

Hoshizaki America, Inc.

Modular Cuber

Models
IM-500SAA



“A Superior Degree
of Reliability”

www.hoshizaki.com

SERVICE MANUAL



Number: M029-897
Issued: 2-8-2013
Revised: 7-19-2013

IMPORTANT

Only qualified service technicians should install, service or maintain the product. 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, and warranty coverage.

Hoshizaki provides this manual primarily to assist qualified service technicians in the maintenance and service of the product.

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.

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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.

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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.

NOTICE Indicates a situation which could result in damage to the unit or property.

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

⚠ WARNING

This appliance 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 injury or damage resulting from improper, incorrect, and unreasonable use. Failure to install, operate, and maintain the appliance in accordance with this manual will adversely affect safety, performance, component life, and warranty coverage and may result in costly water damage.

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

- Only qualified service technicians should install and service the appliance.
- The appliance must be installed in accordance with applicable national, state, and local codes and regulations.
- 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 damage to equipment.
- The icemaker requires an independent power supply of proper capacity. See the nameplate for electrical specifications. Failure to use an independent power supply of proper capacity can result in a tripped breaker, blown fuse, damage to existing wiring, or component failure. This could lead to heat generation or fire.
- **THE ICEMAKER MUST BE GROUNDED.** Failure to properly ground the icemaker could result in death, serious injury, or damage to equipment.
- Move the control switch to the "OFF" position and turn off the power supply before servicing. Lockout/Tagout to prevent the power supply from being turned back on inadvertently.
- To reduce the risk of electric shock, do not touch the control switch with damp hands.
- Do not make any alterations to the appliance. Alterations could result in electric shock, injury, fire, or damage to the appliance.

- This appliance is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- Children should be properly supervised around this appliance.
- Do not climb, stand, or hang on the appliance or allow children or animals to do so. Serious injury could occur or the appliance could be damaged.
- Do not use combustible spray or place volatile or flammable substances near the appliance. They might catch fire.
- Keep the area around the appliance clean. Dirt, dust, or insects in the appliance could cause harm to individuals or damage to the appliance.

NOTICE

- Follow the water supply, drain connection, and maintenance instructions carefully to reduce the risk of costly water damage.
- In areas where water damage is a concern, install in a contained area with a floor drain.
- Install the icemaker in a location that stays above freezing. Normal operating ambient temperature must be within 45°F to 100°F (7°C to 38°C).
- Do not leave the icemaker on during extended periods of non-use, extended absences, or in sub-freezing temperatures. To properly prepare the icemaker for these occasions, follow the instructions in “VI. C. Preparing the Icemaker for Long Storage.”
- Do not place objects on top of the appliance.
- The ice storage bin is for ice use only. Do not store anything else in the ice storage bin.

I. Specifications

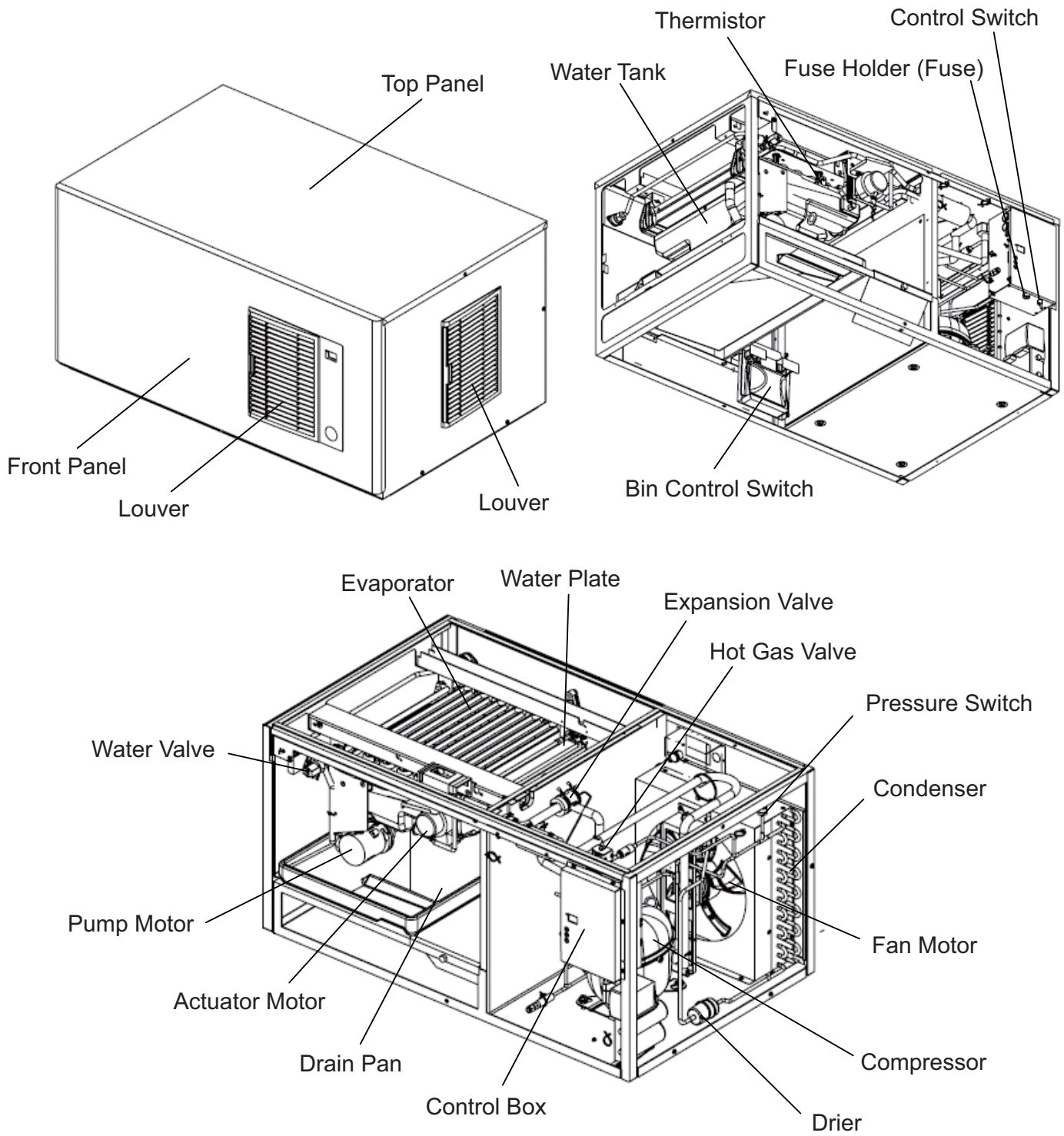
A. Specifications

AC SUPPLY VOLTAGE	115/60/1			
AMPERAGE	11.5 A (5 Min. Freeze AT 104°F / WT 80°F)			
MINIMUM CIRCUIT AMPACITY	20 A			
MAXIMUM FUSE SIZE	20 A			
APPROXIMATE ICE PRODUCTION PER 24 HR. lbs./day (kg/day) Reference without *marks	Ambient Temp.(°F)	WATER TEMP. (°F)		
		50	70	90
	70	*500 (227)	481 (218)	447 (203)
	80	485 (220)	456 (207)	417 (189)
	90	481 (218)	*435 (197)	397 (180)
	100	471 (214)	426 (193)	*363 (165)
SHAPE OF ICE	Cube Ice			
ICE PRODUCTION PER CYCLE	6.9 lbs. (3.15 kg) 140 pcs.			
APPROXIMATE STORAGE CAPACITY	N/A			
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F		
ELECTRIC W (kWH/100 lbs.)	990(5.45)	920(4.40)		
WATER gal./24HR (gal./100 lbs.)	86(19.8)	105(21.0)		
CEC/CEE TIER LEVEL	1			
ENERGY START	YES			
EXTERIOR DIMENSIONS (WxDxH)	44" x 27.6" x 21.7" (1118 x 700 x 550 mm)			
EXTERIOR FINISH	Stainless Steel, Galvanized Steel (Rear)			
WEIGHT	Net 196 lbs. (89 kg), Shipping 220 lbs. (100 kg)			
CONNECTIONS - ELECTRIC	Permanent Connection			
- WATER SUPPLY	Inlet	1/2" FPT		
- DRAIN	Outlet	3/4" FPT		
CUBE CONTROL SYSTEM	Thermistor and Timer			
HARVESTING CONTROL SYSTEM	Hot Gas, Thermistor and Timer			
ICE MAKING WATER CONTROL	Timer Controlled, Overflow Pipe			
COOLING WATER CONTROL	N/A			
BIN CONTROL SYSTEM	Mechanical Level Switch with Delay			
COMPRESSOR	Hermetic, Model NT6222GKV			
CONDENSER	Air-Cooled, Fin and tube type			
EVAPORATOR	Cell type, Copper and Tin dipping			
REFRIGERANT CONTROL	Thermostatic Expansion Valve			
REFRIGERANT CHARGE	R-404A, 1 lb. 26.5 oz. (750g)			
DESIGN PRESSURE	High 350PSIG, Low 220PSIG			
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	N/A			
ACCESSORIES - SUPPLIED	N/A			
- REQUIRED	Ice Storage Bin			
OPERATING CONDITIONS	VOLTAGE RANGE	104 - 127 V		
	AMBIENT TEMP.	45 -100° F		
	WATER SUPPLY TEMP.	45 - 90° F		
	WATER SUPPLY PRESSURE	10 - 113 PSIG		
DRAWING NO. (DIMENSION)	377718S--			

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

II. General Information

A. Construction



B. Operation

This service manual specifies the basic operation of the control board “Ver. 1.4A”.

1. Soft Start

- 1) When the power supply is turned on, the 7-segment LED shows “on” and the hot gas valve opens. After 30 seconds, the defrost cycle starts.
 - If the reset switch is pressed during the 30-second standby time, the unit resets soft start and immediately starts operation.

2. Water Pan Opens

- 1) The hot gas valve opens, the actuator motor starts, and the water pan starts to open.
- 2) After 20 seconds, the water valve opens to supply defrosting water (water pan cleaning water) for a specific time.
 - The defrosting water supply time varies between the water temperatures above and below 48°F (9°C).
 - In the initial cycle, the water temperature is not detected and assumed to be below 48°F (9°C), resulting in a longer defrosting water supply time.
 - The defrosting water supply time is adjustable in the maintenance mode (see “II. D. 1. Maintenance Mode”).
- 3) The opening backup timer starts counting when the water pan starts to open. If the hall IC does not turn on within 3 minutes, the display shows “EE” and the unit stops for 60 minutes. If the error recurs after the unit resumes operation, the display shows “EE” and the unit shuts down (recorded as “E3” in error history).

3. Defrost Cycle

- 1) After the water pan opens, the hot gas valve opens until the defrost completion temperature is reached.
- 2) If the defrost completion temperature is not reached even when the defrost backup timer counts up (30 minutes after water pan starts to open), the display shows “E2” and the unit stops.

If the hot gas valve fails to open, the unit may stop with the “E2” error.

 - The defrost completion temperature is adjustable in the maintenance mode (see “II. D. 1. Maintenance Mode”).

4. Water Pan Closes

- 1) When the cube control thermistor senses the evaporator temperature above the defrost completion temperature, the hot gas valve closes, the fan motor starts, and the water pan starts to close.
- 2) The closing backup timer starts counting when the water pan starts to close. If the hall IC does not turn on within 3 minutes, the display shows “EE” and the unit stops for 60 minutes. If the error recurs after the unit resumes operation, the display shows “EE” and the unit shuts down (recorded as “E4” in error history).
 - In the initial cycle or when the water temperature is below 48°F (9°C), the water valve opens to supply defrosting water for 10 seconds after the water pan starts to close.

5. Freeze Cycle

- 1) When the water pan closes and the hall IC turns on, the water valve opens to supply icemaking water for a specific time. The icemaking water supply time varies between startup, reset, and the end of bin control cycle and between partial drain flush and full drain flush (see note below).
 - The icemaking water supply time and additional water supply time are adjustable in the maintenance mode (see “II. D. 1. Maintenance Mode”).

Note:

Full drain flush - After a freeze cycle ends, the unit drains all the remaining water in the tank and refills the tank in the next freeze cycle.

Partial drain flush (default setting) - After a freeze cycle ends, the unit leaves the remaining water in the tank and adds some water to fill the tank in the next freeze cycle.

- 2) After icemaking water has been supplied, the pump motor starts.
- 3) After 30 seconds, the cube control thermistor senses the temperature that will be added with a predetermined offset value and used as the water temperature in the freeze cycle, water pan opening cycle, defrost cycle, and water pan closing cycle.
 - The offset value for the cube control thermistor temperature is adjustable in the maintenance mode (see “II. D. 1. Maintenance Mode”).
- 4) The freeze cycle is considered to be 100% complete when the predetermined target integrated values are reached.
 - The target integrated values (temperature and time) for the freeze completion are adjustable in the maintenance mode (see “II. D. 1. Maintenance Mode”).
- 5) To reduce ice forming on the water pan when the freeze completion rate reaches 100% at an ambient temperature below 86°F (30°C), the hot gas valve opens and closes two times for a specific time to raise the water pan temperature. Then, the

actuator motor starts to open the water pan.

While the hot gas valve opens and closes, the freeze cycle is not considered to be complete and the pump motor and fan motor keep running.

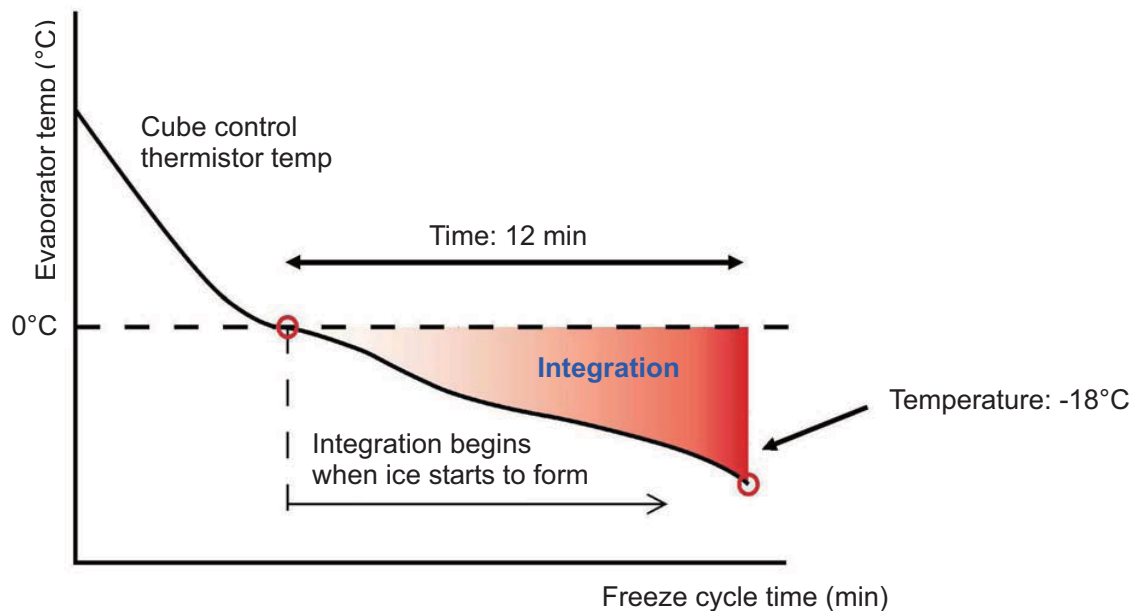
- The ambient temperature setting and hot gas valve opening/closing time are adjustable in the maintenance mode (see “II. D. 1. Maintenance Mode”).
- 6) Even if the freeze backup timer counts up (45 minutes after water pan starts to close), the unit stops with the “E1” error when the evaporator temperature is above 32°F (0°C).

If the hot gas valve fails to close, the unit may stop with the “E1” error.

- The backup timer setting is adjustable in the maintenance mode (see “II. D. 1. Maintenance Mode”).

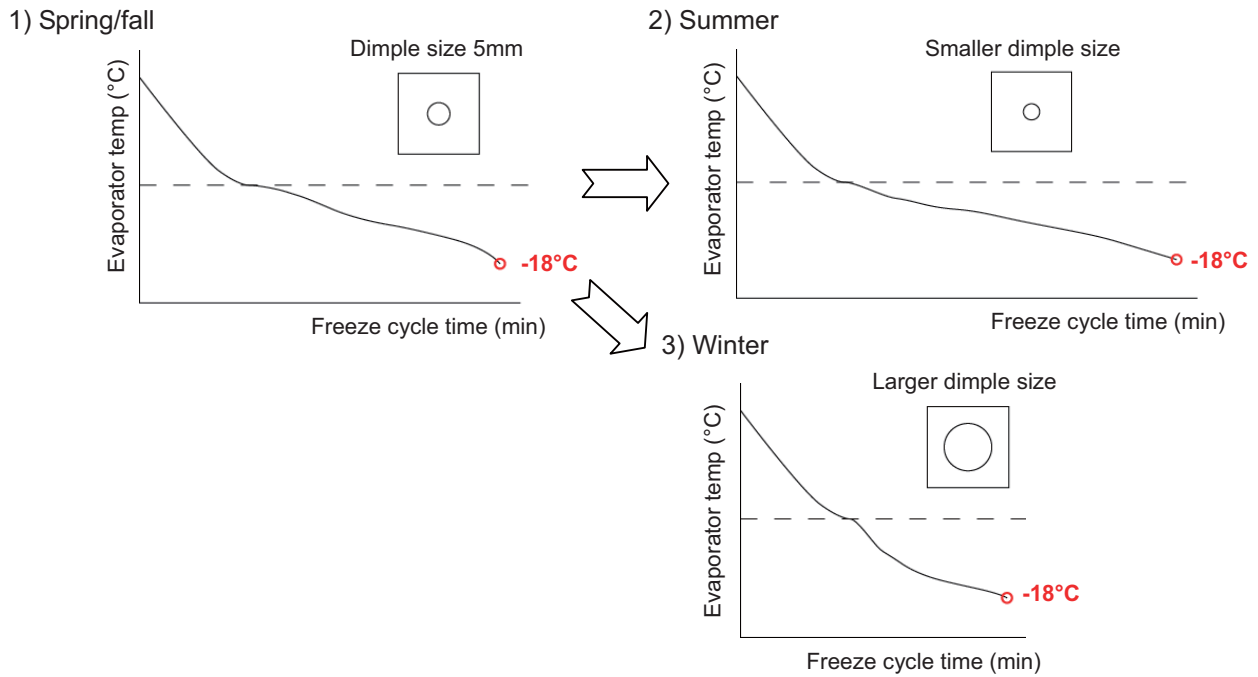
6. Freeze Completion Control

- 1) The target integrated values (cube control thermistor temperature and freeze cycle time) are set for freeze completion.
 - The target integrated freeze completion temperature and time are adjustable in the maintenance mode (see “II. D. 1. Maintenance Mode”).
- 2) After the cube control thermistor senses a temperature below 32°F (0°C), the cube control thermistor temperature and freeze cycle time are integrated every second.
- 3) When the integrated values reach the target, the freeze cycle completes.

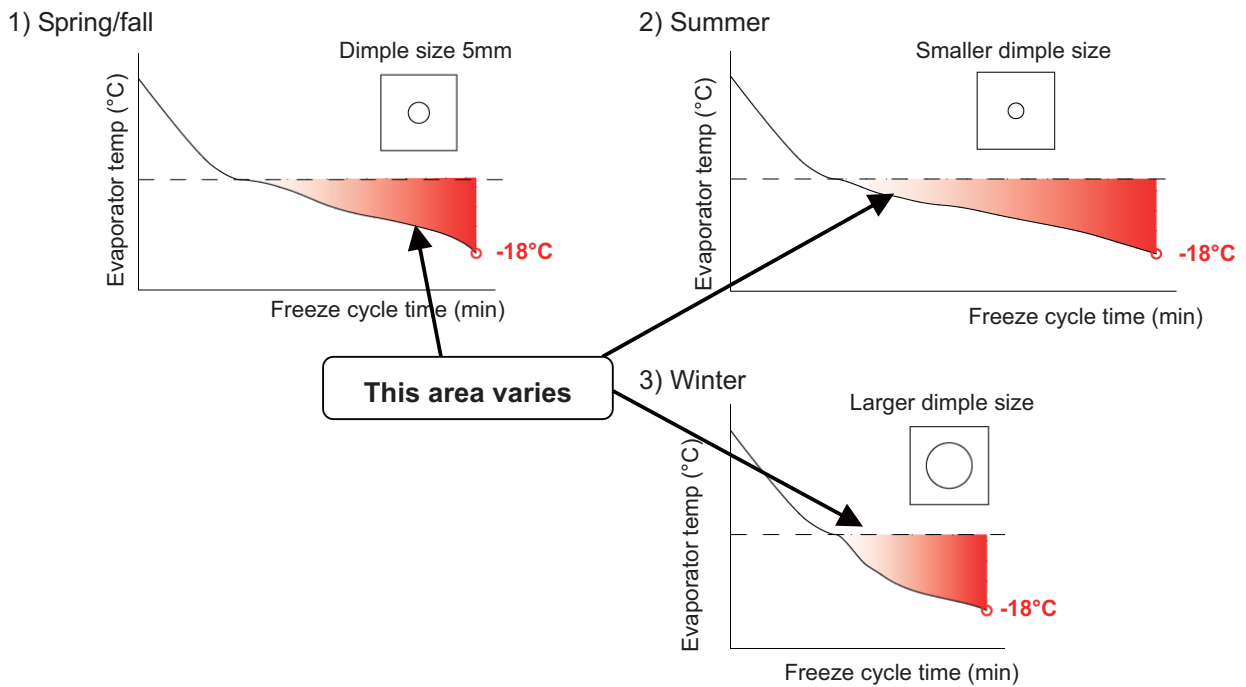


As the previous freeze completion control depended on the freeze completion temperature only, the dimple size varied in 1) spring/fall, 2) summer, and 3) winter even at the same freeze completion temperature.

