



SELF-CONTAINED CRESCENT CUBER

SERVICE MANUAL

**KM-40C-HC
KM-60C-HC
KM-80C-HC
KM-140C-HC**

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I. SPECIFICATIONS

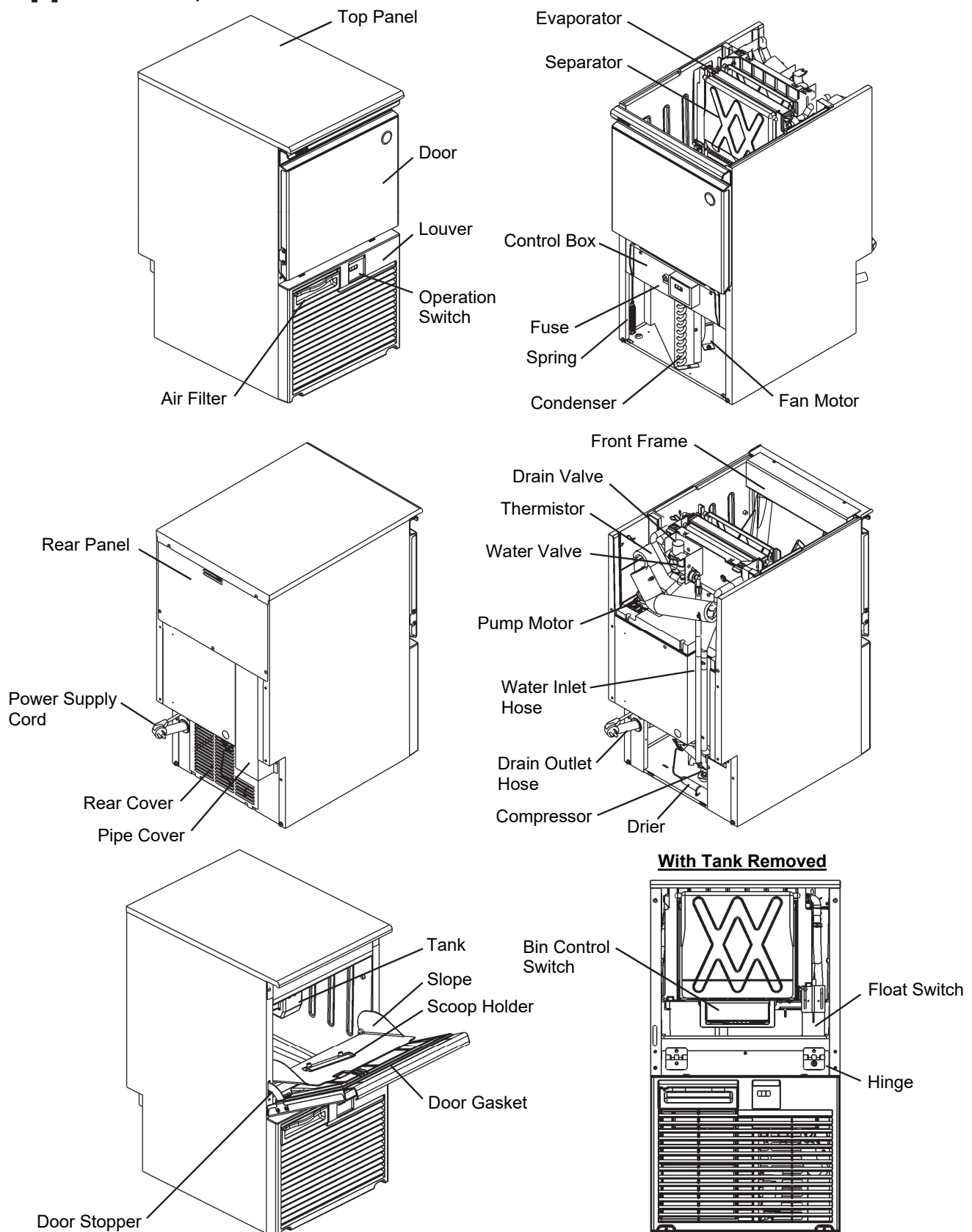
1. DIMENSIONS/SPECIFICATIONS

Refer to the dimensional drawings available from the “Product Literature Search System”.

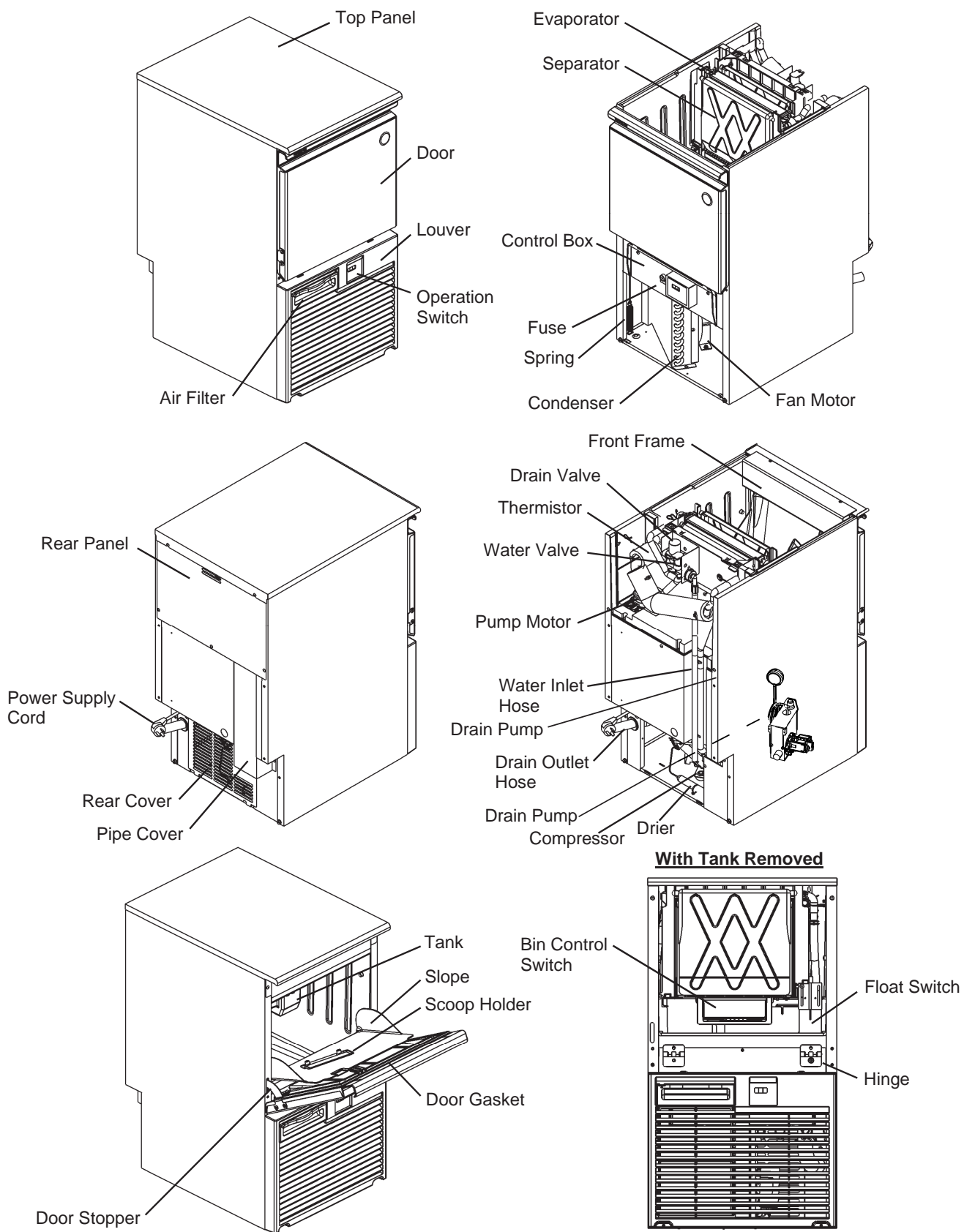
II. GENERAL INFORMATION

1. CONSTRUCTION

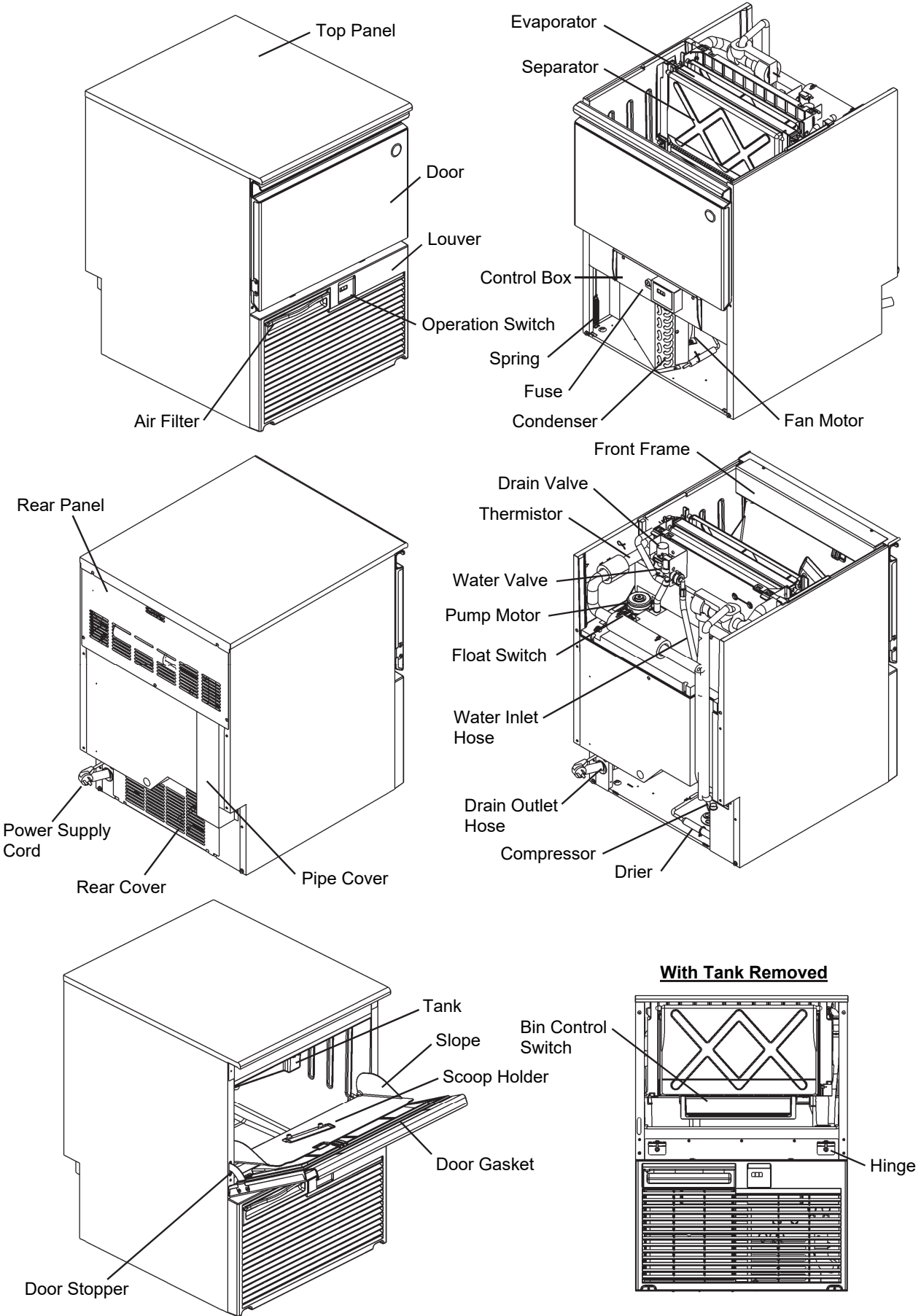
[a] KM-40C-HC, KM-60C-HC



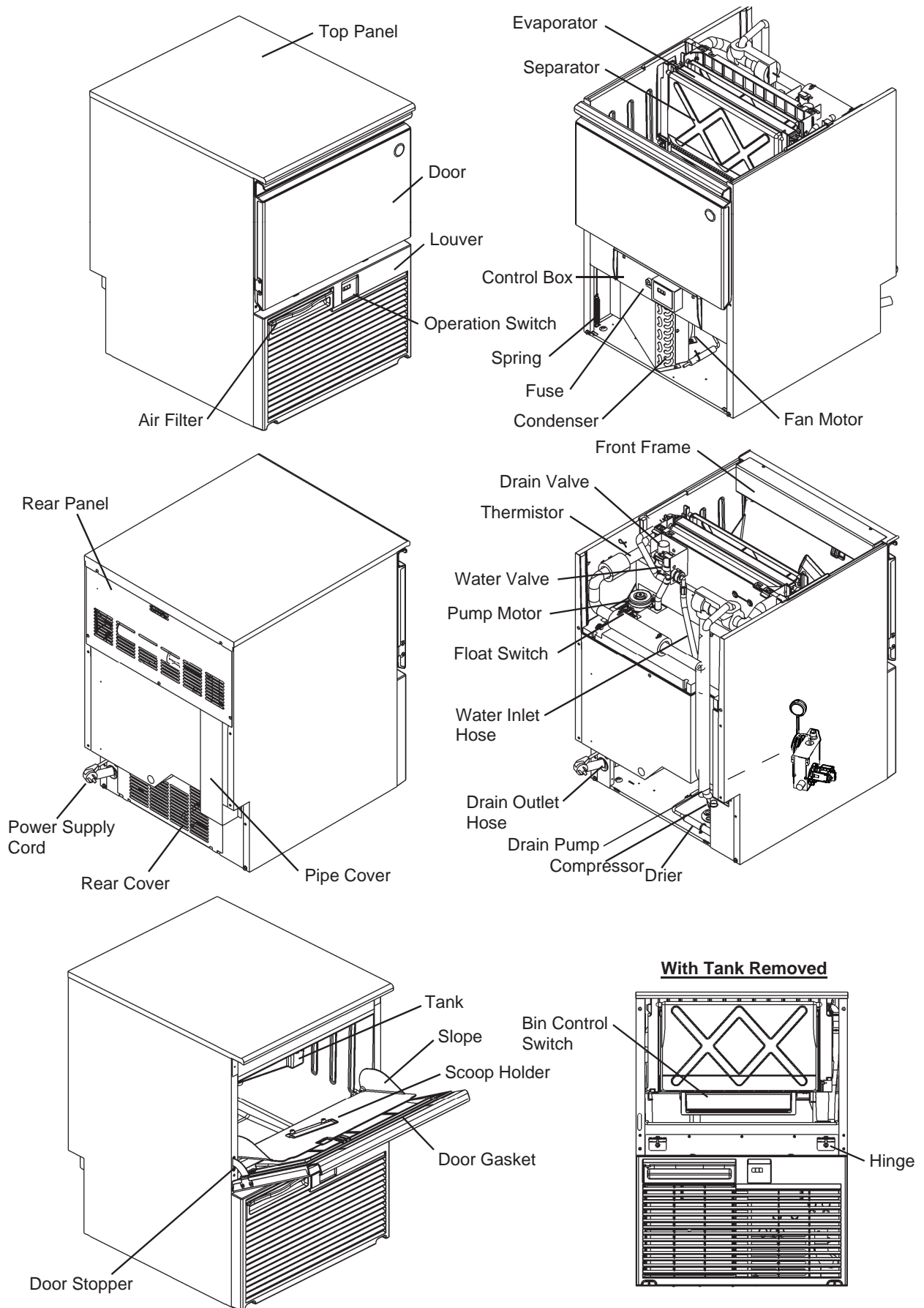
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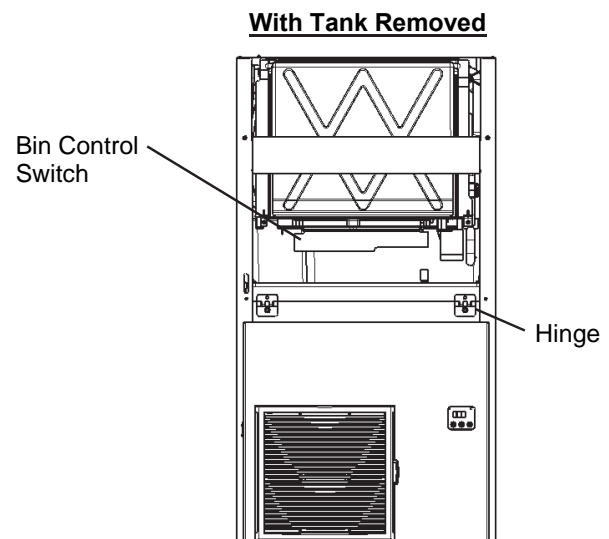
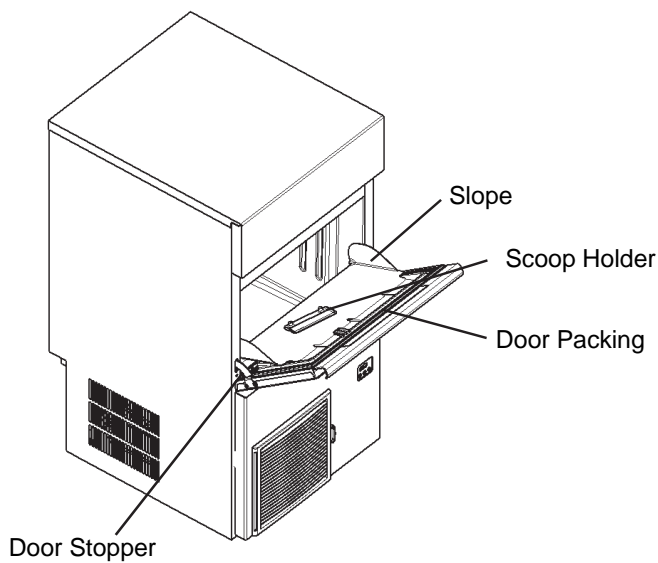
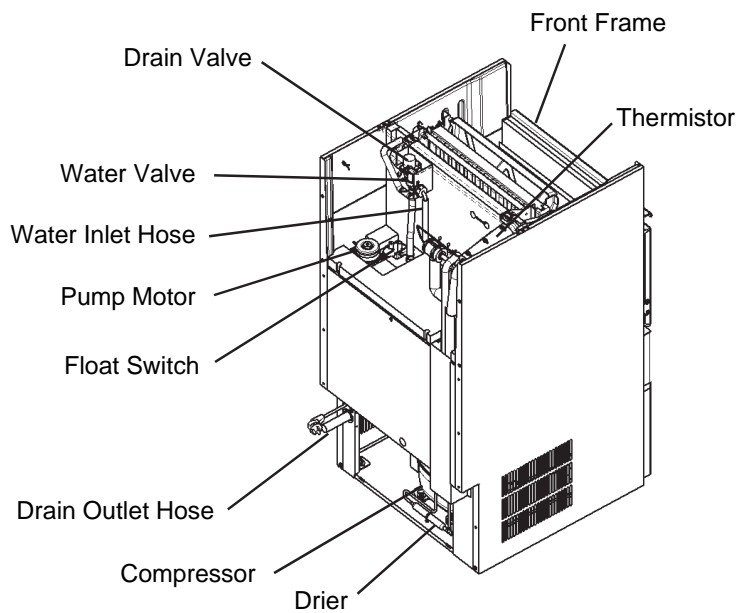
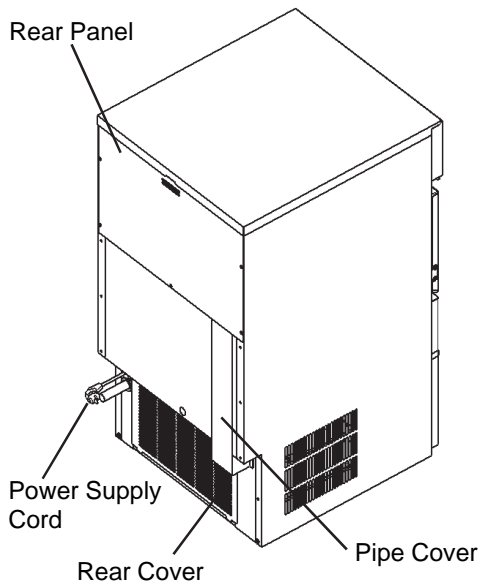
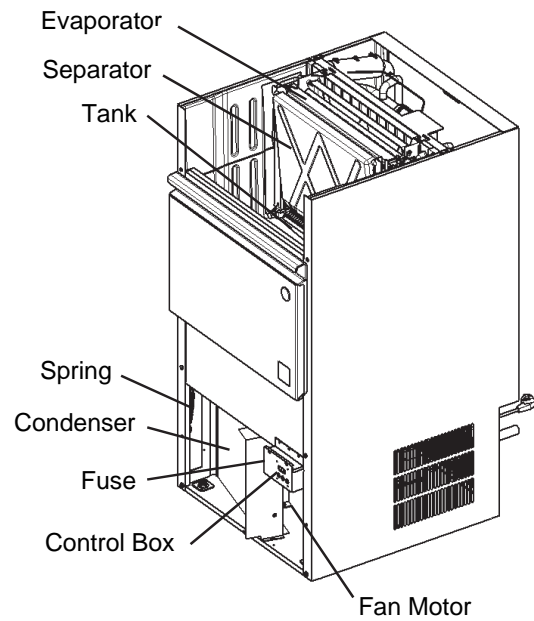
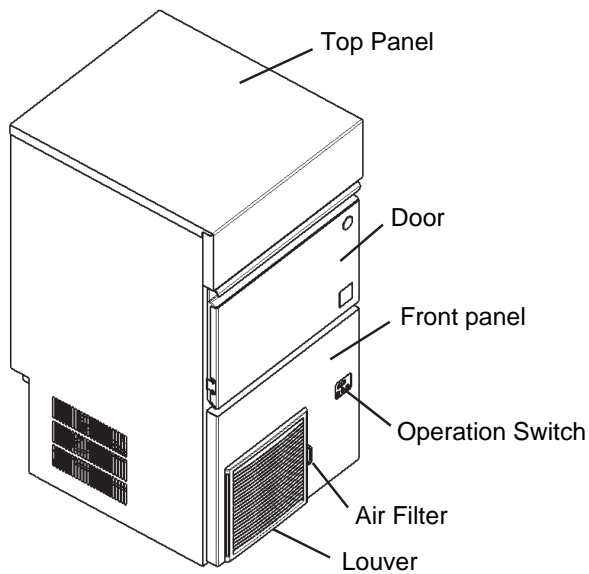
[c] KM-80C-HC



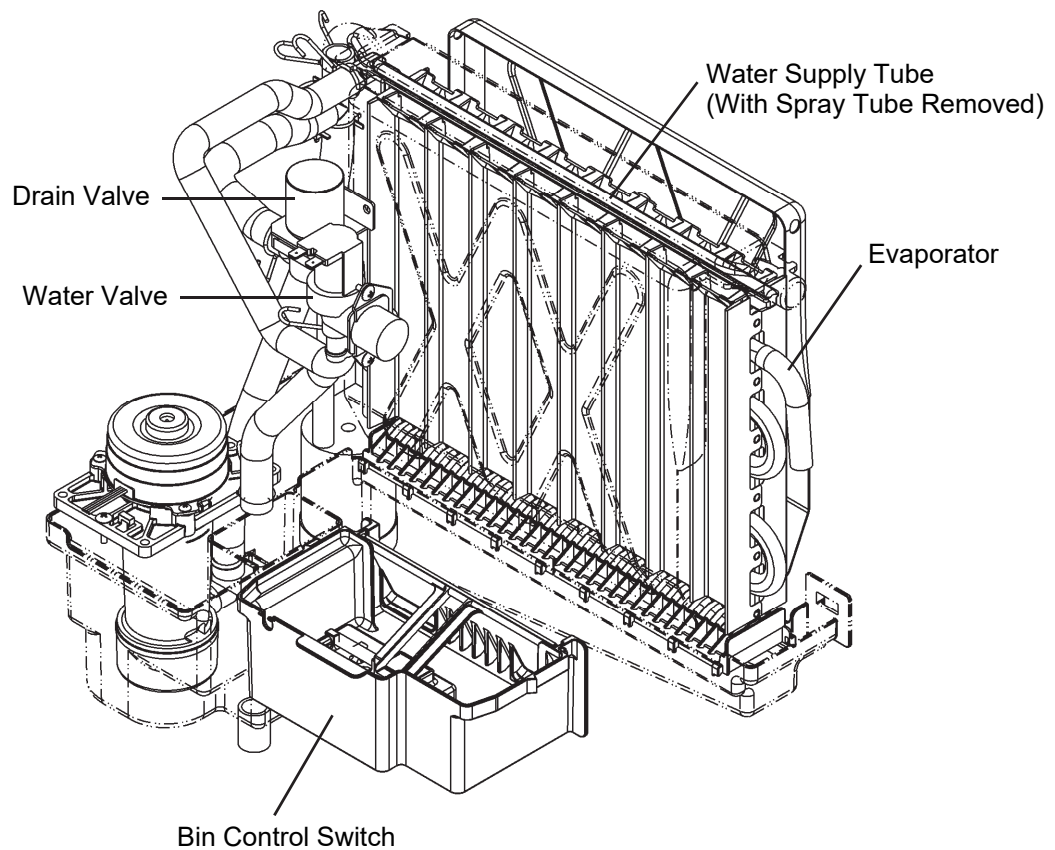
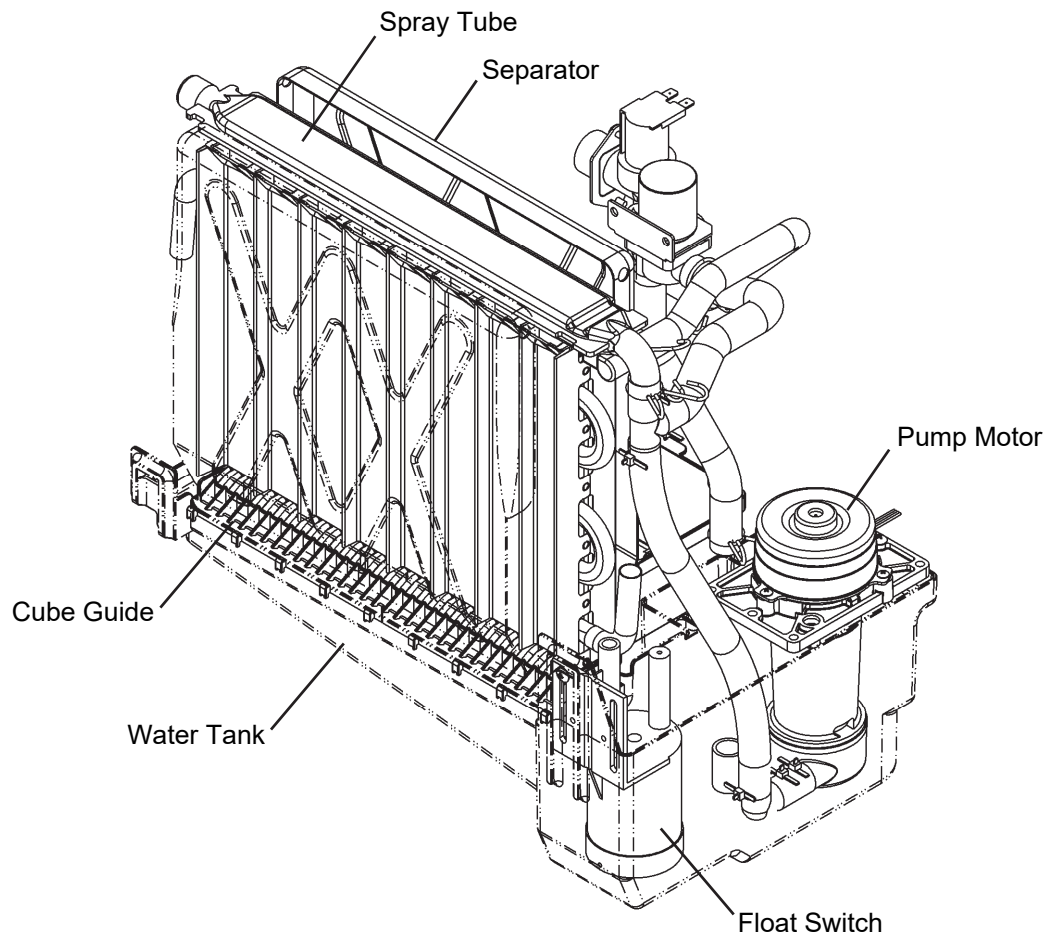
[d] KM-80C-HC



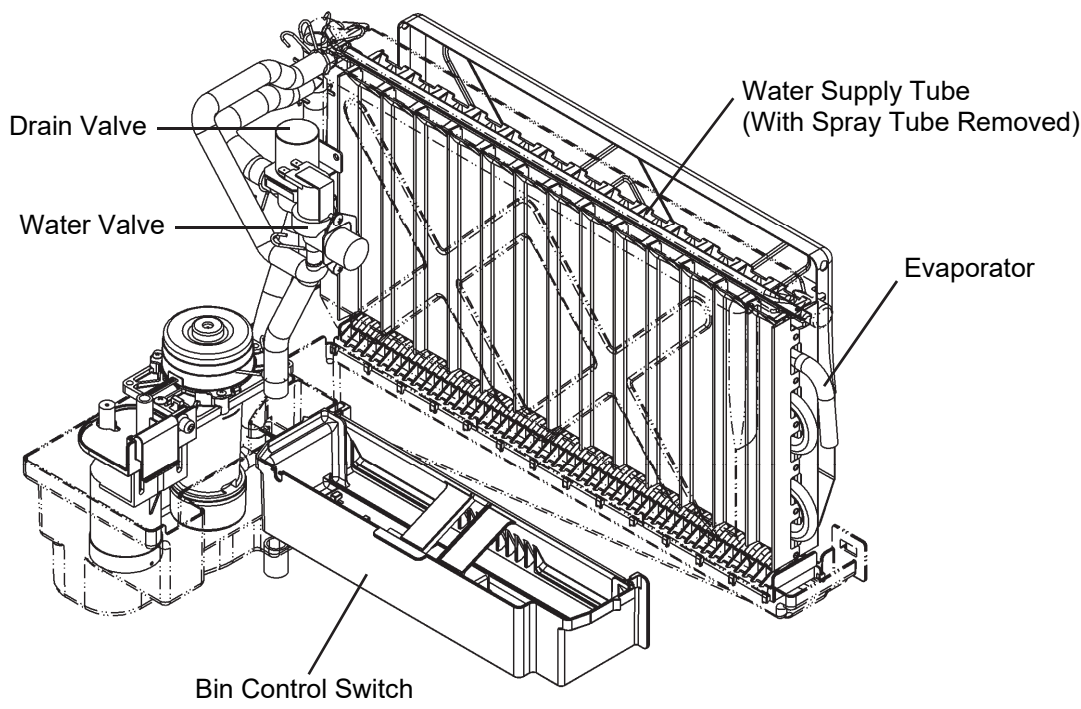
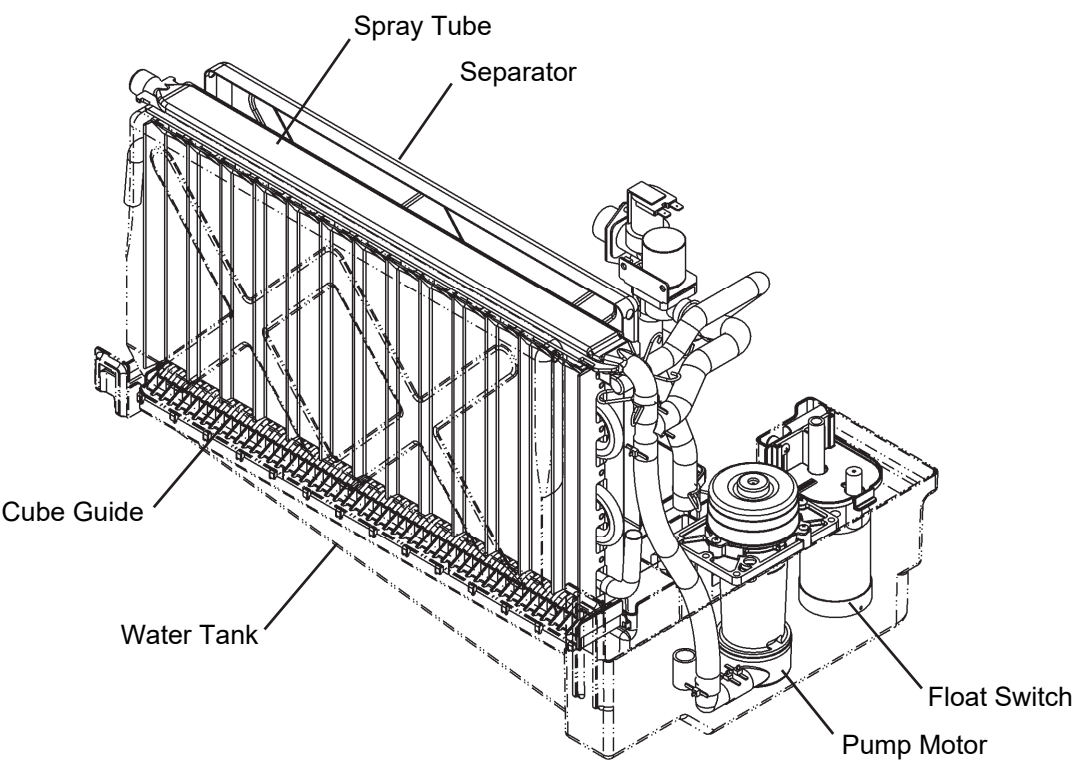
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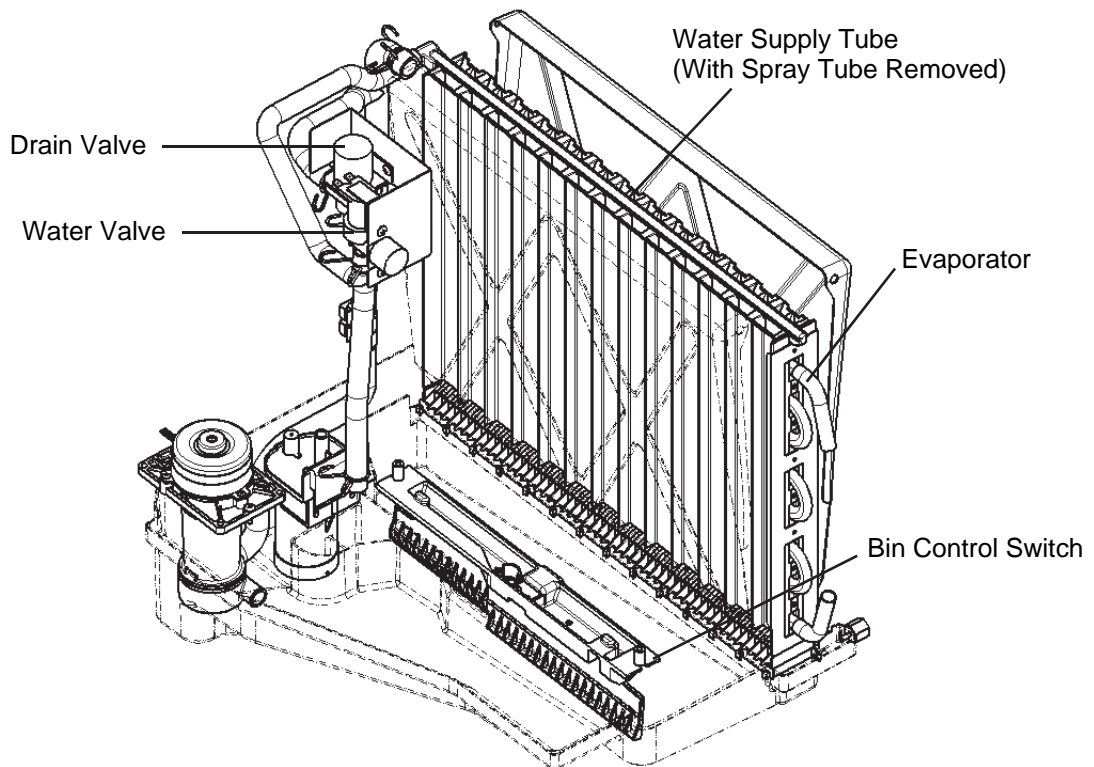
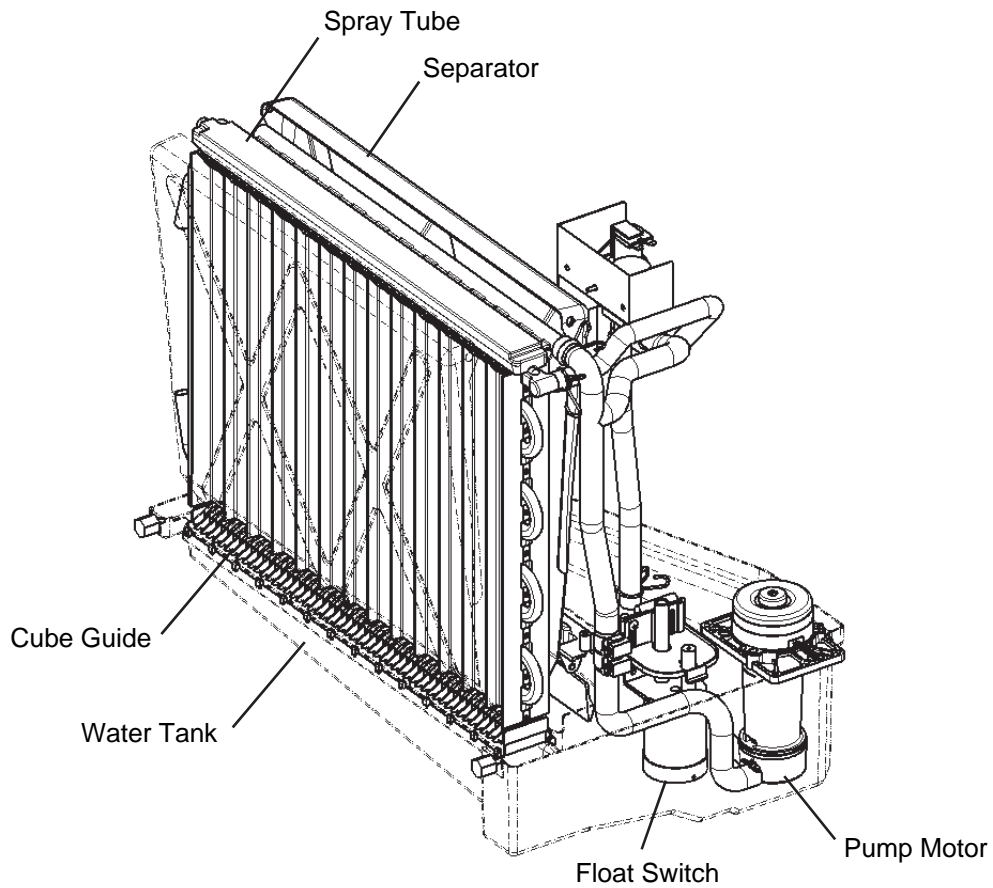
[f] ICEMAKING COMPARTMENT (KM-40C-HC, KM-60C-HC)



