SELF-CONTAINED/MODULAR CUBER

SERVICE MANUAL

IM-21CPE
IM-30CPE
IM-30CWPE
IM-45CPE
IM-45PE
IM-45WPE
IM-65PE
IM-65WPE
IM-100PE
IM-130CPE
IM-130PE
IM-130WPE
IM-130APE
IM-240PE
IM-240WPE
IM-240APE
IM-240AWPE
IM-240DPE
IM-240DWPE
IM-240XPE
IM-240XWPE

M110-1194 (031125)

CONTENTS

PAGE

I. SPECIFICATIONS

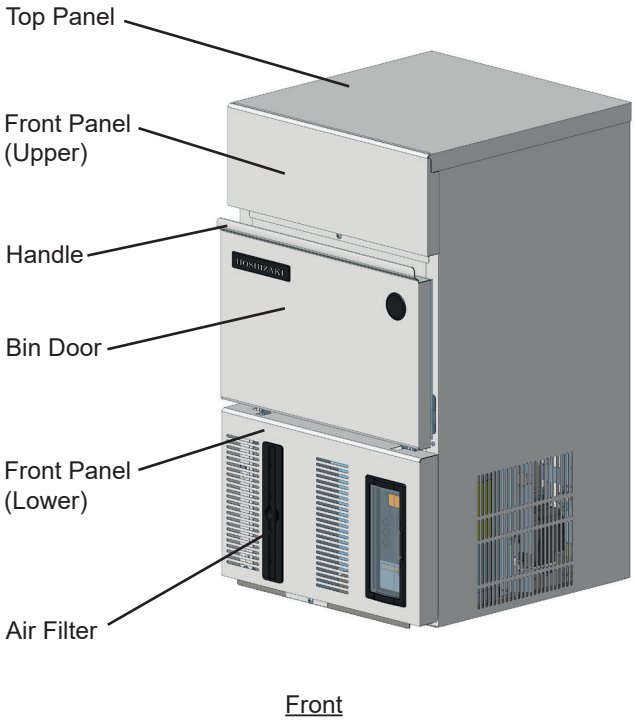
1. DIMENSIONS/SPECIFICATIONS

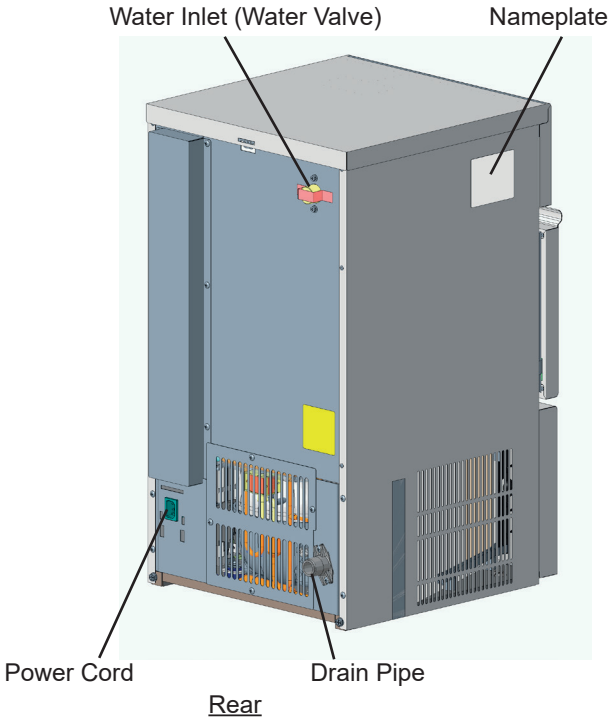
Refer to the dimensional drawings available from the "Product Literature Search System".

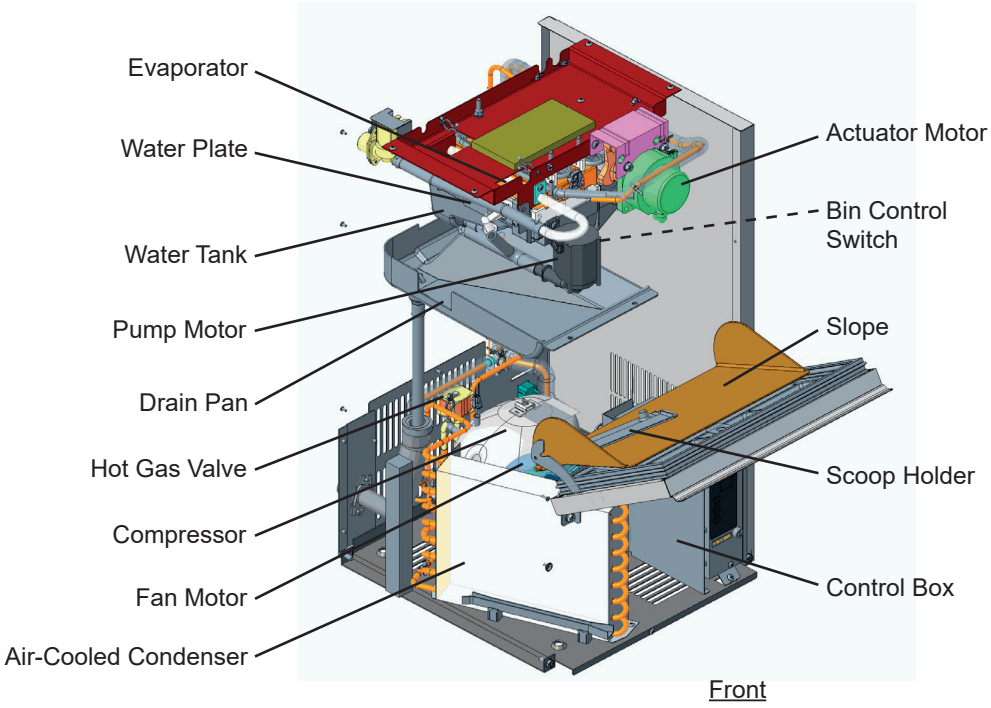
II. GENERAL INFORMATION

1. CONSTRUCTION

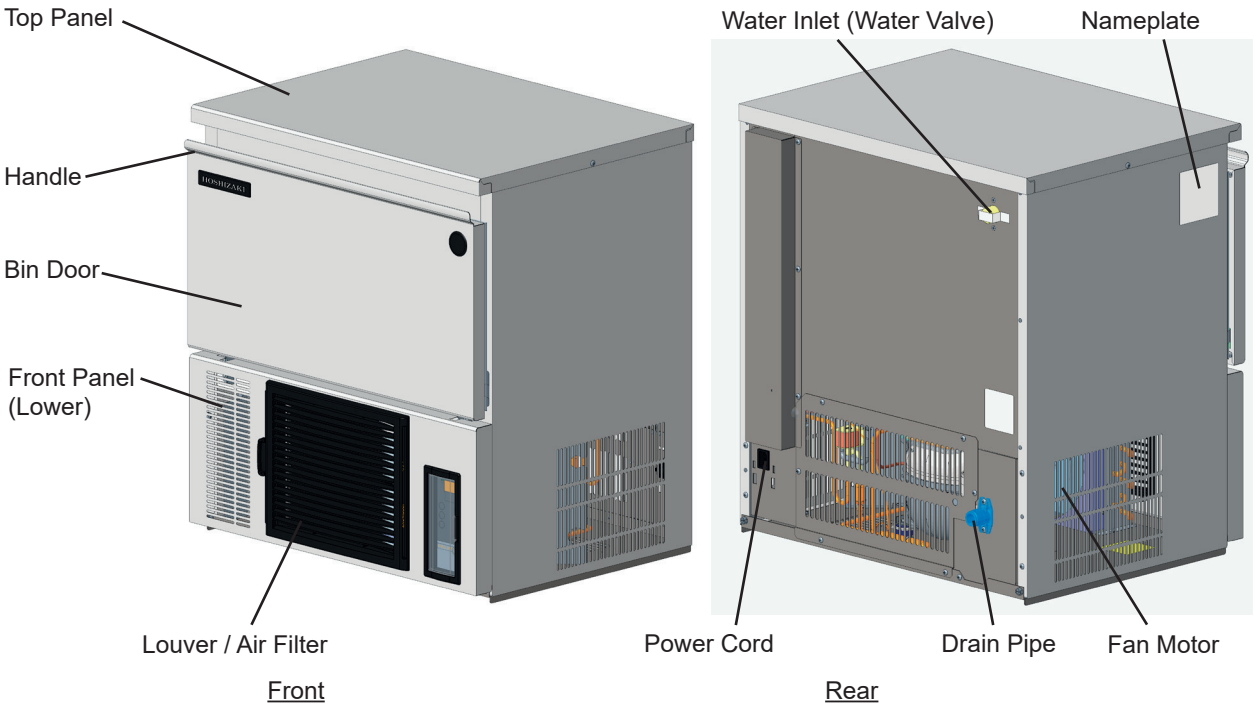
[a] IM-21CPE, IM-30CPE

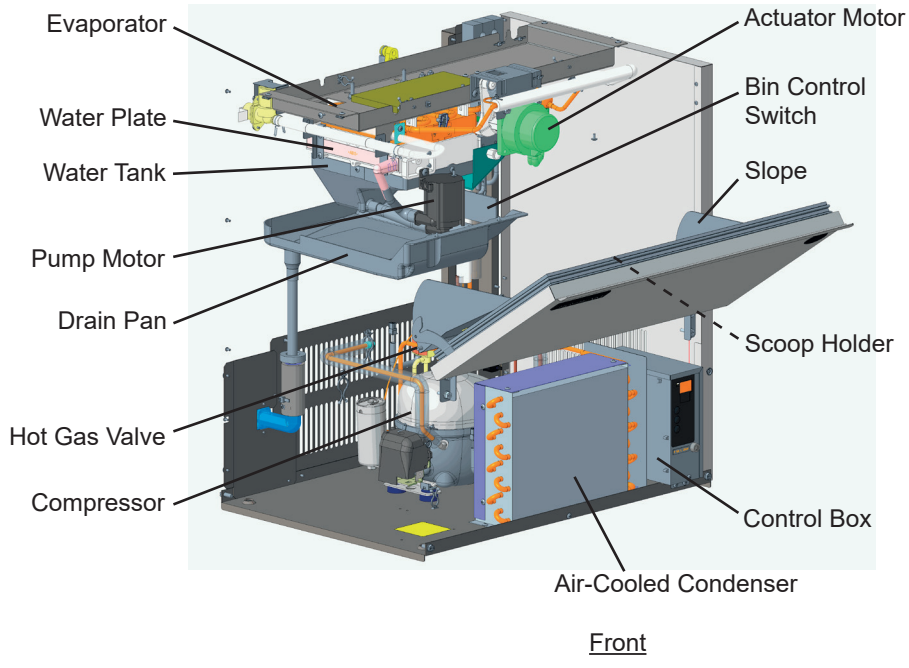




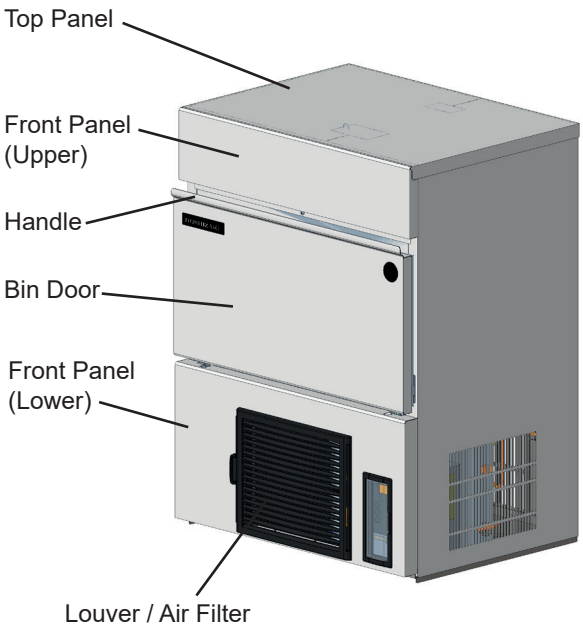


[b] IM-45CPE


Top Panel
Handle
Bin Door
Front Panel
(Lower)
Louver / Air Filter
Front
Water Inlet (Water Valve)
Nameplate
Power Cord
Drain Pipe
Fan Motor
Rear


Evaporator
Water Plate
Water Tank
Pump Motor
Drain Pan
Hot Gas Valve
Compressor
Actuator Motor
Bin Control
Switch
Slope
Scoop Holder
Control Box
Air-Cooled Condenser
Front

[c] IM-45PE, IM-65PE



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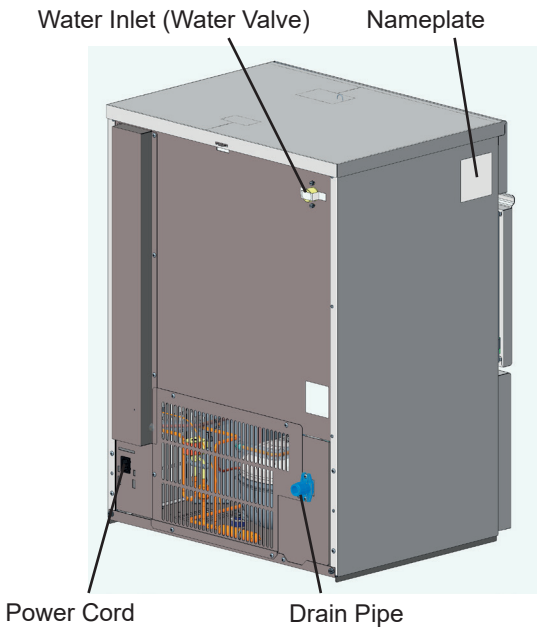

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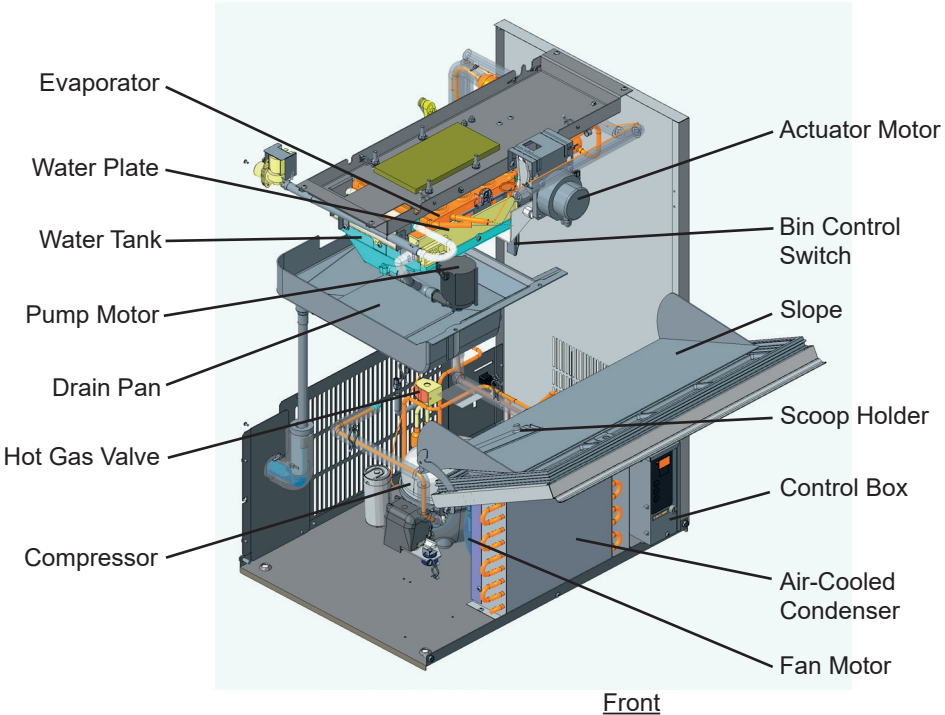

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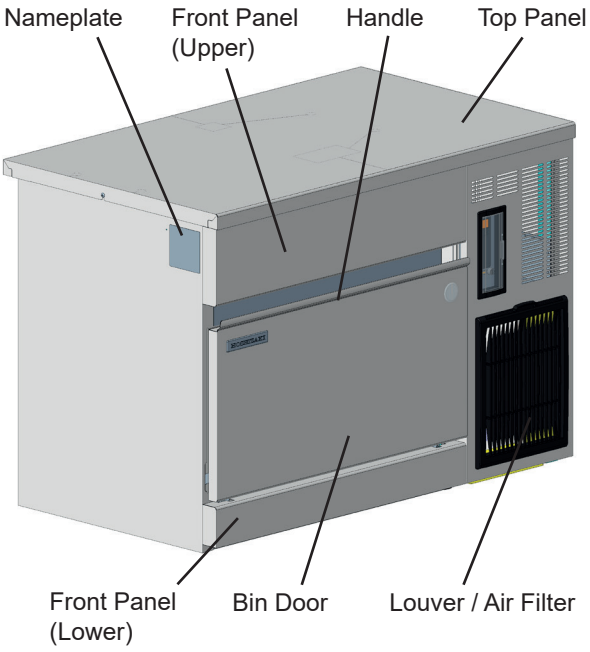
[d] IM-130CPE



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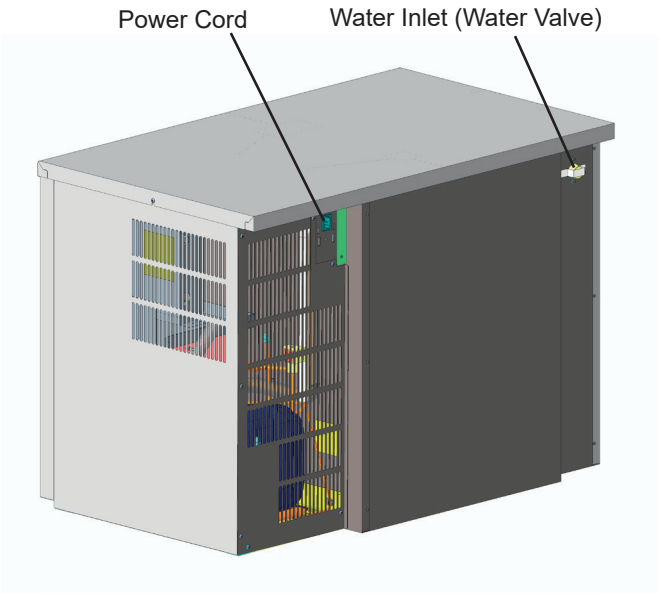

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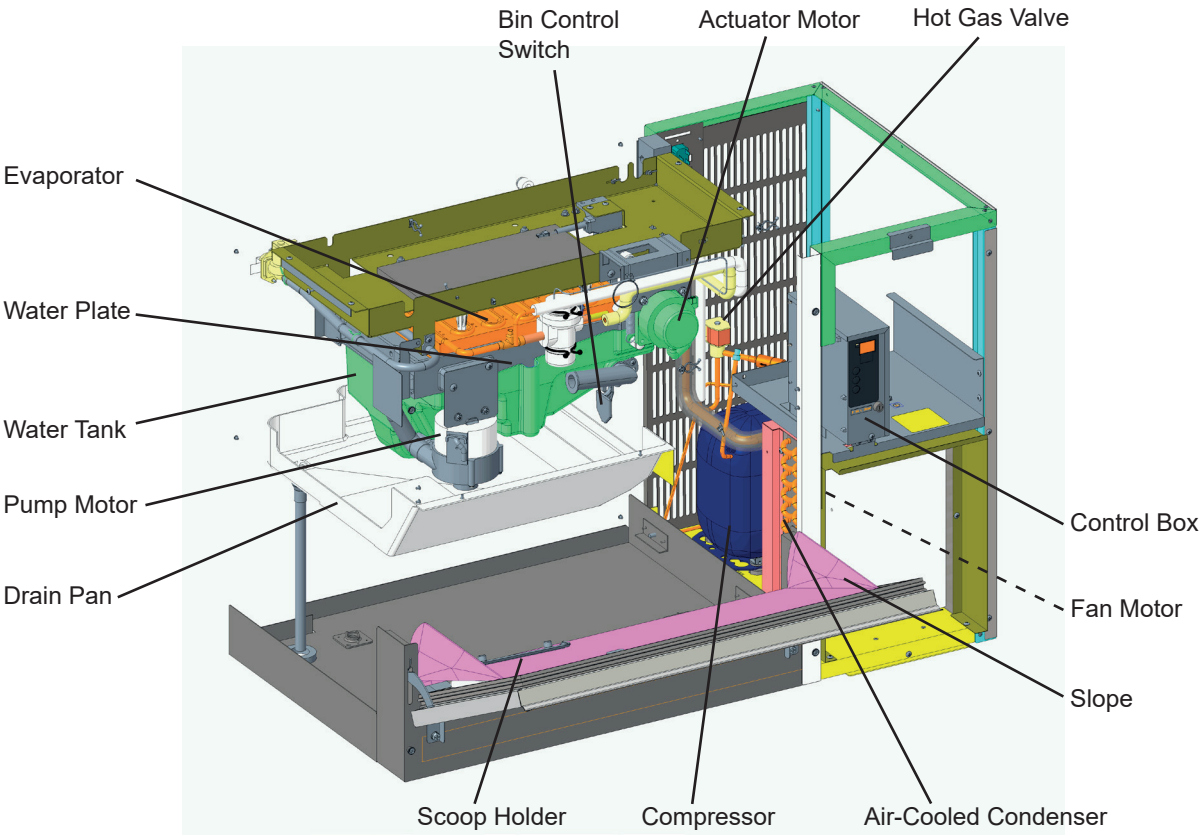

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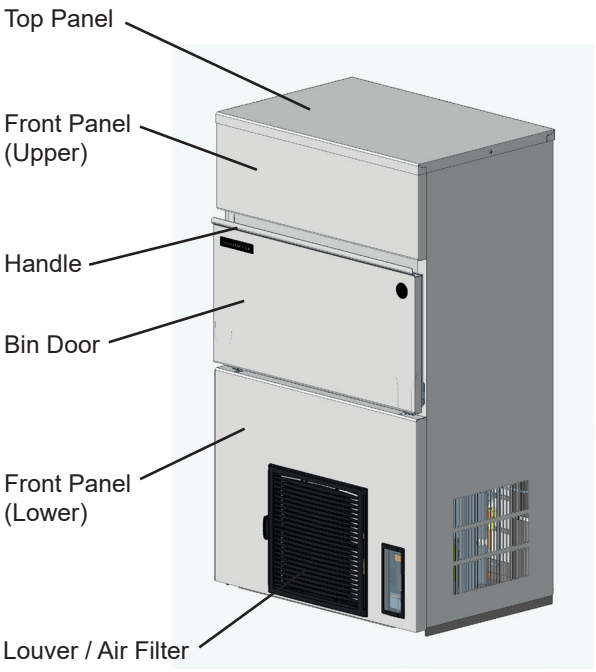
[e] IM-100PE, IM-130PE



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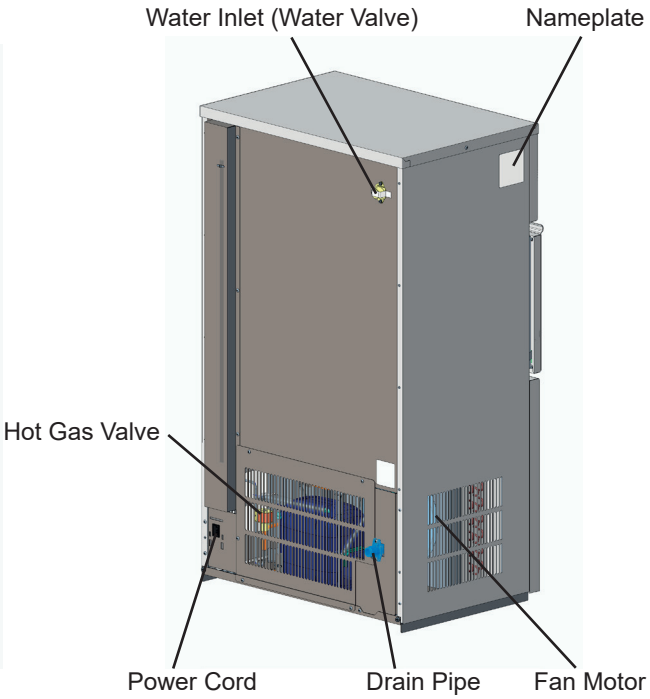

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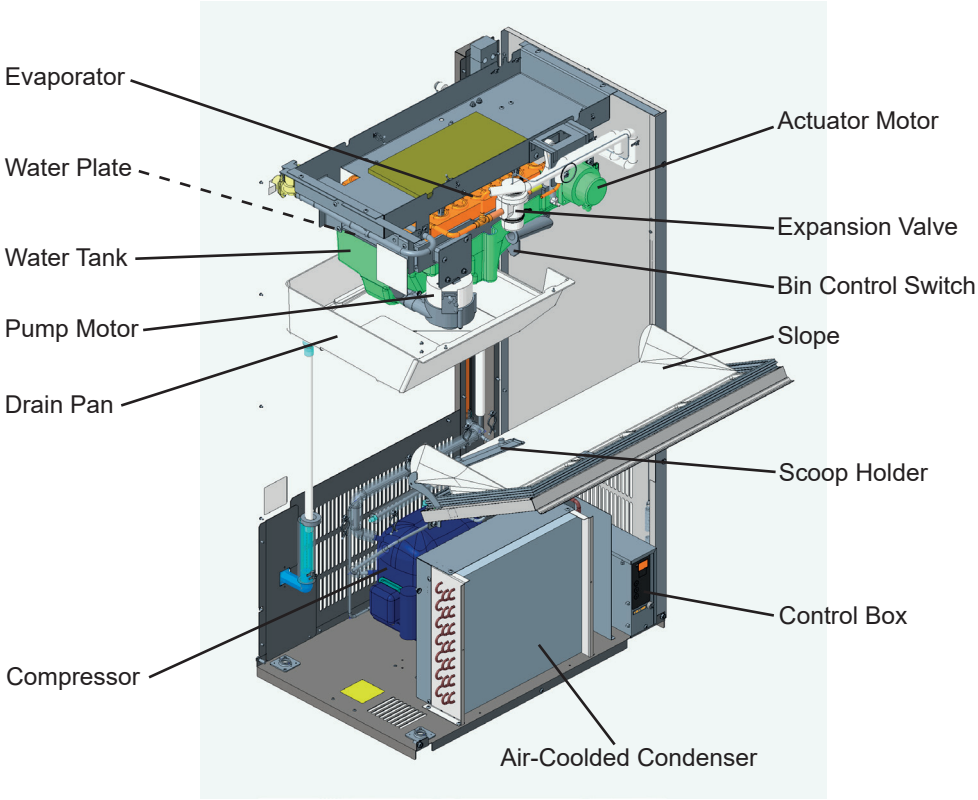

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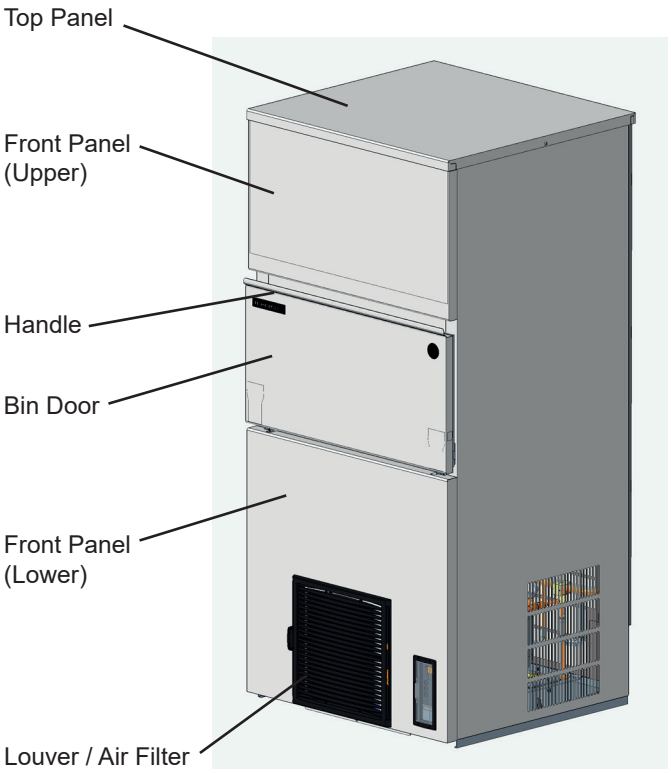
[f] IM-240PE