For example, when the freeze completion temperature is -4°F (-18°C) and the dimple size is 0.2 in (5 mm), the freeze cycle time becomes longer and dimple size smaller in summer, and the freeze cycle time becomes shorter and dimple size larger in winter.



Comparison of the evaporator temperature curves finds that the red-colored area varies in different seasons.



This area corresponds to the energy on ice. Making these different areas into one can equalize the dimple size.

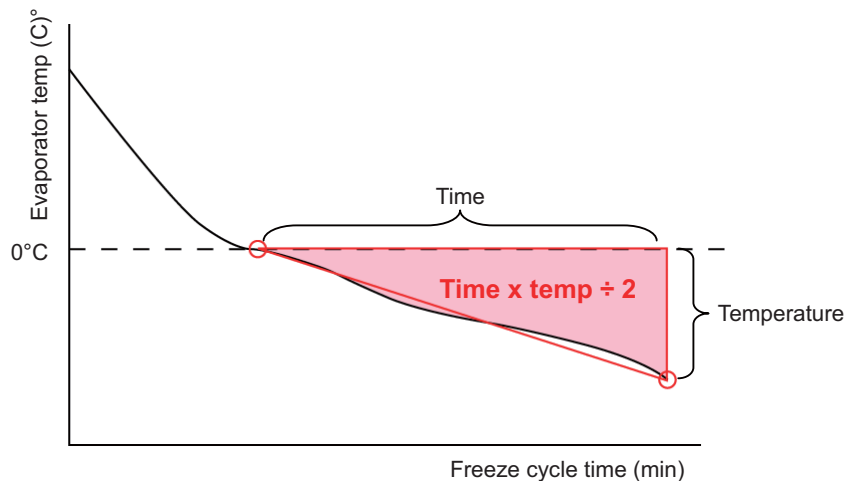
To calculate the energy required for ice production, the actual ice production area under 32°F (0°C) in the evaporator temperature curve is approximated into a triangle.

This area can be calculated by

$$\text{Time} \times \text{temperature} \div 2$$

Therefore,

$$\underline{\text{Energy required for ice production} = \text{time} \times \text{temperature} \div 2}$$



Providing the calculated energy to icemaking water can produce ice with fixed dimple size not affected by ambient conditions.

Actually, after the evaporator temperature becomes 32°F (0°C), the icemaker adds thermistor sensed temperature every second and continues ice production until the energy value calculated above (target freeze completion value) is reached.

To have stable ice production, it is necessary to calculate icemaking energy internally with the microprocessor. This energy calculation requires not just temperature but also time as shown in the above graph.

For this reason, both temperature and time are used to determine freeze completion for the IM models.

7. Water Supply Control

1) When the water pan closes and the hall IC turns on, the water valve opens to supply icemaking water for a specific time. The icemaking water supply time varies between startup, reset, and the end of bin control cycle and between partial drain flush and full drain flush.

- The icemaking water supply time and additional water supply time are adjustable in

the maintenance mode (see “II. D. 1. Maintenance Mode”).

- 2) After the water pan starts to open, the water valve opens in 20 seconds to supply defrosting water (water pan cleaning water) for a specific time. The defrosting water supply time varies between the water temperatures above and below 48°F (9°C). If the water temperature is below 48°F (9°C), the water valve opens for 10 seconds after the water pan starts to close.
 - The defrosting water supply time is adjustable in the maintenance mode (see “II. D. 1. Maintenance Mode”).
- 3) The water temperature is determined by a predetermined offset value plus the cube control thermistor temperature after icemaking water is supplied as mentioned in 1) and the pump motor runs for 30 seconds.
 - The water temperature offset value is adjustable in the maintenance mode (see “II. D. 1. Maintenance Mode”).

8. Ambient Temperature Correction

- 1) At low ambient temperatures, the dimple diameter of ice cubes is increased by a predetermined rate between the ambient temperature and target integrated freeze completion value to prevent reduction in the evaporator temperature leading to excessive ice production.
 - The rate between the ambient temperature and integrated value is adjustable in the maintenance mode (see “II. D. 1. Maintenance Mode”).

9. Dimple Diameter Setting

- 1) When the service 1 or service 2 switch is pressed, the current set point temperature (maintenance mode No. 2) is displayed (see “II. D. 1. Maintenance Mode”).
- 2) When the service 1 or service 2 switch is pressed again, the set point temperature goes up or down in 33°F (0.5°C) increments.
- 3) When the switches are not pressed for 30 seconds, the set point temperature is determined with “on” in the display.

10. Bin Control Cycle

- 1) When the bin control switch stays on for more than 10 seconds, the bin control cycle starts and the icemaker stops after the defrost cycle ends. After the bin control switch stays off for more than 80 seconds, the bin control cycle ends and the icemaker restarts. (The hot gas valve opens 30 seconds before the icemaker restarts.)
- 2) After the bin control cycle ends (or when the power supply is turned on), the water

pan starts to open.

- 3) If the bin control switch turns on while the water pan is opening after the power supply is turned on (or after the reset switch is pressed), the bin control cycle does not start. When the water pan opens and the hall IC turns on, the bin control cycle starts after 10 seconds and the icemaker stops.

11. Control Switch

The control switch is located on the control box.

This switch is used to place the machine into one of the three modes:

“OFF” (center position), “ICE” (left position), “WASH” (right position).

1) “OFF”

In the “OFF” position, no power is supplied to the unit. However, to avoid any possible risk of electrical shock, disconnect the power before servicing.

2) “ICE”

This position applies power to the unit causing the automatic icemaking process to begin.

3) “WASH”

When the control switch is placed in the “WASH” position, power is supplied to the pump motor. This allows cleaning and/or sanitizing solutions (see “VI. Cleaning and Maintenance Instructions”) to circulate throughout the water system and evaporator.

12. Reset Switch

- 1) When the reset switch is pressed and released after the power supply is turned on, the soft start is reset within 3 seconds and the water pan starts to open in the initial cycle.
- 2) When the reset switch is pressed and released during operation (water pan opening or closing, defrost or freeze cycle), the icemaker returns to the initial cycle within 3 seconds and the water pan starts to open.
 - The above control is available because the water pan position is detected by the hall IC not by a change switch.
- 3) When the reset switch is pressed and released while the icemaker is off in the bin control cycle, the icemaker returns to the initial cycle within 3 seconds, the bin control cycle ends and the water pan starts to open.
- 4) When the reset switch is pressed and released while the icemaker is off with an error, the icemaker returns to the initial cycle within 3 seconds, the error is reset and the water pan starts to open.

- When the icemaker returns to the initial cycle by the reset switch operation, the water temperature is assumed to be 32°F (0°C) [below 48°F (9°C)], the freeze back up timer is extended, the icemaking water supply time including additional water supply with the water pan closed doubles and the number of freeze cycles becomes 0.

13. 7-Segment LED

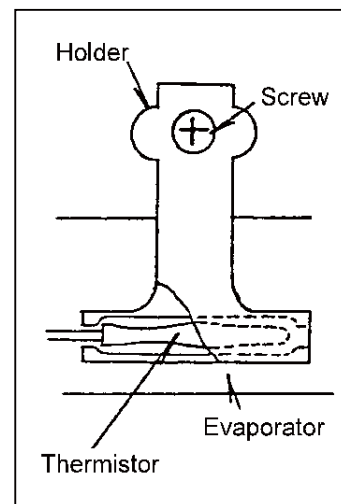
- 1) When the power supply is turned on, the display shows “on” and the automatic icemaking process starts.
- 2) When the service 1 or service 2 switch is pressed, the display shows the current setting. When the switch is pressed again, the setting becomes adjustable. When the switches are not pressed for 30 seconds, the adjusted setting is determined with “on” in the display.
- 3) When an error occurs, the display flashes the applicable error code.
- 4) In the maintenance mode, the display shows various settings.
- 5) In the display mode, the display shows various values and the error history.

14. Cube Control Thermistor (Harvest Control)

A thermistor is used as a harvest control sensor. The thermistor’s resistance varies depending on the evaporator middle temperatures. The control board monitors the resistance to start the harvest timer. No adjustment is required.

If necessary, check the resistance between thermistor leads, and visually check the thermistor mounting, located on the evaporator middle. To check the resistance between thermistor leads, follow the steps below.

- 1) Disconnect the connector CN13 on the board.
- 2) Remove the screw and the thermistor holder on the evaporator.
- 3) Immerse the sensor part in a glass containing ice and water for 2 or 3 minutes.
- 4) Check the resistance between thermistor leads. Normal reading is within 5 to 7 kΩ. Replace the thermistor if it is outside the normal reading.



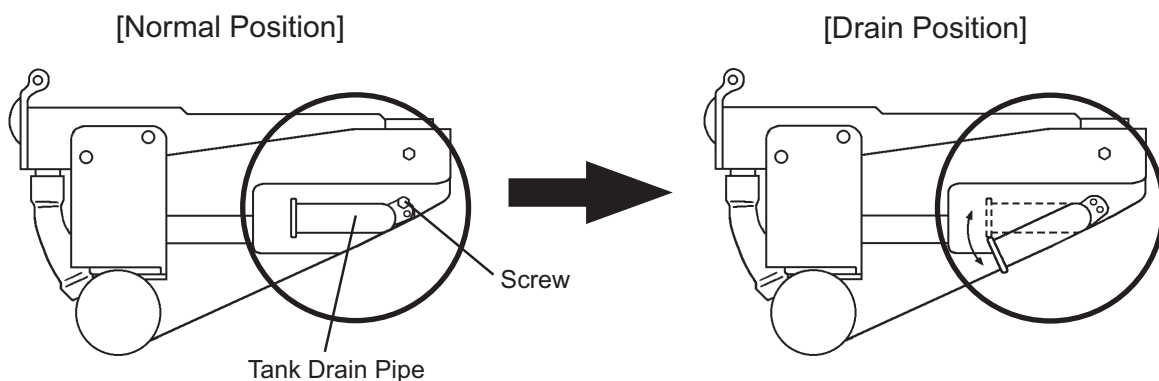
15. Drain Flush

In some hard water areas, white ice may be produced. In such case, install a filter or softener, and change the flush mode from “partial drain flush” (default setting) to “full drain flush” according to the following instructions.

Full drain flush – After a freeze cycle ends, the unit drains all the remaining water in the tank and refills the tank in the next freeze cycle.

Partial drain flush (default setting) – After a freeze cycle ends, the unit leaves the remaining water in the tank and adds some water to fill the tank in the next freeze cycle.

- 1) Remove the screw located on the front of the water tank. Move the tank drain pipe to the drain position (see figure below). Secure the tank drain pipe with the screw.



- 2) Change the following control board settings from “partial drain flush” to “full drain flush”:

Full / partial drain flush selection – Maintenance mode No. 14

Change the set value from “1” to “0”. (1: partial, 0: full)

Icemaking water supply time – Maintenance mode No. 12

Change the set value from “30” to “60”.

Additional icemaking water supply time – Maintenance mode No. 15

Change the set value from “22” to “44”.

- (1) Press the reset switch for more than 3 seconds while the unit is running. The display shows the maintenance mode number “1”. Press the service 1 switch to increase the number and the service 2 switch to decrease the number.
- (2) Press the reset switch to select the desired number. The current set value flashes in the display. Press the service 1 switch to increase the set value and the service 2 switch to decrease the set value.
- (3) Press the reset switch to select the desired value. The display shows the number again.
- (4) Leave the switches untouched for 30 seconds with the maintenance mode number in the display. The setting is complete when “on” appears in the display.

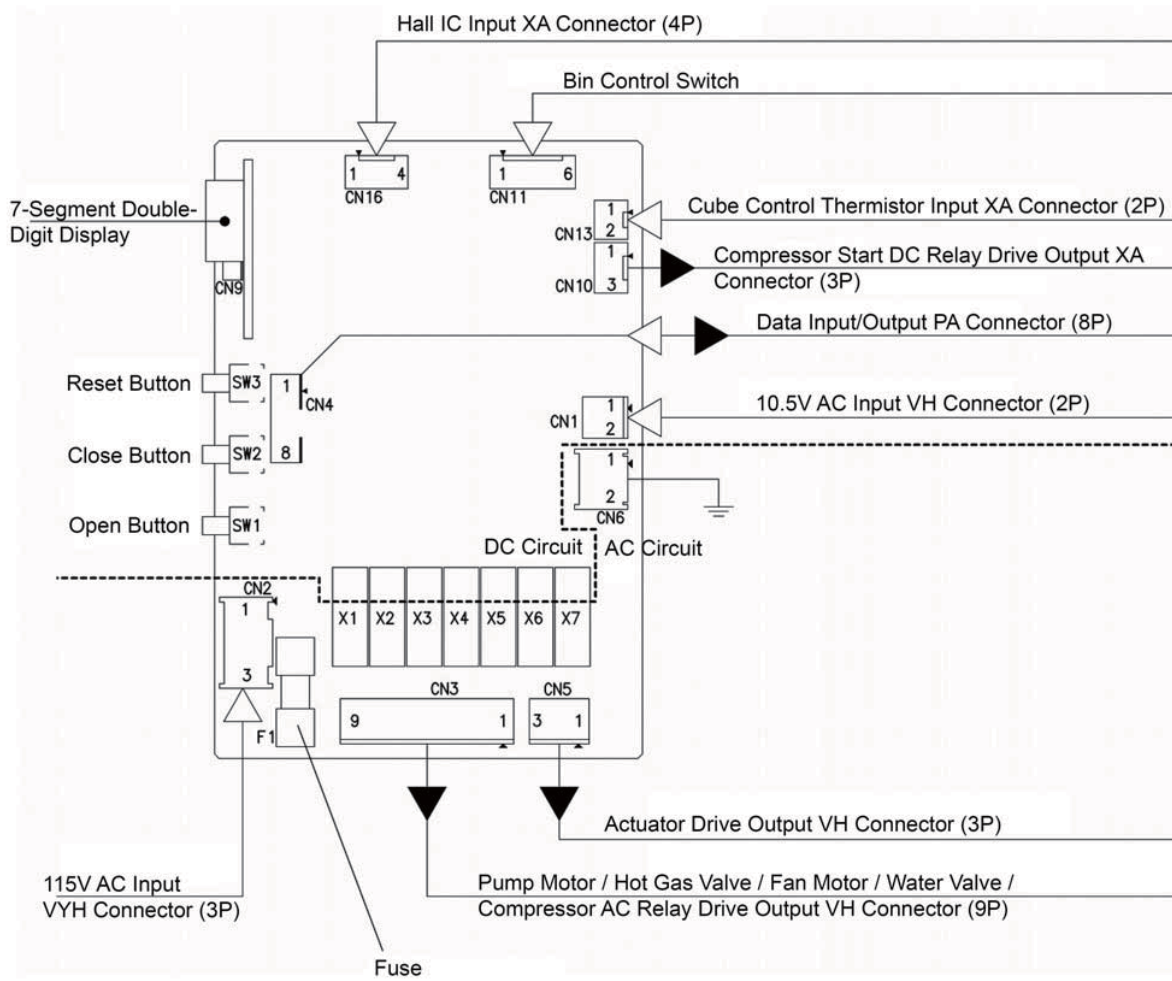
C. Control Board

- A HOSHIZAKI exclusive solid-state control is employed in crescent cubers.
- All models are pretested and factory-adjusted.

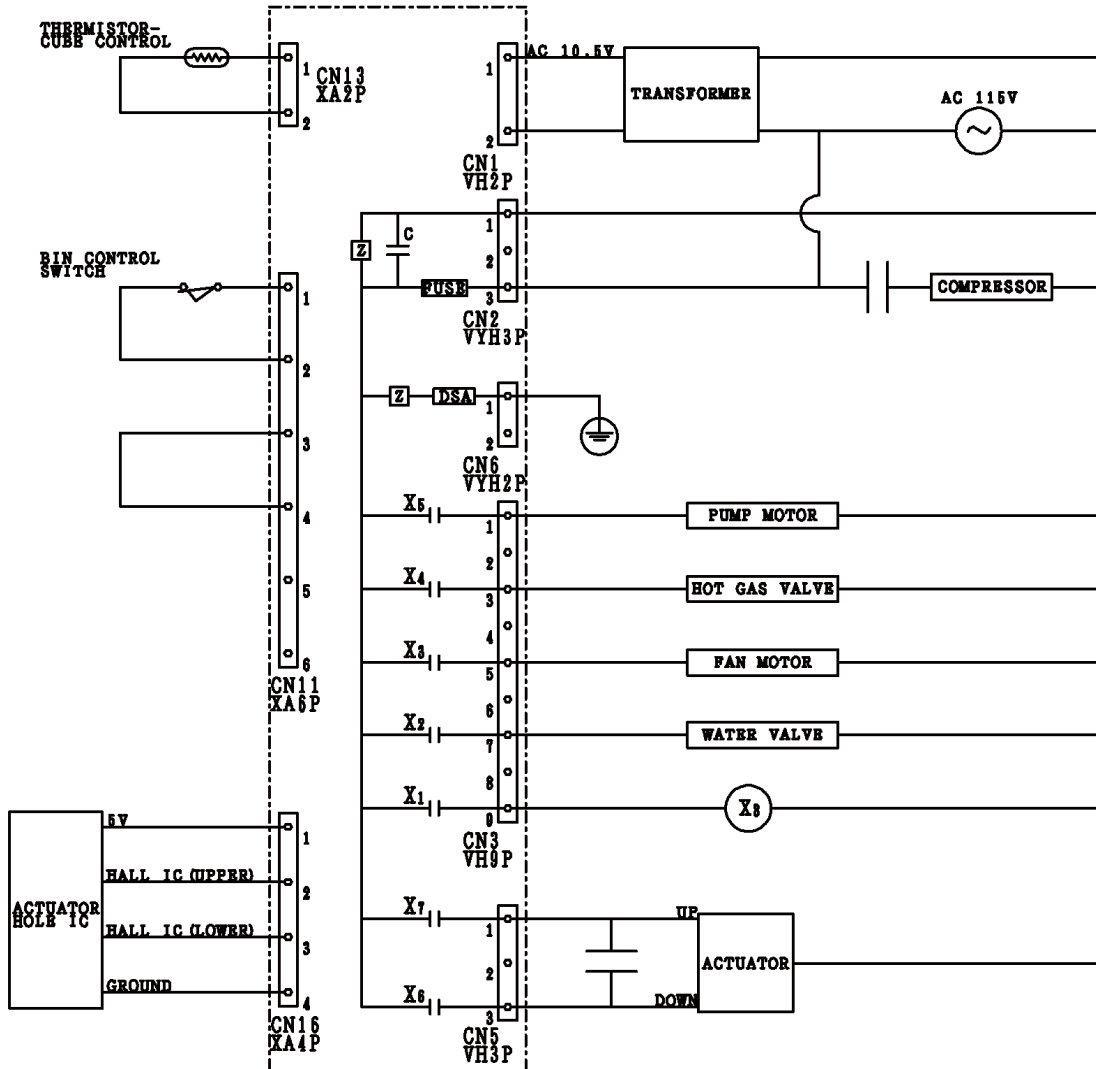
NOTICE

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

1. Input/Output Layout

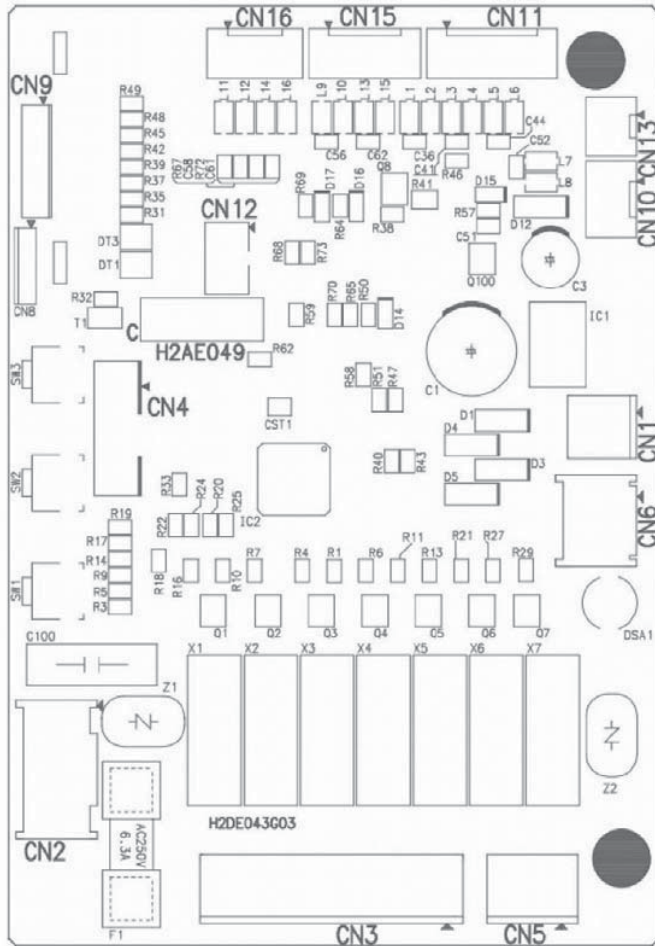


2. Input/Output Circuit

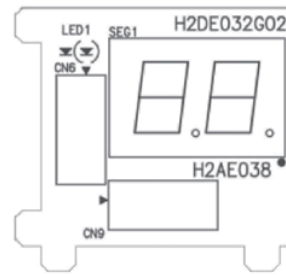


3. Control Board Layout

[Main Board]

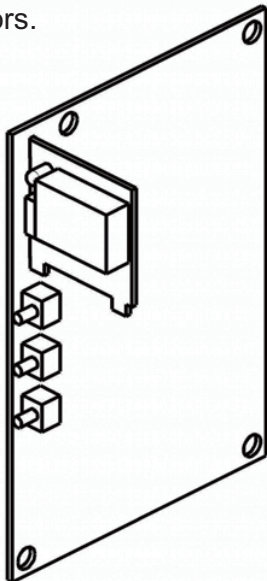


[Sub Board]

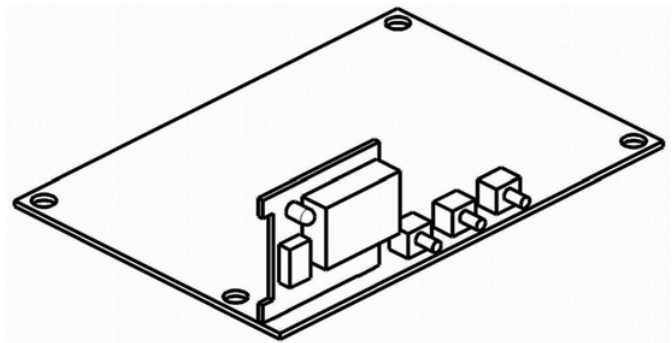


7-segment display board

The direction to install the sub board depends on models and is easily changeable by connectors.



