

Hoshizaki America, Inc.

Stackable Crescent Cuber

Models

KM-2500SWH3

KM-2500SRH3



“A Superior Degree
of Reliability”

www.hoshizaki.com

SERVICE MANUAL



Number: 73164
Issued: 6-10-2010

IMPORTANT

Only qualified service technicians should install, service, and maintain the icemaker. No service or maintenance should be undertaken until the technician has thoroughly read this Service Manual. Failure to service and maintain the equipment in accordance with this manual may adversely affect safety, performance, component life, and warranty coverage.

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 for assistance.

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

Attn: Hoshizaki Technical Support Department

Phone: 1-800-233-1940 Technical Support
(770) 487-2331
Fax: 1-800-843-1056
(770) 487-3360
E-mail: techsupport@hoshizaki.com

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.

IMPORTANT

This manual should be read carefully before the icemaker is serviced or maintenance operations are performed. Only qualified service technicians should install, service, and maintain the icemaker. Read the warnings contained in this booklet carefully as they give important information regarding safety. Please retain this booklet for any further reference that may be necessary.

CONTENTS

Important Safety Information	5
I. Specifications.....	6
A. Icemaker	6
1. KM-2500SWH3 (water-cooled)	6
2. KM-2500SRH3 (remote air-cooled)	7
B. Condenser Unit	8
1. URC-23F	8
II. General Information	10
A. Construction.....	10
1. KM-2500SWH3 (water-cooled)	10
2. KM-2500SRH3 (remote air-cooled)	11
B. Sequence of Operation	12
1. Sequence Cycles and Shutdown	12
a) 1-Minute Fill Cycle	12
b) Initial Harvest Cycle	12
c) Freeze Cycle	12
d) Pump-Out Cycle	12
e) Harvest Cycle	13
f) Shutdown.....	13
2. Sequence Flow Chart.....	14
C. Control Board.....	15
1. Control Board Layout	16
2. Features.....	17
a) Maximum Water Supply Period – 6 minutes	17
b) Harvest Backup Timer and Freeze Timer.....	17
c) High Temperature Safety.....	17
d) Low Water Safety.....	17
e) High Voltage and Low Voltage Cut-outs.....	17
3. LED Lights and Audible Alarm Safeties	18
4. Controls and Adjustments.....	19
a) Default Dip Switch Settings.....	19
b) Harvest Timer (S4 dip switch 1 & 2).....	19
c) Pump-Out Timer (S4 dip switch 3 & 4).....	20
d) Pump-Out Frequency Control (S4 dip switch 5 & 6).....	20
e) Bin Control Selector (S4 dip switch 7).....	21
f) Factory Use (S4 dip switch 8)	21
g) Freeze Timer (S4 dip switch 9 & 10)	21

D. Bin Control	22
E. Float Switch.....	22
F. Thermistor	22
G. Control Switch.....	22
III. Technical Information	23
A. Water Circuit and Refrigeration Circuit	23
1. KM-2500SWH3 (water-cooled)	23
2. KM-2500SRH3 (remote air-cooled)	24
B. Wiring Diagrams.....	25
1. KM-2500SWH3 (water-cooled), KM-2500SRH3 (remote air-cooled)	25
C. Performance Data	26
1. KM-2500SWH3 (water-cooled)	26
2. KM-2500SRH3 (remote air-cooled)	27
IV. Service Diagnosis	28
A. Diagnostic Procedure	28
B. Control Board Check	31
C. Bin Control Check	32
D. Float Switch Check and Cleaning	32
E. Thermistor Check	34
F. Diagnostic Charts	35
V. Removal and Replacement of Components	43
A. Service for Refrigerant Lines.....	43
1. Refrigerant Recovery	43
2. Brazing	44
3. Evacuation and Recharge (R-404A).....	44
B. Removal and Replacement of Compressor.....	45
C. Removal and Replacement of Expansion Valve.....	46
D. Removal and Replacement of Hot Gas Valve or Liquid Line Valve	47
E. Removal and Replacement of Evaporator.....	48
F. Removal and Replacement of Water-Cooled Condenser.....	49
G. Removal and Replacement of Remote Air-Cooled Condenser	50
H. Removal and Replacement of Water Regulating Valve (water-cooled model).....	51
I. Adjustment of Water Regulating Valve - Water-Cooled Model	52
J. Removal and Replacement of Headmaster (Condensing Pressure Regulator - C.P.R.) - Remote Air-Cooled Model	52
K. Removal and Replacement of Thermistor	53
L. Removal and Replacement of Fan Motor – Remote Air-Cooled Model.....	54
M. Removal and Replacement of Inlet Water Valve	54
N. Removal and Replacement of Pump Motor	55
O. Removal and Replacement of Control Board.....	56
VI. Cleaning and Maintenance.....	57
A. Cleaning and Sanitizing Instructions	57
1. Cleaning Procedure.....	58
2. Sanitizing Procedure - Following Cleaning Procedure	59
B. Maintenance.....	60
C. Preparing the Icemaker for Long Storage	60

Important Safety Information

Throughout this manual, notices appear to bring your attention to situations which could result in death, serious injury, or damage to the unit.

⚠ WARNING Indicates a hazardous situation which could result in death or serious injury.

CAUTION Indicates a situation which could result in damage to the unit.

IMPORTANT Indicates important information about the use and care of the unit.

⚠ WARNING

This icemaker should be destined only to the use for which it has been expressly conceived. Any other use should be considered improper and therefore dangerous. The manufacturer cannot be held responsible for eventual damage caused by improper, incorrect, and unreasonable use.

To reduce the risk of death, electric shock, serious injury, or fire, follow basic precautions including the following:

- Electrical connection must be hard-wired and must meet national, state, and local electrical code requirements. Failure to meet these code requirements could result in death, electric shock, serious injury, fire, or severe damage to equipment.
- This unit requires an independent power supply. See the nameplate for proper voltage and breaker/fuse size. Failure to use a proper breaker or fuse can result in a tripped breaker, blown fuse, or damage to existing wiring. This could lead to heat generation or fire.
- **THIS UNIT MUST BE GROUNDED.** Failure to properly ground this unit could result in death or serious injury.
- This unit should be disassembled or repaired only by qualified service personnel to reduce the risk of electric shock, injury, or fire.
- Do not make any alterations to the unit. Alterations could result in electric shock, injury, fire, or damage to the unit.

I. Specifications

A. Icemaker

1. KM-2500SWH3 (water-cooled)

AC SUPPLY VOLTAGE	208-230/60/3			
AMPERAGE	14.2 A (5 Min. Freeze AT 104°F / WT 80°F)			
MINIMUM CIRCUIT AMPACITY	30 A			
MAXIMUM FUSE SIZE	30 A			
APPROXIMATE ICE PRODUCTION PER 24 HR. lbs./day (kg/day) Reference without *marks	Ambient Temp.(°F)	WATER TEMP. (°F)		
		50	70	90
	70	*2408 (1092)	2395 (1087)	2256 (1024)
	80	2398 (1088)	2379 (1079)	2172 (985)
	90	2395 (1087)	*2365 (1073)	2184 (991)
	100	2327 (1055)	2323 (1054)	2018 (915)
SHAPE OF ICE	Crescent Cube			
ICE PRODUCTION PER CYCLE	46.3 lbs. (21 kg) 2160pcs.			
APPROXIMATE STORAGE CAPACITY	N/A			
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F		
ELECTRIC W (kWH/100 lbs.)	3720(3.78)	3510(3.5)		
WATER gal./24HR (gal./100 lbs.)	459(19.4)	744(30.9)		
WATER COOLED CONDENSER gal./24HR (gal./100 lbs.)	1430(101)	1430(59)		
CEC/CEE TIER LEVEL	1			
ENERGY STAR	N/A			
EXTERIOR DIMENSIONS (WxDxH)	48" x 27-3/8" x 36-7/16" (1219 x 695 x 925 mm)			
EXTERIOR FINISH	Stainless Steel, Galvanized Steel (Rear)			
WEIGHT	Net 390 lbs. (177 kg), Shipping 415 lbs. (188 kg)			
CONNECTIONS - ELECTRIC	Permanent - Connection			
- WATER SUPPLY	Inlet	1/2" FPT	Condenser Inlet 1/2" FPT	
- DRAIN	Outlet	3/4" FPT	Condenser Outlet 1/2" FPT	
		3/8" OD Tube		
CUBE CONTROL SYSTEM	Float Switch			
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	Thermostat			
COMPRESSOR	Hermetic, Model CS27K6E-TF5-237			
CONDENSER	Water Cooled, Tube in Tube Type			
EVAPORATOR	Vertical type, Stainless Steel and Copper			
REFRIGERANT CONTROL	Thermostatic Expansion Valve			
REFRIGERANT CHARGE	R404A, 4 lb. 11.5 oz. (2140g)			
DESIGN PRESSURE	High 427PSIG, Low 230PSIG			
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	N/A			
-REQUIRED	Ice Storage Bin			
OPERATING CONDITIONS	VOLTAGE RANGE	187 - 253 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-2500SRH3 (remote air-cooled)

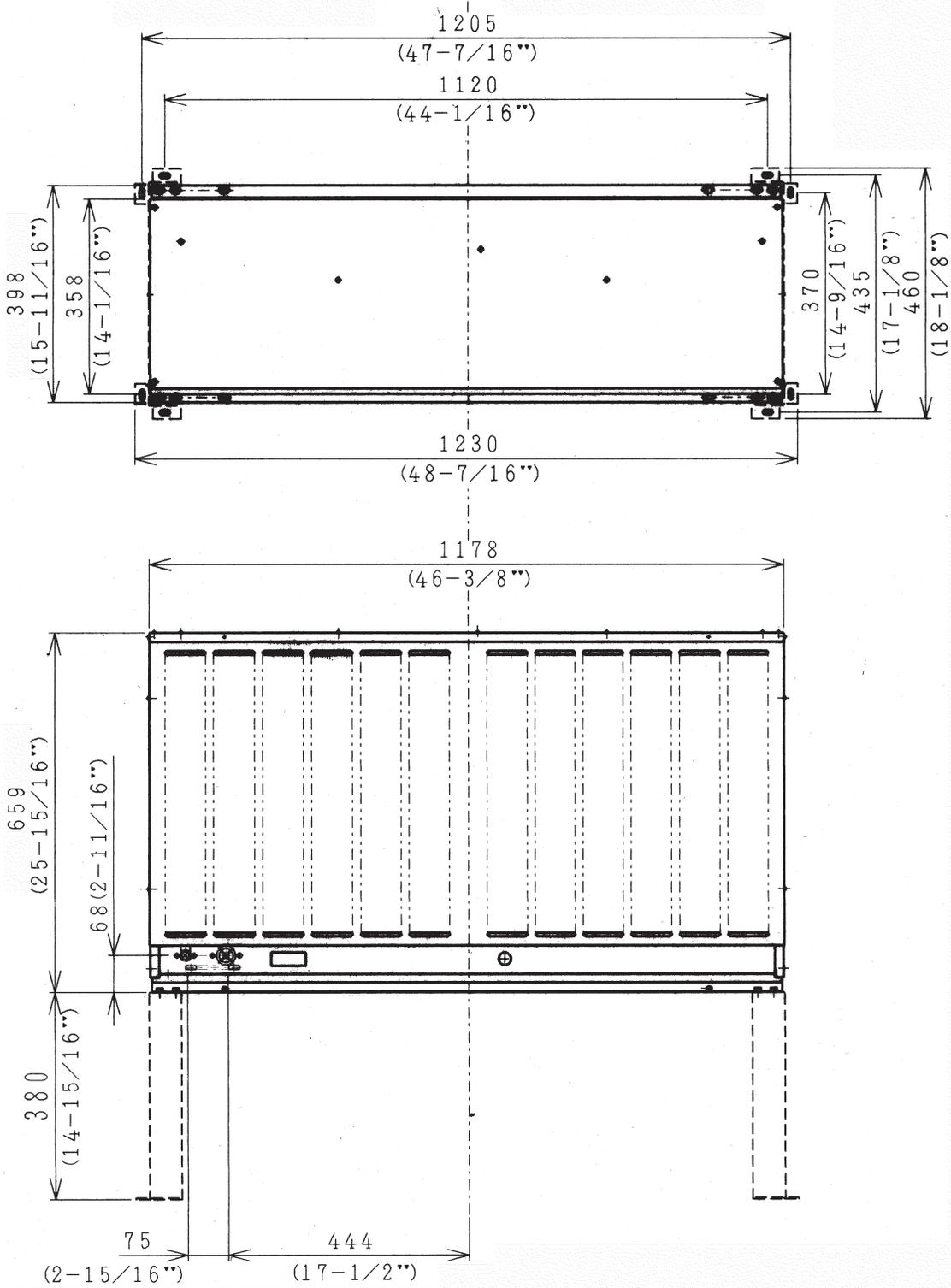
AC SUPPLY VOLTAGE	208-230/60/3			
AMPERAGE	17.7 A (5 Min. Freeze AT 104°F / WT 80°F)			
MINIMUM CIRCUIT AMPACITY	30 A			
MAXIMUM FUSE SIZE	30 A			
APPROXIMATE ICE PRODUCTION PER 24 HR. lbs./day (kg/day) Reference without *marks	Ambient Temp.(°F)	WATER TEMP. (°F)		
		50	70	90
	70	*2424 (1100)	2373 (1076)	2196 (996)
	80	2385 (1082)	2306 (1046)	2069 (939)
	90	2373 (1076)	*2250 (1021)	2035 (923)
	100	2301 (1044)	2200 (998)	1837 (833)
SHAPE OF ICE	Crescent Cube			
ICE PRODUCTION PER CYCLE	46.1 lbs. (20.9 kg) 2160pcs.			
APPROXIMATE STORAGE CAPACITY	N/A			
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F		
ELECTRIC W (kWH/100 lbs.)	4220(4.5)	3780(3.7)		
WATER gal./24HR (gal./100 lbs.)	419(18.6)	791(32.6)		
CEC/CEE TIER LEVEL	2			
ENERGY STAR	YES			
EXTERIOR DIMENSIONS (WxDxH)	48" x 27-3/8" x 36-7/16" (1219 x 695 x 925 mm)			
EXTERIOR FINISH	Stainless Steel, Galvanized Steel (Rear)			
WEIGHT	Net 390 lbs. (177 kg), Shipping 440 lbs. (200 kg)			
CONNECTIONS - ELECTRIC	Permanent - Connection			
- WATER SUPPLY	Inlet	1/2" FPT		
- DRAIN	Outlet	3/4" FPT		
		3/8" OD Tube		
CUBE CONTROL SYSTEM	Float Switch			
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	Thermostat			
COMPRESSOR	Hermetic, Model MTZ-57-HL3A			
CONDENSER	Air-Cooled Remote, Condenser Unit URC-23F			
EVAPORATOR	Vertical type, Stainless Steel and Copper			
REFRIGERANT CONTROL	Thermostatic Expansion Valve			
	Condensing Pressure Regulator on Icemaker (190 PSI)			
REFRIGERANT CHARGE	R404A, 24 lb. 7.5 oz. (11100g) (Icemaker 14 lbs. 12.3 oz. Cond. Unit 9 lbs. 11.2 oz.)			
DESIGN PRESSURE	High 467PSIG, Low 230PSIG			
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	N/A			
-REQUIRED	Ice Storage Bin, Remote Condenser Unit			
OPERATING CONDITIONS	VOLTAGE RANGE	187 - 253 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.