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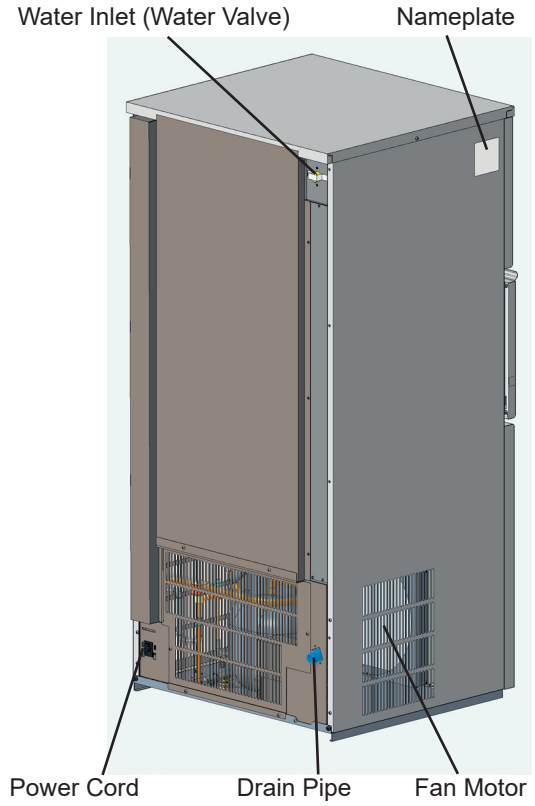

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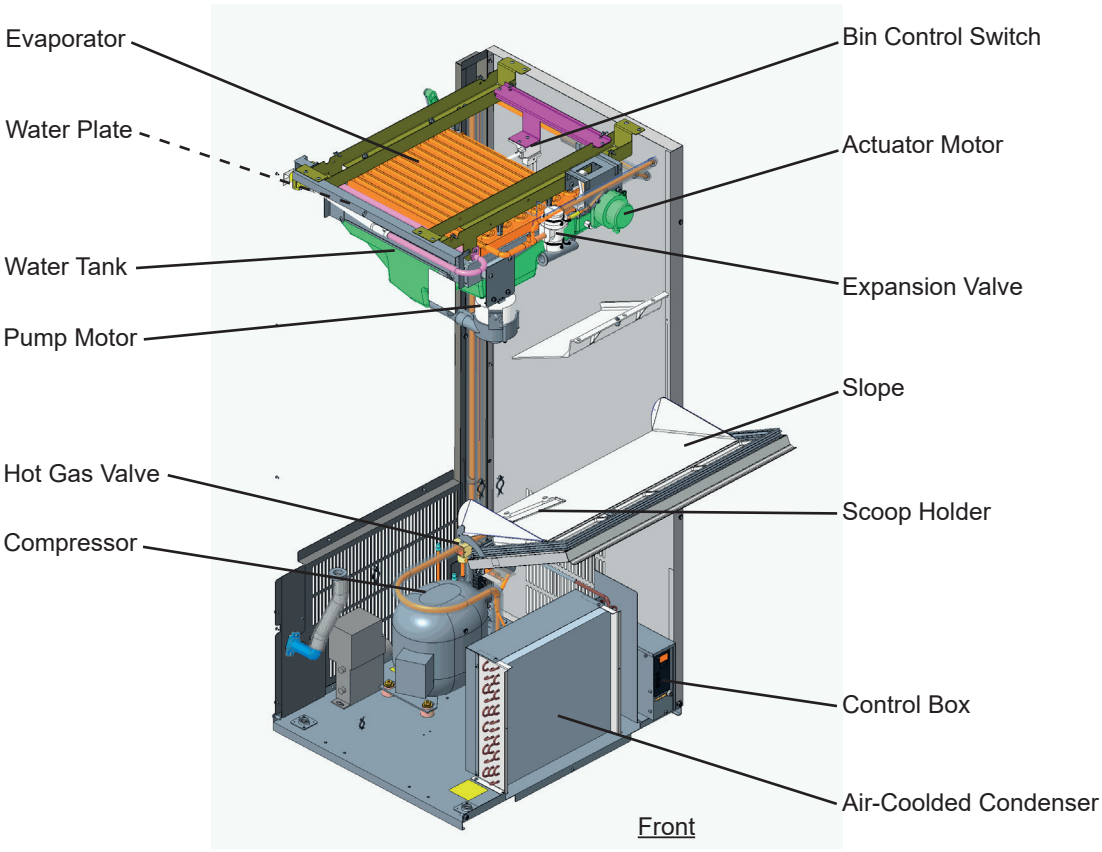

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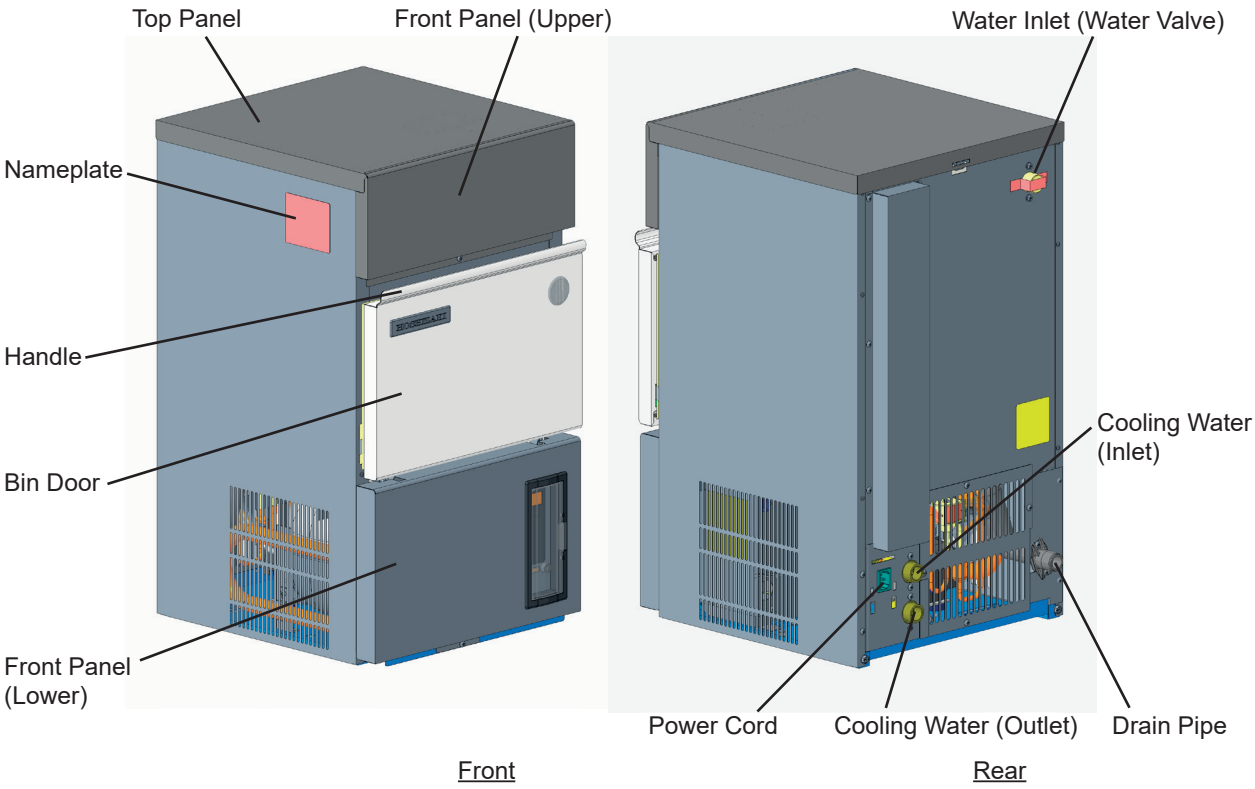
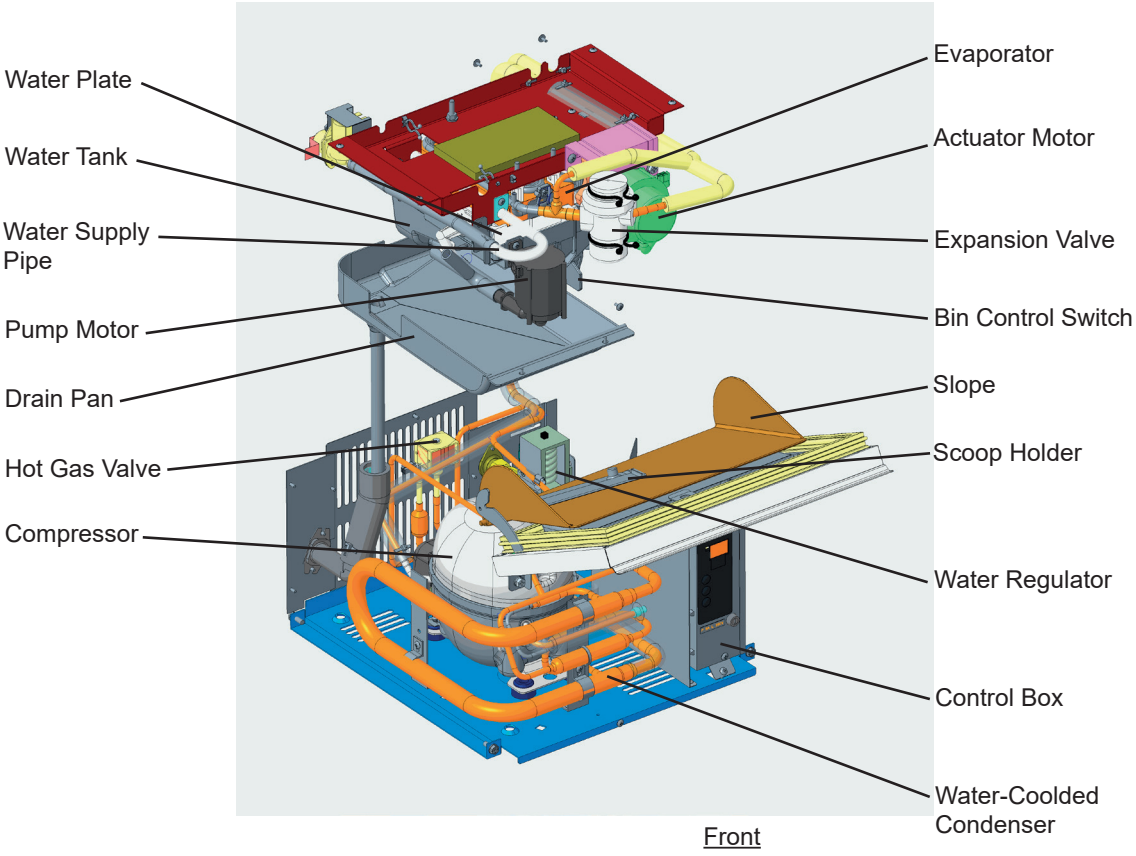
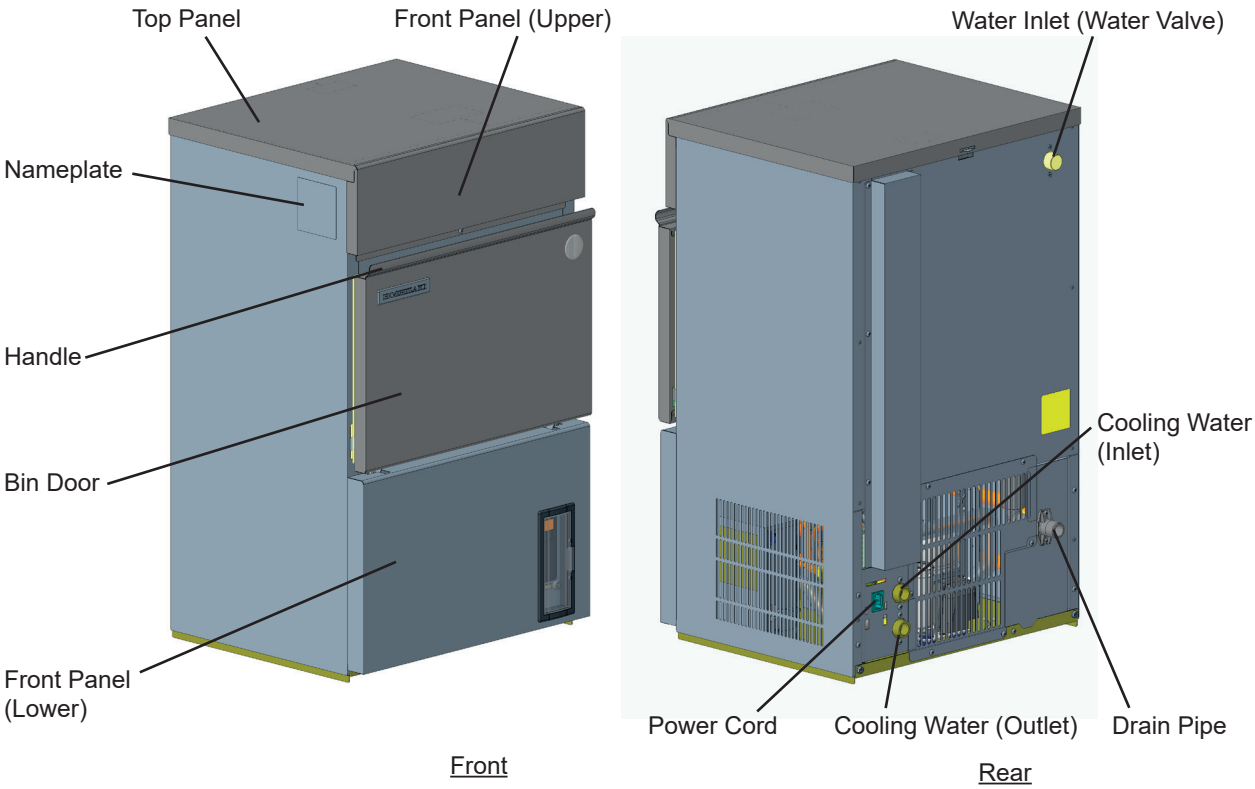
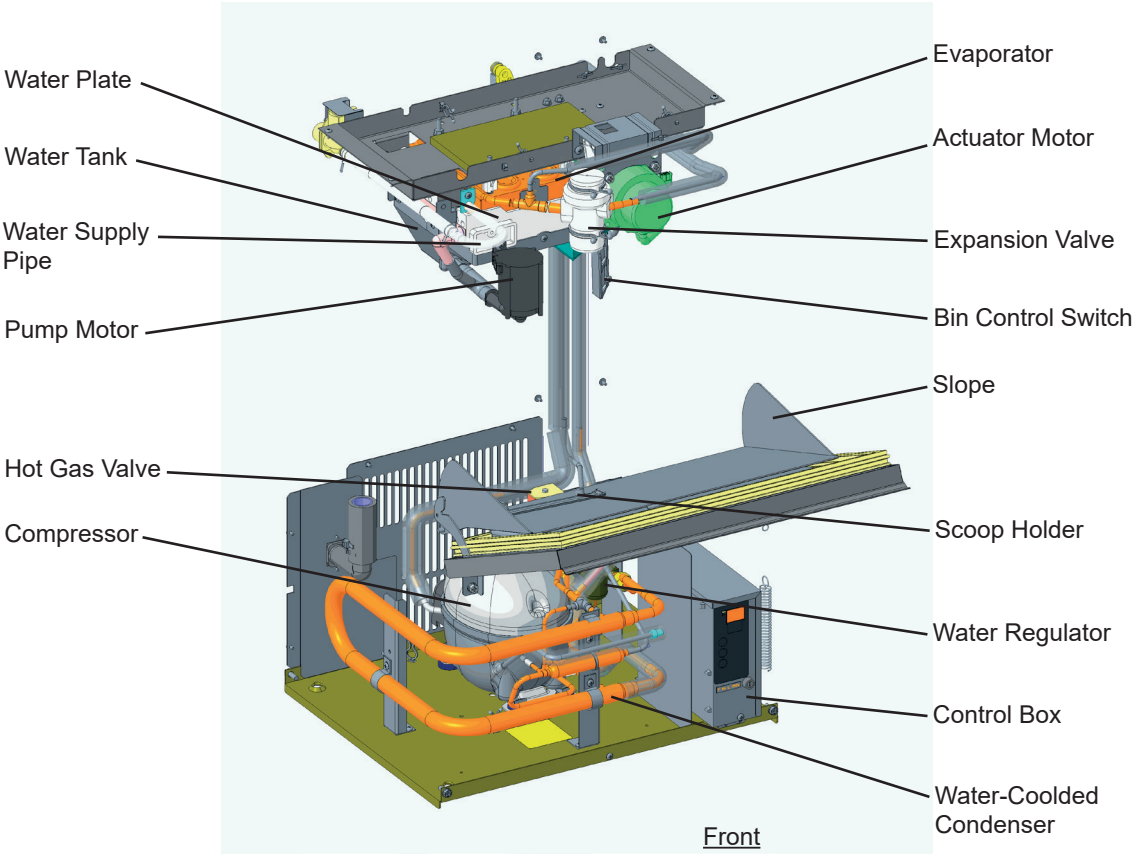
[g] IM-30CWPE


Top Panel
Front Panel (Upper)
Water Inlet (Water Valve)
Nameplate
Handle
Bin Door
Front Panel (Lower)
Cooling Water (Inlet)
Power Cord
Cooling Water (Outlet)
Drain Pipe
Front
Rear

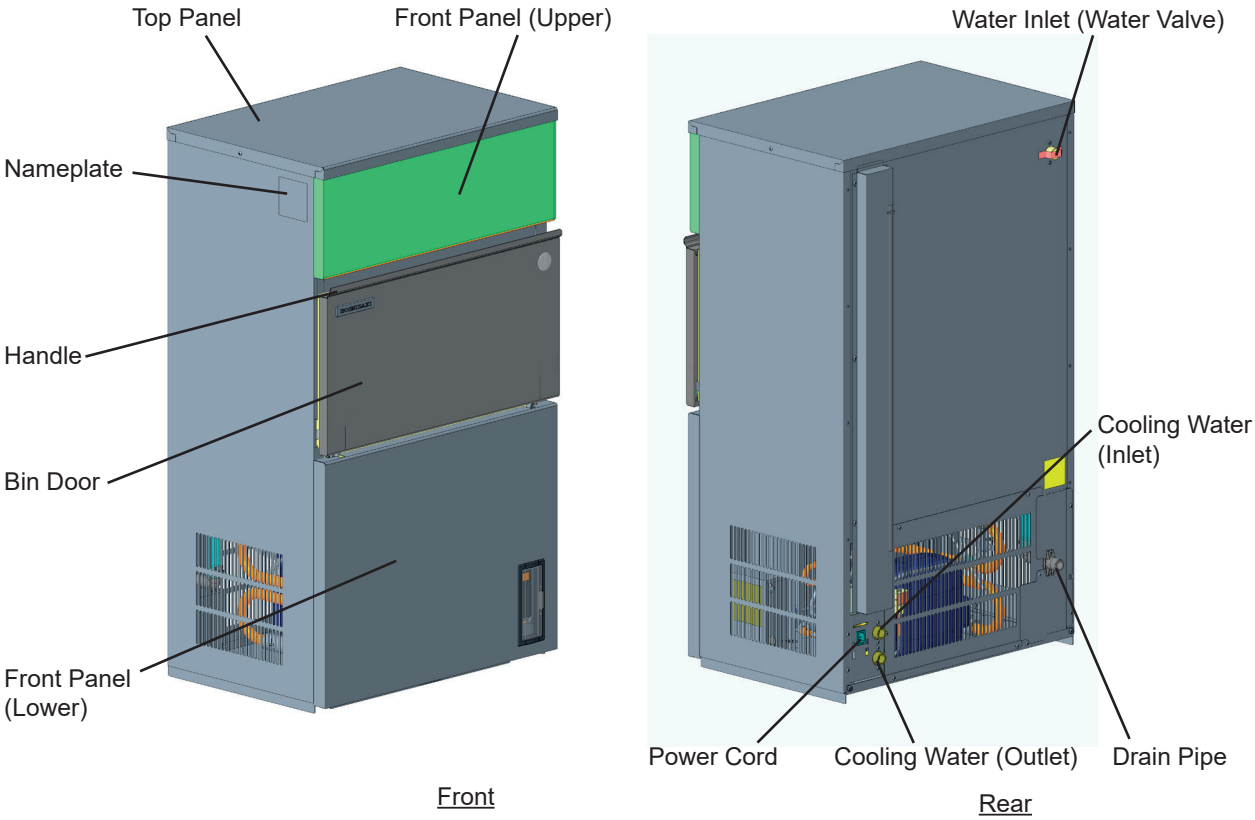

Water Plate
Water Tank
Water Supply Pipe
Pump Motor
Drain Pan
Hot Gas Valve
Compressor
Evaporator
Actuator Motor
Expansion Valve
Bin Control Switch
Slope
Scoop Holder
Water Regulator
Control Box
Water-Coolded Condenser
Front

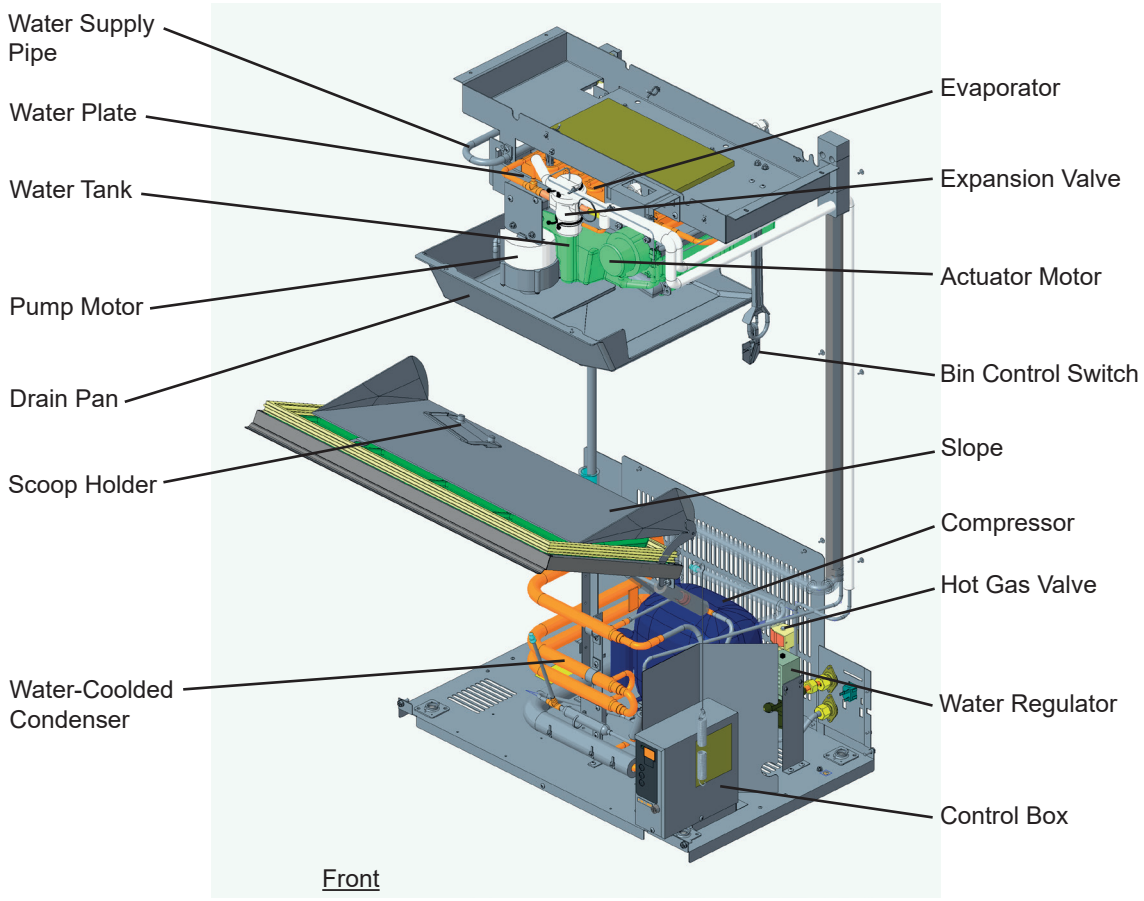
[h] IM-45WPE, IM-65WPE



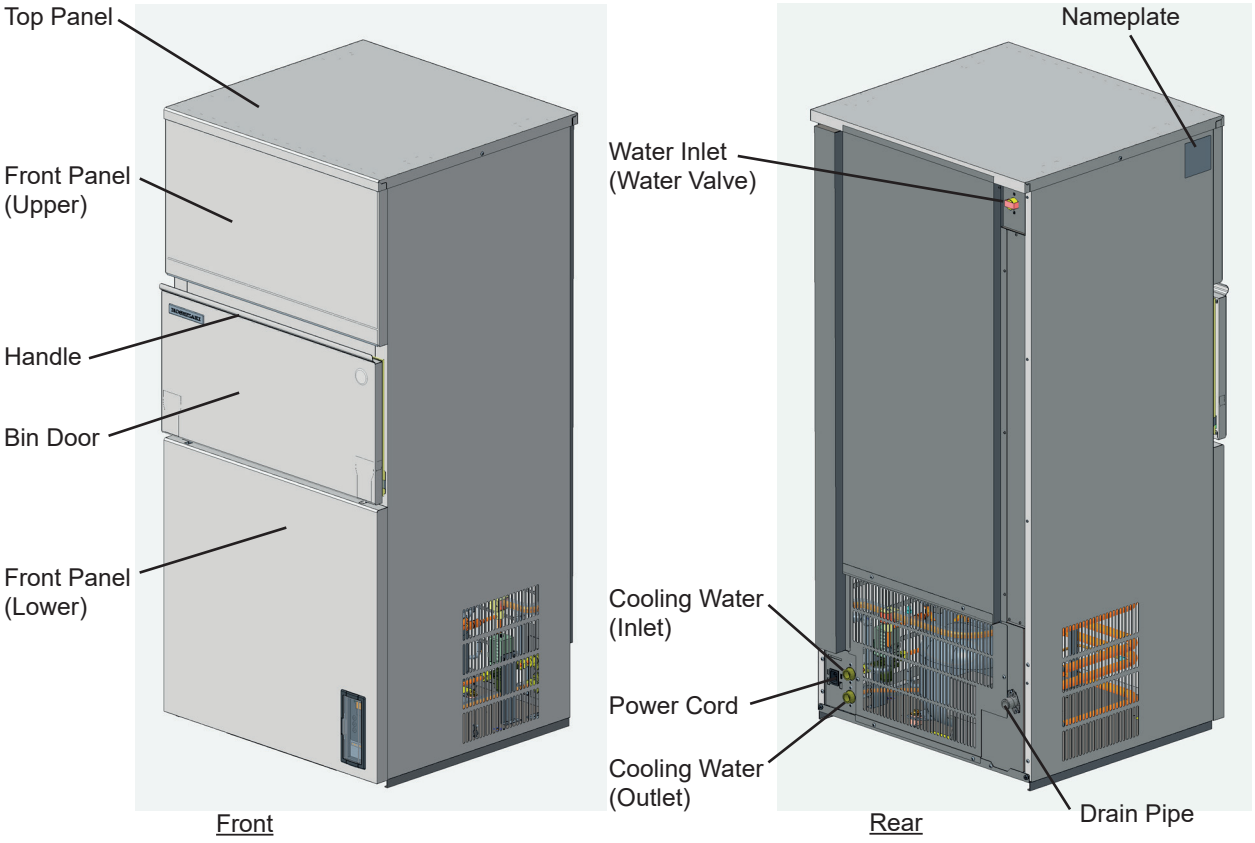


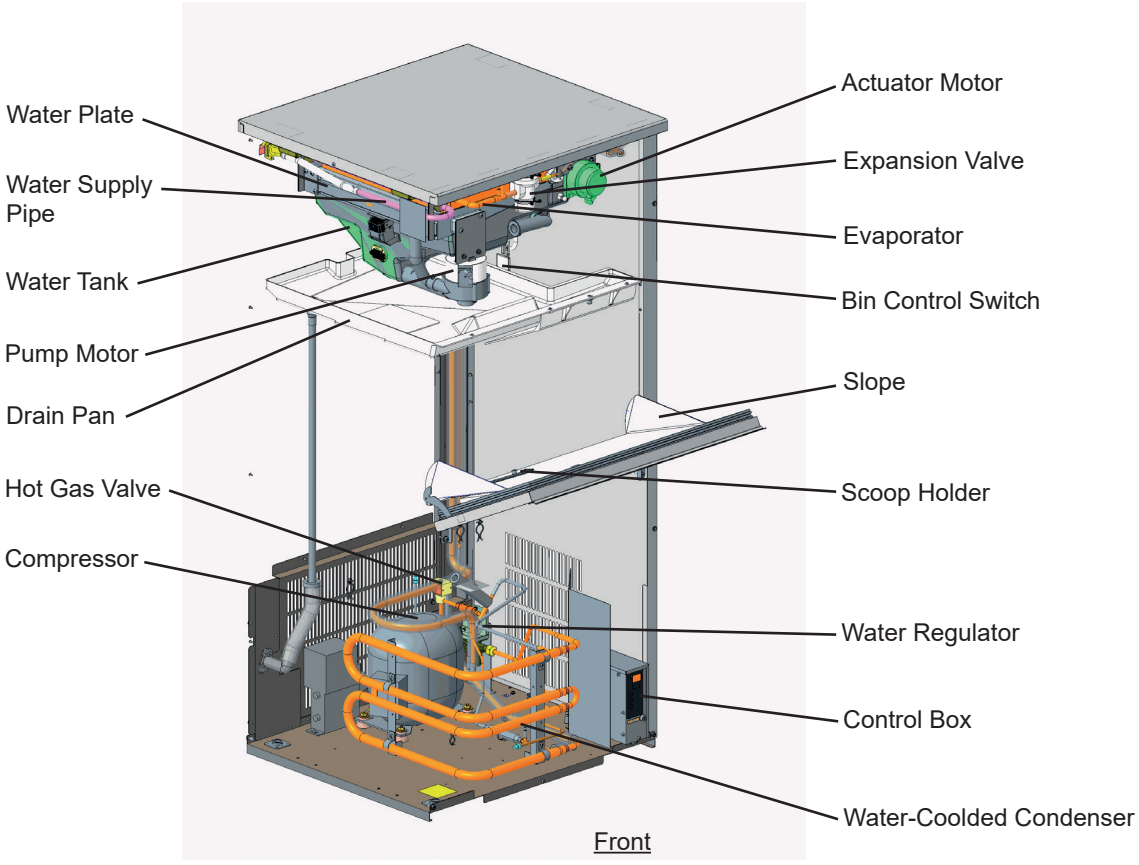
[i] IM-130WPE


Top Panel
Front Panel (Upper)
Nameplate
Handle
Bin Door
Front Panel
(Lower)
Front
Water Inlet (Water Valve)
Cooling Water
(Inlet)
Power Cord
Cooling Water (Outlet)
Drain Pipe
Rear