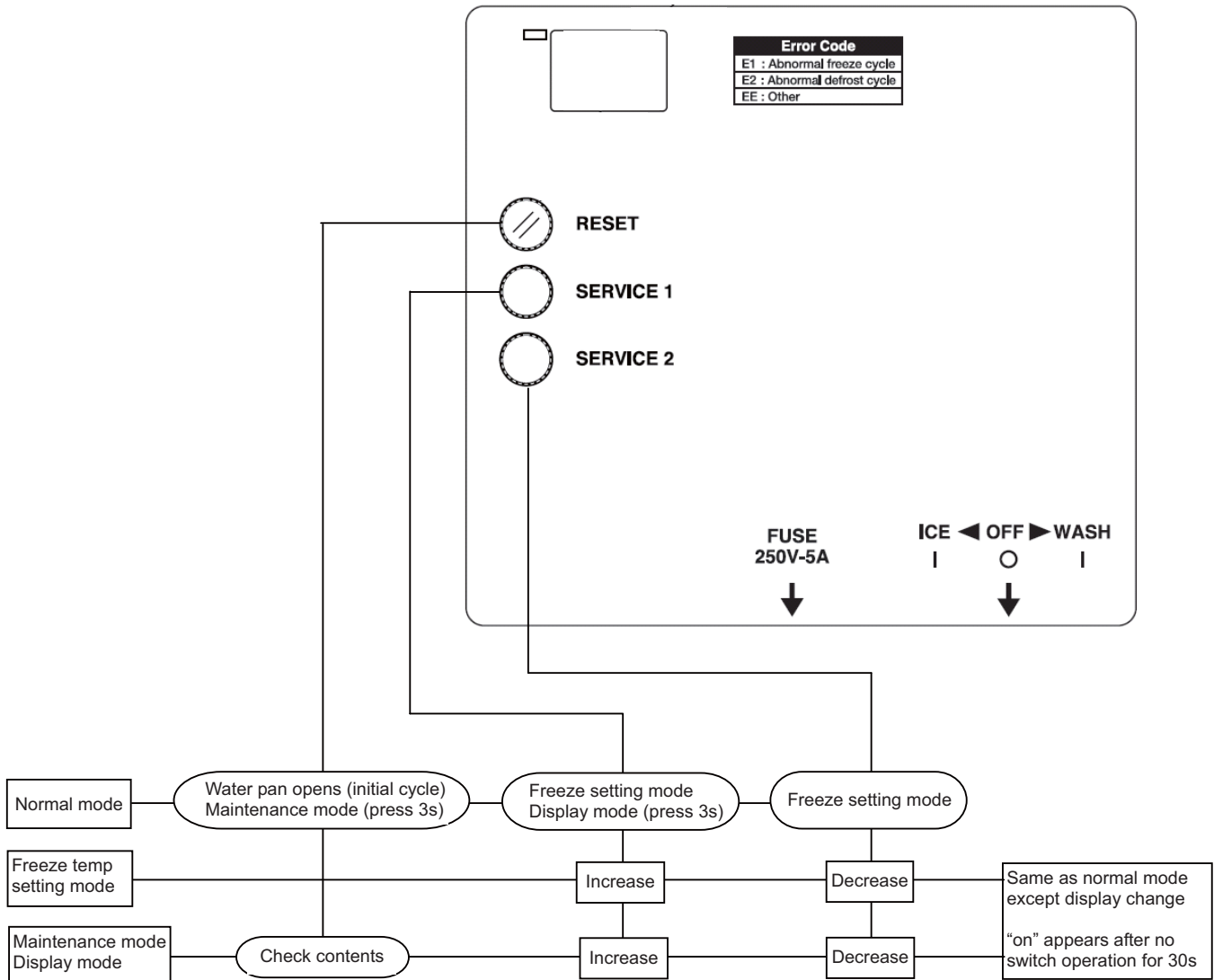
Vertical installation into control box



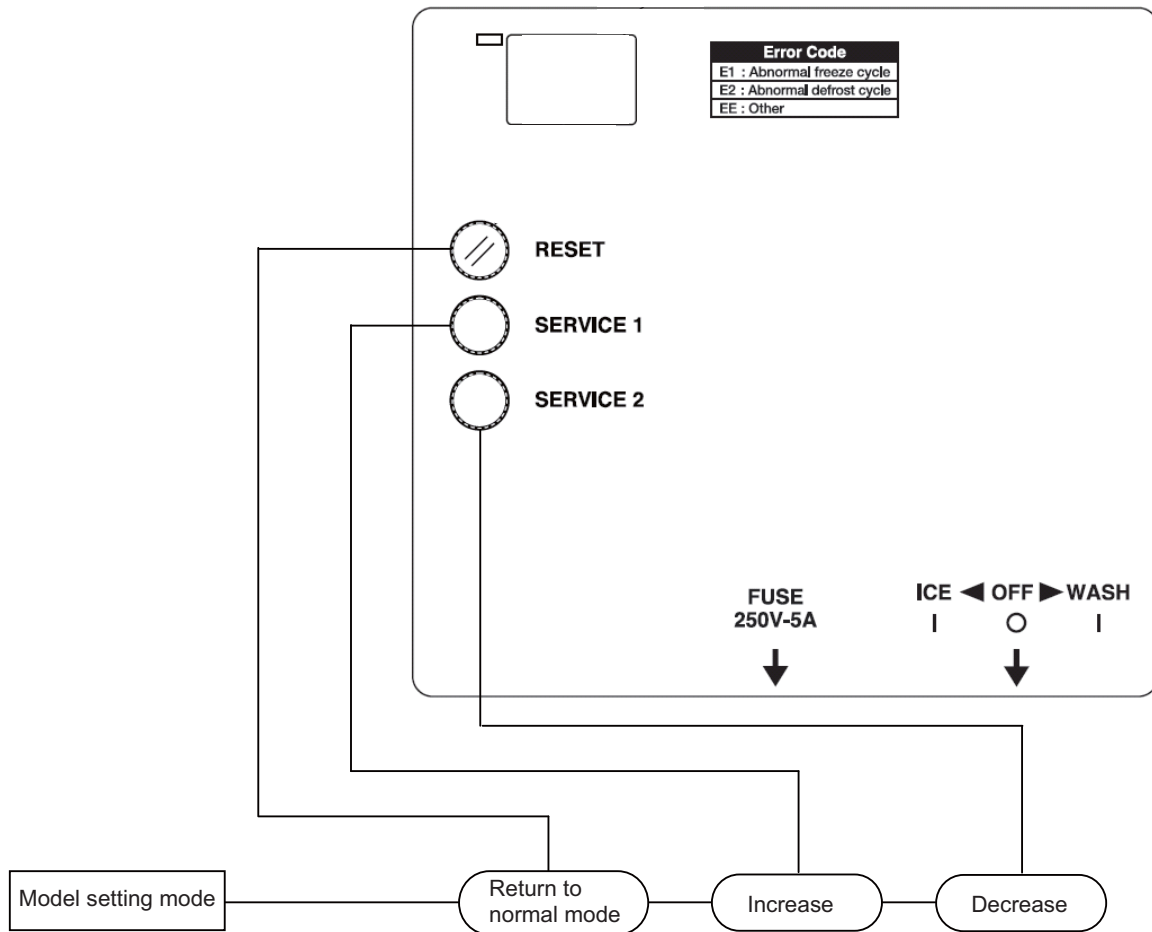
Horizontal installation into control box

4. Switch Operation

1) The following is the switch operation flow in different modes. When pressed and released, the switch detects the operation by its pressing duration.



2) To clear the current model code information and enter the model setting mode, press the service 1 and service 2 switches together for 15 seconds while the model code is indicated in the display mode (see "II. D. 2. Display Mode").



D. Mode Setting

1. Maintenance Mode

When the reset switch is pressed for more than 3 seconds, the maintenance mode starts to allow various set values to be checked or adjusted.

- 1) Press the reset switch for more than 3 seconds while the unit is running. The display shows "1".
- 2) Press the service 1 to increase the number and the service 2 switch to decrease the number.
- 3) Press the reset switch to select the desired number. The current set value flashes in the display.
- 4) Press the service 1 switch to increase the set value and the service 2 to decrease the set value.
- 5) Press the reset switch to select the desired value. The display shows the number again.

To reset, leave the switches untouched for 30 seconds.

Maintenance Mode List

	No	Item	Range	Step
Basic	1	Defrost completion temp	2 to 20°C	1
	2	Integrated constant 1 (temp)	-5 to -40°C	0.5
	3	Integrated constant 2 (time)	5 to 90 min	1
	4	Ambient temp correction operating temp for integrated value	10 to 50°C	1
	5	Ambient temp correction rate for integrated value	10 to 100% (00 = 100)	1
	6	Freeze backup timer	45 to 90 min	5
Water supply	10	Defrosting water supply time, water temp less than 9°C	1 to 99 sec, 99 = continuous	1
	11	Defrosting water supply time, water temp 9°C or more	1 to 99 sec	↑
	12	Icemaking water supply time, normal	0 to 90 sec	1
	13	Water temp measurement correction value	+0 to +20K	1
	14	Full / partial drain flush selection	0: full / 1: partial	1
	15	Additional icemaking water supply time	0 to 90 sec	1
Other	21	Double stack bin control	0: No / 1: Yes	1
	22	Refrigeration unit operation in bin control cycle	0: No / 1: Yes	1
Model	30	Type	0: water-cooled (large) 1: small 2: medium / large 3: separate	1
Defrost cycle high temp control	34	Operating temp	40 to 70°C	1
Water regulator	36	Water regulator error detecting temp	0 to 50°C, 0: cancel	1
Compressor	37	Compressor output selection	0: X8 (DC relay) on 1: X1 (AC relay) on	1
Slush ice	50	Pump off time	0 to 90 sec, 0: no control	1
	51	Water supply time	0 to 5 sec	1
Hard water	60	Operating condition	10 to 100% (00 = 100)	1
	61	Water supply time	0 to 90 sec	1
Ice left in water pan	70	Operating temp	10 to 60°C	1
	71	Hot gas valve on time	0 to 20 sec	1
	72	Hot gas valve off time	10 to 60 sec	1
Ice bridge	73	Hot gas valve off time	0 to 30 sec	1
Low temp in defrost cycle	74	Operating temp	0 to 40°C	1

Maintenance Mode Descriptions

	No	Item	Description
Basic	1	Defrost completion temp	Temperature to complete defrost cycle (detected by cube control thermistor).
	2	Integrated constant 1 (temp)	Target integrated value inside control board is determined by constants 1 and 2. Temperature in freeze cycle is integrated, and freeze cycle continues until target integrated value is reached. Basically, the smaller constant 1 gets, the bigger integrated value and the smaller dimple diameter become.
	3	Integrated constant 2 (time)	Target integrated value inside control board is determined by constants 1 and 2. Temperature in freeze cycle is integrated, and freeze cycle continues until target integrated value is reached. Basically, the smaller constant 2 gets, the smaller integrated value and the bigger dimple diameter become.
	4	Ambient temp correction operating temp for integrated value	Upper temperature limit to trip control to ensure minimum dimple size in low temp conditions like at 1°C / wt 5°C.
	5	Ambient temp correction rate for integrated value	Percentage of integrated value in low temp conditions against target integrated value to ensure minimum dimple size in low temp conditions like at 1°C / wt 5°C based on integrated value inside control board determined by constants 1 and 2.
	6	Freeze backup timer	Timer setting to forcibly complete freeze cycle if cube control thermistor cannot sense freeze completion temp.
Water supply	10	Defrosting water supply time, water temp less than 9°C	Time to supply defrosting water to melt ice on water pan at water supply temp less than 9°C. Adjustable between 1 and 99 sec. When set to "99", defrosting water keeps running until cube control thermistor senses defrost completion temp.
	11	Defrosting water supply time, water temp 9°C or more	Time to supply defrosting water to melt ice on water pan at water supply temp of 9°C or more. Adjustable between 1 and 99 sec. When set to "99", defrosting water keeps running until cube control thermistor senses defrost completion temp.
	12	Icemaking water supply time, normal	Time to supply icemaking water depending on partial or full drain flush.
	13	Water temp measurement correction value	Setting to correct difference between water temp measured by cube control thermistor and actual water supply temp.
	14	Full / partial drain flush selection	Selection between full and partial drain flush of icemaking water tank in case of cloudy ice production even after hard water control. Icemaking water supply time and water tank overflow pipe direction need to be changed.

Water supply	15	Additional icemaking water supply time	Time to supply additional icemaking water required after pump motor starts following normal icemaking water supply time.
Other	21	Double stack bin control	Selection of bin control in case of double stack application.
	22	Refrigeration unit operation in bin control cycle	Selection of control to prevent ice in storage bin from melting in bin control cycle (by operating refrigeration unit).
Model	30	Type	Selection of fan motor type. When set to "0", unit operates as water-cooled model.
Defrost cycle high temp control	34	Operating temp	Set temp for continuous fan motor operation in defrost cycle to lower temp inside control box if ambient temp at the beginning of defrost cycle exceeds set point.
Water regulator	36	Water regulator error detecting temp	Thermistor temp (water regulator outlet) in case of water regulator error and cooling water failure for water-cooled model.
Compressor	37	Compressor output selection	Selection between AC supply and DC supply (normal setting = AC supply). Transformer voltage drop is too large to input both.
Slush ice	50	Pump off time	Pump off time for slush ice control to stop pump after 2 min at evaporator temp of 3 to 4°C, quickly refrigerate evaporator before icemaking water supercools, and form ice core. When set to "0", there is no slush ice control.
	51	Water supply time	Time to supply water while pump is off for slush ice control. If slush ice is too much and cannot be prevented solely by pump off in No. 50, water is supplied while pump is off to slightly raise tank water temp.
Hard water	60	Operating condition	Condition to operate cloudy ice control in hard water application indicated in percentage against target integrated value. After icemaking water supply starts, ice begins to form and freeze cycle integrated value reaches a certain level. Then, additional water is supplied to dilute concentrated icemaking water in water tank.
	61	Water supply time	Time to supply water for hard water control.
Ice left in water pan	70	Operating temp	Upper limit of operating temp to control ice left in water pan at the end of freeze cycle. Decrease amount of defrosting water by reducing ice left in opening water pan after freeze cycle.
	71	Hot gas valve on time	Hot gas valve opening time to control ice left in water pan.
	72	Hot gas valve off time	Hot gas valve closing time to control ice left in water pan.
Ice bridge	73	Hot gas valve off time	Time to keep hot gas valve closed after 20 sec in defrost cycle. Prevent ice bridge in bin by delaying ice dropping time.
Low temp in defrost cycle	74	Operating temp	Upper temperature limit at the beginning of defrost cycle.

Maintenance Mode Settings

	No	Item	IM-500SAA
Basic	1	Defrost completion temp	5
	2	Integrated constant 1 (temp)	-18.5
	3	Integrated constant 2 (time)	10
	4	Ambient temp correction operating temp for integrated value	10
	5	Ambient temp correction rate for integrated value	100
	6	Freeze backup timer	45
Water supply	10	Defrosting water supply time, water temp less than 9°C	95
	11	Defrosting water supply time, water temp 9°C or more	30
	12	Icemaking water supply time, partial drain flush	30
		* Icemaking water supply time, full drain flush	60
	13	Water temp measurement correction value	11
	14	* Full / partial drain flush selection	1
15	Additional icemaking water supply time, partial drain flush	22	
	* Additional icemaking water supply time, full drain flush	44	
Other	21	Double stack bin control	1
	22	Refrigeration unit operation in bin control cycle	0
Model	30	Type	3
Defrost cycle high temp control	34	Operating temp	48
Water regulator	36	Water regulator error detecting temp	0
Compressor	37	Compressor output selection	1
Slush ice	50	Pump off time	0
	51	Water supply time	0
Hard water	60	Operating condition	10
	61	Water supply time	0
Ice left in water pan	70	Operating temp	44
	71	Hot gas valve on time	5
	72	Hot gas valve off time	25
Ice bridge	73	Hot gas valve off time	0
Low temp in defrost cycle	74	Operating temp	27

* When No. 14 is set to "0" (full drain flush), change Nos. 12 and 15 also to full drain flush settings.

2. Display Mode (Log Clearing)

When the service 1 switch is pressed for more than 3 seconds, the display mode starts to allow various items and logs to be checked, displayed or cleared.

- 1) Press the service 1 switch for more than 3 seconds while the unit is running. The display shows "n1".
- 2) Press the service 1 switch to increase the number and the service 2 switch to decrease the number.
- 3) Press the reset switch to select the desired number. The current value appears in the display.

4) Press the reset switch while the value is displayed. The display shows the number again.

To reset, leave the switches untouched for 30 seconds.

To clear, press the service 1 and service 2 switches together for 5 seconds while the value is displayed.

Display Mode List

No	Item	Description	Clear
n1	Freeze cycle time count up (min)	0 to 99 min	No
n2	Freeze cycle completion rate (%)	0 to 100% (00 = 100%)	No
n3	Current cube control thermistor temp	Rounded to the nearest whole number	No
n4	Current ambient thermistor temp	Rounded to the nearest whole number	No
n5	Water temp (presumed)	"H" for 9°C or more "L" for less than 9°C	No
n6	Current condenser thermistor temp (note 1)	Rounded to the nearest whole number	No
h1	Last freeze cycle time (min)	Same as current freeze cycle time. Freeze cycle is not considered complete if interrupted by bin control switch or reset switch.	Yes
h2	Number of freeze cycles	Number of cycles completed. 10 is added every 10 cycles. Freeze cycle is not considered complete or counted in if interrupted by bin control switch or reset switch.	Yes
h3	Total number of freeze cycles	< Display > e.g. 655350 cycles (start) (end) 65→off→53→off→50→off→ - - ↑	No
h4	Error log	Display up to 5 errors from latest to oldest for 1 sec ON, 0.5 sec OFF, "- -" at the end, then back to latest error. In case of less than 5 errors, display oldest error, "- -", then back to latest one. < Display > e.g. E5 (latest), E4, E3, E2, E1 (oldest) (latest) (oldest) E5→off→E4→off→E3→off→E2→off→E1→off→ - - ↑	Yes
h5	Software version	For Ver 1.0A, display "01."→"0A"→"01." alternately for 1 sec ON, 0.5 sec OFF.	No
h6	Default model code	Display set model codes from "00" to "FF" (hexadecimal, 256 patterns)	No (note 2)

Note: 1. No condenser thermistor is provided on IM-500SAA.

