at the end of each harvest cycle. If the lower float switch is closed, the control board proceeds to the next cycle. If the lower float switch is open, the control board calls for a one minute water fill cycle. After one minute, the control board checks the position of the float and either proceeds to the next cycle if the lower float switch is closed or calls for an additional one minute fill if the switch is open. This serves as a low water safety to protect the water pump.

For water-cooled model, if the water is shut off, the unit is also protected by the high pressure switch.

e) High Voltage and Low Voltage Cut-outs

High voltage and low voltage cut-outs help protect the icemaker from supply voltages outside of the accepted range.

If miswiring causes excessive voltage (147Vac ±5% or more for 3 seconds) on the control board, the high voltage cut-out shuts down the circuit and the icemaker automatically stops. The control board will signal this problem using 7 beeps every 3 seconds.

The icemaker also automatically stops in cases of insufficient voltage (92Vac ±5% or less). The control board will signal this problem using 6 beeps every 3 seconds.

When the proper supply voltage is resumed, the icemaker *automatically* starts running again.

f) LED Lights and Audible Alarm Safeties

The red LED indicates control voltage (10 to 12V at K2) and will remain on unless a control voltage problem occurs. At startup a 5 second delay occurs while the board conducts an internal timer check. A beep occurs when the control switch is moved to the ICE position.

The green LEDs 1 through 4 energize and sequence from initial startup as listed in the table below. Note that the order of the LEDs from the outer edge of the board is 1, 4, 3, 2. For more information, see "II.B. Sequence of Operation."

Sequence Step	LED	Energized Components	Time LEDs are On		
			Min.	Max.	Avg.
1 Minute Fill Cycle	4	FWV			60 seconds
Harvest Cycle	1, 4 and 2	HWV, HGV, Comp	2 minutes	20 minutes	3 to 5 minutes
Last 50 seconds of harvest, HWV de-energizes and PM energizes (LEDs 1, 3 and 2 are on)					
Freeze Cycle	1 (and 4 at refills)	Comp, PM, FMS (FWV at refills)	5 minutes	freeze timer setting	30 to 35 minutes
After the first freeze following startup and every 10th cycle thereafter, Comp, HGV, and PM are energized for 10 seconds between freeze and harvest (LEDs 1, 3 and 2 are on)					

The built in safeties shut down the unit and have alarms as listed below.

No. of Beeps (every 3 sec.)	Type of Alarm	Notes
1	High Evaporator Temp. (temperature > 127°F (53°C)	Check for harvest problem (stuck HGV or relay), hot water entering unit, or shorted thermistor.
2	Harvest Backup Timer (harvest > 20 min. for two cycles in a row)	Check for open thermistor, HGV not opening, TXV leaking by, low charge, inefficient Comp, or WRV leaking by (water-cooled model only).
3	Freeze Timer (freeze > specified setting for two cycles in a row) Timer is factory set using S4 dip switch 9 & 10	Check for a float switch stuck closed (up), HWV or FWV leaking by, HGV leaking by, TXV not feeding properly, low charge, or inefficient compressor.
To manually reset the above safeties, press the alarm reset button with the power supply on.		
6	Low Voltage (92Vac ±5% or less)	Red LED will turn off if voltage protection operates. The control voltage safeties automatically reset when voltage is corrected.
7	High Voltage (147Vac ±5% or more)	

Legend: **Comp**–compressor; **FMS**–self-contained fan motor; **FWV**–freeze water valve; **HGV**–hot gas valve; **HWV**–harvest water valve; **PM**–pump motor; **TXV**–thermostatic expansion valve; **WRV**–water regulating valve

3. Controls and Adjustments

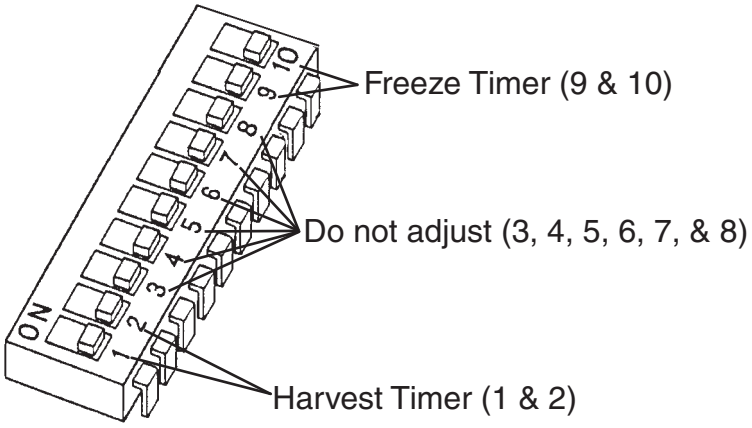
a) Default Dip Switch Settings

The dip switches are factory-adjusted to the following positions:

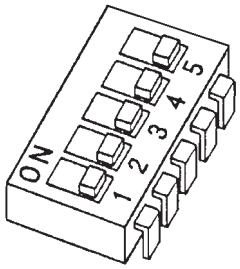
S4 Dip Switch										
Dip Switch No.	1	2	3	4	5	6	7	8	9	10
KM-255BAH	OFF	ON	OFF	ON	ON	ON	ON	OFF	OFF	OFF
KM-255BWH	ON	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF

S5 Dip Switch (Do Not Adjust)					
Dip Switch No.	1	2	3	4	5
KM-255BAH	ON	OFF	ON	OFF	ON
KM-255BWH	ON	OFF	ON	OFF	ON

S4



S5 (do not adjust)



Float switch control and refill counter. Do not adjust.

b) Harvest Control – Thermistor

A thermistor (semiconductor) is used for a harvest control sensor. The resistance varies depending on the suction line temperatures. The thermistor detects the temperature of the evaporator outlet to start the harvest timer. No adjustment is required. If necessary, check for resistance between thermistor leads, and visually check the thermistor mounting, located on the suction line next to the evaporator outlet.

Temperature (°F)	Temperature (°C)	Resistance (kΩ)
0	-18	14.401
10	-12	10.613
32	0	6.000
50	10	3.871
70	21	2.474
90	32	1.633

Check a thermistor for resistance by using the following procedure:

1) Disconnect the connector K3 on the board.
2) Remove the thermistor. See "V.L. Removal and Replacement of Thermistor."

3) Immerse the thermistor sensor portion in a glass containing ice and water for 2 or 3 minutes.

4) Verify the temperature of the glass, then check for resistance between thermistor leads. See the table above for temperature and resistance values. Normal reading is within 3.5 to 7 kΩ. Replace the thermistor if it exceeds the normal reading.

c) Harvest Timer (S4 dip switch 1 & 2)

The harvest timer starts counting when the thermistor reads 48°F (9°C) at the evaporator outlet.

No adjustment is required under normal use, as the harvest timer is adjusted to the suitable position. Before changing this setting, call the HOSHIZAKI Technical Support Department at 1-800-233-1940 for recommendations. Keep in mind that setting the harvest timer to a longer setting will decrease 24 hour production.

Dip Switch Setting		Time (seconds)
No. 1	No. 2	
OFF	OFF	60
ON	OFF	90
OFF	ON	120
ON	ON	180

d) S4 dip switch 3, 4, 5, 6, 7, & 8

Factory set for optimum performance. Do not adjust.

e) Freeze Timer (S4 dip switch 9 & 10)

CAUTION

Adjust to proper specification, or the unit may not operate correctly.

The freeze timer setting determines the maximum allowed freeze time to prevent possible freeze-up issues. Upon termination of freeze timer, the control board initiates the harvest cycle. After 2 consecutive timer terminations, the control board shuts the machine down. In this case, see "IV.B.3. Low Ice Production" for possible solutions.

The freeze timer is factory adjusted and no adjustment is required.

Dip Switch Setting		Time (minutes)
No. 9	No. 10	
OFF	OFF	60
OFF	ON	50
ON	OFF	70
ON	ON	60

f) Float Switch Control and Refill Counter (S5 dip switch 1 through 5)

These must be left in the factory default position or the unit will not operate properly. Do not adjust. The KM-255BAH and KM-255BWH refill 10 times.

Note: There are no refills during the first 5 minutes of the freeze cycle. The first refill generally lasts about 10 seconds and subsequent refills generally last about 5 seconds.

g) Bin Control

This machine uses a lever-actuated proximity switch (mechanical bin control) to control the ice level in the storage bin. No adjustment is required.

(1) Explanation of Operation

The bin control is connected to the K4 connector on the control board. When the bin control is calling for ice (proximity switch closed; green LED, BC CLOSED, on), the control board continues icemaking operations. When the bin control is activated in the bin full position (proximity switch open; yellow LED, BC OPEN, on), the control board shuts down the unit. However, to prevent incomplete batches of ice from forming on the evaporator, the control board will only shut down the machine within the first 5 minutes of the freeze cycle. If ice pushes the lever in after the first five minutes of the freeze cycle, the control board will allow the machine to complete the freeze cycle and the following harvest cycle before shutting down the machine.

4. Bin Control Troubleshooting

a) Machine Will Not Start

1) Confirm that the bin is not full. On the control board, if the yellow LED, BC OPEN, is on, the bin control is the likely problem. If the green LED, BC CLOSED, is on, the bin control is properly calling for ice. In this case, refer to section "IV. Service Diagnosis" to verify that non-bin control related issues are resolved.
2) Check to make sure shipping tape has been removed and the wires are connected properly.
3) Check to make sure no obstruction prevents the lever from moving to the bin empty position.
4) Check proximity switch continuity to make sure it is not stuck open.

b) Machine Will Not Shut Off

1) Confirm that the bin is full and the actuator is in the bin full position. On the control board, if the green LED, BC CLOSED is on, the bin control is the likely problem. If the yellow LED, BC OPEN, is on, the bin control is properly showing that the bin is full. In this case, refer to section "IV. Service Diagnosis" to verify that non-bin control related issues are resolved.
2) Check to make sure no obstruction prevents the lever from moving to the bin full position.