B. Condenser Unit

1. URC-23F

Unit: mm (inches)



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

SPECIFICATIONS

MODEL: URC-23F

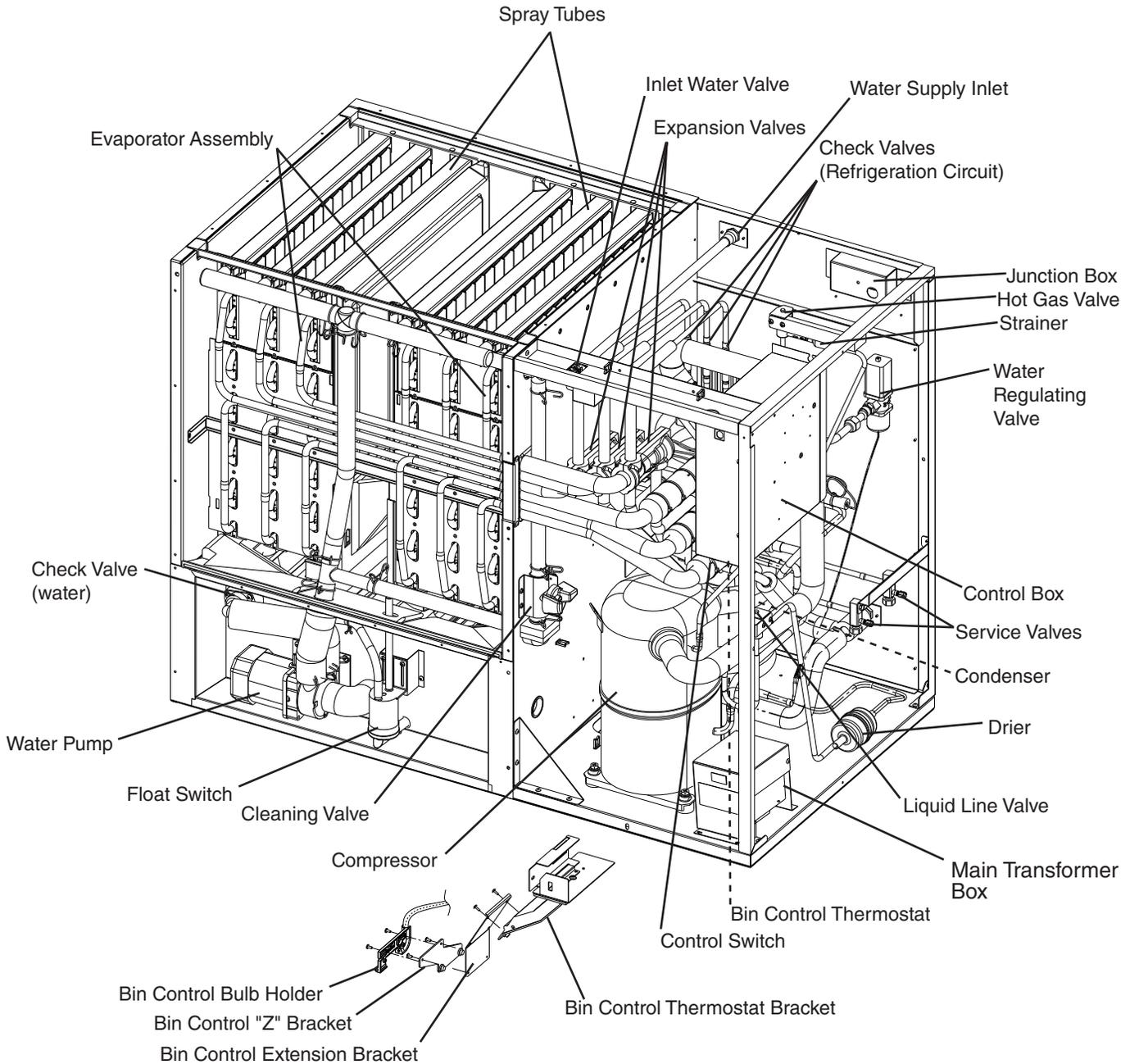
AC SUPPLY VOLTAGE	115/60/1 (Connection to Icemaker)		
FAN MOTOR	115 V	Total 2.6FLA	130W
EXTERIOR DIMENSIONS (WxDxH)	46-3/8" x 15-11/16" x 25-15/16" (1178 x 398 x 659 mm)		
DIMENSIONS INCLUDING LEGS (WxDxH)	48-7/16" x 18-1/8" x 40-7/8" (1230 x 460 x 1039 mm)		
EXTERIOR FINISH	Galvanized Steel		
WEIGHT	Net 158 lbs. (72 kg)	Shipping 169 lbs. (77 kg)	
CONNECTIONS - ELECTRIC	Permanent - Connection		
- REFRIGERANT	Discharge Line 1-1/16"-12 UNF Fitting (#10 AEROQUIP)		
	Liquid Line	5/8"-18 UNF Fitting (#6 AEROQUIP)	
CONDENSER	Air-cooled, Fin and tube type		
FAN MOTOR PROTECTION	Thermal Protection		
REFRIGERANT CONTROL	Condensing Pressure Regulator (In Ice Machine)		
REFRIGERANT CHARGE	R-404A	9 lb. 11oz.	(4400g)
DESIGN PRESSURE	High 467 PSIG	32.2 Bar	
OPERATING CONDITIONS	VOLTAGE RANGE	104 ~ 127 V	
	AMBIENT TEMP.	-20 ~ 122 °F	
ACCESSORIES -SUPPLIED	Leg		2 pcs
	Hex. Head Bolt w/Washer 8 x 16		8 pcs
	Hex. Nut	8	8 pcs

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

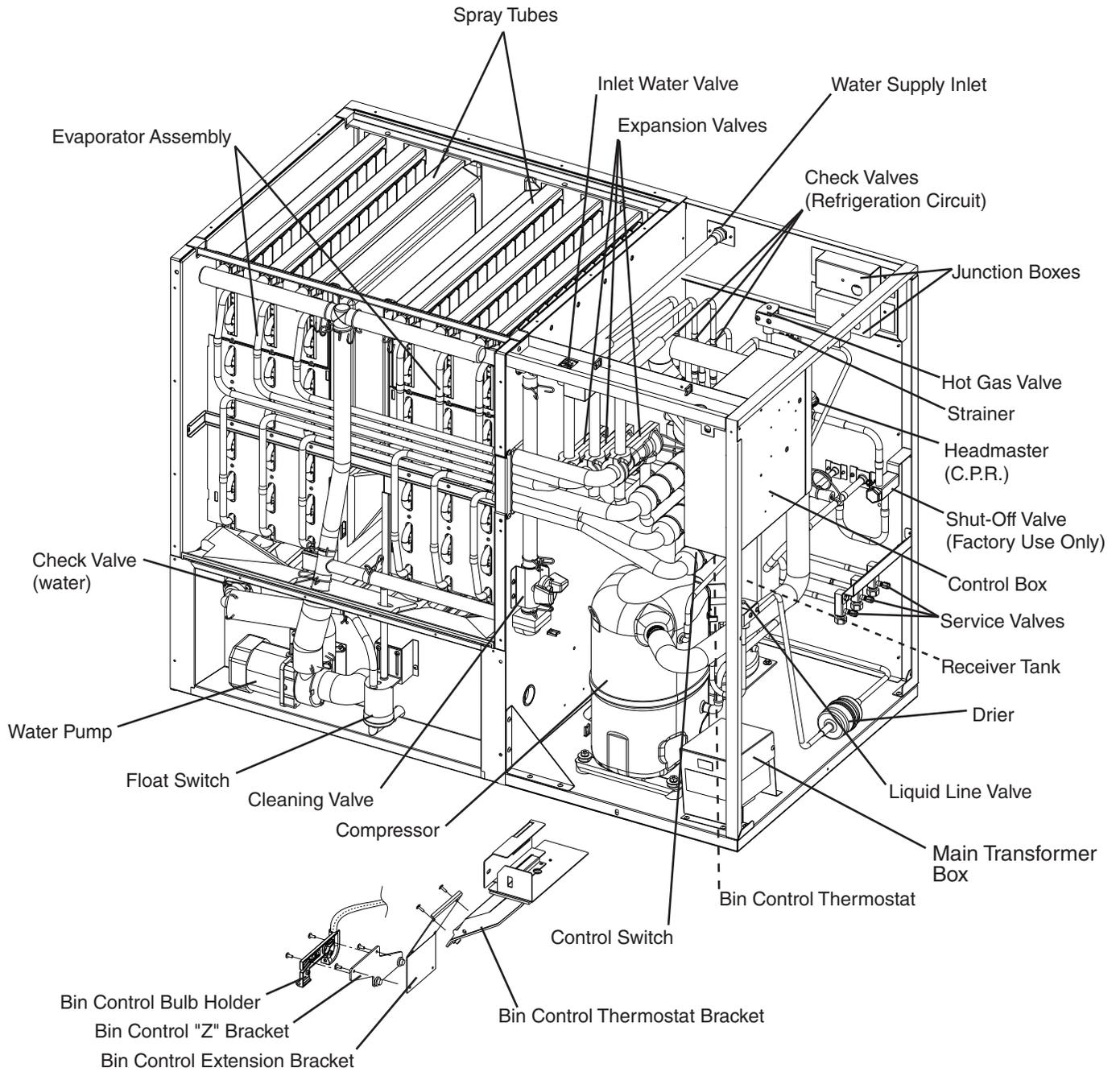
II. General Information

A. Construction

1. KM-2500SWH3 (water-cooled)



2. KM-2500SRH3 (remote air-cooled)



B. Sequence of Operation

1. Sequence Cycles and Shutdown

The steps in the sequence are as outlined below. When power is supplied and BC is closed, CB red "POWER OK" LED comes on. There is a 5-second delay before startup. Note that the order of the LEDs from the outer edge of CB is 1, 4, 3, 2.

a) 1-Minute Fill Cycle

LED 4 is on. WV energizes and the 1-minute fill cycle begins. After 1 minute, CB checks for a closed F/S. If F/S is closed, the harvest cycle begins. If not, WV remains energized through additional 1-minute fill cycles until water enters the tank and closes F/S. This serves as a low water safety to protect PM.

b) Initial Harvest Cycle

LEDs 1, 4, and 2 are on. WV remains energized, Comp, FMR, and HGV energize. CB monitors the warming of the evaporator via the thermistor located on the suction line. When the thermistor warms to 48°F (9°C), CB reads a 3.9 kΩ signal from the thermistor and turns harvest termination over to the harvest timer (S4 dip switch 1 & 2) which is factory set for normal conditions. The harvest timer has settings of 60, 90, 120, and 180 seconds. For details, see "II.C.4.b) Harvest Timer (S4 Dip Switch 1 & 2)." When the harvest timer terminates, the harvest cycle is complete. At the end of harvest, CB checks the position of F/S and proceeds to the next cycle if it is closed or calls for a 1-minute fill cycle if it is open. The minimum total time allowed by CB for a complete harvest cycle is 2 minutes. WV is energized during harvest for a maximum of 6 minutes or the length of harvest, whichever is shorter.

c) Freeze Cycle

LED 1 is on. Comp and FMR remain energized. PM and LLV energize. HGV and WV de-energize. For the first 5 minutes, CB will not accept a signal from F/S. This 5-minute minimum freeze time is short cycle protection for Comp. At the end of 5 minutes, F/S assumes control of freeze termination. As ice builds on the evaporator, the water level in the tank lowers. The freeze cycle continues until F/S opens, then CB terminates the freeze cycle.

d) Pump-Out Cycle

LEDs 1, 3, and 2 are on. LED 4 is on when S4 dip switch 3 & 4 are set to 3 off and 4 on. Comp and FMR remain energized. HGV energizes, LLV de-energizes. WV energizes if S4 dip switch 3 & 4 are set to 3 off and 4 on. PM stops for 2 seconds then reverses, taking water from the bottom of the tank and forcing pressure against the check valve seat allowing water to go through the check valve and down the drain. At the same time, water flows through the small F/S tube to power flush F/S. When the pump-out timer (S4 dip switch 3 & 4) terminates, pump-out is complete.

The first pump-out occurs after the first freeze cycle and every cycle thereafter. The pump-out frequency control is factory set to drain the water tank every cycle, and generally no adjustment is required. The pump-out frequency control (S4 dip switch 5 & 6) can be set to have a pump out occur every cycle, or every 2, 5, or 10 cycles. For details, see "II.C.4.d) Pump-Out Frequency Control (S4 Dip Switch 5 & 6)."

e) Harvest Cycle

Same as the initial harvest cycle. See "II.B.1.b) Initial Harvest Cycle."