2. To clear the model code, press the service 1 and service 2 switches together for 15 seconds (for control board replacement and setting error correction only).

3. Model Code Setting Mode

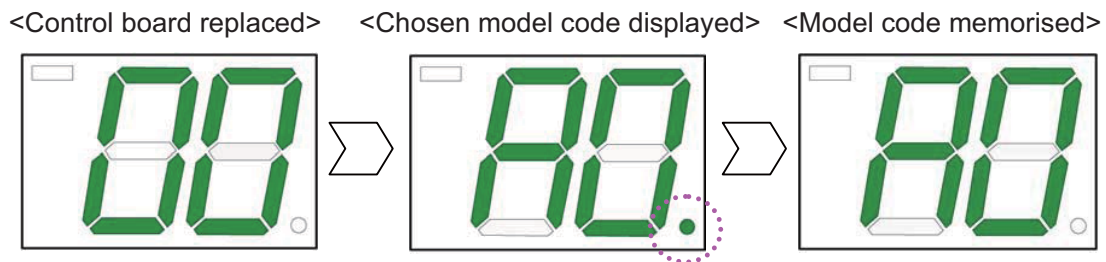
Note: Use this mode only when the control board is replaced or the model code setting needs to be corrected.

- 1) When the service 1 switch is pressed for more than 3 seconds, the display mode starts and the display shows "n1".
- 2) Press the service 1 or service 2 switch to have "h6" in the display.
- 3) Press the reset switch. The current memorised model code appears in the display.
- 4) Press the service 1 and service 2 switches together for 15 seconds. The display shows "00".
- 5) Press the service 1 switch to increase the first digit in the 7-segment display, and the service 2 switch to increase the second digit. The digit changes in the following order: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F.

Set the model code to "08".




When a preset model code is displayed, the dot on the bottom right lights up.

- 6) When the chosen preset model code is displayed, press the reset switch to store the board memory (the display shows "on" and the machine will then always start up with this memorized program as default).
 - To check the current memorised model code, view in the display mode (follow steps 1) to 3) above).











E. 7-Segment Display

1. Normal Mode

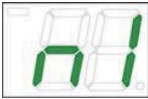














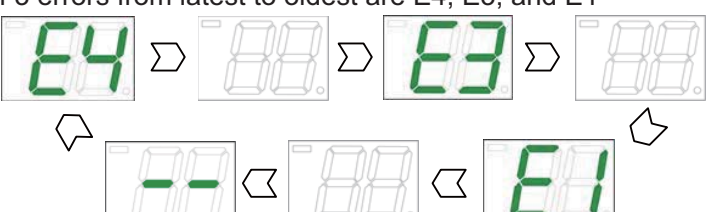
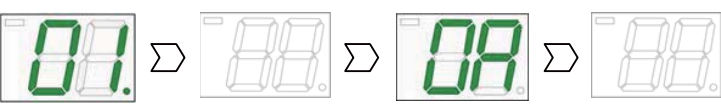

Item	Display
Power on Defrost cycle Freeze cycle Bin full	
Freeze temp setting	Display range from -5.0 to -40.0 
Error code	Flash  E1: Abnormal freeze cycle E2: Abnormal defrost cycle EE: Other (See "IV. A. Error Codes, Caution Codes")

2. Maintenance Mode

No.	Item	Display (example)
1	Defrost completion temp	 16°C
2	Integrated constant 1 (temp)	-18°C  -18.5°C  Dot appears for value with ".5" as in -18.5°C
3	Integrated constant 2 (time)	 21 min
4	Ambient temp correction operating temp for integrated value	Same as No. 1
5	Ambient temp correction rate for integrated value	 90%  100% (last 2 digits only)
6	Freeze backup timer	Same as No. 3
10	Defrosting water supply time, water temp less than 9°C	Same as No. 3 (unit: sec)
11	Defrosting water supply time, water temp 9°C or more	Same as No. 3 (unit: sec)

12	Icemaking water supply time, normal	Same as No. 3 (unit: sec)	
13	Water temp measurement correction value	Same as No. 1	
14	Full / partial drain flush selection	Same as Nos. 21 and 22	
15	Additional icemaking water supply time	Same as No. 3 (unit: sec)	
21	Double stack bin control	0	1
22	Refrigeration unit operation in bin control cycle		
30	Model type	Same as Nos. 21 and 22 (Setting range from 0 to 3)	
34	Defrost cycle high temp control, operating temp	Same as No. 1	
36	Water regulator error detecting temp	Same as No. 1	
37	Compressor output selection	Same as Nos. 21 and 22	
50	Slush ice, pump off time	Same as No. 3 (unit: sec)	
51	Slush ice, water supply time	Same as No. 3 (unit: sec)	
60	Hard water, operating condition	Same as No. 5	
61	Hard water, water supply time	Same as No. 3 (unit: sec)	
70	Ice left in water pan, operating temp	Same as No. 1	
71	Ice left in water pan, hot gas valve on time	Same as No. 3 (unit: sec)	
72	Ice left in water pan, hot gas valve off time	Same as No. 3 (unit: sec)	
73	Ice bridge, hot gas valve off time	Same as No. 3 (unit: sec)	
74	Low temp in defrost cycle, operating temp	Same as No. 1	

3. Display Mode

No.	Item	Display (example)
-	n*, h*	 
n1	Freeze cycle time count up (min)	21 min or 21%  100% (last 2 digits only) 
n2	Freeze cycle completion rate (%)	 
n3	Current cube control thermistor temp	-19°C  24°C 
n4	Current ambient thermistor temp	 
n5	Water temp (presumed)	Water temp 9°C or more  Water temp less than 9°C 
n6	Current condenser thermistor temp	Same as n3 and n4
h1	Last freeze cycle time (min)	 21 min
h2	Number of freeze cycles	If counted number of cycles is 162100 
h3	Total number of freeze cycles	
h4	Error log	If 3 errors from latest to oldest are E4, E3, and E1 
h5	Software version	Ver 1.0A is displayed as follows alternately for 1 sec ON and 0.5 sec OFF 
h6	Default model code	Set model codes from "00" to "FF" (hexadecimal, 256 patterns) 

F. Control Board Troubleshooting

1. Instructions for Service Engineer

- 1) Check that the icemaker has been earthed properly. If not, the control board will not work properly.
- 2) Do not change wiring and connections, or the control board will not work properly.
- 3) Do not touch the electronic devices on the control board or the back of the control board.
- 4) Do not repair the electronic devices and parts on the control board in the field except for the fuse (250V AC, 6.3A, 0.2in DIA x 0.8in (5mm DIA x 20mm)).
- 5) To get static free, always touch the metal part of the icemaker before servicing.
- 6) Handle the control board by the edges only.
- 7) Do not drop the control board on the floor.

2. Checking Control Board

- 1) Before checking the control board, check the cube control thermistor and bin control switch for proper operation.
- 2) If the above parts are operating properly, check each part according to "IV. B. Service Diagnosis".

3. Removal and Replacement

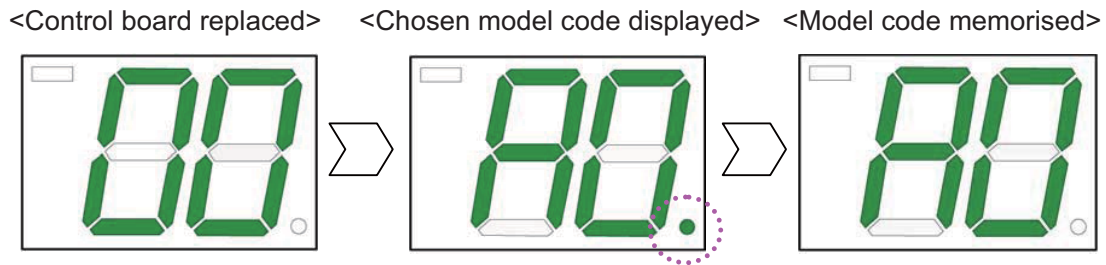
To replace:

- 1) Turn off the power supply.
- 2) Remove the front cover and control box cover.
- 3) Disconnect all the connectors from the control board. Remove the control board from the four board supports for connection to the control box.
- 4) Install the replacement control board in the control box. Reconnect the connectors.
- 5) Replace the control box cover.
- 6) Turn on the power supply. As the replacement control board has not been set for the proper model code, the 7-segment display illuminates "00".
 - The code "00" does not belong to any model.
- 7) Press the service 1 switch to increase the first digit in the 7-segment display, and the service 2 switch to increase the second digit. The digit changes in the following order:
0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F.

Set the model code to "08".

When a preset model code is displayed, the dot on the bottom right lights up.

- 8) When the chosen preset model code is displayed, press the reset switch to store the board memory (the display shows “on” and the machine will then always start up with this memorized program as default).



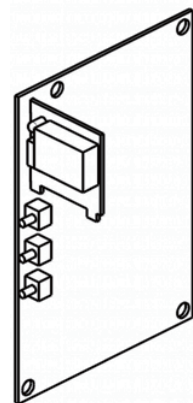
- To check the current memorised model code, view in the display mode (press and hold the service 1 switch for 3 seconds – the display changes to “n1”, then press the service 1 switch several times to find “h6”, then press the reset switch and the memorised code appears in the display).
- If for any reason the machine needs to be reset back to the factory settings, hold the service 1 and service 2 switches for 15 seconds whilst the code is displayed (in display mode). The machine will stop working and the display will reset to “00” (cleared memory).

The control board will then need to be reprogrammed (select and memorise the correct code for the machine) using steps 7) and 8) above.

- 2) Replace the front panel in its correct position.

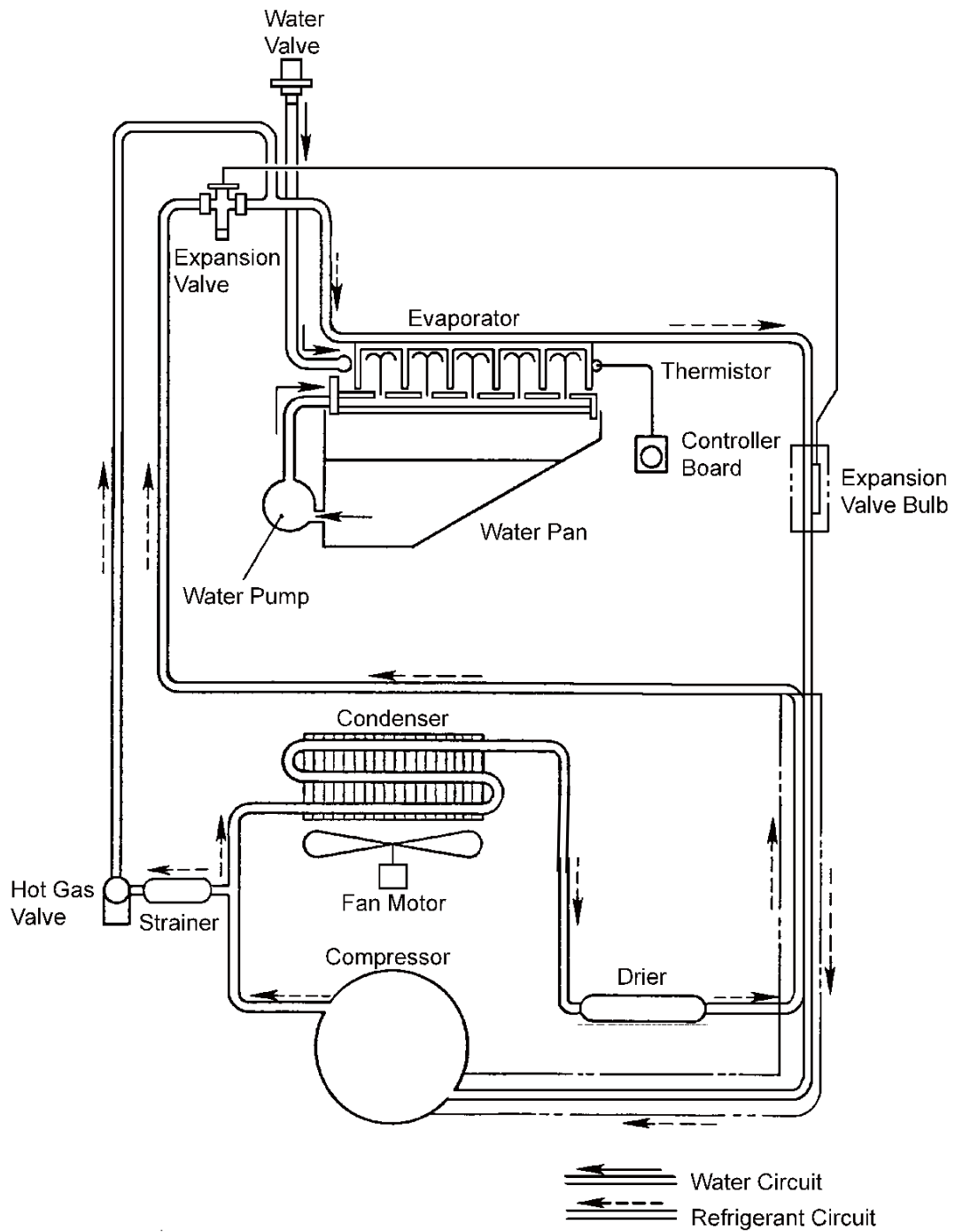
Note:

1. Be sure to get static free before servicing the control board.
2. Do not touch the control board with wet or dirty hands.
3. Do not impact the control board. If it drops on the floor, do not use it.
4. Do not hold the leads when disconnecting the connectors.
 - Locking connectors must be unlocked before being disconnected.
 - Reconnect the connectors properly.
5. Install the new control board in its correct position.
6. Bind the wiring inside the control box the way it was.
 - Do not push the wiring on the control board.
 - Do not bind the thermistor leads and high voltage wires together.