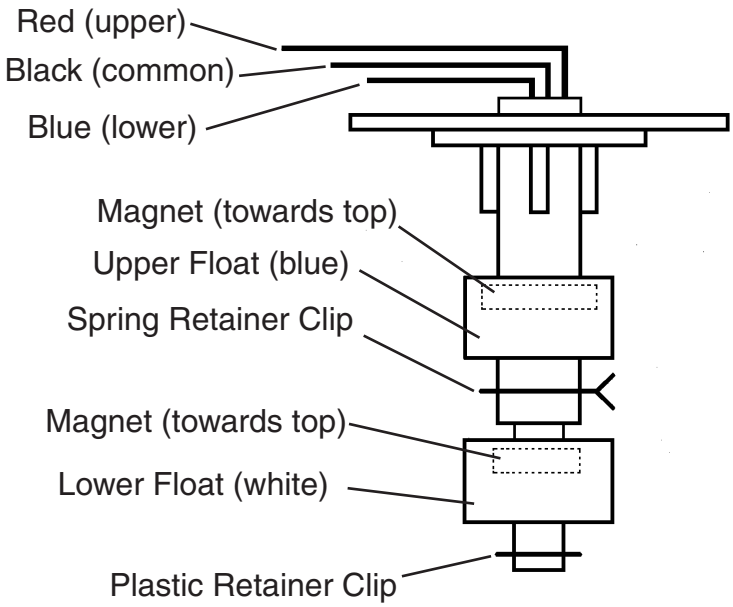
5. Float Switch Troubleshooting

Depending on local water conditions, scale may build up on the float switch. Scale on the switch can cause the floats to stick. In this case, the float switch should be cleaned and checked.

First, remove the switch from the water tank. Soak the switch assembly in ice machine cleaner. While not necessary, the floats can be removed from the shaft during cleaning. If you remove them, note that the blue float is on top. The floats must be installed with the magnets inside them towards the top of the switch. Installing the floats upside down will affect the timing of the float switch operation. Once clean, rinse and wipe the cleaner off.

Next, check the switch with an ohm meter. This float switch has three wires (the black

wire is common) and two separate switches. Check the upper switch by ohming out the black and red wires. When the float is up, the switch should be closed. Check the lower switch by ohming out the black and blue wires in the same manner. If either switch fails, the assembly should be replaced.



6. Control Board Check Procedure

Before replacing a control board that does not show a visible defect and that you suspect is bad, always conduct the following check procedure. This procedure will help you verify your diagnosis.

1) Check the S4 dip switch settings to assure that they are in the factory default positions.

2) Turn the control switch to ICE and check for proper control voltage. If the red LED is on, the control voltage is good. If the red LED is off, check the control transformer circuit.

3) Check the 115 volt input at the 10-pin connector. Check the brown and white wire at pin #10 to a white neutral wire for 115 volts. (Always choose a white neutral wire to establish a good neutral connection when checking voltages.) A jumper also feeds 115 volts into pin #7. If no voltage is present, check the 115 volt supply circuit.

4) The output test switch provides a relay sequence test. Make sure the control switch is in the ICE position, then press the output test switch. The correct lighting sequence should be none, 2, 3, 4, 1, and 4, normal sequence every 5 seconds. Components (e.g., the compressor) will cycle during the test. Note that the order of the relays from the outer edge of the board is 1, 4, 3, 2.

Note: If the LEDs light in a different sequence or the 5–second interval does not occur, the control board is bad and should be replaced.

5) After checking the sequence, the unit automatically resumes normal operation after the test. The unit begins normal operation with the 1 minute fill cycle.

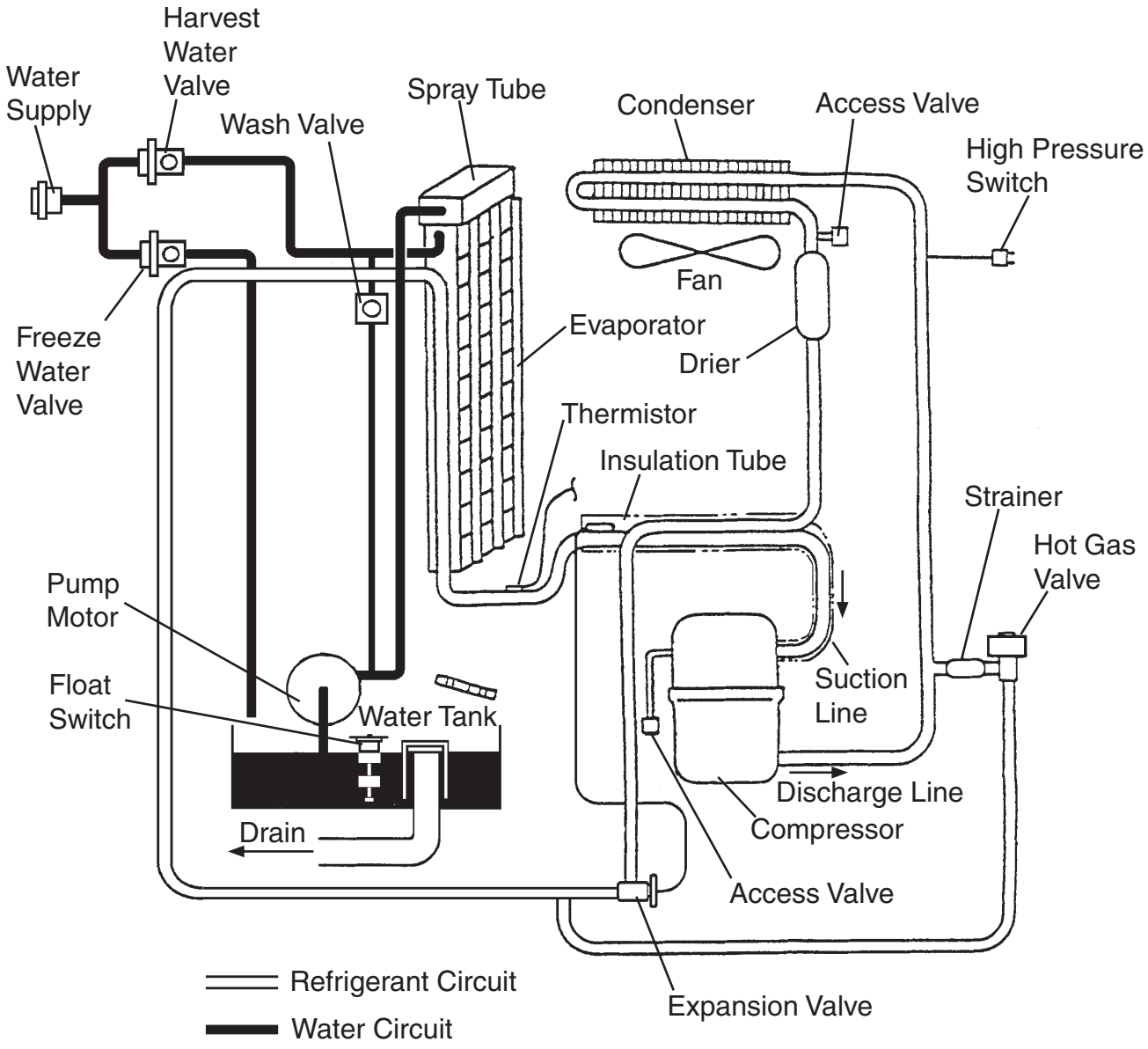
7. Control Board Replacement

1) Unplug the unit from the electrical outlet and disconnect the wiring to the board.
2) Install the new board and make the wiring connections.
3) Set the application switch located between relays X3 & X4 to the ALP position. If this switch is placed in the wrong position, the unit will not start.
4) Adjust the dip switches to the factory default settings. See "II.C.3.a) Default Dip Switch Settings." S4 dip switch #8 must remain in the OFF position.
5) Plug the unit back in, then place the control switch in the ICE position. The red LED should come on.