Note: Unit continues to cycle until BC is satisfied or power is turned off. The unit always restarts at the 1-minute fill cycle.

f) Shutdown

When ice contacts the thermostatic bulb (BC switch open), BC shuts down the unit within 10 seconds. BC is factory set, and generally no adjustment is required. However, adjustment may be needed in some conditions, particularly at higher altitude locations. **CAUTION! Do not adjust S4 dip switch 7 out of the factory default position on this model. This dip switch must be left in the factory default position or this unit will not operate correctly.**

Legend: **BC**—bin control; **CB**—control board; **Comp**—compressor; **FMR**—fan motor-remote; **F/S**—float switch; **HGV**—hot gas valve; **LLV**—liquid line valve; **PM**—pump motor; **WV**—inlet water valve

C. Control Board

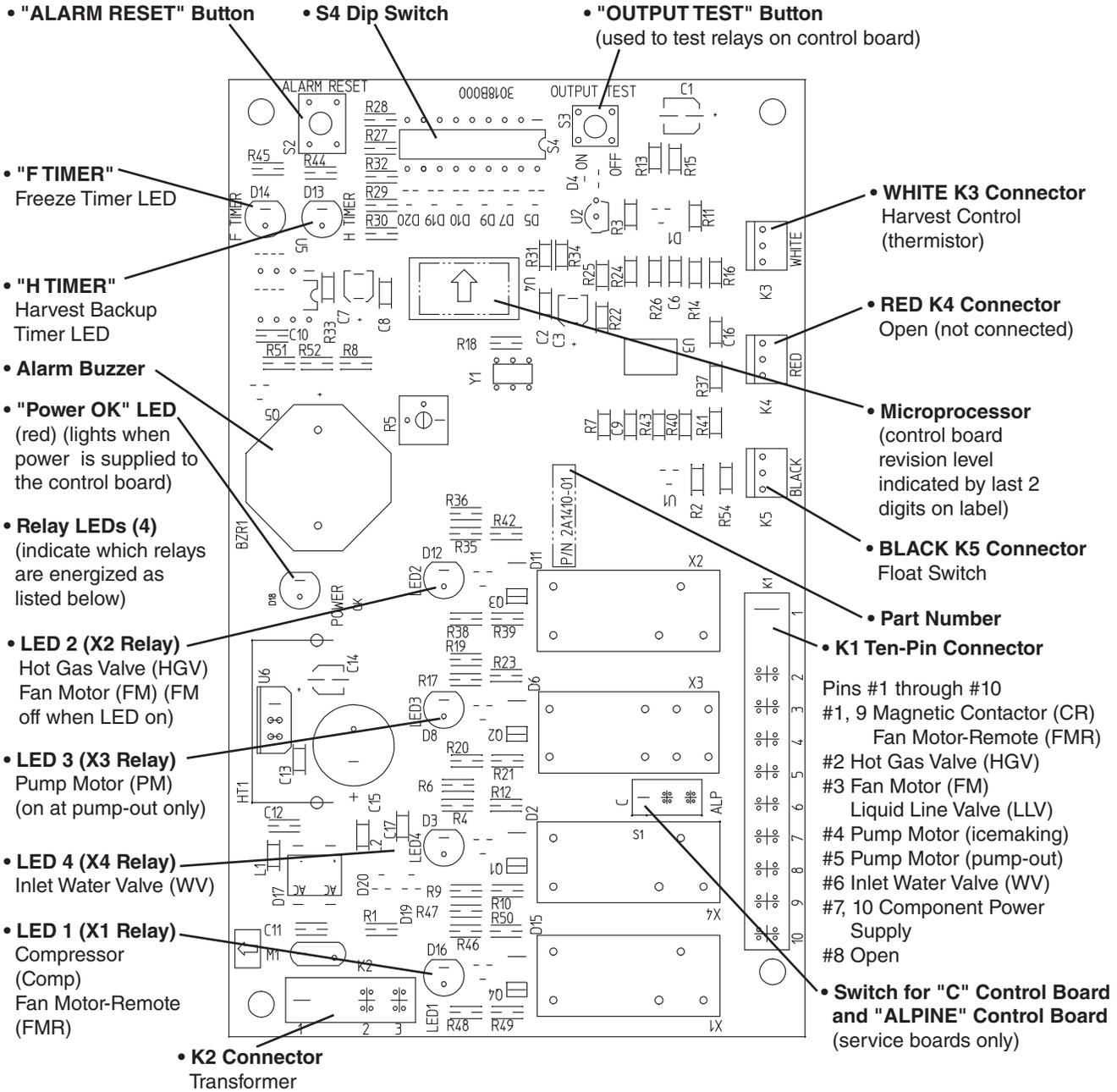
- A Hoshizaki exclusive control board is employed in KM-2500SWH3 and KM-2500SRH3 Stackable Crescent Cubers.
- All models are pretested and factory-adjusted.
- For a control board check procedure, see "IV.B. Control Board Check."

CAUTION

1. The control board is fragile; handle very carefully.
2. The 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 before handling or replacing the control board.
3. Do not touch the electronic devices on the control board or the back of the control board.
4. Do not change wiring and connections. Do not misconnect K3, K4, and K5, because the same connector is used for the thermistor and float switch. K4 is not connected.
5. Always replace the whole control board assembly if it goes bad.
6. Do not short out power supply to test for voltage.

1. Control Board Layout

"E" Control Board



"E" Control Board	
Part Number	2A1410-01 (factory); 2A1410-02 (service)

2. Features

a) **Maximum Water Supply Period – 6 minutes**

The inlet water valve remains energized during harvest for 6 minutes or the length of harvest 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 signals with the "H Timer" LED and 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 by the freeze timer (S4 dip switch 9 & 10). The control board signals with the "F Timer" LED and 3 beeps every 3 seconds. The freeze timer is factory set and no adjustment is required.

To reset either of these safeties, press the "ALARM RESET" button on the control board with power on.

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 reaches $127\pm 7^{\circ}\text{F}$ ($53\pm 4^{\circ}\text{C}$), the control board reads a .8 k Ω signal from the thermistor and shuts down the icemaker.

The control board signals with 1 beep every 3 seconds. To reset this safety, press the "ALARM RESET" button on the control board with power on.

d) **Low Water Safety**

The control board checks the position of the float switch at the end of the initial 1-minute fill cycle and at the end of each harvest cycle. If the float switch is in the up position (electrical circuit closed), the control board proceeds to the next cycle. If the float switch is in the down position (electrical circuit open), the control board returns to the 1-minute fill cycle until water enters the tank and the float switch closes. Once the float switch closes, the control board proceeds to the next cycle. The unit should not start without adequate water in the tank. This serves as a low water safety to protect the pump motor from mechanical seal failure.

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

e) **High Voltage and Low Voltage Cut-outs**

The maximum and minimum allowable supply voltages of this unit are limited by the high voltage and low voltage cut-outs.

Miswiring (especially on single phase 3 wire models) may cause excessive voltage ($147\text{VAC}\pm 5\%$ or more).

If high voltage ($147\text{VAC}\pm 5\%$ or more) is present, the icemaker automatically stops and the control board signals with 7 beeps every 3 seconds.

If low voltage ($92\text{VAC}\pm 5\%$ or less) is present, the icemaker automatically stops and the control board signals with 6 beeps every 3 seconds.

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

3. LED Lights and Audible Alarm Safeties

At startup, a 5-second delay occurs while the control board conducts an internal timer check. A beep occurs when power is turned off. The red LED indicates proper control voltage and remains on unless a control voltage problem occurs. The green LEDs 1 through 4 energize and sequence from startup as listed in the table below. Note that the order of the LEDs from the outer edge of the control board is 1, 4, 3, 2. For more information, see "II.B. Sequence of Operation."

Sequence Step	LED	Energized	Time LEDs are On		
			Min.	Max.	Avg.
1-Minute Fill Cycle	4	WV			1 minute
Harvest Cycle	1, 4, 2	Comp, FMR, WV, HGV	2 minutes	20 minutes	3 to 5 minutes
Freeze Cycle	1	Comp, FMR, PM, LLV	5 minutes	freeze timer setting	30 to 35 minutes
Pump-Out Cycle	1, 4*, 3, 2	Comp, FMR, WV*, PM, HGV	10 seconds	20 seconds	*pump-out timer setting

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, stuck HM, or shorted thermistor.
2	Harvest Backup Timer (harvest > 20 min. for two cycles in a row)	Orange "H TIMER" LED on. Check for open thermistor, HGV not opening, TXV or LLV leaking by, WRV leaking by, low charge, or inefficient Comp.
3	Freeze Timer (freeze > freeze timer setting for two cycles in a row) Timer is factory set using S4 dip switch 9 & 10	Yellow "F TIMER" LED on. Check for F/S stuck closed (up), WV leaking by, HGV leaking by, PM not pumping, TXV not feeding properly, LLV not opening, low charge, HM not bypassing, or inefficient Comp.
To reset the above safeties, press the "ALARM RESET" button with the power supply on.		
6	Low Voltage (92VAC±5% or less)	Red LED turns off if voltage protection operates.
7	High Voltage (147VAC±5% or more)	The control voltage safeties automatically reset when voltage is corrected.

Legend: **Comp**—compressor; **FMR**—fan motor-remote; **F/S**—float switch; **HGV**—hot gas valve; **HM**—headmaster (C.P.R.); **LLV**—liquid line valve; **PM**—pump motor; **TXV**—thermostatic expansion valve; **WRV**—water regulating valve; **WV**—inlet water valve

4. Controls and Adjustments

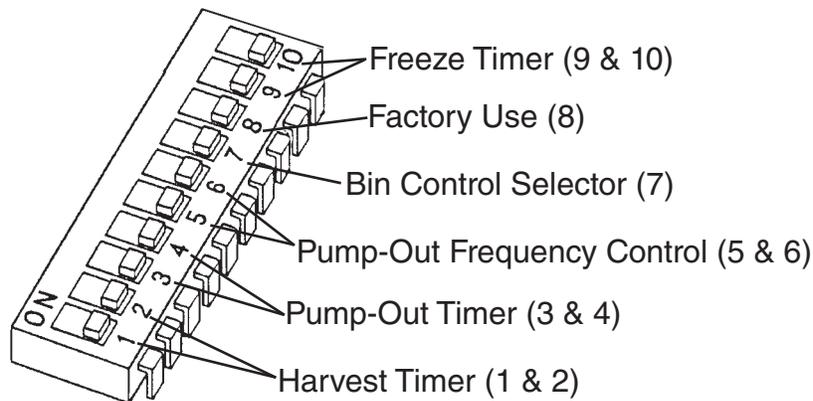
CAUTION

Dip switches are factory set. Failure to maintain factory settings may adversely affect performance and warranty coverage. For more information, contact Hoshizaki Technical Support at 1-800-233-1940.

a) Default Dip Switch Settings

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

S4 Dip Switch										
S4 Dip Switch No.	1	2	3	4	5	6	7	8	9	10
KM-2500SWH3	OFF	ON								
KM-2500SRH3	OFF	ON								



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

The harvest timer starts when the thermistor warms to 48°F (9°C) at the evaporator outlet and the control board reads the thermistor's 3.9 kΩ signal. The harvest timer is factory set, and generally no adjustment is required. However, a setting longer than the factory setting may be advised in cases where the flush provided at harvest needs to be prolonged for extra cleaning. Before changing this setting, contact Hoshizaki Technical Support at 1-800-233-1940 for recommendations. Keep in mind that setting the harvest timer to a longer setting will decrease 24 hour production.

Note that the pump-out timer (S1 dip switch 3 & 4) acts in place of the harvest timer during cycles with a pump-out. For details, see "II.C.4.c) Pump-Out Timer (S1 dip switch 3 & 4)."

S4 Dip Switch Setting		Time (seconds)
No. 1	No. 2	
OFF	OFF	60
ON	OFF	90
OFF	ON	120
ON	ON	180

c) Pump-Out Timer (S4 dip switch 3 & 4)

When a pump-out is called for, the pump motor stops after the preceding freeze cycle. The pump motor energizes 2 seconds later in the reverse direction, taking water from the bottom of the tank and forcing pressure against the check valve seat allowing water to go through the check valve and down the drain. At the same time, water flows through the small float switch tube to power flush the float switch. The pump motor drains the water tank for the time determined by the pump-out timer. The pump-out timer also acts in place of the harvest timer during cycles with a pump-out. The pump-out timer is factory set, and generally no adjustment is required. However, where water quality is bad and the icemaker needs a longer pump-out time, the pump-out timer can be adjusted. The pump-out timer control can be set to pump-out for 10 or 20 seconds.

S4 Dip Switch Setting		Time (seconds)		Inlet Water Valve
No. 3	No. 4	T1	T2	
OFF	OFF	10	150	closed
ON	OFF	10	180	closed
OFF	ON	10	120	open
ON	ON	20	180	closed

T1: Time to drain the water tank

T2: Harvest timer at pump-out

d) Pump-Out Frequency Control (S4 dip switch 5 & 6)

The pump-out frequency control is factory set to drain the water tank every cycle, and generally no adjustment is required. The pump-out frequency control can be set to have a pump-out occur every cycle, or every 2, 5, or 10 cycles.

The first pump-out occurs after the 1st freeze cycle.

S4 Dip Switch Setting		Frequency
No. 5	No. 6	
OFF	OFF	every cycle
ON	OFF	every 2 cycles
OFF	ON	every 5 cycles
ON	ON	every 10 cycles

e) Bin Control Selector (S4 dip switch 7)

S4 dip switch 7 is the bin control selector.

CAUTION

Do not adjust. This dip switch must be left in the factory default position or this unit will not operate correctly.

Factory set for proper operation. Do not adjust. When set to the on position on a unit with a thermostatic bin control, a 5-beep alarm sounds (open circuit) and the unit does not operate.

S4 Dip Switch Setting		Bin Control
No. 7		
ON		Mechanical
OFF		Thermostatic

f) Factory Use (S4 dip switch 8)

Factory set for proper operation. Do not adjust. This must be left in the factory default position.

g) 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 the freeze timer, the control board initiates the harvest cycle. After 2 consecutive timer terminations, the control board shuts down the icemaker. In this case, see "IV.F.3. Low Ice Production" for possible solutions. The freeze timer is factory set, and generally no adjustment is required. Before changing this setting, contact Hoshizaki Technical Support at 1-800-233-1940 for recommendations.

S4 Dip Switch Setting		Time (minutes)
No. 9	No. 10	
OFF	OFF	60
OFF	ON	50
ON	OFF	70
ON	ON	60

D. Bin Control

CAUTION

When the ambient temperature is below 45°F (7°C), the thermostatic bin control switch opens and shuts down the icemaker even if the ice storage bin is empty. When the thermostat is set in the prohibited range, the icemaker operates continuously even if the ice storage bin is filled with ice. Setting in the prohibited range may result in severe damage to the icemaker.

The thermostatic bin control switch is a temperature controlled switch used to control the level of ice in the bin. It is in line with the power supply to the control switch.

The thermostatic bin control switch shuts down the unit within 10 seconds when ice contacts the thermostatic bulb, regardless of the cycle at activation. The bin control is factory set, and generally no adjustment is required. However, adjustment may be needed in some conditions, particularly at higher altitude locations. For further details, see "IV.C. Bin Control Check."

E. Float Switch

The float switch is used to determine that there is sufficient water in the tank after the 1-minute fill cycle and after each harvest cycle. The float switch is also used to determine that the appropriate volume of water has been converted into ice before switching out of the freeze cycle. No adjustment is required.

F. Thermistor

The thermistor is used as a harvest control sensor. The thermistor's resistance varies depending on the suction line temperature. The control board monitors the resistance to start the harvest timer. No adjustment is required.