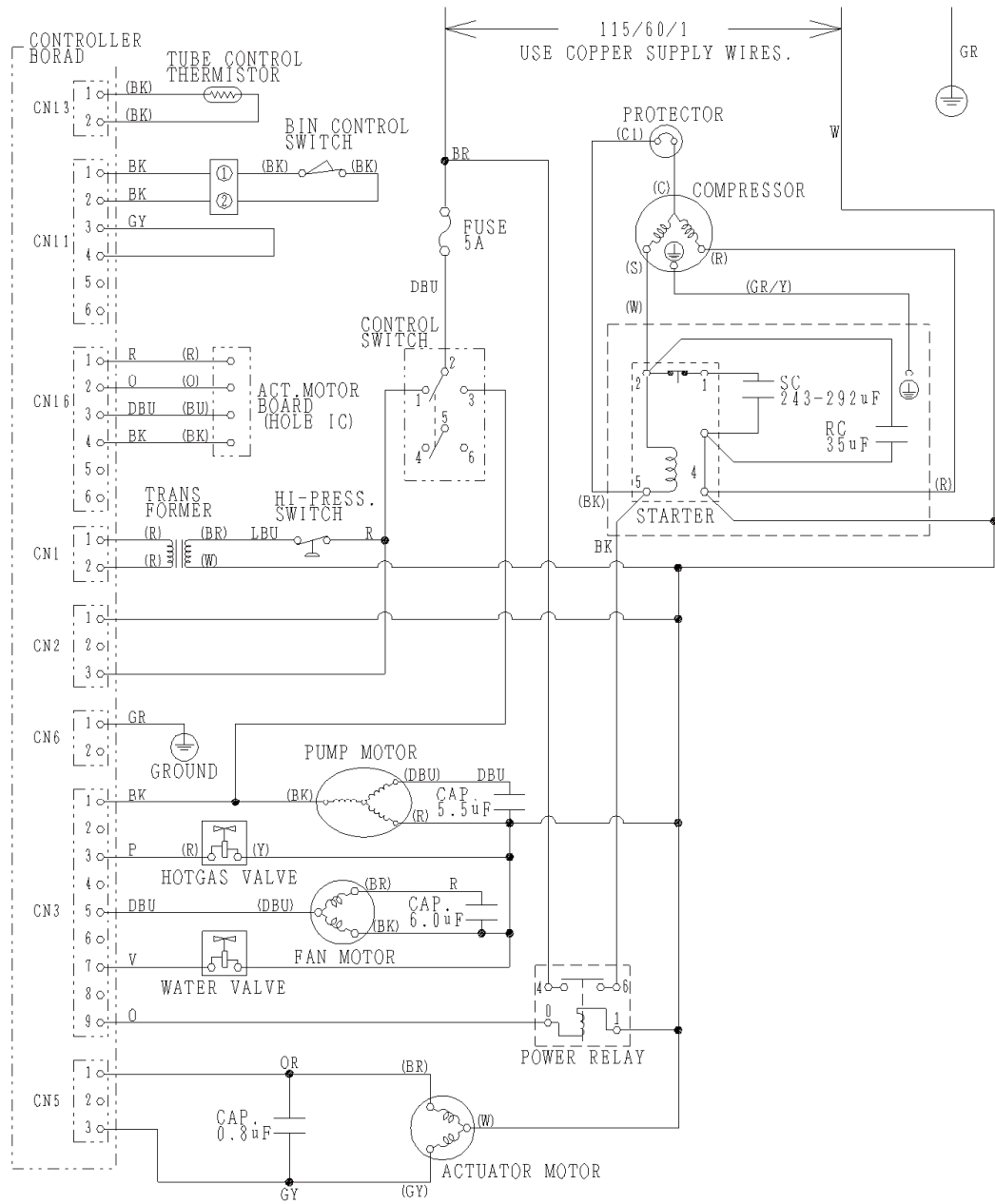


III. Technical Information

A. Water Circuit and Refrigerant Circuit

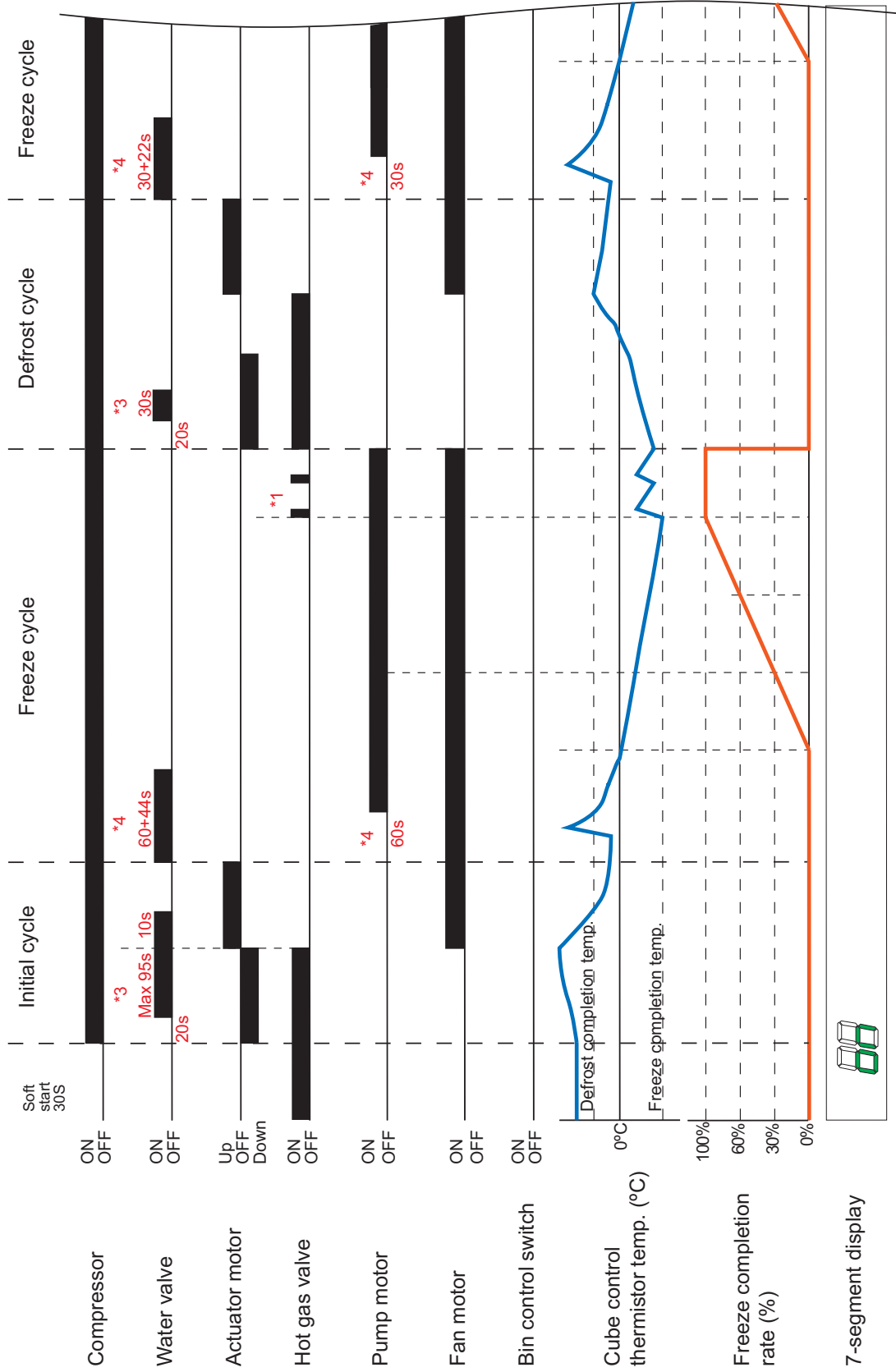


B. Wiring Diagram

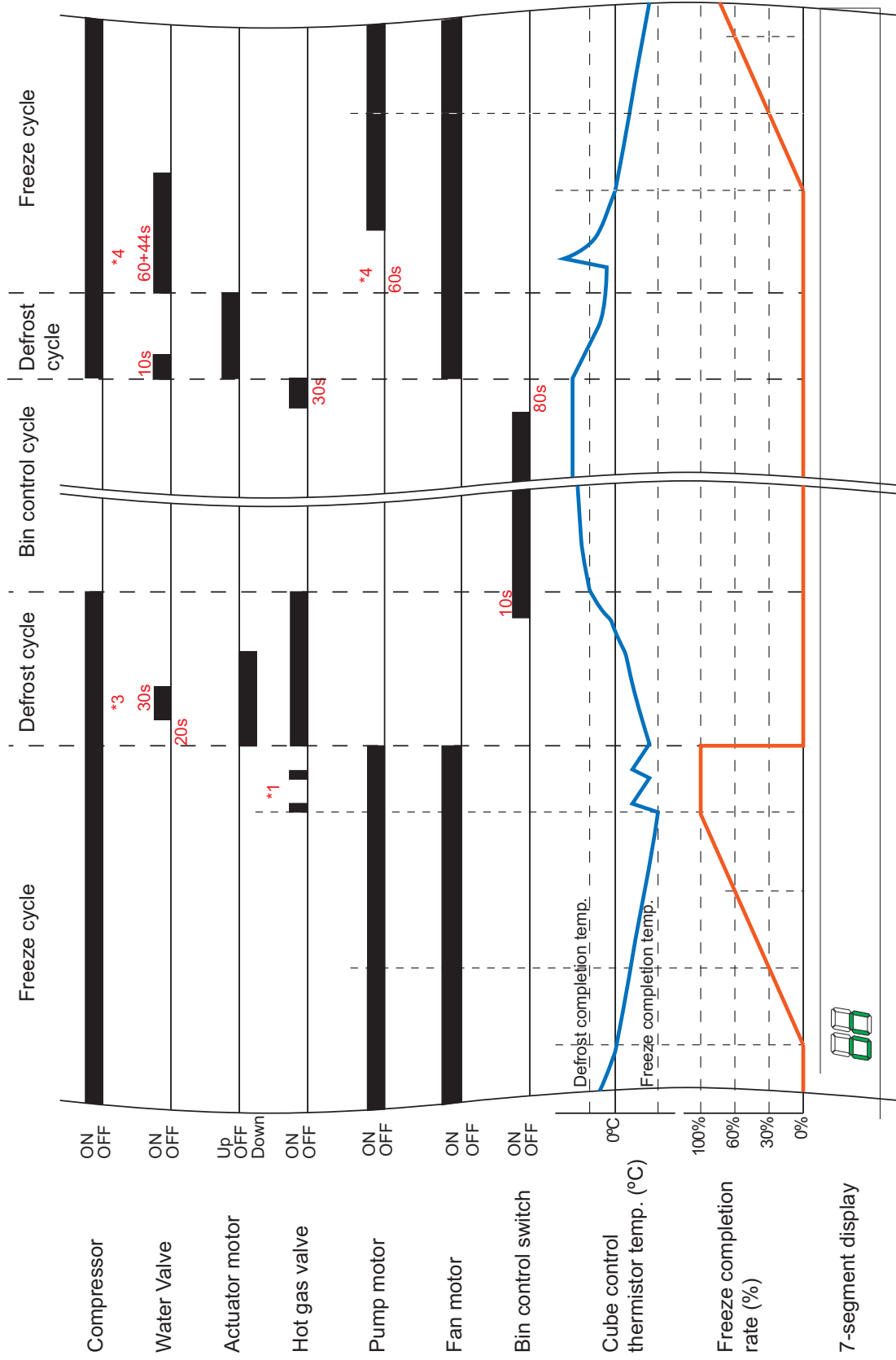


C. Timing Chart

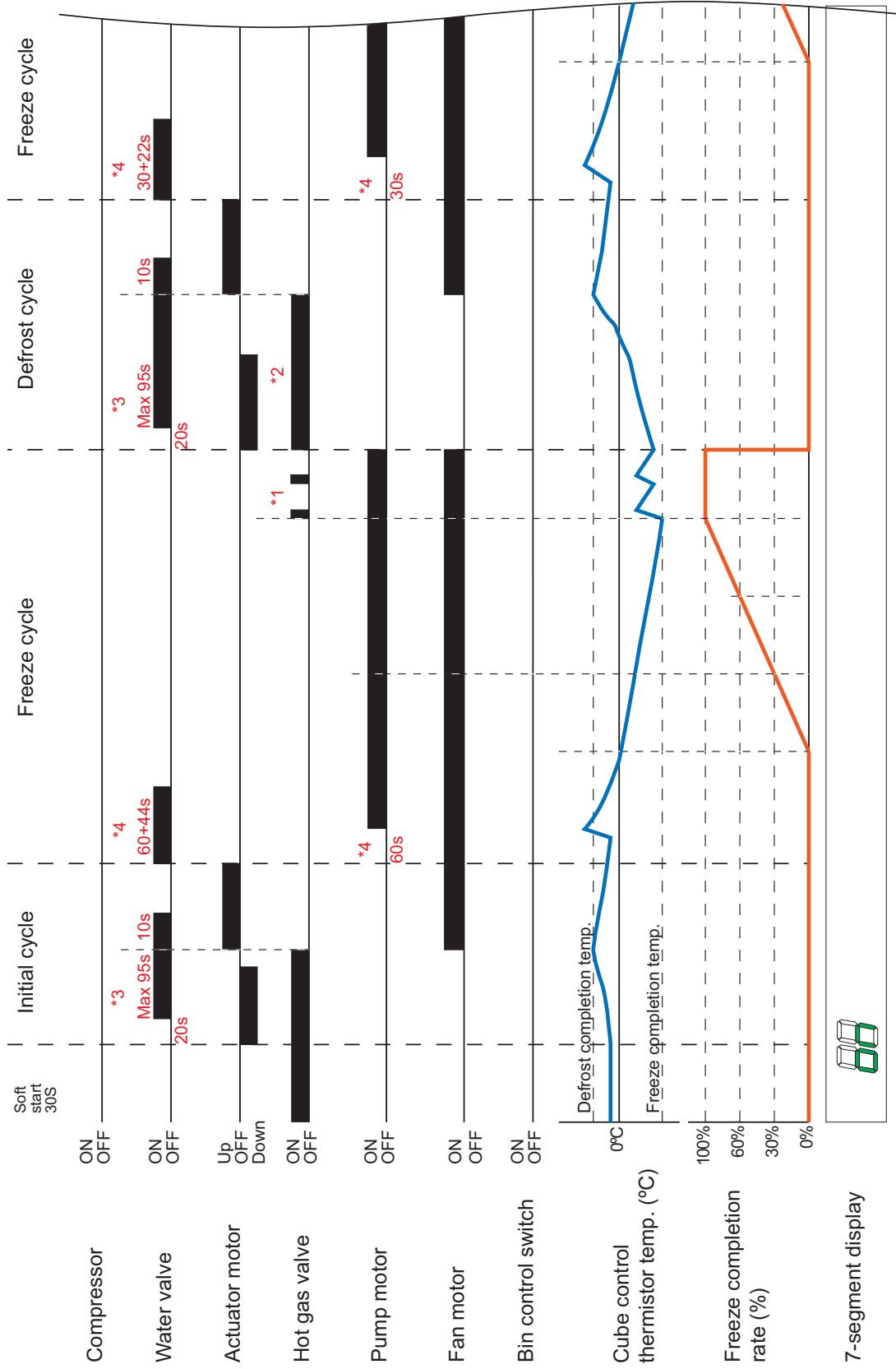
Ice production at normal temperature (partial drain flush) (AT 15°C, WT above 9°C)



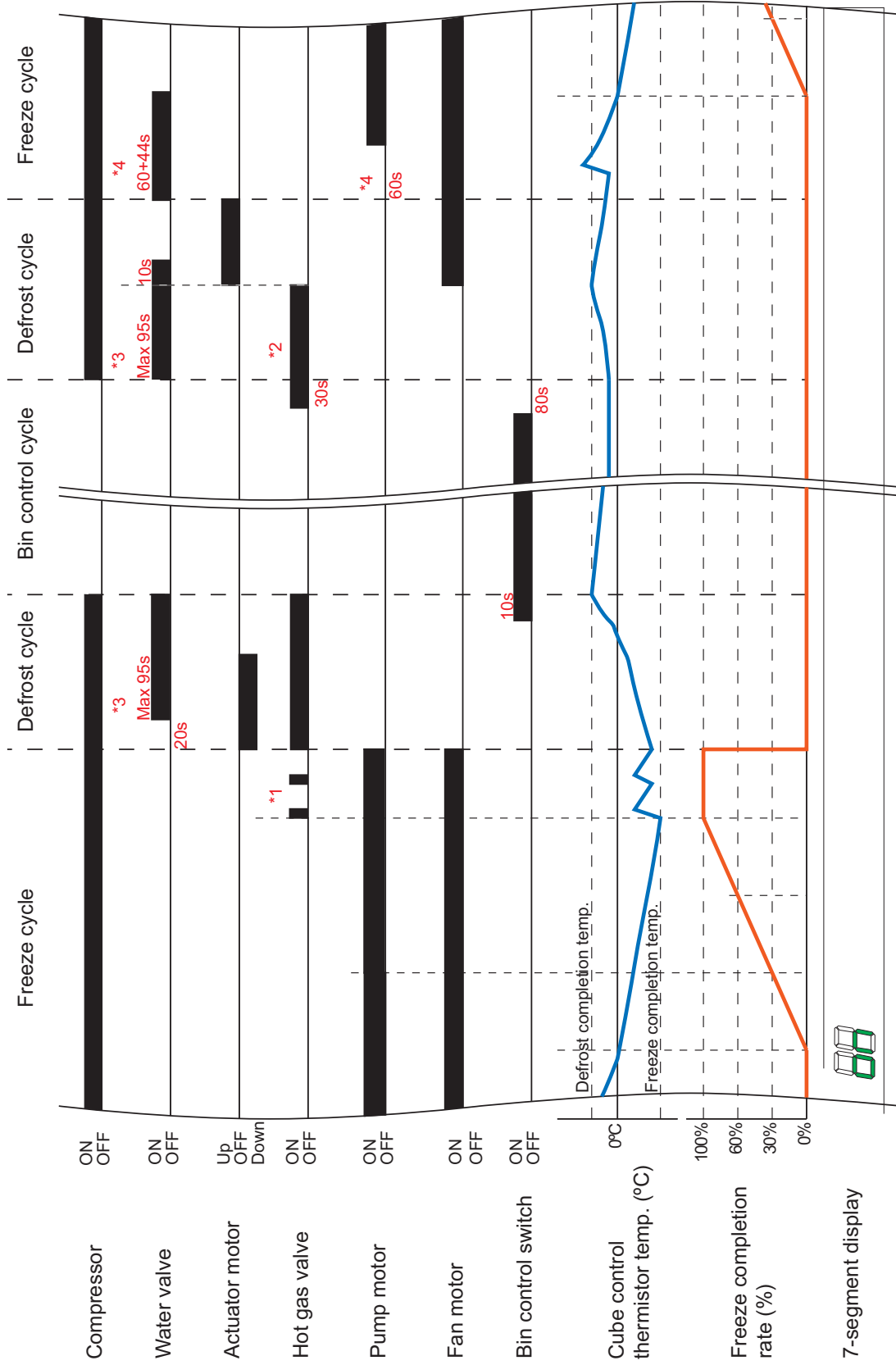
Ice storage at normal temperature (partial drain flush) (AT 15°C, WT above 9°C)



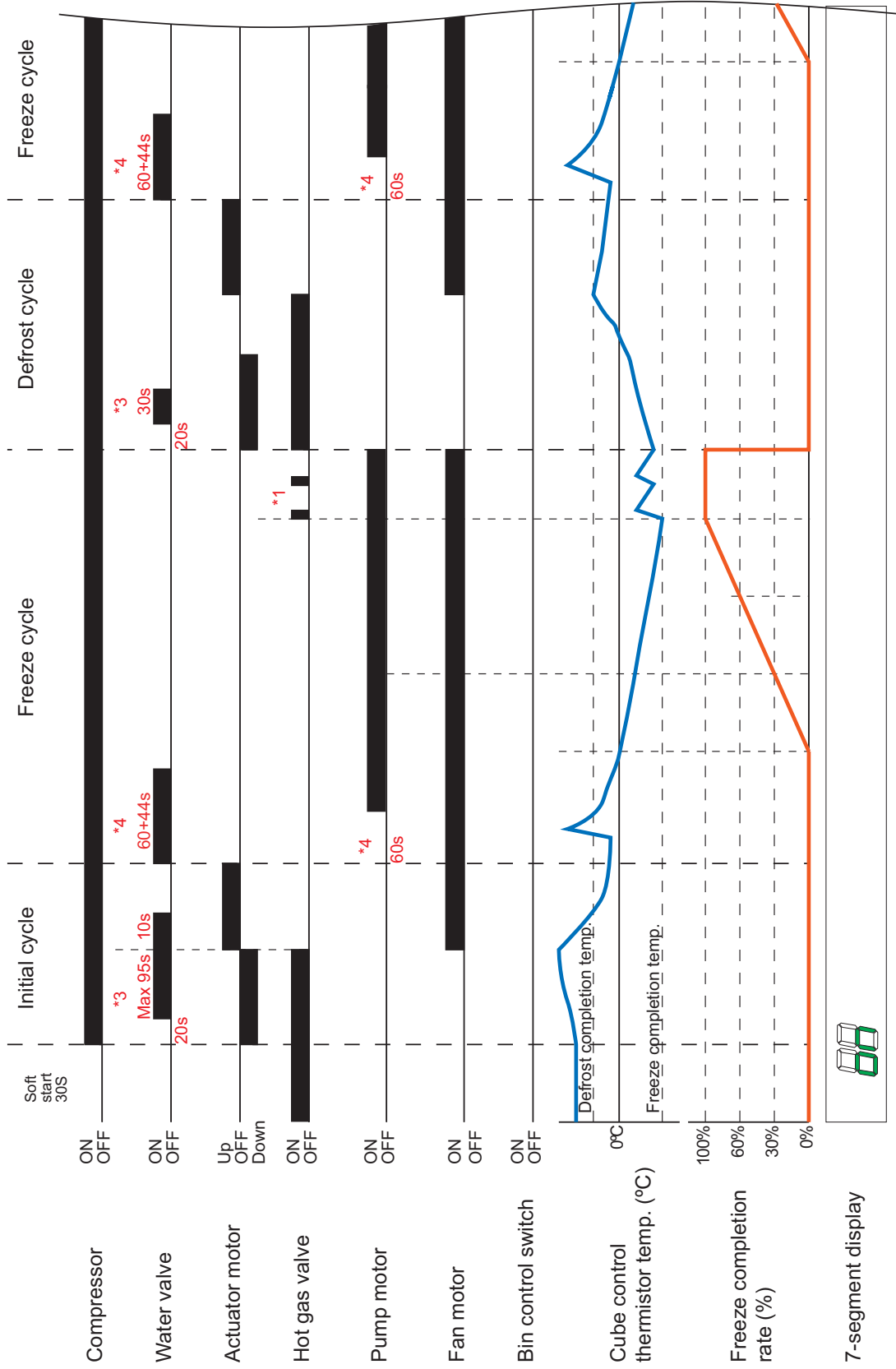
Ice production at low temperature (partial drain flush) (AT 15°C, WT below 9°C)



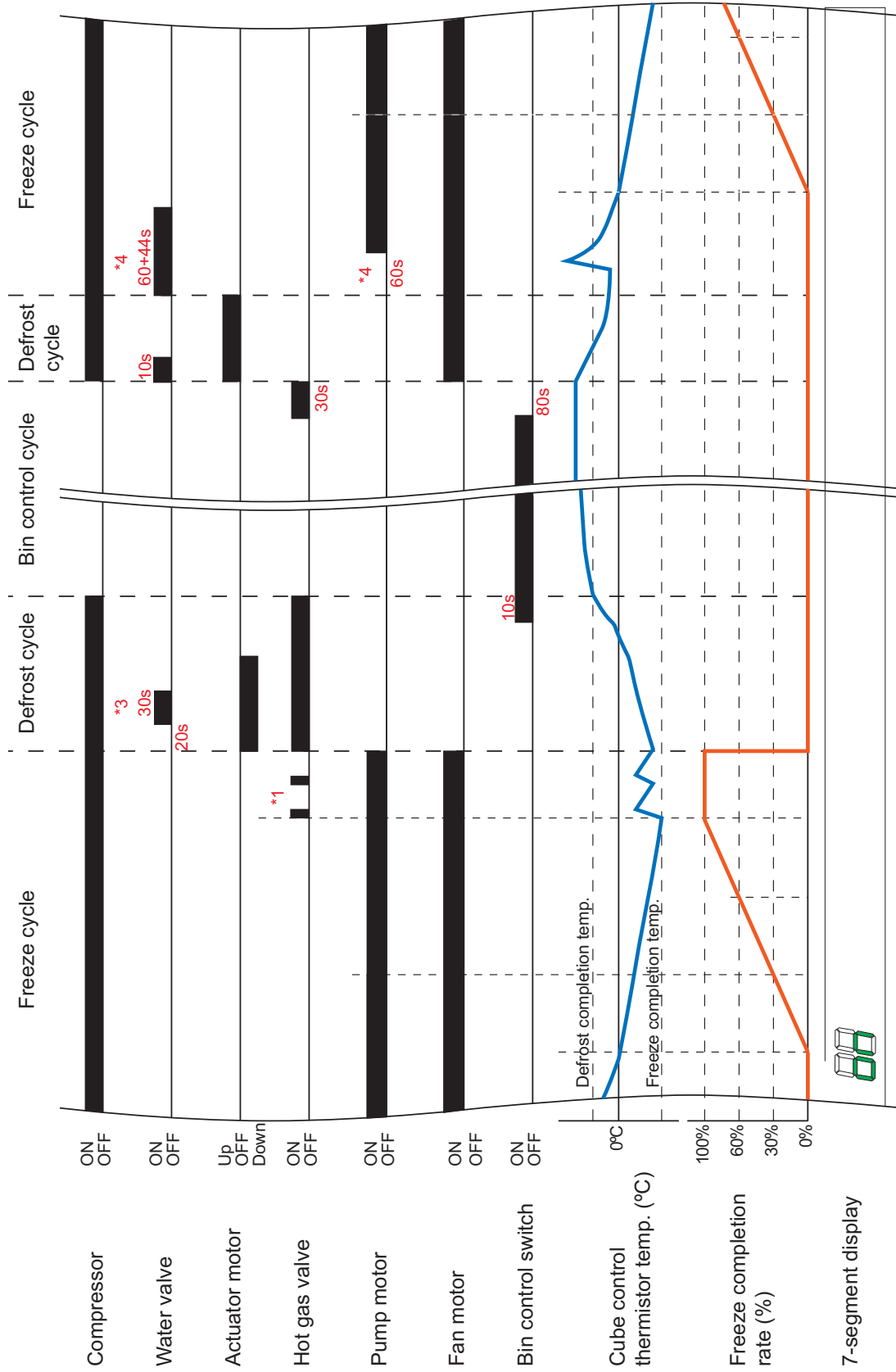
Ice storage at low temperature (partial drain flush) (AT 15°C, WT below 9°C)