[g] ICEMAKING COMPARTMENT (KM-80C-HC)

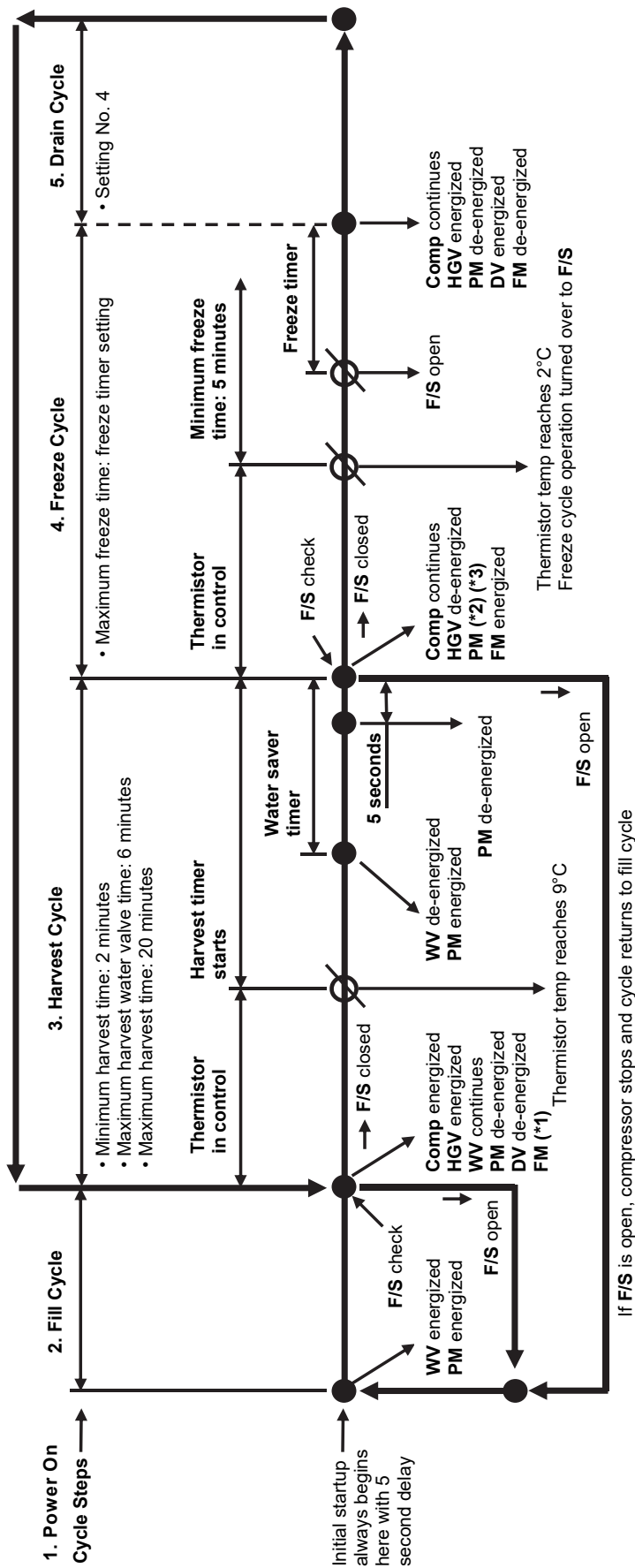


[h] ICEMAKING COMPARTMENT (KM-140C-HC)



2. SEQUENCE OF OPERATION

[a] BASIC CONTROL



Legend:
Comp-compressor
DV-drain valve
FM-fan motor
F/S-float switch
HGV-hot gas valve
PM-pump motor
WV-water valve

*1 Setting No. 18: In harvest cycle, FM energizes when FM operation temperature is reached.
*2 Setting No. 28: PM energizes after freeze cycle begins and PM de-energizing time has passed.
*3 Setting No. 12: PM energizes/de-energizes for slash ice control.

F/S open: No water in water tank
F/S closed: Water in water tank

1. Power On

When power is supplied, a 5 second delay occurs at startup. Then, the display shows “run”.

2. Fill Cycle

WV opens, PM energizes and the fill period begins. Every minute, the board checks for a closed F/S. If F/S is closed, PM de-energizes and the harvest cycle starts.

In the sanitation mode (Setting 53), the fill cycle is followed by the “Sanitation Control”.

3. Harvest Cycle

WV remains open, Comp energizes, HGV opens, and harvest begins. At the same time, the minimum harvest cycle timer (2 minutes) starts counting down. When the evaporator outlet temperature reaches 9°C, the harvest completion delay timer starts counting down. When the time is up, HGV and WV close and the freeze cycle starts. The harvest cycle continues for at least 2 minutes until the minimum harvest cycle timer finishes counting down.

In the water saver mode (Setting 5), WV closes and PM energizes when the water saver timer starts counting down. PM de-energizes 5 seconds before the timer finishes counting down. When the time is up, HGV closes and the freeze cycle starts.

If F/S is open (no water in tank) at the end of harvest cycle, the fill cycle starts.

In Setting 18, FM energizes when FM operation temperature is reached in the harvest cycle.

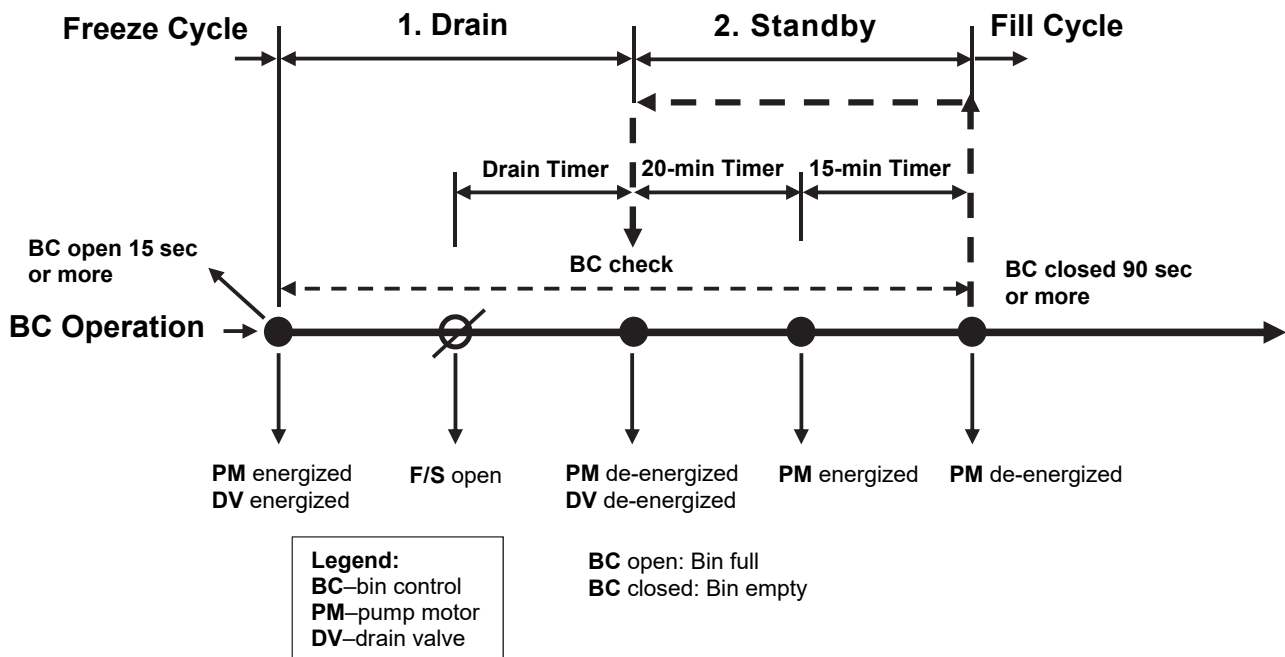
4. Freeze Cycle

Comp continues to run, FM and PM energize. When the evaporator outlet temperature goes down to 2°C, the minimum freeze cycle timer (5 minutes) starts counting down. When F/S opens (no water in tank), the float switch delay timer starts counting down. When the time is up, FM and PM de-energizes and the drain or harvest cycle starts. But the freeze cycle continues until the minimum freeze cycle timer (5 minutes) finishes counting down.

5. Drain Cycle

Comp continues to run and HGV opens. DV opens in 2 seconds and PM energizes to drain out the water tank. After the set time has passed since DV opened, WV opens. DV closes in 12 seconds and PM de-energizes to start the harvest cycle.

[b] BIN CONTROL



1. Drain Process

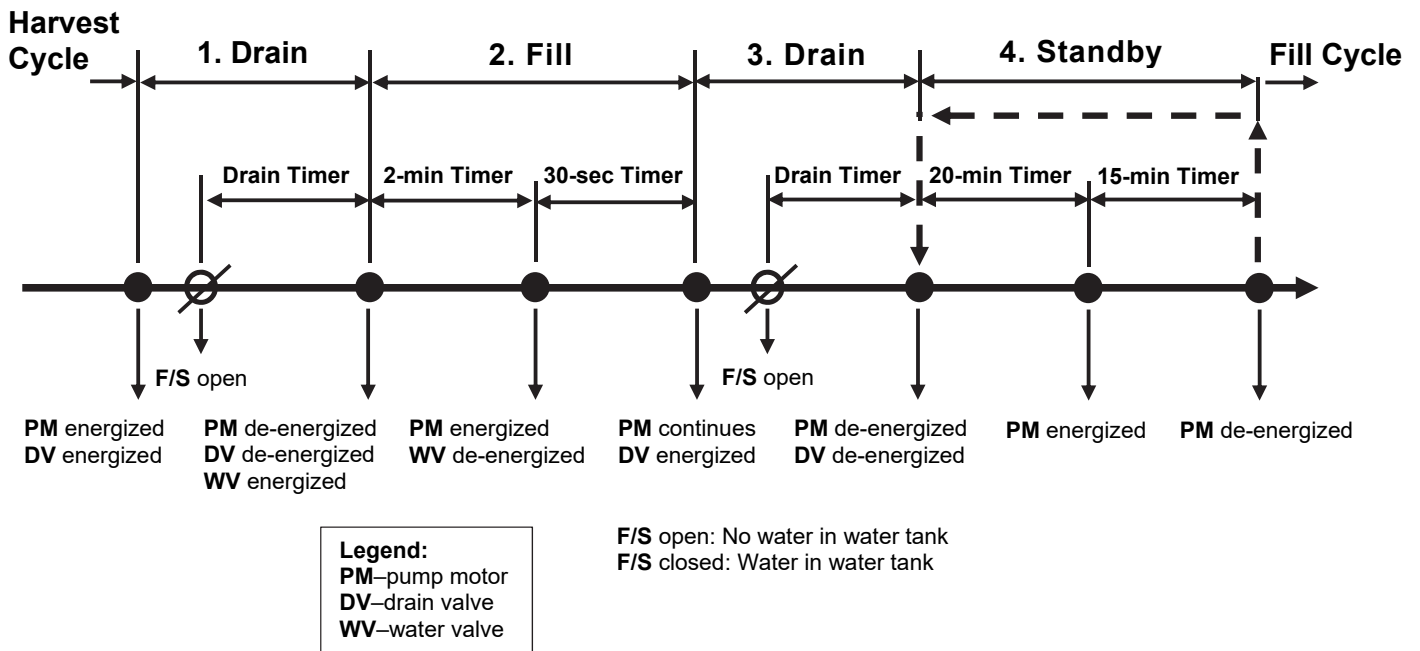
When BC stays open (bin full) for 15 seconds, the display shows “FUL” and every component de-energizes. DV opens in 2 seconds while PM energizes to drain the water tank. If F/S is open (no water in tank), the drain timer starts counting down. When the time is up, DV closes while PM de-energizes to start the standby process.

2. Standby Process

To prevent condensation of PM, the unit repeats de-energizing every component for 20 minutes and energizing PM for 15 minutes. When BC stays closed (bin empty) for 90 seconds, the fill cycle starts.

In the sanitation mode (Setting 53), the sanitation control starts in 4 hours after the beginning of bin control.

[c] HALT CONTROL



1. Drain Process

When the ON/OFF button is pressed, the display flashes “run”. After the end of harvest cycle, every component de-energizes. DV opens in 2 seconds while PM energizes to drain the water tank. If F/S is open (no water in tank), the drain timer starts counting down. When the time is up, DV closes while PM de-energizes to start the fill process.

2. Fill Process

WV opens and the 2-minute timer starts counting down. When the time is up, WV closes while PM energizes and the 30-second timer starts counting down. When the time is up, PM de-energizes to start the drain process.

3. Drain Process

DV opens in 2 seconds while PM energizes to drain the water tank. If F/S is open (no water in tank), the drain timer starts counting down. When the time is up, DV closes while PM and every component de-energize. The display shows “oFF”.

4. Standby Process

To prevent condensation of PM, the unit repeats de-energizing every component for 20 minutes and energizing PM for 15 minutes. When the ON/OFF button is pressed, the display shows “run” and the fill cycle starts.

* To shut down completely, unplug the unit or turn off the main power supply.

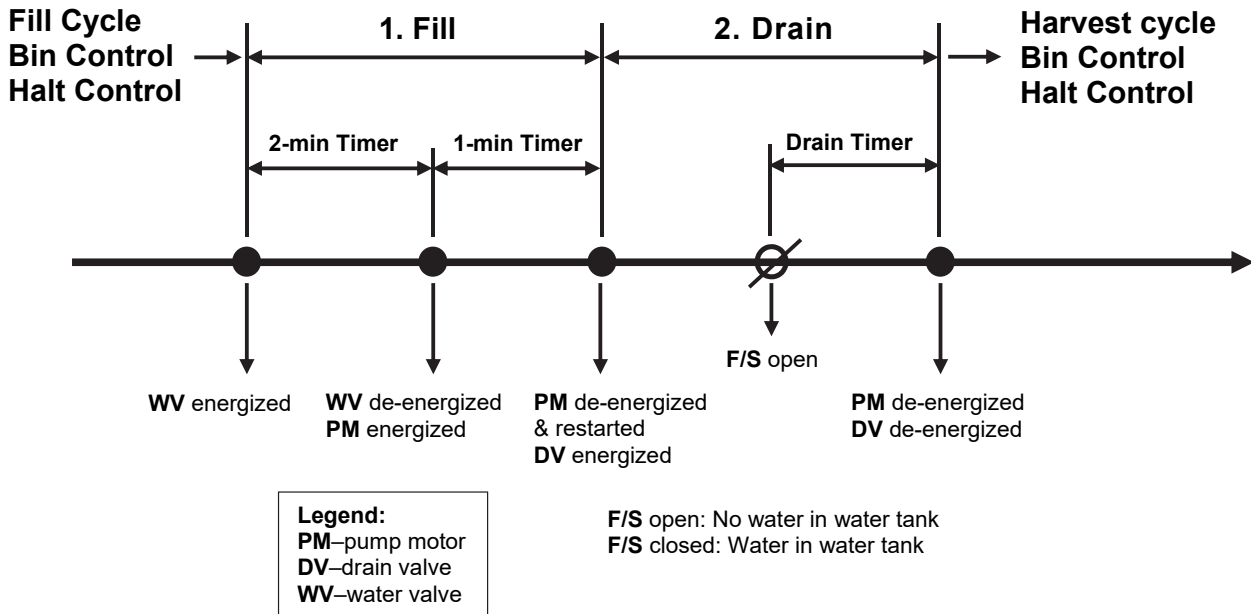
In sanitation mode (Setting 53), the sanitation control starts in 4 hours after the beginning of halt control.

[d] SANITATION CONTROL

The water circuit is periodically flushed with tap water to keep the circuit clean and sanitary for long hours of inactivity.

The sanitation control starts:

- in sanitation mode (Setting 53), after the fill cycle or in 4 hours after the beginning of bin control or halt control, or
- when the cleaning button is pressed in bin control or halt control.



1. Fill Process

WV opens and the 2-minute timer starts counting down. When the time is up, WV closes. Then, the 1-minute timer starts counting down and PM energizes to flush the water circuit with tap water. When the time is up, PM de-energizes.

2. Drain Process

DV opens in 2 seconds while PM energizes to drain the water tank. If F/S is open (no water in tank), the drain timer starts counting down. When the time is up, DV closes while PM and every component de-energize.

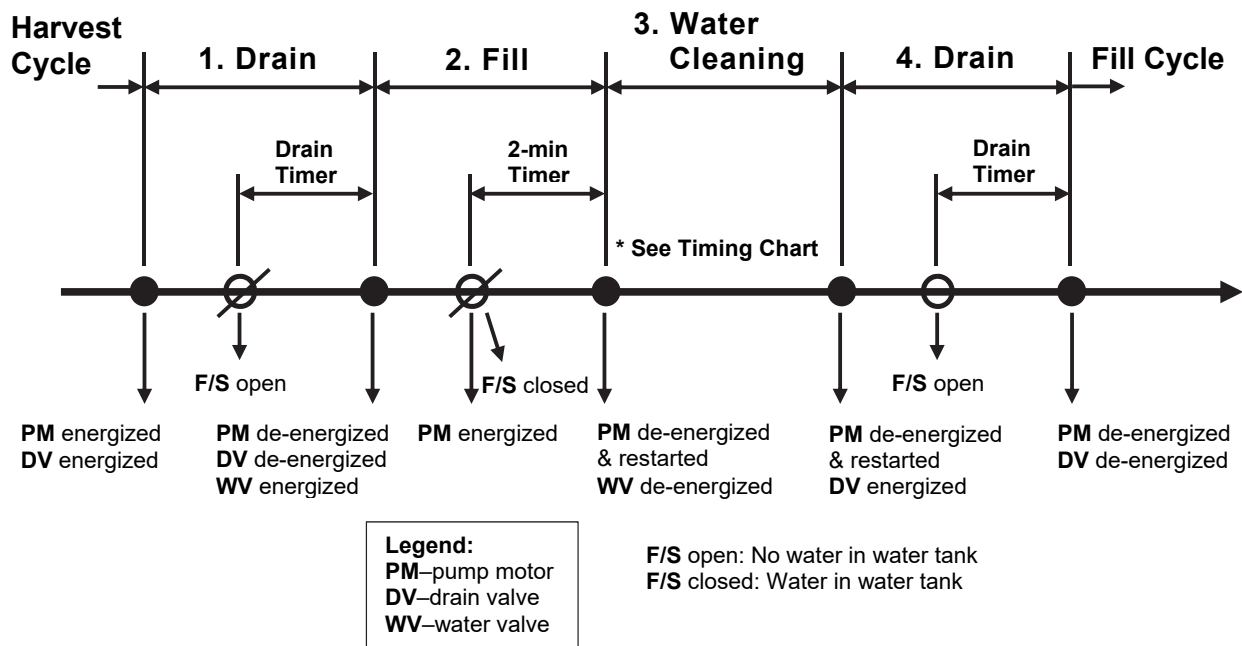
After the end of drain process, the original process is resumed.

[e] WATER CLEANING CONTROL

The water circuit is flushed with tap water at the set frequency, while adjusting the PM flow rate, to prevent scaling of the circuit.

The water cleaning control starts:

- automatically at the set frequency of water cleaning counter (Setting 44), or
- when the cleaning button is pressed other than in bin or halt control.



1. Drain Process

DV opens in 2 seconds while PM energizes to drain the water tank. If F/S is open (no water in tank), the drain timer starts counting down. When the time is up, DV closes while PM de-energizes.

2. Fill Process

WV opens. If F/S is closed (water in tank), the 2-minute timer starts counting down while PM energizes to supply water and flush the water circuit with tap water. When the time is up, WV closes and PM de-energizes.

3. Water Cleaning Process

PM energizes in 2 seconds to flush the water circuit with tap water by adjusting the rotation speed. Then, PM de-energizes.

10 seconds: A >> 5 seconds: D >> 10 seconds: A >> 5 seconds: D >> 10 seconds: A

4. Drain Process

DV opens in 2 seconds while PM energizes to drain the water tank. If F/S is open (no water in tank), the drain timer starts counting down. When the time is up, DV closes while PM de-energizes.

After the end of drain process, the original process is resumed.

[f] AUTOMATED CHEMICAL CLEANING CONTROL

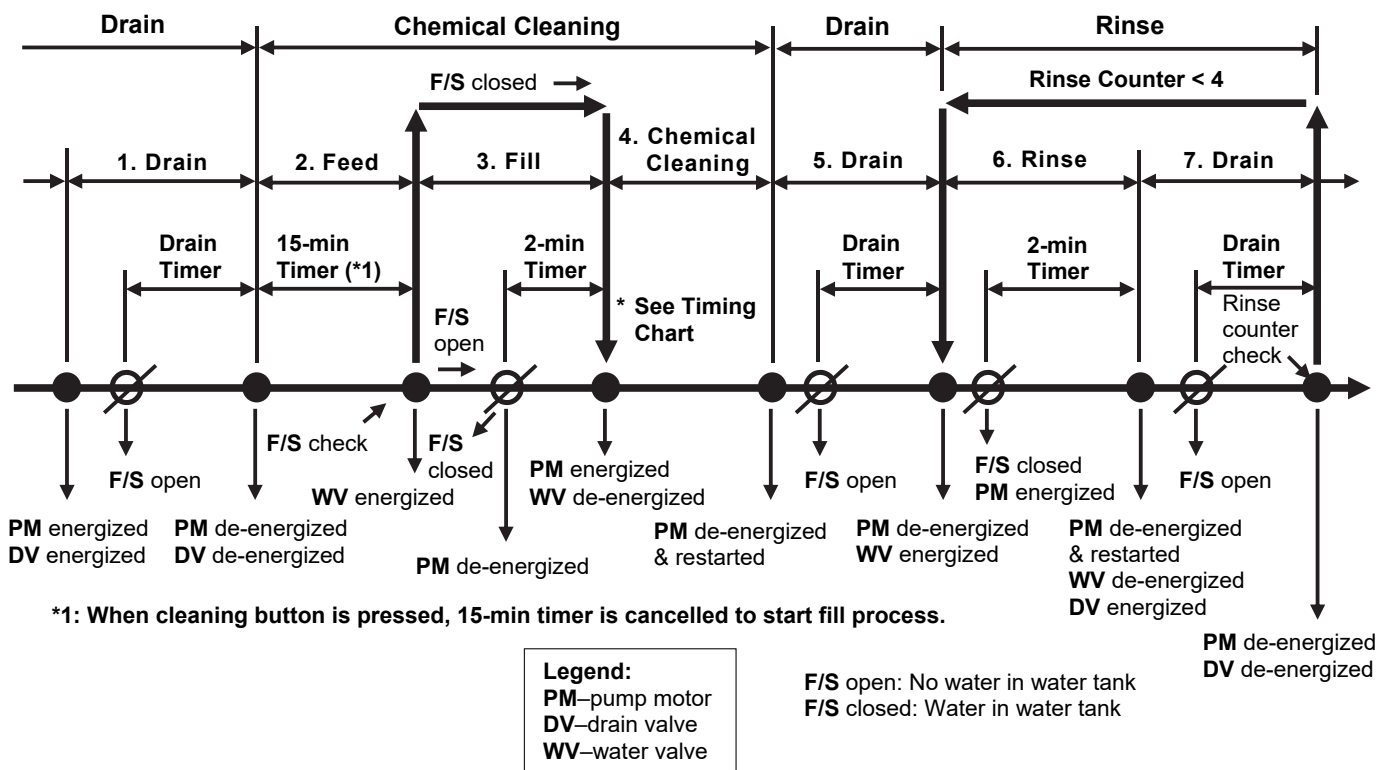
The water circuit is cleaned with chemical solution in the water tank, while adjusting the PM flow rate, to descale and sanitise the circuit.

The automated chemical cleaning control starts when the cleaning button is pressed and held for 3 seconds.

If the cleaning button is pressed:

- during the initial fill or harvest cycle, the cleaning control starts from the drain process after the initial fill or harvest cycle completes.
- during the icemaking operation, the cleaning control starts from the feed process after the icemaking operation stops and the harvest cycle completes.
- during other operation, the cleaning control starts from the feed process after each control completes.

Before pressing the cleaning button, remove all ice from the storage bin.



<Drain>

1. Drain Process

DV opens in 2 seconds while PM energizes to drain the water tank. If F/S is open (no water in tank), the drain timer starts counting down. When the time is up, DV closes while PM de-energizes.

<Chemical Cleaning>

2. Feed Process

When the display shows “cln”, the 15-minute timer starts counting down. Feed the water tank with chemical solution before the time is up. Then, wait until the timer expires or press the cleaning button.

3. Fill Process

PM energizes. In 3 seconds:

- if F/S is open (no water in tank), it is supposed that chemical solution has not been fed manually. Then, the fill process starts.
- if F/S is closed (water in tank), it is supposed that chemical solution has been fed manually. Then, the cleaning process starts.

WV opens. If F/S is closed (water in tank), PM de-energizes and the 2-minute timer starts counting down. When the time is up, WV closes.

4. Chemical Cleaning Process

PM energizes to clean the water circuit with chemical solution by adjusting the rotation speed. Then, PM de-energizes.

600 seconds: C >> 10 seconds: D >> 10 seconds: C >> 10 seconds: D >> 10 seconds: C

<Drain>

5. Drain Process

DV opens in 2 seconds while PM energizes to drain the water tank. If F/S is open (no water in tank), the drain timer starts counting down. When the time is up, DV closes while PM de-energizes.

<Rinse>

6. Rinse Process

WV opens. If F/S is closed (water in tank), the 2-minute timer starts counting down while PM energizes to supply water and rinse the water circuit with tap water. When the time is up, WV closes and PM de-energizes.

7. Drain Process

DV opens in 2 seconds while PM energizes to drain the water tank. If F/S is open (no water in tank), the drain timer starts counting down. When the time is up, DV closes while PM and every component de-energize. The rinse counter counts “+1”.

The above rinse and drain processes (6 and 7) are repeated until the rinse counter counts “+4”.

If the unit had been in the halt control before the automated chemical cleaning control started, the halt control is resumed from the standby process. Otherwise, the initial fill cycle starts.

[g] FULLY AUTOMATED CHEMICAL CLEANING CONTROL (OPTION)

When the fully automated cleaning kit (option) is installed, the water circuit is cleaned at the set frequency with chemical solution automatically provided to the water tank, while adjusting the PM flow rate, to descale the circuit.

The fully automated chemical cleaning control starts at the set frequency of fully automated chemical cleaning (Setting 50):

- after the end of harvest cycle for the icemaking operation in 5 hours after the number of freeze cycles reaches No. 50 setting, or
 - when 1 hour has passed in bin control or halt control started within 5 hours after the number of freeze cycles reaches No. 50 setting
- to avoid shortage of ice storage.

The fully automated chemical cleaning control also starts after the end of harvest cycle when “cln” is selected by the fully automated chemical cleaning mode (Setting 54).

<Cleaning>

1. Drain Process

DV opens in 2 seconds while PM energizes to drain the water tank. If F/S is open (no water in tank), the drain timer starts counting down. When the time is up, DV closes while PM de-energizes.

2. Fill Process

WV opens. If F/S is closed (water in tank), the 2-minute timer starts counting down while PM energizes to supply water and flush the water circuit with tap water. When the time is up, WV closes and PM de-energizes.

3. Water Cleaning Process

PM energizes in 2 seconds to flush the water circuit with tap water by adjusting the rotation speed. Then, PM de-energizes.

10 seconds: A >> 5 seconds: D >> 10 seconds: A >> 5 seconds: D >> 10 seconds: A

4. Drain Process

DV opens in 2 seconds while PM energizes to drain the water tank. If F/S is open (no water in tank), the drain timer starts counting down. When the time is up, DV closes while PM de-energizes.

<Pre-feed>

5. Fill Process

WV opens. If F/S is closed (water in tank), the 2-minute timer starts counting down while PM energizes. When the time is up, WV closes.

DV opens to adjust the tank water level for the duration set for each model. When the time is up, DV closes and PM de-energizes.

<Feed & Chemical Cleaning>

6. Feed Process

In 2 seconds, the 10-minute timer starts counting down. PM energizes while the feed timer starts counting down and TPM starts normal rotation. When the time (feed timer) is up, TPM de-energizes. When the time (10-minute timer) is up, PM de-energizes.

7. Chemical Cleaning Process

PM energizes to clean the water circuit with chemical solution by adjusting the rotation speed. Then, PM de-energizes.

10 seconds: D >> 10 seconds: C >> 10 seconds: D >> 10 seconds: C

<Rinse>

8. Drain Process

DV opens in 2 seconds while PM energizes to drain the water tank. If F/S is open (no water in tank), the drain timer starts counting down. When the time is up, DV closes while PM de-energizes.

9. Rinse Process

WV opens. If F/S is closed (water in tank), the 2-minute timer starts counting down while PM energizes to supply water and rinse the water circuit with tap water. When the time is up, WV closes and PM de-energizes.

10. Drain Process

DV opens in 2 seconds while PM energizes to drain the water tank. If F/S is open (no water in tank), the drain timer starts counting down. When the time is up, DV closes while PM de-energizes.

The above rinse and drain processes (9 and 10) are repeated 4 times.