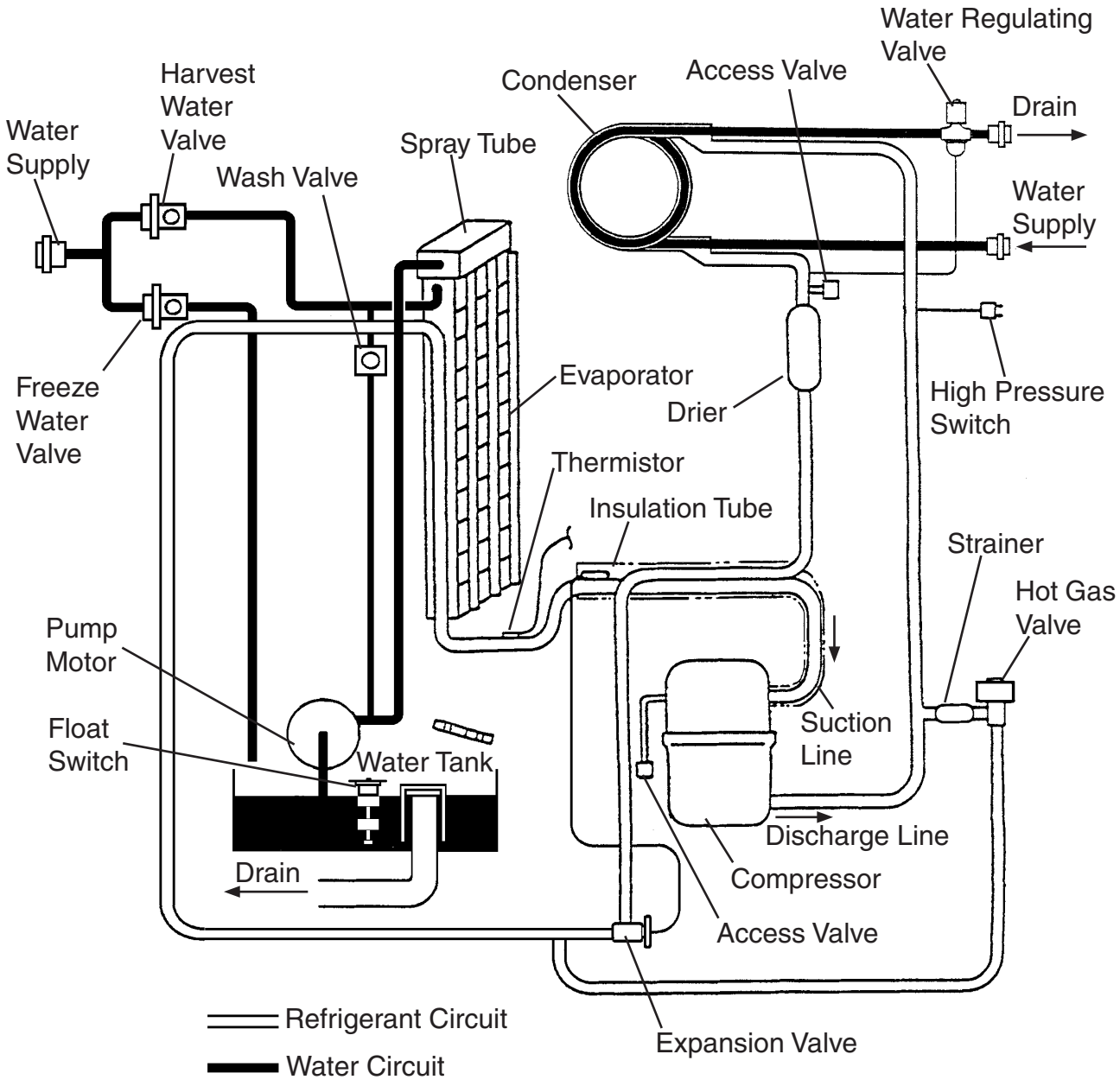
III. Technical Information

A. Water Circuit and Refrigeration Circuit

1. KM-255BAH (air-cooled)

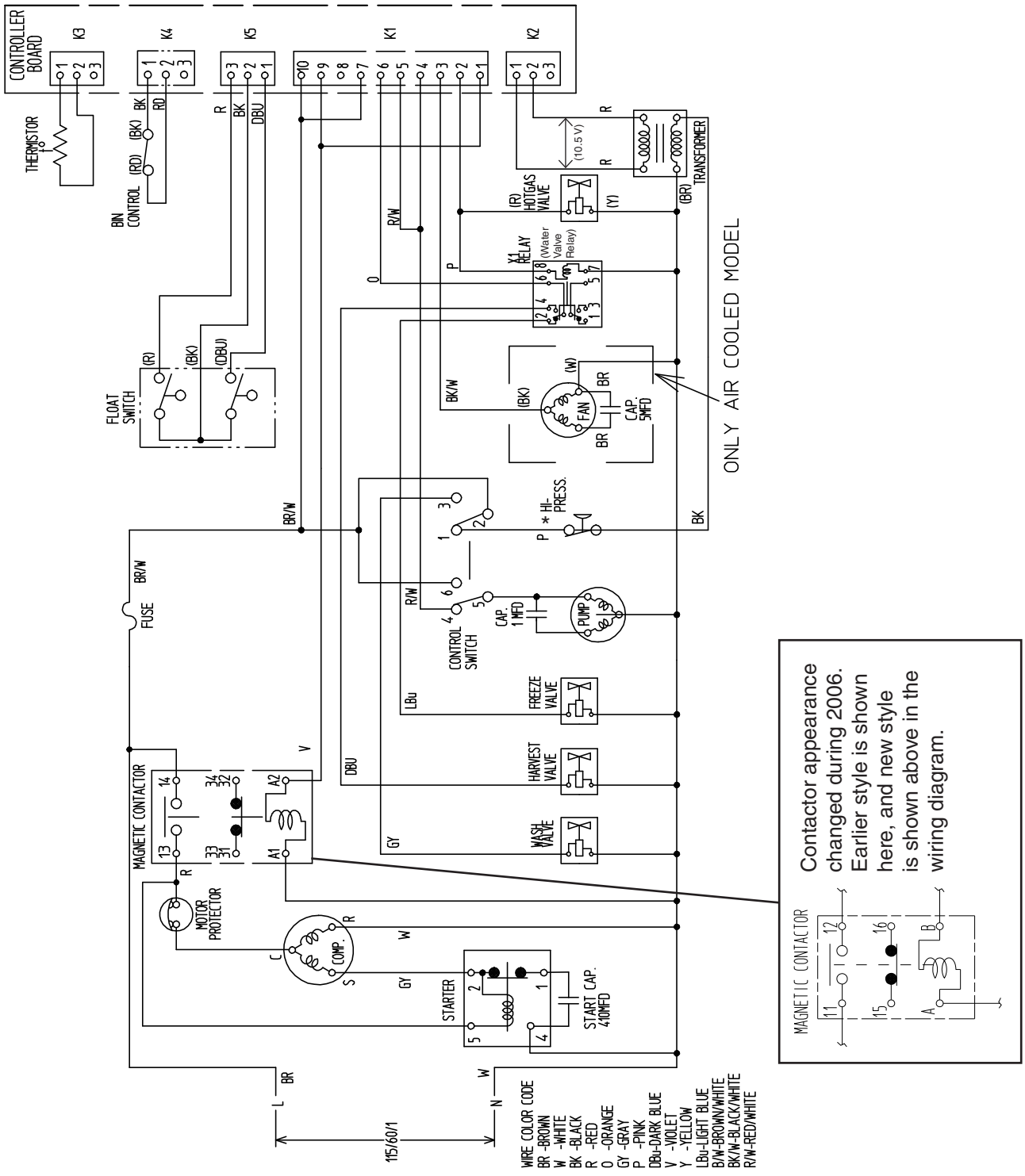


2. KM-255BWH (water-cooled)



B. Wiring Diagram

1. KM-255BAH (air-cooled)



* Pressure Switch	
Cut-out	$412\pm^{21}_{0}$ PSIG
Cut-in	327±21 PSIG

2. KM-255BWH (water-cooled)

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* Pressure Switch	
Cut-out	384^{21}_{0} PSIG
Cut-in	284±21 PSIG

C. Performance Data

1. KM-255BAH (air-cooled)

APPROXIMATE ICE PRODUCTION PER 24 HR.	AMBIENT TEMP. (ºF/ºC)	WATER TEMP. (ºF/ºC)					
		50/10		70/21		90/32	
	70/21	**235**	107	227	103	207	94
	80/27	229	104	216	98	191	87
	90/32	227	103	**207**	94	184	83
lbs./day kg./day	100/38	211	96	202	91	163	74
APPROXIMATE ELECTRIC CONSUMPTION	70/21	**744**		769		790	
	80/27	763		801		816	
	90/32	769		**828**		846	
watts	100/38	801		832		863	
APPROXIMATE WATER CONSUMPTION PER 24 HR.	70/21	**82**	0.31	73	0.28	65	0.25
	80/27	75	0.29	61	0.23	56	0.21
	90/32	73	0.28	**51**	0.19	45	0.17
gal./day m^3/day	100/38	61	0.23	50	0.19	39	0.15
FREEZING CYCLE TIME	70/21	**20**		22		24	
	80/27	21		24		25	
	90/32	22		**25**		27	
min.	100/38	24		26		29	
HARVEST CYCLE TIME	70/21	**4.3**		4		4	
	80/27	4		3.5		3	
	90/32	4		**3.1**		3	
min.	100/38	3.5		3		2.7	
HEAD PRESSURE	70/21	**220**	15.5	243	17.1	267	18.7
	80/27	238	16.7	274	19.3	293	20.6
	90/32	243	17.1	**300**	21.1	321	22.6
PSIG kg/cm^2G	100/38	245	17.2	305	21.4	340	23.9
SUCTION PRESSURE	70/21	**35**	2.5	38	2.7	40	2.8
	80/27	37	2.6	42	2.9	43	3.0
	90/32	38	2.7	**45**	3.2	47	3.3
PSIG kg/cm^2G	100/38	38	2.7	45	3.2	48	3.4

TOTAL HEAT OF REJECTION 4100 BTU/h [AT 90ºF (32ºC) / WT 70ºF (21ºC)]

Note:

1. Pressure data is recorded at 5 minutes into freezing cycle. The data not in **bold** should be used for reference only.
2. We reserve the right to make changes in specifications and design without prior notice.

2. KM-255BWH (water-cooled)

Intentionally Left Blank

Note:
1. Pressure data is recorded at 5 minutes into freezing cycle. The data not in **bold** should be used for reference only.
2. We reserve the right to make changes in specifications and design without prior notice.