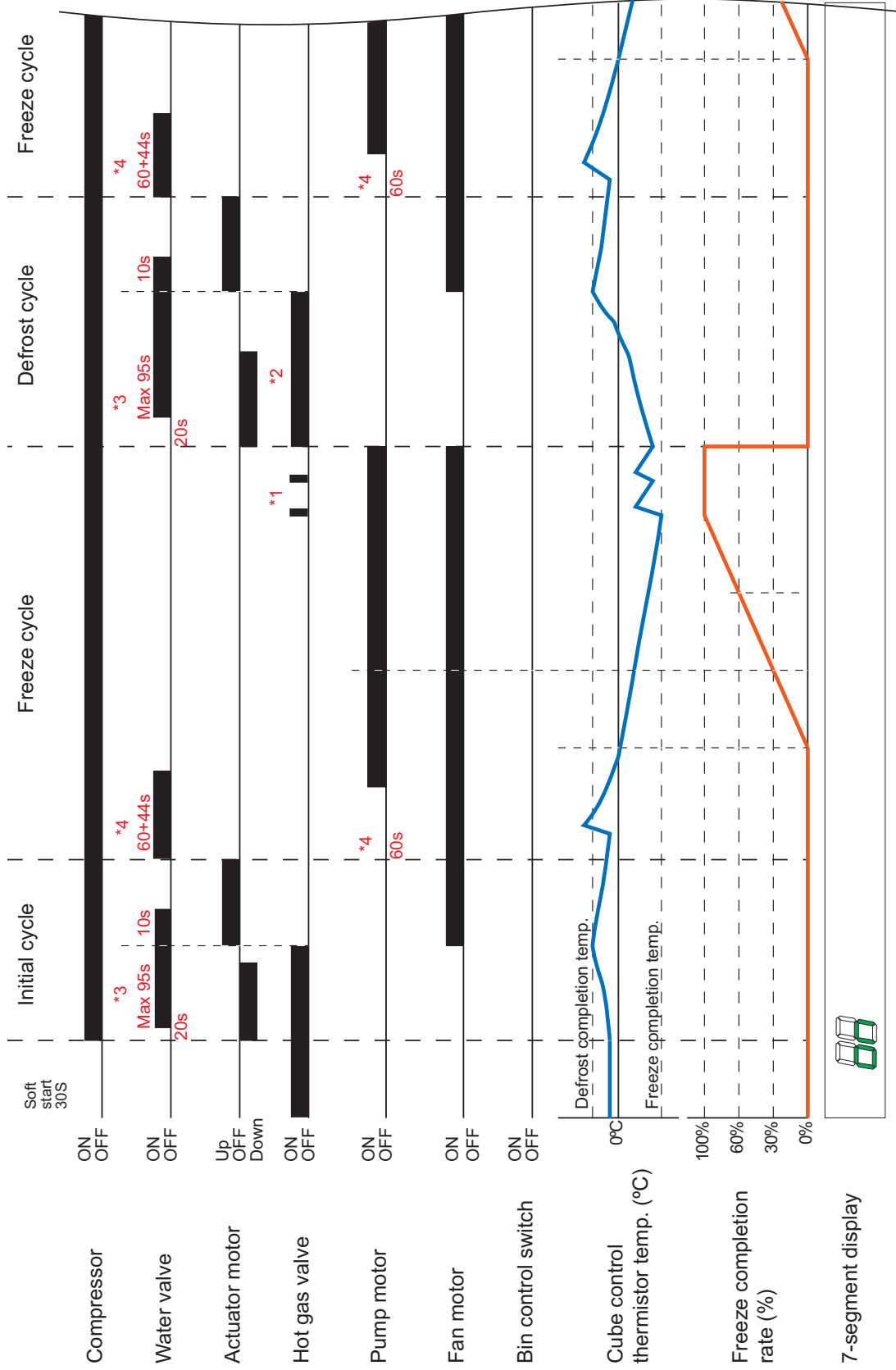
Ice production at normal temperature (full drain flush) (AT 15°C, WT above 9°C)



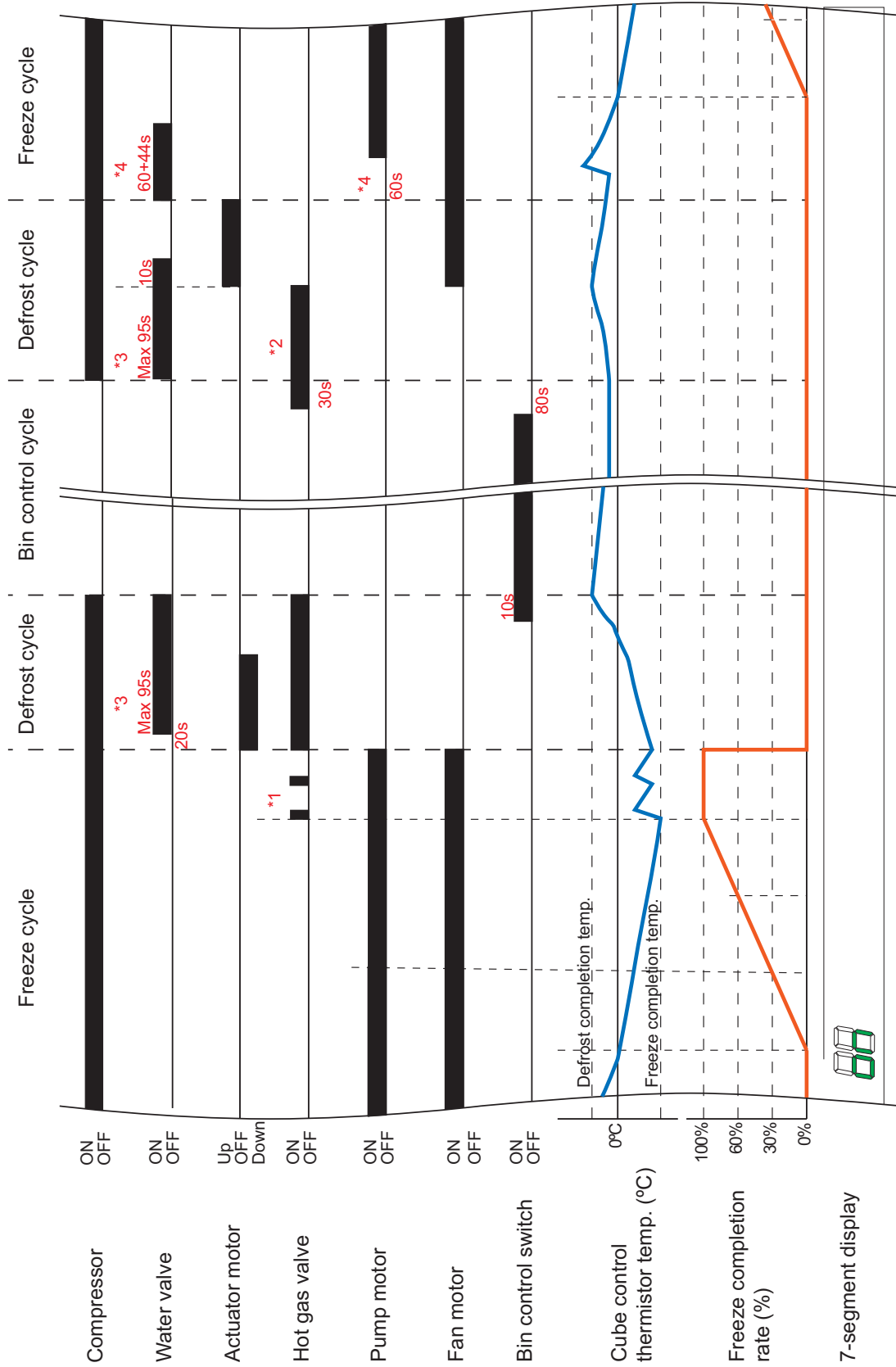
Ice storage at normal temperature (full drain flush) (AT 15°C, WT above 9°C)



Ice production at low temperature (full drain flush) (AT 15°C, WT below 9°C)



Ice storage at low temperature (full drain flush) (AT 15°C, WT below 9°C)



Notes on timing charts (*1, *2, *3, *4)

	Item	IM-500SAA	
*1	Water pan defrost control	Ambient temp in control	33°C or less
		Hot gas valve on/off time	5 / 25s
2	Defrost cycle low temp control	Ambient temp in control	23°C or less
		Hot gas valve on/off time	40 / 40s
3	Defrosting water supply time (water temp less than 9°C, or initial cycle)		*Max 95s
	Defrosting water supply time (water temp 9°C or more)		30s
4	Icemaking water / additional water supply time (partial drain flush)		30 / 22s
	Icemaking water / additional water supply time (full drain flush)		60 / 44s

* Water supply starts 20 seconds after the actuator motor starts to open the water pan, and completes at the same time as the hot gas valve is turned off. Maximum water supply time is 95 seconds. Water supply will be forcibly completed after 95 seconds even if the hot gas valve is not turned off.

- 1) When the power is turned on or the unit resumes operation after a bin control cycle, the water temperature is considered less than 48°F (9°C) and the water valve opens for 95 seconds to supply defrosting water. If the water temperature is normal, the water pan opens and immediately starts to close again. In this case, defrosting water flows for 10 seconds and not for the above supply time.
- 2) In the partial drain flush setting, when the power is turned on or the unit resumes operation after a bin control cycle, the water valve opens for 60 seconds (30s x 2) to supply icemaking water and for 44 seconds (22s x 2) to supply additional icemaking water.
- 3) In the full drain flush setting, the icemaking water supply time is 60 seconds and the additional water supply time is 44 seconds. The water supply time will not be doubled when the power is turned on or the unit resumes operation after a bin control cycle.
- 4) The pump motor starts after the water pan closes and the icemaking water supply completes.
 Partial drain flush - after 30 seconds, or after 60 seconds (30s x 2) when the power is turned on or the unit resumes operation after a bin control cycle
 Full drain flush - after 60 seconds

D. Performance Data

APPROXIMATE ICE PRODUCTION PER 24 HR.	AMBIENT TEMP. (°F/°C)	WATER TEMP. (°F/°C)					
		50/10		70/21		90/32	
	70/21	500	<u>227</u>	481	<u>218</u>	447	<u>203</u>
	80/27	485	<u>220</u>	456	<u>207</u>	417	<u>189</u>
	90/32	481	<u>218</u>	435	<u>197</u>	397	<u>180</u>
lbs./day kg./day	100/38	471	<u>214</u>	426	<u>193</u>	363	<u>165</u>
APPROXIMATE ELECTRIC CONSUMPTION	70/21	920		941		967	
	80/27	936		968		993	
	90/32	941		990		1016	
watts	100/38	945		996		1040	
APPROXIMATE WATER CONSUMPTION PER 24 HR.	70/21	105	<u>0.40</u>	99	<u>0.38</u>	92	<u>0.35</u>
	80/27	101	<u>0.38</u>	92	<u>0.35</u>	84	<u>0.32</u>
	90/32	99	<u>0.38</u>	86	<u>0.33</u>	78	<u>0.30</u>
gal./day m ³ /day	100/38	91	<u>0.34</u>	84	<u>0.32</u>	71	<u>0.27</u>
FREEZING CYCLE TIME	70/21	17		18		20	
	80/27	18		20		23	
	90/32	18		22		24	
min.	100/38	19		23		27	
HARVEST CYCLE TIME	70/21	3.6		3.0		2.0	
	80/27	3.2		2.2		2.0	
	90/32	3.0		1.6		1.5	
min.	100/38	2.4		1.6		1.4	
HEAD PRESSURE	70/21	210	<u>14.8</u>	231	<u>16.3</u>	255	<u>18.0</u>
	80/27	226	<u>15.9</u>	260	<u>18.2</u>	281	<u>19.7</u>
	90/32	231	<u>16.3</u>	283	<u>19.9</u>	306	<u>21.5</u>
PSIG kg/cm ² G	100/38	234	<u>16.5</u>	288	<u>20.3</u>	327	<u>23.0</u>
SUCTION PRESSURE	70/21	42	<u>3.0</u>	45	<u>3.1</u>	48	<u>3.4</u>
	80/27	44	<u>3.1</u>	48	<u>3.4</u>	52	<u>3.6</u>
	90/32	45	<u>3.1</u>	51	<u>3.6</u>	55	<u>3.8</u>
PSIG kg/cm ² G	100/38	45	<u>3.2</u>	52	<u>3.6</u>	58	<u>4.1</u>

TOTAL HEAT OF REJECTION FROM CONDENSER 4,500 BTU/h [AT 90°F (32°C) / WT 70°F (21°C)]

TOTAL HEAT OF REJECTION FROM CONDENSER 1,000 BTU/h [AT 90°F (32°C) / WT 70°F (21°C)]

Note: Pressure data is recorded at 5 minutes into freezing cycle.

The data not in **bold** should be used for reference only.

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

IV. Service Diagnosis

A. Error Codes, Caution Codes

- When the control board detects an error, the display shows one of the following error and caution codes in the display mode. Operation depends on the type of error.
- The error and caution codes other than E1 and E2 are indicated as “EE” in the 7-segment display at the time of occurrence. The error log is indicated up to five errors from the latest entry.

Error	Item	Description	Operation	Reset
E1	Freeze error	Freeze backup timer (45 minutes after water pan starts to close) counts up before freeze cycle completes, and evaporator temperature is 0°C or higher.	Shut down	Press reset switch
E2	Defrost error	Defrost backup timer (30 minutes) counts up before defrost cycle completes.	Shut down	Press reset switch
EE (E3)	Water pan opening error	Water pan has not fully opened within 60 seconds, and 3 minutes have passed even with opening failure control.	Halt	Press reset switch
		Unit resumes operation after 60 minutes and repeats the above error.	Shut down	
EE (E4)	Water pan closing error	Water pan has not fully closed within 60 seconds, and 3 minutes have passed even with closing failure control.	Halt	Press reset switch
		Unit resumes operation after 60 minutes and repeats the above error.	Shut down	
EE (E5)	High temperature error	Evaporator temperature stays 60°C or higher for 5 seconds or more.	Shut down	Press reset switch
EE (E9)	Condenser thermistor error (note)	Condenser thermistor circuit is open or shorted for 2 seconds.	Shut down	Replace thermistor
EE (EA)	Data error	Model setting data memory IC is defective.	Shut down	Replace control board
EE (EC)	Cube control thermistor error	Cube control thermistor circuit is open or shorted for 2 seconds.	Shut down	Replace thermistor
EE (Ed)	Water regulator error	Cooling water cannot stop by water regulator error, and thermistor senses set point or lower temperature.	Continue	Press reset switch

Note: No condenser thermistor is provided on IM-500SAA so EE (E9) error will not occur.

B. Service Diagnosis

Error	Check	Possible Cause	Remedy
E1	Water valve	Closing failure	Clean or replace
	Refrigeration circuit	Gas leak	Repair
		Clogged capillary	Replace heat exchanger
		Clogged expansion valve	Replace
	Compressor	Defective	Replace
		Starting failure	Check supply voltage or replace electrical components
	Compressor relay	Coil circuit open	Replace
	Condenser	Clogged	Clean
	Fan Motor	Locked	Replace
		Low RPM	Replace
Broken fan		Replace fan	
Hot gas valve	Closing failure	Replace	
Cube control thermistor	Disconnected	Reconnect	
E2	Hot gas valve	Opening failure	Replace
	Control board	Defective	Replace
E3	Actuator motor	Defective	Replace
	Control board	Relay contact failure	Replace
		Defective	Replace
E4	Actuator motor	Defective	Replace
	Control board	Relay contact failure	Replace
		Defective	Replace
E5	Hot gas valve	Closing failure	Replace
	Control board	Relay contact failure	Replace
E9	Condenser thermistor (note)	Open or short circuit	Replace
	Control board	Connector disconnected	Reconnect
EA	Control board	Defective	Replace
EC	Cube control thermistor	Open or short circuit	Replace
	Control board	Connector disconnected	Reconnect
Ed	Water regulator	Clogged with foreign matter	Unclog
		Corroded spring	Replace

Note: No condenser thermistor is provided on IM-500SAA so E9 error will not occur.

C. No Error Code Indication

Problem	Check	Possible Cause	Remedy
Icemaker will not start.	Power source	Turned off.	Turn on.
		Supply voltage too low.	Remove cause
		Power failure	Wait until power is resumed.
	Transformer	Defective.	Replace.
	Power cord	Not connected properly.	Reconnect.
		Open circuit (damaged).	Replace.
	Control board	Defective.	Replace.
	Fuse	Blown out.	Check for cause. Replace.
	Bin control switch	Stuck on other parts (e.g. ice guide).	Remove ice.
		Short circuit (display shows "on").	Replace.
	Fan motor	Locked.	Replace.
		Low RPM.	Replace.
		Broken fan.	Replace.
Control switch	"OFF" or "WASH" position.	Move to "ICE" position.	
Air filter	Dirty air filter or condenser.	Clean.	
Temperature	Ambient temperature too warm.	Reduce temperature.	
Slab does not break into separate cubes.	Extension spring	Over-extended.	Replace.
	Water plate	Obstacle caught between evaporator and water plate.	Remove obstacle.
Icemaker will not stop when bin is filled with ice.	Bin control switch actuator	Out of position.	Place in position.
		Broken.	Replace.
	Bin control switch	Out of position.	Place in position.
		Broken.	Replace.
	Bin control switch detector	Out of position.	Place in position.
		Broken.	Replace.
Bin control micro switch	Disconnected from switch box.	Reconnect.	
	Seizing with open contacts.	Replace.	
Control board	Defective.	Replace.	
Cloudy cubes.	Water quality	High hardness.	Set hard water control.
			Switch to full drain flush (see note below).
	Ice condition	Slush ice.	Set slush ice control.
Abnormal noise	Pump motor	Bearing worn out.	Replace.
		Vapor lock.	Clean water valve filter.
			Check water supply cycle time setting.
	Fan motor	Bearing worn out.	Replace.
		Fan touching obstacle.	Remove obstacle.
	Actuator motor	Gear worn out.	Replace.
Cubes drop separately.	Refrigeration circuit	Gas leaks (long defrost cycle).	Repair.
	Cam arm	Worn out.	Replace.

Note:

Full drain flush - After a freeze cycle ends, the unit drains all the remaining water in the tank and refills the tank in the next freeze cycle.

Partial drain flush (default setting) - After a freeze cycle ends, the unit leaves the remaining water in the tank and adds some water to fill the tank in the next freeze cycle.

Problem	Check	Possible Cause	Remedy
Imperfect ice production.	Insufficient water supply	Water valve filter clogged.	Clean.
		Water supply cycle too short.	Extend.
		Water supply pressure too low.	Remove cause.
	Water leaks from water tank or water plate	Water tank broken.	Replace.
		Water plate broken.	Replace.
		Icemaker not level.	Adjust.
	Water valve	Water leaks from valve body.	Replace.
		Water leaks from water supply pipe joint.	Check hose clamp. Replace connection hose.
	Water plate	Spray holes clogged.	Unclog.
Pump motor	Defective.	Replace.	
Large-hole cubes.	Refrigeration circuit	Gas leaks (low refrigeration capacity).	Repair.
	Condenser	Not clean (low condensing capacity).	Clean.
		Filter clogged.	Clean.
	Fan motor	Defective.	Replace.
	Installation site	No clearance at right side and rear.	Ensure clearance.
		Ambient temperature above 38°C.	Ensure ventilation to lower temperature.
	Power supply	Supply voltage too low (low refrigeration capacity).	Remove cause.
	Water valve	Water leaks.	Replace.
Insufficient water supply	Water supply pressure too low.	Remove cause.	
Freeze cycle time is too long.	Installation site	Ambient temperature too high.	Ensure ventilation to lower temperature.
	Condenser	Not clean (low condensing capacity).	Clean.
		Air filter clogged.	Clean.
	Fan motor	Defective.	Replace.
Refrigeration circuit	Gas leaks (low refrigeration capacity).	Repair.	

V. Removal and Replacement

A. Service for Refrigerant Lines

1. Service Information

1) Allowable Compressor Opening Time and Prevention of Lubricant Mixture [R404A]

The compressor must not be opened more than 30 minutes in replacement or service. Do not mix lubricants of different compressors even if both are charged with the same refrigerant, except when they use the same lubricant.

2) Treatment for Refrigerant Leak [R404A]

If a refrigerant leak occurs in the low side of an ice maker, air may be drawn in. Even if the low side pressure is higher than the atmospheric pressure in normal operation, a continuous refrigerant leak will eventually reduce the low side pressure below the atmospheric pressure and will cause air suction. Air contains a large amount of moisture, and ester oil easily absorbs a lot of moisture. If an ice maker charged with R404A has possibly drawn in air, the drier must be replaced. Be sure to use a drier designed for R404A.

3) Handling of Handy Flux [R404A]

Repair of the refrigerant circuit needs brazing. It is no problem to use the same handy flux that has been used for the current refrigerants. However, its entrance into the refrigerant circuit should be avoided as much as possible.

4) Oil for Processing of Copper Tubing [R404A]

When processing the copper tubing for service, wipe off oil, if any used, by using alcohol or the like. Do not use too much oil or let it into the tubing, as wax contained in the oil will clog the capillary tubing.