<Flush>

11. Fill Process

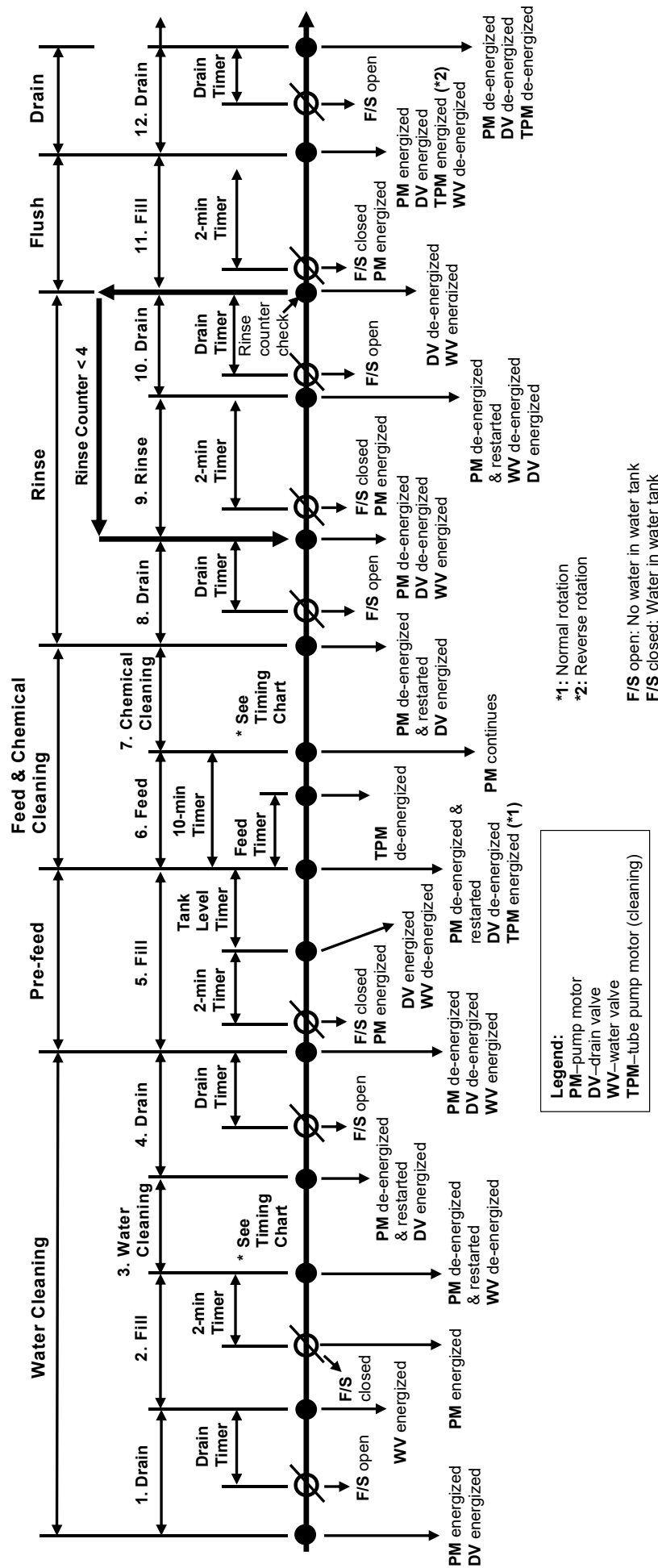
WV opens. If F/S is closed (water in tank), the 2-minute timer starts counting down while PM energizes. When the time is up, WV closes while PM de-energizes.

<Drain>

12. Drain Process

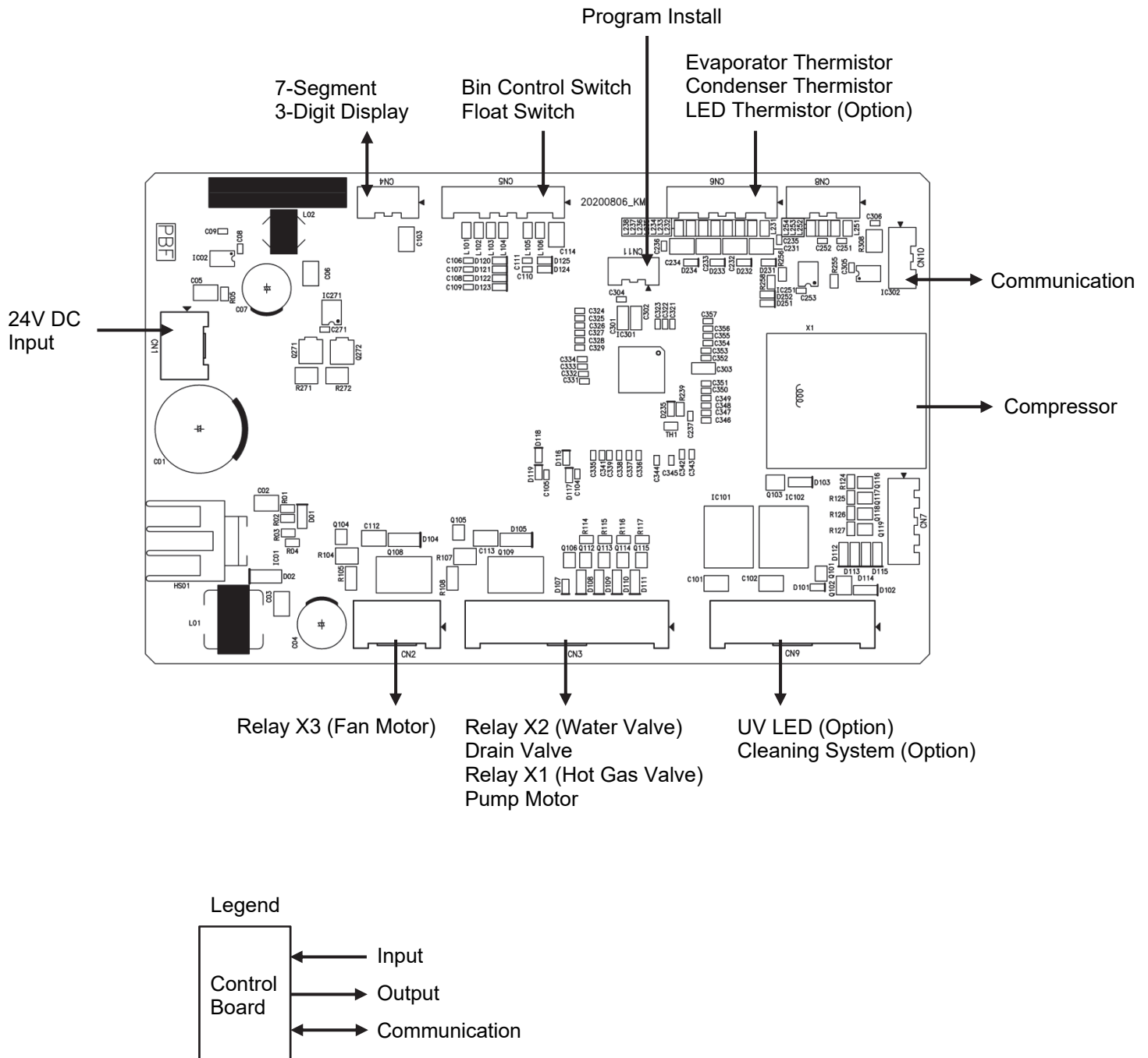
DV opens in 2 seconds while PM energizes and TPM starts reverse rotation to drain the water tank. If F/S is open (no water in tank), the drain timer starts counting down. When the time is up, DV closes while PM and TPM de-energize.

If the unit had been in the halt control or water cleaning control before the fully automated chemical cleaning control started, the halt control is resumed from the standby process. Otherwise, the initial fill cycle starts.

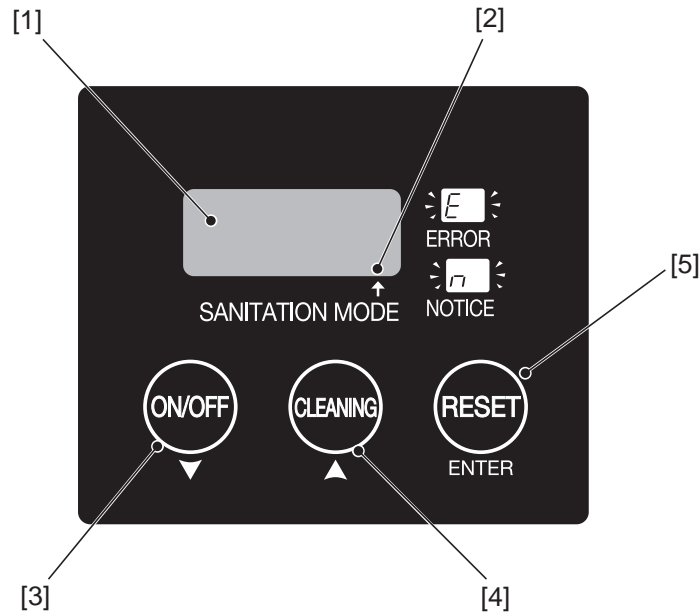


3. CONTROL BOARD

[a] INPUT/OUTPUT LAYOUT



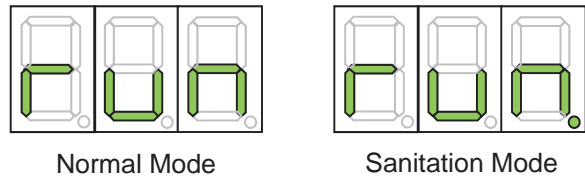
[b] SWITCH OPERATION



- [1] Display
 run: Icemaking
 oFF: Shut down
 FUL: Bin full
 cln: Cleaning

- [2] Dot
 Off: Normal mode
 On: Sanitation mode (*)

* After 4 continued hours of inactivity, the icemaker automatically cleans and refreshes the water circuit to prevent bacterial proliferation, keeping it clean and sanitary for longer periods of time.



- [3] ON/OFF Button / Down Button
- 1) When pressed while the display shows “run”, the display starts flashing “run” to prepare for shutdown. Then, the display shows “oFF” and the unit shuts down.
 - 2) When pressed while the display shows “oFF”, the display switches to “run” and the icemaking operation starts.
 - 3) When pressed while the display shows other than “run” or “oFF”, the display switches to “oFF” and the unit shuts down after finishing the ongoing process.
- [4] Cleaning Button / Up Button
- 1) When pressed during the icemaking operation or shutdown or with the storage bin full, the unit starts the water cleaning and then goes back to the original process.
 - 2) When pressed during cleaning, the cleaning process is cancelled.
 - 3) When pressed and held for 3 seconds, the unit starts the automated chemical cleaning.

[5] Reset Button / Enter Button

- 1) When pressed during the fully automated chemical cleaning, the unit starts the rinse process and finishes the fully automated chemical cleaning.
- 2) When pressed with an error code in the display, the unit determines whether to reset the error.
- 3) When pressed and held for 3 seconds, the user setting mode starts.

* See "[d] USER SETTINGS" for details.

[c] MODEL CODE SETTING

When the power is supplied, the 7-segment display shows "000" if no model code has been set.

To set the model code:

- press the down (ON/OFF) button to change from "__ 0" to "__ 13", "__ 12", "__ 11", or
- press the up (cleaning) button to change from "__ 0" to "__ 1", "__ 2", "__ 3".

To finish the setting:

- press the enter (reset) button.

To check and adjust the setting:

- see "[e] SERVICE MODE" and use the setting code "Cod".

* For the software version 1.1.0 or later, the model code setting can be reset by selecting "__ 0".

[d] USER SETTINGS

The settings listed below are adjustable by the user.

- 1) Press and hold the reset button for 3 seconds to enter the user setting mode. The display shows one of the setting codes.
- 2) Use the up or down button until the display shows the desired setting code. Then, press the enter button.
- 3) Use the up or down button to adjust the setting. Then, press the enter button.
- 4) After finishing the settings, use the up or down button until the display shows "END". Then, press the enter button to exit the user setting mode.

Code	Item	Description	Max.	Min.	Step
U.04	Drain frequency	0: No drain 1: Every 1 cycle 2: Every 2 cycles 5: Every 5 cycles 10: Every 10 cycles 20: Every 20 cycles	20	0	—

Code	Item	Description	Max.	Min.	Step
U.44	Automatic water cleaning frequency	0: No automatic water cleaning 5: Every 5 cycles 10: Every 10 cycles 15: Every 15 cycles 20: Every 20 cycles 40: Every 40 cycles 60: Every 60 cycles	60	0	–
U.49	Number of chemical doses	When chemical doses reach set number of times, notice code "n93" appears to show no chemical is left.	20 times	3 times	1 time
U.50	Fully automated chemical cleaning frequency	Start fully automated chemical cleaning at set frequency. e.g. 40 = 400 cycles	1000 cycles	400 cycles	100 cycles
U.51	UV-LED irradiation time	Irradiate UV-LED for set period of time. None or adjustable from 10 to 30 minutes (in 1-minute steps)	30 min	0 min	1 min
U.52	UV-LED irradiation frequency	Irradiate UV-LED in freeze cycle after set period of time.	300 min	30 min	10 min
U.53	Operation mode	nor: Normal mode cln: Sanitation mode	nor	cln	–
U.54	Fully automated chemical cleaning mode	When Setting 45 is set to "1" and "cln" (sanitation mode) is selected, unit runs one cycle of fully automated chemical cleaning.	–	cln	–
U.55	Reset number of chemical doses	When "res" is selected, number of chemical doses set by U.49 is reset.	–	res	–
U.56	Reset settings	Reset all user settings to default.	–	dEF	–
U.58	Forced shut down	Shut down unit under any conditions. Display shows "oFF".	–	stp	–
U.59	Forced drain	When "drn" is selected, unit de-energizes every component, drain ("drn"), and shuts down ("oFF"). If reset button is pressed during drain cycle, unit shuts down.	–	drn	–
U.60	Notice (e.g. maintenance)	Notice code "n99" appears after set period of time.	6000 hrs	0 hrs (none)	100 hrs
U.68	Reset notice	Reset counting for notice U.60. e.g. 100 hours >> res >> 0 hr	–	res	–

[e] SERVICE MODE

The settings listed below are monitored and adjusted by service personnel.

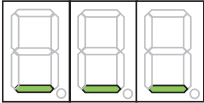
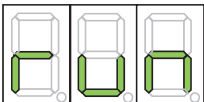
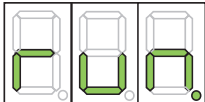
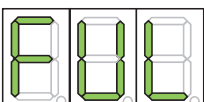
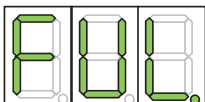
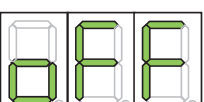
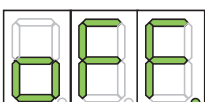



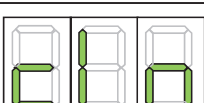
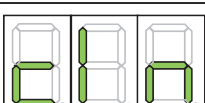
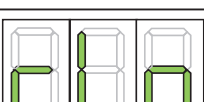
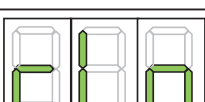
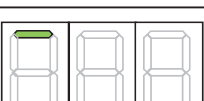
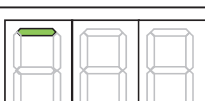
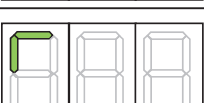
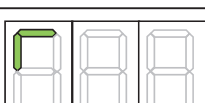
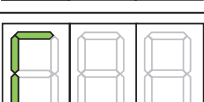
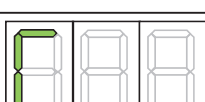
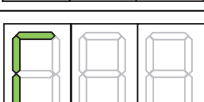



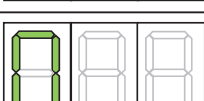
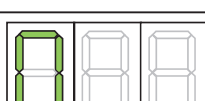
- 1) Press and hold the reset button and press the cleaning button three times to enter the service mode. The display shows one of the setting codes.
- 2) Use the up or down button until the display shows the desired setting code. Then, press the enter button.
- 3) Use the up or down button to adjust the setting. Then, press the enter button.
- 4) After finishing the settings, use the up or down button until the display shows "END". Then, press the enter button to exit the service mode.

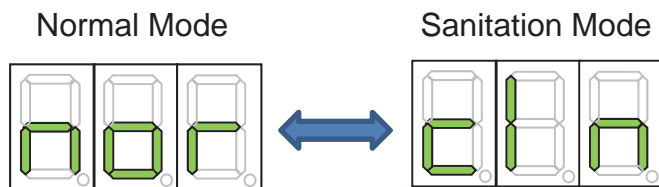
Code	Item	Description	Max.	Min.	Step
1	Harvest completion delay timer	Time since evaporator thermistor reads 9°C (control board setting) until harvest cycle ends.	210 sec	0 sec	10 sec
5	Water saver	Time to de-energize water valve and energize pump motor before the end of harvest cycle. Cannot be set to 5 seconds. 0 >> 10 >> 15 >> 20...	60 sec	0 sec	5 sec
6	Freeze backup timer	If freeze cycle does not end within the set time, unit shuts down with error.	120 min	50 min	10 min
8	Slap control 1	If bin control trips in freeze cycle, harvest cycle begins when minimum freeze cycle time is up. If bin control trips in the last 10 seconds of harvest cycle, harvest cycle is extended for 30 seconds, which repeats every time bin control trips.	ON	OFF	–
9	Thermistor temperature control 1	If evaporator outlet temperature differs by 4°C or more before and after water saver, harvest cycle is extended for 30 seconds.	ON	OFF	–
10	Thermistor temperature control 2	If evaporator outlet temperature differs by 2°C or more but less than 3.5°C within 30 seconds of freeze cycle, next harvest cycle is extended for 30 seconds. If evaporator outlet temperature differs by 3.5°C or more within 30 seconds of freeze cycle, harvest cycle begins when minimum freeze cycle time is up.	ON	OFF	–
11	Thermistor temperature control 3	If evaporator outlet temperature differs by more than 3.5°C but 5°C or less just before the end of harvest cycle, harvest cycle is extended for 50 seconds. If evaporator outlet temperature differs by 3.5°C or less, another harvest cycle begins, which repeats not more than three times. Freeze cycle begins even if evaporator outlet temperature differs by 3.5°C or less at the end of the third harvest cycle.	ON	OFF	–

Code	Item	Description	Max.	Min.	Step
12	Slush ice control	0: No control 1: If evaporator thermistor reads 5°C or less, pump motor de-energizes for 10 seconds. 2: If evaporator thermistor reads 10°C or less, pump motor repeats de-energizing for 10 seconds and energizing for 50 seconds. If evaporator thermistor reads 1°C, pump motor de-energizes for 10 seconds, energizes for 50 seconds, and de-energizes for 10 seconds.	2	0	–
13	High/low temperature reading	High temperature harvest mode if control board thermistor reads set point or higher temperature. Low temperature harvest mode if control board thermistor reads lower than set point temperature.	60°C	5°C	1°C
14	High temperature/minimum harvest time	Minimum harvest cycle time for high temperature harvest mode.	150 sec	90 sec	5 sec
15	Low temperature/minimum harvest time	Minimum harvest cycle time for low temperature harvest mode.	240 sec	120 sec	5 sec
16	Harvest completion temperature	Temperature to start harvest completion delay timer. Harvest cycle ends when time is up.	12°C	6°C	0.5°C
17	Slap control 2	If bin control never trips (no ice hits detector) during harvest cycle, another harvest cycle begins, which repeats not more than three times. Freeze cycle begins even if bin control does not trip during the third harvest cycle.	ON	OFF	–
18	Harvest cycle fan motor operation	To reduce load in harvest cycle, fan motor energizes if control board thermistor reads set point or higher temperature.	70°C	30°C	1°C
35	Float switch delay timer (end of freeze cycle)	Delay time since float switch closes at lower float level until freeze cycle ends.	250 sec	5 sec	5 sec
42	Condenser thermistor high temperature reading	Unit shuts down if condenser thermistor reads set point or higher temperature. Automatically reset.	90°C	40°C	2°C
43	High temperature display	To encourage user to clean air filter, display flashes "n92" if control board thermistor reads set point or higher temperature. Display goes off if thermistor reads lower than set point temperature.	80°C	40°C	1°C
45	Fully automated cleaning kit detection	0: Kit not provided 1: Kit provided	1	0	–
49	Number of chemical doses	When chemical doses reach set number of times, notice code "n93" appears to show no chemical is left.	15 times	3 times	1 time
56	Reset settings	Reset all user settings to default.	–	dEF	–

Code	Item	Description	Max.	Min.	Step
58	Forced shut down	Shut down unit under any conditions. Display shows "oFF".	–	stp	–
59	Forced drain	When "drn" is selected, unit de-energizes every component, drains ("drn"), and shuts down ("oFF"). If reset button is pressed during drain cycle, unit shuts down.	–	drn	–
60	Notice (e.g. maintenance)	Notice code "n99" appears after set period of time.	6000 hrs	0 hrs (none)	100 hrs
64	Compressor run time reset	Reset compressor run time counting (maintenance mode).	–	res	–
65	LED run time reset	Reset LED run time counting (maintenance mode).	–	res	–
66	Number of chemical doses reset	Reset number of chemical doses for fully automated cleaning kit (maintenance mode).	–	res	–
67	Auto-reset error check	When "err" is selected, display shows ongoing auto-reset errors.	–	err	–
69	Low water shut down	If low water is detected in fill cycle, unit shuts down for water leak error.	ON	OFF	–
Err	Error history	Show last ten errors.	–	res	–
Fre	Freeze cycle time	Show freeze cycle time (min) for last ten cycles.	–	res	–
HAr	Harvest cycle time	Show harvest cycle time (min) for last ten cycles.	–	res	–
EVA	Evaporator outlet temperature	Show evaporator outlet thermistor temperature.	–	res	–
Con	Condenser temperature	Show condenser outlet thermistor temperature.	–	res	–
FCt	Number of freeze cycles	Show number of freeze cycles.	–	res	–
ut	UV-LED irradiation time	Show UV-LED irradiation time.	–	res	–
Sct	Total number of chemical doses	Show total number of chemical doses for fully automated cleaning kit.	–	res	–
CCt	Compressor run time	Show compressor run time (hrs).	–	res	–
VEr	Software version	Show software version.	–	res	–
Cod	Model code change	Change model code.	–	res	–

[f] 7-SEGMENT DISPLAY

		Normal Mode	Sanitation Mode
Mode Change			
Icemaking	run		
Bin Full	FUL		
Shut Down	oFF		
Water Cleaning	cln		
Automated Chemical Cleaning	Chemical Cleaning		
	Rinse		
	Drain		
Fully Automated Chemical Cleaning	Water Cleaning		
	Pre-feed		
	Feed & Chemical Cleaning		
	Rinse		
	Flush		
	Drain		



[g] ERROR CODES

Shut down

The display flashes an error code (e.g. “E40” >> blank >> “E40” >> blank >> ...), and the unit shuts down. This will repeat even if the main power supply is turned off and back on.

Press the reset button to restart the unit. The operation resumes from “Power On” except that it resumes from “Rinse Process” for an error under the fully automated chemical cleaning control (see “II. 2. SEQUENCE OF OPERATION”).

The control board and setting errors cannot be reset.

The E65, E66, E81 and E91 errors are reset when their auto-reset conditions are met. The display flashes the error code and shows “run” again when the unit resumes operation.

Auto-reset

The E46 and E69 errors are automatically reset.

The unit continues operation with the dot illuminated at the center of the display. The dot goes off when the main power supply is turned off and back on.

Notice

The n32, n33, n70, n92, n93 and n99 notices are flashed in the display alternately with the current operating condition while the unit keeps running [for n70, with the dot illuminated at the center of the display] (e.g. “run” >> blank >> “n92” >> blank >> “run” >> blank >> “n92” >> blank >> ...). The notices are reset when their resetting conditions are met or the main power supply is turned off and back on.

Error log

The E90 error is logged only while the unit keeps running.

Error history

A maximum of ten errors are stored in the error history. When the eleventh error occurs, the first error is deleted. Any repeating errors are skipped.

The display shows the error history from the latest to the oldest for 1 second each after going off for 0.5 seconds and finally shows “run”.

e.g. When three errors are stored in the error history:

“E40” >> blank >> “E61” >> blank > “E64” >> blank >> “run”

Deleting error history

Press and hold the ON/OFF button for 3 seconds while the error history is displayed.

Error Codes

Code	Item	Description	Operation	Reset
E31	LED thermistor error	LED thermistor circuit is open.	Shut down	Press reset button
E40	Setting error	Control board memory or setting error is detected.	Shut down	Replace control board
E41	EEPROM error	IC storing model code setting data is defective.	Shut down	Replace control board
E46	High pressure error	Pressure switch turns on.	Halt	Pressure switch turns off
E60	Freeze error	Freeze backup timer runs two times in a row.	Shut down	Press reset button
E61	Harvest error	Harvest backup timer runs for 20 minutes two times in a row.	Shut down	Press reset button
E64	High temperature error 1	Evaporator thermistor reads 53°C or more for 2 seconds.	Shut down	Press reset button
E65	Fan lock	Fan motor RPM is kept at 0 for 30 seconds.	Halt	Automatically reset in 10 minutes (fill cycle begins)
E66	Pump lock	In freeze cycle, pump motor RPM is kept at 0 for 30 seconds under control voltage.	Halt	Automatically reset in 10 minutes (fill cycle begins)
E67	Condenser thermistor error	Condenser thermistor circuit is open or shorted for 2 seconds.	Shut down	Replace thermistor
E69	Water regulator error (water-cooled model only)	Condenser thermistor reads set point or higher temperature at the end of freeze cycle.	Halt	Automatically reset in 10 minutes (fill cycle begins)
E71	Low water	With Setting 69 ON, float switch fails to close at lower float level four times in a row when checked every minute in fill cycle.	Shut down	Press reset button
E73	Evaporator thermistor error	Evaporator thermistor circuit is open or shorted for 2 seconds.	Shut down	Replace thermistor
E79	Control board thermistor error	Control board thermistor circuit is open or shorted for 2 seconds.	Shut down	Replace thermistor
E81	Condenser thermistor high temperature error	Condenser thermistor reads higher than set point temperature for 2 seconds.	Halt	Automatically reset in 5 minutes or at 50°C or less
E82	Icemaking water thermistor (not provided) error	Icemaking water thermistor circuit is open or shorted for 2 seconds.	Shut down	Replace thermistor
E90	Low/falling water error	Freeze cycle ends within 15 minutes two times in a row due to low water, falling water, multiple icemaking or water leaks.	Error log	
E91	Low temperature error	Evaporator thermistor reads -30°C or less for 10 seconds due to low water or multiple icemaking.	Halt	Automatically reset in 10 minutes (fill cycle begins)
E98	Fully automated cleaning error	Rinse process never ends in fully automated chemical cleaning.	Shut down	Press reset button

Code	Item	Description	Operation	Reset
n32	LED error	LED temperature fails to rise or LED has reached 10000 hours of its lifetime.	Continue	Replace LED
n33	Fully automated cleaning error	Water circuit fails to flush properly.	Continue	Turn off power supply
n70	Low water	Float switch fails to close at lower float level four times in a row when checked every minute in fill cycle.	Halt	Automatically reset in 10 minutes (fill cycle begins)
n92	High temperature error 2	Control board thermistor reads set point or higher temperature for 10 seconds.	Continue	Read set point - 2°C for 10 seconds
n93	Empty chemical pack	Fully automated chemical cleaning is repeated more than set number of times.	Continue	Replace chemical pack and press reset button
n99	Maintenance	Time for maintenance.	Continue	Press reset button

Service Diagnosis

Code	Check	Possible Cause	Remedy
E31	LED thermistor	Open circuit	Replace
		Short circuit	Replace
		Connector disconnected	Reconnect
E40	Control board	EEPROM defective	Replace
E41	Control board	EEPROM defective	Replace
E46	Fan motor	Locked	Replace
		Broken fan	Replace fan
	Fan motor relay	Coil circuit open	Replace
	Water regulator (water-cooled model only)	Low water	Check water tap
	Hot gas valve	Opening failure	Replace coil or valve
E60	Hot gas valve relay	Coil circuit open	Replace
	Water valve	Closing failure	Clean or replace
		Bad contacts	Replace
	Refrigeration circuit	Gas leak	Repair
		Clogged capillary	Replace
		Clogged expansion valve	Replace
	Compressor	Defective	Replace
		Starting failure	Check supply voltage or replace electrical components
	Compressor relay	Coil circuit open	Replace control board
	Condenser	Clogged	Clean
	Fan motor	Locked	Replace
		Broken fan	Replace fan
	Fan motor relay	Coil circuit open	Replace
	Hot gas valve	Closing failure	Replace
	Hot gas valve relay	Bad contacts	Replace
	Evaporator thermistor	Disconnected	Reconnect

Code	Check	Possible Cause	Remedy
E61	Hot gas valve	Opening failure	Replace coil or valve
	Hot gas valve relay	Coil circuit open	Replace
	Water valve	Opening failure	Clean or replace
	Water valve relay	Coil circuit open	Replace
	Pump motor	Locked	Replace
		Low RPM	Replace motor or control board
E64	Hot gas valve	Closing failure	Replace
	Hot gas valve relay	Bad contacts	Replace
E65	Fan motor	Locked	Replace
		Starting failure	Replace control board
E66	Pump motor	Locked	Replace
		Starting failure	Replace control board
E67	Condenser thermistor	Open circuit	Replace
		Short circuit	Replace
		Connector disconnected	Reconnect
E69	Water regulator (water-cooled model only)	Low flow rate	Adjust
	Water-cooled condenser (water-cooled model only)	Scaled up	Clean
	Control board setting	Wrong model code setting	Correct
E71	Water circuit	Low water	Check water tap
		Low water pressure	Adjust
	Water valve	Closing failure	Clean or replace
	Water valve relay	Bad contacts	Replace
	Water tank	Disconnected	Reconnect
E73	Evaporator thermistor	Open circuit	Replace
		Short circuit	Replace
		Connector disconnected	Reconnect
E79	Control board thermistor	Open circuit	Replace
		Short circuit	Replace
E81	Condenser thermistor	Open circuit	Replace
		Short circuit	Replace
		Connector disconnected	Reconnect
E82	Icemaking water thermistor (not provided)	Open circuit	Replace
		Short circuit	Replace
		Connector disconnected	Reconnect
E90	Water circuit	Low water	Check water tap
		Low water pressure	Adjust
	Water valve	Clogged filter	Clean
	Water tank	Disconnected	Reconnect
		Broken	Replace
	Separator	Disconnected	Reconnect
		Broken	Replace
	Pump motor discharge hose	Disconnected	Reconnect
	Spray tube	Disconnected	Reconnect
	Drain valve	Closing failure	Replace

Code	Check	Possible Cause	Remedy
E91	Pump motor	Locked	Replace
	Pump motor discharge hose	Disconnected	Reconnect
	Hot gas valve	Closing failure	Replace
	Hot gas valve relay	Bad contacts	Replace
E98 (*)	Drain valve	Opening failure	Replace
	Pump motor	Locked	Replace
		Low RPM	Replace motor or control board
	Float switch	Float sticking	Descal
		Bad contacts	Replace
	Water valve	Opening failure	Clean or replace
	Water valve relay	Coil circuit open	Replace
n32	LED	Irradiation failure	Replace
n33	Tube pump motor	Broken	Replace
	Fully automated cleaning hose	Disconnected	Reconnect
n70	Water circuit	Low water	Check water tap
		Low water pressure	Adjust
	Water valve	Closing failure	Clean or replace
	Water valve relay	Bad contacts	Replace
	Water tank	Disconnected	Reconnect
		Broken	Replace
	Float switch	Float sticking	Descal
		Bad contacts	Replace
n92	Air filter	Clogged	Clean
	Fan motor	Locked	Replace
		Broken fan	Replace fan
	Fan motor relay	Coil circuit open	Replace
n93	Chemical pack	Set number of times exceeded	Replace
n99	Control board	Set time exceeded	Press reset button after maintenance
		Starting failure	Replace control board

* After the rinse process starts and the display shows “cln”, wait about 20 minutes for the process to complete. If the power supply is turned off and on during the rinse process, the process restarts from the beginning and takes about another 20 minutes to complete. If the rinse process does not complete in about 25 minutes, the display flashes “E98” again.

[h] SETTINGS FOR EACH MODEL

Note: When a model code is reset, all codes go back to default.