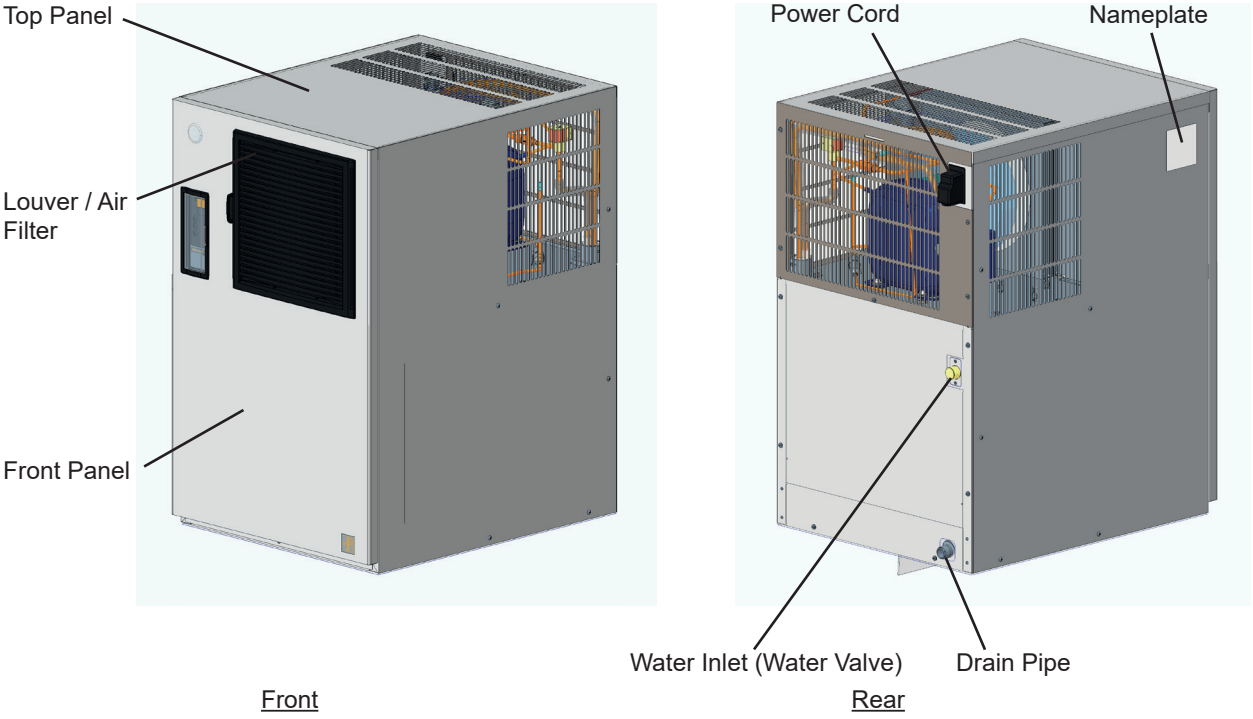

Water Supply
Pipe
Water Plate
Water Tank
Pump Motor
Drain Pan
Scoop Holder
Water-Coolded
Condenser
Evaporator
Expansion Valve
Actuator Motor
Bin Control Switch
Slope
Compressor
Hot Gas Valve
Water Regulator
Control Box
Front

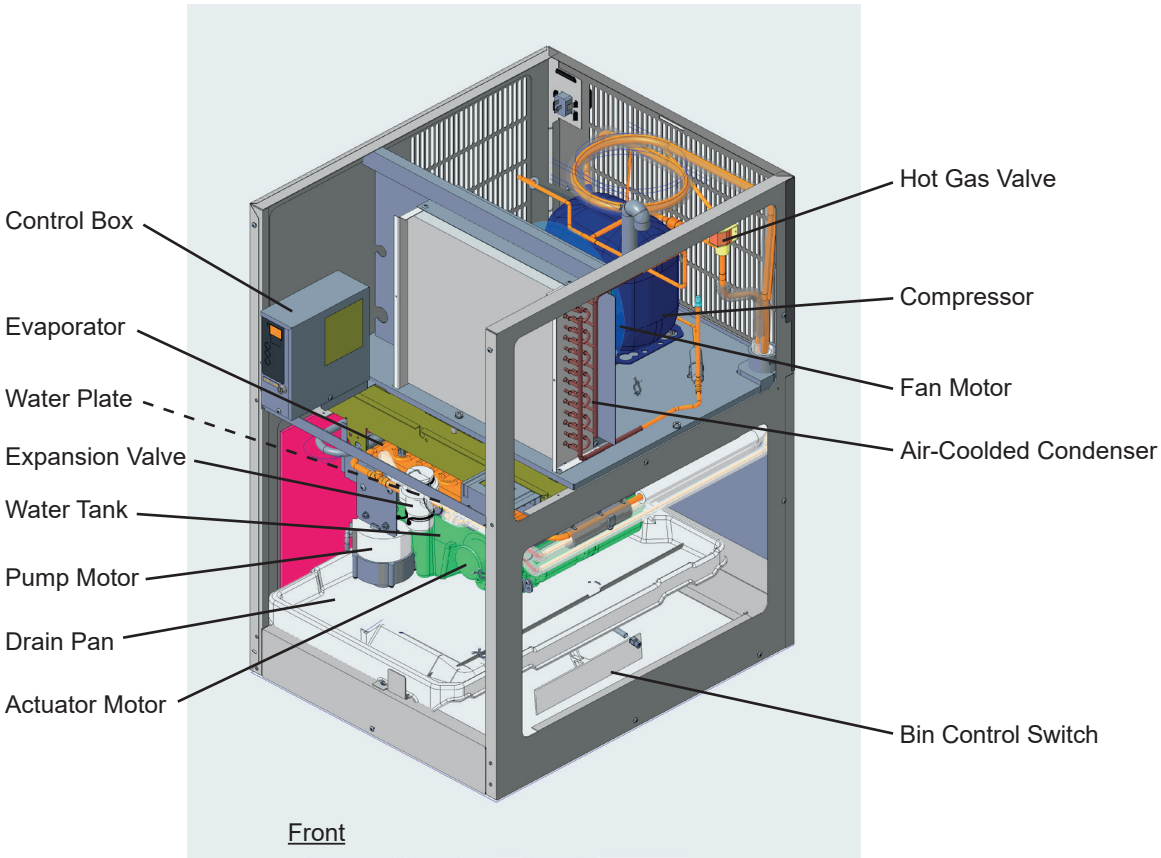
[j] IM-240WPE


Top Panel
Front Panel (Upper)
Handle
Bin Door
Front Panel (Lower)
Front
Nameplate
Water Inlet (Water Valve)
Cooling Water (Inlet)
Power Cord
Cooling Water (Outlet)
Drain Pipe
Rear

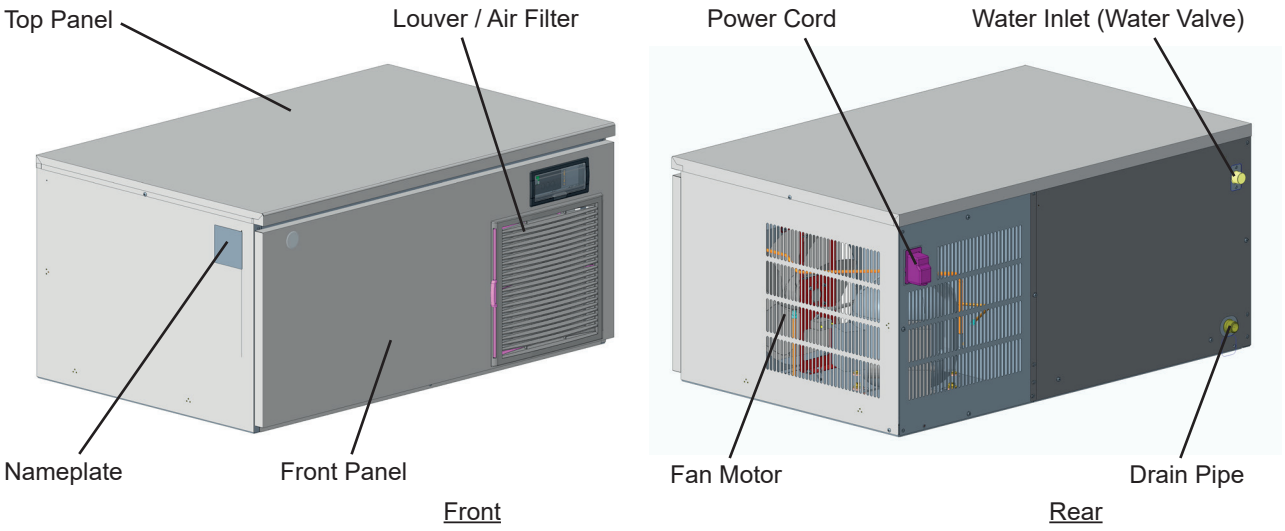

Water Plate
Water Supply Pipe
Water Tank
Pump Motor
Drain Pan
Hot Gas Valve
Compressor
Actuator Motor
Expansion Valve
Evaporator
Bin Control Switch
Slope
Scoop Holder
Water Regulator
Control Box
Water-Coolded Condenser
Front

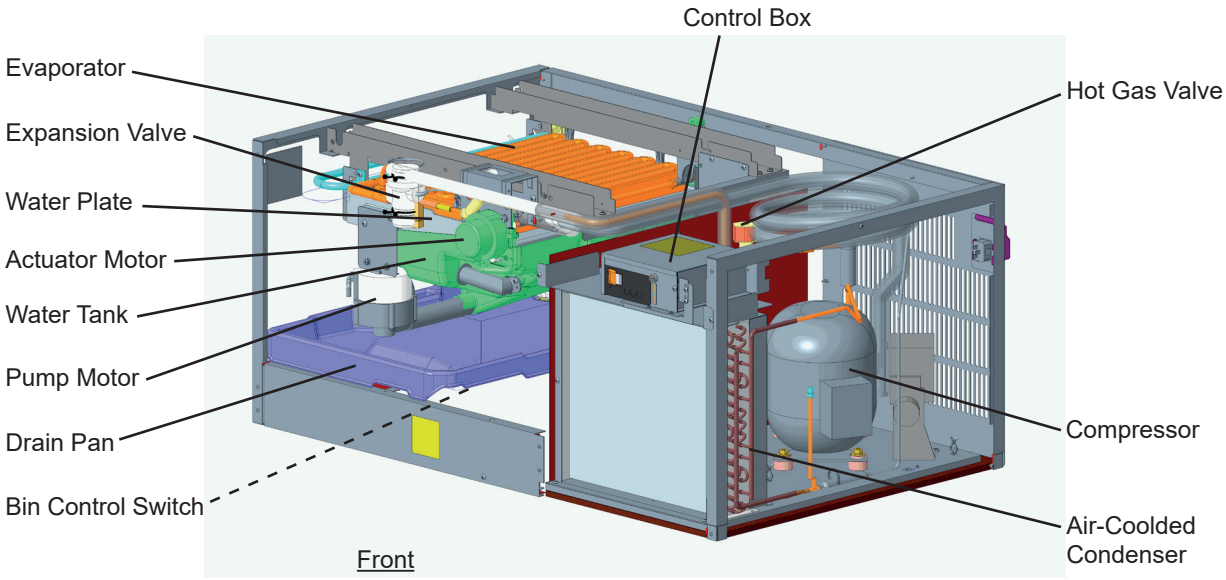
[k] IM-130APE, IM-240APE



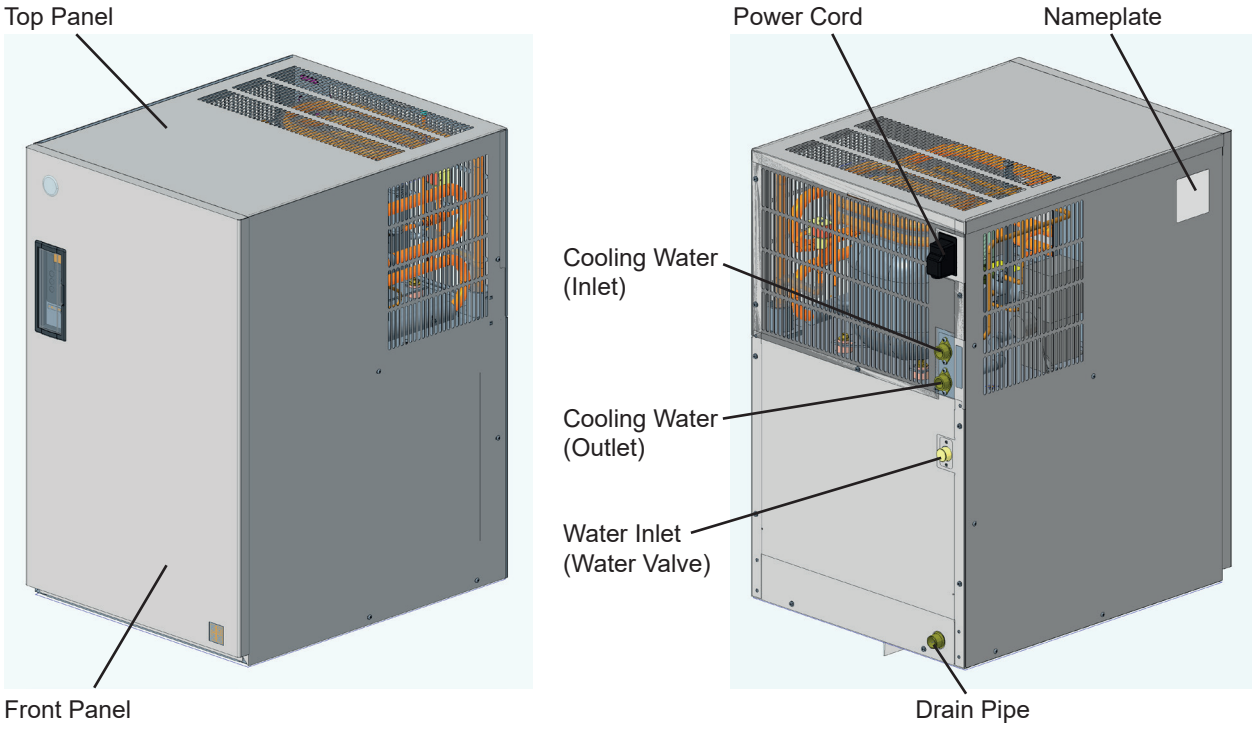


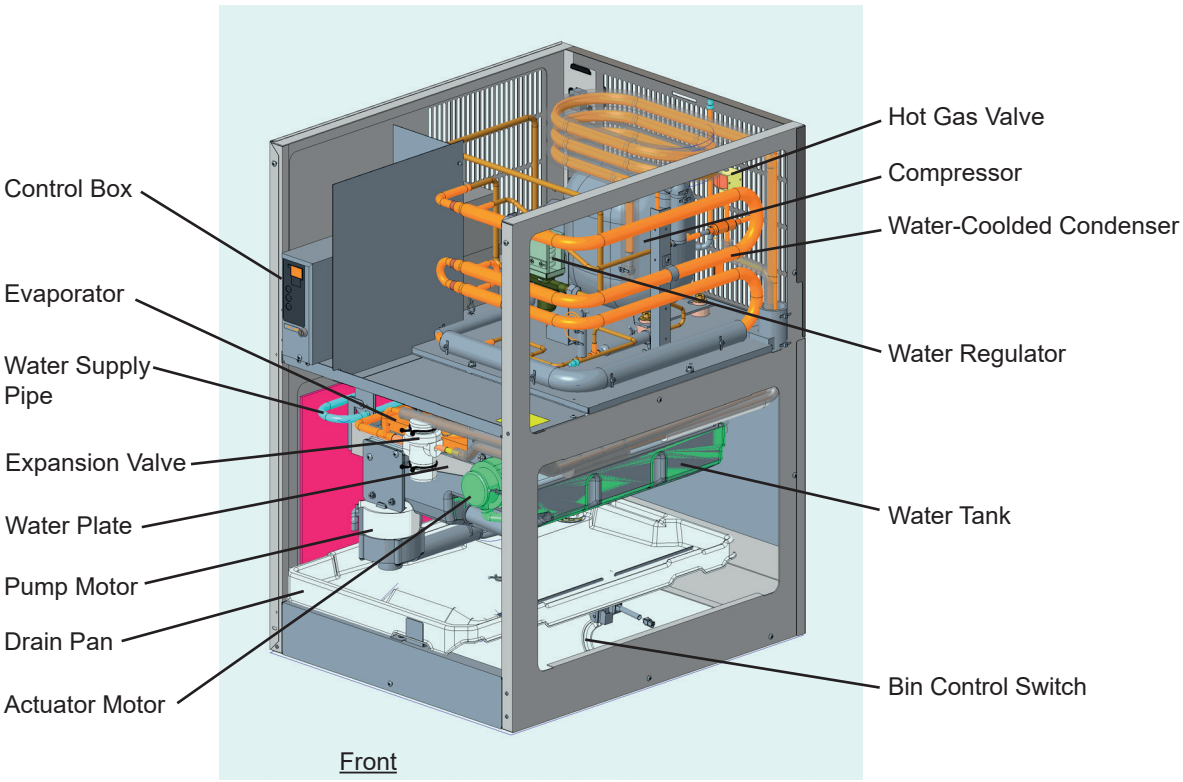
[I] IM-240DPE, IM-240XPE



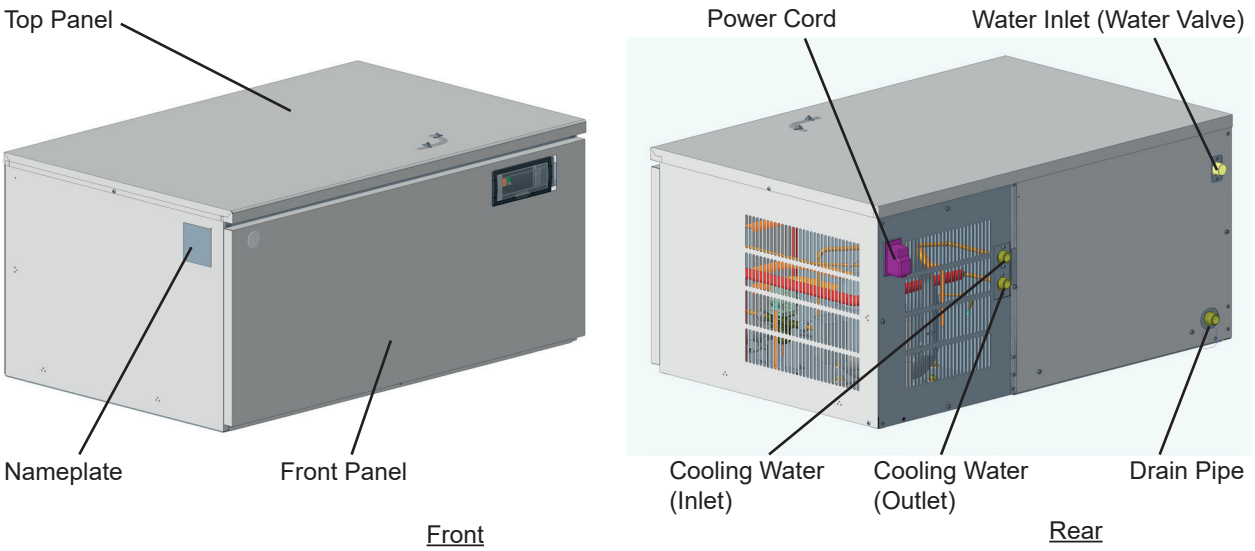


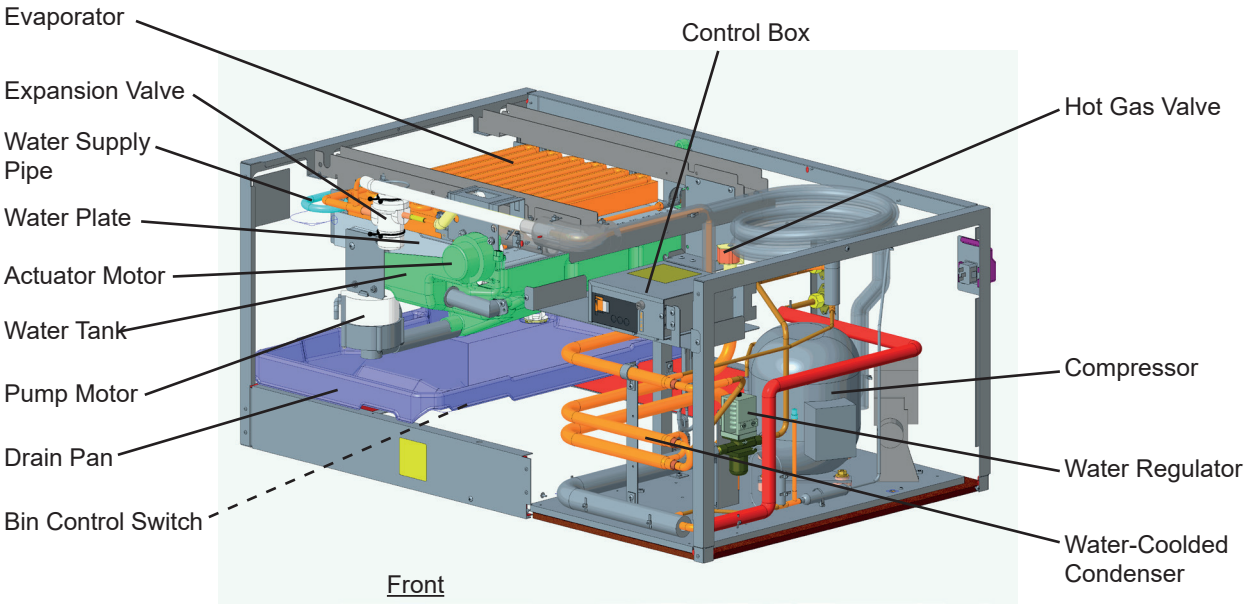
[m] IM-240AWPE


Top Panel
Front Panel
Front
Power Cord
Nameplate
Cooling Water (Inlet)
Cooling Water (Outlet)
Water Inlet (Water Valve)
Drain Pipe
Rear

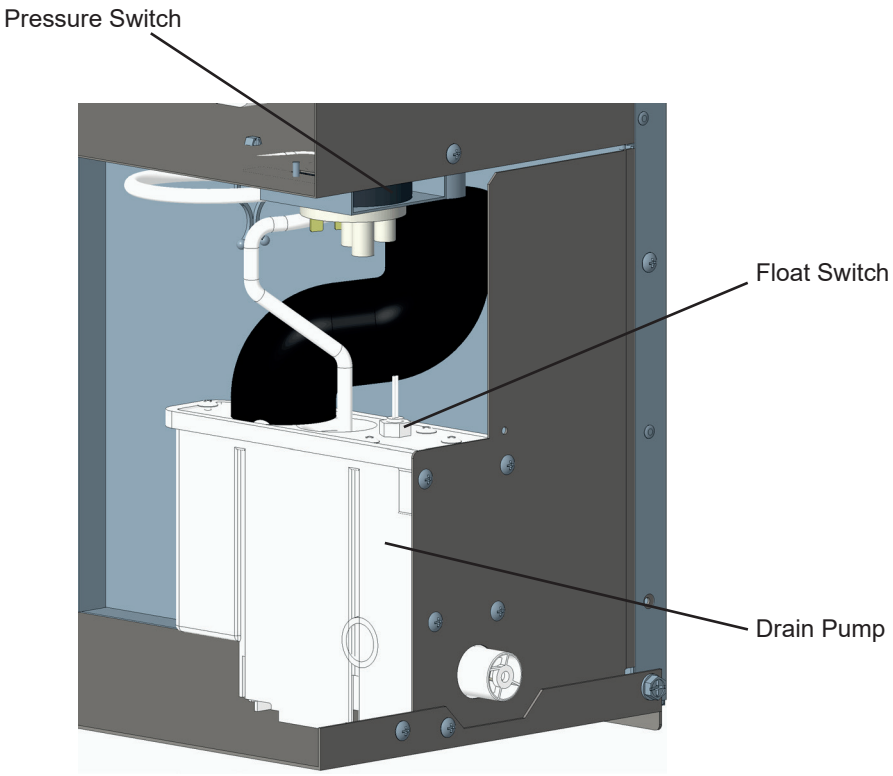

Control Box
Evaporator
Water Supply Pipe
Expansion Valve
Water Plate
Pump Motor
Drain Pan
Actuator Motor
Hot Gas Valve
Compressor
Water-Coolded Condenser
Water Regulator
Water Tank
Bin Control Switch
Front

[n] IM-240DWPE, IM-240XWPE





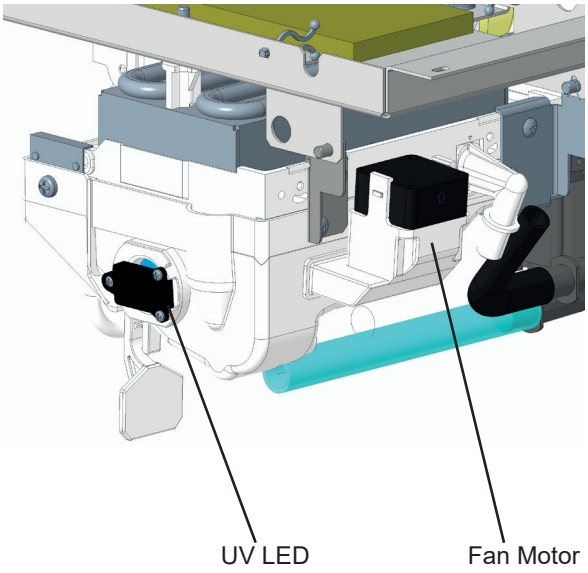
[o] -F (FlexCube), -E (EliteCube) models



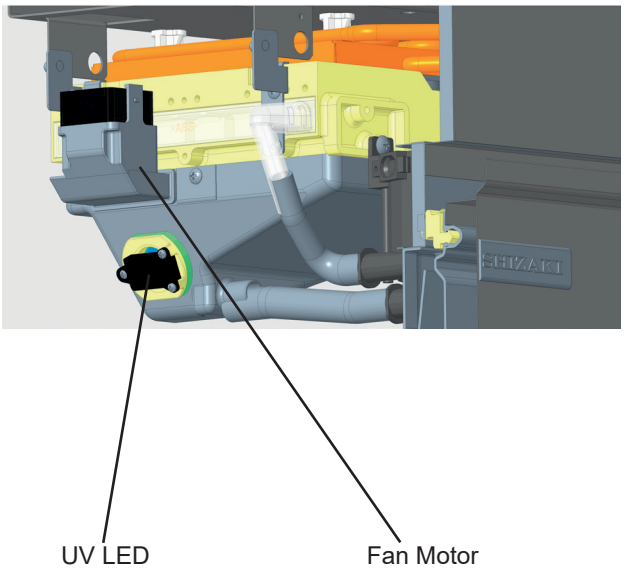
Note: The drain pump feature can be added to the following models:
IM-45CPE, IM-45PE, IM-65PE, IM-130PE, IM-240PE

[p] -U (UltraCube), -E (EliteCube) models

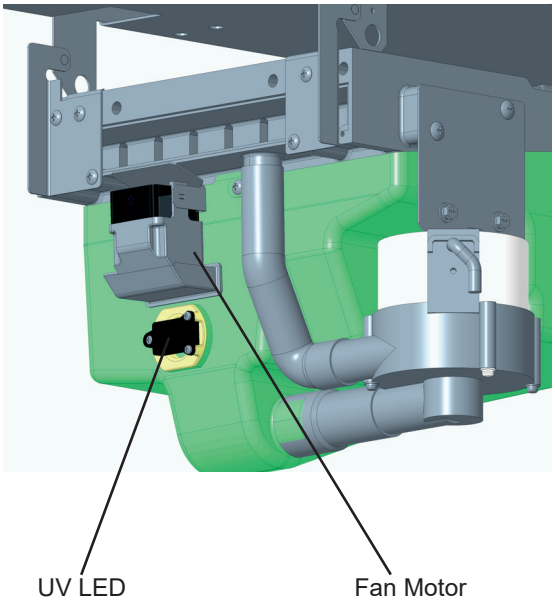
IM-21, 30



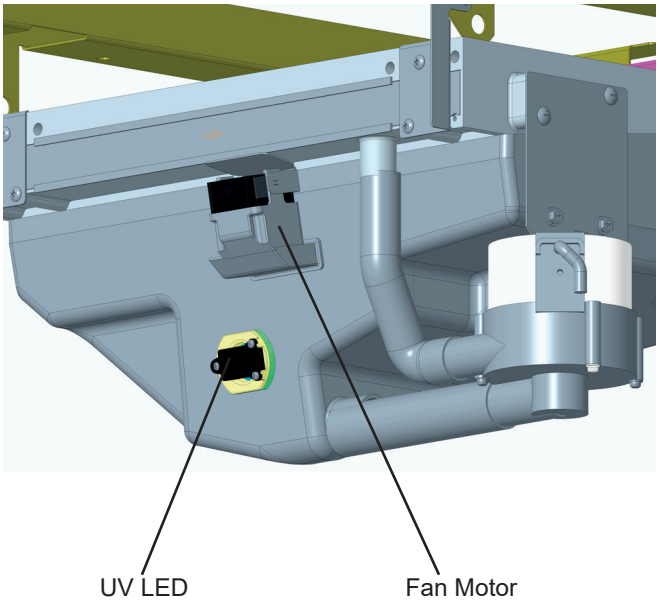
IM-45, 65



IM-100, 130



IM-240



Note: The UV feature can be added to the following models:
IM-30CPE, IM-45CPE, IM-130CPE, IM-45PE, IM-65PE, IM-130PE, IM-240PE, IM-130APE, IM-240APE

2. SEQUENCE OF OPERATION

[a] BASIC CONTROL

See "III. 3. TIMING CHART" for details.