5) Service Parts for R404A

Some parts used for refrigerants other than R404A are similar to those for R404A. But never use any parts unless they are specified for R404A because their endurance against the refrigerant has not been evaluated. Also, for R404A, do not use any parts that have been used for other refrigerants. Otherwise, wax and chlorine remaining on the parts may adversely affect the R404A.

6) Replacement Copper Tubing [R404A]

The copper tubes currently in use are suitable for R404A. But do not use them if oily inside. The residual oil in copper tubes should be as little as possible. (Low residual oil type copper tubes are used in the shipped units.)

7) Evacuation, Vacuum Pump and Refrigerant Charge [R404A]

Never allow the oil in the vacuum pump to flow backward. The vacuum level and vacuum pump may be the same as those for the current refrigerants. However, the rubber hose and gauge manifold to be used for evacuation and refrigerant charge should be exclusively for R404A.

8) Refrigerant Leak Check

Refrigerant leaks can be detected by charging the unit with a little refrigerant, raising the pressure with nitrogen and using an electronic detector. Do not use air or oxygen instead of nitrogen for this purpose, or rise in pressure as well as in temperature may cause R404A to suddenly react with oxygen and explode. Be sure to use nitrogen to prevent explosion.

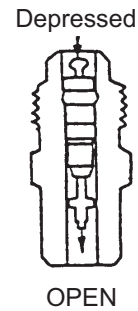
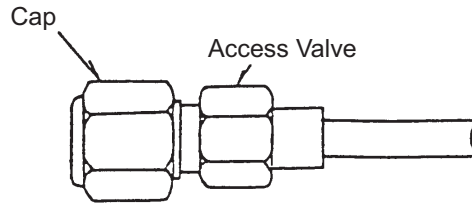
2. Refrigerant Recovery

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

3. Evacuation and Recharge

- 1) Attach a vacuum pump to the system. Be sure to connect charging hoses to both high and low-side access valves.
- 2) Turn on the vacuum pump. Open the service manifold valves. Never allow the oil in the vacuum pump to flow backwards.
- 3) Allow the vacuum pump to pull down to a 760 mmHg vacuum. Evacuating period depends on pump capacity.
- 4) Close the low-side valve and high-side valve on the service manifold.
- 5) Disconnect the vacuum pump and attach a refrigerant service cylinder to the high-side line. Remember to loosen the connection and purge the air from the hose. For air-cooled and water-cooled models, see the nameplate for the required refrigerant charge.
- 6) A liquid charge is recommended for charging an R404A system. Invert the service cylinder and place it on scales. Open the high-side valve on the service 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. Use a throttling valve or liquid dispensing device to add the remaining liquid charge through the low-side access port with the unit running.
- 9) Close the service manifold valves and disconnect the service manifold hoses.

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



B. Brazing

⚠ WARNING

1. Refrigerant R404A itself is not explosive or poisonous. However, when exposed to high temperatures (open flames), R404A can be decomposed to form hydrofluoric acid and carbonyl fluoride both of which can be hazardous.
2. Always recover the refrigerant and store it in a proper container. Do not discharge the refrigerant into the atmosphere.
3. Do not use silver alloy or copper alloy containing Arsenic.
4. Do not use R404A as a mixture with pressurized air for leak testing. Refrigerant leaks can be detected by charging the unit with a little refrigerant, raising the pressure with nitrogen and using an electronic leak detector.

Note: All brazing connections inside the bin are clear coated. Sandpaper the brazing connections before unbrazing the components. Use a good abrasive cloth to remove the coating.

C. Compressor

⚠ WARNING

The compressor terminal cover must be refitted in its correct position. Otherwise, operation under high temperature and high humidity conditions may cause electric shock, fire, or corrosion to shorten the service life.

IMPORTANT

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

- 1) Turn off the power supply.
- 2) Remove the top, front and right side panels.
- 3) Recover the refrigerant and store it in a proper container (See “V. A. 2. Refrigerant Recovery”).
- 4) Remove the terminal cover on the compressor, and disconnect solderless terminals.
- 5) Disconnect the discharge and suction pipes using brazing equipment.
- 6) Remove the hold-down bolts, washers and rubber grommets.
- 7) Slide and remove the compressor. Unpack the new compressor package.
- 8) Attach the rubber grommets of the previous compressor.
- 9) Clean the suction and discharge pipes with an abrasive cloth/paper.
- 10) Place the compressor in position, and secure it using the bolts and washers.
- 11) Remove the drier, then place the new drier in position.
- 12) Remove plugs from the compressor suction, discharge and process pipes.
- 13) Braze all fittings while purging with nitrogen gas flowing at a pressure of 20 to 30 kPa.
- 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 (970 kPa). DO NOT use R404A 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 solderless terminals and replace the terminal cover in its correct position.
- 17) Replace the panels in their correct positions.
- 18) Turn on the power supply.

Note: Hoshizaki recommends that compressor starting electrics are always replaced at the same time as the compressor.

D. Drier

IMPORTANT

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

- 1) Turn off the power supply.
- 2) Remove the top, front and right side panels.
- 3) Recover the refrigerant and store it in a proper container.
- 4) Remove the drier holder, if any, and pull the drier toward you for easy service.
- 5) Remove the drier using brazing equipment.
- 6) Braze the new drier, with the arrow on the drier in the direction of the refrigerant flow. Use nitrogen gas at a pressure of 20 to 30 kPa when brazing tubings. Braze in an access valve using a tee if necessary.
- 7) Check for leaks using nitrogen gas (970 kPa) and soap bubbles.
- 8) Evacuate the system and charge it with refrigerant (See "V. A. 3. Evacuation and Recharge").
- 9) Refit the panels in their correct positions.
- 10) Turn on the power supply.

Note: Always use a drier of the correct capacity and refrigerant type.

E. Hot Gas Valve

NOTICE

To ensure optimum performance, use a copper tube of the same diameter and length for replacement of the hot gas circuit.

IMPORTANT

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

- 1) Turn off the power supply.
- 2) Remove the top and front panels.
- 3) Recover the refrigerant and store it in an approved container.
- 4) Disconnect the hot gas valve leads.
- 5) Remove the screw and the solenoid coil.
- 6) Remove the valve and drier using brazing equipment.
- 7) Braze the new hot gas valve with nitrogen gas flowing at the pressure of 20 to 30 kPa.

⚠ WARNING

Always protect the valve body by using a damp cloth to prevent the valve from overheating. Do not braze with the valve body exceeding 275°F (135°C).

- 8) Install the new drier (See “V. D. Drier”).
- 9) Check for leaks using nitrogen gas (970 kPa) and soap bubbles.
- 10) Evacuate the system and charge it with refrigerant (See “V. A. 3. Evacuation and Recharge”).
- 11) Attach the solenoid coil to the valve body, and secure it with the screw.
- 12) Connect the leads.
- 13) Refit the panels in their correct positions.
- 14) Turn on the power supply.

F. Expansion Valve

IMPORTANT

The water in the refrigeration circuit may exceed the capacity of the drier and freeze in the expansion valve. Always install a new drier every time the sealed refrigeration system is opened. Do not replace the drier until after all other repair or replacement has been made.

- 1) Turn off the power supply.

- 2) Remove the top and front 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 20 to 30 kPa.

⚠ WARNING

Always protect the valve body by using a damp cloth to prevent the valve from overheating. Do not braze with the valve body exceeding 239°F (115°C).

- 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 (970 kPa). DO NOT use R404A as a mixture with pressurized air for leak testing.
- 9) Evacuate the system and charge it with refrigerant. See the nameplates for the required refrigerant charge.
- 10) Attach the expansion valve bulb to the suction line in the same location as the previous bulb. The bulb should be at the 12 o'clock position on the tube. Be sure to secure the bulb with the clamp 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.

G. Evaporator

IMPORTANT

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

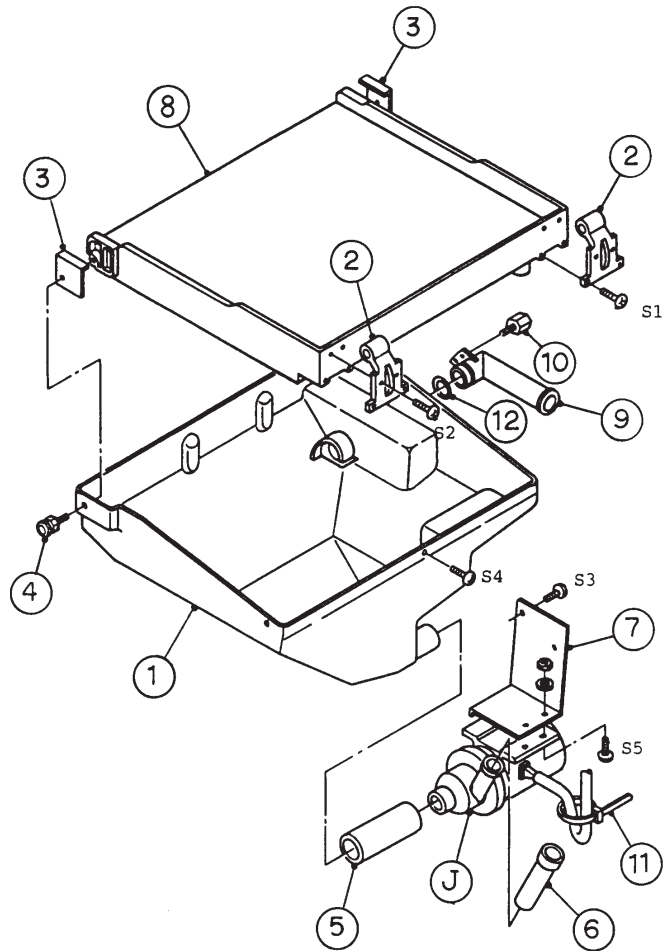
- 1) Turn off the power supply.

- 2) Remove the top, front and left side panels.
- 3) Recover the refrigerant and store it in an approved container.
- 4) Remove the water pan assembly, referring to “V. H. Water Pan Assembly”.
- 5) Disconnect the solder connections on the evaporator using brazing equipment.
- 6) Remove four nuts holding the evaporator.
- 7) Install the new evaporator, and secure it with the bolts, collars (spacer) and nuts.
- 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 20 to 30 kPa.
- 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 (970 kPa). DO NOT use R404A as a mixture with pressurized air for leak testing.
- 11) Evacuate the system, and charge it with refrigerant. See the nameplate for the required refrigerant charge.
- 12) Replace the removed parts in the reverse order of which they were removed.
- 13) Replace the panels in their correct positions.
- 14) Turn on the power supply.

H. Water Pan Assembly

- 1) Remove the top, front and left side panels.
- 2) Push the reset switch on the control box to open the water pan.
- 3) Turn off the power supply.
- 4) Disconnect the pump motor leads in the wiring channel.
- 5) Remove the two extension springs from the cam arms.
- 6) Remove the water plate bracket and the water pan assembly.
- 7) Remove the two spring hook screws from the water tank.
- 8) Remove the screws and the water plate bracket.

- 9) Remove the pump suction and discharge tubings.
- 10) Remove the pump motor bracket from the water plate.
- 11) Install the new water plate or water tank in the reverse order of the removal procedure.
- 12) Replace the panels in their correct positions.
- 13) Turn on the power supply.



INDEX NO.	DESCRIPTION
1	Water Tank
2	Water Plate Bracket
3	Bracket
4	Spring Hook Screw
5	Pump Tubing (Suction)
6	Pump Tubing (Discharge)
7	Pump Motor Bracket
8	Water Plate
9	Overflow Pipe
10	Thumbscrew (for Overflow Pipe)
11	Nylon Tie
12	O-ring
J	Pump Motor Assembly
S1 - 4	Tapping Screw
S5	Machine Screw

I. Pump Motor

- 1) Turn off the power supply.
- 2) Remove the top panel and front panel.
- 3) Disconnect the pump motor leads in the wiring channel.
- 4) Unscrew and remove the pump motor from the bracket.
- 5) Disconnect the pump suction and discharge tubings.
- 6) Install the new motor in the reverse order of the removal procedure.
- 7) Turn on the power supply, and check for leaks.
- 8) Replace the panels in their correct positions.

J. Water Valve

- 1) Close the icemaker water supply line shut-off valve.
- 2) Turn off the power supply.
- 3) Remove the front panel.
- 4) Disconnect the tubing attached to the valve. Loosen the fitting nut. Be careful not to loosen the washer.
- 5) Disconnect the terminals from the valve.
- 6) Remove the bracket and valve from the unit.
- 7) 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.
- 8) Open the icemaker water supply line shut-off valve.
- 9) Turn on the power supply.
- 10) Check for leaks.
- 11) Replace the panels in their correct positions.

K. Actuator Motor

- 1) Remove the top panel and front panel.
- 2) Push the reset switch on the control box to open the water pan.
- 3) Turn off the power supply.
- 4) Remove the extension spring (actuator motor side) from the cam arm.
- 5) Disconnect the actuator motor leads in the wiring channel.
- 6) Remove the actuator motor bracket.
- 7) Remove the spring pin securing the shaft to the cam arm.
- 8) Remove the actuator motor.
- 9) Install the new actuator motor in the reverse order of the removal procedure.
- 10) Check that the cam arm can move in the proper range.
- 11) Replace the panels in their correct positions.
- 12) Turn on the power supply.

L. Cam Arm

1. Cam Arm (A) - Actuator Motor Side

Refer to “V. K. Actuator Motor”.

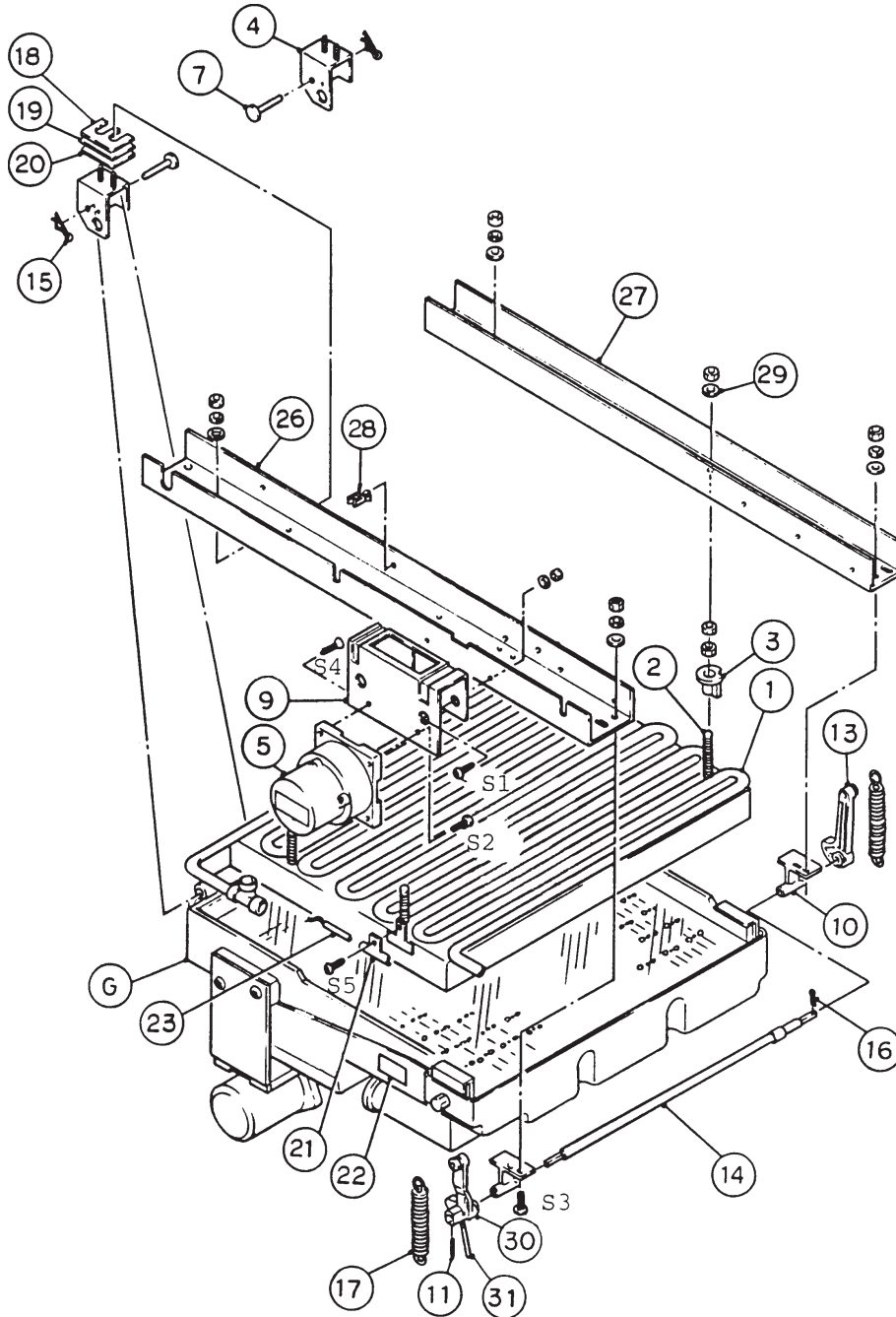
2. Cam Arm (B) - Rear Side

- 1) Remove the top panel and front panel.
- 2) Push the reset switch on the control box to open the water pan.
- 3) Turn off the power supply.
- 4) Remove the extension spring from the cam arm (B).
- 5) Remove the split pin from the cam shaft.
- 6) Remove the cam arm (B).

7) Install the new cam in the reverse order of the removal procedure.

8) Replace the panels in their correct positions.

9) Turn on the power supply.



ICEMAKING ASSEMBLY AND CAM MECHANISM

INDEX NO.	DESCRIPTION
G	Water Pan Assembly
1	Evaporator
2	Bolt
3	Collar (Spacer)
4	Bearing
5	Actuator Motor
7	Shaft
9	Actuator Motor Bracket
10	Cam Shaft Bearing
11	Spring Pin
13	Cam Arm (B)
14	Cam Shaft
15	Snap Pin
16	Split Pin
17	Spring
18	Washer (A)
19	Washer (B)
20	Washer (C)
21	Thermistor Holder
22	Label (for Overflow Pipe)
23	Thermistor (Cube Control)
26	Frame
27	Frame
28	Wire Saddle
29	Washer
30	Cam Arm (A)
31	Change Lever
S1 - 5	Machine Screw

M. Control Board

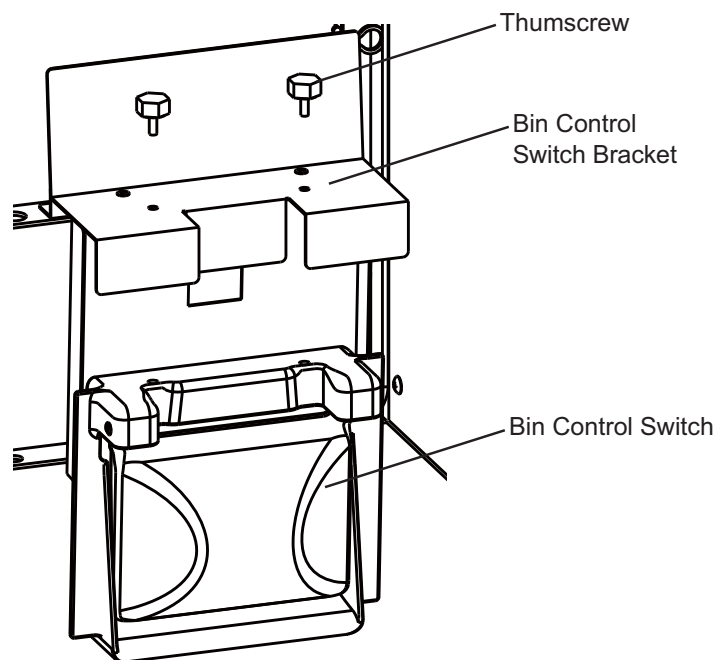
IMPORTANT

Some adjustment will be required for the control board to fit the icemaker models. Do not repair any parts and electronic devices on the control board in the field. Replace the whole board with a new service board.

See "II. F. 3. Removal and Replacement".

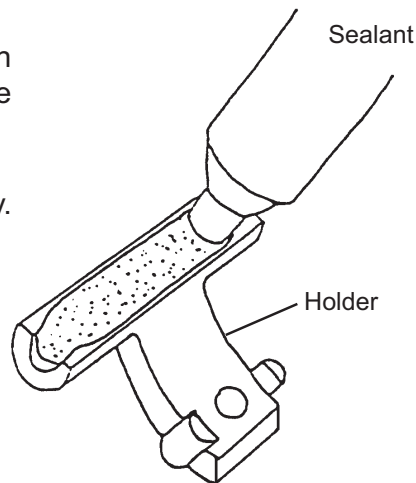
N. Bin Control Switch

- 1) Turn off the power supply.
- 2) Remove the top and front panels.
- 3) Disconnect the bin control switch leads in the wiring channel.
- 4) Remove the two thumbscrews, and pull down to remove the bin control switch.
- 5) Install the new bin control switch in the reverse order of the removal procedure.
- 6) Replace the panels in their correct positions.
- 7) Turn on the power supply.