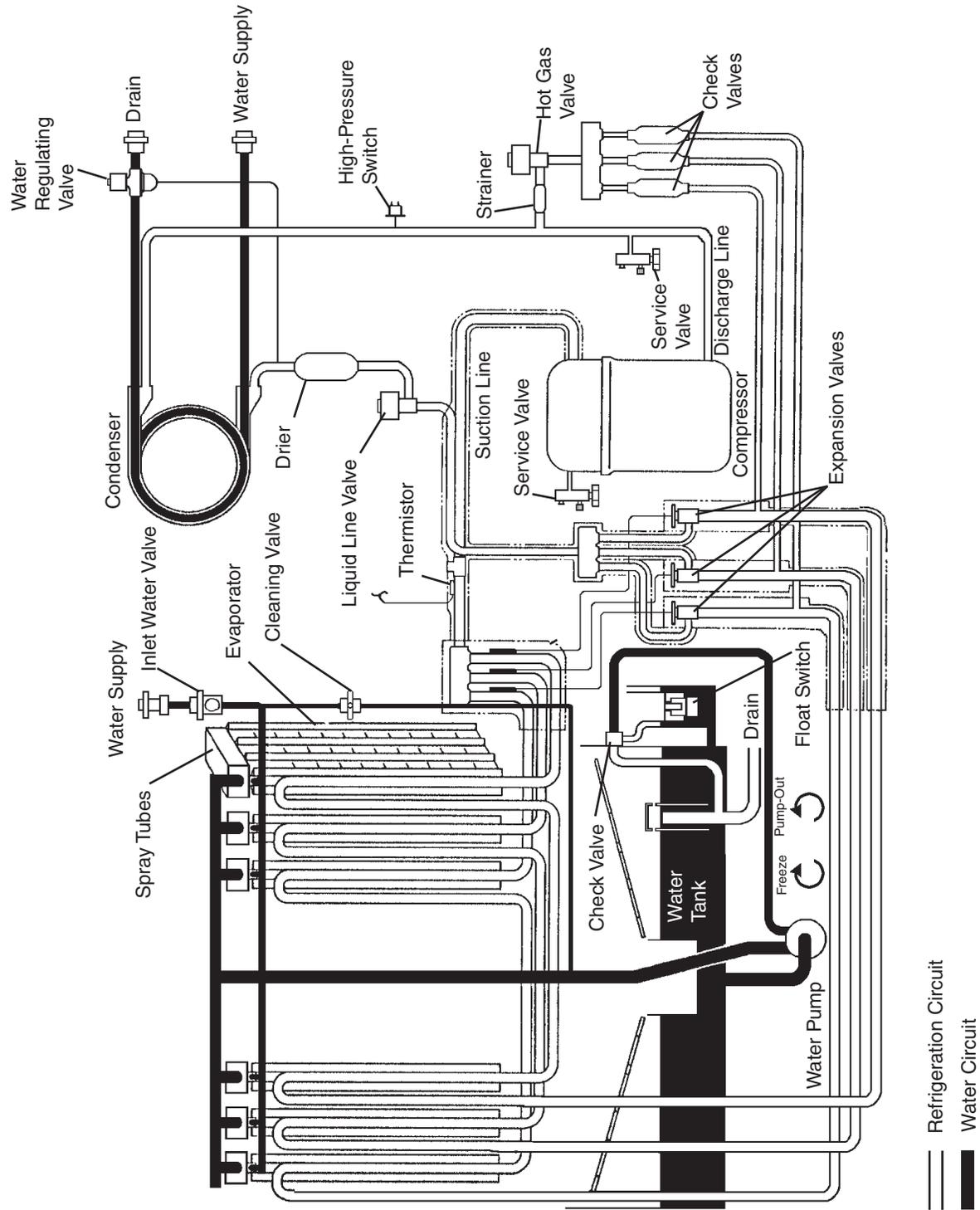
G. Control Switch

The control switch has three positions: "OFF" for power off, "ICE" for icemaking, and "WASH" to activate the water pump when cleaning and sanitizing.

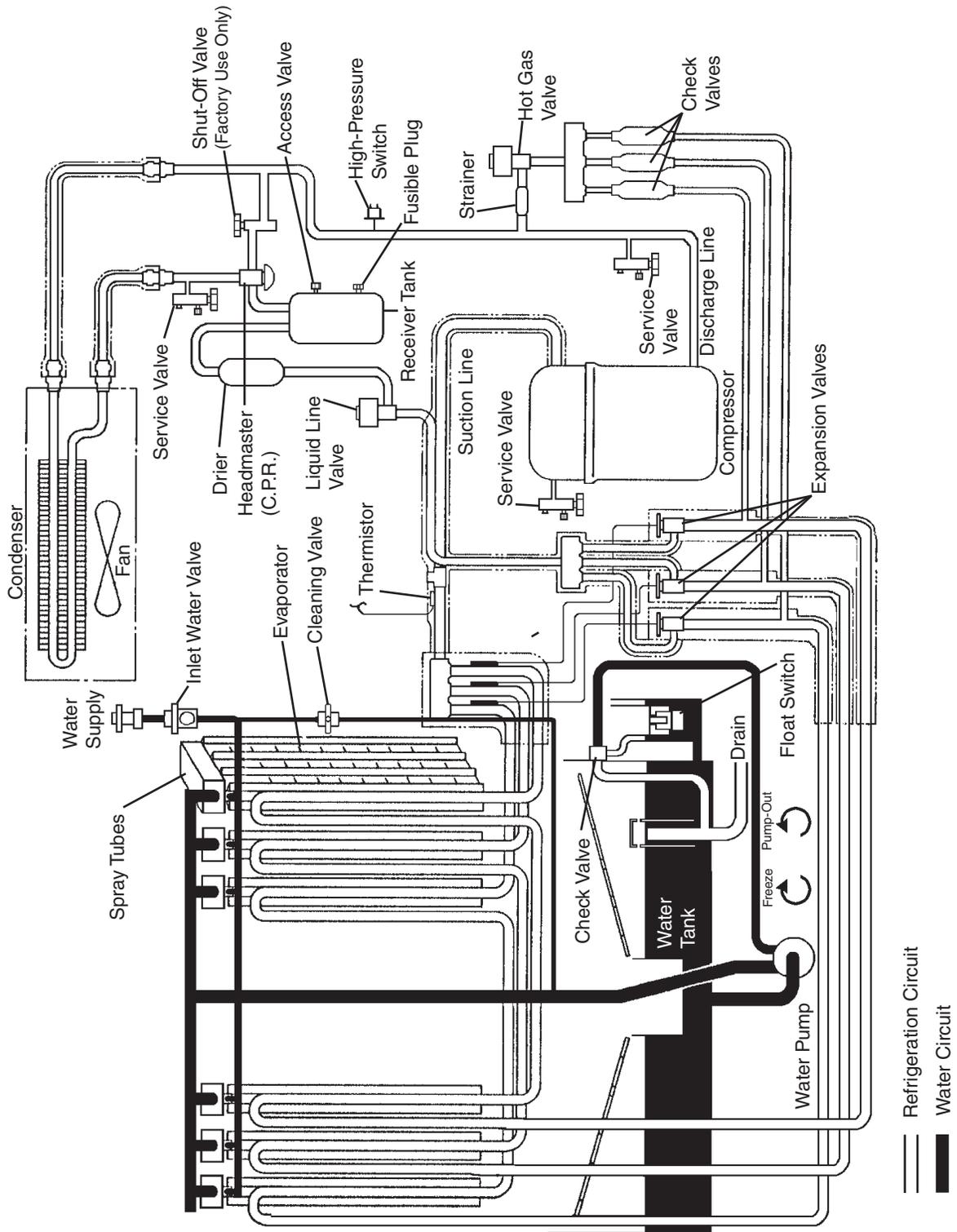
III. Technical Information

A. Water Circuit and Refrigeration Circuit

1. KM-2500SWH3 (water-cooled)



2. KM-2500SRH3 (remote air-cooled)



C. Performance Data

1. KM-2500SWH3 (water-cooled)

APPROXIMATE ICE PRODUCTION PER 24 HR.	AMBIENT TEMP. (°F/°C)	WATER TEMP. (°F/°C)					
		50/10		70/21		90/32	
	70/21	2408	<u>1092</u>	2395	<u>1087</u>	2256	<u>1024</u>
	80/27	2398	<u>1088</u>	2379	<u>1079</u>	2172	<u>985</u>
	90/32	2395	<u>1087</u>	2365	<u>1073</u>	2184	<u>991</u>
lbs./day <u>kg./day</u>	100/38	2327	<u>1055</u>	2323	<u>1054</u>	2018	<u>915</u>
APPROXIMATE ELECTRIC CONSUMPTION	70/21	3510		3572		3615	
	80/27	3557		3653		3673	
	90/32	3572		3720		3751	
watts	100/38	3566		3727		3780	
APPROXIMATE WATER CONSUMPTION PER 24 HR.	70/21	2174	<u>8.23</u>	2372	<u>8.98</u>	2679	<u>10.14</u>
	80/27	2325	<u>8.80</u>	2631	<u>9.96</u>	2959	<u>11.20</u>
	90/32	2372	<u>8.98</u>	2847	<u>10.78</u>	3173	<u>12.01</u>
gal./day <u>m³/day</u>	100/38	2685	<u>10.16</u>	2924	<u>11.07</u>	3473	<u>13.15</u>
FREEZING CYCLE TIME	70/21	24		24		26	
	80/27	24		25		27	
	90/32	24		26		28	
min.	100/38	25		26		30	
HARVEST CYCLE TIME	70/21	5.0		4.4		4.1	
	80/27	4.6		3.7		3.6	
	90/32	4.4		3.1		2.9	
min.	100/38	3.8		3.1		2.7	
HEAD PRESSURE	70/21	245	<u>17.2</u>	250	<u>17.6</u>	272	<u>19.1</u>
	80/27	249	<u>17.5</u>	256	<u>18.0</u>	287	<u>20.2</u>
	90/32	250	<u>17.6</u>	261	<u>18.4</u>	289	<u>20.3</u>
PSIG <u>kg/cm²G</u>	100/38	259	<u>18.2</u>	267	<u>18.8</u>	314	<u>22.1</u>
SUCTION PRESSURE	70/21	39	<u>2.7</u>	40	<u>2.8</u>	42	<u>3.0</u>
	80/27	39	<u>2.8</u>	40	<u>2.8</u>	44	<u>3.1</u>
	90/32	40	<u>2.8</u>	41	<u>2.9</u>	44	<u>3.1</u>
PSIG <u>kg/cm²G</u>	100/38	41	<u>2.9</u>	42	<u>2.9</u>	47	<u>3.3</u>

TOTAL HEAT OF REJECTION FROM CONDENSER	35,500 BTU/h [AT 90°F (32°C) / WT 70°F (21°C)]
TOTAL HEAT OF REJECTION FROM COMPRESSOR	4,900 BTU/h [AT 90°F (32°C) / WT 70°F (21°C)]
WATER FLOW FOR CONDENSER	130 gal./h [AT 100°F (38°C) / WT 90°F (32°C)]
PRESSURE DROP OF COOLING WATER LINE	less than 10 PSIG

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

WARNING

1. This unit should be diagnosed and repaired only by qualified service personnel to reduce the risk of death, electric shock, serious injury, or fire.
2. Risk of electric shock. Use extreme caution and exercise safe electrical practices.
3. Moving parts (e.g., fan blade) can crush and cut. Keep hands clear.
4. **CHOKING HAZARD:** Ensure all components, fasteners, and thumbscrews are securely in place after the unit is serviced. Make sure that none have fallen into the storage bin.
5. Make sure all food zones in the icemaker and storage bin are clean after the unit is serviced. For cleaning procedures, see "VI. Cleaning and Maintenance."

A. Diagnostic Procedure

The diagnostic procedure is basically a sequence check which can be used at unit startup or for system diagnosis. This procedure allows you to diagnose electrical system and component failures in normal operating conditions of 70°F (21°C) or warmer air and 50°F (10°C) or warmer water temperatures. Before conducting the diagnostic procedure, check for correct installation, proper voltage per unit nameplate, and adequate water supply. The maximum allowable voltage variation is ± 10 percent of the nameplate rating. Check the dip switch settings to assure that S4 dip switch 3, 4, 7, 8, 9, & 10 are in the factory default position. S4 dip switch 1, 2, 5, & 6 are cleaning adjustments and the settings are flexible. For factory default settings, see "II.C.4.a) Default Dip Switch Settings." Check CB using the steps in "IV.B. Control Board Check." As you go through the diagnostic procedure, check to assure the components energize and de-energize correctly. If not, those components or controls are suspect. Always choose a white (W) neutral wire to establish a good neutral connection when checking high voltages.

- 1) Turn off the power supply, then access the control box. Clear any ice from BC.
- 2) Turn on the power supply, then move the control switch to the "ICE" position. A 5-second delay occurs. The red "POWER OK" LED on CB comes on.
- 3) **1-Minute Fill Cycle – LED 4 is on.** WV energizes. After 1 minute, CB checks for a closed F/S. If F/S is closed, harvest cycle begins. If closed, continue to step 4. If open, WV remains energized through additional 1-minute fill cycles until water fills the tank and closes F/S (low water safety). **Diagnosis:** If WV does not open, check for 115VAC at WV terminals. If 115VAC is not present, CB is defective and must be replaced. If 115VAC is present, check continuity of WV coil, confirm the screen or external filter is not plugged (no water flow). If unit fails to start harvest, check for open F/S or bad 1-minute timer in CB. See "IV.D. Float Switch Check and Cleaning" and "IV.B. Control Board Check."

4) **Initial Harvest Cycle – LEDs 1, 4, and 2 are on.** WV remains energized. Comp, FMR, and HGV energize. WV is energized during harvest for a maximum of six minutes or the length of harvest which ever is shorter. LED 4 goes off when WV de-energizes. CB monitors the warming of the evaporator via the thermistor located on the suction line. When the thermistor warms to 48°F (9°C), CB reads a 3.9 kΩ signal from the thermistor and turns harvest termination over to the harvest timer (S4 dip switch 1 & 2). The harvest timer has settings of 60, 90, 120, and 180 seconds. For details, see "II.C.4.b) Harvest Timer (S4 dip switch 1 & 2)." When the harvest timer terminates, the harvest cycle is complete. CB checks the position of F/S and proceeds to the next cycle if it is closed, or calls for a 1-minute fill if it is open. The minimum total time allowed by CB for a complete harvest cycle is 2 minutes.

Diagnosis: Check that WV remains energized, Comp, FMR, and HGV energize. Average harvest cycle at factory setting is 2 to 3 minutes. How long does initial harvest last? 1.5 minutes after initial harvest begins, touch the Comp discharge line. Is it hot? If not, check that Comp is energized, refrigerant pressures are in range, and Comp is efficient. If it is hot, place a thermometer on the suction line next to the thermistor. Has it warmed to 48°F (9°C)? If not, check that the HGV is energized and open. On water-cooled model, check that WRV is not leaking by. If temperature has been reached and the freeze cycle fails to start, if not yet confirmed, confirm thermistor status. See "IV.E. Thermistor Check." If the thermistor reading is in proper range and CB fails to terminate the harvest cycle, CB is bad and must be replaced.