Additional settings are required for:

- fully automated cleaning model (-W) or fully automated cleaning kit (ACK): setting code "45"
- UV-LED model (-U) or UV-LED optional kit: setting code "51"

Model code			
3	7	11	15
KM-40C-HC	KM-60C-HC	KM-80C-HC	KM-140C-HC

Code	Item	Description	KM-40C-HC	KM-60C-HC	KM-80C-HC	KM-140C-HC
1	Harvest completion delay timer	Time since evaporator thermistor reads 9°C (control board setting) until harvest cycle ends.	50	60	50	60
4	Drain frequency	0: No drain 1: Every 1 cycle 2: Every 2 cycles 5: Every 5 cycles 10: Every 10 cycles 20: Every 20 cycles	10	10	10	10
5	Water saver	Time to de-energize water valve and energize pump motor before the end of harvest cycle. Cannot be set to 5 seconds. 0 >> 10 >> 15 >> 20...	30	45	30	40
6	Freeze backup timer	If freeze cycle does not end within the set time, unit shuts down with error.	60	70	60	60
8	Slap control 1	If bin control trips in freeze cycle, harvest cycle begins when minimum freeze cycle time is up. If bin control trips in the last 10 seconds of harvest cycle, harvest cycle is extended for 30 seconds, which repeats every time bin control trips.	0	0	0	0
9	Thermistor temperature control 1	If evaporator outlet temperature differs by 4°C or more before and after water saver, harvest cycle is extended for 30 seconds.	0	0	0	0
10	Thermistor temperature control 2	If evaporator outlet temperature differs by 2°C or more but less than 3.5°C within 30 seconds of freeze cycle, next harvest cycle is extended for 30 seconds. If evaporator outlet temperature differs by 3.5°C or more within 30 seconds of freeze cycle, harvest cycle begins when minimum freeze cycle time is up.	0	0	0	0

Code	Item	Description	KM-40C-HC	KM-60C-HC	KM-80C-HC	KM-140C-HC
11	Thermistor temperature control 3	If evaporator outlet temperature differs by more than 3.5°C but 5°C or less just before the end of harvest cycle, harvest cycle is extended for 50 seconds. If evaporator outlet temperature differs by 3.5°C or less, another harvest cycle begins, which repeats not more than three times. Freeze cycle begins even if evaporator outlet temperature differs by 3.5°C or less at the end of the third harvest cycle.	0	0	0	0
12	Slush ice control	0: No control 1: If evaporator thermistor reads 5°C or less, pump motor de-energizes for 10 seconds. 2: If evaporator thermistor reads 10°C or less, pump motor repeats de-energizing for 10 seconds and energizing for 50 seconds. If evaporator thermistor reads 1°C, pump motor de-energizes for 10 seconds, energizes for 50 seconds, and de-energizes for 10 seconds.	2	2	2	2
13	High/low temperature reading	High temperature harvest mode if control board thermistor reads set point or higher temperature. Low temperature harvest mode if control board thermistor reads lower than set point temperature.	25	25	25	30
14	High temperature/minimum harvest time	Minimum harvest cycle time for high temperature harvest mode.	120	120	120	120
15	Low temperature/minimum harvest time	Minimum harvest cycle time for low temperature harvest mode.	150	150	150	150
16	Harvest completion temperature	Temperature to start harvest completion delay timer. Harvest cycle ends when time is up.	9	9	9	9
17	Slap control 2	If bin control never trips (no ice hits detector) during harvest cycle, another harvest cycle begins, which repeats not more than three times. Freeze cycle begins even if bin control does not trip during the third harvest cycle.	0	0	0	0
18	Harvest cycle fan motor operation	To reduce load in harvest cycle, fan motor energizes if control board thermistor reads set point or higher temperature.	38	33	33	47

Code	Item	Description	KM-40C-HC	KM-60C-HC	KM-80C-HC	KM-140C-HC
35	Float switch delay timer (end of freeze cycle)	Delay time since float switch closes at lower float level until freeze cycle ends.	110	190	5	30
42	Condenser thermistor high temperature reading	Unit shuts down if condenser thermistor reads set point or higher temperature. Automatically reset.	—	—	62	62
43	High temperature display	To encourage user to clean air filter, display flashes "n92" if control board thermistor reads set point or higher temperature. Display goes off if thermistor reads lower than set point temperature.	65	65	65	65
44	Automatic water cleaning frequency	0: No automatic water cleaning 5: Every 5 cycles 10: Every 10 cycles 15: Every 15 cycles 20: Every 20 cycles 40: Every 40 cycles 60: Every 60 cycles	20	20	20	20
45	Fully automated cleaning kit detection	0: Kit not provided 1: Kit provided	0	0	0	0
49	Number of chemical doses	When chemical doses reach set number of times, notice code "n93" appears to show no chemical is left.	15	13	12	16
50	Fully automated chemical cleaning frequency	Start fully automated chemical cleaning at set frequency. e.g. 40 = 400 cycles	400	400	400	400
51	UV-LED irradiation time	Irradiate UV-LED for set period of time. None or adjustable from 10 to 30 minutes (in 1-minute steps)	0	0	0	0
52	UV-LED irradiation frequency	Irradiate UV-LED in freeze cycle after set period of time.	120	120	120	120
53	Operation mode	nor: Normal mode cln: Sanitation mode	nor	nor	nor	nor
54	Fully automated chemical cleaning mode	When Setting 45 is set to "1" and "cln" (sanitation mode) is selected, unit runs one cycle of fully automated chemical cleaning.	—	—	—	—
55	Reset number of chemical doses	When "res" is selected, number of chemical doses set by U.49 is reset.	—	—	—	—
56	Reset settings	Reset all user settings to default.	—	—	—	—

Code	Item	Description	KM-40C-HC	KM-60C-HC	KM-80C-HC	KM-140C-HC
58	Forced shut down	Shut down unit under any conditions. Display shows "oFF".	—	—	—	—
59	Forced drain	When "drn" is selected, unit de-energizes every component, drain ("drn"), and shuts down ("oFF"). If reset button is pressed during drain cycle, unit shuts down.	—	—	—	—
60	Notice (e.g. maintenance)	Notice code "n99" appears after set period of time.	0	0	0	0
64	Compressor run time reset	Reset compressor run time counting (maintenance mode).	—	—	—	—
65	LED run time reset	Reset LED run time counting (maintenance mode).	—	—	—	—
66	Number of chemical doses reset	Reset number of chemical doses for fully automated cleaning kit (maintenance mode).	—	—	—	—
67	Auto-reset error check	When "err" is selected, display shows ongoing auto-reset errors.	—	—	—	—
68	Reset notice	Reset counting for notice U.60. e.g. 100 hours >> res >> 0 hr	—	—	—	—
69	Low water shut down	If low water is detected in fill cycle, unit shuts down for water leak error.	0	0	0	0

4. THERMISTOR

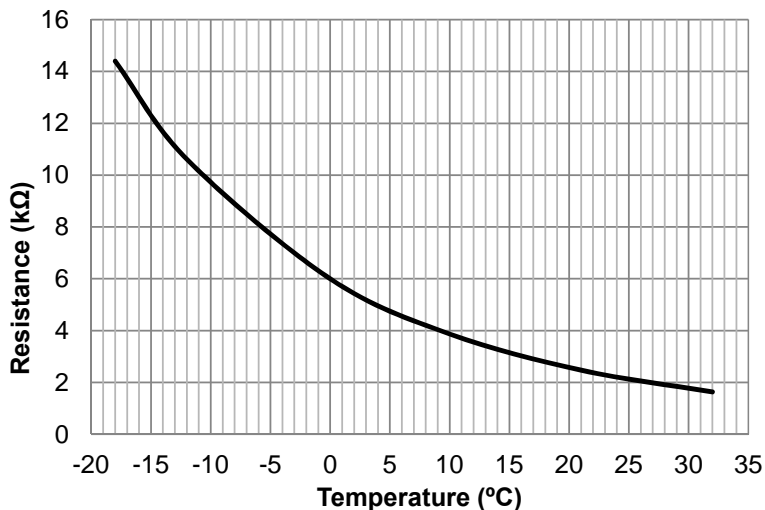
A thermistor (semiconductor) is used as a harvest control sensor and anti-slush sensor. The resistance varies depending on the suction line temperatures.

During the harvest cycle, the thermistor detects the evaporator outlet temperature and starts the harvest completion delay timer (Setting 1: 0 to 210 seconds) when the temperature reaches the harvest completion temperature (Setting 16: 6 to 12°C).

During the freeze cycle, the thermistor detects the evaporator outlet temperature and momentarily stops the pump motor to prevent slushing in accordance with the anti-slush control (Setting 12: 0 to 2) and the slush ice control (Setting 62: -5 to 20°C).

No adjustment is required. If necessary, check for resistance between thermistor leads, and visually check the thermistor mounting, located at the evaporator outlet.

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



Check a thermistor for resistance by using the following procedure:

- 1) Disconnect the connector CN6 on the board.
- 2) Remove the thermistor. See “V. 13. THERMISTOR”.
- 3) Immerse the thermistor sensor portion in a glass containing ice and water for 2 or 3 minutes.
- 4) Check for resistance between the thermistor leads. Normal reading is within 3.5 to 7 kΩ. Replace the thermistor if it exceeds the normal reading.

5. BIN CONTROL

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

[a] EXPLANATION OF OPERATION

The bin control is connected to the CN5 connector (pins 1 & 6) on the control board. When the bin control is calling for ice (proximity switch closed), the control board continues icemaking operations. When the bin control is activated in the bin full position (proximity switch open), the control board performs the bin control (“II. 2. [b] BIN CONTROL”) and shuts down the unit.

However, to prevent incomplete batches of ice from forming on the evaporator, the control board will only shut down the machine during the freeze cycle before the minimum freeze cycle timer (5 minutes) expires. The minimum freeze cycle timer starts counting down when the thermistor temperature reaches 2°C. If, during the freeze cycle, ice pushes in the lever after the minimum freeze cycle timer expires, the control board will allow the machine to complete the freeze cycle and the following harvest cycle before shutting down the machine.

If the bin control is calling for ice (proximity switch closed) for more than 90 seconds, the fill cycle starts.

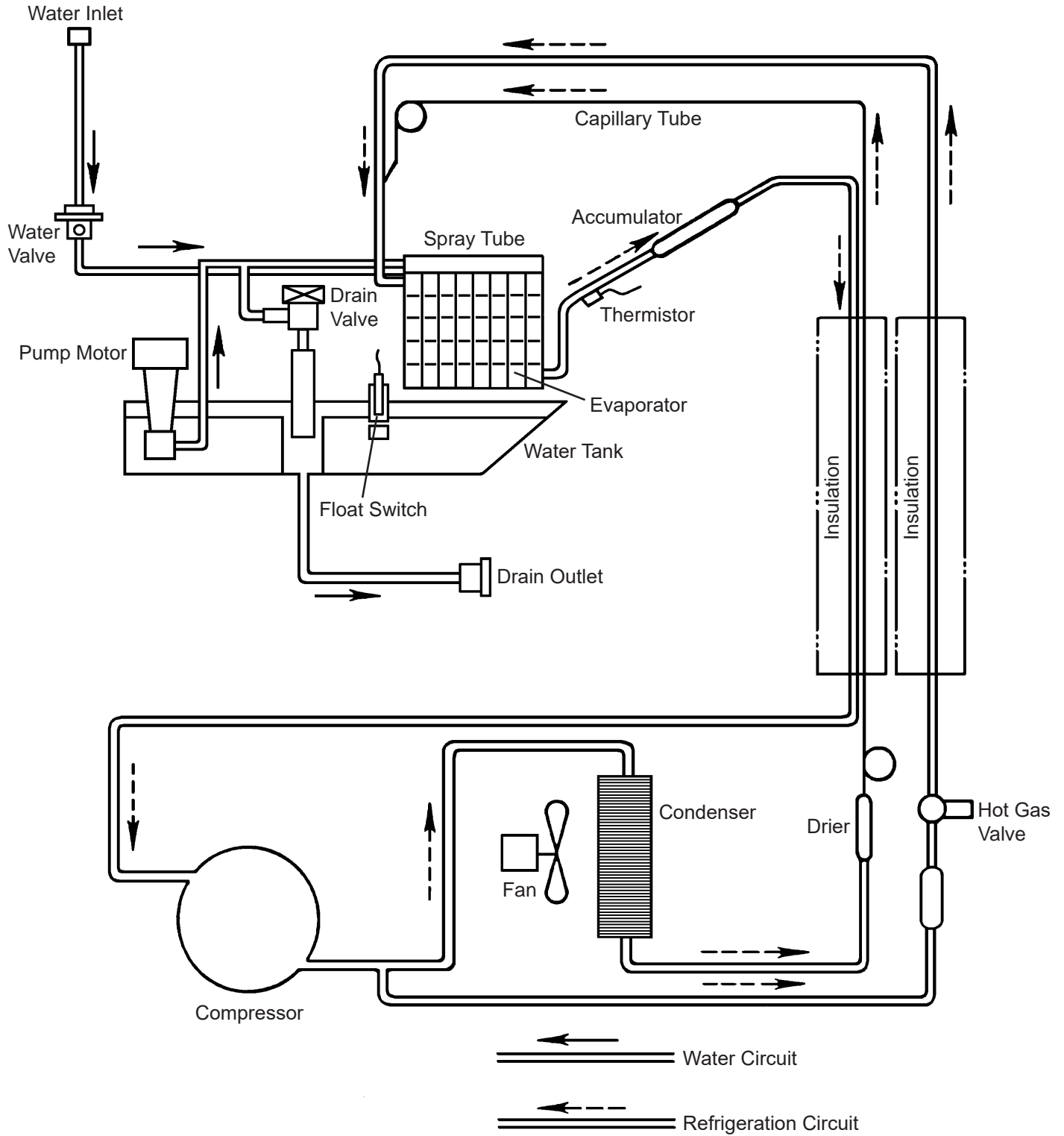
[b] BIN CONTROL CHECK PROCEDURE

- 1) The display shows “FUL” and every component de-energizes.
- 2) Clear any ice away from the bin control.
- 3) If the bin control is calling for ice (proximity switch closed) for more than 90 seconds, the display shows “run” and the fill cycle starts.
- 4) Activate the bin control actuator (press the actuator in) for more than 15 seconds (proximity switch open). Check that the display shows “FUL” and the unit performs the bin control and shuts down.
- 5) Disconnect the bin control leads from the CN5 connector (pins 1 & 6) on the control board.
- 6) Check for continuity across the bin control leads. When calling for ice, the bin control proximity switch should be closed. If open, replace the bin control. Activate the bin control actuator (press the actuator in), check for continuity across the bin control leads. The bin control proximity switch should be open. If closed, replace the bin control.
- 7) Reconnect the 2-pin connector to the CN5 connector (pins 1 & 6) on the control board. Allow the machine to cycle into the fill cycle.
- 8) Activate the bin control actuator (press the actuator in) for more than 15 seconds (proximity switch open). Check that the display shows “FUL” and the unit performs the bin control and shuts down.
- 9) If the unit does not perform the bin control, replace the control board.

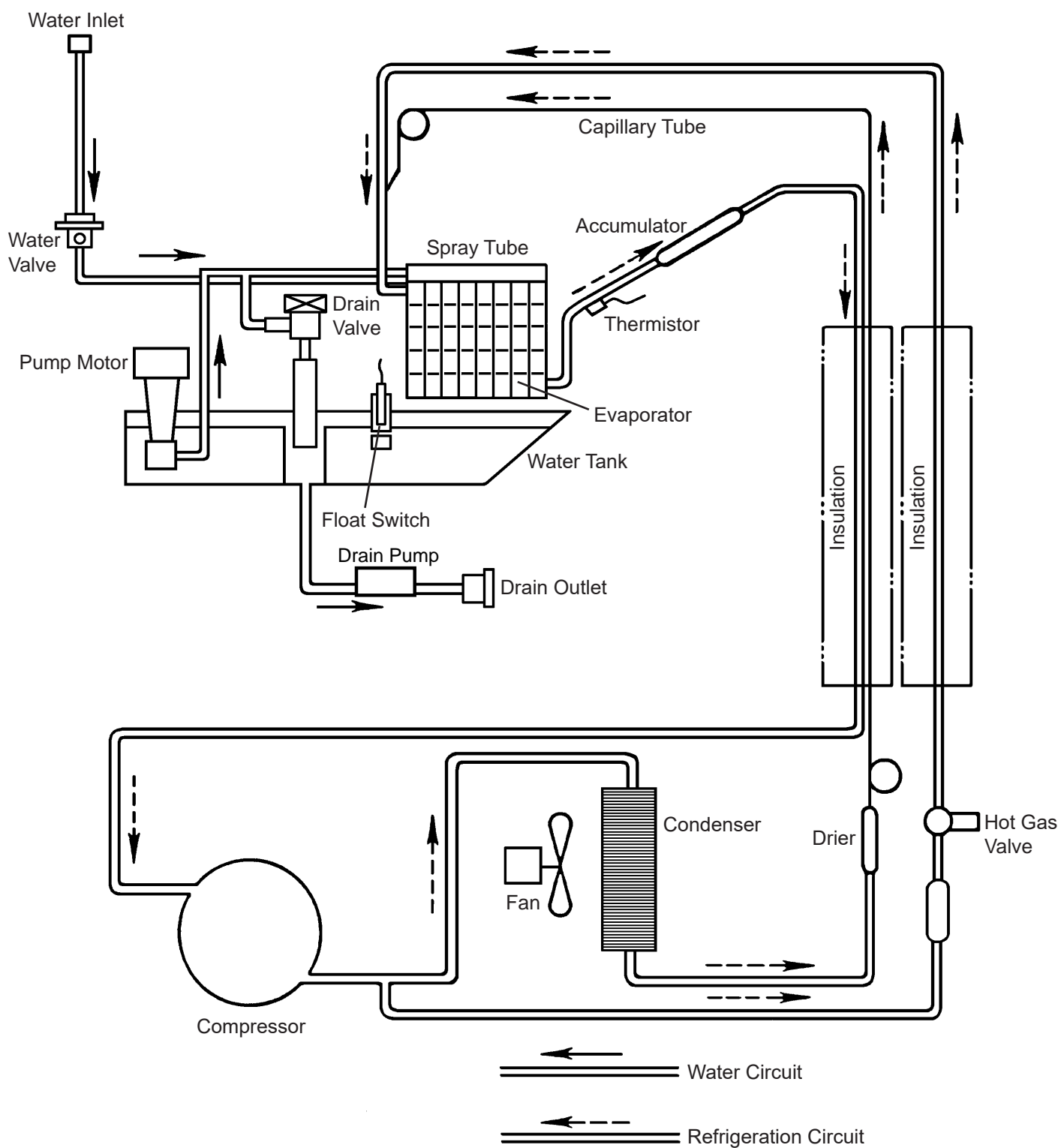
III. TECHNICAL INFORMATION

1. WATER CIRCUIT AND REFRIGERANT CIRCUIT

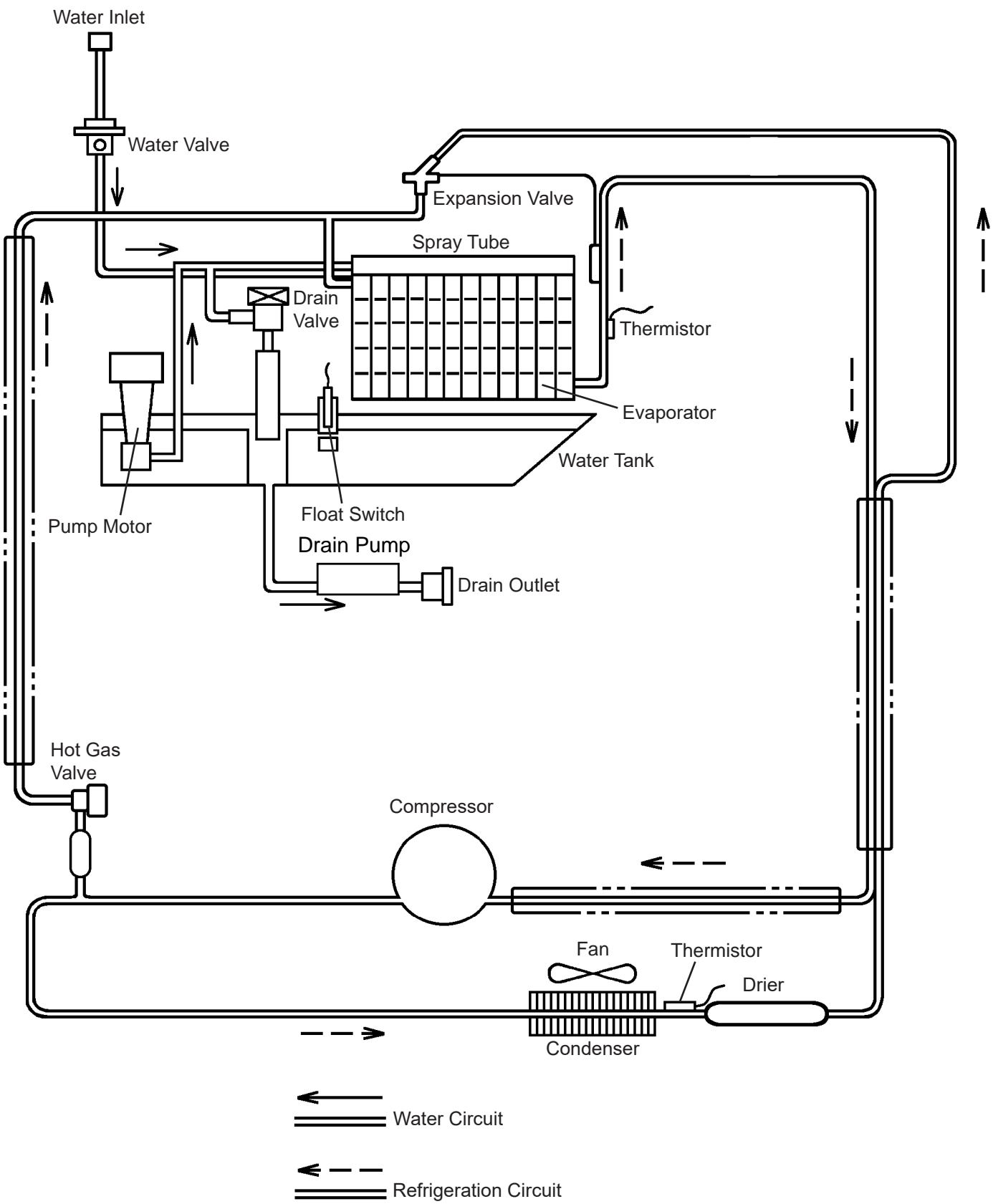
[a] KM-40C-HC, KM-60C-HC



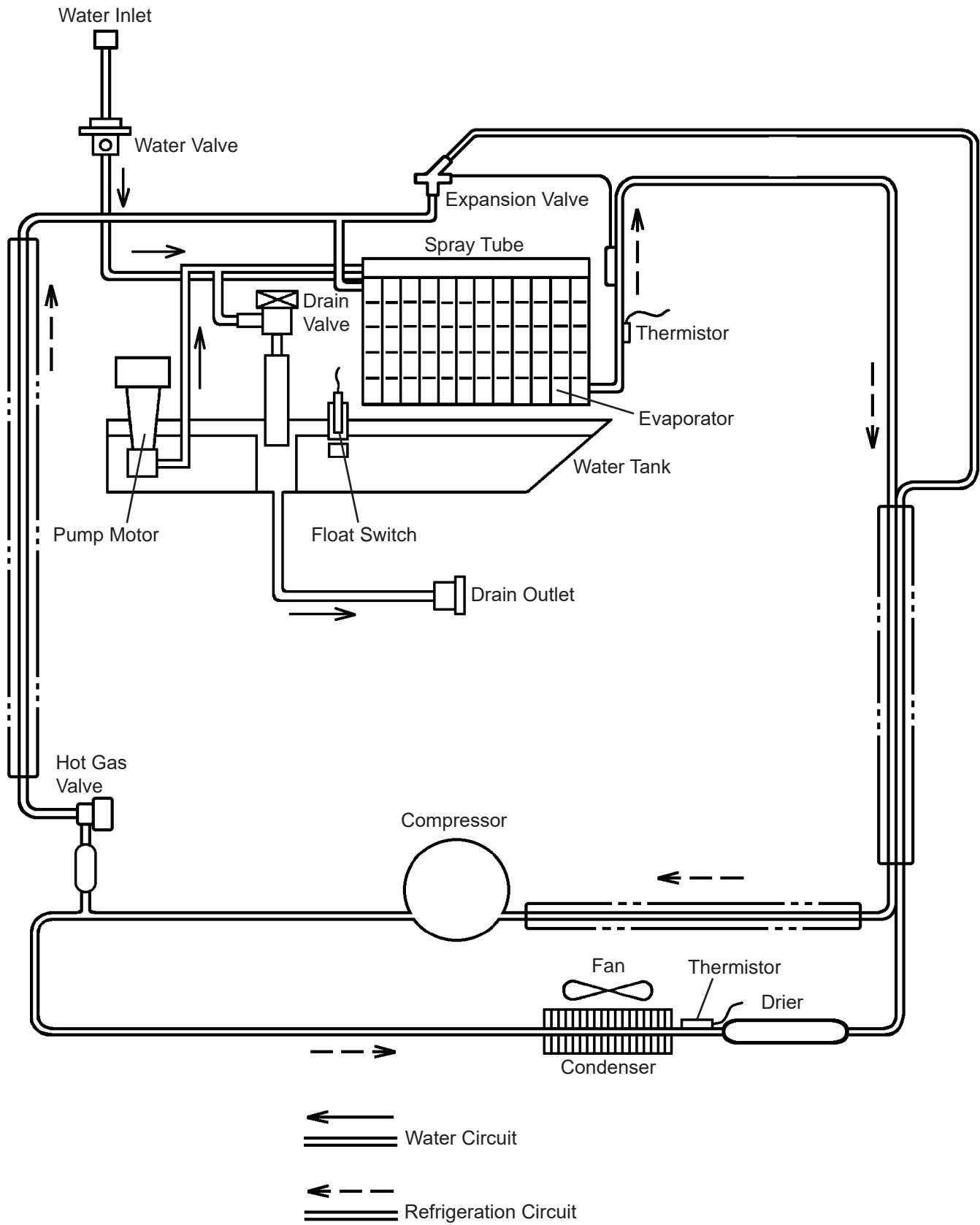
[b] KM-40C-HC, KM-60C-HC



[c] KM-80C-HC

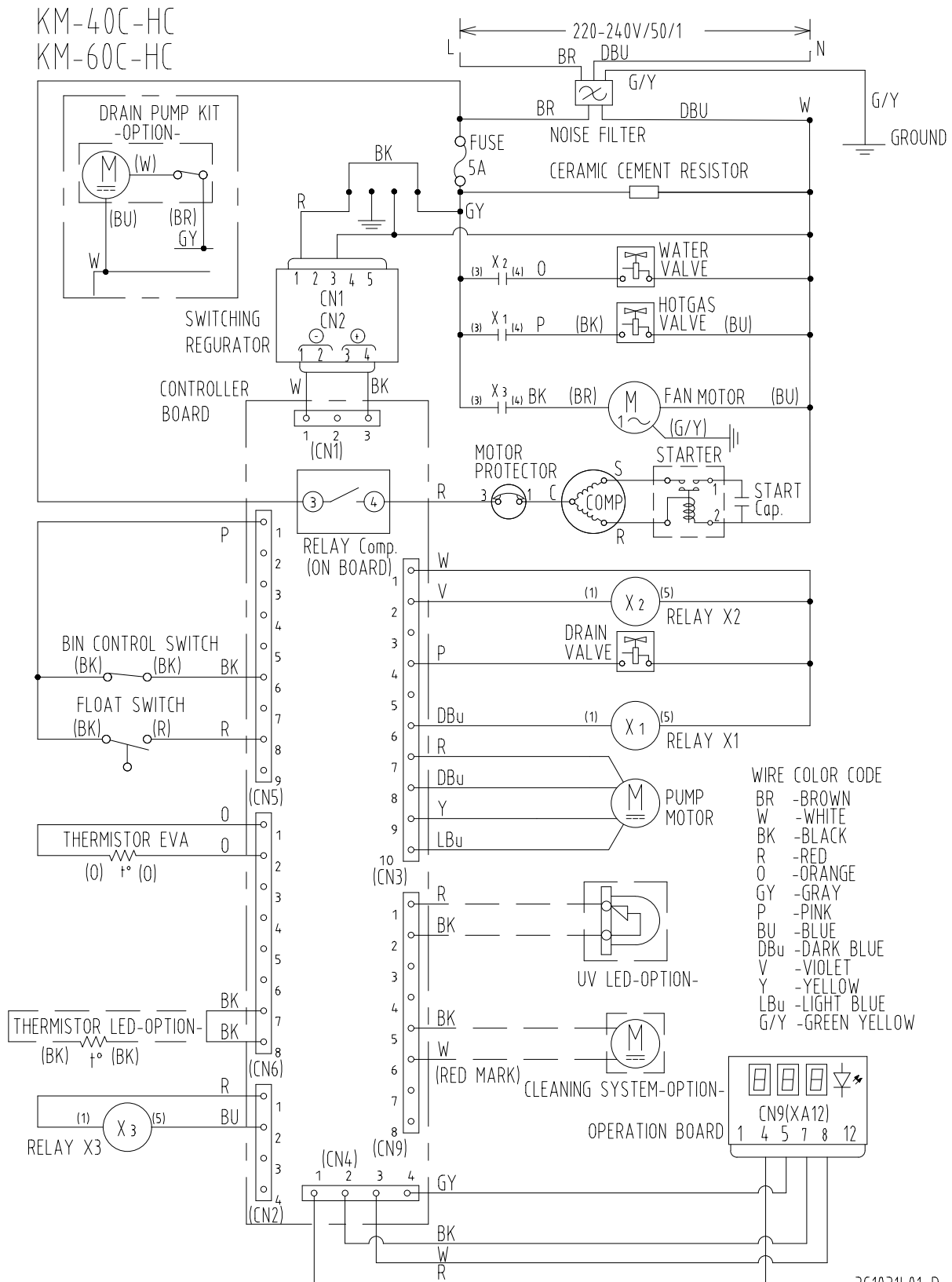


[d] KM-80C-HC,KM-140C-HC

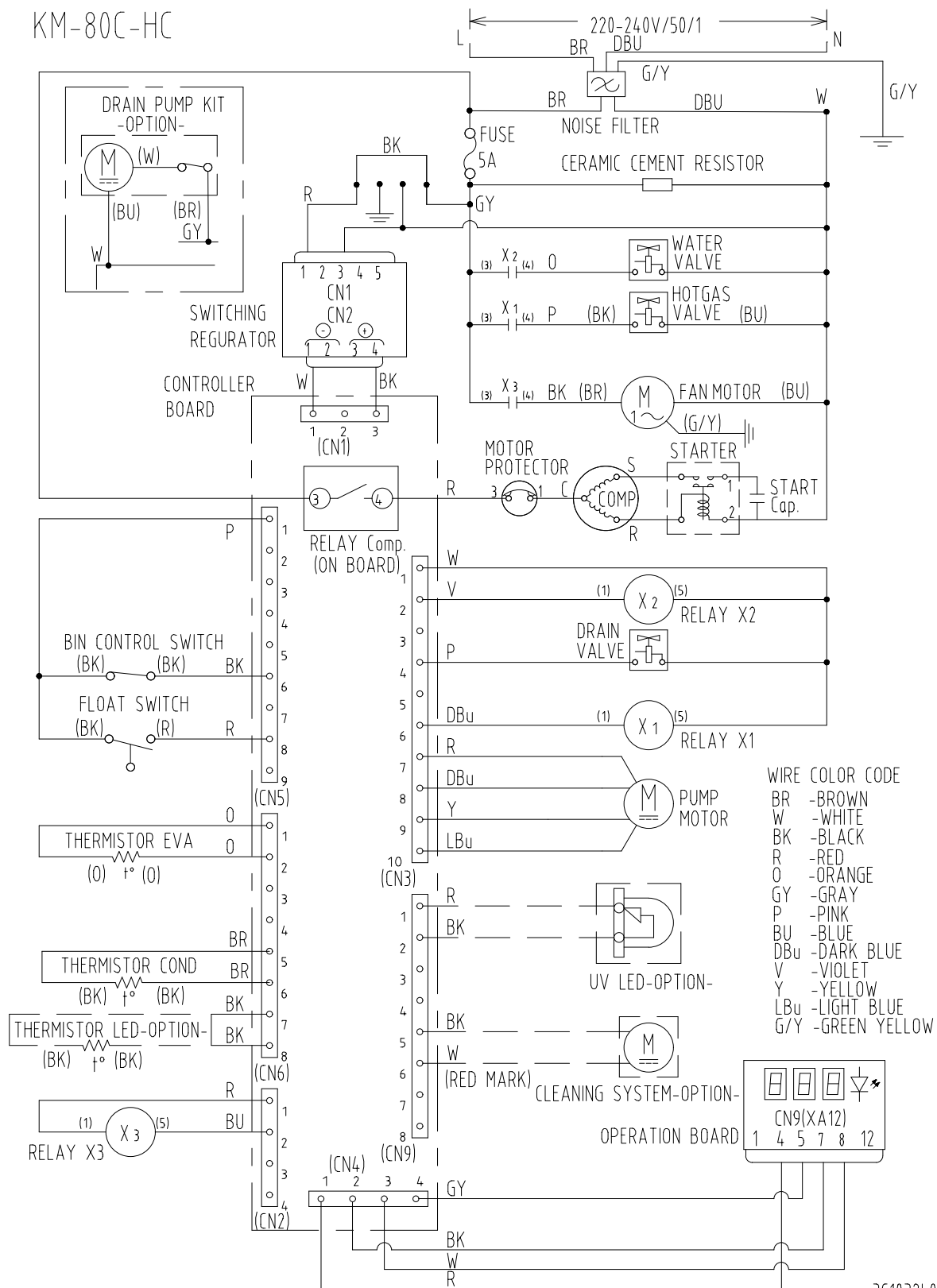


2. WIRING DIAGRAM

[a] KM-40C-HC, HC-60C-HC

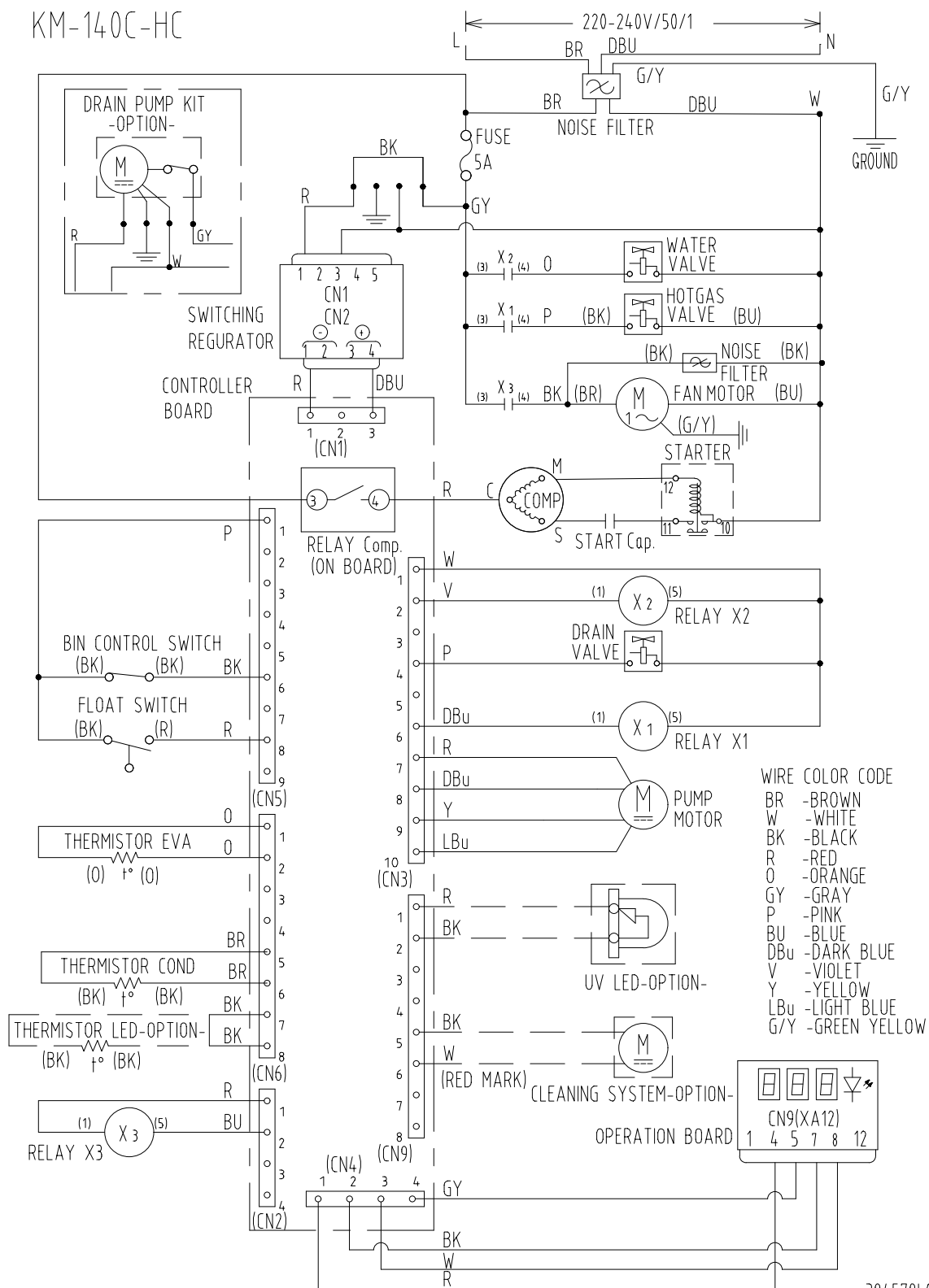


[b] KM-80C-HC



3C1032L01 D

[c] KM-140C-HC



[a] BASIC CONTROL

Basic Control

[b] BIN CONTROL

*BS = Controller Board Setting PART NAME		FREEZE CYCLE	HARVEST CYCLE	FREEZE	BIN FULL	FILL	HARVEST CYCLE (INITIAL)
ON / OFF	ON OFF						
CLEANING	ON OFF						
RESET	ON OFF						
BS No.16:(6-12°C) THERMISTOR	9°C	5°C BS(0-10°C)	BS No.1:(0-210sec)				BS No.1:(0-210sec)
	1°C						
COMPRESSOR	ON OFF						
FAN MOTOR	ON OFF		ON or OFF BS No.18(30-70°C)				
PUMP MOTOR	ON	BS(0-180sec)	BS No.5:(0-60sec)	BS(0-30sec)	BS No.5:(0-60sec)		
	OFF	B D C	5sec	2sec	D	C	5sec
HOT GAS VALVE	ON OFF		BS(High/Low/0-240sec)				
WATER VALVE	ON	5sec	BS(High/Low/0-240sec)				Max 6min
	OFF		BS(High/Low/0-120sec)				
DRAIN VALVE	ON OFF			Max 5min			
CLEANING VALVE	ON OFF						
BIN CONTROL SWITCH	ON	15sec		90sec			
	OFF						
FLOAT SWITCH	ON OFF	BS No.35:(5-250)					5sec
PUMP MOTOR AUTO CLEANING KIT	Normal Location OFF						
BS No.45:(1:set)	Reverse Location		5sec				5sec
UV LED	ON OFF	BS No.51:(0-30min)					
7 SEGMENT DISPLAY		run		Ful	run		