Soft Start

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

Water Pan Opens

1) HGV opens, the actuator motor starts, and the water pan starts to open.

2) After 20 seconds, WV opens to supply defrosting water for a specific time (setting No. 10 or 11).

Harvest Cycle

1) After the water pan opens, HGV remains open until the evaporator thermistor reaches a specified temperature (setting No. 1).

Water Pan Closes

1) When the evaporator thermistor reaches a specified temperature (setting No. 1), HGV closes, FM starts and the water pan starts to close.

Freeze Cycle

1) When the water pan closes, WV opens to supply icemaking water for a specific time (setting No. 12).

2) After icemaking water has been supplied, PM starts and continues to supply additional water (setting No. 15) if the setting No. 15 is set.

3) The freeze cycle is considered to be 100% complete when the target integrated values (setting No. 2 and 3) are reached. Then, operation goes back to "2. WATER PAN OPENS".

[b] BIN CONTROL CYCLE

1) When the bin cotrol switch stays on for more than 10 seconds, the bin control cycle starts and the icemaker stops after completing the freeze and defrost cycles. After the bin control switch stays off for more than 80 seconds, the bin control cycle ends and the icemaker restarts. (HGV opens 30 seconds before the icemaker restarts.)

2) After the bin control cycle ends (or when the power supply is turned on), the water pan starts to open (if the icemaker stopped while the water pan was closing).

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

[c] AUTOMATED CLEANING CONTROL

Pre-set

1) The cleaning control starts and all operation stops when SW1 is pressed and held for 3 seconds except when the icemaker is out of operation due to an error. The harvest cycle starts and the 7-segment display shows "Pr".

2) When the temperature reaches the harvest completion temperature, the water pan closes and the pre-set completes.

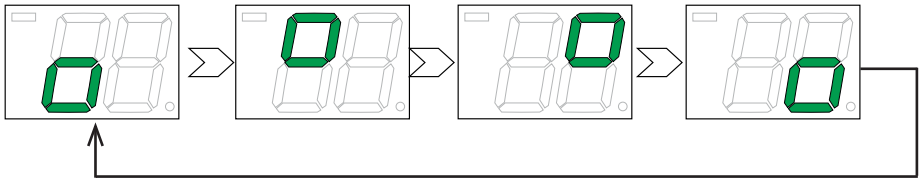
   Note: The compressor does not turn on for 3 minutes right after the freeze cycle completes.

3) The icemaker resumes the icemaking operation when SW1 is pressed and held for 3 seconds or when the power supply is turned off while the display shows "Pr".

Note: If the set cleaning operation time (setting No. 25) is "0", the icemaker does not enter the cleaning control.

Feed Process

1) When the water pan is closed, the 7-segment display shows the feed process indication.
   Feed the cleaning solution while the display shows the indication.



2) Press SW1 or wait for 15 minutes to enter the next step.

3) PM starts, and the compressor turns on after stopping for 3 minutes.

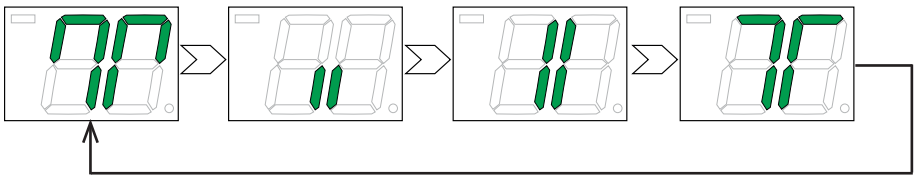
4) If the icemaking thermistor reaches the set temperature (setting No. 24) 1 minute or later after PM starts, HGV and the compressor turn off and the feed process ends. The feed process also ends if the icemaking thermistor does not reach the set temperature within 90 minutes after PM starts.

Note: 1. If SW1 is pressed and held for 3 seconds while the display shows the feed process indication, the cleaning operation time is forcibly ended and the water pan opens. The icemaker resumes the icemaking operation after the rinse process.

2. If the power supply is turned off while the display shows the feed process indication, the cleaning control re-starts from the feed process.

Cleaning Process

1) After the feed process completes, the 7-segment display shows the cleaning process indication.



2) PM stops after the cleaning operation time (setting No. 25) has passed.

3) The water pan remains closed for the evaporator drain time (setting No. 28) for draining.
* The remaining water on the evaporator drops into the water pan, reducing water drips into the storage bin.

4) The water pan opens.

5) The cleaning water is drained for the tank drain time (setting No. 29).

6) After the tank drain time has passed, the cleaning process completes.

Note: If SW1 is pressed and held for 3 seconds during the cleaning process, the cleaning operation time is forcibly ended and the water pan opens. The icemaker resumes the icemaking operation after the rinse process.

Rinse Process

1) The water pan closes.

2) WV opens and water is supplied for the icemaking water supply time (setting No. 12) twice.

3) PM starts and water is supplied for the additional icemaking water supply time (setting No. 15) twice.

4) PM stops after the rinsing time (setting No. 27) has passed.

5) The water pan remains closed for the evaporator drain time (setting No. 28) for draining.

6) The water pan opens.

7) The water pan remains open for the tank drain time (setting No. 29).

8) The first rinse process completes.

9) Steps 1) to 8) are repeated for the set number of times (setting No. 29).

Note: If the power supply is turned off during the rinse process, the icemaker resumes the rinse process from step 1). The count is reset.
* SW1 is inactive.

Return to Icemaking Operation

1) After the rinse process completes, the icemaker returns to the icemaking operation (harvest cycle) and the 7-segment display shows the harvest cycle indication.

2) The icemaker operates the same way as when the water pan opens after the power supply is turned on.

[d] UV SANITATION CONTROL

* When the sanitation control setting (setting No. 75) is "1", this control becomes effective.

1) If the controller board thermistor reaches the set temperature (setting No. 76) while the bin control switch is on and the set time (setting No. 79) has passed, the sanitation control (air) starts. The water pan opens if not fully open.

2) UV-LED and UV-FM turn on.

3) After the set time (setting No. 77) has passed, UV-LED and UV-FM turn off and the sanitation control (air) ends.

4) The sanitation control (water) starts.

5) ACM starts and the water pan closes.

6) UV-LED turns on.

7) After the set time (setting No. 78) has passed, UV-LED turns off.

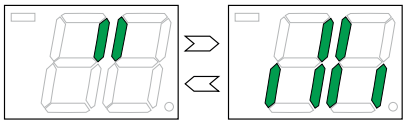
8) ACM starts and the water pan opens.

9) The sanitation control (water) ends.

10) After the set time (setting No. 79) has passed, steps 2) to 9) are repeated .

Note: If the bin control is reset during the sanitation control, the sanitation control ends and the icemaker resumes the normal operation from the soft start.

[7-segment display indication during UV irradiation]



[e] DRAIN PUMP OPERATION

1) Water drained during the icemaking operation accumulates in the tank, and the pressure switch turns on.

2) PM turns on and starts draining water.

3) When the water in the tank decreases and the pressure switch turns off, PM turns off.

4) If there is any problem with PM or the pressure switch, the unit operates as follows:

   If the float switch remains on for the set time (setting No. 7), an error is indicated and the unit stops.

3. CONTROLLER BOARD

IMPORTANT

If receiving a service call, ask the user to turn off the power to the icemaker and turn it on again, while watching the icemaker. This will reset the controller, and in some cases normal operation will resume.

NOTICE

1. Check that the icemaker has been earthed properly. If not, the controller board will not work properly.

2. Do not change wiring and connections, or the controller board will not work properly.

3. Do not touch the reverse side of the controller board and tiny electronic devices on it.

4. Do not repair the electronic devices and parts on the controller board in the field (except for fuse replacement). Replace the whole board assembly when it fails.

5. To get static free, always touch the metal part of the icemaker before servicing. Electrostatic discharge will cause severe damage to the controller board.

6. The signal ground wire must be connected to the control box when replacing the controller board after service.

7. The controller board is fragile. Handle with care.

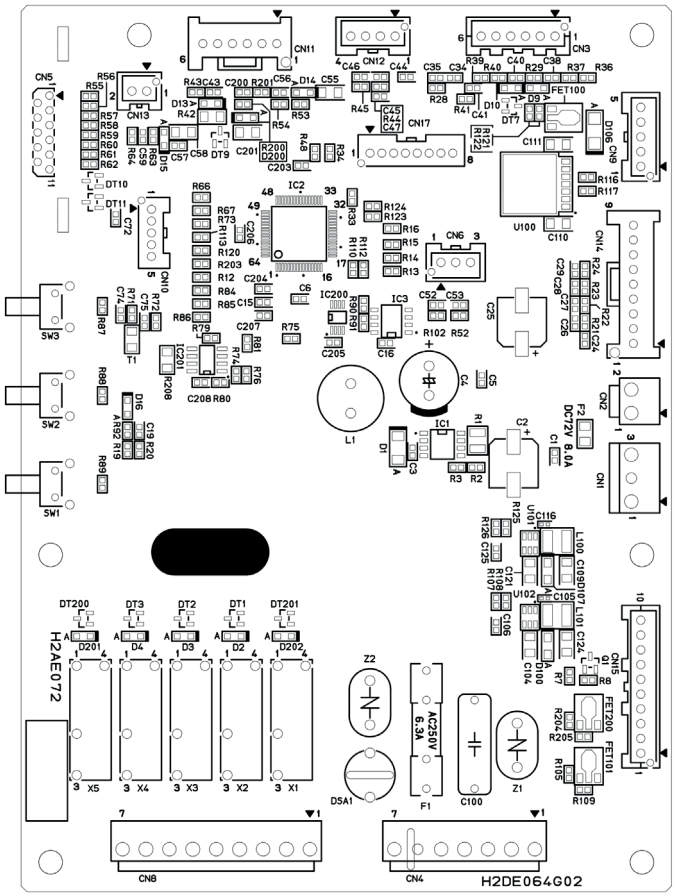
   * Do not drop the board on the floor.

   * Make sure that the board is placed correctly into the guides in the control box.

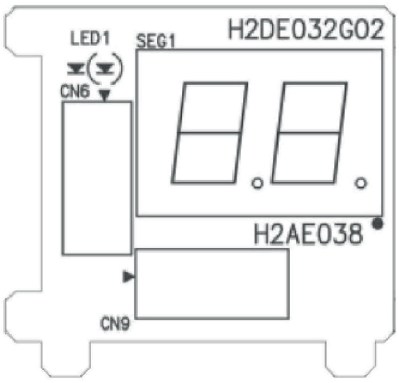
   * Handle the board by the edges only. Do not touch the electric parts and devices.

[a] CONTROLLER BOARD LAYOUT

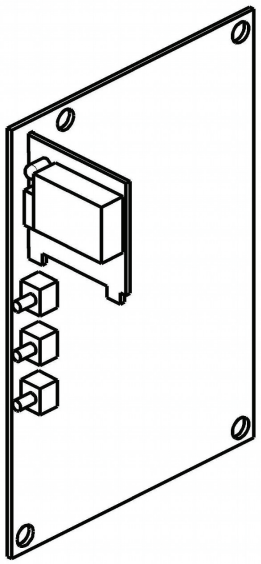
[Main Board]



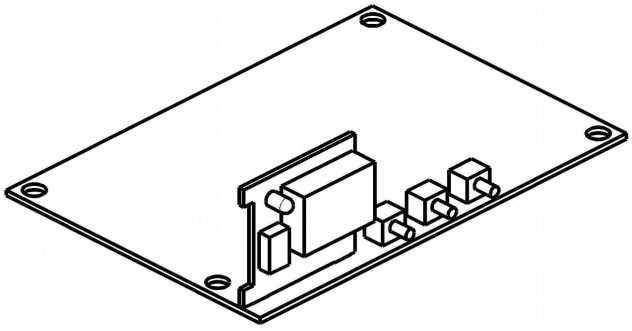
[Sub Board]



[Combination]

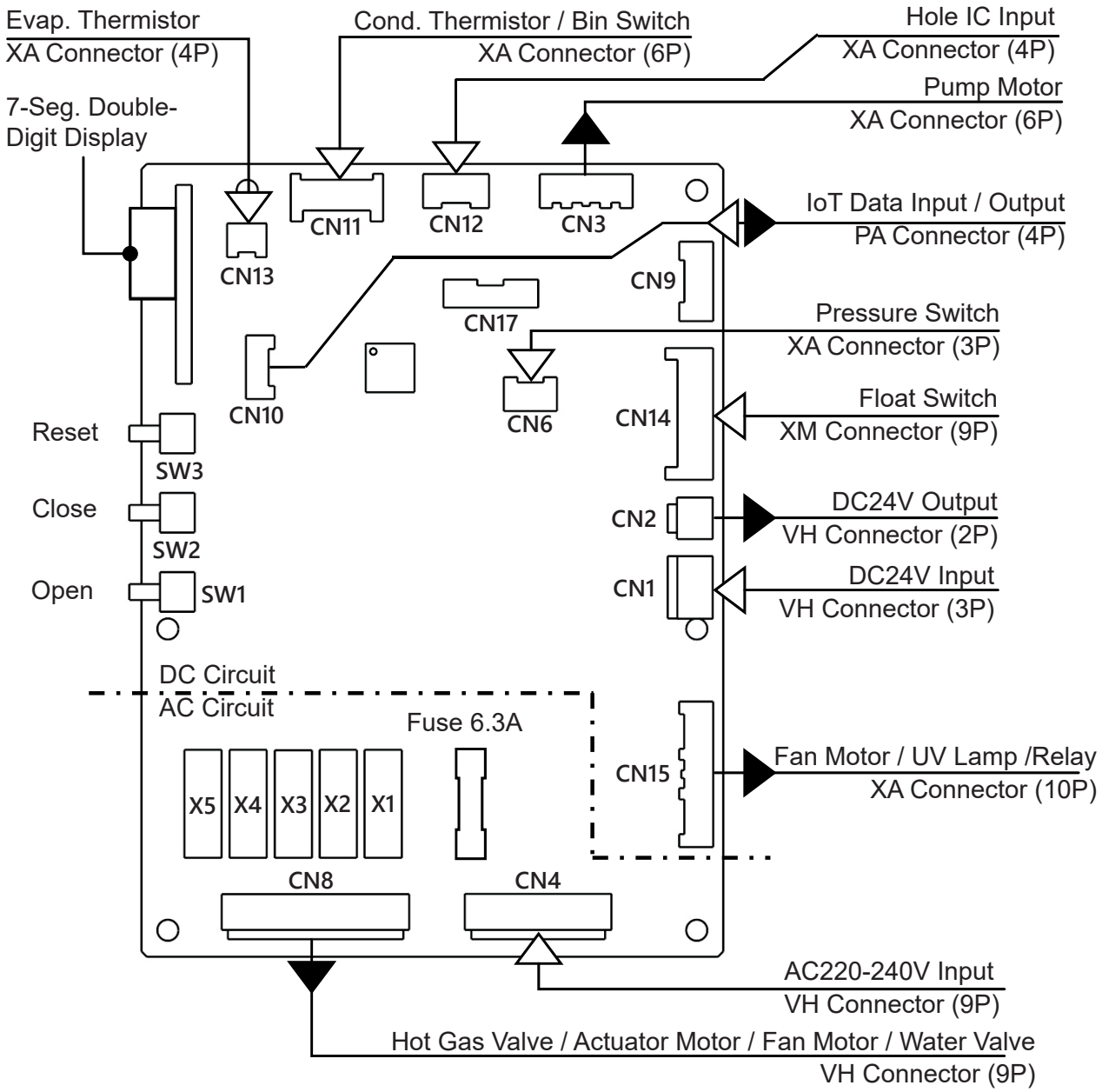


Vertical installation

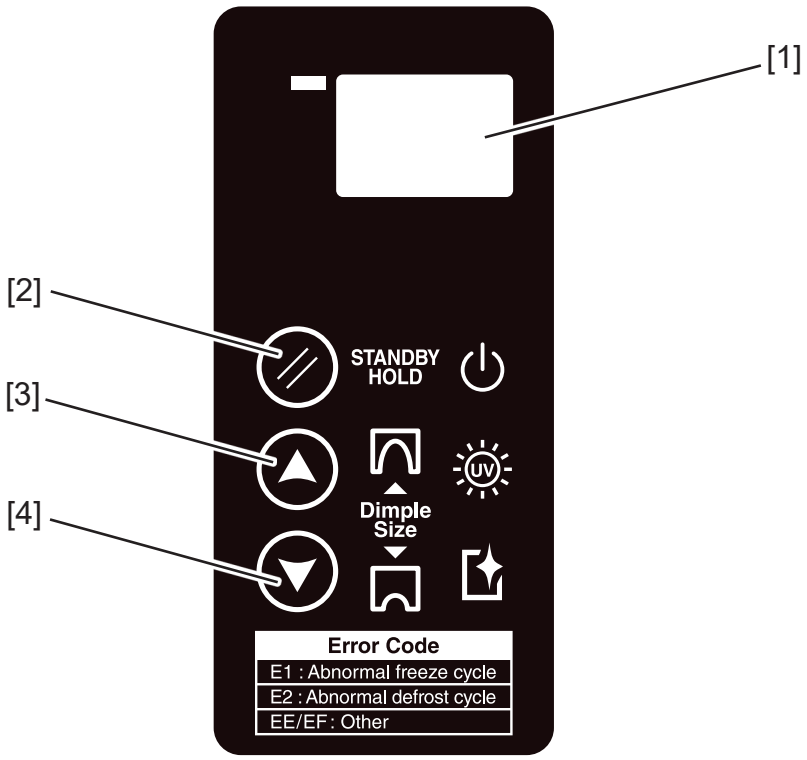


Horizontal installation

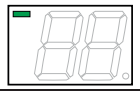
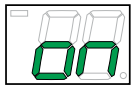
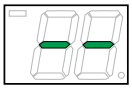
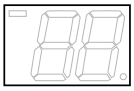
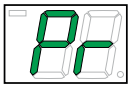
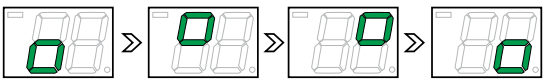
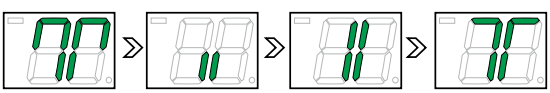
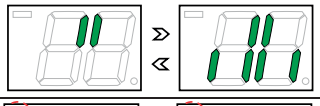
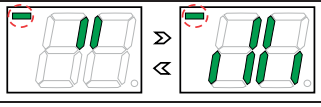
[b] INPUT/OUTPUT LAYOUT



[c] SWITCH OPERATION



[1] Display

Standby		
Icemaking	on	
Bin Full	--	
Shut Down		
Auto Cleaning	Pre-set	
	Feed	
	Cleaning/Rinsing	
UV Sanitation	General	
	With Standby	

[2] Reset Switch / Standby Switch

1) When the reset switch is pressed and released after the power supply is turned on, the soft start is reset within 3 seconds and the water pan starts to open in the initial cycle.

2) When the reset switch is pressed and released during operation (water pan opening or closing, defrost or freeze cycle), the icemaker returns to the initial cycle within 3 seconds and the water pan starts to open.
   * The above control is available because the water pan position is detected by the hall IC not by a change switch.

3) When the reset switch is pressed and released while the icemaker is off in the bin control cycle, the icemaker returns to the initial cycle within 3 seconds, the bin control cycle ends and the water pan starts to open.

4) When the reset switch is pressed and released while the icemaker is off with an error, the icemaker returns to the initial cycle within 3 seconds, the error is reset and the water pan starts to open.
   * When the icemaker returns to the initial cycle by the reset switch operation, the water temperature is assumed to be 0°C (below 13°C), the freeze back up timer is extended, the icemaking water supply time including additional water supply with the water pan closed doubles and the number of freeze cycles becomes 0.

5) When the reset switch is pressed and held for 3 seconds, the icemaker enters the standby mode. To reset the standby mode, press the reset switch again. Then, the icemaker resumes the normal opration from the soft start.

   * In the standby mode, the icemaker operates as the storage bin is full.

[3] Up switch / Sanitation switch

1) When the up switch is pressed, the current set point temperature (maintenance mode No. 2) is displayed (see “3. [f] MAINTENANCE MODE”).

2) When the up switch is pressed again, the set point temperature goes up in 0.5°C increments (dimple size is increasesd).

3) When the switch is pressed for 30 seconds, the set point temperature is determined with “on” in the display.

4) When the switch is pressed and held for 30 seconds, the icemaker enters the UV sanitation control.

[4] Down Switch / Cleaning Switch

1) When the down switch is pressed, the current set point temperature (maintenance mode No. 2) is displayed (see “II.3. [f] MAINTENANCE MODE”).

2) When the down switch is pressed again, the set point temperature goes down in 0.5°C increments (dimple size is decreased).

3) When the switch is pressed for 30 seconds, the set point temperature is determined with “on” in the display.

4) When the switch is pressed and held for 30 seconds, the icemaker enters the automated cleaning control.

[d] DISPLAY MODE

1) Press the up and down switches together for more than 3 seconds while the unit is running. The display shows “n1”.

2) Press the up switch to increase the number and the down switch to decrease the number.

3) Press the reset switch to select the desired number. The current value appears in the display.

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

To reset, leave the switches untouched for 30 seconds.
To clear, press the up and down switches together for 5 seconds while the value is displayed.

Display Mode List

No	Item	Description	Clear
n1	Freeze cycle time count up (min)	0 to 99 min	No
n2	Freeze cycle completion rate (%)	0 to 100% (00 = 100%)	No
n3	Current cube control thermistor temp	Rounded to the nearest whole number	No
n4	Current ambient thermistor temp	Rounded to the nearest whole number	No
n5	Water temp (presumed)	“H” for 13°C or more “L” for less than 13°C	No
n7	Current pump motor RPM	1/100 of actual value. Rounded to the nearst whole number. E.g. 1560 r/min : 16, 820r/min : 8	No

No	Item	Description	Clear
n8	Current condenser thermistor temp	Rounded to the nearest whole number	No
n9	UV sanitation completion (%)	0 to 100% (00 = 100%)	No
h1	Last freeze cycle time (min)	Same as current freeze cycle time. Freeze cycle is not considered complete if interrupted by bin control switch or reset switch.	Yes
h2	Number of freeze cycles	Number of cycles completed. 10 is added every 10 cycles. Freeze cycle is not considered complete or counted in if interrupted by bin control switch or reset switch. < Display > E.g. 655350 cycles (start) (end) 65→off→53→off→50→off→ - -	Yes
h3	Total number of freeze cycles		No
h4	Error log	Display up to 5 errors from latest to oldest for 1 sec ON, 0.5 sec OFF, “- -” at the end, then back to latest error. In case of less than 5 errors, display oldest error, “- -”, then back to latest one. < Display > e.g. E5 (latest), E4, E3, E2, E1 (oldest) (latest) (oldest) E5→off→E4→off→E3→off→E2→off→E1→off→ - -	Yes
h5	Software version	For Ver 1.0A, display “01.”→“0A”→“01.”alternately for 1 sec ON, 0.5 sec OFF.	No
h6	Default model code	Display set model codes from “00” to “FF” (hexadecimal, 256 patterns)	No (*)
h7	UV irradiation time	Display UV irradiation time (10000 at maximum). E.g. 8520 hour (start) (end) 0→off→85→off→20→off→ - -	Yes

* To clear the model code, press the up and down switches together for 15 seconds (for controller board replacement and setting error correction only).

[e] MODEL CODE SETTING MODE

1) When the up switch is pressed for more than 3 seconds, the display mode starts and the display shows “n1”.

2) Press the up or down switch to have “h6” in the display.

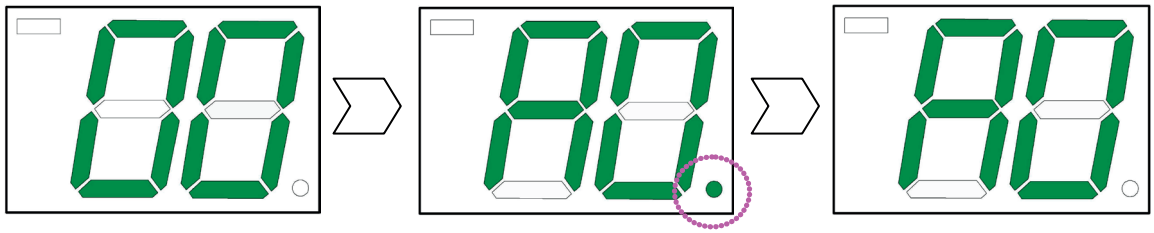
3) Press the reset switch. The current memorised model code appears in the display.

4) Press the up and down switches together for 15 seconds. The display shows “00”. When the controller board P01873-02 is used, the hyphen on the top left lights up.