5) **Freeze Cycle – LED 1 is on.** Comp and FMR remain energized, PM and LLV energize. WV and HGV de-energize. The unit is held in freeze by a 5-minute short cycle protection timer (CB will not accept a signal from F/S). After the 5-minute short cycle protection timer terminates, CB turns freeze termination over to F/S.

Diagnosis: During the first 5 minutes of freeze, confirm the evaporator temperature drops. If the evaporator is not cold, confirm that WV and HGV are closed and TXV is operating properly. Next, check for proper refrigerant pressures, inefficient Comp, or headmaster sticking (remote air-cooled). After 5 minutes in freeze, disconnect black F/S connector from CB BLACK K5 connector. If the unit switches out of freeze with F/S removed, but would previously not switch out of freeze with F/S connected (long freeze - 3 beep alarm), F/S may be sticking. To check and clean F/S, see "IV.D. Float Switch Check and Cleaning." If the unit remains in freeze with F/S removed, CB is bad and must be replaced. See "V.O. Removal and Replacement of Control Board."

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

6) **Pump-Out Cycle (10/20 second pump out) – LEDs 1, 3, and 2 are on.** LED 4 is on when S4 dip switch 3 & 4 are set to 3 off and 4 on. Comp and FMR remain energized, HGV energizes. WV energizes if S4 dip switch 3 off & 4 on. LLV de-energizes. PM stops for 2 seconds, then reverses for 10/20 seconds depending on pump-out timer S4 dip switch 3 & 4 setting. When pump-out timer terminates, the pump-out is complete. The pump-out frequency control is factory set for every cycle. The first pump out occurs after the 1st freeze cycle and every cycle thereafter. Generally no adjustment is required. For details, see "II.C.4.d) Pump-Out Frequency Control (S4 dip switch 5 & 6)."

Diagnosis: If PM does not reverse, check PM circuit and capacitor. Next, check CB 10-pin connector #5 pin dark blue (DBU) wire for 115VAC. If 115VAC is not present, CB is bad and must be replaced. If 115VAC is present, check PM continuity. If PM is reversing but water does not pump out, check and clean the check valve assembly and tubing. If S4 dip switch 3 & 4 are adjusted to 3 off and 4 on, WV energizes.

7) **Normal Harvest Cycle** – same as the initial harvest cycle – Return to "IV.A.4) Initial Harvest Cycle."

8) **Shutdown**

When the unit is running hold ice in contact with the thermostatic bulb, the thermostatic BC switch opens within 10 seconds, shutting down the unit. The bin control is factory set, and generally no adjustment is required. However, adjustment may be needed in some conditions, particularly at higher altitude locations. **CAUTION! Do not adjust S4 dip switch 7 out of the factory default position on this model. This dip switch must be left in the factory default position or this unit will not operate correctly.**

Diagnosis: See "IV.C. Bin Control Check."

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.

Legend: **BC**–bin control; **CB**–control board; **Comp**–compressor; **FMR**–fan motor-remote; **F/S**–float switch; **HGV**–hot gas valve; **HM**–headmaster (C.P.R.); **LLV**–liquid line valve; **PM**–pump motor; **TXV**–thermostatic expansion valve; **WV**–inlet water valve

B. Control Board Check

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.

Alarm Reset: If the control board is in alarm (beeping), press the "ALARM RESET" button on the control board with power on. Once reset, the unit starts at the 1-minute fill cycle. For audible alarm information, see "II.C.3. LED Lights and Audible Alarm Safeties."

- 1) Check the dip switch settings to assure that S4 dip switch #3, 4, 7, 8, 9, & 10 are in the factory default position. S4 dip switch 1, 2, 5, & 6 are cleaning adjustments and the settings are flexible. For factory default settings, see "II.C.4.a) Default Dip Switch Settings."
- 2) Move the control switch to the "ICE" position. If the red "POWER OK" LED is on, control voltage is good. If the "POWER OK" LED is off, check the control transformer secondary circuit. The control transformer secondary circuit includes the cleaning valve interlock switch. Make sure the interlock switch is closed; otherwise, no control voltage is supplied to the K2 connector. Transformer output is 10.5V at 115V primary input. If the secondary circuit has proper voltage and the red LED is off, the control board is bad and should be replaced. See "V.O. Removal and Replacement of Control Board."

If the secondary circuit does not have proper voltage, check the control transformer primary circuit. Check for 115V at the control board K1 ten-pin connector. Check the #10 pin (BR wire) to a white neutral wire for 115V. Always choose a white neutral wire to establish a good neutral connection when checking voltages. For additional checks, see "IV.F.1.[1] The icemaker will not start."

- 3) The "OUTPUT TEST" button provides a relay sequence test. Make sure the control switch is in the "ICE" position, then press the "OUTPUT TEST" button. The correct lighting sequence is none, 2, 3, 4, 1. Note that the order of the LEDs from the outer edge of the control board is 1, 4, 3, 2. Components (e.g., compressor) cycle during the test. Following the test, the icemaker resumes operation. If the LEDs do not light as described above, the control board is bad and should be replaced. See "V.O. Removal and Replacement of Control Board."
- 4) To verify voltage output from the control board to the components, slide the control board K1 ten-pin connector out far enough to allow multimeter lead contact. With the unit in the cycle to be tested, check output voltage from the corresponding pin on the control board K1 ten-pin connector to ground. If output voltage is not found and the appropriate LED is on, the control board is bad and should be replaced. See "V.O. Removal and Replacement of Control Board."

C. Bin Control Check

To check the thermostatic bin control, follow the steps below.

CAUTION

When the ambient temperature is below 45°F (7°C), the bin control thermostat operates to stop the icemaker even if the ice storage bin is empty. When the thermostat is set in the prohibited range, the icemaker operates continuously even if the ice storage bin is filled with ice. Setting in the prohibited range may result in severe damage to the icemaker.

The thermostatic bin control is factory set, and generally no adjustment is required. However, adjustment may be needed in some conditions, particularly at higher altitude locations. Adjust it, if necessary, so that the icemaker stops automatically within 10 seconds after ice contacts the bin control.

- 1) Turn off the power supply.
- 2) Remove the front panel, then remove the control box cover.
- 3) Disconnect the thermostatic bin control wires from the thermostatic bin control switch.
- 4) Clear any ice away from the thermostatic bulb, then hold your hand around the thermostatic bulb to warm it up.
- 5) Check for continuity across the thermostatic bin control switch. If closed, continue to step 6. If open, adjust or replace the thermostatic bin control.
- 6) With the multimeter test leads still in place, hold ice on the thermostatic bulb to lower the temperature. Within 10 seconds, the thermostatic bin control switch should open (no continuity). If it remains closed, adjust or replace the thermostatic bin control.

D. Float Switch Check and Cleaning

1. Float Switch Check

To check the float switch, follow the steps below.

- 1) Turn off the power supply.
- 2) Remove the front panel. Move the control switch to the "OFF" position, then remove the insulation panel.
- 3) Remove the drain plug located on the lower front part of the ice dropping hole. Allow the water tank to drain. See Fig. 1.
- 4) Replace the drain plug in its correct position. Be careful not to cross thread it.
- 5) Remove the control box cover.
- 6) Disconnect the black float switch connector from the control board BLACK K5 connector.
- 7) Check for continuity across the float switch leads. With the water tank empty, the float switch should be open. If open, continue to step 8. If closed, follow the steps in "IV.D.2. Float Switch Cleaning." After cleaning the float switch, check it again. Replace if necessary.

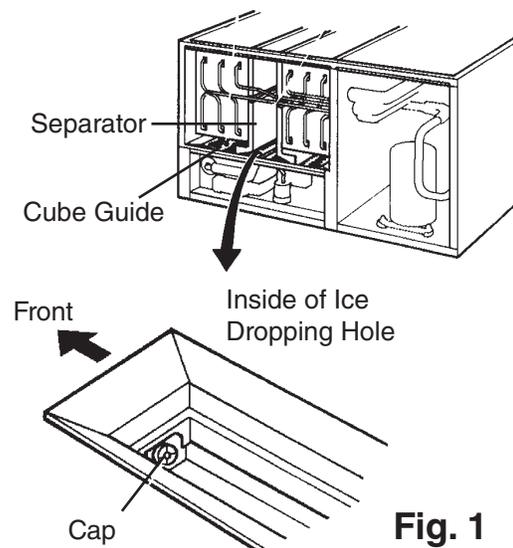


Fig. 1

- 8) Reconnect the black float switch connector, then replace the control box cover in its correct position.
- 9) Move the control switch to the "ICE" position. Replace the insulation panel and the front panel in their correct positions, then turn on the power supply. After 1 minute, the 1-minute fill cycle should end and the initial harvest cycle should begin. If the initial harvest cycle begins, the float switch is good and the check is complete. If the initial harvest cycle does not begin, continue to step 10.
- 10) Turn off the power supply.
- 11) Remove the front panel.
- 12) Move the control switch to the "OFF" position.
- 13) Remove the control box cover.
- 14) Disconnect the black float switch connector from the control board BLACK K5 connector.
- 15) Check for continuity across the float switch leads. With the water tank full, the float switch should be closed. If the float switch is closed and the icemaker will not switch from the 1-minute fill cycle to the initial harvest cycle, replace the control board.

If the float switch is open, confirm that the water tank is full. If the tank is not full, check the water supply, water filters, and inlet water valve. If the tank is full, follow the steps in "IV.D.2. Float Switch Cleaning." After cleaning the float switch, check it again. Replace if necessary.

2. Float Switch Cleaning

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

- 1) Turn off the power supply.
- 2) Remove the front panel and move the control switch to the "OFF" position.
- 3) Remove the insulation panel, then remove the cap located on the front bottom part of the ice dropping hole. Drain the water tank.
- 4) Replace the cap in its correct position. Be careful not to cross thread it.
- 5) Disconnect the vent tube and the flush tube from the top of the float switch, then remove the float switch assembly from the mounting bracket and remove the rubber boot from the bottom of the float switch assembly. See Fig. 2.
- 6) Remove the retainer rod from the bottom of the float switch assembly, then remove the float. Be careful not to bend the retainer rod excessively when removing it.

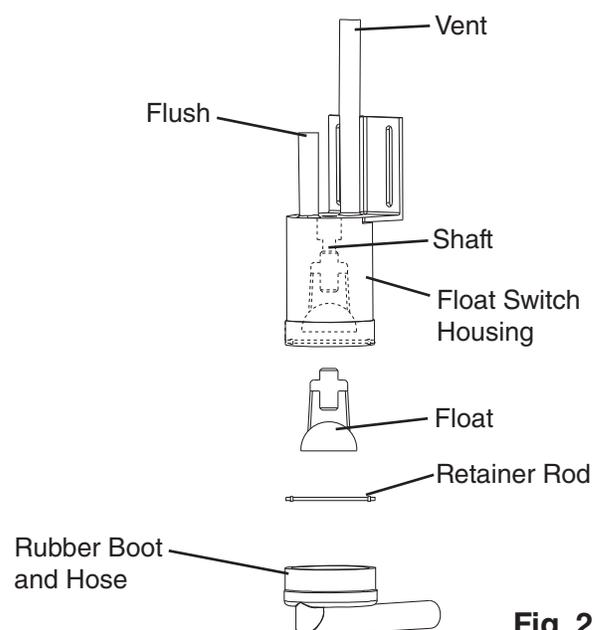


Fig. 2

- 7) Wipe down the float switch assembly's housing, shaft, float, and retainer rod with a mixture of 1 part Hoshizaki "Scale Away" and 25 parts warm water. Clean the inside of the rubber boot and hose with the cleaning solution. Rinse the parts thoroughly with clean water.
- 8) Reassemble the float switch assembly and replace it and the rubber boot in their correct positions. Reconnect the vent tube and the flush tube.
- 9) Move the control switch to the "ICE" position.
- 10) Replace the insulation panel and front panel in their correct positions.

E. Thermistor Check

To check thermistor resistance, follow the steps below.

- 1) Turn off the power supply.
- 2) Remove the front panel, then move the control switch to the "OFF" position.
- 3) Remove the control box cover.
- 4) Remove the thermistor. See "V.K. Removal and Replacement of Thermistor."
- 5) Immerse the thermistor sensor portion in a glass containing ice and water for 2 or 3 minutes.
- 6) Remove the white thermistor connector from the control board WHITE K3 connector and check the resistance between thermistor leads. Normal reading is within 4.7 to 6.2 k Ω . If outside the normal reading, replace the thermistor. If inside the normal reading, continue to the next step.
- 7) Replace the thermistor in its correct position. See "V.K. Removal Replacement of Thermistor."
- 8) Reconnect the white thermistor connector to the control board WHITE K3 connector.
- 9) Replace the control box cover in its correct position, then turn on the power supply.
- 10) Move the control switch to the "ICE" position.
- 11) Once the harvest cycle starts, begin timing the harvest cycle.
- 12) The harvest timer should expire and terminate the harvest cycle within 2 to 3 minutes. If the harvest timer does not expire and terminate the harvest cycle, the harvest timer is bad and the control board should be replaced. See "V.O. Removal and Replacement of Control Board."

F. Diagnostic Charts

1. No Ice Production

Problem	Possible Cause	Remedy	
[1] The icemaker will not start.	a) Power Supply	1. Off, blown fuse, or tripped breaker.	1. Turn on, replace, or reset.
		2. Loose connection.	2. Tighten.
		3. Bad contacts.	3. Check for continuity and replace.
		4. Not within specifications.	4. Refer to nameplate and correct.
	b) Transformer (main transformer)	1. Voltage tap switch does not match incoming voltage.	1. Verify incoming voltage, move switch to proper setting.
		2. Coil winding open or shorted.	2. Replace.
	c) Water Supply	1. Water supply off or pressure too low.	1. Check and get recommended pressure.
	d) Bin Control Thermostat	1. Tripped with bin filled with ice.	1. Remove ice.
		2. Ambient temperature too cool.	2. Increase ambient temperature.
		3. Set too warm.	3. See "IV.C. Bin Control Check."
		4. Bulb out of position.	4. Place in position.
		5. Bad contacts.	5. Check for continuity and replace.
	e) Fuse (Control Box)	1. Blown.	1. Check for short circuit and replace.
	f) Control Switch	1. "OFF" or "WASH" position.	1. Move to "ICE" position.
		2. Bad contacts.	2. Check for continuity and replace.
	g) 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. Recover, evacuate, and recharge.
		5. Fan not operating (except water-cooled model).	5. See chart 1.[7]
		6. Refrigerant line or components restricted.	6. Clean and replace drier.
7. Condenser water pressure too low or off (water-cooled model).		7. Check and get recommended pressure.	