IV. Service Diagnosis

A. 10-Minute Diagnostic Procedure

The 10 minute check out procedure is basically a sequence check which can be used at unit start-up or for system diagnosis. Using this check out procedure will allow you to diagnose electrical system and component failures in approximately 10 minutes under normal operating conditions of 70°F or warmer air and 50°F or warmer water temperatures. Before conducting a 10 minute checkout, check for correct installation, proper voltage per unit nameplate and adequate water supply. As you go through the procedure, check to assure the components energize and de-energize correctly. If not, those components and controls are suspect. Check for voltage at the 10-pin connector.

1) Unplug the unit from the electrical outlet and access the control box and the electrical box.

2) Plug the unit back in and place the control switch in the ICE position. The red LED on the control board comes on. A 5 second delay occurs.

3) **One Minute Fill Cycle** – LED 4 is on. The freeze water valve is energized. After 1 minute, the control board checks for a closed lower float switch. If the lower float switch is closed, the harvest cycle begins. If closed, continue to step 4. If the lower float switch is open, the freeze water valve will remain energized through additional 1 minute fill cycles until water enters the sump and the lower float switch closes (low water safety protection during initial start up and at the end of each harvest). **Diagnosis:** If the freeze water valve does not open, check for no supply voltage at water valve terminals, bad coil, or plugged screen or external filter (no water flow). If unit fails to start harvest, check for open lower float switch or bad 1 minute timer in board.

4) **Initial Harvest Cycle** – LEDs 1, 4 and 2 are on. The freeze water valve de-energizes and the hot gas valve energizes (also energizing the water valve relay), the harvest water valve energizes, and the contactor coil energizes to start the compressor.

   The evaporator warms and the thermistor senses 48°F (9°C). The control board then receives the thermistor's 3.9 kΩ signal and turns operation of harvest over to the harvest timer. The timer completes counting (1 to 3 minutes – S4 dip switch 1 & 2). The unit then cycles to freeze. The harvest water valve is open during harvest for a maximum of 6 minutes or the length of harvest minus 50 seconds, whichever is shorter. The pump motor energizes and runs for the last 50 seconds of harvest. **Diagnosis:** Check if compressor is running, hot gas valve is open, harvest water valve open. If these are okay, next check for at least 48°F (9°C) on the suction line. If cooler, check for inlet water too cold, expansion valve stuck open, or water regulating valve (water-cooled model) stuck open. If the suction line is at least 48°F (9°C), disconnect the thermistor at the board (K3) and check for resistance of 3.9 kΩ or less. If different, check and replace if necessary. See "II.C.3.b) Harvest Control – Thermistor," for check procedure. If resistance is 3.9 kΩ or less, reconnect the thermistor to the board. If harvest does not terminate within 3 minutes, replace the board.

5) **Freeze Cycle** – LED 1 is on. The compressor and pump motor remain energized and the fan motor energizes. The hot gas valve de-energizes (also de-energizing the water valve relay) and the harvest water valve de-energizes. The unit is held in freeze by a 5 minute short cycle protection timer. After 5 minutes, the freeze cycle operation is transferred to the lower float switch for freeze termination. During the first 5 minutes

of freeze, confirm that the evaporator temperature drops. After 7 minutes in freeze, disconnect the float switch by unplugging the harness from the K5 connector. The unit should switch out of the freeze cycle.

Note: At this point, after the initial freeze cycle and every 10th cycle thereafter, LEDs 1, 3, and 2 come on, the compressor continues to run, the hot gas valve opens and the fan motor de-energizes. The pump motor stops for 2 seconds. The pump motor restarts and runs for 10 seconds.

Diagnosis: If the evaporator is not cold, check to see if the hot gas valve is still open or if the expansion valve is not opening properly, if the harvest water valve or harvest valves relay is stuck open (the freeze water valve will cycle on and off during freeze), if there are improper unit pressures, or an inoperative compressor. If the unit remains in freeze with the float switch removed, replace the board.

Note: Normal freeze cycle will last 20 to 40 minutes depending on model and conditions. Cycle times and pressures should follow performance data provided in this manual.

6) **Normal Harvest Cycle** – same as the initial harvest cycle – Return to step 4.

Note: Unit continues to cycle until bin control is satisfied or power is switched OFF. The unit always restarts at the 1 minute fill cycle.

B. Diagnostic Charts

1. No Ice Production

Problem	Possible Cause		Remedy
[1] The icemaker will not start.	a) Power Supply	1. Off (breaker tripped or fuse blown).	1. Reset breaker or replace fuse.
		2. Loose connection.	2. Tighten.
		3. Bad contacts.	3. Check for continuity and replace.
		4. Voltage too high or too low.	4. Check and get recommended voltage.
	b) Control Switch	1. OFF position.	1. Move to ICE position.
		2. Bad contacts.	2. Check for continuity and replace.
	c) Fuse (internal)	1. Blown.	1. Check for short circuit and replace.
	d) Bin Control	1. Tripped with bin filled with ice.	1. Remove ice.
		2. Improperly activated.	2. Check for proper position and movement.
	e) High Pressure Control	1. Bad contacts.	1. Check for continuity and replace.
		2. Dirty air filter or condenser.	2. Clean.
		3. Ambient or condenser water temperature too warm.	3. Reduce temperature.
		4. Refrigerant overcharged.	4. Recharge.

Problem	Possible Cause		Remedy
[1] The icemaker will not start. (continued)		5. Fan not operating. (except water-cooled model)	5. See chart 1.[6]
		6. Refrigerant line or components plugged.	6. Clean and replace drier.
		7. Condenser water pressure too low or off. (water-cooled model only)	7. Check and get recommended pressure.
	f) Transformer	1. Coil winding opened or shorted.	1. Replace.
	g) Wiring to Control Board	1. Loose connections or open.	1. Check for continuity and replace.
	h) Thermistor	1. Leads shorted or opened and high temperature or harvest backup timer safety operates. (1 beep or 2 beep alarm)	1. See "II.C.3. Controls and Adjustments, b) Harvest Control."
	i) Hot Gas Valve	1. Continues to open in freeze cycle and freeze timer safety operates. (3 beep alarm)	1. Check for hot gas valve stuck open and replace.
	j) Water Supply Line	1. Water supply off and water supply cycle does not finish.	1. Check and get recommended pressure.
		2. Condenser water pressure too low or off and pressure control opens and closes frequently to finally operate high temperature safety. (1 beep alarm)	2. Check and get recommended pressure.
	k) Water Valves	1. Mesh filter or orifice gets clogged and water supply cycle does not finish.	1. Clean.
		2. Coil winding opened.	2. Replace.
		3. Wiring to water valve.	3. Check for loose connection or open, and replace.
	l) Control Board	1. Defective or in alarm.	1. See "II.C.6. Control Board Check Procedure."
	m)Control Switch	1. WASH position.	1. Move to ICE position.
		2. Bad contacts.	2. Check and replace.

Problem	Possible Cause		Remedy
[2] Water continues to be supplied, and the icemaker will not start.	a) Float Switch	1. Connector disconnected.	1. Place in position.
		2. Leads opened or defective switch.	2. Check and replace.
		3. Float does not move freely.	3. Clean or replace.
	b) Control Board	1. Defective.	1. Replace.
	c) Low Water Safety	1. Loose hose.	1. Check and reattach.
[3] Compressor will not start or stops operating.	a) Magnetic Contactor	1. Bad contacts.	1. Check for continuity and replace.
		2. Coil winding opened.	2. Replace.
	b) Start Capacitor	1. Defective.	1. Replace.
	c) Internal Overload Protector Open (check 1 through 3 to the right and d through f below)	1. Loose terminal.	1. Tighten or replace.
		2. Voltage.	2. Check and correct.
		3. Dirty condenser.	3. Clean.
	d) Starter	1. Bad contacts.	1. Check and replace.
		2. Coil winding opened.	2. Replace.
	e) Compressor	1. Wiring to compressor.	1. Check for loose connection or open, and replace.
		2. Defective.	2. Replace.
		3. Protector tripped.	3. Reduce temperature.
	f) Control Board	1. No power to contactor.	1. See "II.C.6. Control Board Check Procedure."
[4] Water continues to be supplied by harvest water valve in freeze cycle.	a) Harvest Water Valve	1. Diaphragm does not close.	1. Check for water leaks with icemaker off.
	b) Water Valve Relay	1. Contacts stuck.	1. Replace.
	c) Control Board	1. Defective.	1. See "II.C.6. Control Board Check Procedure."
[5] No water comes from spray tubes. Water pump will not start, or freeze cycle time is too short.	a) Water Supply Line	1. Water pressure too low and water level in water tank too low.	1. Check and get recommended pressure.
	b) Water Valves	1. Dirty mesh filter or orifice and water level in water tank too low.	1. Clean.
	c) Water System	1. Water leaks.	1. Check connections for water leaks, and replace.
		2. Clogged.	2. Clean.
	d) Pump Motor	1. Motor winding opened.	1. Replace.
		2. Bearing worn out.	2. Replace.
		3. Wiring to pump motor.	3. Check for loose connection or open, and replace.