Bin Control

[c] HALT CONTROL

*BS = Controller Board Setting	PART NAME	FREEZE CYCLE	HARVEST CYCLE	STOP	FILL	HARVEST CYCLE (INITIAL)
ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF
CLEANING	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF
RESET	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF
BS No.16: (6-12°C)	9°C	5°C BS (0-10°C)	BS No.1: (0-21°C)			BS No.1: (0-210sec)
THERMISTOR	1°C					
COMPRESSOR	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF
FAN MOTOR	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF
PUMP MOTOR	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF
HOT GAS VALVE	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF
WATER VALVE	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF
DRAIN VALVE	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF
CLEANING VALVE	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF
BIN CONTROL SWITCH	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF
FLOAT SWITCH	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF
PUMP MOTOR AUTO CLEANING KIT	Normal Location	Normal Location	Normal Location	Normal Location	Normal Location	Normal Location
BS No.45: (1-set)	Reverse Location	Reverse Location	Reverse Location	Reverse Location	Reverse Location	Reverse Location
UV LED	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF
BS No.52: (0-300min)	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF	ON / OFF
7 SEGMENT DISPLAY	run	run (flash)	run	run	run	run

Halt Control

[d] SANITATION CONTROL

BS = Controller Board Setting	PART NAME	Fill	CLEANING *dr* selected by U.S3	HARVEST CYCLE (INITIAL)
ON / OFF	ON / OFF	ON OFF		
CLEANING	ON OFF	ON OFF		
RESET	ON OFF	ON OFF		
BS No. 16 (6~12°C)	9°C			
THERMISTOR	1°C			
COMPRESSOR	ON OFF	ON OFF		
FAN MOTOR	ON OFF	ON OFF		
PUMP MOTOR	ON OFF	ON OFF		
HOT GAS VALVE	ON OFF	ON OFF		
WATER VALVE	ON OFF	ON OFF		
DRAIN VALVE	ON OFF	ON OFF		
CLEANING VALVE	ON OFF	ON OFF		
BIN CONTROL SWITCH	ON OFF	ON OFF		
FLOAT SWITCH	ON OFF	ON OFF		
PUMP MOTOR AUTO CLEANING KIT	Normal Lotation OFF Reverse Lotation			
UV LED	ON OFF	ON OFF		
7 SEGMENT DISPLAY		run.		

BS No. 1 (0.2-10sec)

BS No. 5 (0-60sec)

BS No. 10 (0-120sec)

BS No. 12 (0-120sec)

BS No. 13 (0-120sec)

BS No. 14 (0-120sec)

BS No. 15 (0-120sec)

BS No. 16 (6~12°C)

BS No. 17 (0-120sec)

BS No. 18 (0-120sec)

BS No. 19 (0-120sec)

BS No. 20 (0-120sec)

BS No. 21 (0-120sec)

BS No. 22 (0-120sec)

BS No. 23 (0-120sec)

BS No. 24 (0-120sec)

BS No. 25 (0-120sec)

BS No. 26 (0-120sec)

BS No. 27 (0-120sec)

BS No. 28 (0-120sec)

BS No. 29 (0-120sec)

BS No. 30 (0-120sec)

BS No. 31 (0-120sec)

BS No. 32 (0-120sec)

BS No. 33 (0-120sec)

BS No. 34 (0-120sec)

BS No. 35 (0-120sec)

BS No. 36 (0-120sec)

BS No. 37 (0-120sec)

BS No. 38 (0-120sec)

BS No. 39 (0-120sec)

BS No. 40 (0-120sec)

BS No. 41 (0-120sec)

BS No. 42 (0-120sec)

BS No. 43 (0-120sec)

BS No. 44 (0-120sec)

BS No. 45 (0-120sec)

BS No. 46 (0-120sec)

BS No. 47 (0-120sec)

BS No. 48 (0-120sec)

BS No. 49 (0-120sec)

BS No. 50 (0-120sec)

BS No. 51 (0-120sec)

BS No. 52 (0-120sec)

BS No. 53 (0-120sec)

[e] WATER CLEANING CONTROL


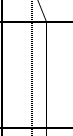
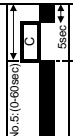
BS - Controller Board Setting	PART NAME	FREEZE CYCLE	HARVEST CYCLE	CLEANING	Fill	HARVEST CYCLE (INITIAL)
	ON / OFF					
	CLEANING					
	RESET					
	BS No.16 (6-12°C) THERMISTOR	9°C 1°C				
	COMPRESSOR					
	FAN MOTOR					
	PUMP MOTOR					
	HOT GAS VALVE					
	WATER VALVE					
	DRAIN VALVE					
	CLEANING VALVE					
	BIN CONTROL SWITCH					
	FLOAT SWITCH					
	PUMP MOTOR AUTO CLEANING KIT					
	UV LED					
	BS No.52 (0-30min)					
	7 SEGMENT DISPLAY					
		run	cin	run	run	

When the cleaning button is pressed other than in bin or halt control

BS - Controller Board Setting	PART NAME	FREEZE CYCLE	HARVEST CYCLE	CLEANING BS No.44 (0-60cycle)	Fill	HARVEST CYCLE (INITIAL)
	ON / OFF					
	CLEANING					
	RESET					
	BS No.16 (6-12°C) THERMISTOR	9°C 1°C				
	COMPRESSOR					
	FAN MOTOR					
	PUMP MOTOR					
	HOT GAS VALVE					
	WATER VALVE					
	DRAIN VALVE					
	CLEANING VALVE					
	BIN CONTROL SWITCH					
	FLOAT SWITCH					
	PUMP MOTOR AUTO CLEANING KIT					
	UV LED					
	BS No.52 (0-30min)					
	7 SEGMENT DISPLAY					
		run				

Water Cleaning Control

[f] AUTOMATED CHEMICAL CLEANING CONTROL

*BS = Controller Board Setting	PART NAME	FREEZE CYCLE	HARVEST CYCLE	CLEANING	Fill	HARVEST CYCLE (INITIAL)
	ON / OFF	ON OFF				
	CLEANING	ON OFF				
	RESET	ON OFF				
	BS No.16:(6-12°C) THERMISTOR	9°C 1°C				
	COMPRESSOR	ON OFF				
	FAN MOTOR	ON OFF	ON or OFF BS No.18:(30-70°C)			
	PUMP MOTOR	ON OFF	BS No.5:(0-60sec) BS No.18:(30-70°C)			BS No.5:(0-60sec) 5sec
	HOT GAS VALVE	ON OFF	BS (High/Low)(0-240sec)			
	WATER VALVE	ON OFF	BS (High/Low)(0-240sec)			
	DRAIN VALVE	ON OFF	BS (High/Low)(0-120sec)			
	CLEANING VALVE	ON OFF				
	BIN CONTROL SWITCH	ON OFF				
	FLOAT SWITCH	ON OFF				
	PUMP MOTOR AUTO CLEANING KIT	Normal Rotation OFF Reverse Rotation				
	UV LED	ON OFF	BS No.51:(0-30min)			
	BS No.52:(0-300min)					
	7 SEGMENT DISPLAY					
		run	run(flash)	cln(light up)	cln(flash)	run

Automated Chemical Cleaning Control

[g] FULLY AUTOMATED CHEMICAL CLEANING CONTROL

BS = Computer Board Setting PART NAME	FREEZE CYCLE	HARVEST CYCLE	SANITATION CYCLE		FILL	HARVEST CYCLE (INITIAL)
			Starts when "cin" is selected by U54	Starts when "cin" is selected by U54 or after number of cycles set by U50 is complete		
ON / OFF						
CLEANING						
RESET						
BS No.16:(6-12°C) THERMISTOR						
COMPRESSOR						
FAN MOTOR						
PUMP MOTOR						
HOT GAS VALVE						
WATER VALVE						
DRAIN VALVE						
CLEANING VALVE						
BIN CONTROL SWITCH						
FLOAT SWITCH						
PUMP MOTOR AUTO CLEANING KIT						
UV LED						
BS No.52:(0-30min)						
7 SEGMENT DISPLAY	run					run

Fully Automated Chemical Cleaning Control

IV. SERVICE DIAGNOSIS

Before making a diagnosis, check for proper supply voltage, water supply pressure, electrical part connections, and component installations.

1. OUTPUT TEST

This mode is to locate the cause of the trouble.

Shutdown

1) Press the ON/OFF button to shut down the unit. The display starts flashing “run” to prepare for shutdown. Then, the display shows “oFF” and the unit shuts down.

2) Unplug the unit.

Diagnosis

1) Plug in the unit.

2) During the 5 second delay, press the ON/OFF button for more than 1 second. The unit enters the output test mode.

3) Check whether the unit runs in the following sequence:

- (1) Every component is de-energized.
- (2) In 1 second, the compressor energizes and the display shows “888”.
- (3) In 5 seconds, the compressor is still energized and the hot gas valve opens.
- (4) In 5 seconds, the compressor de-energizes, the hot gas valve closes and the fan motor energizes. When set to “1 (DC)” [Setting 19: 1 (AC) or 1 (DC)], the fan motor runs at the speed set by the fan speed control (DC/high speed) [Setting 23: 0 to 5V].
- (5) In 5 seconds, the fan motor de-energizes and the pump motor energizes. The pump motor runs at the speed (A) set by the DC pump speed A: high speed [Setting 31: 0 to 5V].
- (6) In 5 seconds, the pump motor de-energizes and the water valve 1 opens.
- (7) In 5 seconds, the water valve 1 closes and the water valve 2 (*) opens.
- (8) In 5 seconds, the water valve 2 closes and the drain valve opens.
- (9) In 5 seconds, the drain valve closes and the cleaning valve (*) opens.
- (10) In 5 seconds, the cleaning valve closes and the tube pump motor energizes and rotates in normal direction.
- (11) In 5 seconds, the tube pump motor de-energizes and re-energizes to rotate in reverse direction.
- (12) In 5 seconds, the tube pump motor de-energizes and the UV-LED energizes.
- (13) In 5 seconds, the UV LED and every load de-energize to go back to step (1) above.

* The water valve 2 and cleaning valve are not provided for KM-40C-HC, KM-60C-HC, KM-80C-HC and KM-140C-HC.

2. NO ICE PRODUCTION

PROBLEM	POSSIBLE CAUSE		REMEDY
[1] The icemaker will not start.	a) Power Supply	1. Unplugged.	1. Plug in.
		2. Loose connections.	2. Tighten.
		3. Bad contacts.	3. Check for continuity and replace.
		4. Voltage too high.	4. Check and get recommended voltage.
	b) Fuse (inside fused disconnect, if any)	1. Blown out.	1. Check for short circuit and replace.
	c) Bin Control Switch	1. Tripped with bin filled with ice.	1. Remove ice.
		2. Defective reed switch.	2. Check for continuity and replace.
	d) Wiring to Control Board	1. Loose connections or open.	1. Check for continuity and replace.
	e) Thermistor	1. Leads shorted or open and high temperature safety operates. If open, unit will start but have long defrost cycle.	1. See "II. 4. THERMISTOR".
	f) Hot Gas Solenoid Valve	1. Continues to open in freeze cycle and high temperature safety operates.	1. Check for power off in freeze cycle and replace.
	g) Water Supply Line	1. Water supply off and water supply cycle does not finish.	1. Check and get recommended pressure. Check for water supply.
	h) Inlet Water Valve	1. Mesh filter or orifice gets clogged and water supply cycle does not finish.	1. Clean. Replace if necessary.
2. Coil winding opened.		2. Replace.	
3. Wiring to water valve.		3. Check for loose connection or open circuit, and replace.	
i) Control Board	1. Defective.	1. Check and replace.	
j) Switching Regulator	1. Defective.	1. Check and replace.	
[2] Water continues to be supplied, and the icemaker will not start.	a) Float Switch	1. Connector disconnected.	1. Reconnect.
		2. Leads opened or defective switch.	2. Check and replace.
		3. Float does not move freely.	3. Clean or replace.
	b) Control Board	1. Defective.	1. Check and replace.
	c) Drain Valve	1. Closing failure.	1. Clean or replace.
	d) Water Supply and Drain Lines	1. Water leaks.	1. Check connections for water leaks, and replace.

PROBLEM	POSSIBLE CAUSE		REMEDY
[3] Compressor will not start or operates intermittently.	a) Overload Protector	1. Bad contacts.	1. Check for continuity and replace.
		2. Voltage too low.	2. Increase voltage.
		3. Refrigerant overcharged or undercharged.	3. Recharge.
	b) Starter	1. Bad contacts.	1. Check and replace.
		2. Coil winding opened.	2. Replace.
	c) Start Capacitor	1. Defective.	1. Replace.
	d) Power Relay	1. Bad contacts.	1. Replace control board.
		2. Coil winding opened.	2. Replace control board.
	e) Compressor	1. Wiring to compressor.	1. Check for loose connection or open circuit, and replace.
		2. Defective.	2. Replace.
		3. Protector tripped.	3. Reduce temperature and verify cause.
	f) Control Board	1. Defective.	1. Check and replace.
	g) Condenser, Air Filter	1. Clogged with dirt and dust.	1. Clean and unclog.
	h) Condenser Thermistor (KM-80/140C-HC only)	1. Dirty air filter or condenser.	1. Clean.
		2. Ambient temperature too warm.	2. Reduce ambient temperature.
		3. Refrigerant overcharged.	3. Recharge.
		4. Fan not operating.	4. See chart 6 - [2].
		5. Refrigerant line or components plugged.	5. Clean and replace drier.
[4] Water continues to be supplied in freeze cycle.	a) Inlet Water Valve	1. Diaphragm does not close.	1. Check for water leaks with icemaker off. Replace if necessary.
	b) Control Board	1. Defective.	1. Check and replace.
	c) Water Pressure	1. Too high.	1. Reduce.

PROBLEM	POSSIBLE CAUSE		REMEDY
[5] No water comes from spray tubes. Water pump will not start, or freeze cycle time is too short.	a) Water Supply Line	1. Water pressure too low and water level in water tank too low.	1. Check and get recommended pressure.
	b) Inlet Water Valve	1. Dirty mesh filter or orifice and water level in water tank too low.	1. Clean.
	c) Water System	1. Water leaks.	1. Check connections for water leaks, and replace.
		2. Clogged.	2. Clean.
	d) Pump Motor	1. Motor winding opened.	1. Replace.
		2. Bearing worn out.	2. Replace.
		3. Wiring to pump motor.	3. Check for loose connection or open circuit, and replace.
		4. Defective Capacitor.	4. Replace.
		5. Defective or bound impeller.	5. Replace and clean.
	e) Control Board	1. Defective.	1. Check and replace.
[6] Fan motor will not start, or is not operating.	f) Drain Valve	1. Leaking by.	1. Clean or replace.
	g) Float Switch	1. Dirty or erratic operation.	1. Clean or replace.
	h) Switching Regulator	1. Defective.	1. Check and replace.
	a) Fan Motor	1. Motor winding opened.	1. Replace.
		2. Bearing worn out.	2. Replace.
		3. Wiring to fan motor.	3. Check for loose connection or open circuit, and replace.
		4. Fan blade bound (locked fan motor).	4. Check and replace.
	b) Control Board	1. Defective.	1. Check and replace.
[7] All components run but no ice is produced.	a) Refrigerant	1. Undercharged.	1. Check for leaks and recharge.
		2. Air or moisture trapped.	2. Replace drier, and recharge.
	b) Compressor	1. Defective valve.	1. Replace.
	c) Hot Gas Solenoid Valve	1. Continues to open in freeze cycle.	1. Check and replace.

3. EVAPORATOR IS FROZEN UP

PROBLEM	POSSIBLE CAUSE		REMEDY
[1] Freeze cycle time is too long.	a) Float Switch	1. Leads shorted or defective switch.	1. Check and replace.
		2. Float does not move freely.	2. Clean or replace.
	b) Inlet Water Valve	1. Diaphragm does not close.	1. Check for water leaks with icemaker off. Replace if necessary.
	c) Control Board	1. Defective.	1. Check and replace.
	d) Water Pump	1. RPM too slow.	1. Check and replace.
	e) Spray Tubes	1. Clogged.	1. Unclog.
	f) Evaporator	1. Scaled up.	1. Clean.
	g) Expansion Valve (KM-80/140C-HC only)	1. Operating erratically.	1. Check and replace.
[2] All ice formed on evaporator does not fall into bin in harvest cycle.	a) Evaporator	1. Scaled up.	1. Clean.
	b) Water Supply Line	1. Water pressure too low.	1. Check and get recommended pressure.
	c) Inlet Water Valve	1. Dirty mesh filter or orifice.	1. Clean.
		2. Diaphragm does not close.	2. Check for water leaks with icemaker off. Replace if necessary.
	d) Ambient and/or water temperature	1. Too cool.	1. Increase temperature.
	e) Thermistor	1. Out of position or loose attachment.	1. See "V. 13. THERMISTOR".
	f) Control Board	1. Harvest timer is set too short.	1. Adjust longer, referring to "II. 3. [e] SERVICE MODE".
		2. Defective.	2. Check and replace.
[3] Other	a) Spray Tubes	1. Clogged.	1. Clean.
		2. Out of position.	2. Place in position.
	b) Water System	1. Dirty.	1. Clean.
	c) Refrigerant	1. Undercharged.	1. Check for leaks and recharge.
	d) Expansion Valve (KM-80/140C-HC only)	1. Bulb out of position or loose attachment.	1. Place in position.
		2. Defective.	2. Replace.
	e) Hot Gas Solenoid Valve	1. Coil winding opened.	1. Replace.
		2. Plunger does not move.	2. Replace.
		3. Wiring to hot gas valve.	3. Check for loose connection or open circuit, and replace.
	f) Water Supply Line	1. Too small; requires 9.5 mm OD line dedicated per machine.	1. Increase water supply line size.
	g) Water Filter	1. Flow rate too small.	1. Replace with filter that has larger flow rate.

4. LOW ICE PRODUCTION

PROBLEM	POSSIBLE CAUSE	REMEDY
[1] Freeze cycle time is long.	a) See chart 2 - [3] and check dirty air filter or condenser, ambient or water temperature, water pressure, and refrigerant charge.	
	b) See chart 2 - [7] and check refrigerant, compressor, and hot gas solenoid valve.	
	c) See chart 3 - [1] and check float switch, inlet water valve, and control board.	
[2] Defrost cycle time is long.	a) See chart 3 - [2] and check control board, thermistor, evaporator, ambient and/or water temperature, water supply line, and inlet water valve.	

5. ABNORMAL ICE

PROBLEM	POSSIBLE CAUSE		REMEDY
[1] Small cubes	a) Cube Guide, Water Tank	1. Out of position. Circulated water falls into bin.	1. Check that cube guide is properly installed on water tank and tank is fixed securely with snaps.
	b) See chart 2 - [5] and check water supply line, inlet water valve, water system, pump motor, and control board.		
	c) Drain Valve	1. Dirty.	1. Clean.
[2] Cloudy or irregular cubes	a) See chart 3 - [1] and - [3] and check float switch, inlet water valve, control board, spray tubes, water system, refrigerant charge, and expansion valve (KM-80/140C-HC only).		
	b) Spray Guide	1. Dirty.	1. Clean.
	c) Water Quality	1. High hardness or contains impurities.	1. Install a water filter or softener.

6. OTHER

PROBLEM	POSSIBLE CAUSE		REMEDY
[1] Icemaker will not stop when bin is filled with ice.	a) Bin Control Switch	1. Completely disconnected and dropped inside bin.	1. Place in position.
		2. Detector broken.	2. Replace.
		3. Detector out of position.	3. Place in position.
		4. Defective reed switch.	4. Check for continuity and replace.
		5. Reed switch out of position.	5. Place in position.
		6. Magnet disconnected from detector.	6. Place in position.
	b) Control Board	1. Defective.	1. Check and replace.
[2] Abnormal noise	a) Pump Motor	1. Bearings worn out.	1. Replace.
	b) Fan Motor	1. Bearings worn out.	1. Replace.
		2. Fan blade deformed.	2. Replace fan blade.
		3. Fan blade does not move freely.	3. Replace.
	c) Compressor	1. Bearings worn out, or cylinder valve broken.	1. Replace.
		2. Mounting pad out of position or loose hold-down bolt.	2. Reinstall.
	d) Refrigerant Lines	1. Rub or touch lines or other surfaces.	1. Reposition.
[3] Ice in storage bin often melts.	a) Bin Drain	1. Plugged.	1. Clean.

V. REMOVAL AND REPLACEMENT

WARNING

Only trained service engineer can service the R290 refrigeration unit.

1. SERVICE FOR REFRIGERANT LINES

[a] SERVICE INFORMATION

1) Allowable Compressor Opening Time and Prevention of Lubricant Mixture [R290]

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 [R290]

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 R290 has possibly drawn in air, the drier must be replaced. Be sure to use a drier designed for R290.

3) Handling of Handy Flux [R290]

Brazing is needed to connect the refrigeration circuit pipes. 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 [R290]

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 R290

Some parts used for refrigerants other than R290 are similar to those for R290. But never use any parts unless they are specified for R290 because their endurance against the refrigerant has not been evaluated. Also, for R290, do not use any parts that have been used for other refrigerants. Otherwise, wax and chlorine remaining on the parts may adversely affect the R290.

6) Replacement Copper Tubing [R290]

The copper tubes currently in use are suitable for R290. 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 [R290]

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 R290.

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 R290 to suddenly react with oxygen and explode. Be sure to use nitrogen to prevent explosion.

[b] REFRIGERANT RECOVERY

WARNING

Do not recover the R290 refrigerant in a refrigerant recovery cylinder for R404A or R134a.

The R290 refrigerant has almost no effect on global warming, so can be released to outdoors atmosphere without risk to the environment. Recovery should only be considered if the unit cannot be taken outdoors to evacuate the circuit.

If R290 is recovered in a refrigerant recovery cylinder for R404A or R134a, there is a risk of ignition and a refrigerant destruction operator may reject collection.

[c] REFRIGERANT REMOVAL

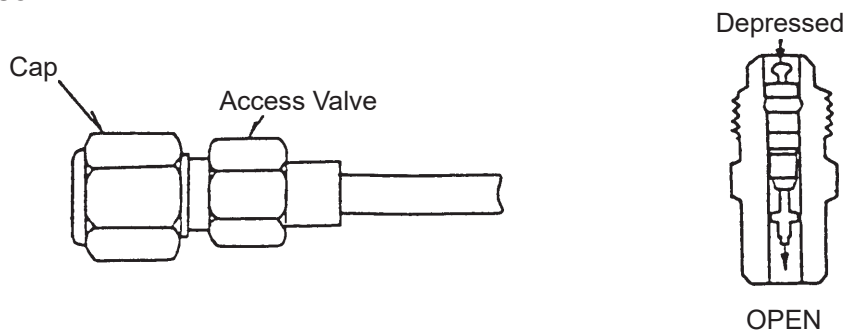
WARNING

Remove the R290 refrigerant from the unit in an area well-ventilated and free from open flames.

When removing the refrigerant from the unit, be sure the surrounding area is well-ventilated and free from open flames. Discharge refrigerant in small amounts into the atmosphere. If the surrounding area is not well-ventilated and exposed to open flames, recover the refrigerant in a refrigerant recovery cylinder and discharge it in small amounts into the atmosphere outdoors.

[d] EVACUATION AND RECHARGE

- 1) Attach charging hoses, service manifold and vacuum pump to the low-side and high-side (to be fitted by service engineer) access valves.
- 2) Turn on the vacuum pump.
- 3) Allow the vacuum pump to pull down to a 760 mmHg vacuum. Evacuating period depends on the pump capacity.
- 4) Close the low-side and high-side valves on the service manifold.
- 5) Disconnect the vacuum pump, and attach a refrigerant charging cylinder to accurately weigh in the liquid charge. Remember to purge any air from the charging hose. See the nameplate for the required refrigerant charge.
- 6) Open the high-side valve on the gauge manifold, and accurately measure in the liquid charge. Close the valve on the charging cylinder before closing the high-side manifold valve. Any remaining liquid in the line can be charged into the low side.
- 7) Do not charge more than 150 g of R290.
- 8) Turn on the icemaker. Release the high-side access connector, and allow pressure in the charging line to slowly enter the low side of the system. Cap off the high-side access valve. When pressure reduces on the low side, disconnect the low side charging line and cap off the access valve.
- 9) Always cap the access valves to prevent a refrigerant leak.
- 10) Always thoroughly leak test all joints and valve caps.
- 11) Avoid charging large quantities of liquid into the low side in case of damage to the compressor.



2. WELDING REPAIR FOR R290 REFRIGERATION CIRCUIT

- 1) Make sure the surrounding area of the unit to be repaired is free from ignition sources.
- 2) Open the window or operate the ventilator to make the surrounding area well-ventilated.
- 3) Connect the piercing valve. Recover the refrigerant in the specified manner or discharge it into the atmosphere.
- 4) The refrigeration circuit pressure is back to atmospheric pressure. Pressurize the circuit using nitrogen.
- 5) Discharge the pressurized nitrogen and recover the refrigeration circuit to atmospheric pressure.
- 6) Repeat 4) and 5) above. Use a gas detector at the open end of refrigeration circuit to detect any gas left inside the circuit.
- 7) Evacuate the refrigeration circuit for 30 minutes to remove any gas left inside the circuit.

WARNING

Remove the R290 refrigerant from the unit in an area well-ventilated and free from open flames.

Note: 1. Attach an access valve for recharging the unit.

2. 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.

3. 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) Unplug the icemaker.
- 2) Remove the louver and rear cover.
- 3) Remove the refrigerant from the unit and then any residual refrigerant still existing in the unit to allow welding process (See "V. 2. WELDING REPAIR FOR R290 REFRIGERATION CIRCUIT").
- 4) Remove the terminal cover on the compressor, and disconnect solderless terminals.
- 5) Disconnect the discharge and suction pipes using a pipe cutter near the compressor to keep the pipe length as much as possible. If needed, expand the end of disconnected pipes using a pipe expander to connect with the new compressor.

WARNING

When it is required to disconnect the pipes using brazing equipment, be careful that the refrigerant in the oil left inside the pipes may burn.

- 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 plugs from the compressor suction and discharge pipes.
- 12) Adjust the pipes to fit the compressor. Braze or solder the access, suction and discharge lines (Do not change this order), with nitrogen gas flowing at a pressure of 0.2 - 0.3 bar.
- 13) Install the new drier (see "V. 4. DRIER").
- 14) Check for leaks using nitrogen gas (10 bar) and soap bubbles.
- 15) Evacuate the system and charge it with refrigerant (see "V. 1. [d] EVACUATION AND RECHARGE").
- 16) Connect the solderless terminals, and replace the terminal cover in its correct position.
- 17) Refit the louver and rear cover in their correct positions.
- 18) Plug in the icemaker.

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

4. DRIER

IMPORTANT

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

- 1) Unplug the icemaker.
- 2) Remove the rear cover.
- 3) Remove the refrigerant from the unit and then any residual refrigerant still existing in the unit to allow welding process. (See "V. 2. WELDING REPAIR FOR R290 REFRIGERATION CIRCUIT").
- 4) Remove the drier holder, if any, and pull the drier toward you for easy service.
- 5) Disconnect the outlet and inlet using a pipe cutter near the drier to keep the pipe length as much as possible. If needed, expand the end of disconnected pipes using a pipe expander to connect with the new drier.

WARNING

When it is required to disconnect the pipes using brazing equipment, be careful that the refrigerant in the oil left inside the pipes may burn.

- 6) Braze or solder the new drier, with the arrow on the drier in the direction of the refrigerant flow. Adjust the pipes to fit the drier. Use nitrogen gas at a pressure of 0.2 - 0.3 bar when brazing tubings. Braze in an access valve using a tee if necessary.
- 7) Check for leaks using nitrogen gas (10 bar) and soap bubbles.
- 8) Evacuate the system and charge it with refrigerant (see "V. 1. [d] EVACUATION AND RECHARGE").
- 9) Refit the rear cover in its correct position.
- 10) Plug in the icemaker.

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

5. HOT GAS VALVE

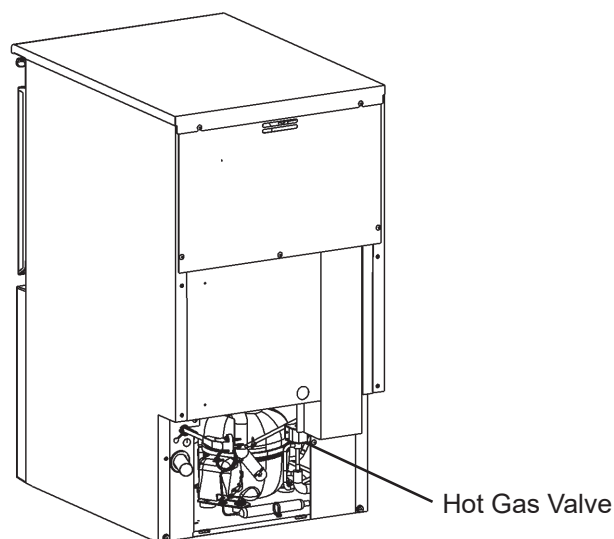
CAUTION

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) Unplug the icemaker.
- 2) Remove the louver and rear cover.
- 3) Remove the refrigerant from the unit and then any residual refrigerant still existing in the unit to allow welding process. (See "V. 2. WELDING REPAIR FOR R290 REFRIGERATION CIRCUIT").
- 4) Disconnect the hot gas valve leads.
- 5) Remove the screw and the solenoid coil.
- 6) Disconnect the outlet and inlet of hot gas valve using a pipe cutter near the hot gas valve to keep the pipe length as much as possible. If needed, expand the end of disconnected pipes using a pipe expander to connect with the new hot gas valve.



WARNING

When it is required to disconnect the pipes using brazing equipment, be careful that the refrigerant in the oil left inside the pipes may burn.

- 7) Adjust the pipes to fit the hot gas valve. Braze the new hot gas valve with nitrogen gas flowing at a pressure of 0.2 - 0.3 bar.

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 135°C.

- 8) Install the new drier (see "V. 4. DRIER").
- 9) Check for leaks using nitrogen gas (10 bar) and soap bubbles.
- 10) Evacuate the system and charge it with refrigerant (see "V. 1. [d] EVACUATION AND RECHARGE").
- 11) Attach the solenoid coil to the valve body, and secure it with the screw.
- 12) Connect the lead wires.
- 13) Refit the panels in their correct positions.
- 14) Plug in the icemaker.