Problem	Possible Cause	Remedy	
[1] The icemaker will not start. (continued)	h) Control Transformer	1. Coil winding open or shorted.	1. Replace.
	i) Wiring to Control Board	1. Loose connections or open.	1. Check for continuity and replace.
	j) Interlock Switch (Cleaning Valve)	1. Open position.	1. Move to closed position.
		2. Bad contacts.	2. Check for continuity and replace.
	k) Thermistor	1. Leads shorted or open and high temperature or harvest backup timer safety operates (1 beep or 2 beep alarm).	1. See "IV.E. Thermistor Check."
	l) 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.
	m) Inlet Water Valve	1. Mesh filter or orifice gets clogged and water supply cycle does not finish.	1. Clean.
		2. Coil winding open.	2. Replace.
		3. Wiring to inlet water valve.	3. Check for loose connection or open, and replace.
	n) Float Switch	1. Bad contacts.	1. Check for continuity and replace.
2. Float does not move freely.		2. Clean or replace.	
o) Control Board	1. Defective or in alarm.	1. See "IV.B. Control Board Check."	
[2] Fill cycle will not terminate.	a) Water Supply	1. Water supply off or pressure too low.	1. Check and get recommended pressure.
	b) Float Switch	1. Connector disconnected.	1. Reconnect.
		2. Defective switch.	2. Check and replace.
		3. Float does not move freely.	3. See "IV.D. Float Switch Check and Cleaning."
c) Control Board	1. Defective.	1. See "IV.B. Control Board Check."	
[3] Compressor will not start or stops operating.	a) Magnetic Contactor	1. Bad contacts.	1. Check for continuity and replace.
		2. Coil winding open.	2. Replace.
	b) Start Capacitor or Run Capacitor	1. Defective.	1. Replace.

Problem	Possible Cause	Remedy	
[3] Compressor will not start or stops operating. (continued)	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 open.	2. Replace.
	e) Compressor	1. Power supply not within specifications.	1. Refer to nameplate and correct.
		2. Wiring to compressor.	2. Check for loose connection or open, and replace.
		3. Defective.	3. Replace.
		4. Protector tripped.	4. Reduce temperature.
	f) Control Board	1. No power to contactor.	1. See "IV.B. Control Board Check."
[4] Water continues to be supplied in freeze cycle.	a) Water Pressure	1. Too high.	1. Reduce.
	b) Inlet Water Valve	1. Diaphragm does not close.	1. Check for water leaks with icemaker off.
	c) Control Board	1. Defective.	1. See "IV.B. Control Board Check."
[5] Pump motor will not start.	a) Pump Motor	1. Motor winding open.	1. Replace.
		2. Bearing worn out.	2. Replace.
		3. Wiring to pump motor.	3. Check for loose connection or open, and replace.
		4. Defective capacitor.	4. Replace.
		5. Defective or bound impeller.	5. Replace and clean.
		6. Mechanical seal worn out.	6. Check and replace.
	b) Control Board	1. Defective.	1. See "IV.B. Control Board Check."
c) Control Switch	1. Bad contacts.	1. Replace.	
[6] Freeze cycle time is too short.	a) Pump Out Check Valve	1. Leaking by.	1. Clean or replace.
	b) Float Switch	1. Dirty or erratic operation.	1. Clean or replace.
	c) Control Board	1. Defective.	1. See "IV.B. Control Board Check."
	d) Water System	1. Water leaks.	1. Check connections for water leaks, and replace.
[7] Fan motor will not start, or is not operating (except water-cooled model).	a) Fan Motor	1. Motor winding open.	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.

Problem	Possible Cause	Remedy	
[7] Fan motor will not start, or is not operating (except water-cooled model). (continued)	b) Control Board	1. Defective. 1. See "IV.B. Control Board Check."	
[8] All components run, but no ice is produced.	a) Refrigerant	1. Low charge.	1. Check for leaks. Recover, repair, evacuate, and recharge.
		2. Air or moisture trapped.	2. Replace drier, evacuate, and recharge.
	b) Compressor	1. Defective.	1. Replace.
	c) Hot Gas Valve	1. Continues to open in freeze cycle.	1. Check and replace.
	d) Liquid Line Valve (if applicable)	1. Continues to close in freeze cycle.	1. Check and replace.
	e) Inlet Water Valve	1. Inlet water valve is wide open during freeze.	1. Check for water leaks with icemaker off.
	f) Expansion Valve	1. Bulb loose.	1. Secure bulb.
		2. Operating erratically.	2. Check and replace.
	g) Headmaster (C.P.R.) (remote air-cooled model)	1. Not operating properly and liquid line temperature too warm.	1. Replace headmaster.
h) Water Supply Line (water-cooled model)	1. Condenser water pressure too low or off and high pressure control opens and closes frequently.	1. Check and get recommended pressure.	
i) Water Regulating Valve (water-cooled model)	1. Set too high.	1. Adjust or replace. See "V.I. Adjustment of Water Regulating Valve."	

2. Evaporator is Frozen Up

Problem	Possible Cause	Remedy
[1] Freeze cycle time is too long.	a) Inlet Water Valve	1. Diaphragm does not close. 1. Check for water leaks with icemaker off.
	b) Float Switch	1. Float does not move freely. 1. Clean or replace.
		2. Defective switch. 2. Check and replace.
	c) Evaporator	1. Scaled up. 1. Clean.
		2. Damaged. 2. Replace.
	d) Spray Tubes	1. Dirty. 1. Clean.
		2. Out of position. 2. Place in Position.
	e) Water Pump	1. RPM too slow. 1. See chart 1. [5].
f) Thermistor	1. Loose or disconnected. 1. Reattach or connect. See "IV.E. Thermistor Check."	
g) Refrigerant Charge	1. Low Charge 1. Check for leaks. Recover, repair, evacuate, and recharge.	

Problem	Possible Cause	Remedy	
[1] Freeze cycle time is too long. (continued)	h) Expansion Valve	1. Bulb loose.	1. Secure bulb.
		2. Operating erratically.	2. Check and replace.
	i) Control Board	1. Defective.	1. See "IV.B. Control Board Check."
[2] All ice formed on evaporator does not fall into bin in harvest cycle.	a) Evaporator	1. Scaled up.	1. Clean.
		2. Damaged.	2. Replace.
	b) Ambient and/or Water Temperature	1. Too cool.	1. Increase temperature.
	c) Water Supply Line	1. Water pressure too low.	1. Check and get recommended pressure.
	d) Water System	1. Water supply line too small; requires 3/8" OD line dedicated per machine.	1. Increase water line size.
		2. Water filter clogged or flow rate too small.	2. Replace filter or install a higher flow rate filter.
	e) Inlet Water Valve	1. Dirty mesh filter or orifice.	1. Clean.
		2. Diaphragm does not close.	2. Check for water leaks with icemaker off.
	f) Spray Tubes	1. Dirty.	1. Clean.
		2. Out of position.	2. Place in position.
	g) Thermistor	1. Loose or disconnected.	1. Reattach or connect. See "IV.E. Thermistor Check."
	h) Hot Gas Valve	1. Coil winding open.	1. Replace.
		2. Plunger does not move.	2. Replace.
		3. Wiring to hot gas valve.	3. Check for loose connection or open, and replace.
	i) Expansion Valve	1. Open.	1. Check and replace.
	j) Liquid Line Valve (if applicable)	1. Continues to open in harvest cycle.	1. Check operation in harvest cycle and replace.
	k) Control Board	1. Harvest timer is set too short.	1. Adjust longer, referring to "II.C.4.b) Harvest Timer (S4 dip switch 1 & 2)."
2. Defective.		2. See "IV.B. Control Board Check."	
l) Refrigerant Charge	1. Low Charge	1. Check for leaks. Recover, repair, evacuate, and recharge.	
m) Water Regulating Valve (water-cooled model)	1. Leaking by in harvest.	1. Check and replace.	

Problem	Possible Cause	Remedy	
[3] Other.	a) Ice Cube Guide	1. Out of position.	1. Place in position.
	b) Bin Control Thermostat	1. Bulb out of position.	1. Place in position.
		2. Bad contacts.	2. Check for continuity and replace.

3. Low Ice Production

Problem	Possible Cause	Remedy	
[1] Freeze cycle time is long.	a) Inlet Water Valve	1. Diaphragm does not close.	1. Check for water leaks with icemaker off.
	b) Float Switch	1. Float switch does not move freely.	1. Clean or replace.
		2. Defective switch.	2. Check and replace.
	c) Evaporator	1. Scaled up.	1. Clean.
		2. Damaged.	2. Replace.
	d) Spray Tubes	1. Dirty.	1. Clean.
		2. Out of position.	2. Place in Position.
	e) Water Pump	1. RPM too slow.	1. Check and replace.
	f) Condenser (except water-cooled model)	1. Air filter or condenser clogged (except water-cooled model).	1. Clean.
	g) Refrigerant Charge	1. Low charge.	1. Check for leaks. Recover, repair, evacuate, and recharge.
	h) Hot Gas Valve	1. Open.	1. Check and replace.
	i) Expansion Valve	1. Bulb loose.	1. Secure bulb.
		2. Operating erratically.	2. Check and replace.
	j) Compressor	1. Erratic or off.	1. See chart 1. [3].
	k) Condenser Water (water-cooled model)	1. Water regulating valve set too high.	1. Adjust or replace. See "V.I. Adjustment of Water Regulating Valve."
		2. Condenser water pressure too low.	2. Check and get recommended pressure.
3. Water temperature out of specification.		3. Correct to specification.	
l) Liquid Line Valve	1. Erratic, sticking.	1. Check and replace.	
m) Headmaster (C.P.R.) (remote air-cooled model)	1. Bypassing.	1. Replace.	
n) Control Board	1. Float switch connection loose (K5).	1. Check and reconnect.	
	2. Defective.	2. See "IV.B. Control Board Check."	

Problem	Possible Cause		Remedy
[2] Harvest cycle time is long.	a) Water Supply	1. Water temperature too cold.	1. Increase temperature.
	b) Thermistor	1. Out of position or defective.	1. Reattach and secure. See "IV.E. Thermistor Check."
	c) Control Board	1. Not reading thermistor.	1. Check and replace.
		2. Sending voltage to liquid line valve (if applicable) in harvest.	2. Check and replace. See "IV.B. Control Board Check.""
	d) Inlet Water Valve	1. Clogged.	1. Clean or replace.
	e) Evaporator	1. Scaled up.	1. Clean.
	f) Hot Gas Valve	1. Does not open, or opens partially.	1. Check and replace.
	g) Expansion Valve	1. Wide open in harvest.	1. Check and replace.
	h) Water Regulating Valve (water-cooled model)	1. Open during harvest.	1. Adjust or replace. See "V.I. Adjustment of Water Regulating Valve."
	i) Liquid Line Valve (if applicable)	1. Open during harvest cycle.	1. Check and replace.

4. Abnormal Ice

Problem	Possible Cause		Remedy
[1] Small cubes.	a) Pump Out Check Valve	1. Dirty or worn and leaking by.	1. Clean or replace.
	b) Ice Cube Guide	1. Out of position. Circulated water falls into bin.	1. Place in position.
	c) Water System	1. Water supply line too small; requires 3/8" OD line dedicated per machine.	1. Increase water line size.
		2. Water filter clogged or flow rate too small.	2. Replace filter or install a higher flow rate filter.
	d) Inlet Water Valve	1. Dirty mesh filter or orifice.	1. Clean.
	e) Pump Motor	1. RPM too slow.	1. See chart 1.[5].
f) Control Board	1. Defective.	1. See "IV.B. Control Board Check."	

[2] Cloudy or irregular cubes.	a) Evaporator	1. Frozen up.	1. See "IV.F.2. Evaporator is Frozen Up."
		2. Scaled up.	2. Clean
		3. Damaged.	3. Replace.
	b) Water System	1. Water supply line too small; requires 1/2" nominal line dedicated per machine.	1. Increase water line size.
		2. Water filter clogged or flow rate too small.	2. Replace filter or install a higher flow rate filter.
		3. High hardness or contains impurities.	3. Install a water softener or filter.
	c) Spray Guide	1. Dirty.	1. Clean.

5. Other

Problem	Possible Cause	Remedy	
[1] Icemaker will not stop when bin is filled with ice.	a) Bin Control Thermostat	1. Set too cold.	1. See "II.D. Bin Control."
		2. Defective.	2. Replace.
[2] Abnormal noise.	a) Pump Motor	1. Bearings worn out.	1. Replace.
	b) Fan Motor (except water-cooled model)	1. Bearings worn out.	1. Replace.
		2. Fan blade deformed.	2. Replace.
		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. Reposition.	
[3] Ice in storage bin often melts.	a) Drain Line(s)	1. Plugged.	1. Clean.
	b) Icemaker and Bin	1. Drains not run separately.	1. Separate the drain lines.
	c) Ice Cube Guide	1. Out of position. Circulated water falls into bin.	1. Place in position.

V. Removal and Replacement of Components

⚠ WARNING

1. This unit should be diagnosed and repaired only by qualified service personnel to reduce the risk of death, electric shock, serious injury, or fire.
2. Move the control switch to the "OFF" position and turn off the power supply before servicing.
3. **CHOKING HAZARD:** Ensure all components, fasteners, and thumbscrews are securely in place after the unit is serviced. Make sure that none have fallen into the storage bin.
4. Make sure all food zones in the icemaker and storage bin are clean after the unit is serviced. For cleaning procedures, see "VI. Cleaning and Maintenance."

A. Service for Refrigerant Lines

⚠ WARNING

1. Repairs requiring the refrigeration circuit to be opened must be performed by properly trained and EPA-certified service personnel.
2. Always recover the refrigerant and store it in an approved container. Do not discharge the refrigerant into the atmosphere.
3. Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.

CAUTION

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 replace the drier until after all other repair or replacement has been made. Install the new drier with the arrow on the drier in the direction of the refrigerant flow.
4. When brazing, protect the drier by using a wet cloth to prevent the drier from overheating. Do not allow the drier to exceed 250°F (121°C).
5. Do not leave the system open for longer than 15 minutes when replacing or servicing parts.

1. Refrigerant Recovery

The icemaker is provided with refrigerant service valves. Using proper refrigerant practices, recover the refrigerant from the service valves and store it in an approved container. Do not discharge the refrigerant into the atmosphere.

2. Brazing

▲ WARNING

1. R-404A itself is not flammable at atmospheric pressure and temperatures up to 176°F (80°C).
2. 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. Do not use silver alloy or copper alloy containing arsenic.
4. Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.

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

CAUTION

1. Always install a new drier every time the sealed refrigeration system is opened.
2. Do not replace the drier until after all other repair or replacement has been made. Install the new drier with the arrow on the drier in the direction of the refrigerant flow.
3. When brazing, protect the drier by using a wet cloth to prevent the drier from overheating. Do not allow the drier to exceed 250°F (121°C).