5) Press the up switch to increase the first digit in the 7-segment display, and the down switch to increase the second digit. The digit changes in the following order: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F, H. Set the proper model code according to the model code list below. When a preset model code is displayed, the dot on the bottom right lights up.

6) When the chosen preset model code is displayed, press the reset switch to store the board memory (the display shows “on” and the machine will then always start up with this memorized program as default).
   * To check the current memorised model code, view in the display mode (see "II.3.[d] DISPLAY MODE).

<Controller board replaced> <Chosen model code displayed> <Model code memorised>



Model Code List

1st Digit	2nd Digit	Model
1	0	IM-30CPE
	1	IM-30CPE-25
	2	
	3	
	4	IM-30CWPE
	5	IM-30CWPE-25
	6	
	7	
	8	IM-21CPE
	9	
	A	
	B	
	C	
	D	
	E	
	F	
2	0	IM-45PE
	1	IM-45PE-25
	2	
	3	
	4	IM-45WPE
	5	IM-45WPE-25
	6	
	7	
	8	
	9	
	A	
	B	
	C	
	D	
	E	
	F	

1st Digit	2nd Digit	Model
3	0	IM-45CPE
	1	IM-45CPE-25
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	A	
	B	
	C	
	D	
	E	
	F	
4	0	IM-65PE
	1	IM-65PE-25
	2	
	3	
	4	
	5	
	6	
	7	IM-65PE-Q
	8	
	9	
	A	
	B	
	C	
	D	
	E	
	F	

1st Digit	2nd Digit	Model
5	0	IM-658WPE
	1	IM-65WPE-25
	2	
	3	
	4	
	5	
	6	
	7	IM-65WPE-Q
	8	
	9	
	A	
	B	
	C	
	D	
	E	
	F	
6	0	IM-130PE
	1	IM-130PE-23
	2	IM-130PE-32
	3	
	4	
	5	
	6	
	7	
	8	IM-100PE
	9	
	A	
	B	
	C	
	D	
	E	
	F	

1st Digit	2nd Digit	Model
7	0	IM-130WPE
	1	IM-130WPE-23
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	A	
	B	
	C	
	D	
	E	
	F	
A	0	IM-130CPE
	1	IM-130CPE-23
	2	IM-130CPE-32
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	A	
	B	
	C	
	D	
	E	
	F	

1st Digit	2nd Digit	Model
B	0	IM-130APE
	1	IM-130APE-23
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	A	
	B	
	C	
	D	
	E	
	F	
C	0	IM-240DPE
	1	IM-240DPE-23
	2	IM-240DPE-32
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	A	
	B	
	C	
	D	
	E	
	F	

1st Digit	2nd Digit	Model
D	0	IM-240DWPE
	1	IM-240DWPE-23
	2	IM-240DWPE-32
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	A	
	B	
	C	
	D	
	E	
	F	
E	0	IM-240APE
	1	IM-240APE-23
	2	IM-240APE-32
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	A	
	B	
	C	
	D	
	E	
	F	

1st Digit	2nd Digit	Model
F	0	IM-240AWPE
	1	IM-240AWPE-23
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	A	
	B	
	C	
	D	
	E	
	F	
H	0	IM-240PE
	1	IM-240PE-23
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	A	
	B	
	C	
	D	
	E	
	F	

1st Digit	2nd Digit	Model
J	0	IM-240WPE
	1	IM-240WPE-23
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	A	
	B	
	C	
	D	
	E	
	F	

[f] MAINTENANCE MODE

1) Press the reset switch for more than 3 seconds while the unit is running. The display shows “1”.

2) Press the up switch to increase the number and the down switch to decrease the number.

3) Press the reset switch to select the desired number. The current set value flashes in the display.

4) Press the up switch to increase the set value and the down switch to decrease the set value.

5) Press the reset switch to select the desired value. The display shows the number again.

To reset, leave the switches untouched for 30 seconds.

Maintenance Mode List

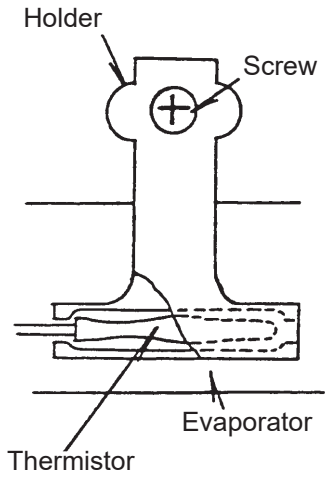
	No	Item	Range	Step
Basic	1	Defrost completion temp	2 to 20°C	1
	2	Integrated constant 1 (temp)	-5 to -40°C	0.5
	3	Integrated constant 2 (time)	5 to 90 min	1
	4	Ambient temp correction operating temp for integrated value	10 to 50°C	1
	5	Ambient temp correction rate for integrated value	10 to 100% (00 = 100)	1
	6	Freeze backup timer	45 to 90 min	5
Drain pump	7	Float switch detection time	0 to 60 min	1
Water supply	10	Defrosting water supply time, water temp less than 13°C	1 to 99 sec, 99 = continuous	1
	11	Defrosting water supply time, water temp 13°C or more	1 to 99 sec	↑
	12	Icemaking water supply time, normal	0 to 90 sec	1
	13	Water temp measurement correction value	+0 to +20K	1
	15	Additional icemaking water supply time	0 to 90 sec	1
	17	Defrosting water control	0: normal control 1: segmented control	1
	18	Defrost completion temp correction	+0 to +20K	1
Other	21	Double stack bin control	0: No / 1: Yes	1
Auto cleaning	24	Cleaning Water temp	0 to 35°C	1
	25	Cleaning operation time	0 to 99 min	1
	26	Number of rinsing	1 to 99 times	1
	27	Rinsing time	1 to 99 sec (1=10sec)	1
	28	Evaporator drain time	2 to 99 min	1
	29	Tank Drain time	1 to 99 sec (1=10sec)	1
Model	30	Type	0: water-cooled (large) 1: small 2: medium / large 3: separate	1
Defrost cycle low temp control	34	Operating temp	40 to 70°C	1
Water regulator	36	Water regulator error detecting temp	0 to 50°C, 0: cancel	1
Pump motor	41	Normal target RPM	15 to 45 RPM (15=1500)	1
	42	Low RPM operating condition (Completion rate = No.42 setting)	10 to 100%	1
	43	Low RPM ratio (Low RPM = No.41 × No.43)	50 to 100%	1
Slush ice	50	Slush ice pump off time	0 to 90 sec, 0:no control	1
	51	Slush ice water supply time	0 to 5 sec	1
	52	Slush ice PM on time	0 to 99 sec	1
	53	Slush ice control operating temp	0 to 20°C	1
	54	Slush ice control cancellation temp	-30 to 10°C	1
Hard water	60	Operating condition	10 to 100% (00 = 100)	1
	61	Water supply time	0 to 90 sec	1

	No	Item	Range	Step
Ice left in water pan	70	Operating temp	10 to 60°C	1
	71	Hot gas valve on time	0 to 20 sec	1
Ice bridge	73	Hot gas valve off time	0 to 30 sec	1
Low temp in defrost cycle	74	Operating temp	0 to 40°C	1
UV sanitation	75	UV Device selection	0:No / 1:Yes	1
	76	Ambient temp for UV device operation control	10 to 40°C	1
	77	Sanitizing time for air	0 to 60 min	1
	78	Sanitizing time for water	0 to 60 min	1
	79	Operation control interval	1 to 99 hour	1
High pressure	80	Sensed temp	55 to 70°C	1
Cond cleaning notice	81	Condenser cleaning notice	0 to 99 hour (1 =100)	1
Water circuit cleaning	82	Cleaning notice	0 to 99 hour (1 =100)	1

For the maintenance mode settings, refer to page 104 and onwards.

[g] BEFORE CHECKING CONTROLLER BOARD

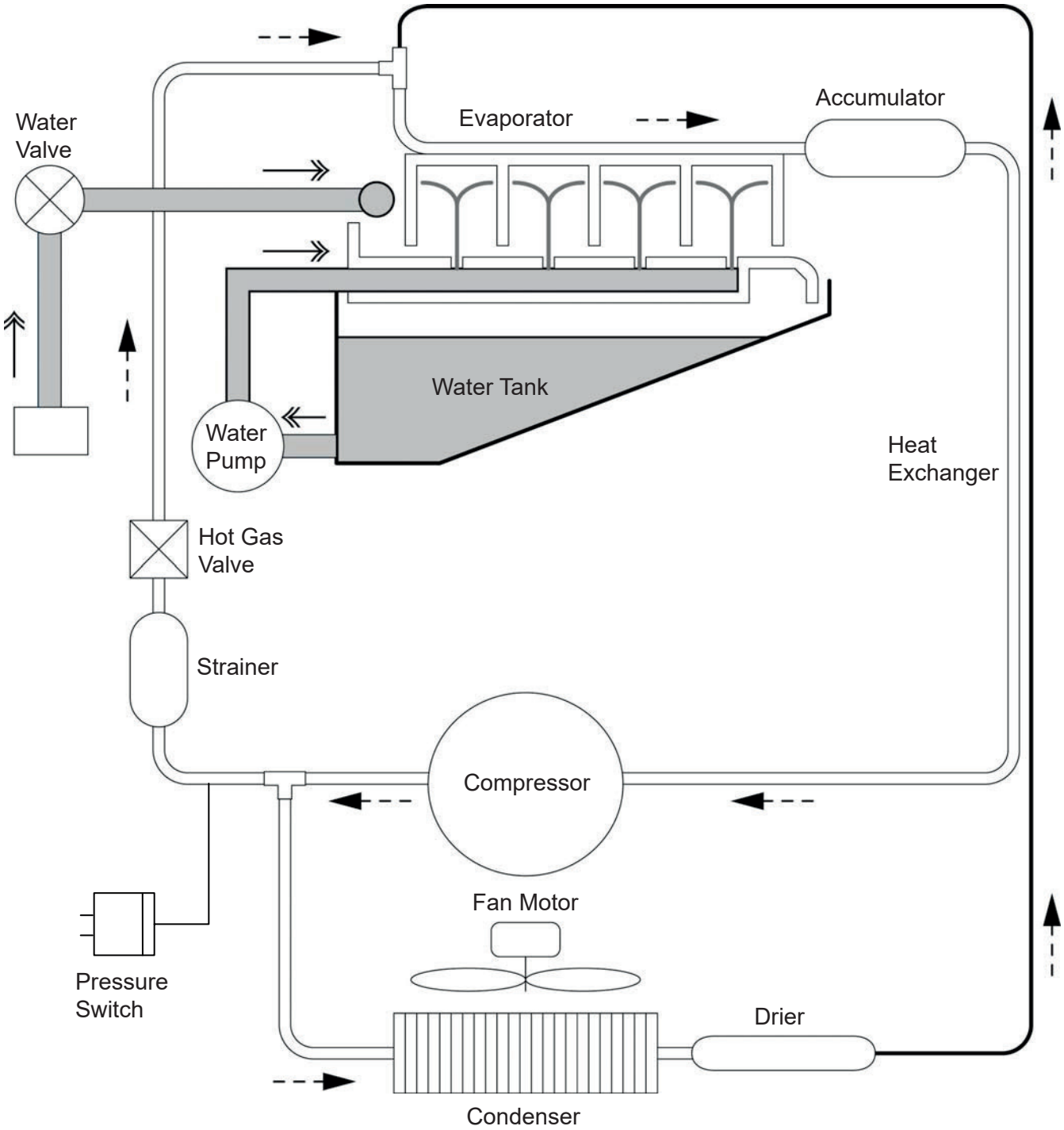
Check the power source voltage and the components as shown in the table below.

Component	Procedure	Normal
1. Thermistor (on evaporator)  	**NOTICE** Thermistor sensor part is fragile, glass sealed. Handle with care. * Disconnect the connector CN13 on the board. * Remove the screw and the thermistor holder on the evaporator. * Immerse the sensor part in a glass containing ice and water for 5 minutes. * Check the resistance between CN13 connector pins. * Replace the thermistor in its correct position. * Connect CN13.	5 -7 kilohms
2. Bin Control Switch	Manually set the micro switch in the TRIP and RESET positions, and check the period.	Approx. TRIP(Closed) 10 sec. RESET(Open) 80 sec.

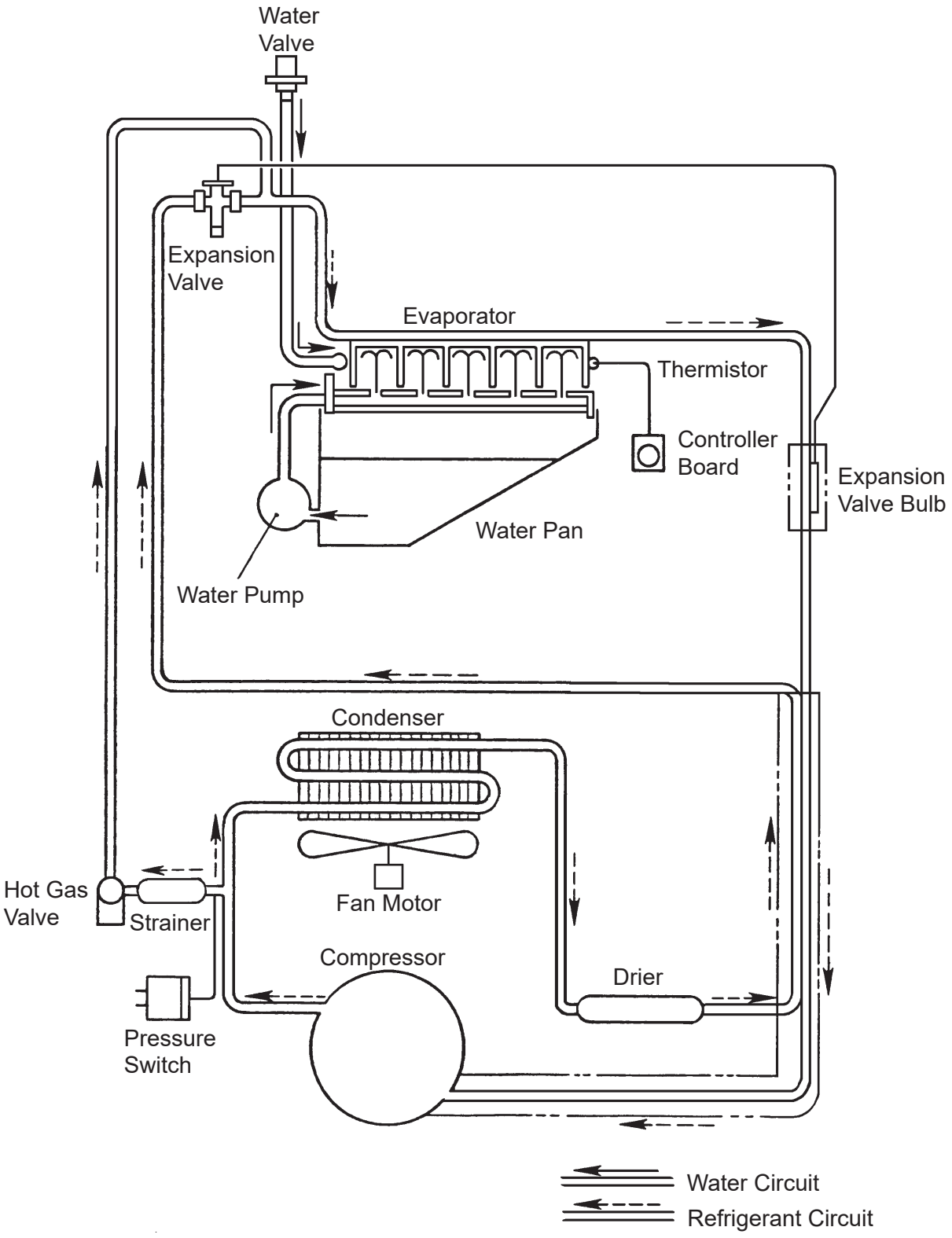
III. TECHNICAL INFORMATION

1. WATER CIRCUIT AND REFRIGERANT CIRCUIT

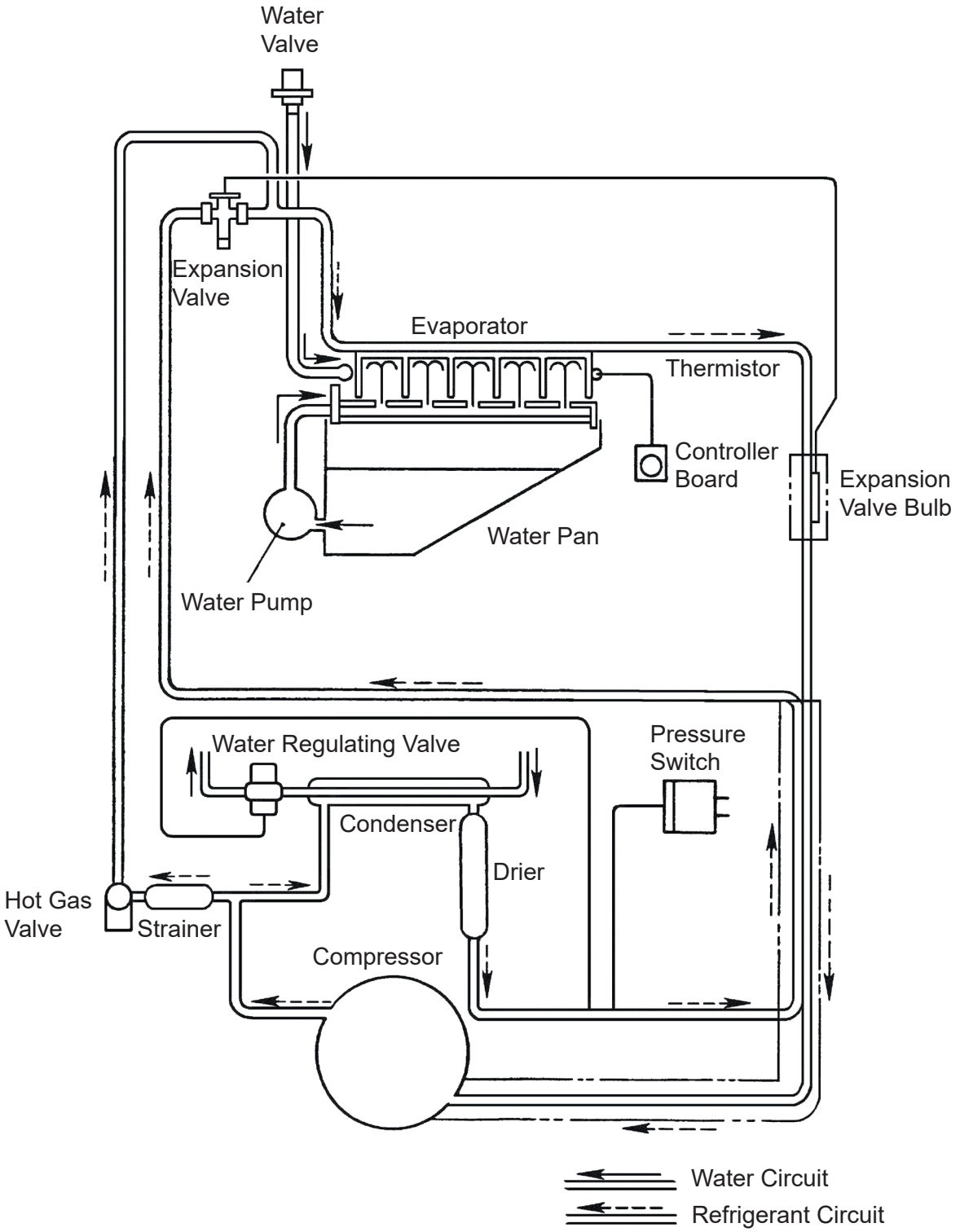
[a] IM-21CPE, IM-30CPE, IM-45CPE, IM-45PE, IM-65PE (Air-cooled)



[b] IM-100PE, IM-130PE, IM-240PE (Air-cooled)

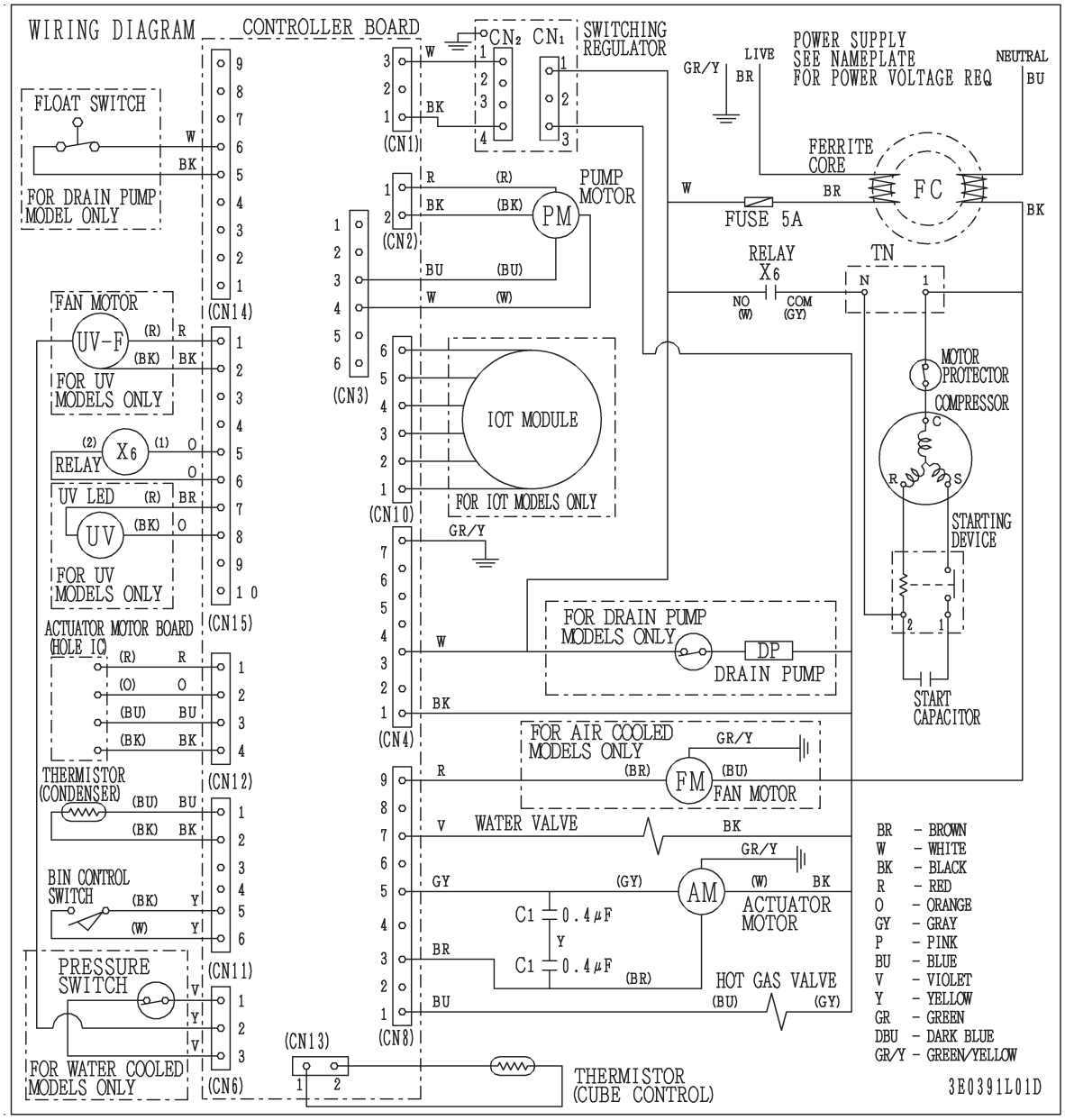


[c] IM-30CWPE, IM-45WPE, IM-65WPE, IM-130WPE, IM-240WPE (Water-cooled)

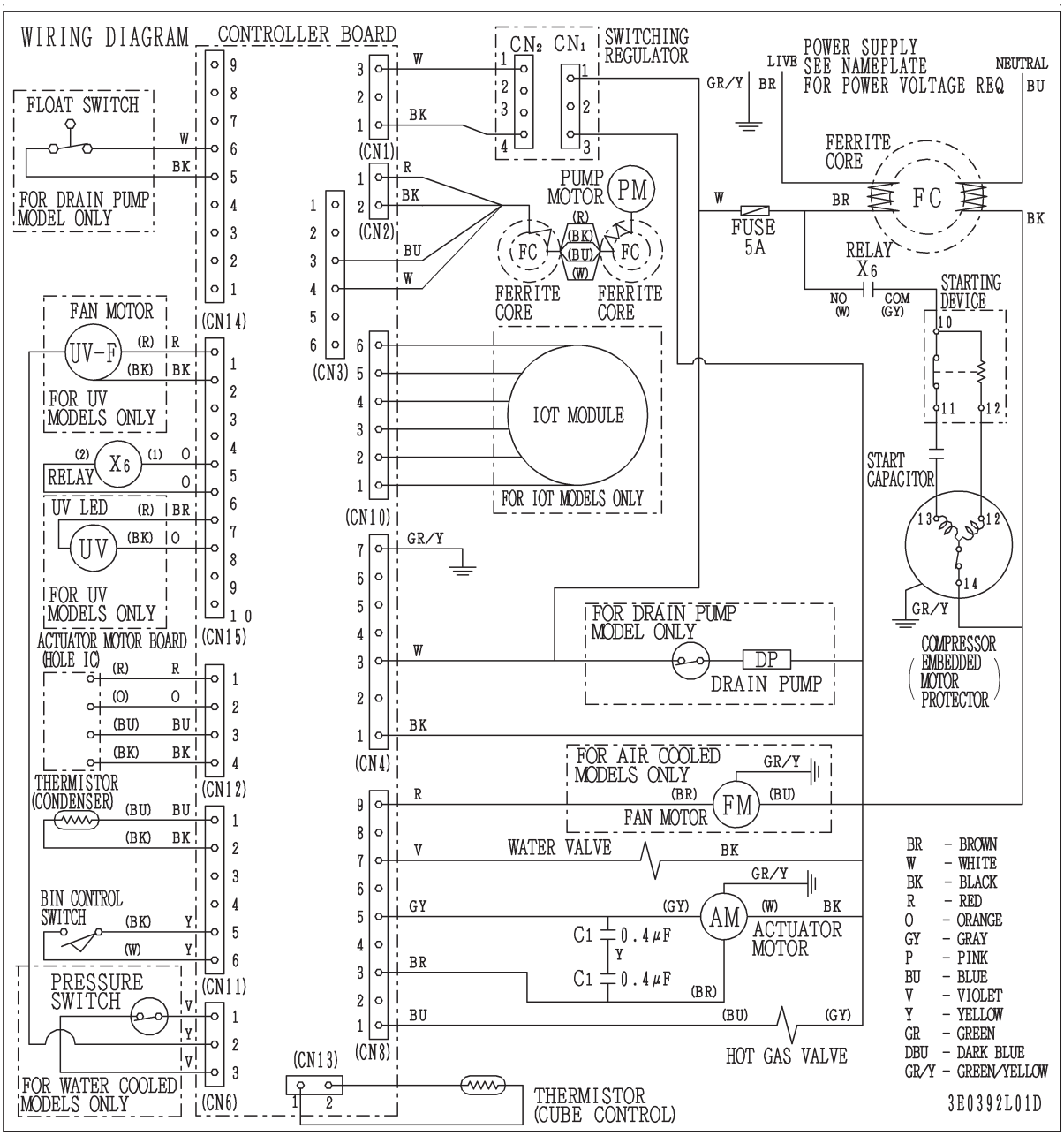


2. WIRING DIAGRAM

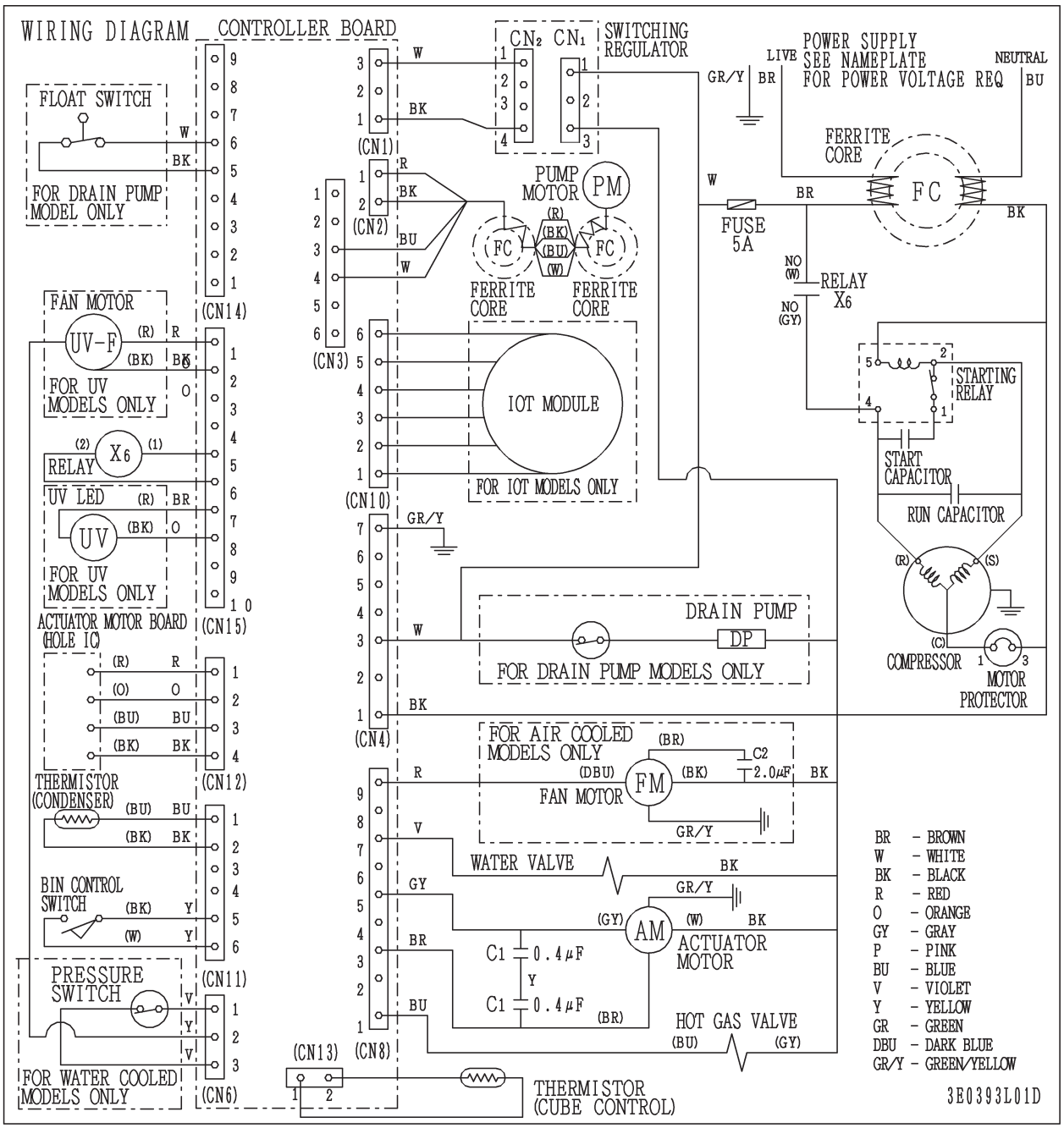
[a] IM-21CPE, IM-30CPE, IM-30CWPE, IM-45CPE, IM-45PE, IM-45WPE, IM-65PE, IM-65WPE