6. EXPANSION VALVE - KM-80C-HC, KM-140C-HC ONLY

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) Unplug the icemaker.
- 2) Remove the top panel, rear panel and rear cover.
- 3) Remove the refrigerant from the unit and then any residual refrigerant still existing in the unit to allow welding process. (See "V. 2. WELDING REPAIR FOR R290 REFRIGERATION CIRCUIT").
- 4) Disconnect the outlet and inlet of expansion valve using a pipe cutter near the expansion valve to keep the pipe length as much as possible. If needed, expand the end of disconnected pipes using a pipe expander to connect with the new expansion valve.

WARNING

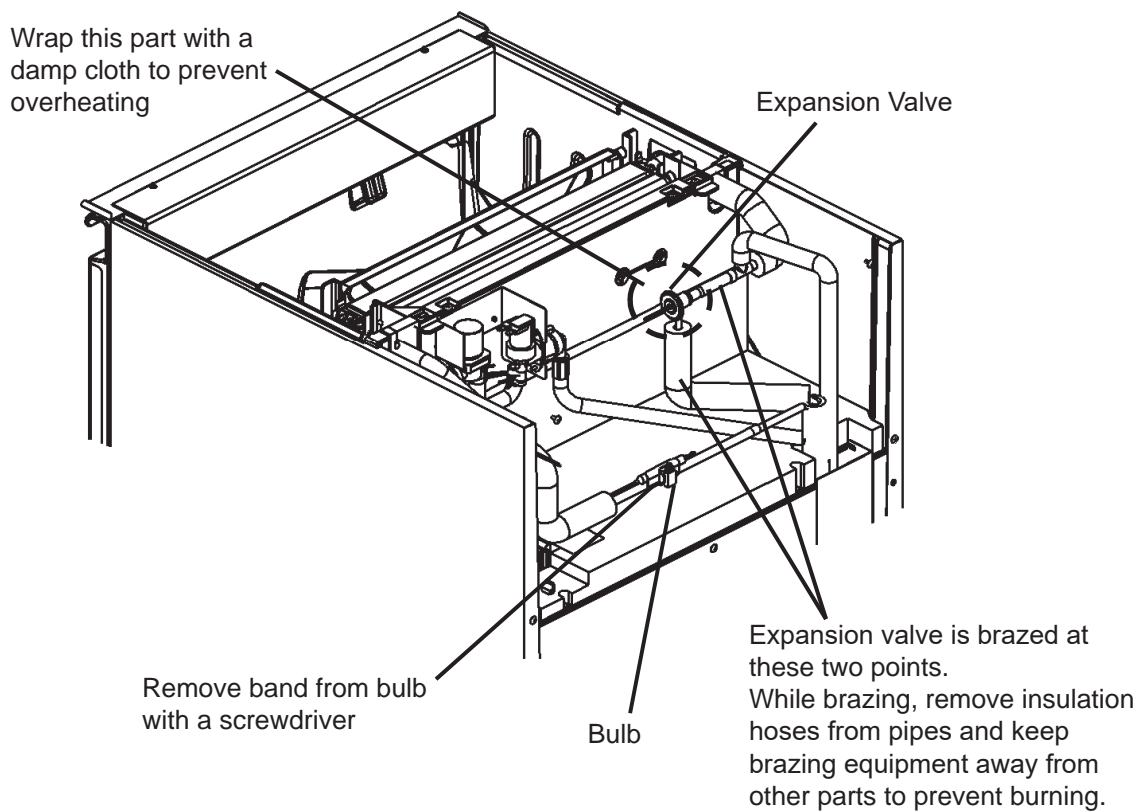
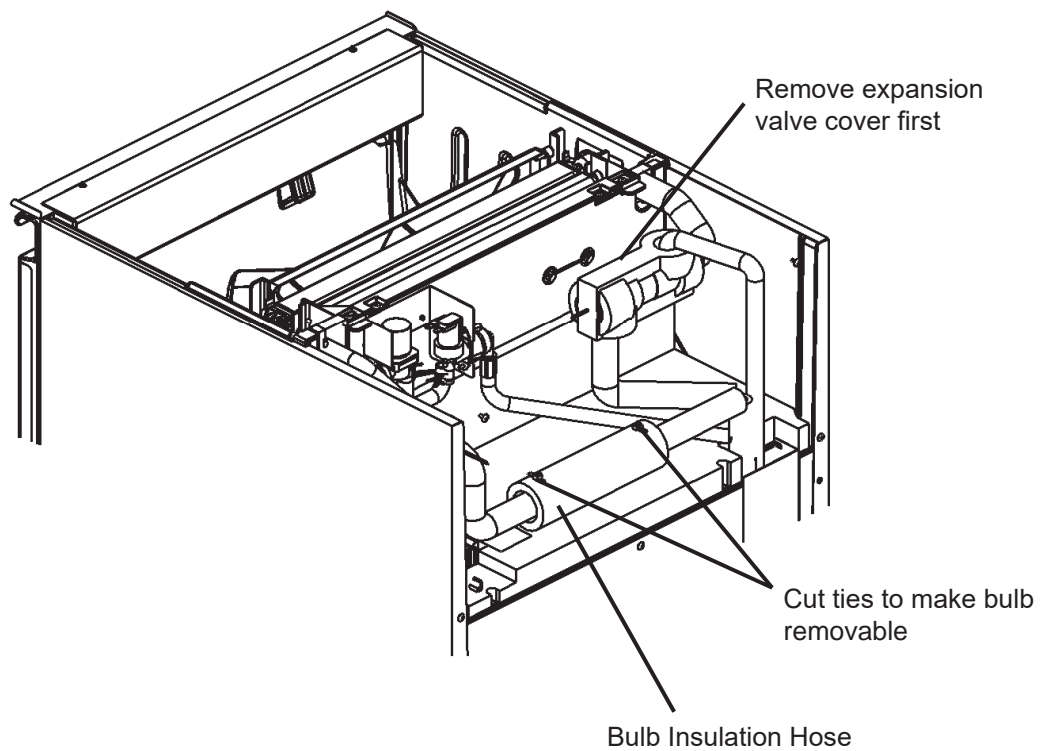
When it is required to disconnect the pipes using brazing equipment, be careful that the refrigerant in the oil left inside the pipes may burn.

- 5) Remove the insulation hose from the expansion valve sensor (bulb), and remove the bulb.
- 6) Remove the drier using brazing equipment.
- 7) Braze in the new expansion valve. Adjust the pipes to fit the expansion valve. Protect the body of the valve from excessive heat, and use nitrogen at a pressure of 0.2 - 0.3 bar when brazing.
- 8) Braze or solder the new drier (see "V. 4. DRIER").
- 9) Check for leaks using nitrogen gas (10 bar) and soap bubbles.
- 10) Evacuate the system and charge it with refrigerant (see "V. 1. [d] EVACUATION AND RECHARGE").
- 11) Attach the bulb to the suction line in position. Be sure to secure it using a wire or clamp and replace the insulation.
- 12) Replace the panels in their correct positions.
- 13) Plug in the icemaker.

WARNING

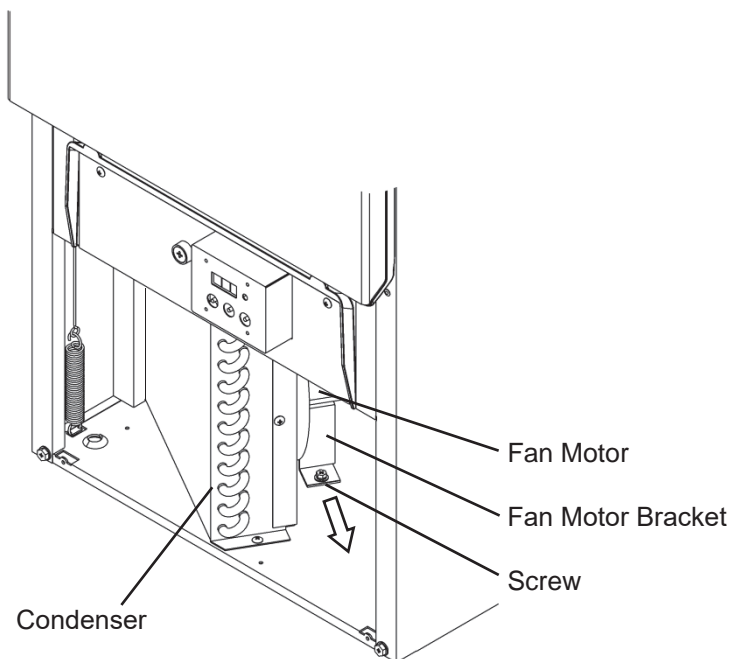
Always protect the valve body by using a damp cloth to prevent the valve from overheating. Do not braze with the valve body exceeding 115°C.

Top Rear View with Top and Rear Panels Removed



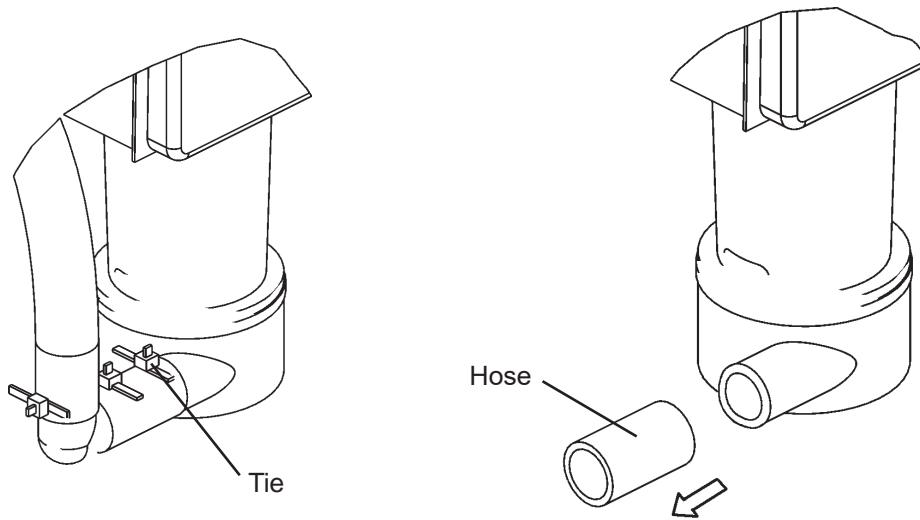
7. FAN MOTOR

- 1) Unplug the icemaker.
- 2) Remove the louver.
- 3) Disconnect the connector of the fan motor lead.
- 4) Remove the two screws securing the fan motor bracket, and pull out the fan motor in the arrow direction. To prevent deformation, do not hit the fan on the condenser or other parts.
- 5) Install the new fan motor in the reverse order of the removal procedure.
- 6) Refit the louver in its correct position.
- 7) Plug in the icemaker.

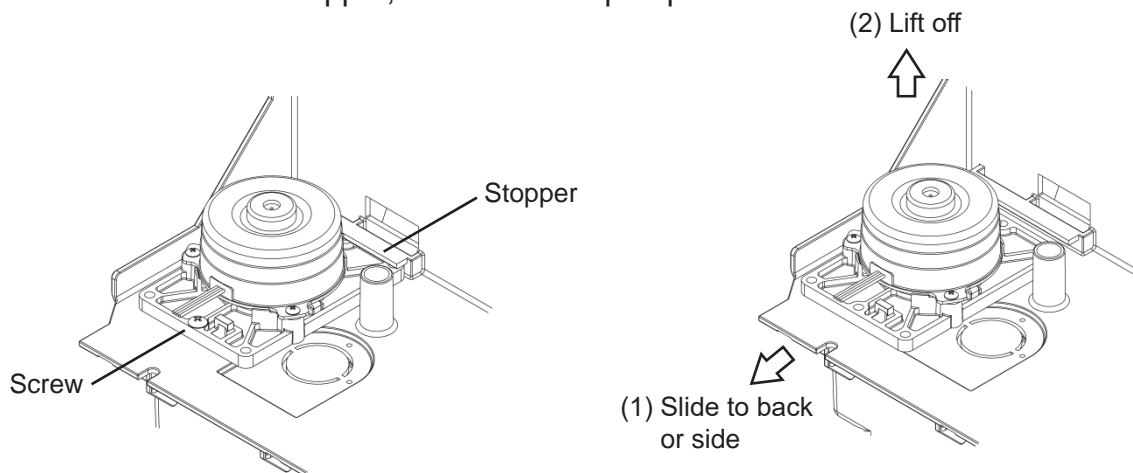


8. PUMP MOTOR

- 1) Unplug the icemaker.
- 2) Remove the top panel, and unscrew the rear panel.
- 3) Disconnect the connector of the pump motor lead.
- 4) Remove the water tank (see "V. 15. WATER TANK").
- 5) Remove the ties connecting the pump motor discharge outlet, and pull off the hose.



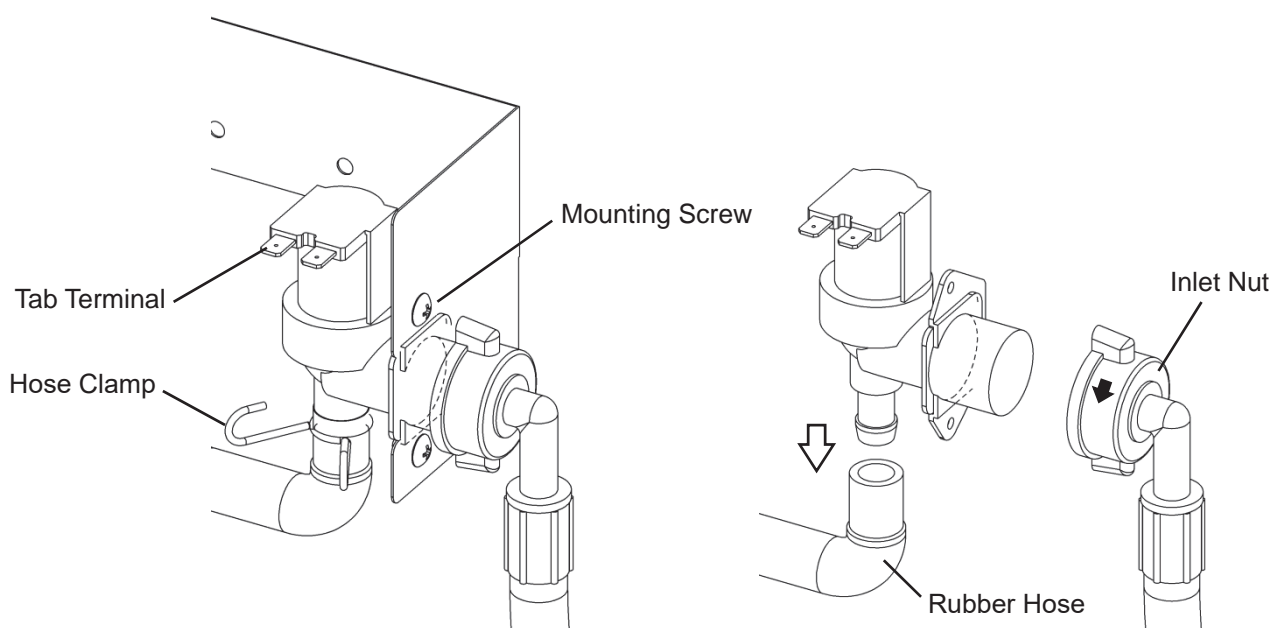
- 6) Remove the screw securing the pump motor. Shift the case to the back or side to release it from the stopper, and lift off the pump motor.



- 7) Install the new motor in the reverse order of the removal procedure.
- 8) Refit the water tank in its correct position.
- 9) Plug in the icemaker, and check for leaks.
- 10) Refit the panels in their correct positions.

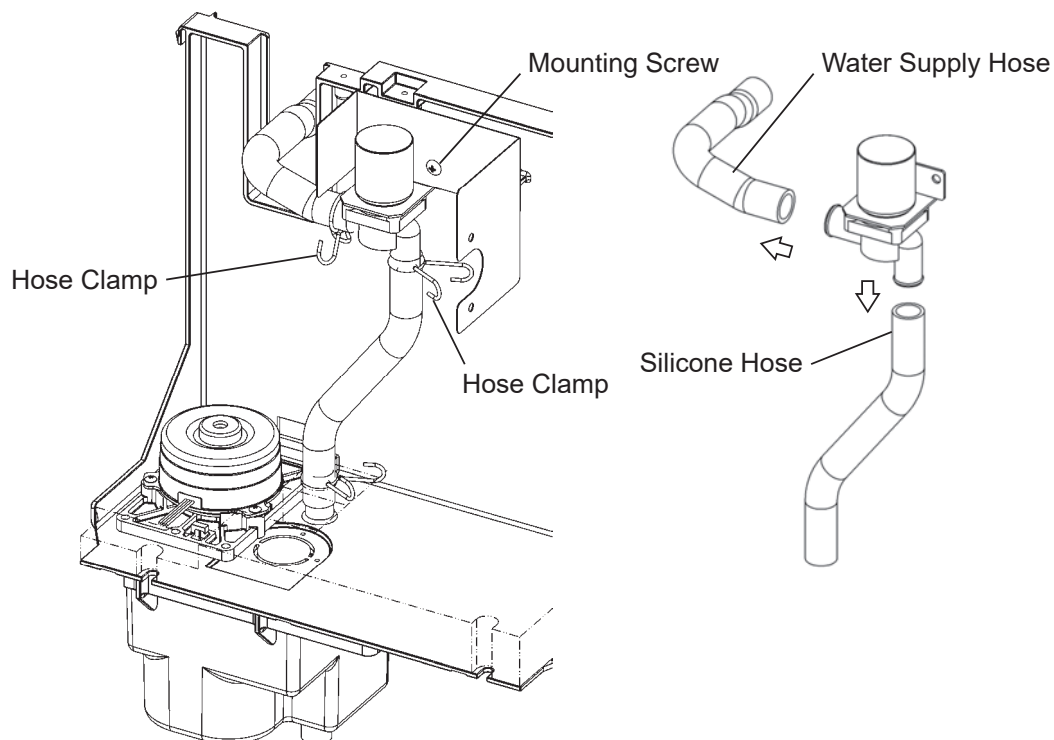
9. WATER VALVE

- 1) Unplug the icemaker.
- 2) Close the water supply tap.
- 3) Remove the top panel, and unscrew the rear panel.
- 4) Disconnect the tab terminals.
- 5) Pinch and lower the hose clamp.
- 6) Disconnect the rubber hose from the water valve. Put a towel under the water valve to receive water coming out.
- 7) Turn the inlet nut in the arrow direction to remove it from the water valve.
- 8) Remove the two mounting screws.
- 9) Install the new valve in the reverse order of the removal procedure.
- 10) Tighten the inlet nut to a torque of $7.85 \text{ N}\cdot\text{m}$ ($\pm 5\%$) to prevent water leaks.
- 11) Open the water supply tap.
- 12) Plug in the icemaker.
- 13) Check for leaks.
- 14) Refit the panels in their correct positions.



10. DRAIN VALVE

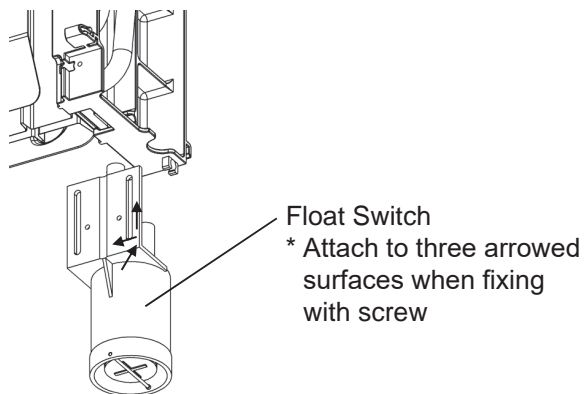
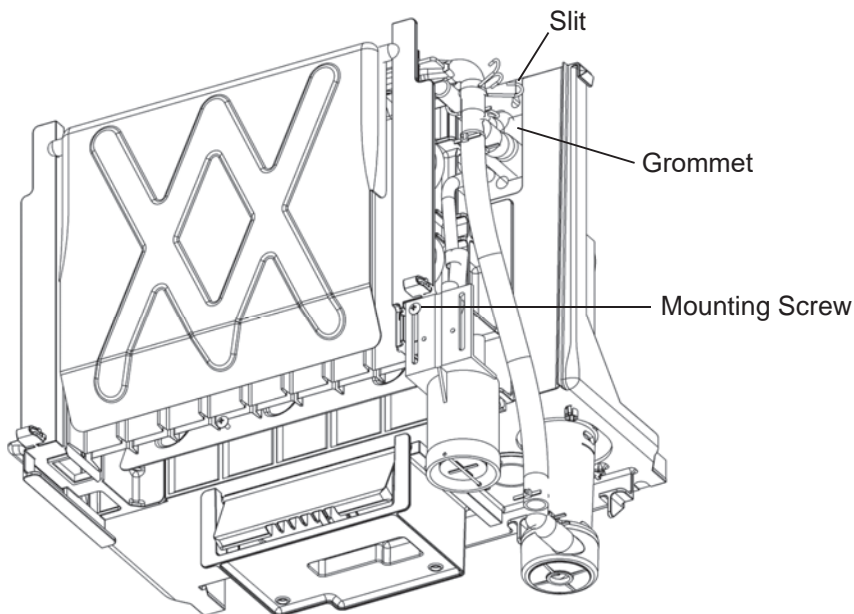
- 1) Unplug the icemaker.
- 2) Close the water supply tap.
- 3) Remove the top panel, and unscrew the rear panel.
- 4) Remove the water valve (see “V. 9. WATER VALVE”).
- 5) Disconnect the connectors (or tab terminals) of the drain valve lead.
- 6) Pinch and shift the two hose clamps.
- 7) Disconnect the hoses from the drain valve. Put a towel under the drain valve to receive any water coming out and prevent it from splashing out.
- 8) Remove the mounting screw.
- 9) Install the new valve in the reverse order of the removal procedure.
- 10) Open the water supply tap.
- 11) Plug in the icemaker.
- 12) Check for leaks.
- 13) Refit the panels in their correct positions.



11. FLOAT SWITCH

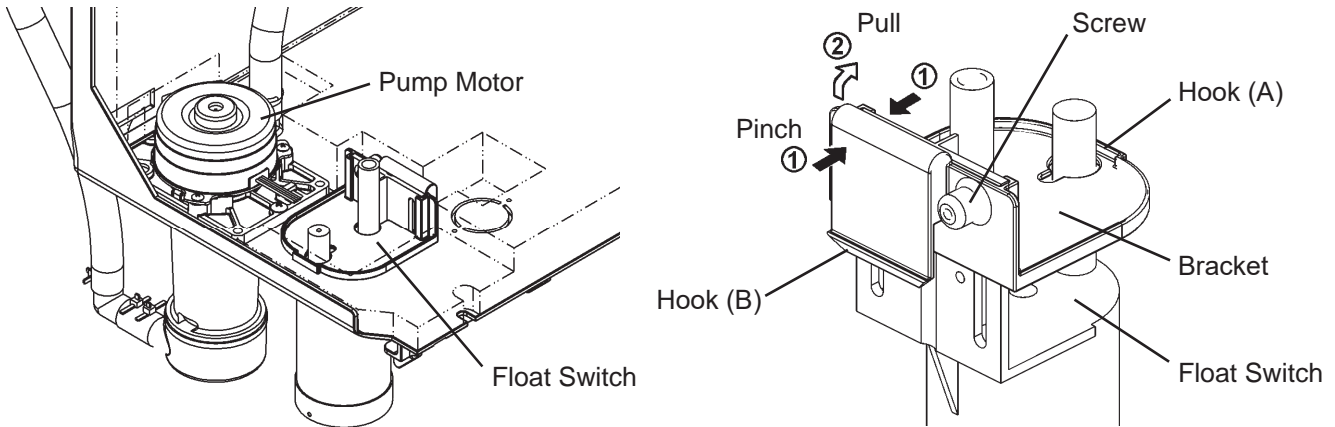
[a] KM-40C-HC, KM-60C-HC

- 1) Unplug the icemaker.
- 2) Remove the top panel, and unscrew the rear panel.
- 3) Disconnect the connector of the float switch lead and remove the lead wire from the grommet through the slit.
- 4) Remove the water tank (see "V. 15. WATER TANK").
- 5) Remove the screw securing the float switch.
- 6) Install the new float switch in the reverse order of the removal procedure.
- 7) Refit the panels in their correct positions.
- 8) Plug in the icemaker.

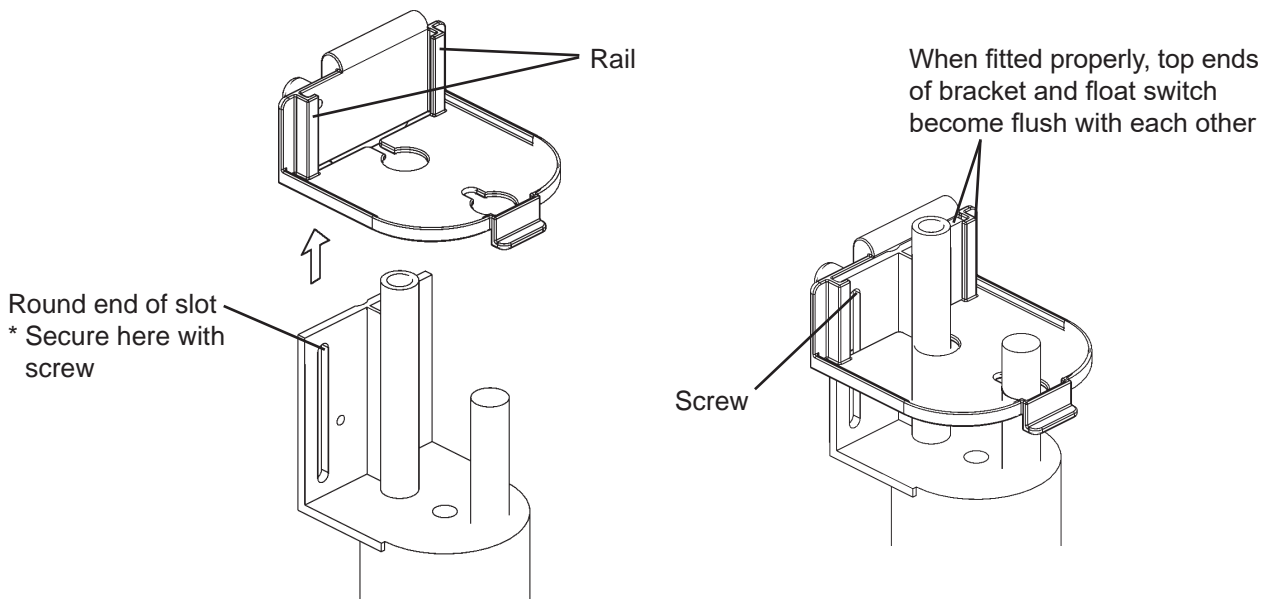


[b] KM-80C-HC, KM-140C-HC

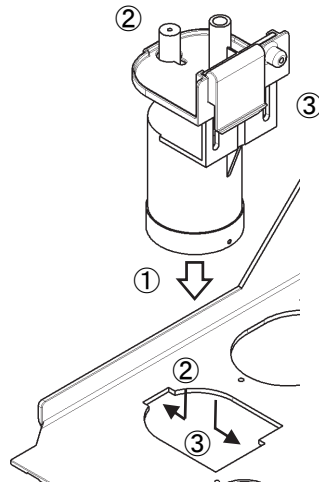
- 1) Unplug the icemaker.
- 2) Remove the top panel, and unscrew the rear panel.
- 3) Disconnect the connector of the float switch lead (gray).
- 4) The float switch is located next to the pump motor. Pinch the arrowed part (1) and pull it diagonally forward (2) to unhook the float switch.



- 5) Remove the screw securing the float switch to the bracket.
- 6) Attach the new float switch to the rail of the bracket. Secure them with the screw by fitting the round end of the slot to the screw hole.



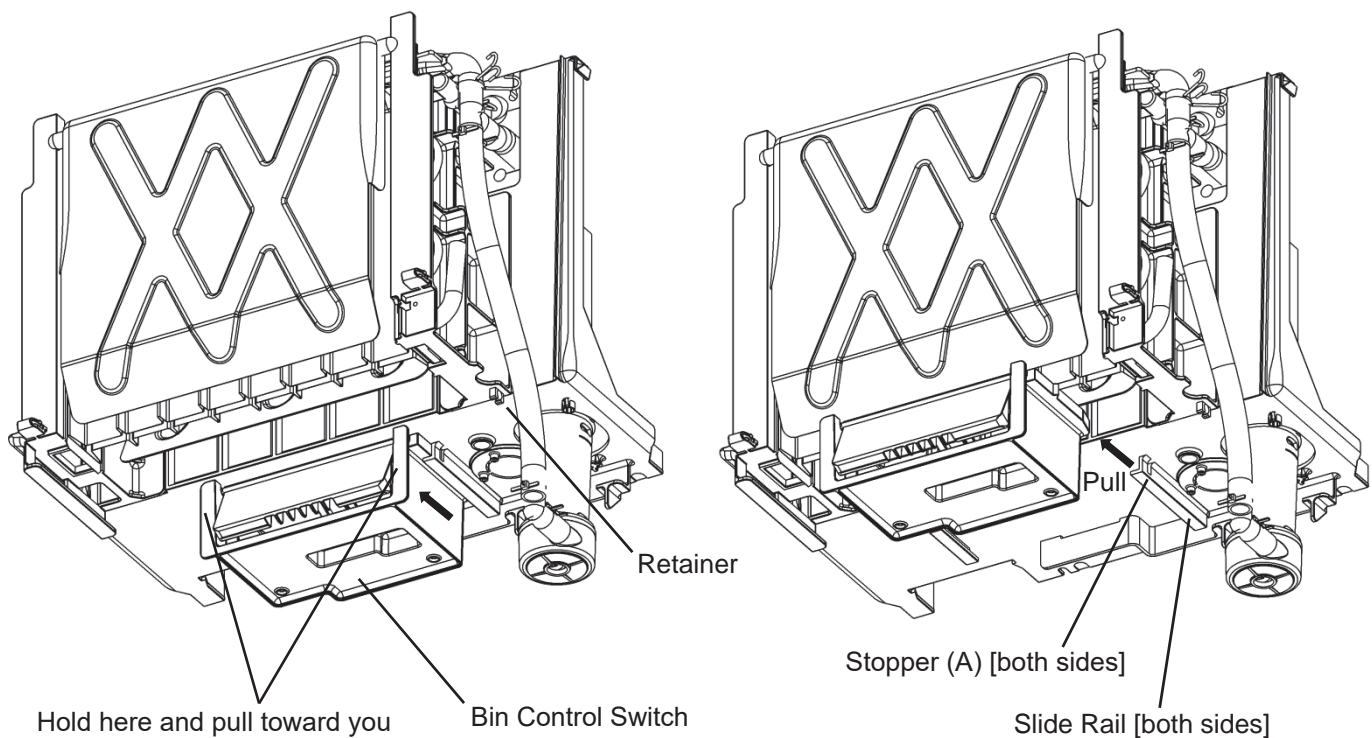
- 7) Put the float switch down into the mounting hole and hook it in position as shown. To ensure proper operation, be sure to fit the hook (A) under the mounting hole.
- 8) Refit the removed parts in the reverse order of the removal procedure.
- 9) Plug in the icemaker.



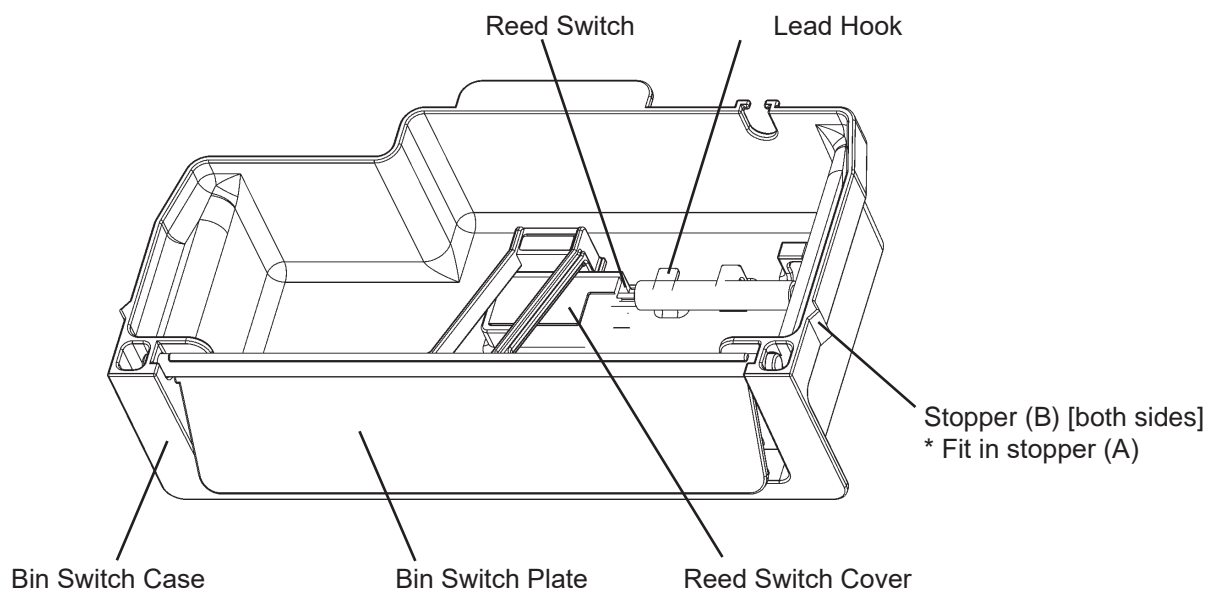
12. BIN CONTROL SWITCH

[a] KM-40C-HC, KM-60C-HC, KM-80C-HC

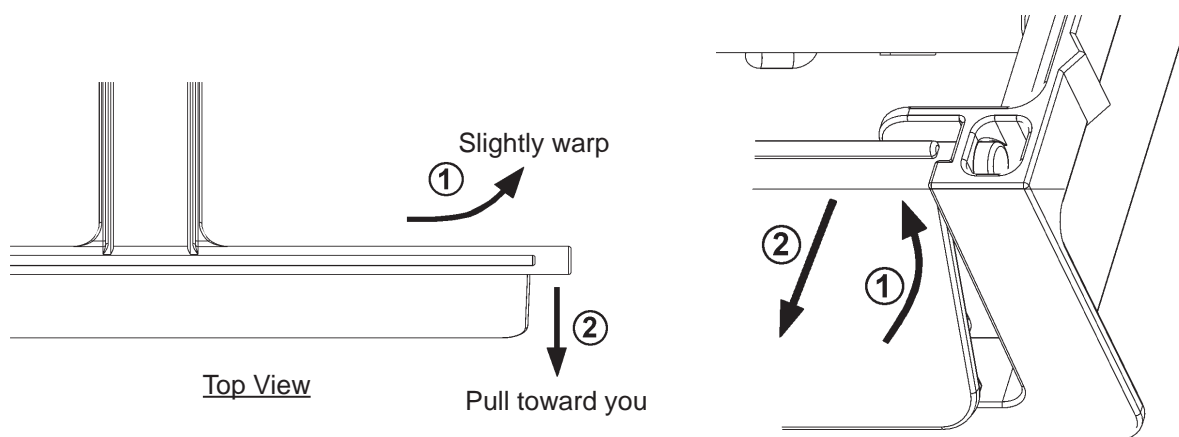
- 1) Unplug the icemaker.
- 2) Remove the top panel, and unscrew the rear panel.
- 3) Disconnect the connector of the bin control switch lead (black) covered with a silicone hose and remove the lead wire from the grommet.
- 4) Remove the water tank (see "V. 15. WATER TANK"). The bin control switch is located as shown below when viewed from the front.
- 5) Pull down and remove the lead wire from the retainer on the right side of the bin control switch.