- 2) Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.

3. Evacuation and Recharge (R-404A)

- 1) Attach a vacuum pump to the system. Be sure to connect the charging hoses to both high and low-side service 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. Open the gauge manifold valves. Then, open the high and low-side service valves. Never allow the oil in the vacuum pump to flow backwards.
- 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 gauge manifold.
- 5) Disconnect the gauge manifold hose from the vacuum pump and attach it to a refrigerant service cylinder. Remember to loosen the connection and purge the air from the hose. For water-cooled model, see the nameplate for the required refrigerant charge. For remote air-cooled model, see the rating label inside the icemaker. Hoshizaki recommends only virgin refrigerant or reclaimed refrigerant which meets ARI Standard 700 (latest edition) be used.
- 6) A liquid charge is required when charging an R-404A system (to prevent fractionation). Place the service cylinder on the scales; if the service cylinder is not equipped with a dip tube, invert the service cylinder, then place it on the scales. Open the high-side valve on the gauge manifold.
- 7) Allow the system to charge with liquid until the proper charge weight is met.
- 8) If necessary, add any remaining charge to the system through the low-side.
CAUTION! To prevent compressor damage, use a throttling valve or liquid dispensing device to add the remaining liquid charge through the low-side service valve with the unit running.
- 9) Close the service valves, then close the gauge manifold valves and disconnect the hoses.
- 10) Cap the service valves to prevent a possible leak.

B. Removal and Replacement of Compressor

CAUTION

1. Always install a new drier every time the sealed refrigeration system is opened.
2. Do not replace the drier until after all other repair or replacement has been made. Install the new drier with the arrow on the drier in the direction of the refrigerant flow.
3. When brazing, protect the drier by using a wet cloth to prevent the drier from overheating. Do not allow the drier to exceed 250°F (121°C).

- 1) Turn off the power supply.
- 2) Remove the panels.
- 3) Recover the refrigerant and store it in an approved container.
- 4) Remove the terminal cover on the compressor and disconnect the compressor wiring. On remote air-cooled model, disconnect the crankcase heater.
- 5) Remove the hold-down bolts, washers, and rubber grommets.
- 6) Remove the discharge and suction pipes.
- 7) Remove the compressor. Unpack the new compressor package.
- 8) Attach the rubber grommets of the prior compressor.
- 9) Place the compressor in position and secure it using the bolts and washers.

- 10) Remove the drier, then place the new drier in position.
- 11) Remove the plugs from the suction, discharge, and process pipes.
- 12) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.
- 13) Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.
- 14) Evacuate the system and charge it with refrigerant. For water-cooled model, see the nameplate for the required refrigerant charge. For remote air-cooled models, see the rating label inside the icemaker.
- 15) Connect the terminals and replace the terminal cover in its correct position. On remote air-cooled model, connect the crankcase heater.
- 16) Replace the panels in their correct positions.
- 17) Turn on the power supply.

C. Removal and Replacement of Expansion Valve

CAUTION

1. Always install a new drier every time the sealed refrigeration system is opened.
2. Do not replace the drier until after all other repair or replacement has been made. Install the new drier with the arrow on the drier in the direction of the refrigerant flow.
3. When brazing, protect the valve body and drier by using wet cloths to prevent the valve body and drier from overheating. Do not allow the drier to exceed 250°F (121°C).

IMPORTANT

Sometimes moisture in the refrigeration circuit exceeds the drier capacity and freezes up at the expansion valve.

- 1) Turn off the power supply.
- 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 disconnect the expansion valve. Place the new expansion valve in position.
- 6) Remove the drier, 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.
- 8) Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.

- 9) Evacuate the system, and charge it with refrigerant. For water-cooled model, see the nameplate for the required refrigerant charge. For remote air-cooled model, see the rating label inside the icemaker.
- 10) Attach the expansion valve bulb to the suction line in the same location as the previous bulb. The bulb should be placed between the 10 o'clock and 2 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) Turn on the power supply.

D. Removal and Replacement of Hot Gas Valve or Liquid Line Valve

CAUTION

1. Always use a copper tube of the same diameter and length when replacing the valve lines; otherwise, performance may be affected.
2. Always replace the strainer when replacing the hot gas valve.
3. Always install a new drier every time the sealed refrigeration system is opened.
4. Do not replace the drier until after all other repair or replacement has been made. Install the new drier with the arrow on the drier in the direction of the refrigerant flow.
5. When brazing, protect the valve body and drier by using wet cloths to prevent the valve body and drier from overheating. Do not allow the drier to exceed 250°F (121°C).

- 1) Turn off the power supply.
- 2) Remove the panels.
- 3) Recover the refrigerant and store it in an approved container.
- 4) Remove the bolt and the solenoid.
- 5) Disconnect the valve. If replacing the hot gas valve, also remove the strainer.
- 6) Place the new valve and strainer (if applicable) in position.
- 7) Remove the drier, then place the new drier in position.
- 8) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.
- 9) Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.
- 10) Evacuate the system, and charge it with refrigerant. For water-cooled model, see the nameplate for the required refrigerant charge. For remote air-cooled model, see the rating label inside the icemaker.
- 11) Cut the leads of the solenoid allowing enough lead length to reconnect using closed end connectors.

- 12) Connect the new solenoid leads.
- 13) Attach the solenoid to the valve body and secure it with the bolt.
- 14) Replace the panels in their correct positions.
- 15) Turn on the power supply.

E. Removal and Replacement of Evaporator

CAUTION

1. Always install a new drier every time the sealed refrigeration system is opened.
2. Do not replace the drier until after all other repair or replacement has been made. Install the new drier with the arrow on the drier in the direction of the refrigerant flow.
3. When brazing, protect the drier by using a wet cloth to prevent the drier from overheating. Do not allow the drier to exceed 250°F (121°C).

- 1) Turn off the power supply.
- 2) Remove the panels and the front and top insulation.
- 3) Recover the refrigerant and store it in an approved container.
- 4) Remove the spray tubes. Remove the insulation at the notch where the refrigeration tubing passes through the molded chassis.
- 5) Disconnect the evaporator tubing.
Note: The pipes in the evaporator case are specially coated to resist corrosion. Use sandpaper to remove the coating from the brazing connections before unbrazing.
- 6) Remove the pop rivets securing the evaporator, then lift out the evaporator.
- 7) Install the new evaporator.
- 8) Remove the drier, then place the new drier in position.
- 9) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.
- 10) Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.
- 11) Evacuate the system, and charge it with refrigerant. For water-cooled model, see the nameplate for the required refrigerant charge. For remote air-cooled model, see the rating label inside the icemaker.
- 12) Replace the removed parts in the reverse order of which they were removed.
- 13) Replace the top insulation and the panels in their correct positions.
- 14) Turn on the power supply.

F. Removal and Replacement of Water-Cooled Condenser

CAUTION

1. Always install a new drier every time the sealed refrigeration system is opened.
2. Do not replace the drier until after all other repair or replacement has been made. Install the new drier with the arrow on the drier in the direction of the refrigerant flow.
3. When brazing, protect the drier by using a wet cloth to prevent the drier from overheating. Do not allow the drier to exceed 250°F (121°C).

- 1) Turn off the power supply.
- 2) Remove the panels.
- 3) Close the condenser water supply line shut-off valve. If connected to a closed loop water supply, also close the condenser return outlet shut-off valve.
- 4) Open the condenser water supply line drain valve. If connected to a closed loop water supply, also open the condenser return outlet drain valve.
- 5) Attach a compressed air or carbon dioxide supply to the condenser water supply line drain valve.
- 6) Open the water regulating valve by using a screwdriver to pry up on the spring retainer underneath the spring. While holding the valve open, blow out the condenser using the compressed air or carbon dioxide supply until water stops coming out.
- 7) Recover the refrigerant and store it in an approved container.
- 8) Disconnect the condenser water inlet and outlet piping and the refrigeration inlet and outlet piping at the condenser.
- 9) Remove the old condenser and install the new condenser.
- 10) Remove the drier, then place the new drier in position.
- 11) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.
- 12) Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.
- 13) Evacuate the system, and charge it with refrigerant. See the nameplate for the required refrigerant charge.
- 14) Close the drain valve(s). Open the condenser water supply line shut-off valve. If connected to a closed loop water supply, also open the condenser return outlet shut-off valve.
- 15) Check for water leaks.
- 16) Replace the panels in their correct positions.
- 17) Turn on the power supply.

G. Removal and Replacement of Remote Air-Cooled Condenser

CAUTION

1. Always install a new drier every time the sealed refrigeration system is opened.
2. Do not replace the drier until after all other repair or replacement has been made. Install the new drier with the arrow on the drier in the direction of the refrigerant flow.
3. When brazing, protect the drier by using a wet cloth to prevent the drier from overheating. Do not allow the drier to exceed 250°F (121°C).

- 1) Turn off the power supply.
- 2) Remove the icemaker panels.
- 3) Recover the refrigerant and store it in an approved container.
- 4) Remove the condenser unit panels.
- 5) Disconnect the condenser inlet and outlet piping.
- 6) Remove the screws securing the condenser to the base of the unit, then remove the condenser.
- 7) Remove the shroud from the condenser and attach to the new condenser.
- 8) Install the new condenser.
- 9) Remove the drier (located in the icemaker), 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) Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.
- 12) Evacuate the system, and charge it with refrigerant. See the rating label inside the icemaker for the required refrigerant charge.
- 13) Replace the removed parts in the reverse order of which they were removed.
- 14) Replace the panels in their correct positions.
- 15) Turn on the power supply.

H. Removal and Replacement of Water Regulating Valve

(water-cooled model)

CAUTION

1. Always install a new drier every time the sealed refrigeration system is opened.
2. Do not replace the drier until after all other repair or replacement has been made. Install the new drier with the arrow on the drier in the direction of the refrigerant flow.
3. When brazing, protect the drier by using a wet cloth to prevent the drier from overheating. Do not allow the drier to exceed 250°F (121°C).

- 1) Turn off the power supply.
- 2) Remove the panels.
- 3) Close the condenser water supply line shut-off valve. If connected to a closed loop water supply, also close the condenser return outlet shut-off valve.
- 4) Open the condenser water supply line drain valve. If connected to a closed loop water supply, also open the condenser return outlet drain valve.
- 5) Attach a compressed air or carbon dioxide supply to the condenser water supply line drain valve.
- 6) Open the water regulating valve by using a screwdriver to pry up on the spring retainer underneath the spring. While holding the valve open, blow out the condenser using the compressed air or carbon dioxide supply until water stops coming out.
- 7) Recover the refrigerant and store it in an approved container.
- 8) Disconnect the capillary tube at the condenser outlet.
- 9) Disconnect the flare-connections of the valve.
- 10) Remove the screws and the valve from the bracket.
- 11) Install the new valve.
- 12) Remove the drier, then place the new drier in position.
- 13) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.
- 14) Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.
- 15) Evacuate the system, and charge it with refrigerant. See the nameplate for the required refrigerant charge.
- 16) Connect the flare-connections.
- 17) Close the drain valve(s). Open the condenser water supply line shut-off valve. If connected to a closed loop water supply, also open the condenser return outlet shut-off valve.

- 18) Check for water leaks.
- 19) Replace the panels in their correct positions.
- 20) Turn on the power supply.

I. Adjustment of Water Regulating Valve - Water-Cooled Model

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. See Fig. 3. Next, check that the reference pressure is in the range indicated in the Head Pressure table in the Performance Data section. See "III.C. Performance Data." If it is not in the proper range, verify the refrigerant charge.
- 3) Check that the condenser drain temperature is stable.

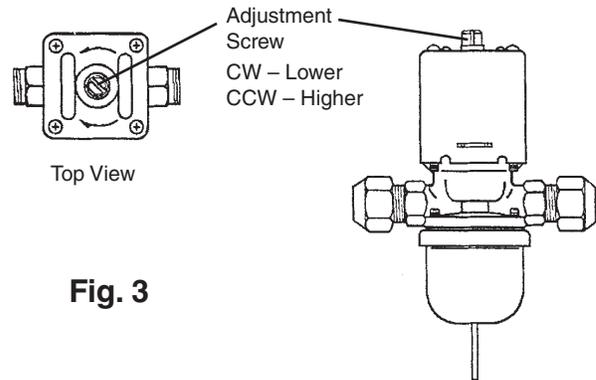


Fig. 3

J. Removal and Replacement of Headmaster (Condensing Pressure Regulator - C.P.R.) - Remote Air-Cooled Model

CAUTION

1. Always install a new drier every time the sealed refrigeration system is opened.
2. Do not replace the drier until after all other repair or replacement has been made. Install the new drier with the arrow on the drier in the direction of the refrigerant flow.
3. When brazing, protect the headmaster and drier by using wet cloths to prevent the headmaster and drier from overheating. Do not allow the drier to exceed 250°F (121°C).

- 1) Turn off the power supply.
- 2) Remove the panels from the remote condenser unit.
- 3) Recover the refrigerant and store it in an approved container.
- 4) Before heating, break off the stub on the dome to release the dome charge.
- 5) Disconnect the headmaster.
- 6) Place the new headmaster in position.
- 7) Remove the drier, then place the new drier in position.

- 8) Braze all fittings with nitrogen gas flowing at a pressure of 3 to 4 PSIG.
- 9) Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.
- 10) Evacuate the system and charge it with refrigerant. See the rating label inside the icemaker for the required refrigerant charge.
- 11) Replace the panels in their correct positions.
- 12) Turn on the power supply.

K. Removal and Replacement of Thermistor

This section covers removal and replacement of the thermistor. For a thermistor check procedure, see "IV.E. Thermistor Check."

CAUTION

1. The thermistor is fragile; handle very carefully.
2. Always use the recommended sealant (high thermal conductive type), Model KE4560RTV manufactured by SHINETSU SILICONE, Part Code 60Y000-11, or Part Code 4A0683-01 or equivalent.
3. Always use the recommended foam insulation (non-absorbent type) or equivalent.
4. Do not shorten or cut the thermistor leads.

- 1) Turn off the power supply.
- 2) Remove the panels.
- 3) Remove the control box cover.
- 4) Disconnect the white thermistor connector from the control board WHITE K3 connector.
- 5) Remove the plastic cable ties, foam insulation, thermistor holder, and thermistor. See Fig. 4.
- 6) Scrape away the old sealant on the thermistor holder and the suction pipe.
- 7) Wipe off moisture or condensation on the suction pipe.
- 8) Smoothly apply recommended sealant (KE4560RTV, Part Code 60Y000-11 or 4A0683-01) to the thermistor holder concave.
- 9) Attach the new thermistor to the suction pipe in the same position as the previous thermistor. Be very careful to prevent damage to the leads. Secure it using the thermistor holder and recommended foam insulation.