Problem	Possible Cause		Remedy
[5] No water comes from spray tubes. Water pump will not start, or freeze cycle time is too short. (continued)		4. Defective capacitor.	4. Replace.
		5. Defective or bound impeller.	5. Replace and clean.
	e) Control Board	1. Defective.	1. See "II.C.6. Control Board Check Procedure."
[6] Fan motor will not start, or is not operating.	a) Fan Motor	1. Motor winding opened.	1. Replace.
		2. Bearing worn out.	2. Replace.
		3. Wiring to fan motor.	3. Check for loose connection or open, and replace.
		4. Defective capacitor.	4. Replace.
		5. Fan blade bound.	5. Check and replace.
	b) Control Board	1. Defective.	1. See "II.C.6. Control Board Check Procedure."
[7] All components run, but no ice is produced.	a) Refrigerant	1. Undercharged.	1. Check for leaks and recharge.
		2. Air or moisture trapped.	2. Replace drier and recharge.
	b) Compressor	1. Defective valve.	1. Replace.
	c) Hot Gas Valve	1. Continues to open in freeze cycle.	1. Check and replace.
	d) Harvest Water Valve	1. Water valve is wide open during freeze.	1. Check for water leaks with icemaker off.
	e) Water Valve Relay	1. Contacts stuck.	1. Replace.
	f) Water Supply Line (water-cooled model only)	1. Condenser water pressure too low or off and pressure control opens and closes frequently.	1. Check and get recommended pressure.
	g) Water Regulator (water-cooled model only)	1. Set too high or faulty.	1. Adjust or replace. See "V.K. Adjustment of Water Regulating Valve."

2. Evaporator is Frozen Up

Problem	Possible Cause		Remedy
[1] Freeze cycle time is too long.	a) Float Switch	1. Leads shorted or defective switch.	1. Check and replace.
		2. Float does not move freely.	2. Clean or replace.
	b) Water Valves	1. Diaphragm does not close.	1. Check for water leaks with icemaker off.
	c) Control Board	1. Defective.	1. See "II.C.6. Control Board Check Procedure."
[2] All ice formed on evaporator does not fall into bin in harvest cycle.	a) Evaporator	1. Scaled up.	1. Clean.
	b) Water Supply Line	1. Water pressure too low.	1. Check and get recommended pressure.
	c) Water Filter System	1. Dirty/Restricted	1. Replace filter.
	d) Water Valves	1. Dirty mesh filter or orifice.	1. Clean.
		2. Diaphragm does not close.	2. Check for water leaks with icemaker off.
	e) Ambient and/or water temperature.	1. Too cool.	1. Increase temperature.
	f) Thermistor	1. Out of position or loose attachment.	1. See "V.L. Removal and Replacement of Thermistor."
	g) Control Board	1. Harvest timer is set too short.	1. Adjust longer, referring to "II.C.3. Controls and Adjustments, c) Harvest Timer.
		2. Defective.	2. See "II.C.6. Control Board Check Procedure."
[3] Other	a) Spray Tubes	1. Clogged.	1. Clean
		2. Out of position.	2. Place in position.
	b) Water System	1. Dirty.	1. Clean.
	c) Refrigerant	1. Undercharged.	1. Check for leaks and recharge.
	d) Expansion Valve	1. Bulb out of position or loose attachment.	1. Place in position.
		2. Defective.	2. Replace.
	e) Hot Gas Valve	1. Coil winding opened.	1. Replace.
		2. Plunger does not move.	2. Replace.
		3. Wiring to hot gas valve.	3. Check for loose connection or open, and replace.
	f) Ice Cube Guides	1. Out of position and ice trapped.	1. Place in position.

Problem	Possible Cause		Remedy
[3] Other (continued)	g) Water Supply Line	1. Too small; requires 3/8" OD line dedicated per machine.	1. Increase water line size.
	h) Water Filter	1. Flow rate too small.	1. Replace with filter that has larger flow rate.

3. Low Ice Production

Problem	Possible Cause	Remedy
[1] Freeze cycle time is long.	a) See chart 1.[3] and check dirty air filter or condenser, ambient or water temperature, water pressure, condenser water regulating valve (water-cooled model), and refrigerant charge.	
	b) See chart 2.[1] and check float switch, water valves and control board.	
	c) Check pump, hot gas valve, expansion valve, refrigerant charge, and compressor.	
[2] Harvest cycle time is long.	a) See chart 2.[2] and check control board, thermistor, evaporator, ambient and/or water temperature, water supply line, water valves, and hot gas valve.	

4. Abnormal Ice

Problem	Possible Cause		Remedy
[1] Small cubes.	a) Ice Cube Guides	1. Out of position. Circulated water falls into bin.	1. Place in position.
	b) See chart 1.[5] and check water supply line, water valves, water system, pump motor, and control board.		
[2] Cloudy or irregular cubes.	a) See chart 2.[1] and 2.[3], and check float switch, water valves, control board, spray tubes, water system, refrigerant charge, and expansion valve.		
	b) Spray Guide	1. Dirty.	1. Clean.
	c) Water Quality	1. High hardness or contains impurities.	1. Install a water softener or filter.

5. Other

Problem	Possible Cause		Remedy
[1] Icemaker will not stop when bin is filled with ice.	a) Bin Control	1. See "II.C.4. Bin Control Troubleshooting."	
[2] Abnormal noise.	a) Pump Motor	1. Bearings worn out.	1. Replace
	b) Fan Motor	1. Bearings worn out.	1. Replace
		2. Fan blade deformed.	2. Replace fan blade.
		3. Fan blade does not move freely.	3. Replace.
	c) Compressor	1. Bearings worn out or cylinder valve broken.	1. Replace.
		2. Mounting pad out of position.	2. Reinstall.
	d) Refrigerant Lines	1. Rub or touch other lines or surfaces.	1. Replace.

Problem	Possible Cause		Remedy
[3] Ice in storage bin often melts.	a) Drain Line	1. Plugged.	1. Clean.
	b) Ice Cube Guides	1. Out of position. Circulated water falls into bin.	1. Place in position.

V. Removal and Replacement of Components

IMPORTANT

Ensure all components, fasteners and thumbscrews are securely in place after the equipment is serviced.

IMPORTANT

1. The Polyol Ester (POE) oils used in R-404A units can absorb moisture quickly. Therefore it is important to prevent moisture from entering the system when replacing or servicing parts.
2. Always install a new drier every time the sealed refrigeration system is opened.
3. Do not leave the system open for longer than 15 minutes when replacing or servicing parts.

A. Servicing the Refrigeration Circuit

1. Refrigerant Recovery

The icemaker unit is provided with two refrigerant access valves–one on the low-side and one on the high-side line. Using proper refrigerant practices recover the refrigerant from the access valves and store it in an approved container. Do not discharge the refrigerant into the atmosphere.

2. Evacuation and Recharge (R-404A)

1) Attach service manifold hoses and a vacuum pump to the system. Be sure to connect charging hoses to both high and low-side access valves.

IMPORTANT

The vacuum level and vacuum pump may be the same as those for current refrigerants. However, the rubber hose and gauge manifold to be used for evacuation and refrigerant charge should be exclusively for POE oils.

2) Turn on the vacuum pump. Never allow the oil in the vacuum pump to flow backward.

3) Allow the vacuum pump to pull down to a 29.9" Hg vacuum. Evacuating period depends on pump capacity.

4) Close the low-side valve and high-side valve on the service manifold.

5) Disconnect the vacuum pump, and attach a refrigerant service cylinder to the high-side line. Remember to loosen the connection, and purge the air from the hose. See the nameplate for the required refrigerant charge. Hoshizaki recommends only virgin refrigerant or reclaimed refrigerant which meets ARI Standard No. 700-88 be used.

6) A liquid charge is recommended for charging an R-404A system. Invert the service cylinder and place it on scales. Open the high-side, service manifold valve.

7) Allow the system to charge with liquid until the nameplate weight is met.

8) If necessary, add any remaining charge to the system through the low-side. Use a throttling valve or liquid dispensing device to add the remaining liquid charge through the low-side access port with the unit running.

9) Close the two refrigerant access valves, and disconnect the service manifold hoses.

10) Cap the access valves to prevent a possible leak.

B. Brazing

DANGER

1. Refrigerant R-404A itself is not flammable at atmospheric pressure and temperatures up to 176°F (80°C).
2. Refrigerant R-404A itself is not, explosive or poisonous. However, when exposed to high temperatures (open flames), R-404A can be decomposed to form hydrofluoric acid and carbonyl fluoride both of which are hazardous.
3. Always recover the refrigerant and store it in an approved container. Do not discharge the refrigerant into the atmosphere.
4. Do not use silver alloy or copper alloy containing arsenic.
5. Do not use R-404A as a mixture with pressurized air for leak testing. Refrigerant leaks can be detected by charging the unit with a little refrigerant, raising the pressure with nitrogen and using an electronic leak detector.

Note: Because the pipes in the evaporator case are specially coated to resist corrosion, it is important to make connections outside the evaporator case when possible. If it is necessary to braze inside the evaporator case, use sandpaper to remove the coating from the brazing connections before unbrazing the components.

C. Removal and Replacement of Compressor

IMPORTANT

Always install a new drier every time the sealed refrigeration system is opened. Do not replace the drier until after all other repair or replacement has been made.

Note: When replacing a compressor with a defective winding, be sure to install the new start capacitor and start relay supplied with the replacement compressor. Due to the ability of the POE oil in the compressor to absorb moisture quickly, the compressor must not be opened more than 15 minutes for replacement or service. Do not mix lubricants of different compressors even if both are charged with R-404A, except when they use the same lubricant.

1) Unplug the unit from the electrical outlet.

2) Remove the panels.

3) Recover the refrigerant and store it in an approved container.

4) Remove the screws securing the electrical box (located over the compressor), then slide out the box.

5) Remove the screws securing the compressor base and the condenser. On water-cooled models, close the water supply line shut-off valve, drain the condenser and then disconnect the water inlet and outlet at the condenser. Carefully slide the refrigeration assembly forward.

6) Remove the terminal cover on the compressor, and disconnect the compressor wiring.

7) Remove the discharge and suction pipes.

8) Remove the hold-down bolts, washers and rubber grommets.

9) Remove the compressor. Unpack the new compressor package.