- 6) Hold both sides of the bin control switch and pull it toward you.
- 7) The bin control switch (KM-40C-HC) pulled out of the storage bin has the internal structure as shown below.



8) To remove the bin switch plate, slightly warp both sides and pull the shaft toward you.

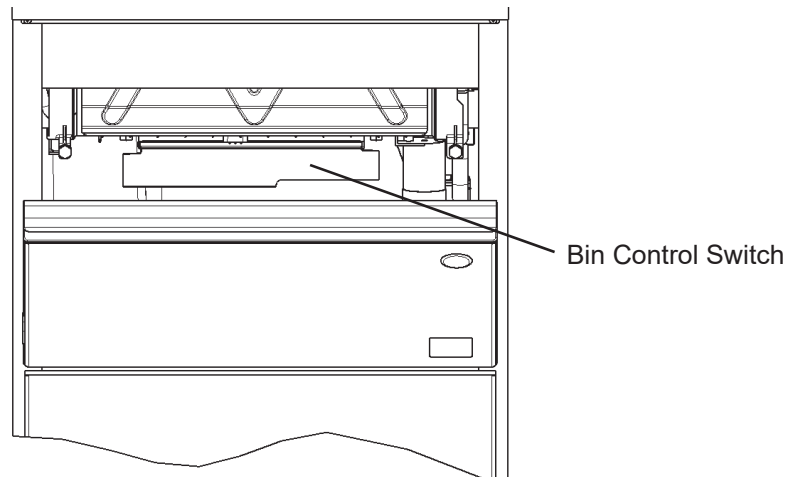


9) Refit the removed parts in the reverse order of the removal procedure. Be sure to put the lead wire back in the retainer on the bracket.

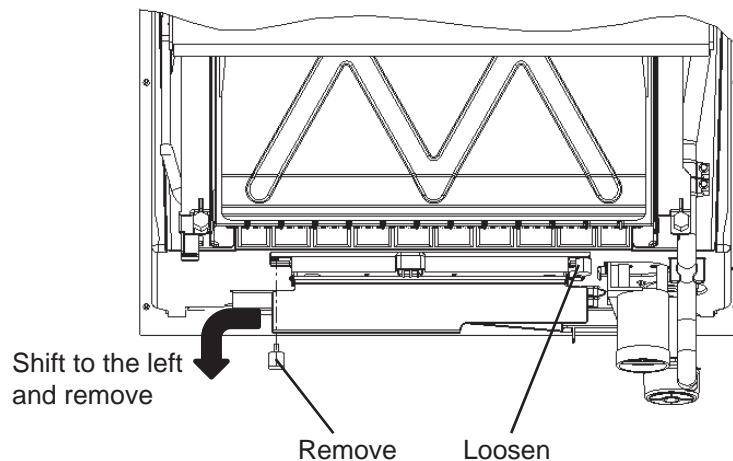
10) Plug in the icemaker.

[b] KM-140C-HC

- 1) Unplug the icemaker.
- 2) Remove the top panel, and unscrew the rear panel.
- 3) Disconnect the connector of the bin control switch lead (black) covered with a silicone hose and remove the lead wire from the grommet.
- 4) Remove the water tank (see “V. 15. WATER TANK”). The bin control switch is located as shown below when viewed from the front.



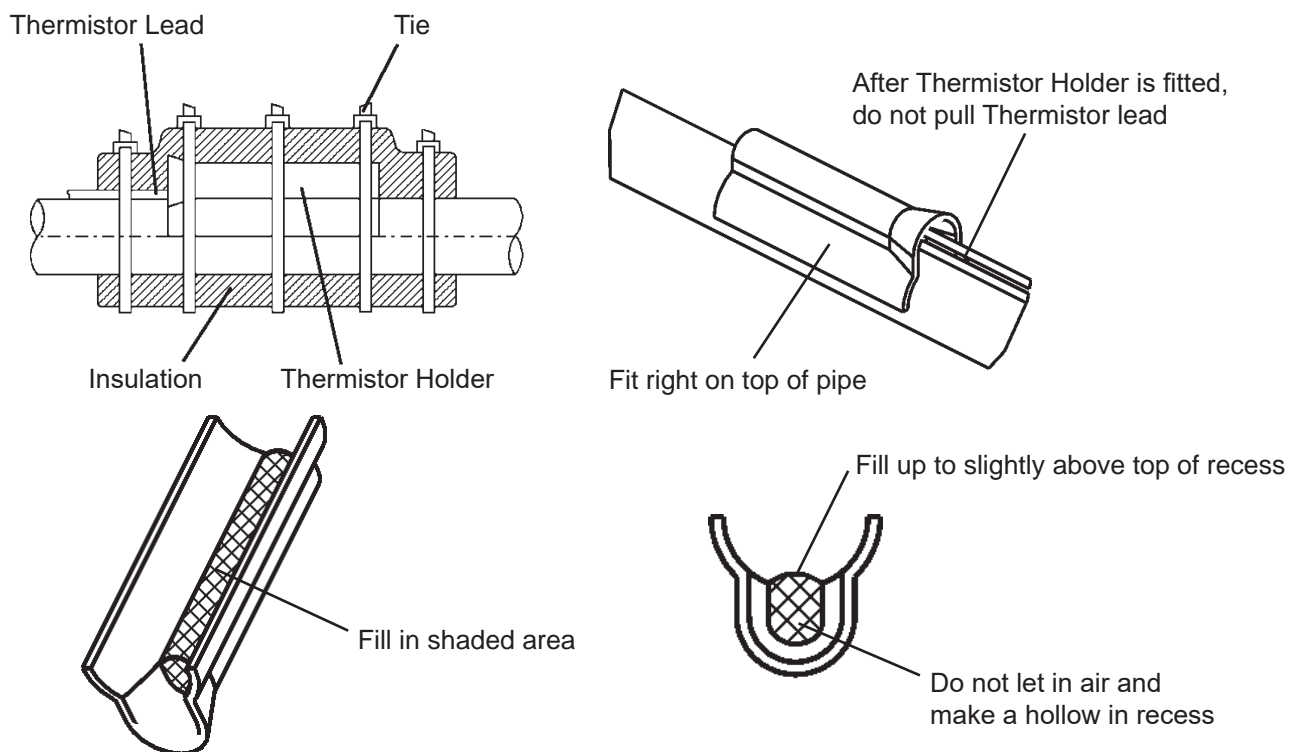
- 5) Loosen the thumbscrew on the right side.
- 6) Remove the thumbscrew on the left side. Shift the bin control switch to the left to remove.



- 7) Refit the removed parts in the reverse order of the removal procedure. Be sure to put the lead wire back in the retainer on the bracket.
- 8) Plug in the icemaker.

13. THERMISTOR

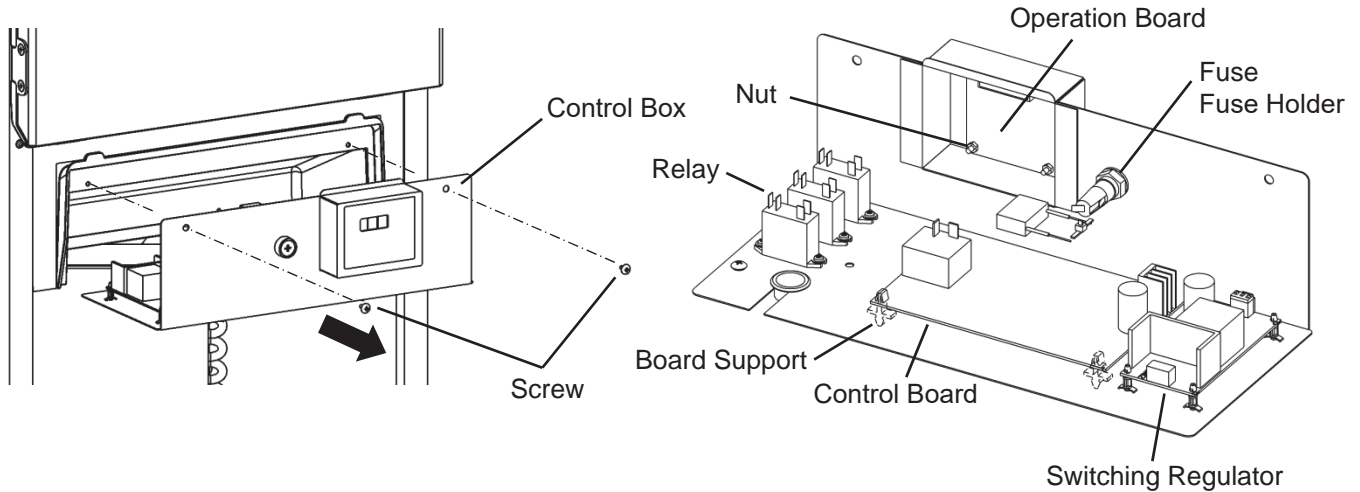
- 1) Unplug the icemaker.
- 2) Remove the top panel, and unscrew the rear panel.
- 3) Disconnect the connector of the thermistor lead (orange).
- 4) Remove the ties, insulation, thermistor holder, and thermistor in this order.
- 5) Remove the old sealant from the thermistor holder and suction pipe.
- 6) Wipe off any moisture or condensation from the suction pipe surfaces.
- 7) Press a tube of the sealant KE4560RTV, 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 suction pipe and press down the thermistor holder over the thermistor. Be careful not to damage the thermistor lead. Cover the parts with the insulation and secure them with the ties. 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) Plug in the icemaker.



14. CONTROL BOX

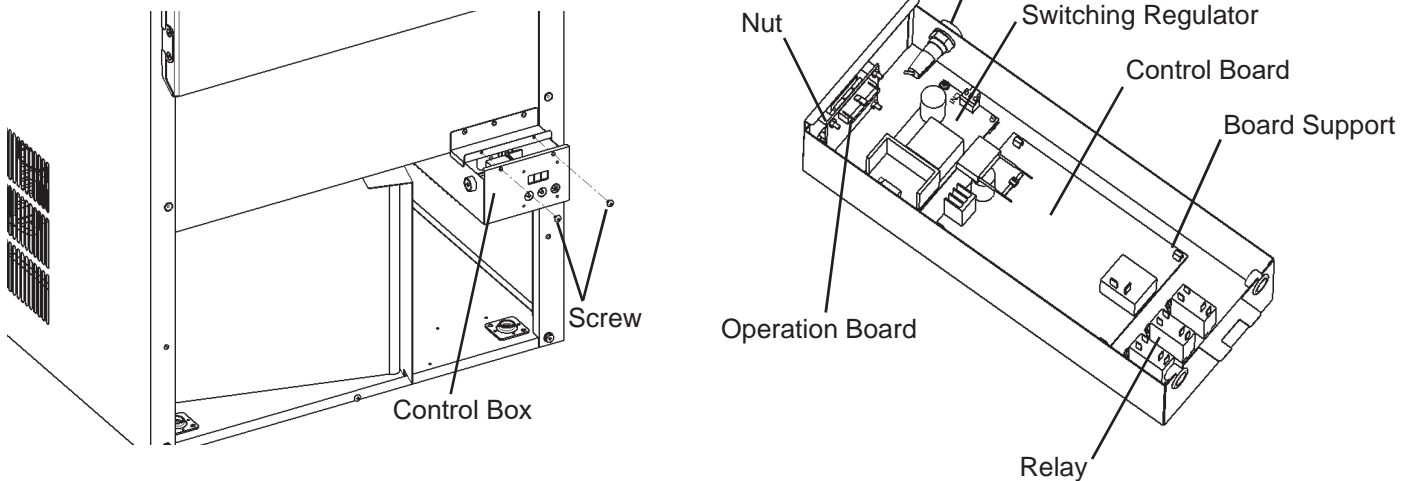
- 1) Unplug the icemaker.
- 2) Remove the louver.
- 3) Remove the two mounting screws, and pull the control box toward you.
- 4) To refit the control box, push it in horizontally.

[KM-40C-HC, KM-60C-HC, KM-80C-HC]



Control Box

[KM-140C-HC]



Control Box

Note: After replacing the components inside the control box, connect and tie the wires properly in their correct position. Especially make sure that the harness is not pinched between the parts.

[a] FUSE

- 1) Use a phillips head screwdriver to remove the fuse holder cap, and take out the fuse.
- 2) Install the new fuse in the reverse order of the removal procedure.

[b] FUSE HOLDER

- 1) Disconnect the tab terminal, and remove the nut securing the fuse holder.
- 2) Install the new fuse holder in the reverse order of the removal procedure.

[c] CONTROL BOARD

- 1) Disconnect all the connectors.
- 2) Release the control board from the board support.
- 3) Install the new control board in the reverse order of the removal procedure.
- 4) When reconnecting the connectors, do not push them too hard. The control board may be damaged.

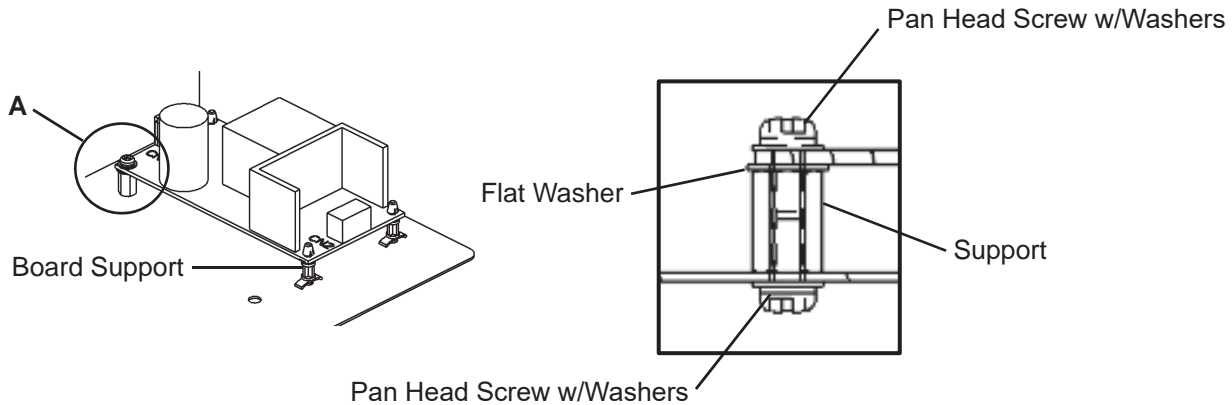
[d] OPERATION BOARD

- 1) Disconnect all the connectors.
- 2) Remove the four nuts, and release the operation board from the bolts.
- 3) Install the new operation board in the reverse order of the removal procedure.
- 4) When reconnecting the connectors, do not push them too hard. The operation board may be damaged.

[e] SWITCHING REGULATOR

- 1) Disconnect all the connectors.
- 2) Remove the mounting screw (see Detail A).

- 3) Release the switching regulator from the three board supports.
- 4) Install the new switching regulator in the reverse order of the removal procedure.
- 5) When reconnecting the connectors, do not push them too hard. The switching regulator may be damaged.



Detail A

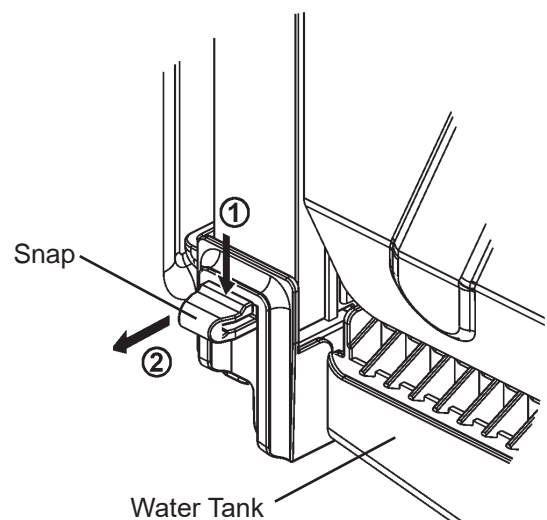
[f] RELAY

- 1) Disconnect the tab terminals.
- 2) Remove the mounting screw.
- 3) Install the new relay in the reverse order of the removal procedure.
- 4) To prevent miswiring, check the terminal numbers and lead wire colors with the wiring label.

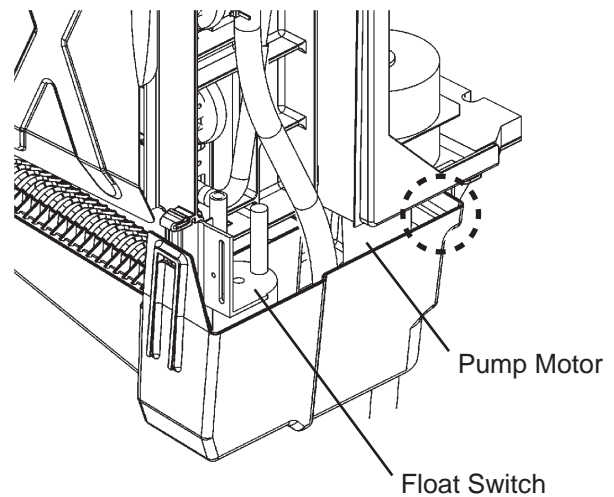
15. WATER TANK

[a] KM-40C-HC, KM-60C-HC, KM-80C-HC

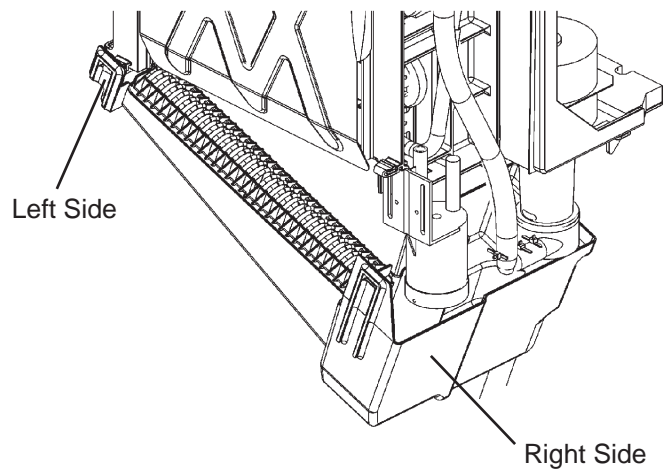
- 1) Unplug the icemaker. Remove all ice from the storage bin.
- 2) Drain out the water tank by performing the service mode code 59 (forced drain) for several tens of seconds. See "II. 3. [e] SERVICE MODE".
- 3) Pinch and push down the snaps on both sides of the bracket to unhook the water tank from the square holes, and pull it about 3 cm toward you.



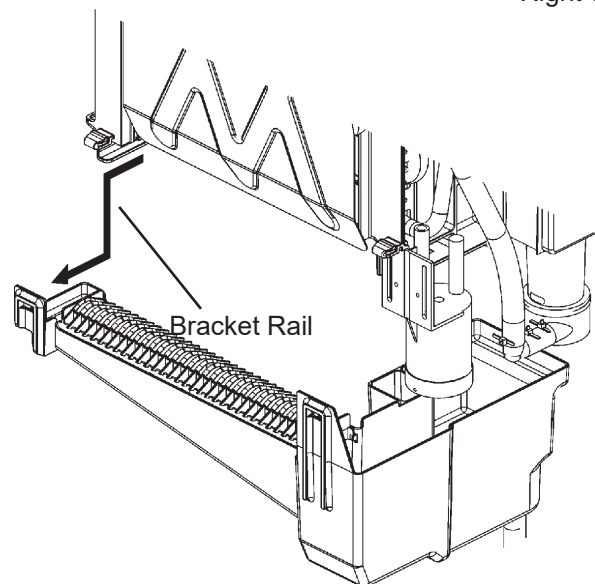
- 4) When the snaps are unhooked from the square holes, the rear part of the water tank (dotted circle below) is also unhooked. Hold the water tank with both hands.



- 5) Tilt the right side of the water tank and pull it toward you. Do not hit the pump motor or float switch. Slightly twist the left side of the water tank inward and pull it toward you.



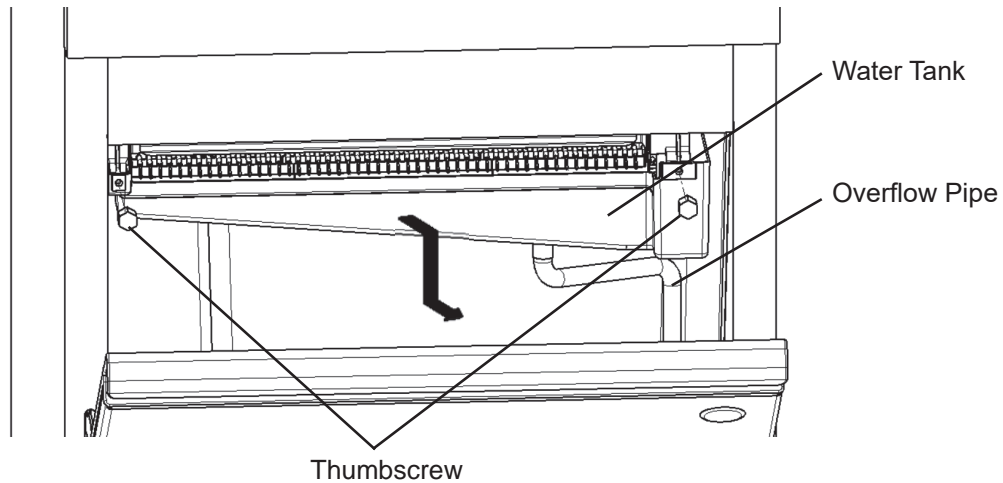
- 6) Slide the left side of the water tank to release it from the bracket rail, lift down the entire water tank, and pull it toward you out of the storage bin. Do not hit the other components.
- 7) Refit the water tank in the reverse order of the removal procedure (left, right, top, rear).



- 8) Plug in the icemaker.

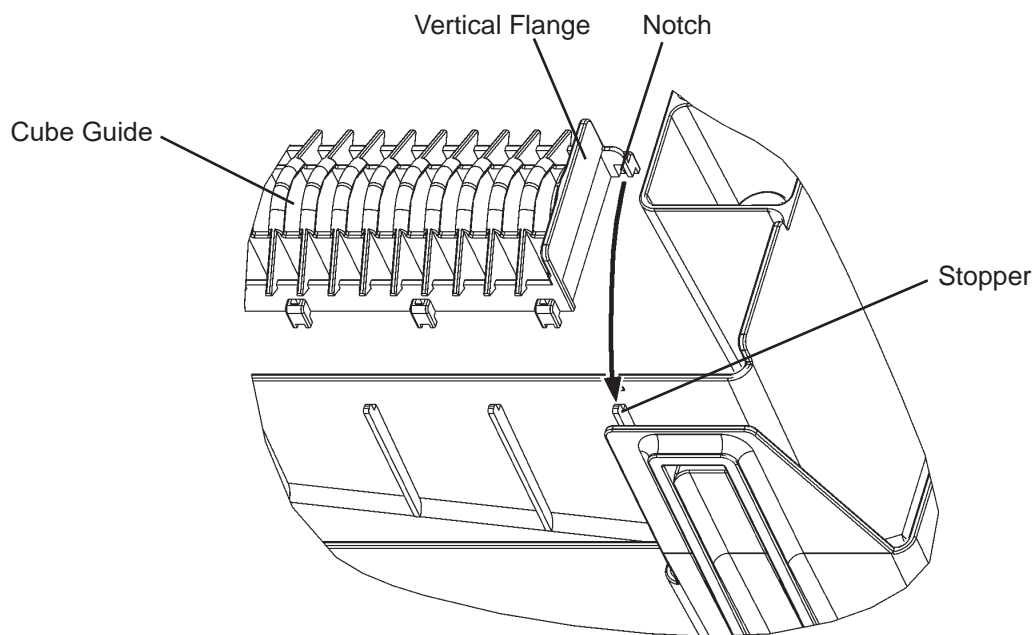
[b] KM-140C-HC

- 1) Unplug the icemaker. Remove all ice from the storage bin.
- 2) Drain out the water tank by performing the service mode code 59 (forced drain) for several tens of seconds. See “II. 3. [e] SERVICE MODE”.
- 3) Disconnect the overflow pipe.
- 4) Remove the two thumbscrews. Pull the water tank slightly toward you and push it down. Be careful to avoid breakage when handling the parts.
- 5) Refit the water tank in the reverse order of the removal procedure.
- 6) Plug in the icemaker.



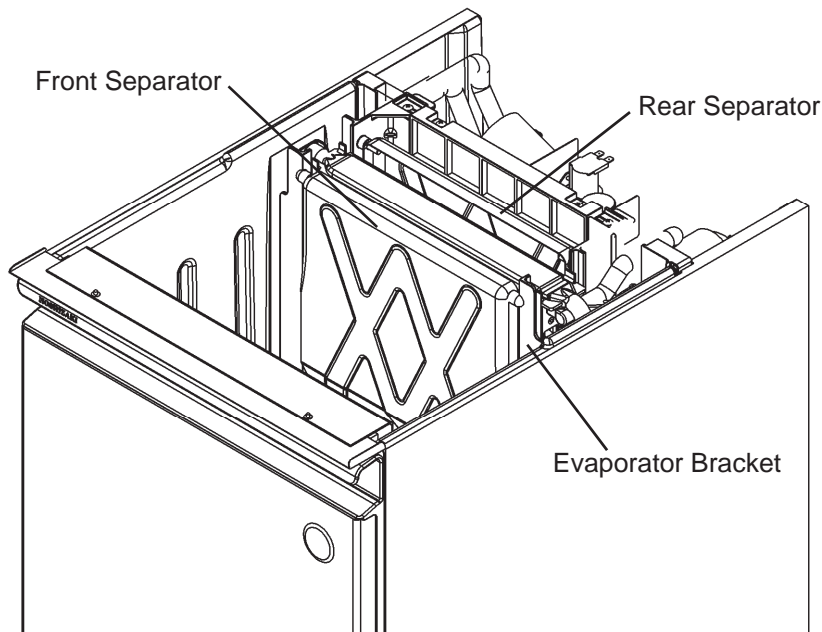
16. CUBE GUIDE

- 1) Remove the water tank (see "V. 15. WATER TANK").
- 2) Lift off the cube guide out of the water tank.
- 3) To refit the cube guide, fit the notches on both sides to the stoppers in the water tank.
- 4) The unit is provided with two or three cube guides (quantity varies depending on model). Be sure to locate the vertical flanges on both sides.



17. SEPARATOR

- 1) Unplug the icemaker.
- 2) Remove the top panel.
- 3) Hold both sides of the separator from the top. Bend the front separator into a U-shape and remove it from the shaft of the evaporator bracket. Bend the rear separator into an inverted U-shape and lift it off the shaft of the evaporator bracket.
- 4) Refit the separator in the reverse order of the removal procedure. Check that the separator is fit correctly on the shaft and can swing like a pendulum.
- 5) Plug in the icemaker.



18. SPRAY TUBE, WATER SUPPLY PIPE, SPRAY GUIDE

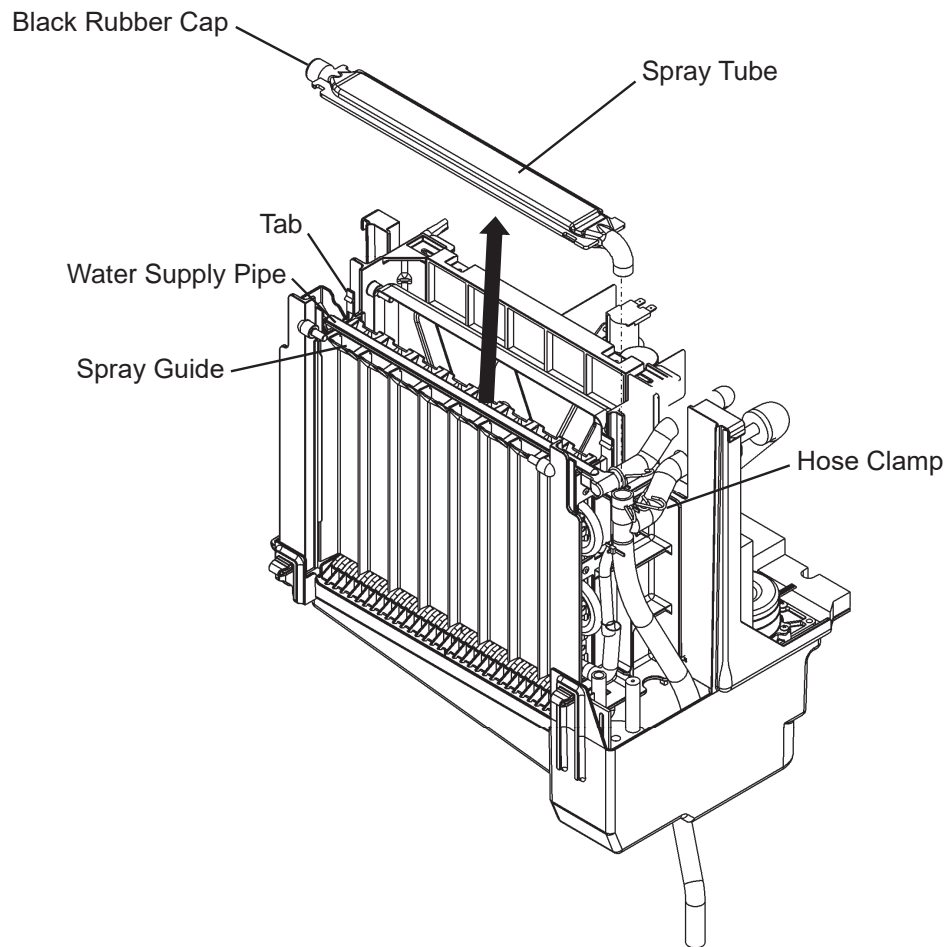
- 1) Unplug the icemaker. Remove the top panel.
- 2) Push the tabs on both sides to release the spray tube.
- 3) Remove the end of the spray tube from the bracket.
- 4) Pinch and lower the hose clamp and disconnect the hose. The spray tube is easily cleanable by removing the black rubber cap on the end.
- 5) The water supply pipe is located right under the spray tube. Remove the water supply pipe from the evaporator, pinch and shift the hose clamp, and disconnect the hose.
- 6) The spray guide is located under the water supply pipe. Pull off the spray guide from the evaporator plate.
- 7) Refit the removed parts in the reverse order of the removal procedure. Check for water leaks.

IMPORTANT

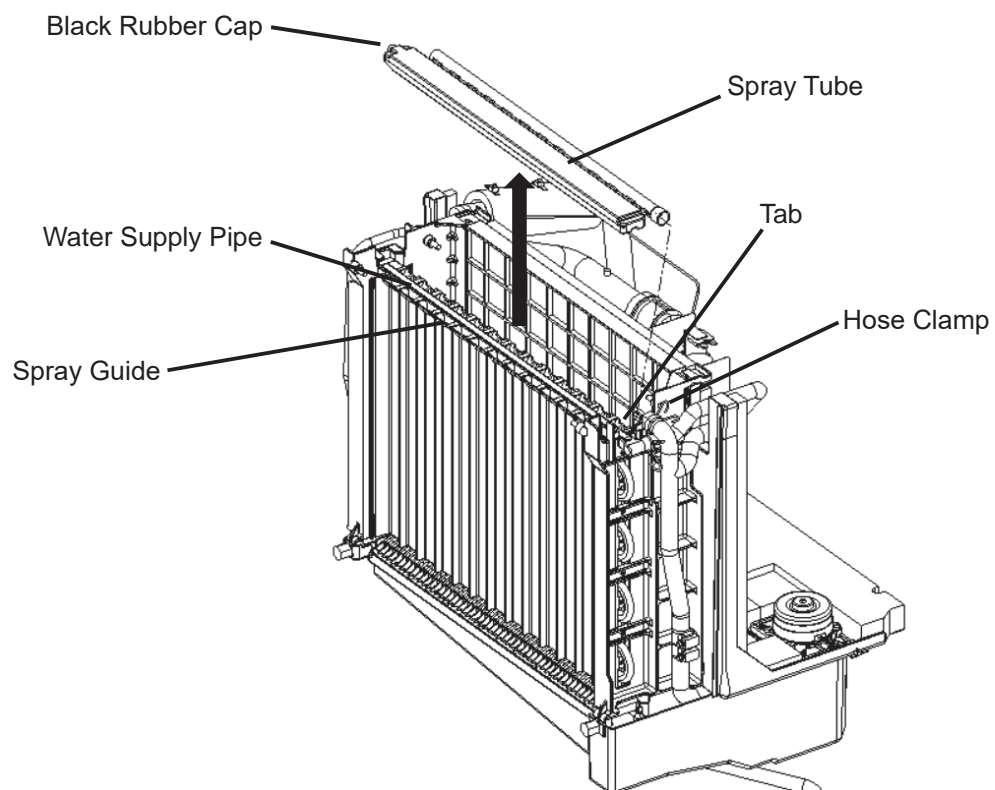
Fit the spray guide securely and tightly on the evaporator fin. Otherwise, cloudy or irregular ice cubes or performance reduction may be caused.