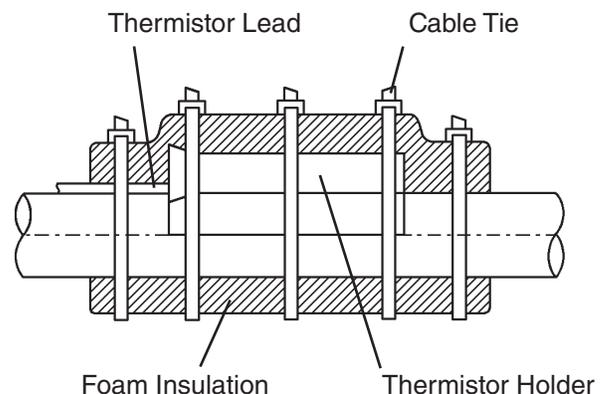


Fig. 4

- 10) Secure the insulation using the plastic cable ties.
- 11) Connect the white thermistor connector through the bushing of the control box to the control board WHITE K3 connector. **CAUTION! Do not shorten or cut the thermistor leads.**
- 12) Replace the control box cover and the panels in their correct positions.
- 13) Turn on the power supply.

L. Removal and Replacement of Fan Motor – Remote Air-Cooled Model

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

- 1) Turn off the power supply.
- 2) Remove the remote condenser unit panels.
- 3) Remove the junction box cover from the remote condenser unit.
- 4) Disconnect the fan motor wires.
- 5) Remove the fan motor bracket and fan motor.
- 6) Install the new fan motor, connect the fan motor wires, and replace the removed parts in the reverse order of which they were removed.
- 7) Replace the junction box cover in its correct position.
- 8) Replace the panels in their correct positions.
- 9) Turn on the power supply.

M. Removal and Replacement of Inlet Water Valve

- 1) Turn off the power supply.
- 2) Close the icemaker water supply line shut-off valve. Open the icemaker water supply line drain valve.
- 3) Remove the front panel.
- 4) Disconnect the valve outlet tubing by releasing the clamp.
- 5) Loosen the fitting nut. Be careful not to lose the washer.
- 6) Disconnect the terminals from the inlet water valve.
- 7) Remove the bracket and valve from the unit.
- 8) Install the new valve. Replace the removed parts in the reverse order of which they were removed. Make sure the washer is in place in the fitting nut.

- 9) Close the icemaker water supply line drain valve. Open the icemaker water supply line shut-off valve.
- 10) Turn on the power supply.
- 11) Check for leaks.
- 12) Replace the front panel in its correct position.

N. Removal and Replacement of Pump Motor

- 1) Turn off the power supply.
- 2) Remove the front panel.
- 3) Drain the water tank by removing the cap located on the front bottom part of the ice dropping hole. See Fig. 5.
- 4) Replace the cap in its correct position. Be careful not to cross thread the cap.
- 5) Disconnect the pump suction and discharge hoses.
- 6) Remove the closed end connectors from the pump motor leads.
- 7) Remove the two screws and the pump motor bracket.
- 8) Remove the pump housing and check the impeller.
- 9) If the impeller is defective, install a new impeller.
- 10) Install the new motor or new parts, and replace the removed parts in the reverse order of which they were removed.
- 11) Turn on the power supply and check for leaks.
- 12) Replace the front panel in its correct position.

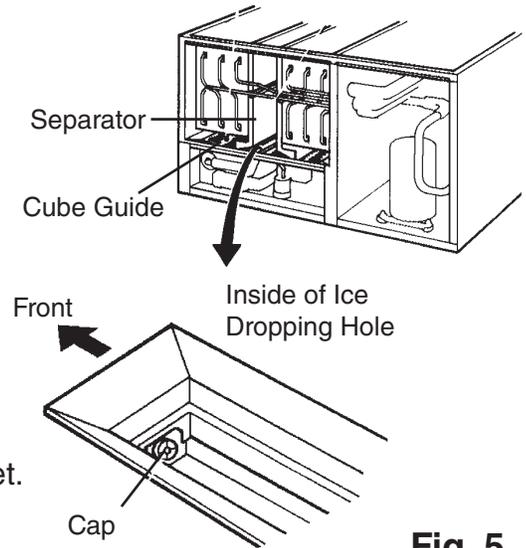


Fig. 5

O. Removal and Replacement of Control Board

CAUTION

1. The control board is fragile; handle very carefully.
2. The 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 before handling or replacing the control board.
3. Do not touch the electronic devices on the control board or the back of the control board.
4. Do not change wiring and connections. Do not misconnect K3, K4, and K5, because the same connector is used for the thermistor and float switch. K4 is not connected.
5. Always replace the whole control board assembly if it goes bad.
6. Do not short out power supply to test for voltage.

- 1) Turn off the power supply.
- 2) Remove the front panel and the control box cover.
- 3) Disconnect the control board connectors from the control board.
- 4) Remove the control board.
- 5) Adjust the dip switches on the new control board to the factory default settings. See "II.C.4.a) Default Dip Switch Settings." **CAUTION! Do not adjust S4 dip switch 7 out of the factory default position on this model. This dip switch must be left in the factory default position or this unit will not operate correctly.**
- 6) Install the new control board taking care not to damage it.
- 7) Connect the control board connectors to the new control board.
- 8) Replace the control box cover and front panel in their correct positions.
- 9) Turn on the power supply.

VI. Cleaning and Maintenance

IMPORTANT

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

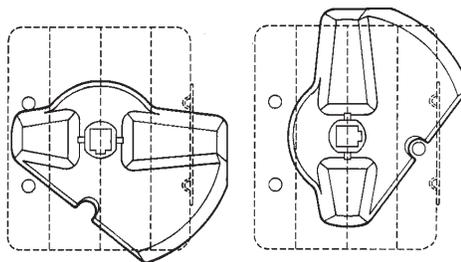
A. Cleaning and Sanitizing Instructions

WARNING

1. Hoshizaki recommends cleaning this icemaker 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. Carefully follow any instructions provided with the bottles of cleaning and sanitizing solution.
5. Never run the icemaker when the water tank is empty.

IMPORTANT

1. The cleaning valve is used to allow solution flow to the inside of the evaporator during the cleaning and sanitizing operation. It should be closed for all icemaking operation. The compressor will not operate unless this valve is completely closed.
2. To open the cleaning valve, the valve handle should be parallel to the valve body. To close the valve, the valve handle should be at a right angle to the valve body.



CLOSED POSITION

OPEN POSITION

1. Cleaning Procedure

- 1) Dilute 38 fl. oz. (1,124 ml) of recommended cleaner Hoshizaki "Scale Away" with 7 gal. (26 l) of warm water.
- 2) Remove all ice from the evaporator and the storage bin.
Note: To remove cubes on the evaporator, turn off the power supply and turn it back on after 3 minutes. The harvest cycle starts and the cubes will be removed from the evaporator.

- 3) Turn off the power supply.
- 4) Remove the front panel, and then remove the insulation panel by first removing the thumbscrew, lifting up the panel slightly and pulling it towards you.

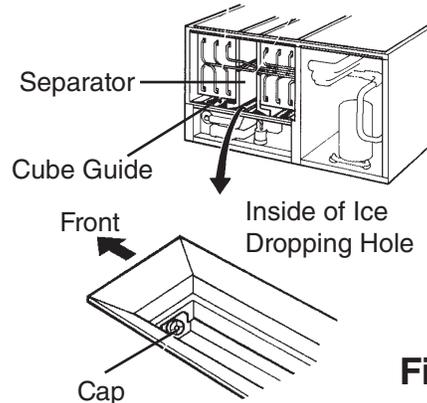


Fig. 6

- 5) Remove the cap located on the front bottom part of the ice dropping hole. Drain the water tank. See Fig. 6.
- 6) Replace the cap in its correct position. Be careful not to cross thread it.
- 7) In bad or severe water conditions, clean the float switch assembly as described below. Otherwise, continue to step 8.
 - a. Disconnect the vent tube and the flush tube from the top of the float switch, then remove the float switch assembly from the mounting bracket and remove the rubber boot from the bottom of the assembly.
 - b. Remove the retainer rod from the bottom of the float switch assembly, then remove the float. Be careful not to bend the retainer rod excessively when removing it.
 - c. Wipe down the float switch assembly's housing, shaft, float, and retainer rod with cleaning solution. Clean the inside of the rubber boot and hose with cleaning solution. Rinse the parts thoroughly with clean water.
 - d. Reassemble the float switch assembly and replace it and the rubber boot in their correct positions. Reconnect the vent tube and the flush tube.
- 8) Pour the cleaning solution into the water tank.
- 9) Fully open the cleaning valve on the left side wall of the machine compartment.
- 10) Move the control switch on the control box to the "WASH" position.
- 11) Replace the insulation panel and the front panel in their correct positions.
- 12) Turn on the power supply to start the washing process.
- 13) Turn off the power supply after 30 minutes.
- 14) Remove the front panel and the insulation panel.
- 15) Remove the cap located on the front bottom part of the ice dropping hole. Drain the water tank. Replace the cap and the insulation panel in their correct positions.
- 16) Move the control switch to the "ICE" position.
- 17) Close the cleaning valve.
Note: The icemaker will not operate unless the cleaning valve is completely closed.

- 18) Replace the front panel in its correct position.
- 19) Turn on the power supply to fill the water tank with water.
- 20) Turn off the power supply after 3 minutes.
- 21) Remove the front panel and fully open the cleaning valve.
- 22) Move the control switch to the "WASH" position.
- 23) Replace the front panel in its correct position.
- 24) Turn on the power supply to rinse off the cleaning solution.
- 25) Turn off the power supply after 5 minutes.
- 26) Remove the front panel and the insulation panel.
- 27) Remove the cap located on the front bottom part of the ice dropping hole. Drain the water tank. Replace the cap and the insulation panel in their correct positions.
Note: Do not replace the insulation panel when you proceed to "2. Sanitizing Procedure."
- 28) Repeat steps 16 through 27 three more times to rinse thoroughly.
Note: If you do not sanitize the icemaker, go to step 9 in "2. Sanitizing Procedure."

2. Sanitizing Procedure - Following Cleaning Procedure

- 1) Dilute 3.5 fl. oz. (104 ml or 7 tbs) of a 5.25% sodium hypochlorite solution (chlorine bleach) with 7 gal. (26 l) of warm water.
- 2) Pour the sanitizing solution into the water tank.
- 3) Replace the insulation panel and the front panel in their correct positions.
Note: Make sure that the control switch is in the "WASH" position and the cleaning valve is open.
- 4) Turn on the power supply to start the sanitizing process.
- 5) Turn off the power supply after 15 minutes.
- 6) Remove the front panel and the insulation panel.
- 7) Remove the cap located on the front bottom part of the ice dropping hole. Drain the water tank. Replace the cap and the insulation panel in their correct positions.
- 8) Repeat steps 16 through 27 in "1. Cleaning Procedure" two times to rinse thoroughly.
- 9) Close the cleaning valve.
- 10) Move the control switch to the "ICE" position.
- 11) Replace the front panel in its correct position.
- 12) Clean the storage bin using a neutral cleaner. Rinse thoroughly after cleaning.
- 13) Turn on the power supply to start the automatic icemaking process.

B. Maintenance

IMPORTANT

This icemaker must be maintained individually, referring to the instruction manual and labels provided with the icemaker.

1. Stainless Steel Exterior

To prevent corrosion, wipe the exterior occasionally with a clean, 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 (bin accessory).
- The storage bin is for ice use only. Do not store anything else in the storage bin.
- Clean the scoop and the storage bin liner using a neutral cleaner. Rinse thoroughly after cleaning.

3. Condenser (remote air-cooled model only)

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

C. Preparing the Icemaker for Long Storage

CAUTION

1. When storing the icemaker for an extended time or in sub-freezing temperatures, follow the instructions below to prevent damage.
2. To prevent damage to the water pump seal, do not operate the icemaker with the control switch in the "WASH" position when the water tank is empty.

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.

1. Remove the water from the icemaker water supply line:

- 1) Turn off the power supply, then remove the front panel.
- 2) Close the icemaker water supply line shut-off valve and open the icemaker water supply line drain valve.
- 3) Allow the line to drain by gravity.
- 4) Attach a compressed air or carbon dioxide supply to the icemaker water supply line drain valve.
- 5) Make sure at least 3 minutes have elapsed since you turned off the power supply. Make sure the control switch is in the "ICE" position. Replace the front panel in its correct position and turn on the power supply.
- 6) Blow the icemaker water supply line out using the compressed air or carbon dioxide supply.
- 7) Close the icemaker water supply line drain valve.

2. Drain the water tank:

- 1) Turn off the power supply, then remove the front panel. Move the control switch to the "OFF" position.
- 2) Remove the insulation panel. Remove the cap located on the front bottom part of the ice dropping hole. Drain the water tank. See Fig. 7.
- 3) Replace the cap and the insulation panel in their correct positions. Be careful not to cross thread the cap.
- 4) Replace the front panel in its correct position.
- 5) Remove all ice from the storage bin. Clean the storage bin using a neutral cleaner. Rinse thoroughly after cleaning.

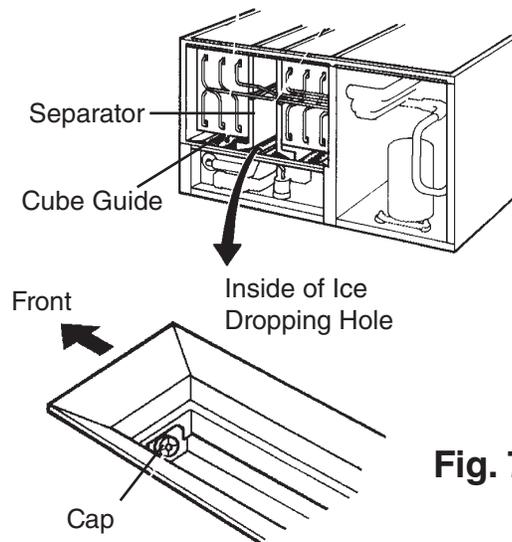


Fig. 7

3. On water-cooled model only, first remove the water from the water-cooled condenser:

- 1) Make sure the power supply is off, then remove the front panel and right side panel.
- 2) Close the condenser water supply line shut-off valve. If connected to a closed loop water supply, also close the condenser return line shut-off valve.
- 3) Open the condenser water supply line drain valve. If connected to a closed loop water supply, also open the condenser return line drain valve.
- 4) Attach a compressed air or carbon dioxide supply to the condenser water supply line drain valve.
- 5) Open the water regulating valve by using a screwdriver to pry up on the spring retainer underneath the spring. While holding the valve open, blow out the condenser using the compressed air or carbon dioxide supply until water stops coming out.
- 6) Close the drain valve(s), then replace the right side panel and front panel in their correct positions.