10) Attach the rubber grommets of the prior compressor.

11) Place the compressor in position, and secure it using the bolts and washers.

12) Remove the drier (located behind the upper, rear panel), then place the new drier in position.

13) Remove plugs from the suction, discharge and process pipes.

14) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.

15) Check for leaks using nitrogen gas (140 PSIG) and soap bubbles.

16) Evacuate the system, and charge it with refrigerant. See the nameplate for the required refrigerant charge.

17) Connect the terminals, and replace the terminal cover in its correct position.

18) Replace the removed parts in the reverse order of which they were removed. On water-cooled models, open the water-supply line shut-off valve and check for leaks. Replace the panels in their correct positions.

19) Plug the unit back in.

D. Removal and Replacement of Drier

IMPORTANT

Always install a new drier every time the sealed refrigeration system is opened. Do not replace the drier until after all other repair or replacement has been made.

1) Unplug the unit from the electrical outlet.

2) Remove the panels.

3) Recover the refrigerant and store it in an approved container.

4) Remove the drier (located behind the upper, rear panel).

5) Install the new drier with the arrow on the drier in the direction of the refrigerant flow. Use nitrogen gas at a pressure of 3 to 4 PSIG when brazing the tubings.

6) Check for leaks using nitrogen gas (140 PSIG) and soap bubbles.

7) Evacuate the system, and charge it with refrigerant. See the nameplate for the required refrigerant charge.

8) Replace the panels in their correct positions.

9) Plug the unit back in.

E. Removal and Replacement of Expansion Valve

IMPORTANT

Sometimes moisture in the refrigeration circuit exceeds the drier capacity and freezes up at the expansion valve. Always install a new drier every time the sealed refrigeration system is opened. Do not replace the drier until after all other repair or replacement has been made.

1) Unplug the unit from the electrical outlet.
2) Remove the panels.
3) Recover the refrigerant and store it in an approved container.
4) Remove the insulation and the expansion valve bulb on the suction line.
5) Remove the expansion valve cover, and then remove the expansion valve. Place the new expansion valve in position.
6) Remove the drier (located below the expansion valve), then place the new drier in position.
7) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.

WARNING

Always protect the valve body by using a damp cloth to prevent the valve from overheating. Do not braze with the valve body exceeding 250°F (121°C).

8) Check for leaks using nitrogen gas (140 PSIG) and soap bubbles.
9) Evacuate the system, and charge it with refrigerant. See the nameplate for the required refrigerant charge.
10) Attach the expansion valve bulb to the suction line in the same location as the previous bulb. The bulb should be at the 12 o'clock position on the tube. Be sure to secure the bulb with the clamp and holder and to insulate it.
11) Place the expansion valve cover in position.
12) Replace the panels in their correct positions.
13) Plug the unit back in.

F. Removal and Replacement of Hot Gas Valve

IMPORTANT

1. Always use a copper tube of the same diameter and length when replacing the hot gas lines; otherwise the performance may be reduced.
2. Always install a new drier every time the sealed refrigeration system is opened. Do not replace the drier until after all other repair or replacement has been made.
3. Always replace the strainer when replacing the hot gas valve.

1) Unplug the unit from the electrical outlet.
2) Remove the panels.
3) Recover the refrigerant and store it in an approved container.
4) Remove the screws securing the electrical box (located over the compressor), then slide out the box.
5) Remove the screws securing the compressor base and the condenser. On water-cooled models, close the water supply line shut-off valve, drain the condenser and then disconnect the water inlet and outlet at the condenser. Carefully slide the refrigeration assembly forward.
6) Remove the screw and the solenoid.
7) Disconnect the hot gas valve and the strainer.
8) Place the new valve and new strainer in position.
9) Remove the drier (located behind the upper, rear panel), then place the new drier in position.
10) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.

CAUTION

Always protect the valve body by using a damp cloth to prevent the valve from overheating. Do not braze with the valve body exceeding 250°F (121°C).

11) Check for leaks using nitrogen gas (140 PSIG) and soap bubbles.
12) Evacuate the system, and charge it with refrigerant. See the nameplate for the required refrigerant charge.
13) Cut the leads of the solenoid allowing enough lead length to reconnect using closed end connectors.
14) Connect the new solenoid leads.
15) Attach the solenoid to the valve body, and secure it with a screw.
16) Replace the removed parts in the reverse order of which they were removed. On water-cooled models, open the water-supply line shut-off valve and check for leaks. Replace the panels in their correct positions.
17) Plug the unit back in.

G. Removal and Replacement of Evaporator

IMPORTANT

Always install a new drier every time the sealed refrigeration system is opened. Do not replace the drier until after all other repairs or replacement have been made.

1) Unplug the unit from the electrical outlet.
2) Close the water supply line shut-off valve.
3) Remove the panels.
4) Recover the refrigerant and store it in an approved container.
5) Disconnect all affected water hoses and remove the spray tube.
6) Remove the screws securing the mounting brackets, lift the evaporator up slightly and disconnect the evaporator inlet tubing.
7) Lift up the evaporator, and disconnect the evaporator outlet tubing. Remove the evaporator.
8) Remove the drier (located behind the upper, rear panel), then place the new drier in position.
9) Install the new evaporator. Braze all fittings, including drier, while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.
10) Check for leaks using nitrogen gas (140 PSIG) and soap bubbles.
11) Evacuate the system, and charge it with refrigerant. See the nameplate for the required refrigerant charge.
12) Replace the removed parts in the reverse order of which they were removed.
13) Open the water supply line shut-off valve.
14) Plug the unit back in.
15) Check for leaks.
16) Replace the panels in their correct positions.

H. Removal and Replacement of Air-Cooled Condenser

1) Unplug the unit from the electrical outlet.
2) Remove the panels.
3) Recover the refrigerant and store it in an approved container.
4) Remove the screws securing the electrical box (located over the compressor), then slide out the box.
5) Remove the screws securing the compressor base and the condenser. Carefully slide the refrigeration assembly forward.
6) Disconnect the condenser inlet and outlet piping.
7) Remove the fan motor and shroud assembly from the old condenser and attach it to the new condenser.

8) Place the new condenser in position.

9) Remove the drier (located behind the upper, rear panel), then place the new drier in position.

10) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.

11) Check for leaks using nitrogen gas (140 PSIG) and soap bubbles.

12) Evacuate the system, and charge it with refrigerant. See the nameplate for the required refrigerant charge.

13) Replace the removed parts in the reverse order of which they were removed, then replace the panels in their correct positions.

14) Plug the unit back in.

I. Removal and Replacement of Water-Cooled Condenser

1) Unplug the unit from the electrical outlet.

2) Remove the panels.

3) Recover the refrigerant and store it in an approved container.

4) Remove the screws securing the electrical box (located over the compressor), then slide out the box.

5) Remove the screws securing the compressor base and the condenser. Close the water supply line shut-off valve, drain the condenser and then disconnect the water inlet and outlet at the condenser. Carefully slide the refrigeration assembly forward.

6) Disconnect the condenser inlet and outlet piping from the refrigeration circuit.

7) Remove the mounting bracket from the old condenser and attach it to the new condenser

8) Place the new condenser in position.

9) Remove the drier (located behind the upper, rear panel), then place the new drier in position.

10) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.

11) Check for leaks using nitrogen gas (140 PSIG) and soap bubbles.

12) Evacuate the system, and charge it with refrigerant. See the nameplate for the required refrigerant charge.

13) Replace the removed parts in the reverse order of which they were removed. Open the water-supply line shut-off valve and check for leaks. Replace the panels in their correct positions.

14) Plug the unit back in.

J. Removal and Replacement of Water Regulating Valve - Water-Cooled Model Only

IMPORTANT

Always install a new drier every time the sealed refrigeration system is opened. Do not replace the drier until after all other repair or replacement has been made.

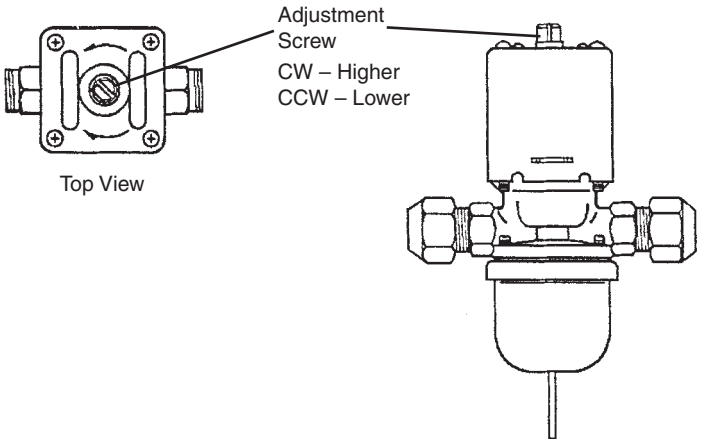
1) Unplug the unit from the electrical outlet.
2) Close the condenser water supply line shut-off valve, and then drain the condenser.
3) Remove the panels.
4) Recover the refrigerant and store it in an approved container.
5) Disconnect the capillary tube at the condenser outlet.
6) Disconnect the flare-connections of the valve.
7) Remove the screws and the valve from the bracket.
8) Install the new valve, and braze the capillary tube.
9) Install the new drier.
10) Check for leaks using nitrogen gas (140 PSIG) and soap bubbles.
11) Evacuate the system, and charge it with refrigerant. See the nameplate for the required refrigerant charge.
12) Connect the flare-connections.
13) Open the water supply line shut-off valve.
14) Check for water leaks.
15) Replace the panels in their correct positions.
16) Plug the unit back in.