- 8) Plug in the icemaker.

[KM-40C-HC, KM-60C-HC, KM-80C-HC]



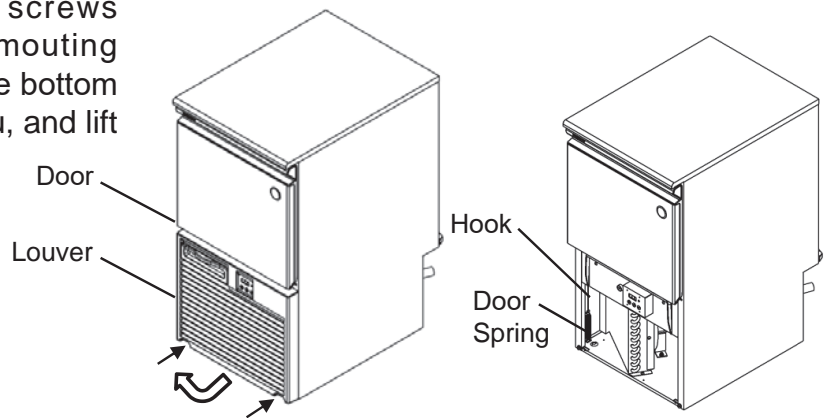
[KM-140C-HC]



19. DOOR, DOOR STOPPER, DOOR SPRING, HOOK, SLOPE, LOUVER

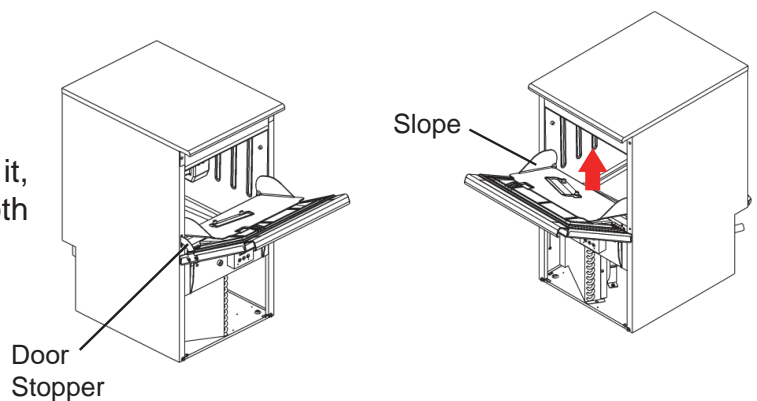
- 1) Remove the two mounting screws [KM-40/60/80C-HC] or one mounting screw [KM-140C-HC]. Hold the bottom of the louver, pull it toward you, and lift it off (1 cm).

- 2) Unhook the door spring.



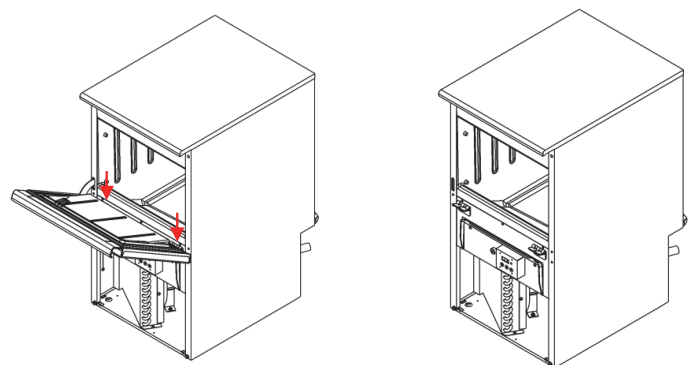
- 3) Open the door.

- 4) Lift up the center of the slope, warp it, and release it from the shaft on both sides.



- 5) Remove the two mounting bolts securing the door to the hinges.

- 6) Remove the door from the hinges. Pull the door stopper and hook together out of the icemaker.

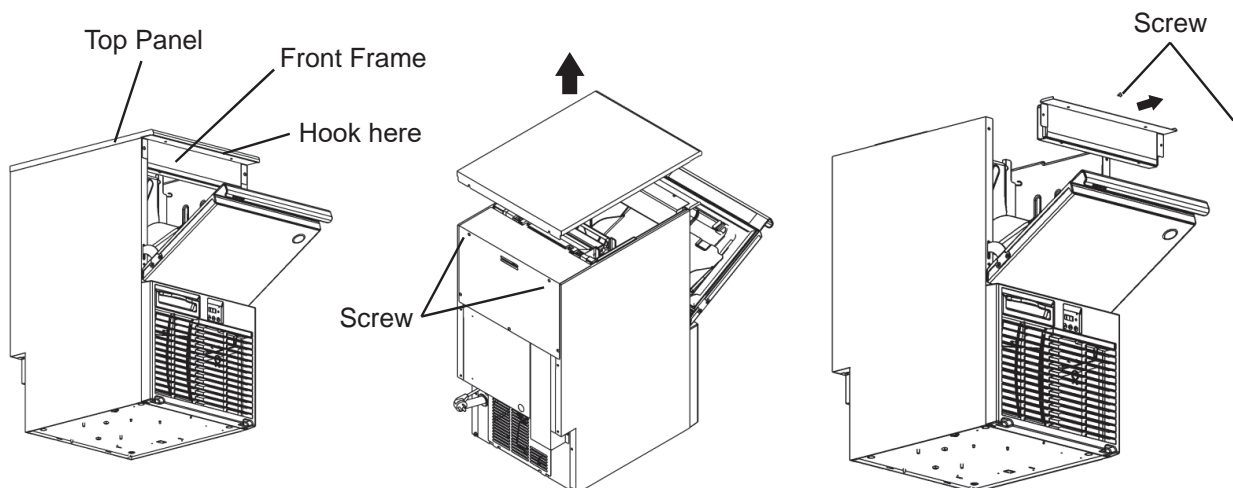


- 7) Refit the removed parts in the reverse order of the removal procedure.

* The above illustrations show KM-40/60/80C-HC.

20. TOP PANEL, FRONT FRAME

- 1) Loosen the two screws at the rear [KM-40/60/80C-HC] or front [KM-140C-HC] of the icemaker, and remove the top panel.
- 2) Remove the two screws, and take off the front frame [KM-40/60/80C-HC only].
 - * The front frame is not removable for KM-140C-HC.
- 3) Refit the removed parts in the reverse order of the removal procedure.
 - * Hook the top of the front frame on the top panel.



VI. CLEANING AND MAINTENANCE INSTRUCTIONS

IMPORTANT

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

1. CLEANING

WARNING

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

[a] ICEMAKING WATER SYSTEM

CAUTION

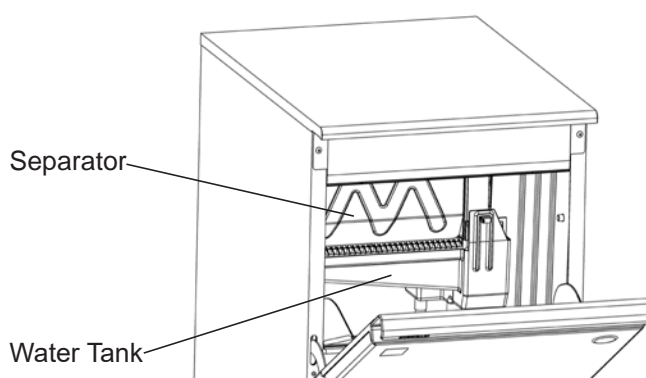
Wear protective equipment (e.g. protective glasses) when using the citric acid or sodium hypochlorite solution. The solution may spout out and splash into your eyes. In that case, wash your eyes with clean water.

NOTICE

If the citric acid solution is found dripping on the sheet metal parts, wipe it off thoroughly to prevent rust.

- 1) Prepare the required amount of 2% citric acid solution for cleaning (descaling) according to step 4).

2) Open the door, and remove all ice from the storage bin. Check that the separator is attached in its correct position as shown. Otherwise, the solution may splash onto the ice in the storage bin.



3) Press and hold the cleaning button for 3 seconds. The display flashes the current mode. For example, the display showing “run” during the icemaking operation starts to flash “run”.

4) When the display changes to “cln”, pour the following amount of solution into the water tank carefully not to overflow it.

Model	2% citric acid solution or sodium hypochlorite solution	Required amount of concentrate	
		Citric acid powder	5.25% sodium hypochlorite
KM-40C-HC	2.0 litres	40 g	7 ml
KM-60C-HC	2.5 litres	50 g	9 ml
KM-80C-HC	3.0 litres	60 g	11 ml
KM-140C-HC	3.5 litres	70 g	13 ml

5) Rinse the bin liner with clean water to remove any solution spilled in the storage bin. Then, close the door.

6) Press the cleaning button (or wait for 15 minutes) to start the automated chemical cleaning.

7) The unit resumes the original state when the cleaning is over.

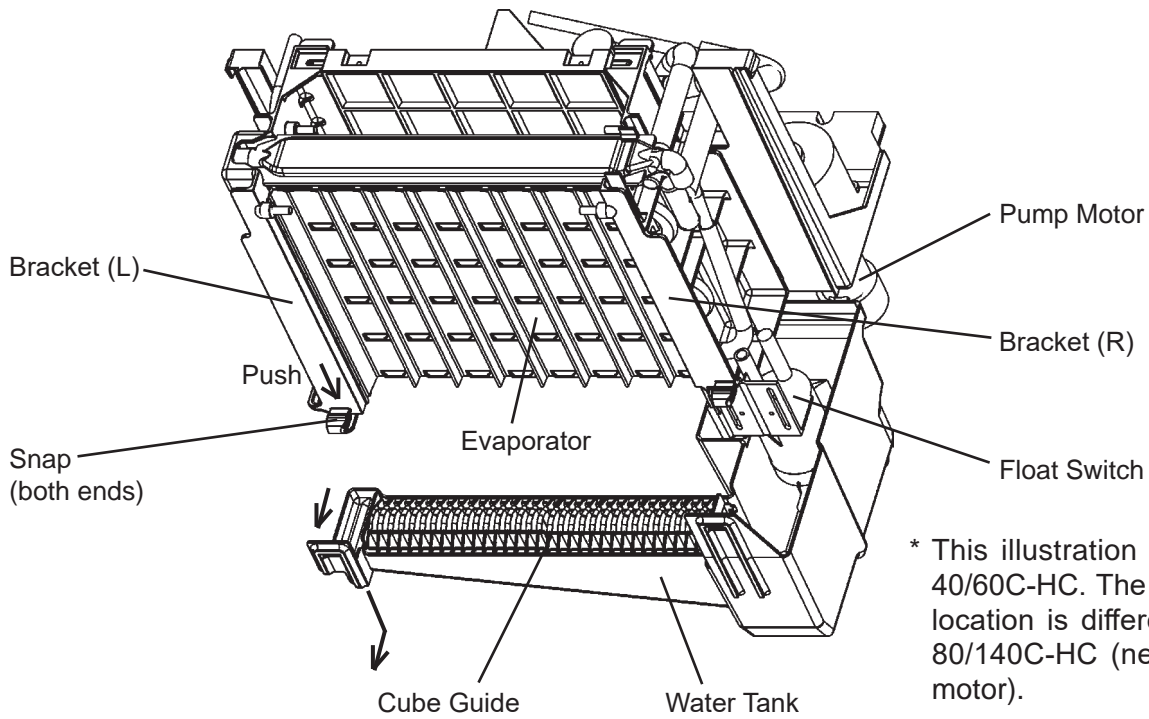
8) Prepare the required amount of sodium hypochlorite solution for sanitising according to step 4).

9) Repeat the above steps 3) to 7).

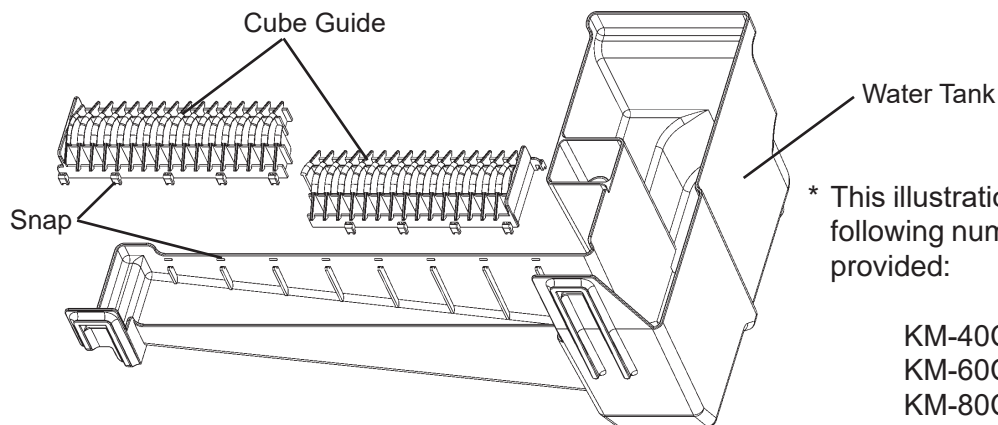
[b] PARTS

1) Disconnect the overflow pipe from the water tank. Next, remove the water tank by pressing down on the snaps on the brackets (L) and (R) and pulling the tank towards you slightly and pushing it down. Be careful to avoid breakage when handling the parts.

2) Pull the cube guides (quantity varies depending on model) upward to remove them from the water tank. They are snapped in place.

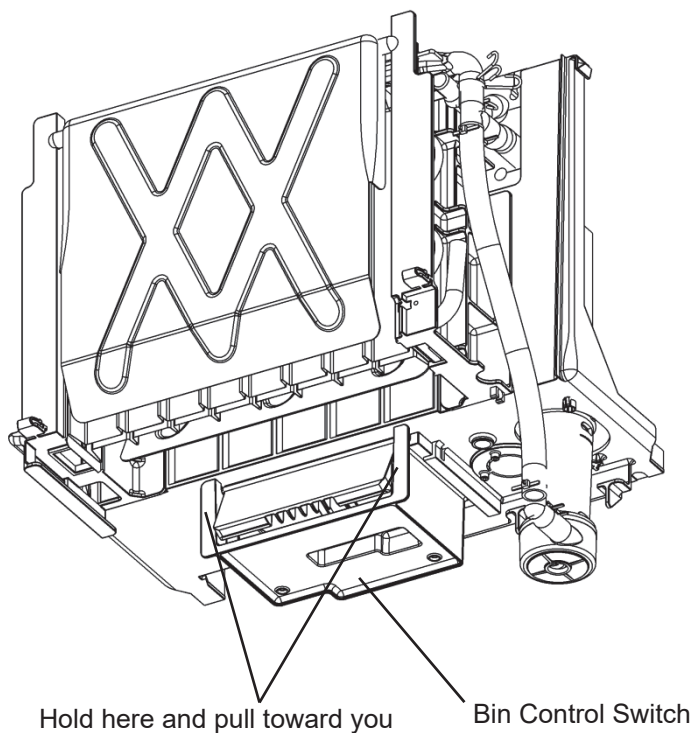


* This illustration shows KM-40/60C-HC. The float switch location is different for KM-80/140C-HC (next to pump motor).



* This illustration shows KM-40C. The following number of cube guides are provided:

KM-40C-HC	2 pcs
KM-60C-HC	3 pcs
KM-80C-HC	3 pcs
KM-140C-HC	3 pcs



* This illustration shows KM-40/60/80C-HC. For KM-140C-HC, see "V. 12. BIN CONTROL SWITCH".

- 3) Prepare 3 litres of 2% citric acid solution for cleaning (descaling).
- 4) Wash the bin control switch, water tank, float switch, cube guide and overflow pipe by using a nylon scouring pad, brushes and the solution. In addition to the removed parts, also wash the bin liner and brackets (L) and (R) with the solution.
- 5) Discard the solution and rinse the parts thoroughly with water.
- 6) Dilute 11 ml of 5.25% sodium hypochlorite solution with 3 litres of water for sanitising.
- 7) Repeat the above steps 4) to 5).

2. MAINTENANCE

[a] MACHINE AND BIN EXTERIOR

Wipe the exterior at least once per week with a clean, soft cloth. Use a damp cloth containing a neutral cleaner to wipe off grease or dirt.

[b] SCOOP AND STORAGE BIN HANDLE CLEANING/SANITISATION (DAILY)

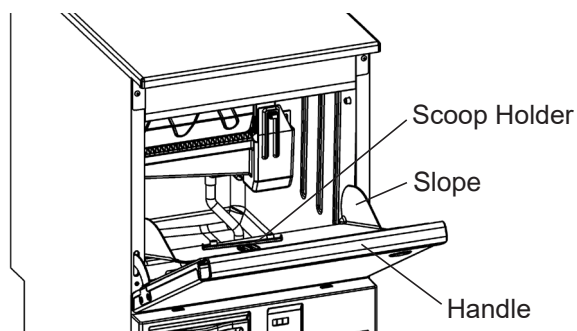
- 1) Either mix 3 litres of water with 11 ml of 5.25% sodium hypochlorite solution in a suitable container, or the recommended Hoshizaki sanitiser as directed.
- 2) Soak the scoop in the solution for more than 3 minutes. Rinse thoroughly, and shake to remove surplus liquid.

Note: Using a cloth to dry may re-contaminate.

- 3) Use a neutral cleaner to wash the storage bin handle. Rinse thoroughly.
- 4) Soak a clean cloth with the sanitising solution, and wipe the handle. Use fresh water and a clean cloth to rinse/dry.

[c] STORAGE BIN INTERIOR CLEANING/SANITISATION (WEEKLY)

- 1) Open the storage bin door, and remove all ice.
- 2) Remove the scoop holder from the slope.
- 3) Wash the bin liner and scoop holder with a neutral non-abrasive cleaner. Rinse thoroughly.

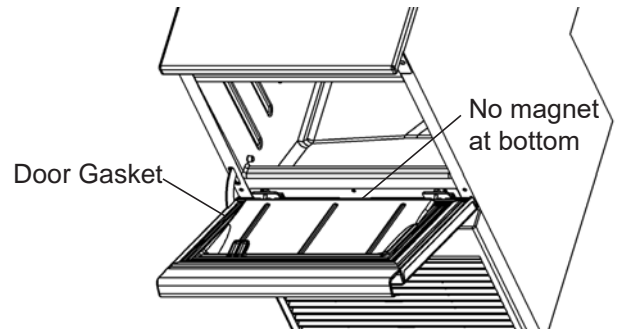


- 4) Soak a clean cloth with the neutral cleaner, and wipe both sides of the slope and the door inner surface. Wipe off the cleaner with a clean damp cloth.
- 5) Either mix 3 litres of water with 11 ml of 5.25% sodium hypochlorite solution in a suitable container, or the recommended Hoshizaki sanitiser as directed.
- 6) Soak a clean sponge or cloth with the solution, and wipe the bin liner, bin door, slope and scoop holder.

Note: Clean every surface of the door gasket which gets soiled easily. It is readily removable for cleaning.

IMPORTANT

The door gasket is provided with a magnet at the top and both sides. To ensure air tightness of the door, refit the gasket properly in its correct position.



- 7) The remaining solution can be used to sanitise utensils.

Note: Do not wipe dry or rinse after sanitising, but allow to air dry.

[d] AIR FILTER

Plastic mesh air filters remove dirt or dust from the air, and keep the condenser from getting clogged. If the filters get clogged, the icemaker's performance will be reduced. Remove and clean the air filter(s) at least twice per month:

- 1) Remove the air filter.

Note: Do not put your hand inside the machine compartment.

- 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.

NOTICE

After cleaning, be sure to place the air filter back in position.

[e] CONDENSER

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

3. PREPARING THE ICEMAKER FOR LONG STORAGE

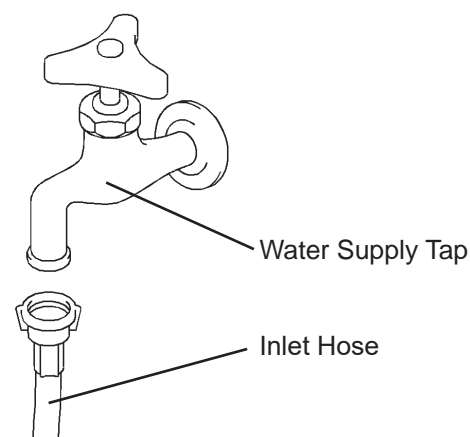
IMPORTANT

When shutting off the icemaker for an extended time, drain out all water from the water lines and remove the ice from the storage bin. The storage bin should be cleaned and dried. Drain the water supply lines to prevent their damage at sub-freezing temperatures. Shut off the icemaker until the proper ambient temperature is resumed.

When the icemaker is not used for two or three days, it is sufficient to only press the ON/OFF button to go into the halt control, unless the icemaker will be at sub-freezing temperatures.

[a] Remove the water from the potable water supply line:

- 1) Press the ON/OFF button to start the halt control.
- 2) Unplug the icemaker.
- 3) Close the water supply tap, and remove the inlet hose.
- 4) Remove all ice from the storage bin, and clean the bin.



[b] Drain the potable water tank:

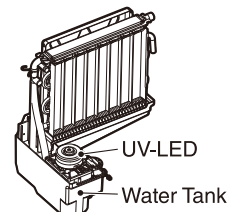
- 1) Turn off the power supply at the breaker box.
- 2) Disconnect the overflow pipe from the water tank. Next, remove the water tank by pressing down on the snaps on the brackets (L) and (R) and pulling the tank towards you slightly and pushing it down. Be careful to avoid breakage when handling the parts.
- 3) Drain the water tank, and refit the removed parts in their correct positions.
- 4) Clean the bin.

VII. UV-LED OPTIONAL KIT INSTALLATION

UV-LED Optional Kit Installation Sheet

UV-LED

The UV-LED emits deep-UV (UVC) radiation with a wavelength of 260 - 270 nm which is highly effective for disinfection. UVC radiation is directly emitted to the icemaking water circulating in the water tank to kill bacteria in the water. The UV-LED enables more hygienic ice production.



Deep-UV (UVC)

UVC radiation has strong influence on cells. Direct exposure is harmful to the human body. The UV-LED emits invisible UVC over a wide area.

⚠ WARNING

Do not look directly at UVC nor expose skin to UVC.

Always wear protective glasses and vinyl gloves when lighting up the UV-LED.

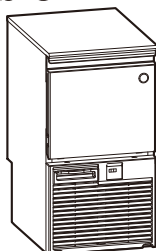
NOTICE

Do not disassemble the UV-LED.

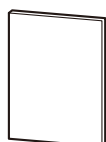
Do not light up the UV-LED without the water tank. UVC radiation will not be emitted on the ice storage bin since the water tank is not transparent.

Applicable Models

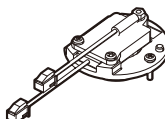
KM-40C(-HC)
KM-60C(-HC)
KM-80C(-HC)
KM-130C
KM-140C-HC



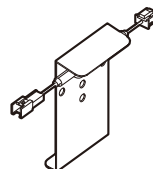
Accessories



Installation Sheet
1 pc



UV-LED
1 pc



Wire Harness
1 pc



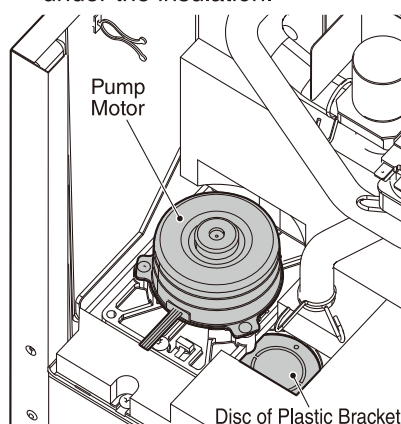
Screw 1 pc



Label 1 pc

Preparation before Installation

1. Turn off the power supply.
2. Unplug the icemaker.
3. Remove the top panel and rear panel.
4. Remove the insulation near the pump motor.
5. Remove the disc of plastic bracket under the insulation.

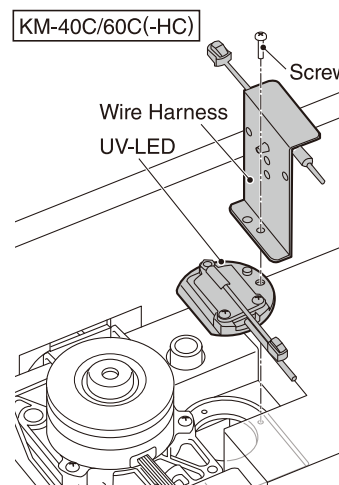
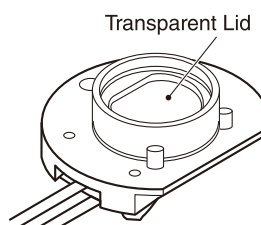


Installation

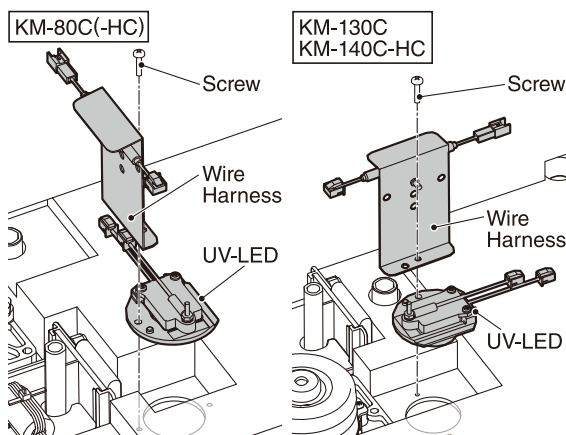
1. Fit the UV-LED to the opening in the plastic bracket.
2. Put the harness bracket on the UV-LED.
3. Tightly fit the screw through the mounting holes in the harness bracket, UV-LED and plastic bracket.
4. Replace the insulation in its correct position.

Note

Do not touch the transparent lid of the UV-LED.

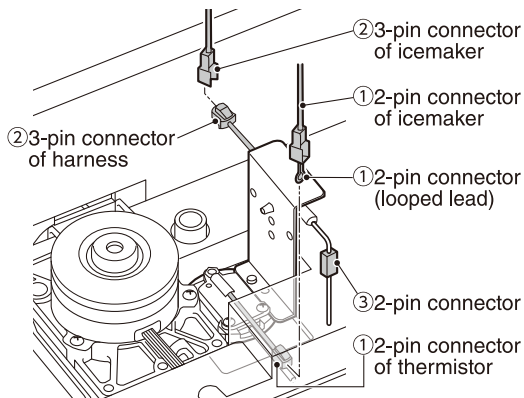


284522L01B



Wiring Connections

- ① Disconnect the 2-pin connector (black looped lead) from the 2-pin connector (black leads) of icemaker, and connect it to the 2-pin connector of thermistor (black leads).
- ② Connect the 3-pin connector of harness (black and red leads) to the 3-pin connector (black and red leads) of icemaker.
- ③ Do not disconnect the 2-pin connector of harness (black and red leads) and the 2-pin connector of UV-LED (black and red leads).



Cover the connected connectors with plastic bags and fix them with cable ties to shut out dripping water from the copper pipes.

Control Board Settings

1. Plug in the icemaker.
2. Turn on the power supply.
3. Press and hold the reset (enter) button for 3 seconds.
4. Set the user setting U.51 to 10 (min), and press the reset (enter) button.
5. Set the user setting U.52 to 120 (min), and press the reset (enter) button.
6. With "END" shown in the display, press the reset (enter) button.

UV-LED Radiation

- The radiation starts at the beginning of freeze cycle.
- The radiation is emitted for the time set by U.51.
- The radiation restarts in the freeze cycle after the time set by U.52 passes.

Warning Label

Attach the accessory warning label to the rear panel of the icemaker.

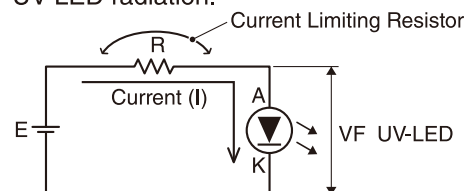


UV-LED Circuit

The wire harness includes a current limiting resistor to apply proper current to the UV-LED.

Make sure to connect the wire harness.

If a proper current limiting resistor is not connected, excessive current passes through the circuit and may cause damage. Avoid direct contact to the current limiting resistor which becomes hot during the UV-LED radiation.



Thermistor Connection

The icemaker will not start without the thermistor connected. Make sure that the thermistor is properly connected.

"n32" Indication

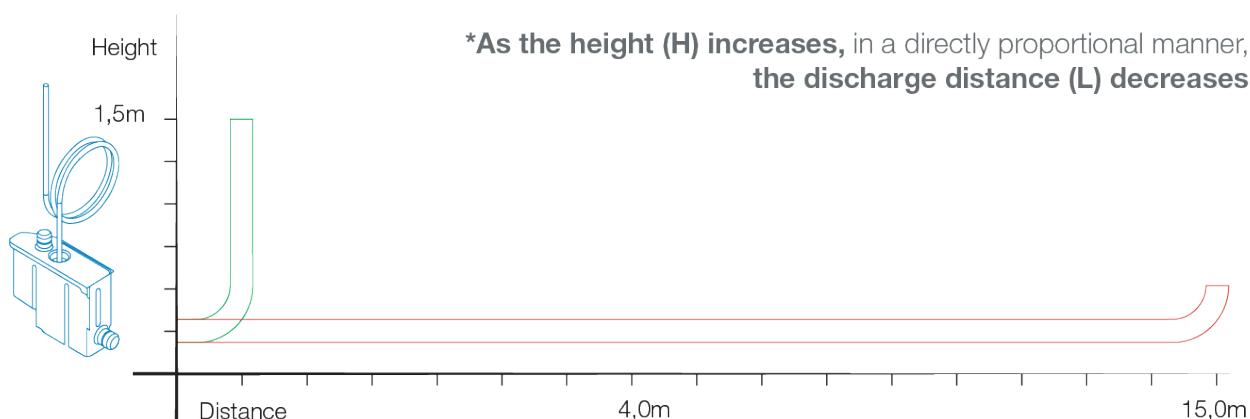
When the thermistor attached to the UV-LED body does not detect the set temperature three times in a row or the accumulated radiation time reaches 10,000 hours, the display shows "n32." Replace the UV-LED.

Discoloration

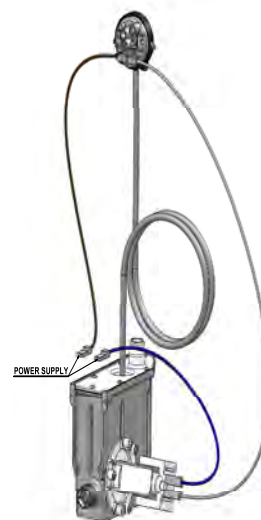
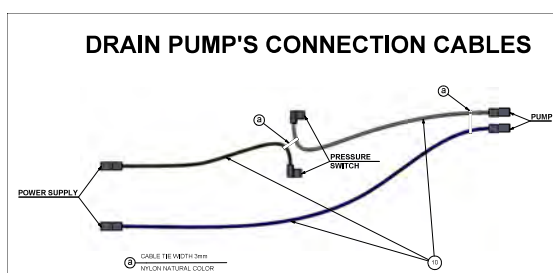
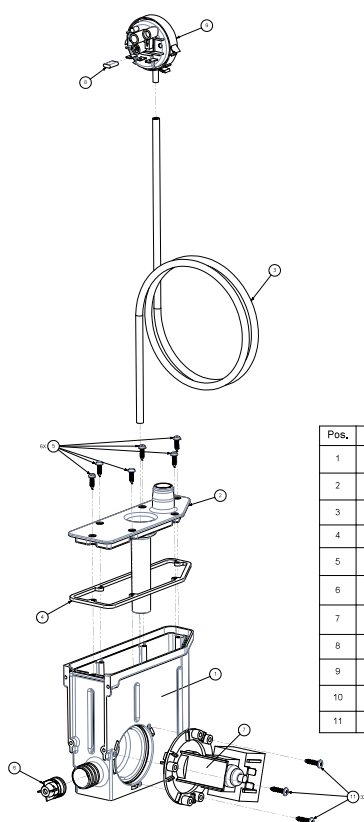
UV rays radiate in the 130 degree range and may discolor the surrounding plastic parts, which causes no problems.

VIII. DRAIN PUMP INSTALLATION

1. All ice makers require a drainage connection. To dispose of residual water by gravity, the water must flow to a collection point positioned below the ice machine base, and this is a constraint. Flexible drain tubes are the next hurdle, as they may create loops that retain drainage water. Any stagnant water will in time develop into a bacterial hazard and restrict the choice of installation location.



2. Wiring method for drain pump



Pos.	Cod.	Rev.	Description	Material	Quantity
1	10784	01	Drain Pump's pan	Hostacom PC072-3 natural	1
2	10785	01	Drain Pump's cover	WHITE ABS CP2503 H70	1
3	13162	00	Crystal tube L=1130 Ø7x4	TRASPARENT PVC	1
4	13193	00	Drain Pump's gasket	MARFRAN AND DRW OF	1
5	15110	00	Screw 3,5x 13 TC Ph C - UNI 7049 - Inox	AISI 304	6
6	201160	00	Non-return valve DN20	POM (Dierlin)	1
7	231016	00	Hanning Pump DP825-383N 230/50 VDE - att. 024		1
8	10538	00	Cap for male terminal 6.3 type 3		1
9	23670	00	Pressure switch Cod. 761175 - Type 760 TAR, 28-12		1
10	231224	01	Drain Pump's connection cables		1
11		00	Screw 4 x 18 TC - Stainless steel - for Hanning Pump fixing	AISI 304	3