[b] IM-100PE, IM-100WPE, IM-130PE, IM-130WPE

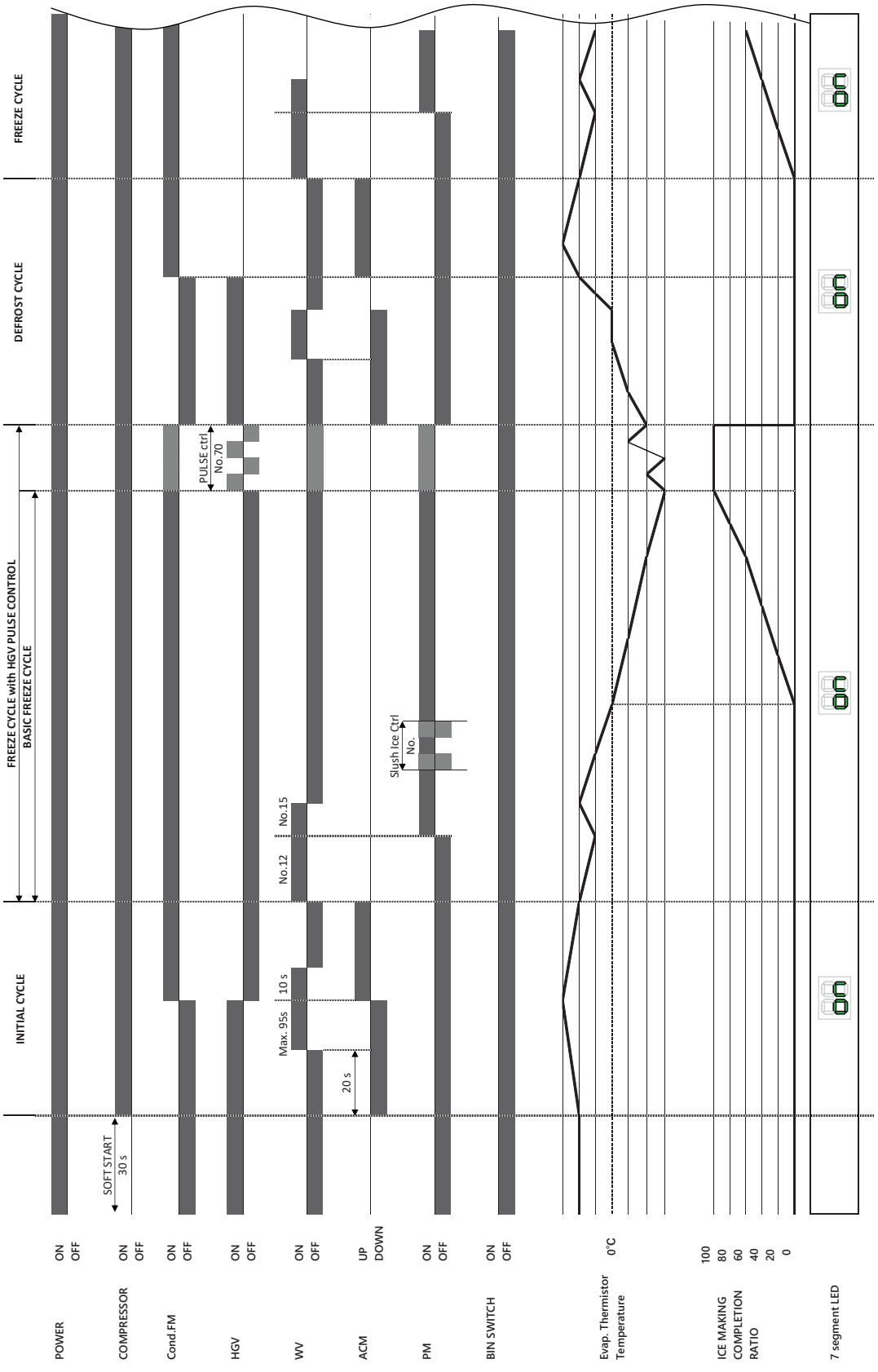


[c] IM-240PE, IM-240WPE, IM-240DPE, IM-240APE, IM-240DWPE, IM-240AWPE

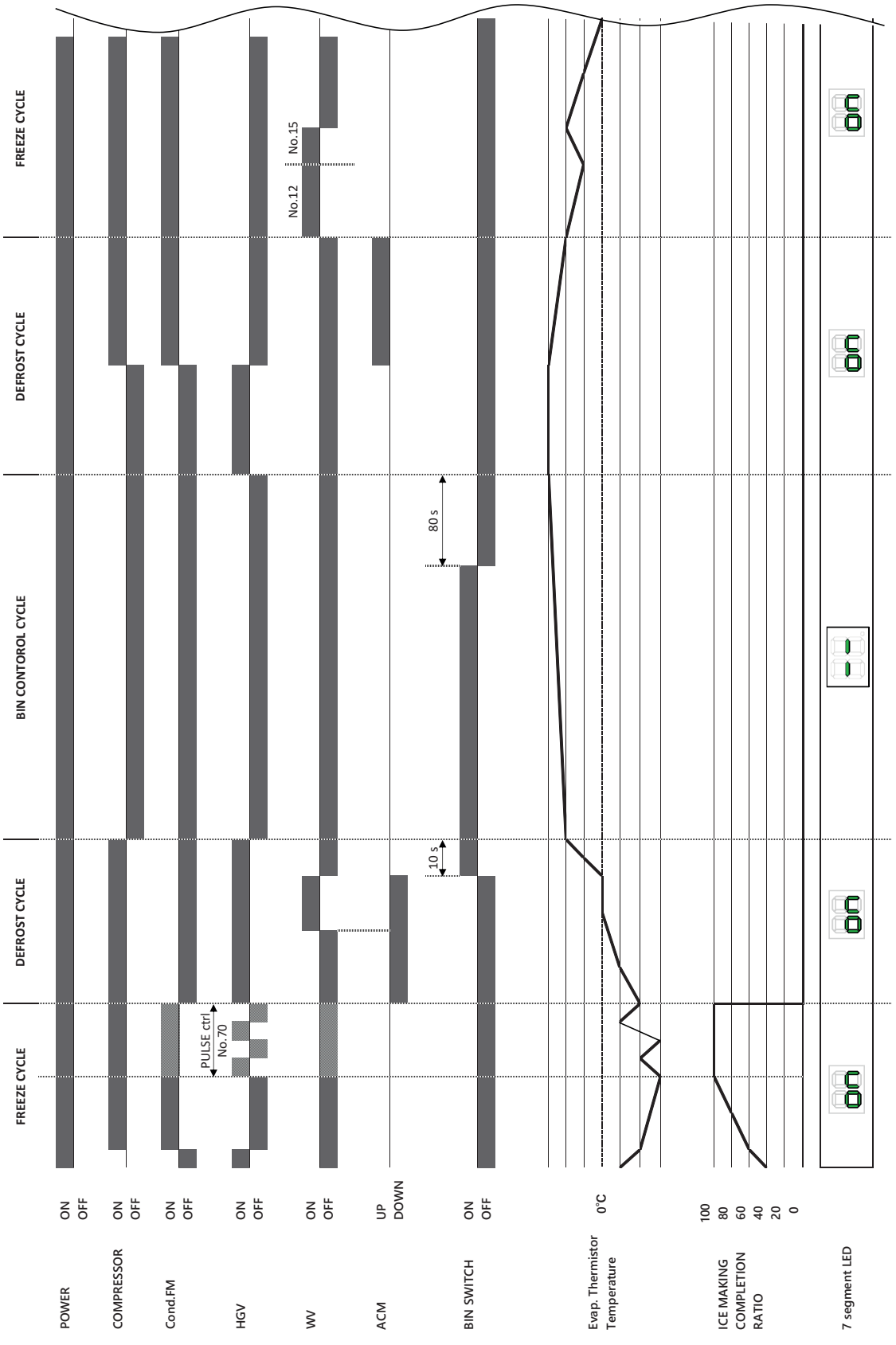


3. TIMING CHART

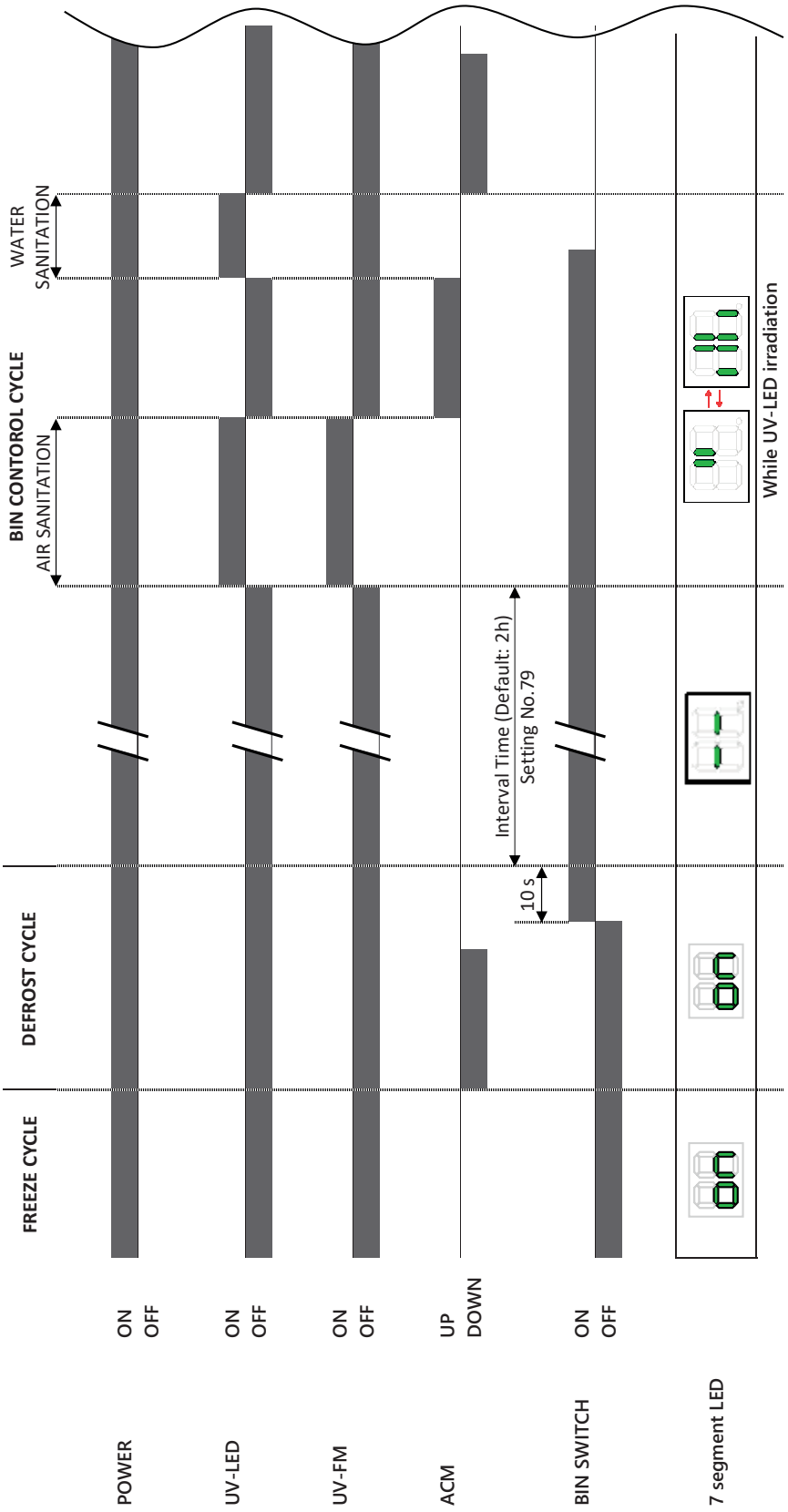
[a] BASIC CONTROL



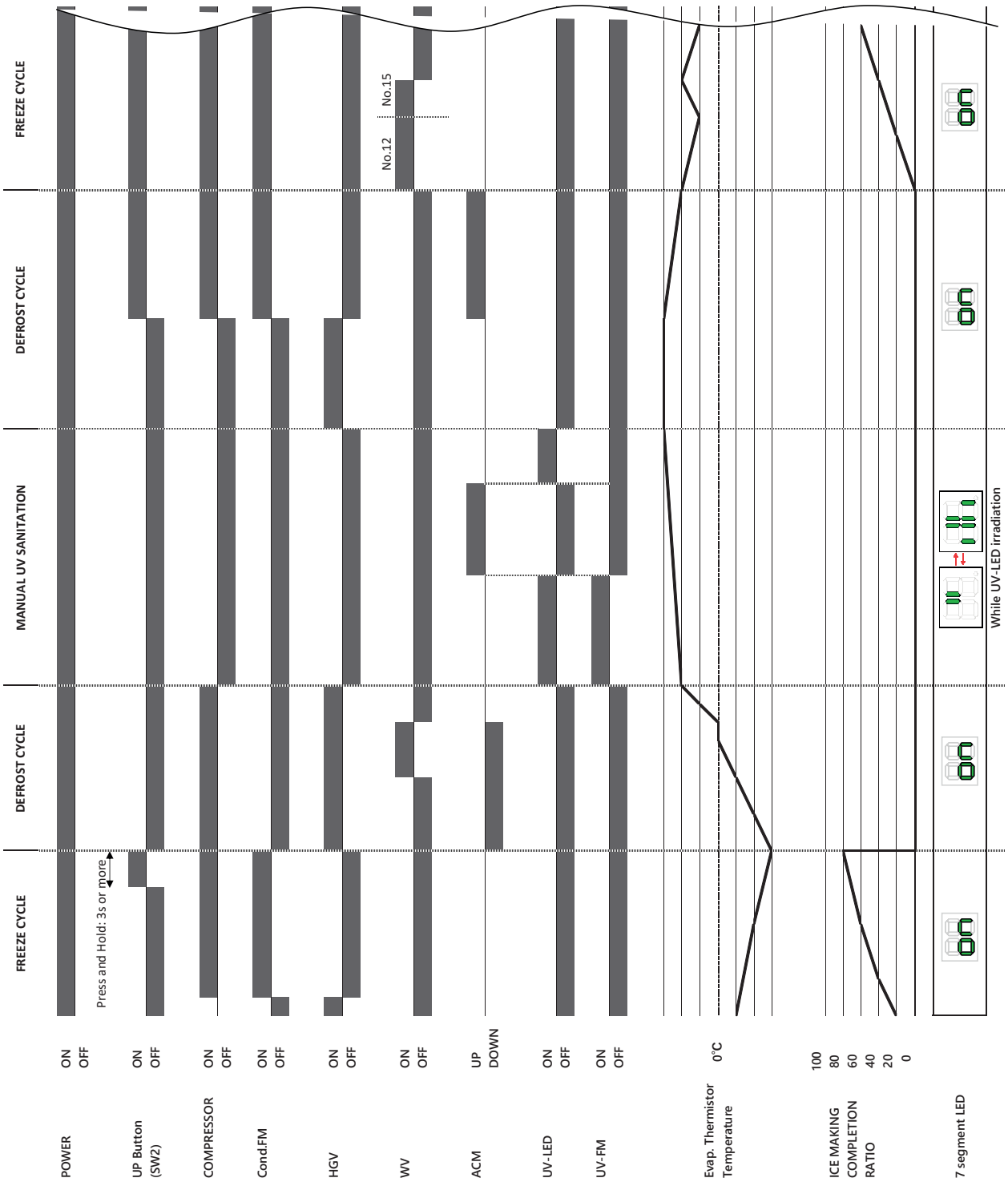
[b] BIN CONTROL



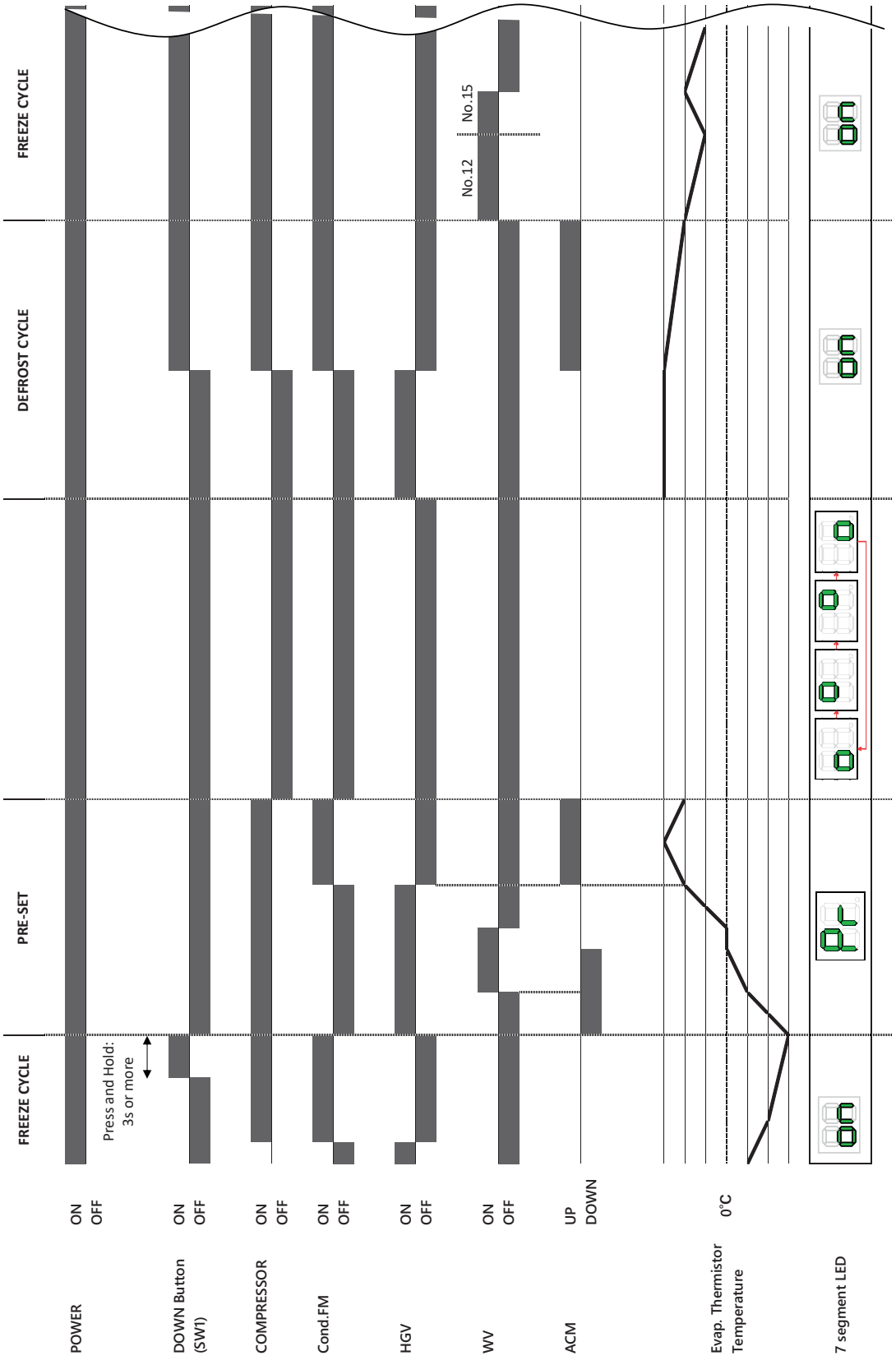
[c] UV SANITATION CONTROL (AUTO)



[d] UV SANITATION CONTROL (MANUAL)



[e] AUTOMATED CLEANING CONTROL



4. PERFORMANCE DATA

Suction Pressure and Evaporator Temp.

50Hz

Model	Ambient Temp.	(˚C)	10	21	32	38
	Water Temp.	(˚C)	10	15	21	32
IM-21CPE	Suction Pressure [peak]	(bar)	2.0	2.4	3.0	3.8
	Evaporator Inlet Temp.	(˚C)	-19	-17	-14	-13
IM-30CPE IM-30CPE-25	Suction Pressure [peak]	(bar)	2.2	2.8	3.6	4.3
	Evaporator Inlet Temp.	(˚C)	-20	-17	-14	-13
IM-30CWPE IM-30CWPE-25	Suction Pressure [peak]	(bar)	2.2	2.8	3.6	4.2
	Evaporator Inlet Temp.	(˚C)	-22	-21	-20	-20
IM-45PE IM-45PE-25 IM-45CPE IM-45CPE-25	Suction Pressure [peak]	(bar)	2.4	2.8	3.4	4.2
	Evaporator Inlet Temp.	(˚C)	-19	-17	-15	-13
IM-45WPE IM-45WPE-25	Suction Pressure [peak]	(bar)	2.2	2.8	3.6	4.2
	Evaporator Inlet Temp.	(˚C)	-22	-21	-20	-20
IM-65PE IM-65PE-25 IM-65PE-LM IM-65PE-LM103 IM-65PE-S IM-65PE-H IM-65PE-C IM-65PE-Q	Suction Pressure [peak]	(bar)	2.4	2.8	3.4	4.1
	Evaporator Inlet Temp.	(˚C)	-18	-17	-15	-14
IM-65WPE IM-65WPE-25	Suction Pressure [peak]	(bar)	3.0	3.4	4.0	4.8
	Evaporator Inlet Temp.	(˚C)	-22	-21	-20	-20
IM-100PE IM-130CPE	Suction Pressure [peak]	(bar)	2.8	3.2	4.0	4.5
	Evaporator Inlet Temp.	(˚C)	-17	-16	-15	-15
IM-130PE IM-130PE-23 IM-130PE-32	Suction Pressure [peak]	(bar)	2.7	3.0	3.7	4.4
	Evaporator Inlet Temp.	(˚C)	-18	-16	-15	-15
IM-130WPE IM-130WPE-23	Suction Pressure [peak]	(bar)	2.7	3	3.7	4.4
	Evaporator Inlet Temp.	(˚C)	-20	-20	-19	-19
IIM-240PE IM-240PE-23	Suction Pressure [peak]	(bar)	2.6	3.0	3.6	4.3
	Evaporator Inlet Temp.	(˚C)	-20	-20	-19	-18
IM-240WPE IM-240WPE-23	Suction Pressure [peak]	(bar)	2.6	2.8	3.2	3
	Evaporator Inlet Temp.	(˚C)	-20	-20	-19	-19
IM-240APE IM-240APE-23	Suction Pressure [peak]	(bar)	2.5	3.0	3.5	4.0
	Evaporator Inlet Temp.	(˚C)	-16	-15	-15	-15
IM-240DPE IM-240DPE-23 IM-240-DPE-32	Suction Pressure [peak]	(bar)	2.4	2.8	3.3	4.1
	Evaporator Inlet Temp.	(˚C)	-21	-21	-20	-19
IM-240DWPE IM-240DWPE-21 IM-240DWPE-23 IM-240DWPE-32	Suction Pressure [peak]	(bar)	2.6	3.1	3.4	4.1
	Evaporator Inlet Temp.	(˚C)	-22	-22	-21	-21

Note: The above data are only for reference in servicing. Actual readings may be slightly different for each product.
Suction Pressure = Peak readings in freezing cycle
Evaporator Inlet Temp. = 5 minutes before completion of freezing cycle

IV. OPERATING INSTRUCTIONS

⚠WARNING

The use of any electrical equipment involves the observance of some fundamental rules. In particular:

* Instances of high humidity and moisture increase the risk of electrical short circuits and potential electrical shocks. If in doubt, disconnect the icemaker.
* Do not damage the power cord or pull it in order to disconnect the icemaker from the electrical supply network.
* Do not touch the electrical parts or operate the switches with damp hands.
* This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities, or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.
* Children shall not play with the appliance.
* Cleaning and user maintenance shall not be made by children without supervision.
* Do not attempt to modify the icemaker. Only qualified personnel may disassemble or repair the appliance.

⚠CAUTION

Do not put your hands into the back of the storage bin or the ice chute on top of the storage bin. Ice may drop off the icemaker, a hard block of ice may suddenly break down, or the icemaking mechanism may suddenly move, resulting in injury.

NOTICE

1. All parts are factory-adjusted. Improper adjustments may result in failure.

2. If the unit is turned off, wait for at least 3 minutes before restarting the icemaker to prevent damage to the compressor.

⚠ HYGIENE

This icemaker is designed to produce and store edible ice. To keep the icemaker hygienic:

* Wash your hands before removing ice. Use the plastic scoop provided (accessory).
* The storage bin is for ice use only. Do not store anything else in the bin.
* Clean the storage bin before use (see " V. 1. PERIODICAL CLEANING").
* Keep the scoop clean. Clean it by using a neutral cleaner and rinse thoroughly.
* Close the door after removing ice to prevent entrance of dirt, dust or insects into the storage bin.

1. START UP

1) Disconnect the power supply.

2) Open the water tap.

3) Connect the power supply and energise.

4) The following should occur in sequence:
   a) Hot gas valve will open.
   b) Compressor will start.
   c) Water pan will fully open.
   d) Water valve will open.
   e) Water pan will start to close (hot gas valve closed).
   f) Water pan fully closed - pump motor will start.
   g) Water valve will close.

2. PREPARING THE ICEMAKER FOR LONG STORAGE

[a] IM-21, 30, 45, 65

1) Close the water supply tap, and remove the inlet hose.

2) Remove the front panel.

3) Push the reset switch. The water pan will start to open.