K. Adjustment of Water Regulating Valve - Water-Cooled Model Only

The water regulating valve (also called "water regulator") is factory-adjusted. No adjustment is required under normal use. Adjust the water regulator, if necessary, using the following procedures.

1) Prepare a thermometer to check the condenser drain temperature. Attach a pressure gauge to the high-side line of the system.
2) Five minutes after a freeze cycle starts, confirm that the thermometer reads 104°F to 115°F (40°C to 46°C). If it does not, rotate the adjustment screw by using a flat blade screwdriver until the temperature is in the proper range. Next, check that the reference pressure is in the range indicated in the Head Pressure table in the Performance Data section. If it is not in the proper range, verify the refrigerant charge.

3) Check that the condenser drain temperature is stable.



L. Removal and Replacement of Thermistor

IMPORTANT

1. Fragile, handle very carefully.
2. Always use a recommended sealant (High Thermal Conductive Type), Model KE4560RTV manufactured by SHINETSU SILICONE, Part Code 60Y000-11, or Part Code 4A0683-01 equivalent.
3. Always use a recommended foam insulation (non-absorbent type) or equivalent.
4. Do not shorten or cut the thermistor leads when installing it.

1) Unplug the unit from the electrical outlet.

2) Remove the panels.

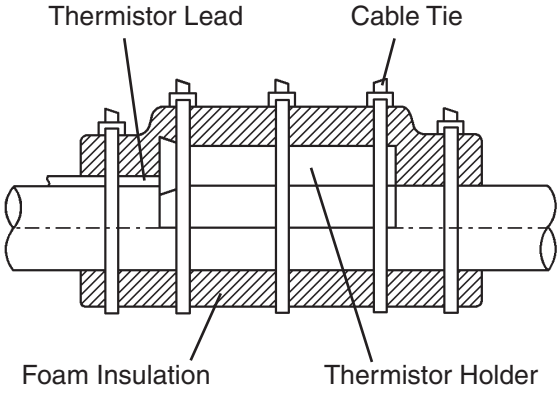
3) Disconnect the thermistor leads from the K3 connector on the control board.

4) Remove the plastic cable ties, foam insulation, thermistor holder and thermistor.

5) Scrape away the old sealant on the thermistor holder and the suction pipe.

6) Wipe off moisture or condensation on the suction pipe.

7) Smoothly apply recommended sealant (KE4560RTV, Part Code 60Y000-11 or 4A0683-01) to the thermistor holder concave.



8) Attach the new thermistor to the suction pipe very carefully to prevent damage to the leads. Secure it using the thermistor holder and recommended foam insulation.

9) Secure the insulation using plastic cable ties.

10) Connect the thermistor leads to the K3 connector on the control board.
Note: Do not cut the leads of the thermistor while installing it.

11) Replace the panels in their correct positions.

12) Plug the unit back in.

M. Removal and Replacement of Fan Motor

Note: When replacing a fan motor with defective winding, it is recommended that a new capacitor be installed.

1) Unplug the unit from the electrical outlet.

2) Remove the panels.

3) Remove the screws securing the electrical box (located over the compressor), then slide out the box.

4) Remove the screws securing the compressor base and the condenser. Carefully slide the refrigeration assembly forward.

5) Remove the closed end connectors from the fan motor leads.

6) Remove the fan motor bracket and fan motor.

7) Remove the fan blade from the old fan motor and attach it to the new fan motor.

8) Install the new fan motor, and replace the removed parts in the reverse order of which they were removed.

9) Replace the panels in their correct positions.

10) Plug the unit back in.

N. Removal and Replacement of Freeze or Harvest Water Valve

1) Unplug the unit from the electrical outlet.

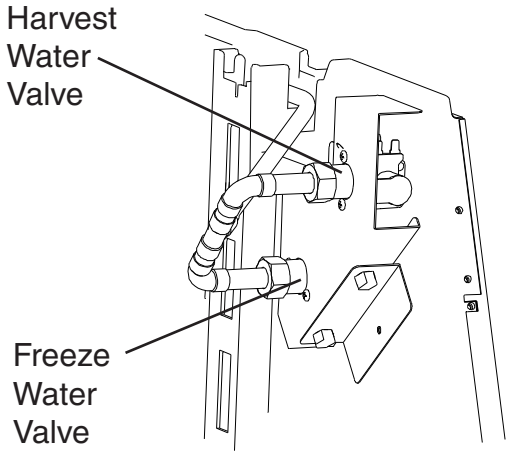
2) Close the water supply line shut-off valve.

3) Remove the top panel and the insulation panel.

4) Remove the thumbscrews and bracket securing the valve mounting bracket and the plastic water pan.

5) Loosen the fitting nuts. Be careful not to lose the washers.

6) Disconnect the hoses and the terminals, then remove the valve mounting bracket from the unit.



7) Install the new water valve, and replace the removed parts in the reverse order of which they were removed. Make sure the washers are in place in the fitting nuts.

8) Open the water supply line shut-off valve.

9) Plug the unit back in.

10) Check for leaks.

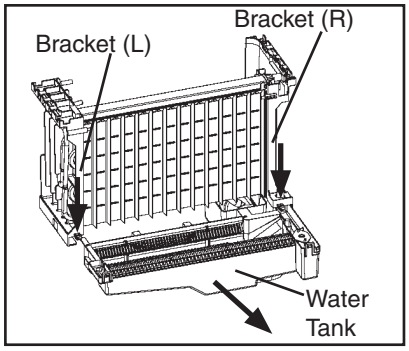
11) Replace the panels in their correct positions.

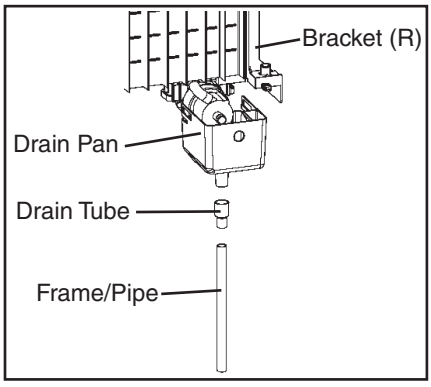
O. Removal and Replacement of Wash Valve

1) Unplug the unit from the electrical outlet.
2) Close the water supply line shut-off valve.
3) Remove the top panel and the insulation panel.
4) Remove the screws securing the valve to the bracket.
5) Disconnect the hoses and the terminals.
6) Note the orientation of the rubber grommet, then remove the rubber grommet and the valve.
7) Put the rubber grommet on the new valve and then install the valve.
8) Replace the removed parts in the reverse order of which they were removed.
9) Open the water supply line shut-off valve.
10) Plug the unit back in.
11) Check for leaks.
12) Replace the panels in their correct positions.

P. Removal and Replacement of Pump Motor

1) Unplug the unit from the electrical outlet.
2) Remove the top panel and the insulation panel.
3) Disconnect the pump suction and discharge hoses.
4) Remove the water tank by pressing down on the snaps on Bracket (L) and Bracket (R) and pulling the tank towards you.
5) Remove the drain pan assembly from Bracket (R) by pulling it towards you. It is snapped in place.
6) Disconnect the ground wire from the frame and disconnect the pump wiring at the connector.
7) Push up on the plastic tab securing the water pump and slide the pump forward to remove it.
8) Install the new pump, then replace the removed parts in the reverse order of which they were removed.
9) Plug the unit back in and check for leaks.
10) Replace the panels in their correct positions.





Q. Removal and Replacement of Spray Tube

1) Unplug the unit from the electrical outlet.
2) Remove the top panel and the insulation panel.
3) Remove the rubber hoses from the spray tube (water supply pipe).
4) Release the clamps, and disconnect the rubber hoses.
5) Remove the spray tube.
6) Install the new spray tube, and replace the removed parts in the reverse order of which they were removed.
7) Replace the panels in their correct positions.
8) Plug the unit back in.

VI. Cleaning and Maintenance Instructions

IMPORTANT

Ensure all components, fasteners and thumbscrews are securely in place after any maintenance or cleaning is done to the equipment.

A. Cleaning

WARNING

1. Hoshizaki recommends cleaning this unit at least once a year. More frequent cleaning, however, may be required in some existing water conditions.
2. To prevent injury to individuals and damage to the icemaker, do not use ammonia type cleaners.
3. Always wear liquid-proof gloves to prevent the cleaning and sanitizing solutions from coming into contact with skin.
4. For safety and maximum effectiveness, use cleaning and sanitizing solutions immediately after dilution.

1. Cleaning Procedure

1) Dilute 5 fl. oz. (148 ml) of recommended cleaner Hoshizaki "Scale Away" or "LIME-A-WAY," (Economics Laboratory, Inc.) with 1 gallon (3.8 l) of warm water.
2) Remove the top panel and the insulation panel.
3) Remove all ice from the evaporator and the storage bin.
   Note: To remove cubes on the evaporator, move the control switch on the control box to the OFF position and move it back to the ICE position after 3 minutes. The defrost cycle starts and the cubes will be removed from the evaporator.
4) Move the control switch to the OFF position. Open the door.
5) Disconnect the suction hose to drain the water. See Fig. 1.
6) Reconnect the suction hose back in its correct position after all of the water has drained.
7) Pour the cleaning solution into the water tank.
8) Move the control switch to the WASH position.
9) Close the door.