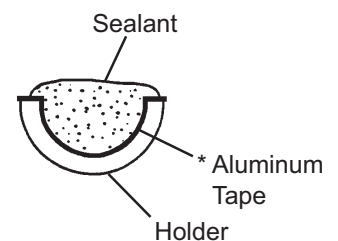


O. Thermistor for Cube Control

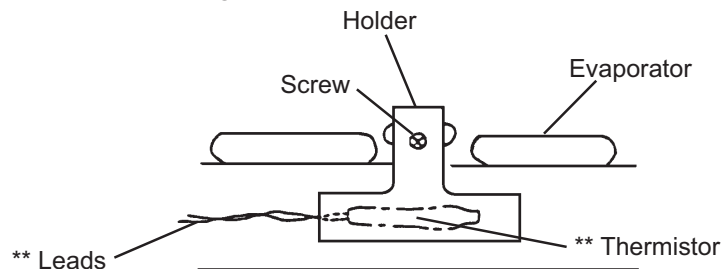
- 1) Turn off the power supply.
- 2) Remove the top and front panels.
- 3) Remove the connector CN13 on the control board, referring to "V. M. Control Board".
- 4) Unscrew and remove the thermistor holder and thermistor, located on the evaporator (front side).
- 5) Remove the old sealant from the thermistor holder and evaporator.
- 6) Wipe off any moisture or condensation from the evaporator surface.
- 7) Press a tube of the sealant KE 60RTV, manufactured by Shin-Etsu Silicones, to the recess of the thermistor holder. Slowly squeeze the sealant out of the tube and spread it smoothly in the recess. Do not use any sealant other than the above.
- 8) Attach the new thermistor in position on the evaporator and press down the thermistor holder over the thermistor. Be careful not to damage the thermistor lead. Keep the thermistor inside the thermistor holder. After the thermistor holder is fitted, do not pull the thermistor lead to move the thermistor.
- 9) Refit the removed parts in the reverse order of the removal procedure.
- 10) Turn on the power supply.



* Insert aluminum tape or foil between holder and sealant.



** Thermistor and leads are FRAGILE.
HANDLE WITH CARE.



VI. Cleaning and Maintenance Instructions

⚠ WARNING

CHOKING HAZARD: Ensure all components, fasteners, and thumbscrews are securely in place after any cleaning or maintenance is done to the unit. Make sure that none have fallen into the storage bin.

A. Cleaning

HOSHIZAKI recommends cleaning this unit at least once a year. More frequent cleaning, however, may be required in some existing water conditions.

⚠ WARNING

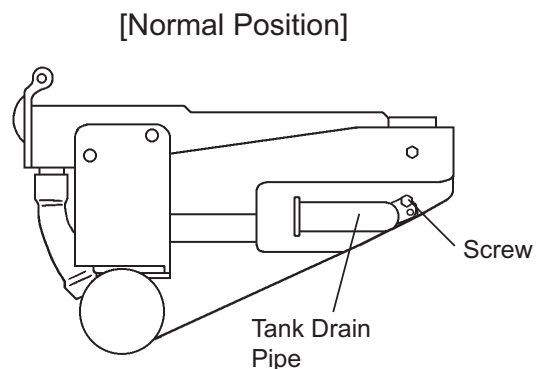
1. To prevent injury to individuals and damage to the icemaker, do not use ammonia type cleaners.
2. Carefully follow any instructions provided with the bottles of cleaning and sanitizing solution.
3. Always wear liquid-proof gloves and goggles to prevent the cleaning and sanitizing solutions from coming into contact with skin or eyes.

NOTICE

To prevent damage to the water pump, do not leave the control switch in the "WASH" position for extended periods of time when the water tank is empty.

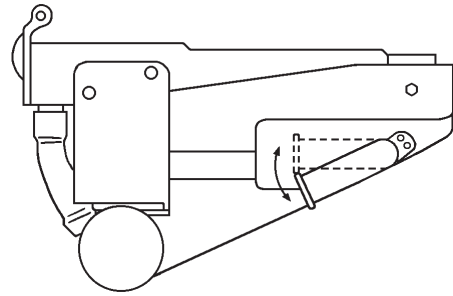
1. Cleaning Procedure

- 1) Dilute approximately 7.2 fl. oz. (214 ml) of recommended cleaner Hoshizaki "Scale Away" with 0.8 gal. (3.0 lit.) of water.
- 2) Turn off the power supply.
- 3) Remove all ice from the storage bin.
- 4) Remove the front panel.
- 5) Remove the screw, then move the water tank drain pipe to the drain position. Use the screw to secure the water tank drain pipe in the drain position.



- 6) Make sure the control switch is in the "ICE" position, then replace the front panel.
- 7) Close the icemaker water supply line shut-off valve.
- 8) Turn on the power supply for 3 minutes. The water tank drains and cubes are removed from the evaporator.

[Drain Position]



- 9) Turn off the power supply.
- 10) Remove the front panel and top panel.
- 11) Move the control switch to the "WASH" position.
- 12) Slowly pour the cleaning solution over the top of the evaporator and into the water tank. Do not splash or spill the solution onto other parts.
- 13) Replace the front panel and top panel in their correct positions.
- 14) Turn on the power supply to start the washing process.
- 15) Turn off the power supply after 30 minutes.
- 16) Open the icemaker water supply line shut-off valve.
- 17) Remove the front panel.
- 18) Move the control switch to the "ICE" position.
- 19) Replace the front panel.
- 20) Turn on the power supply for 3 minutes. The water tank drains.
- 21) Turn off the power supply.
- 22) Repeat steps 20 and 21 three more times to rinse thoroughly.

Note: If not sanitizing the icemaker, go to step 19 in "VI. A. 2. Sanitizing Procedure."

2. Sanitizing Procedure - Following Cleaning Procedure

- 1) Dilute a 5.25% sodium hypochlorite solution (chlorine bleach) with water (add approximately 0.4 fl. oz. (12 ml) to 0.8 gal. (3.0 lit.) of water).
- 2) Close the icemaker water supply line shut-off valve.
- 3) Turn on the power supply for 3 minutes. The water tank drains.

- 4) Turn off the power supply.
- 5) Remove the front panel and top panel.
- 6) Move the control switch to the "WASH" position.
- 7) Slowly pour the sanitizing solution over the top of the evaporator and into the water tank.
Do not splash or spill the solution onto other parts.
- 8) Replace the front panel and top panel in their correct positions.
- 9) Turn on the power supply to start the sanitizing process.
- 10) Turn off the power supply after 15 minutes.
- 11) Open the icemaker water supply line shut-off valve.
- 12) Remove the front panel.
- 13) Move the control switch to the "ICE" position.
- 14) Replace the front panel.
- 15) Turn on the power supply for 3 minutes. The water tank drains.
- 16) Turn off the power supply.
- 17) Repeat steps 15 and 16 three more times to rinse thoroughly.
- 18) Repeat steps 1 through 17 one more time.
- 19) Remove the front panel.
- 20) Remove the screw, then move the water tank drain pipe to the normal position. Use the screw to secure the water tank drain pipe in the normal position.
- 21) Replace the front panel.
- 22) Clean the storage bin liner using a neutral cleaner. Rinse thoroughly after cleaning.
- 23) Turn on the power supply to start the automatic icemaking process.

B. Maintenance

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

⚠ WARNING

1. Only qualified service technicians should service this icemaker.
2. Move the control switch to the “OFF” position and turn off the power supply before servicing. Lockout/Tagout to prevent the power supply from being turned back on inadvertently.

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.

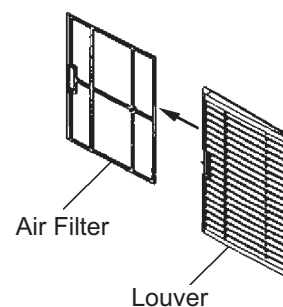
2. Storage Bin and Scoop

- 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. Air Filters

Plastic mesh air filters remove dirt and dust from the air, and keep the condenser from getting clogged. As the filters get clogged, the icemaker’s performance will be reduced. Check the filters at least twice a month. When clogged, use warm water and a neutral cleaner to wash the filters.

- 1) Slide the air filter out of the louver.
- 2) Clean the air filter by using a vacuum cleaner. When severely clogged, use warm water and a neutral cleaner to wash the air filter.
- 3) Rinse and dry the air filter thoroughly, and place it in position.



NOTICE

Do not use hot water, thinner, petroleum-based products, or any strong cleaner to clean the air filter.

4. Condenser

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

C. Preparing the Icemaker for Long Storage

NOTICE

1. When shutting off the icemaker for an extended time, drain out all water from the water line and remove the ice from the storage bin. The storage bin should be cleaned and dried. Drain the icemaker to prevent damage to the water supply line at sub-freezing temperatures, using air or carbon dioxide. Shut off the icemaker until the proper ambient temperature is resumed.
2. To prevent damage to the water pump, do not leave the control switch in the "WASH" position for extended periods of time when the water tank is empty.

When the icemaker is not used for two or three days under normal conditions, it is sufficient to only move the control switch to the "OFF" position. When storing the icemaker for an extended time or in sub-freezing temperatures, follow the instructions below.

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

- 1) Turn off the power supply.
- 2) Move the control switch to the "OFF" position.
- 3) Close the icemaker water supply line shut-off valve and open the icemaker water supply line drain valve.
- 4) Allow the icemaker water supply line to drain by gravity.
- 5) Attach compressed air or carbon dioxide supply to the icemaker water supply line drain valve.
- 6) Move the control switch to the "ICE" position and turn on the power supply.
- 7) Blow the icemaker water supply line out using compressed air or carbon dioxide.

2. Drain the water tank:

- 1) Turn off the power supply.

- 2) Remove the front panel.
- 3) Remove the screw, and move the tank drain pipe to the drain position.
- 4) Close the icemaker water supply line.
- 5) Turn on the power supply.
- 6) Press the reset button. The water tank will start to open.

Note: This procedure is necessary to protect the icemaker from freezing up at sub-freezing temperatures.

- 7) Turn off the power supply when the water tank has fully opened.
- 8) Move the tank drain pipe to the normal position, and secure it with the screw.
- 9) Replace the front panel.

VII. Stacking Installation

A. Set Up

NOTICE

1. Do not use the frame to lift the icemaker. Lift the icemaker from the base.
2. Up to three icemakers can be stacked.
Double: IM-500SAA x 2, STACKING KIT x 1
Triple: IM-500SAA x 3, STACKING KIT x 2.
3. The bin control switch on the lowest unit controls all the units. The bin control switch must be removed from the upper unit. Misconnection or no connection may cause serious damage to the icemaker units, resulting in failure.
4. Allow 6" (15cm) clearance at rear, left side, and top and 12" (30cm) clearance at right side for proper air circulation and ease of maintenance and/or, service should they be required.

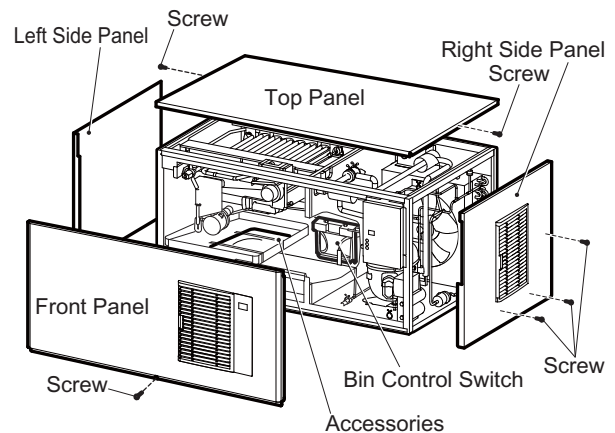
1) Unpack the storage bin, and attach the four adjustable legs provided (bin accessory) to the bottom of the storage bin.

2) Position the storage bin in the selected permanent location.

3) Unpack the icemaker and remove all shipping cartons, tape and packing material.

4) Remove the panels to prevent damage when installing the icemaker.

- Front Panel: Loosen the screw. Lift up and pull towards you.
- Top Panel: Remove the screws and lift up.
- Left Side Panel: Slide forward slightly, and then lift off.
- Right Side Panel: Remove the screws and pull towards you.



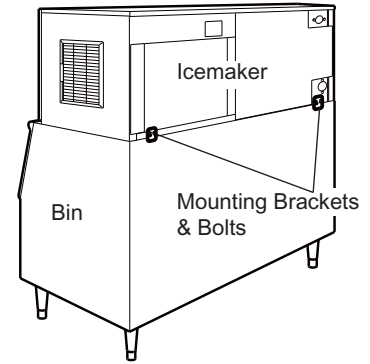
5) Remove the protective plastic film from the panels. If the unit is exposed to the sun or to heat, remove the film after the unit cools.

6) Remove the package containing the accessories from the icemaker.

7) Remove the shipping tape holding the bin control switch.

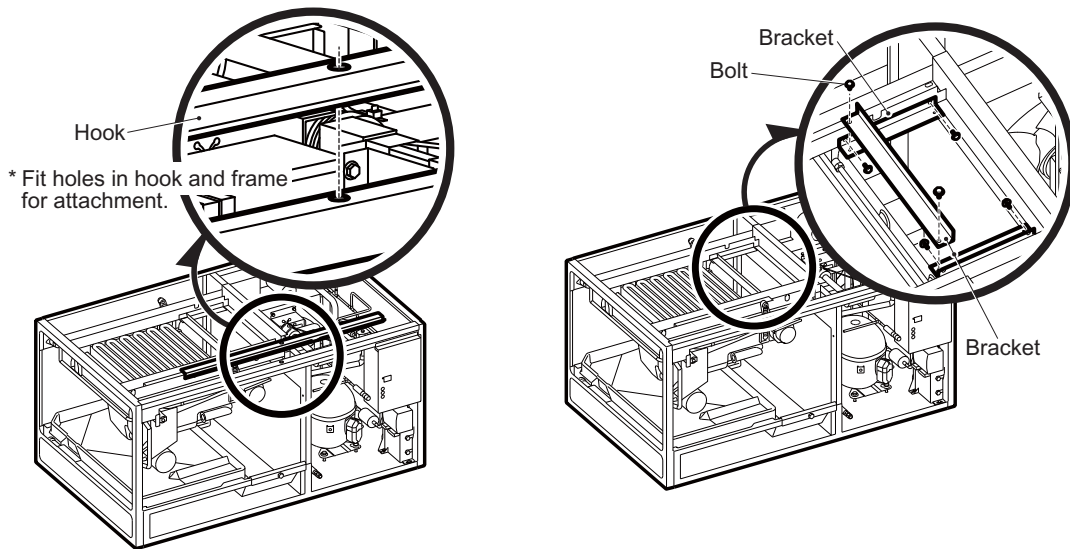
Lower Unit

- 8) Place the icemaker on the top of the storage bin.
- 9) Secure the icemaker to the storage bin using the two mounting brackets and the bolts provided.
- 10) Level the icemaker and storage bin in both left-to-right and front-to-rear directions. Adjust the storage bin legs to make the icemaker level.



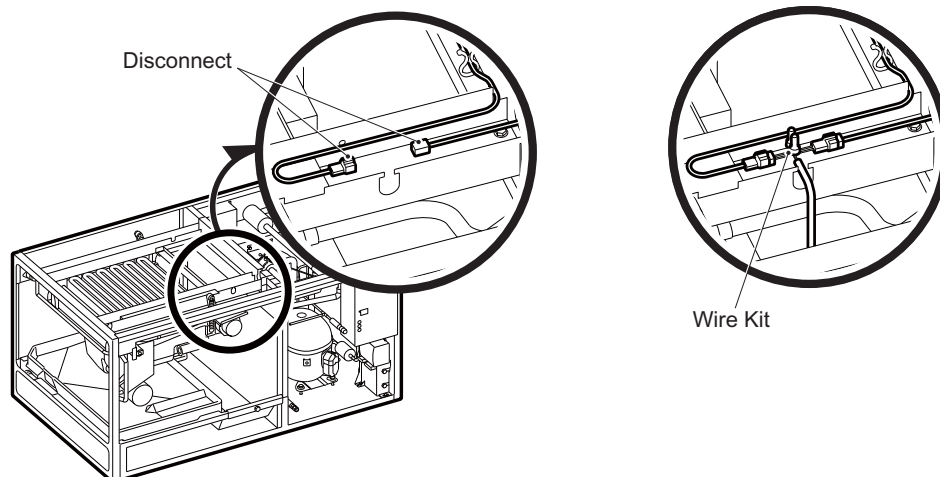
- 11) Attach the hook (option parts) to hook the front panel.
* For auxiliary code C0 and earlier, the hook is already attached.

- 12) Attach the brackets provided in the stacking kit.



- 13) Disconnect the connector of the bin control switch.

- 14) Attach the wire kit to the connector of the bin control switch.

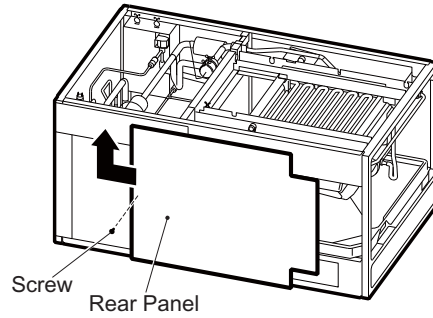
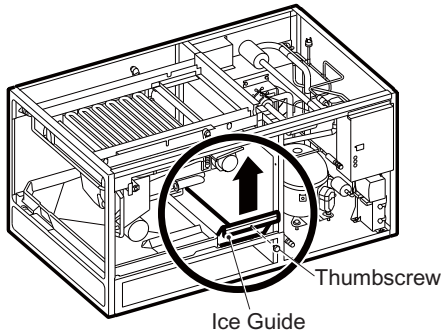


Upper Unit

15) Remove the ice guide.

16) Remove the rear panel.

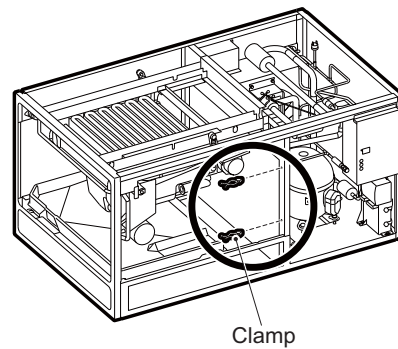
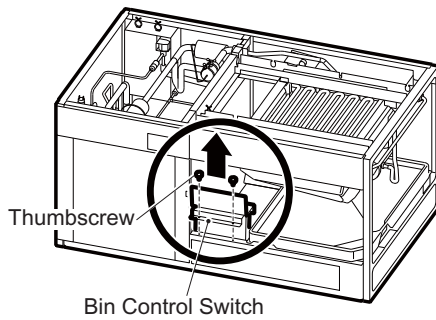
- Rear Panel: Remove the screw. Slide to the left then to the top, and pull towards you.



17) Disconnect the connector of the bin control switch.

18) Remove the bin control switch.

19) Attach the clamps provided.

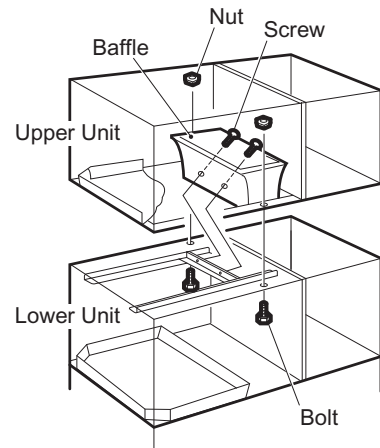


Stacking

20) Attach the upper unit on the lower unit.

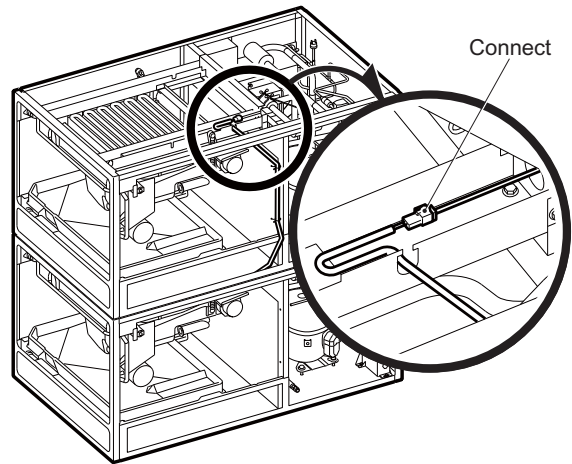
21) Secure the two units with the two bolts and the two nuts provided.

22) Place the baffle and secure it to the bracket with the two screws.



23) Connect the connector of the wire kit to the upper unit.

24) Replace the panels in their correct positions.



NOTICE

If stacking three icemakers, repeat the steps 11 to 24 for the upper unit.