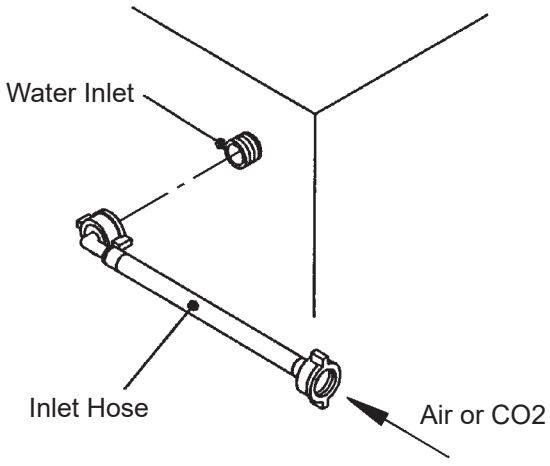


Fig. 1

4) Blow out the water supply line immediately after the water pan has opened.

Note: This procedure is necessary to protect the icemaker from freezing up at subfreezing temperature.

5) Unplug the icemaker or disconnect the power source when the water pan has fully opened.

6) Remove all ice from the storage bin, and clean the bin.

7) Replace the front panel in its correct position.

8) Replace the inlet hose in its correct position.

[b] IM-100, 130, 240

1) Close the water supply tap, and remove the inlet hose.

2) Remove the front panel.

3) Remove the screw located on the front of the water tank.

4) Move the tank drain pipe to the drain position. See Fig. 2.

5) Push the reset switch. The water pan will start to open.

6) Blow out the water supply line immediately after the water pan has opened.

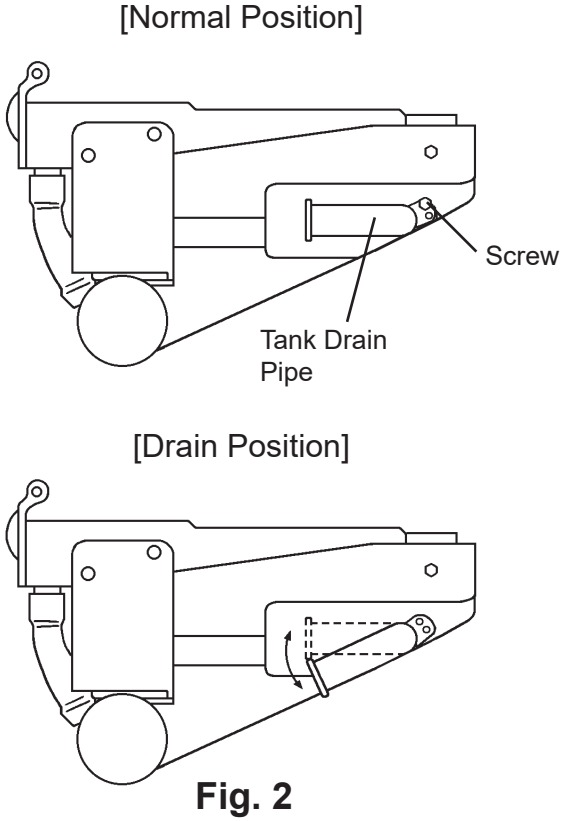


Fig. 2

Note: This procedure is necessary to protect the icemaker from freezing up at subfreezing temperature.

7) Unplug the icemaker or disconnect the power source when the water pan has fully opened.

8) Move the tank drain pipe to the normal position, and secure it with the screw.

9) Remove all ice from the storage bin, and clean the bin.

10) Replace the front panel in its correct position.

11) Replace the inlet hose in its correct position.

3. BIN CONTROL

Bin control switch is mounted on the upper side of the storage bin. This switch will turn off the unit automatically when the storage bin is full of ice.
Handle the bin control switch carefully, because the switch assembly is fragile. Especially on removing ice, do not touch or poke with a scoop.
Keep away from the water plate or drain pan to prevent jamming.

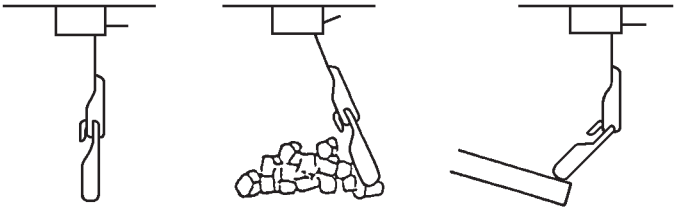


Fig. 3

[a] BIN CONTROL SWITCH ASSEMBLY

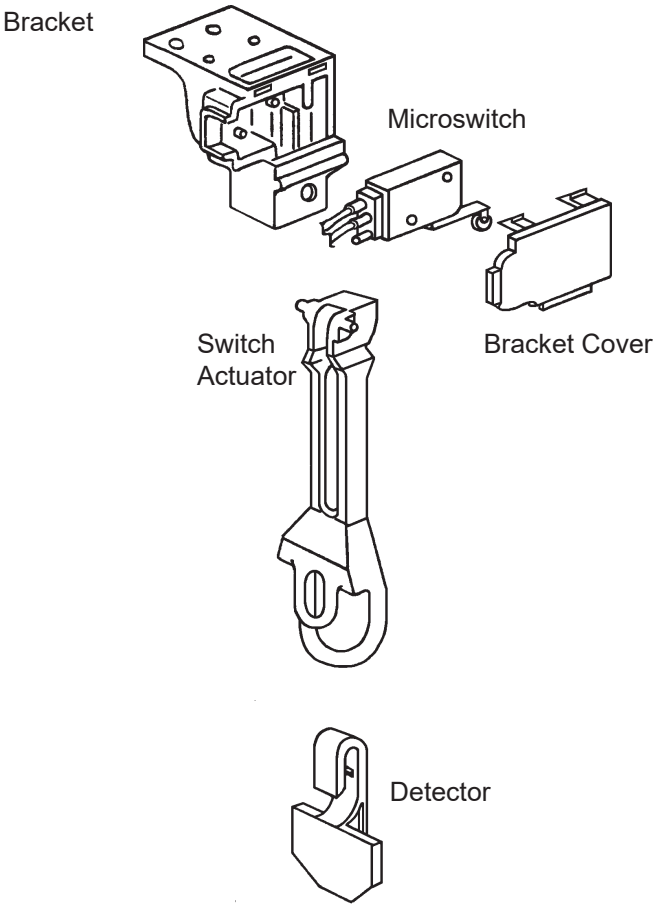


Fig. 4

[b] REMOVAL

BRACKET COVER

Push the two pawls and remove the bracket cover.

SWITCH

Pull out the switch, holding the rubber leads cap. Handle with care.

SWITCH ACTUATOR

Insert a flat blade screwdriver and wrench it slightly to pull out the switch actuator. Handle with care to prevent damage to the cam surface of the actuator.

DETECTOR

Push out the detector, holding the switch actuator.

[c] REASSEMBLING

SWITCH ACTUATOR

Insert the lower shaft and push it along the U notch. Check that the switch actuator moves free.

SWITCH & BRACKET COVER

Place the switch lever first, and then attach the switch in position. Insert the guide and push the bracket cover to lock.

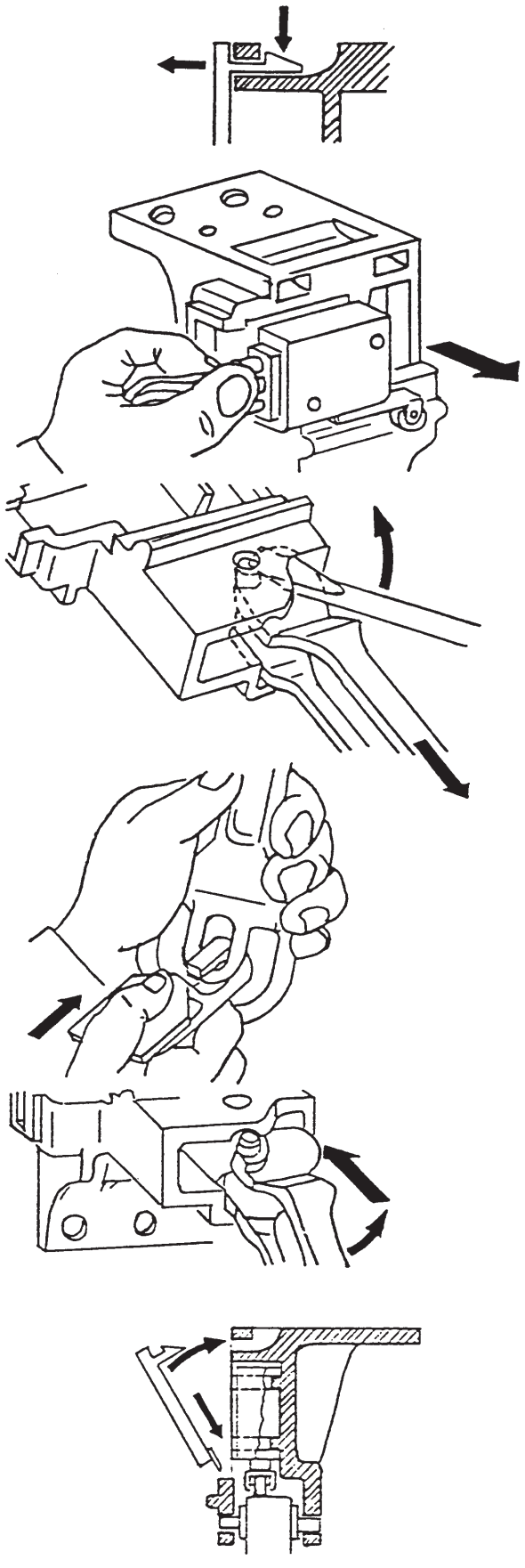


Fig. 5

[d] D AND X STACKING COMBINATION

Product Top	Product Mid	Product Bottom	Harness Top	Harness Mid	Harness Bottom
Gen 1	Gen 1	Gen 1	Harness C (3Y7984)	Harness C (3Y7984)	Harness C (3Y7984)
Gen 1	Gen 1	Gen 2	Harness C (3Y7984)	Harness C (3Y7984)	Harness D (3E0434) + Harness E1 (3E0458G01)
Gen 1	Gen 2	Gen 2	Harness C (3Y7984)	Harness D (3E0434) + Harness E1 (3E0458G01)	Harness D (3E0434)
Gen 2	Gen 2	Gen 1	Harness D (3E0434)	Harness D (3E0434)	Harness C (3Y7984) + Harness E2 (3E0458G02)
Gen 2	Gen 1	Gen 2	Harness D (3E0434)	Harness C (3Y7984) + Harness E2 (3E0458G02)	Harness D (3E0434) + Harness E1 (3E0458G01)
Gen 2	Gen 2	Gen 2	Harness D (3E0434)	Harness D (3E0434)	Harness D (3E0434)

Note: Harness C (3Y7984) = IM N-series (Gen 1) standard connection harness

Harness D (3E0434) = IM P-series (Gen 2) standard connection harness

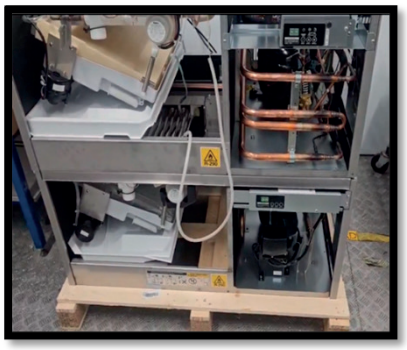
Harness E1 (3E0458G01) = connector

Harness E2 (3E0458G02) = connector

Harness E1 & E2 are optional parts and can be ordered through Part Centre with their part numbers.

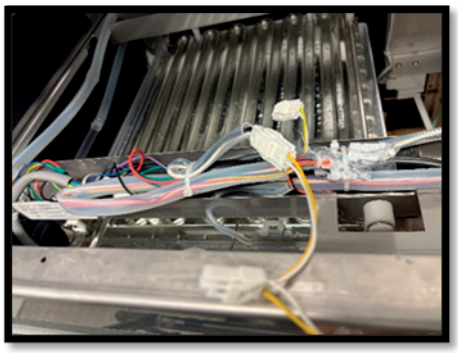
[e] STACKING INSTRUCTIONS

Stacking P-series Unit on Top

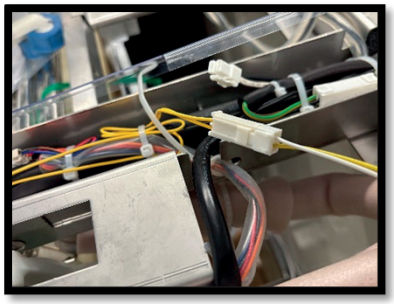


1) To stack units, attach FBH0816S0 from the top and secure it with FNH108S0 nut to prevent the top unit from tipping over.

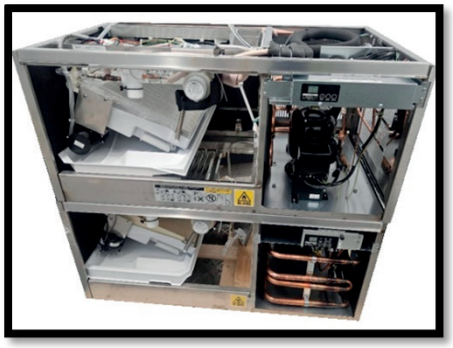
2) Connect the female end of 3Y7984 to the male end of the control board harness (black and white wire) and the other male end to the bin switch harness (yellow and white) for the bottom unit.



3) Connect the female end of 3E0458G01 to 3Y7984 and the male end to the control board harness of the top unit.



Stacking N-series Unit on Top



1) Connect the female end of 3E0434 to the male end of the control board harness (black and white wire) and the other male end to the bin switch harness (yellow and white) for the bottom unit.

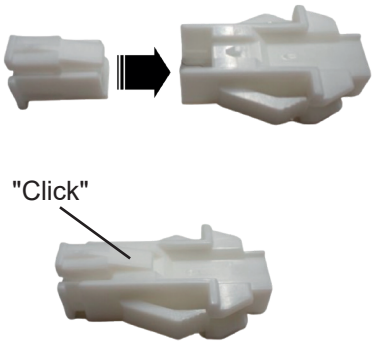
2) Connect the female end of 3E0458G02 to 3E0434 and the male end to the control board harness of the top unit.

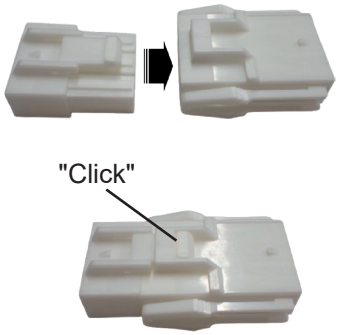
4. HARNESS CONNECTOR

Harness Joint

1) Insert the connector until it clicks.

2) Check if the connector is inserted all the way.

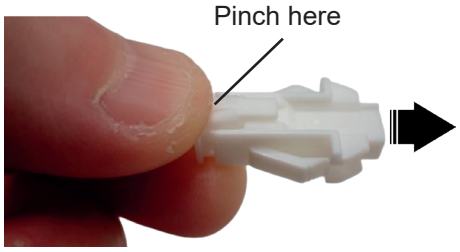


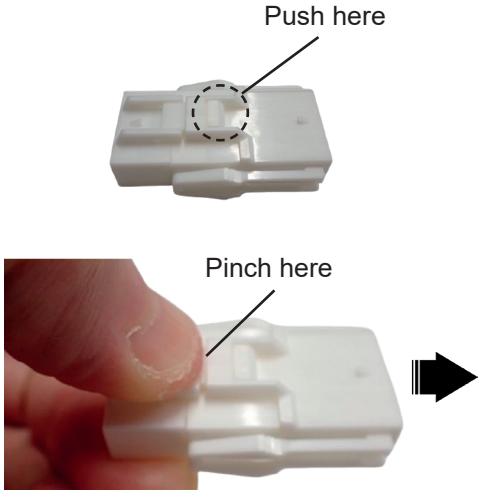


Disconnection

1) Pinch the tab on the connector as shown below.

2) Pull the other connector. If it is hard to pull out, push the point indicated in the figure using a flat head driver.





V. MAINTENANCE INSTRUCTIONS

⚠ WARNING

1. Before carrying out any cleaning or maintenance operations, unplug the icemaker from the electrical supply network.

2. This appliance must not be cleaned by use of a water jet.

⚠ CAUTION

Before handling or using cleaning solutions, check the guidelines on the product for advice on suitable personal protective clothing, gloves, goggles, etc.

NOTICE

1. Clean and sanitise the icemaker water system at least twice a year, and check and clean the condenser at least once a year.

2. To prevent possible damage, do not clean the plastic parts with water above 40°C or in a dishwasher.

1. PERIODICAL CLEANING

[1] 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.

[2] Scoop and Storage Bin Handle Cleaning/Sanitisation (Daily)

1) Either mix 1 litre of water with 4 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.

[3] Storage Bin Interior Cleaning/Sanitisation (Weekly)

1) Open the storage bin door, and remove all ice.

2) Wash the bin liner with a neutral non-abrasive cleaner. Rinse thoroughly.

3) 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.

4) Either mix 5 litres of water with 18 ml of 5.25% sodium hypochlorite solution in a suitable container, or the recommended Hoshizaki sanitiser as directed.

5) Soak a clean sponge or cloth with the solution, and wipe the bin liner, bin door and slope.

6) The remaining solution can be used to sanitise utensils.

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

[4] 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 filters at least twice per month:

1) Slide the air filter off the filter guide [IM-21CPE/30CPE] or the louver [IM-45CPE/45PE/65PE/100PE/130PE/240PE].

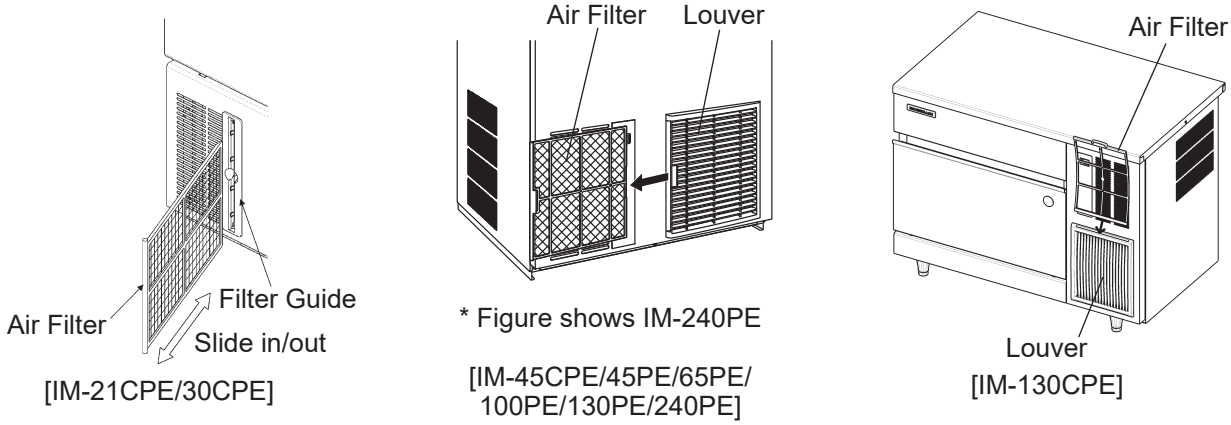


Fig. 6

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.

2. WATER VALVE

1) Unplug the icemaker or disconnect the power source.

2) Close the water supply tap.

3) Remove the top panel and front panel.

4) Disconnect the inlet hose from the water valve.

5) Remove the mesh filter from the water valve.

6) Clean the mesh using a brush.

7) Replace the mesh and inlet hose in their correct positions.

8) Open the shut-off valve.

9) Plug in the icemaker or connect the power source.

10) Check for leaks.

11) Replace the panels in their correct positions.

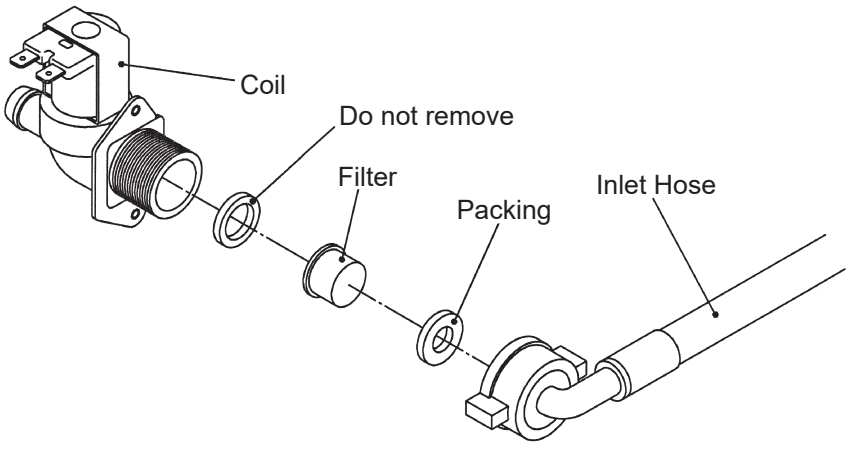


Fig. 7

3. WATER-COOLED CONDENSER

Deposits inside the water circuit of the water-cooled condenser decrease cooling performance. Clean inside of the condenser by circulating a cleaning solution.

1) Prepare the following:
   Cleaning solution [Read and follow any instructions on label or bottle.]
   Pump Container for solution Hose Hose bands
   Two fittings [R1/2 - 3/8”DIA] Two fittings [3/8” flare - 3/8”DIA]

⚠ CAUTION

Do not use a cleaning solution that will corrode the copper tubing. In case of contact with the solution, flush with water.

2) Remove the panels and check for leaks from the water line.

3) Unplug the icemaker or disconnect the power source, and close the water supply tap.

4) Disconnect the cooling water inlet and outlet pipings and attach fittings to connect hoses.

5) Disconnect the inlet and outlet tubings of the water regulator and replace the water regulator by fittings.

6) Connect hoses as shown in Fig. 8 and secure them by hose bands.

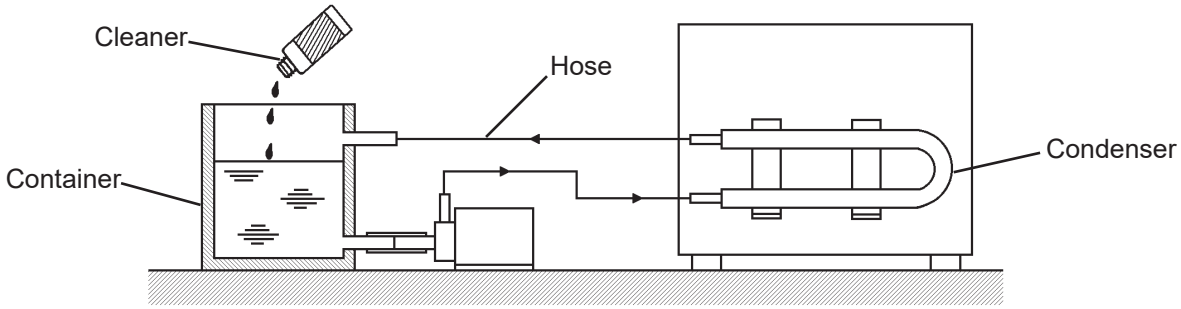


Fig. 8

7) Fill the container with the cleaning solution.

8) Run the pump motor and circulate the solution for a period recommended in the instructions on label or bottle of the cleaner.

9) Rinse the water circuit.

10) Reverse the above procedure in steps 2) through 6).

11) Check the icemaking capacity referring to "V. 4. PERFORMANCE DATA".

4. ICEMAKING WATER SYSTEM

To keep the icemaker hygienic, clean and sanitise the icemaking water system at least once every six months. More frequent cleaning and sanitising may be required depending on the water quality.

⚠ CAUTION

Always wear rubber gloves, eye protectors, apron, etc. for safe handling of the cleaner and sanitiser.

NOTICE

1. Use the cleaners and sanitisers recommended by Hoshizaki. Contact your local Hoshizaki office for further details. (The instructions below give an example of those recommended cleaners and sanitisers.)
2. Never mix cleaning and sanitising solutions in an attempt to shorten cleaning time.
3. Wipe off any splashed or spilt cleaner/sanitiser immediately.
4. Do not use any ammonia type cleaners on any part of the icemaker.
5. When the ambient and water temperatures are 10°C or below, the water pan may remain open. Warm the icemaking compartment up to 20°C around the thermistor.
6. Be sure to follow the cleaning and sanitising instructions below.

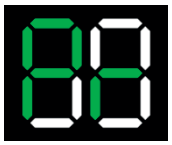
1) Use a suitable container to dilute 236 ml of the cleaner (“Nickel-Safe Ice Machine Cleaner” by The Rectorseal Corporation) with 11.4 lit. of water.

2) Open the storage bin door, and remove all the ice to avoid contaminating by the cleaner.

3) Remove the front and top panels.

4) [IM-100, 130, 240 model only]
Remove the screw, and move the tank drain pipe to the drain position.

5) [Pre-set Process]
Press SW1 on the controller board for 3 seconds to enter the cleaning process.
Then, the 7-segment display shows “Pr”.



6) After few minutes, 7-segment display shows the indication below.

Pour the cleaning solution prepared in 1) carefully into the water tank.

7) [Cleaning Process]
Press SW1 or wait for15 minutes to enter the cleaning process.
The 7-segment display shows the indication below.

8) The cleaning solution is circulated for a setting time and drained automatically.

9) The cleaning solution is drained for a setting time and the icemaker enters the rinsing process.

10) If SW1 is pressed and held for 3 seconds during the cleaning process, the process will be forcibly terminated and the rinsing process will start.

11) [Rinsing Process]
Tap water is supplied and circulated for a setting time and rinsed water will be drained.

12) The step 11) is repeated for the set number of times and the rinsing process completes.

13) If the icemaker is out of operation due to power supply accident or the like during the rinsing process, the icemaker restarts from the rinsing process.

14) [Enter Icemaking Process]
After the rinsing process completes, the icemaker automatically enters the icemaking process.

SANITISING INSTRUCTIONS

Note: Sanitising should always be completed after cleaning or alternately as an individual procedure if conditions exist to make it necessary.

16) Use a suitable container to dilute 44 ml of 5.25% sodium hypochlorite solution with 11.4 lit. of water.

* Alternatively use the Hoshizaki recommended sanitiser as directed by the relevant instructions.

17) Close the water supply tap. Plug in the icemaker or connect the power source. When the 7-segment display on the controller board turns on, press DOWN on the controller board for 3 seconds to start the flush mode.

18) When the flush mode has started, pour the cleaning solution prepared in 16) carefully into the water tank within 60 seconds before the pump motor starts. Do not splash or spill the solution onto the other parts.

19) Circulate the sanitising solution for 15 minutes. Push the reset switch to open the water pan. Unplug the icemaker or disconnect the power source when the water pan has fully opened. Wait until the sanitising solution has completely drained out.

20) Open the water supply tap, and repeat the above step 9). Since the water supply tap is open this time, water is supplied as in the normal freeze cycle.

21) When the water pan closes again, pour clean water into the water pan until it floods from the overflow pipe, and circulate the water for 5 minutes.

22) Push the reset switch to open the water pan and drain the water. This time the water does not drain out completely.

23) Repeat the above steps 21) and 22) at least three times to rinse thoroughly. To drain the rinse water completely, unplug the icemaker or disconnect the power source when the water pan has fully opened.

24) [IM-100, 130, 240 only]
Move the tank drain pipe to the normal position, and secure it with the screw. See Fig. 2.

25) Plug in the icemaker or connect the power source. Check for proper icemaking operation.

26) Replace the front panel and top panel in their correct positions.

27) Complete storage bin cleaning as detailed in V. 1. [3] Storage Bin Interior Cleaning/ Sanitisation (Weekly).

5. DRAIN PUMP

1) Unplug the icemaker or disconnect the power source.

2) Remove the rear panel and drain hose.

3) Remove the one-way valve using long-nose pliers.

4) Check the one-way valve for blockages and clean it if required.

5) Refit the one-way valve to the drain pump tank.

6) Check the pressure switch tube for blockages caused by minerals.

7) Clean the pressure switch tube if required.

8) Remove the float switch using an M8 wrench and check its operation.

9) Replace the float switch with a new one if required.

6. WINDOW GASKET FOR UV-LED

⚠ WARNING

Before maintaining UV-LED or UV-FM, be sure to unplug the icemaker.

1) Unplug the icemaker or disconnect the power source.

2) Remove the top panel and front panel.

3) Remove the water pan assembly.