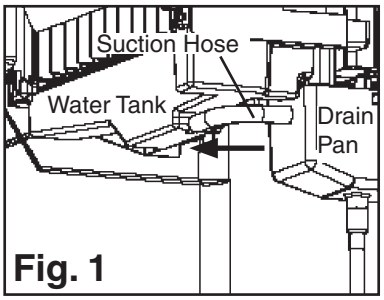


Fig. 1

10) After 30 minutes, move the control switch to the OFF position.
11) Disconnect the suction hose to drain the water. Reconnect the suction hose back in its correct position after all of the water has drained.
12) Move the control switch to the ICE position to fill the water tank with water.
13) After 3 minutes, move the control switch to the WASH position.
14) After 5 minutes, move the control switch to the OFF position.
15) Disconnect the suction hose to drain the water. Reconnect the suction hose back in its correct position after all of the water has drained.
16) Repeat steps 12 through 15 three more times to rinse thoroughly.

17) Remove the bin control switch housing at the back of the water tank. It is snapped in place. Pinch it and then pull down. See Fig. 2.

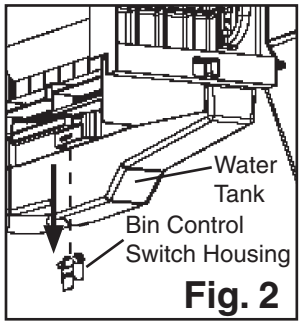


Fig. 2

18) Disconnect the suction hose. Next, remove the water tank by pressing down on the snaps on Bracket (L) and Bracket (R) and pulling the tank towards you. See Fig. 3.

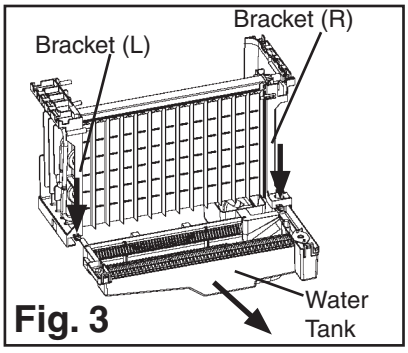


Fig. 3

19) Remove the float switch from the water tank by pulling out on the right-side wall of the water tank slightly and sliding the float switch upward. Be careful to avoid breakage when handling the parts. See Fig. 4.

20) Remove the detector from the water tank. It is snapped in place. Slide it up and then out. See Fig. 4.

21) Pull Cube Guide (A) and Cube Guide (B) (qty. varies depending on model) upward to remove them from the water tank. They are snapped in place. See Fig. 4.

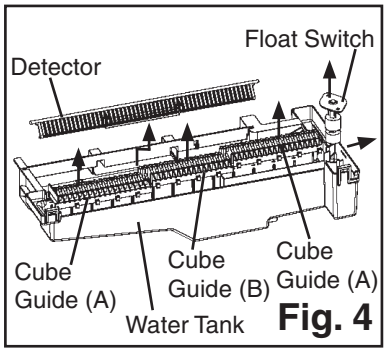


Fig. 4

22) Remove the suction hose from the water tank.

23) Remove the drain pan from Bracket (R) by pulling it towards you. It is snapped in place. Remove the drain tube and the frame/pipe from the drain pan. See Fig. 5.

24) Dilute 5 fl. oz. (148 ml) of recommended cleaner Hoshizaki "Scale Away" or "LIME-A-WAY," (Economics Laboratory, Inc.) with 1 gallon (3.8 l) of warm water.

25) Wash the bin control switch housing, water tank, float switch, detector, Cube Guide (A), Cube Guide (B), suction hose, drain pan, drain tube, and frame/pipe by using a nylon scouring pad, brushes and the cleaning solution. In addition to the removed parts, also wash the bin liner, Bracket (L) and Bracket (R) with the solution.

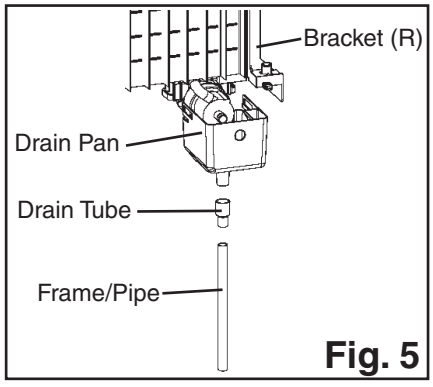


Fig. 5

26) Discard the cleaning solution and rinse the parts thoroughly with water.

2. Sanitizing Procedure - Following Cleaning Procedure

1) Dilute approximately 0.5 fl. oz. (15 ml or 1 tbs) of a 5.25% sodium hypochlorite solution (chlorine bleach) with 1 gallon (3.8 l) of warm water. Using a chlorine test strip or other method, confirm that you have a concentration of about 200 ppm.
2) Soak the removed parts from step 25 above in a clean container containing the sanitizing solution. After allowing the parts to soak for 10 minutes, wash them with the solution. Also wash the bin liner, Bracket (L) and Bracket (R) with the solution.
3) Discard the sanitizing solution and rinse the parts thoroughly with water.
4) Replace the removed parts in their correct positions in the reverse order of which they were removed. Put the float switch wiring tubing in the slot to the right of the water tank latch before putting the water tank in place.
5) Dilute approximately 0.5 fl. oz. (15 ml or 1 tbs) of a 5.25% sodium hypochlorite solution (chlorine bleach) with 1 gallon (3.8 l) of warm water. Using a chlorine test strip or other method, confirm that you have a concentration of about 200 ppm.
6) Pour the sanitizing solution into the water tank, and allow the sanitizer to sit for 10 minutes.
7) Move the control switch to the WASH position.
8) Close the door.
9) After 15 minutes, move the control switch to the OFF position.
10) Open the door.
11) Disconnect the suction hose to drain the water. Reconnect the suction hose back in its correct position after all of the water has drained.
12) Repeat steps 5 through 11 one time.
13) Repeat steps 12 through 15 in the Cleaning Procedure three times to rinse thoroughly.
14) Flush the storage bin with water.
15) Move the control switch to the ICE position, and start the automatic icemaking process.
16) Close the door.
17) Replace the front panel in its correct position.

B. Maintenance

1. Exterior Panels

To prevent corrosion, wipe the exterior occasionally with a clean and soft cloth. Use a damp cloth containing a neutral cleaner to wipe off oil or dirt build up.

2. Storage Bin and Scoop

- Wash your hands before removing ice. Use the plastic scoop provided (Accessory).
- The storage bin is for ice use only. Do not store anything else in the bin.
- Keep the scoop clean. Clean it by using a neutral cleaner and rinse thoroughly.
- Clean the bin liner by using a neutral cleaner. Rinse thoroughly after cleaning.

3. Air Filter (air-cooled model only)

The plastic mesh air filter removes dirt and dust from the air, and keeps the condenser from getting clogged. As the filter gets clogged, the icemaker's performance will be reduced. Check the filter at least twice a month. When it is clogged, use warm water and a neutral cleaner to wash the filter.

4. Condenser (air-cooled model only)

Check the condenser once a year and clean if required by using a brush or vacuum cleaner. More frequent cleaning may be required depending on the location of the icemaker.

C. Preparing the Icemaker for Long Storage

IMPORTANT

When shutting off the icemaker for an extended time, drain out all water from the water lines and remove the ice from the storage bin. The storage bin should be cleaned and dried. Drain the icemaker and water-cooled condenser (if applicable) using air or carbon dioxide to prevent damage to the water supply lines at sub-freezing temperatures. Shut off the icemaker until the proper ambient temperature is resumed.

When the icemaker is not used for two or three days, it is sufficient to only move the control switch to the OFF position, unless the icemaker will be at sub-freezing temperatures.

To drain all water from the icemaker, follow the steps below.

1) Remove the front panel, top panel and insulation panel.
2) Move the control switch on the control box to the OFF position.
3) Wait 3 minutes, then move the control switch to the ICE position.
4) Allow the icemaker to complete the one minute fill cycle (LED 4 is on), then move the switch back to the OFF position.
5) Close the potable water supply line shut-off valve and open the potable water supply line drain valve.
6) Allow the line to drain by gravity.
7) Move the control switch to the ICE position.
8) Blow the potable water supply line out using compressed air or carbon dioxide. This will clear water from the freeze water valve.
9) Allow the machine to cycle from the one minute fill cycle to the initial harvest cycle (LEDs 1, 4 and 2 are on). Blow the potable water supply line out using compressed air or carbon dioxide. This will clear water from the harvest water valve.
10) Move the control switch to the OFF position.
11) Disconnect the suction hose to drain the water. See Fig. 1.
12) Disconnect the upper hose from the harvest water valve. Move the control switch to the WASH position and quickly blow out the hose line using compressed air or carbon dioxide. This will clear water from the wash valve.

13) Move the control switch to the OFF position.

14) Reconnect the suction hose and harvest water valve hose.

15) Close the potable water supply line drain valve.

16) Remove all ice from the storage bin and clean the bin.

17) Unplug the unit from the electrical outlet.

18) If the icemaker is water cooled, proceed to the next section to drain the condenser. If the icemaker is air cooled, place the panels back in their correct positions. The procedure is complete.

To drain all water from the water-cooled condenser, follow the steps below.

1) Close the water-cooled condenser water supply line shut-off valve.

2) Open the drain valve for the water-cooled condenser water supply line.

3) Allow the line to drain by gravity.

4) Attach compressed air or carbon dioxide supply to the condenser water supply line drain valve.

5) Blow the water supply line out using compressed air or carbon dioxide until water stops coming out.

6) Disconnect the water inlet and outlet at the condenser.

7) Remove the screws securing the compressor base and the condenser. Carefully slide the refrigeration assembly forward.

8) Attach compressed air or carbon dioxide supply to the condenser and blow out the condenser.

9) Close the condenser water supply line drain valve.

10) Place all removed parts back in their correct positions, and then place the panels back in their correct positions.