4) Remove the tank from the water pan assembly.

5) Remove the screw securing the LED holder.

6) Remove the UV-LED, LED holder and window gasket.

7) Check the window gasket.

Note: If the gasket is covered with mineral scale, the UV effects are reduced.

8) Clean the window gasket if required.

9) Install each part in the reverse order of the removal procedure.

VI. SERVICE DIAGNOSIS

1. ERROR CODE INDICATION

* The error and caution codes other than E1, E2, EF, AI and A2 are indicated as “EE” in the 7-segment display at the time of occurrence. But the error history is recorded as the actual error codes in parenthesis, and a maximum of five errors are indicated from the latest entry.

Error	Item	Description	Operation	Reset
E1	Freeze error	Freeze backup timer (45/60 minutes) counts up before freeze cycle completes, and evaporator temperature is 0°C or higher.	Shut down	Press reset switch
E2	Defrost error	Defrost backup timer (30 minutes) counts up before defrost cycle completes.	Shut down	Press reset switch
EE (E3)	Water pan opening error	Water pan has not fully opened within 60 seconds, and 3 minutes have passed even with opening failure control.	Halt	Press reset switch
		Unit resumes operation after 60 minutes and repeats the above error.	Shut down	
EE (E4)	Water pan closing error	[Controller board before ver. 1.6A] Water pan has not fully closed within 60 seconds, and 3 minutes have passed even with closing failure control.	Halt	Press reset switch
		[Controller board ver. 1.6A and later] Water pan has not fully closed within 50 seconds, opened and started to close again, but failed to close fully within 50 seconds.		
		Unit resumes operation after 60 minutes and repeats the above error.	Shut down	
EE (E5)	High temperature error	Evaporator temperature stays 60°C or higher for 5 seconds or more.	Shut down	Press reset switch
EE (E8)	Pump lock error	Pump motor RPM is kept at 0 for 30 seconds under control voltage.	Continue	Shut down Press reset switch
		Unit resumes operation after icemaking cycle ends and repeats above error for 3 times in row.	Shut down	
EE (E9)	Condenser thermistor error	Condenser thermistor circuit is open or shorted for 2 seconds.	Shut down	Replace thermistor
EE (EA)	Data error	Model setting data memory IC is defective.	Shut down	Replace controller board
EE (Eb)	Drain pump error	Float switch is ON for set time (setting No. 7) or longer.	Shut down	Replace drain pump or pressure switch
EE (EC)	Cube control thermistor error	Cube control thermistor circuit is open or shorted for 2 seconds.	Shut down	Replace thermistor
EE (Ed)	Water regulator error	Cooling water cannot stop by water regulator error, and thermistor senses set point or lower temperature.	Continue	Press reset switch
AL (A3)	UV-LED error	LED turns off due to open circuit.	Continue	Shut down Press reset switch
		Open circuit is detected when LED turns on. Output alternates between 1 second OFF and 200 seconds ON.		
AL (A4)	UV-FM error	UV fan motor does not rotate for 30 seconds during unit operation.	Continue	Shut down Press reset switch

Caution	Item	Description	Operation	Reset
C2	High pressure	[Air-cooled] Condenser thermistor senses 63°C or higher temperature. [Water-cooled] Pressure switch senses 2.65MPa or higher pressure.	Compressor stops	After 5 minutes, condensing temperature 50°C or lower, pressure 1.96MPa or lower
AF	Condenser cleaning	Compressor running time reached set value of No. 81.	Error code "AF" appears	Shut down Press reset switch
AC	Cleaning	Compressor running time reached set value of No. 82.	Error code "AC" appears	Shut down Press reset switch Cleaning completes

2. NO ERROR CODE INDICATION

Problem	Check	Possible Cause	Remedy
Icemaker will not start.	Power source	Turned off.	Turn on.
		Supply voltage too low.	Remove cause
		Power failure	Wait until power is resumed.
	Transformer	Defective.	Replace.
	Power cord	Not connected properly.	Reconnect.
		Open circuit (damaged).	Replace.
	Controller board	Defective.	Replace.
	Fuse	Blown out.	Check for cause. Replace.
	Bin control switch	Stuck on other parts (e.g. ice guide).	Remove ice.
		Short circuit (display shows “on”).	Replace.
Slab does not break into separate cubes.	Extension spring	Over-extended.	Replace.
	Water plate	Obstacle caught between evaporator and water plate.	Remove obstacle.
Icemaker will not stop when bin is filled with ice.	Bin control switch actuator	Out of position.	Place in position.
		Broken.	Replace.
	Bin control switch	Out of position.	Place in position.
		Broken.	Replace.
	Bin control switch detector	Out of position.	Place in position.
		Broken.	Replace.
	Bin control micro switch	Disconnected from switch box.	Reconnect.
		Seizing with open contacts.	Replace.
	Controller board	Defective.	Replace.
Cloudy cubes.	Water quality	High hardness.	Set hard water control.
			Switch to full drain flush (see note below).
	Ice condition	Slush ice.	Set slush ice control.
Abnormal noise	Pump motor	Bearing worn out.	Replace.
		Vapor lock.	Clean water valve filter.
			Check water supply cycle time setting.
	Fan motor	Bearing worn out.	Replace.
		Fan touching obstacle.	Remove obstacle.
	Actuator motor	Gear worn out.	Replace.

Cubes drop separately.	Refrigeration circuit	Gas leaks (long defrost cycle).	Repair.
	Cam arm	Worn out.	Replace.

Note:

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

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

Problem	Check	Possible Cause	Remedy
Imperfect ice production.	Insufficient water supply	Water valve filter clogged.	Clean.
		Water supply cycle too short.	Extend.
		Water supply pressure too low.	Remove cause.
	Water leaks from water tank or water plate	Water tank broken.	Replace.
		Water plate broken.	Replace.
		Icemaker not level.	Adjust.
	Water valve	Water leaks valve body.	Replace.
		Water leaks from water supply pipe joint.	Check hose clamp.
			Replace connection hose.
	Water plate	Spray holes clogged.	Unclog.
	Pump motor	Defective.	Replace.
Large-hole cubes.	Refrigeration circuit	Gas leaks (low refrigeration capacity).	Repair.
	Condenser	Not clean (low condensing capacity).	Clean.
		Filter clogged.	Clean.
	Fan motor	Defective.	Replace.
	Installation site	No clearance at right side and rear (air-cooled model only).	Ensure clearance.
		Ambient temperature above 40°C.	Ensure ventilation to lower temperature.
	Power supply	Supply voltage too low (low refrigeration capacity).	Remove cause.
	Water valve	Water leaks.	Replace.
	Insufficient water supply	Water supply pressure too low.	Remove cause.
Freeze cycle time is too long.	Installation site	Ambient temperature too high.	Ensure ventilation to lower temperature.
	Condenser	Not clean (low condensing capacity).	Clean.
		Filter clogged.	Clean.
	Fan motor	Defective.	Replace.
	Refrigeration circuit	Gas leaks (low refrigeration capacity).	Repair.

VII. ADJUSTMENT

1. EXPANSION VALVE

⚠ WARNING

To prevent possible refrigerant leakage, do not make adjustments while the unit is running. Stop the unit before making adjustments

The expansion valve is factory-adjusted. Do not adjust it except at replacement or service. Adjust the valve setting, if necessary, as follows:

1) Remove the cap nut.

2) Rotate the adjust screw by using a flat blade screwdriver.

3) Watch holes of ice cubes produced. Standard setting is that evaporator inlet side and outlet side cubes have almost the same diameters. To make the inlet side larger, rotate 90 - 180° clockwise. Smaller, counterclockwise. Do not rotate more than 180° at a time.

4) Secure the cap nut tightly.

NOTICE

Over adjustment of the valve may result in liquid refrigerant return causing freezing to the suction line and severe damage to the compressor.

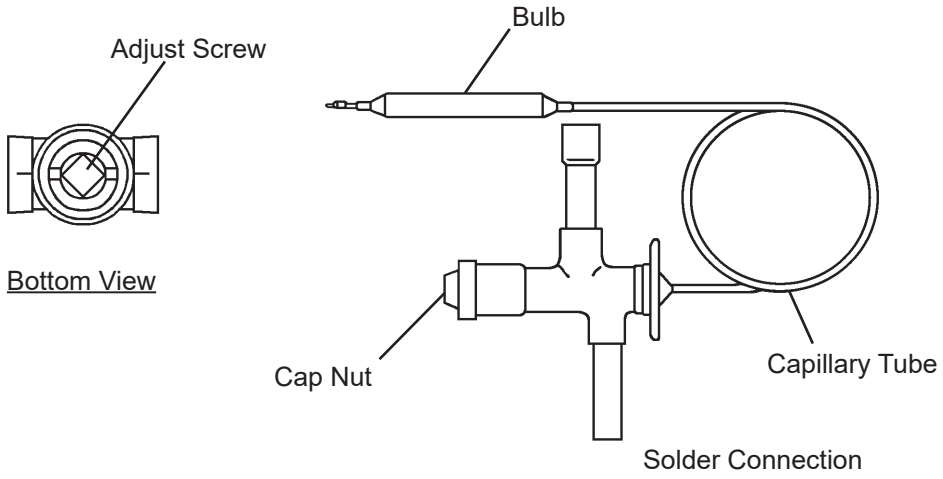


Fig. 9

2. WATER REGULATING VALVE - WATER-COOLED MODEL ONLY

The water regulating valve is factory-adjusted. Do not adjust it except at replacement or service. Adjust the valve setting, if necessary, as follows:

1) Attach a pressure gauge to high-side line, or prepare a thermometer to check condenser drain temperature.

2) Rotate the adjust screw using a flat blade screwdriver so that the pressure gauge shows 10 bar (IM-30/45/100) / 16 bar (IM-130) / 19 bar (IM-240), or the thermometer reads 30 - 40°C (IM-30/45/100) / 35 - 40°C (IM-130) / 45 - 50°C (IM-240), 5 minutes after freeze cycle starts.
   When the pressure or temperature exceeds the above, rotate the adjust screw counterclockwise.

3) Check that the pressure or temperature holds.

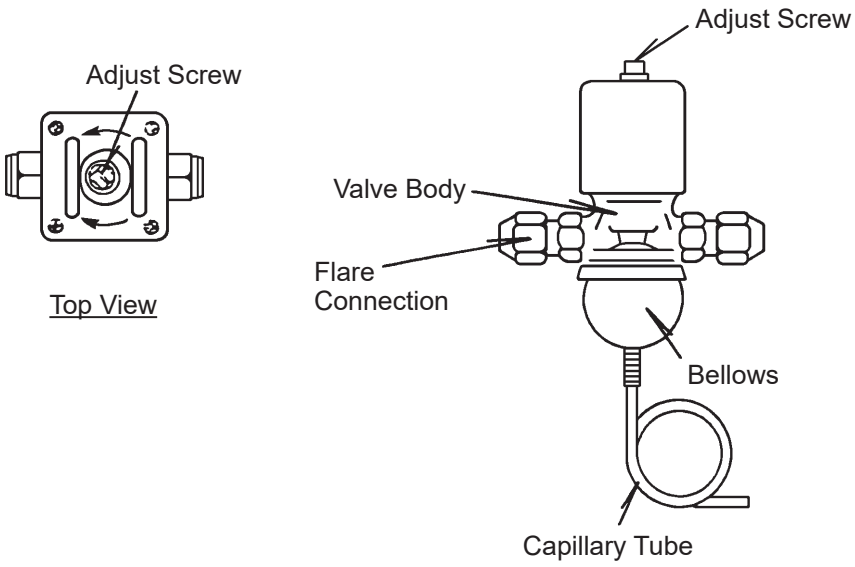


Fig. 10

3. FULL DRAIN FLUSH

In some hard water areas, white ice and scaling can be caused. In such case, install a filter or softener, and change the flush mode from “partial drain flush” to “full drain flush” according to the following instructions.

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

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

1) Remove the screw located on the front of the water tank. Move the tank drain pipe to the drain position (see Fig. 11). Secure the tank drain pipe with the screw.

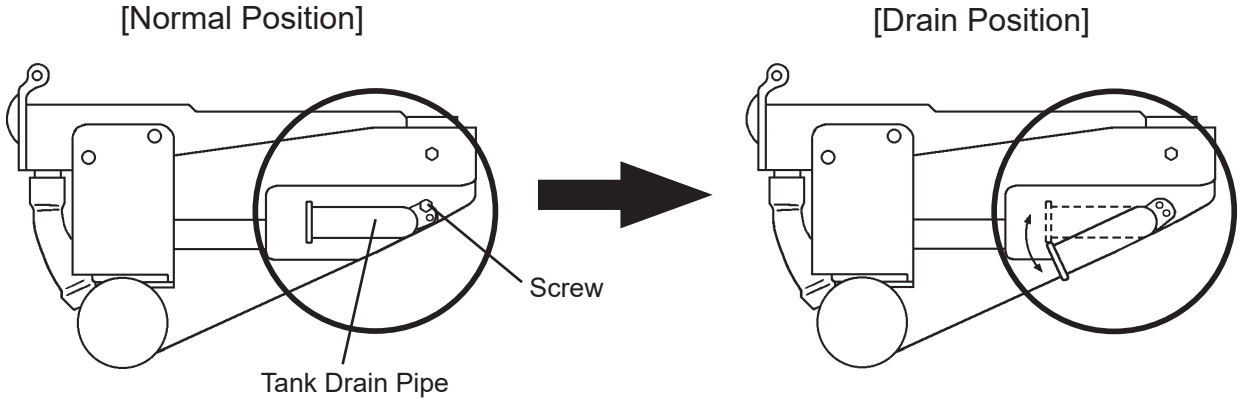


Fig. 11

2) Change the following controller board settings from “partial drain flush” to “full drain flush”, referring to “3. [b] MAINTENANCE MODE” in the IM-N series controller board service manual (E1CK-811).

   Full / partial drain flush selection – Maintenance mode No. 14 (0: full, 1: partial)
   Icemaking water supply time – Maintenance mode No. 12
   Additional icemaking water supply time – Maintenance mode No. 15

4. DIMPLE DIAMETER

See “2. [i] DIMPLE DIAMETER SETTING” in the IM-N series controller board service manual (E1CK-811).

VIII. 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 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.

[c] 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.

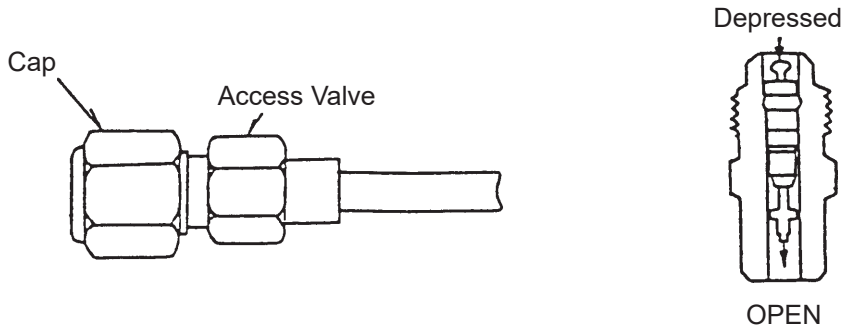


Fig. 12

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: Attach an access valve for recharging the unit charged by a lock ring.

3. COMPRESSOR

1) Unplug the icemaker or disconnect the power source.

2) Remove the front and rear panels.

3) Remove the refrigerant from the unit and then any residual refrigerant still existing in the unit to allow welding process. (See “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 the pressure of 0.2 - 0.3 bar.

13) Install the new drier (See “4. DRIER”).

14) Check for leaks using nitrogen gas (10 bar) and soap bubbles.

15) Evacuate the system and charge it with refrigerant (See “1. [d] EVACUATION AND RECHARGE”).

16) Connect the solderless terminals and replace the terminal cover in its correct position.

17) Replace the panels in their correct positions.

18) Plug in the icemaker or connect the power source.

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

4. DRIER

1) Unplug the icemaker or disconnect the power source.

2) Remove the front and rear panels.

3) Remove the refrigerant from the unit and then any residual refrigerant still existing in the unit to allow welding process. (See “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 of drier 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

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

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 the pressure of 0.2 - 0.3 bar when brazing tubings.

7) Check for leaks using nitrogen gas (10 bar) and soap bubbles.

8) Evacuate the system and charge it with refrigerant (See “1. [d] EVACUATION AND RECHARGE”).

9) Replace the panels in their correct positions.

10) Plug in the icemaker or connect the power source.

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

5. EXPANSION VALVE

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 or disconnect the power source.

2) Remove the top, front and rear panels.

3) Remove the refrigerant from the unit and then any residual refrigerant still existing in the unit to allow welding process. (See “2. WELDING REPAIR FOR R290 REFRIGERATION CIRCUIT”.)

4) Disconnect the outlet and inlet of expansion valve using a pipe cutter. Disconnect the inlet side near the expansion valve to keep the pipe length as much as possible. Disconnect the outlet side at the broken line in Fig. 13. 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. Protect the evaporator and pipes from excessive heat with damp cloths or similar.

5) Remove the expansion valve sensor (bulb).

6) Remove the drier (See “4. DRIER”).

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 “4. DRIER”).

9) Check for leaks using nitrogen gas (10 bar) and soap bubbles.

10) Evacuate the system and charge it with refrigerant (See “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 or connect the power source.

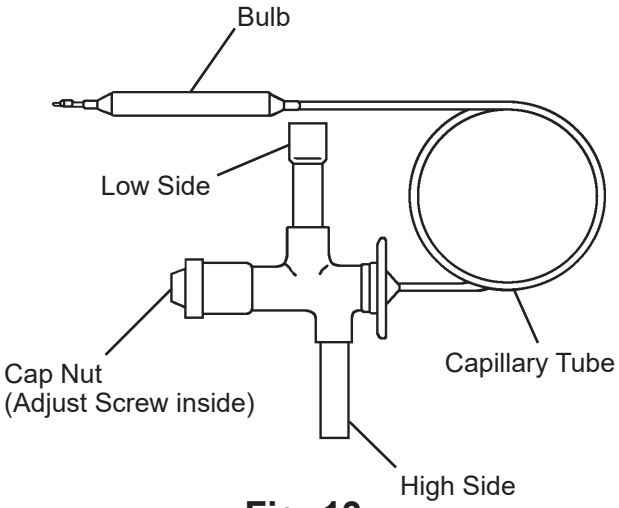


Fig. 13

6. EVAPORATOR

IMPORTANT

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

1) Unplug the icemaker or disconnect the power source.

2) Remove the top, front and rear panels.

3) Remove the refrigerant from the unit and then any residual refrigerant still existing in the unit to allow welding process. (See “2. WELDING REPAIR FOR R290 REFRIGERATION CIRCUIT”.)

4) Remove the water pan assembly, referring to “9. WATER PAN ASSEMBLY”.

5) Disconnect the evaporator pipe using a pipe cutter.

⚠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. Protect the evaporator and pipes from excessive heat with damp cloths or similar.

6) Remove four nuts holding the evaporator.

7) Install the new evaporator, and secure it with the bolts, collars (spacer) and nuts. Adjust the length of the new evaporator pipe to fit the pipe disconnected in 5). If needed, expand the pipe using a pipe expander.

8) Install the new drier (See “4. DRIER”).

9) Braze pipes, with nitrogen gas flowing at the pressure of 0.2 - 0.3 bar.

10) Check for leaks using nitrogen gas (10 bar) and soap bubbles.

11) Evacuate the system and charge it with refrigerant (See “1. [d] EVACUATION AND RECHARGE”).

12) Replace the removed panels in their correct positions.

13) Plug in the icemaker or connect the power source.

7. HOT GAS VALVE

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 or disconnect the power source.

2) Remove the front and rear panels.

3) Remove the refrigerant from the unit and then any residual refrigerant still existing in the unit to allow welding process. (See “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 solenoid valve. Braze the new hot gas valve with nitrogen gas flowing at the 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 120°C.

8) Install the new drier (See “4. DRIER”).

9) Check for leaks using nitrogen gas (10 bar) and soap bubbles.

10) Evacuate the system and charge it with refrigerant (See “1. [d] EVACUATION AND RECHARGE”).

11) Attach the solenoid coil to the valve body, and secure it with the screw.

12) Connect the leads.

13) Replace the panels in their correct positions.

14) Plug in the icemaker or connect the power source.

8. WATER REGULATING VALVE - WATER-COOLED MODEL ONLY

[a] VALVE BODY

1) Unplug the icemaker or disconnect the power source.

2) Close the water supply tap.

3) Remove the front and rear panels.

4) Disconnect the flare connections of the water regulating valve.

5) Remove the valve from the bracket.

6) Install a new water regulating valve.

7) Connect the flare connections.

8) Open the water supply tap.

9) Check for water leaks.

10) Replace the panels in their correct positions.

11) Plug in the icemaker or connect the power source.

[b] WHOLE VALVE

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 or disconnect the power source.

2) Close the water supply tap.

3) Remove the front and rear panels.

4) Recover the refrigerant and store it in a proper container, if required by an applicable law (See “1. [b] REFRIGERANT RECOVERY”).

5) Cut off the copper tube near the capillary tube solder connection, using a pipe cutter.

6) Cut off the capillary tubes of the valve and high-pressure switch, using a file and pliers. Be careful not to damage the capillary tube end.

7) Disconnect the flare connections from the bracket.

8) Remove the screws and the valve from the bracket.

9) Install the new valve, and insert the capillary tubes into the copper tube.

10) Web the copper tube end, and braze or solder the copper tube and capillary tubes together.

11) Install the new drier (See “4. DRIER”).

12) Check for leaks using nitrogen gas (10 bar) and soap bubbles.

13) Evacuate the system and charge it with refrigerant (See “1. [d] EVACUATION AND RECHARGE”).

14) Connect the flare connections.

15) Open the water supply tap.

16) Check for water leaks.

17) Replace the panels in their correct positions.

18) Plug in the icemaker or connect the power source.

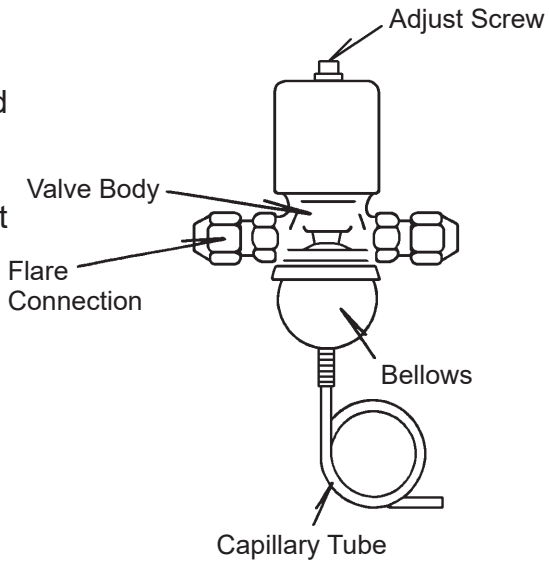


Fig. 14

9. WATER PAN ASSEMBLY

1) Remove the top and front panels.

2) Push the reset switch on the control box to open the water pan.

3) Unplug the icemaker or disconnect the power source.

4) Disconnect the pump motor leads in the wiring channel.

5) Remove the two extension springs from the cams.

6) Remove the retaining pin and the water pan assembly.

7) Remove the two spring hook screws from the water tank.

8) Remove the screws and the water plate bracket.

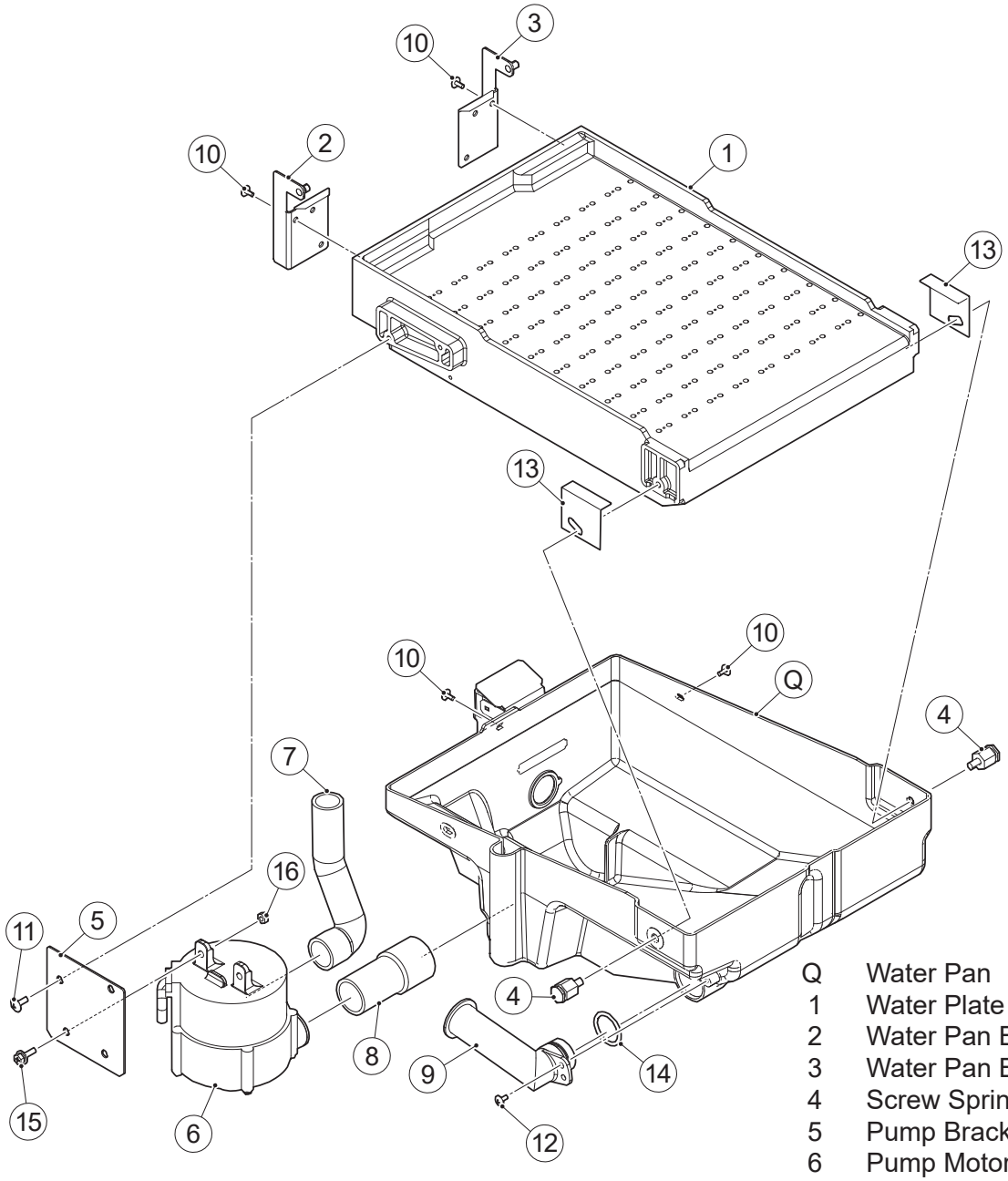
9) Remove the pump suction and discharge tubings.

10) Remove the pump motor bracket from the water plate.

11) Install the new water plate or water tank in the reverse order of the removal procedure.

12) Replace the panels in their correct positions.

13) Plug in the icemaker or connect the power source.



Q	Water Pan
1	Water Plate
2	Water Pan Bracket
3	Water Pan Bracket
4	Screw Spring Hook
5	Pump Bracket
6	Pump Motor
7	Discharge Tubing
8	Suction Tubing
9	Drain Pipe
10	Truss Head Screw
11	Truss Heat Tapping Screw
12	Truss Head Screw
13	Bracket
14	O-ring
15	Hex Head Bolt
16	Nut
17	Pan Head Machine Screw
18	Nut
19	Pan Head Machine Screw
20	Truss Head Screw

Fig. 15

10. PUMP MOTOR

1) Unplug the icemaker or disconnect the power source.

2) Remove the top panel and front panel.

3) Disconnect the pump motor leads in the wiring channel.

4) Unscrew and remove the pump motor from the bracket.

5) Disconnect the pump suction and discharge tubings.

6) Install the new motor in the reverse order of the removal procedure.

7) Plug in the icemaker or connect the power source, and check for leaks.

8) Replace the panels in their correct positions.

11. WATER VALVE

1) Close the water supply tap.

2) Unplug the icemaker or disconnect the power source.

3) Remove the top panel and front panel.

4) Disconnect the receptacle (leads) from the water valve.

5) Remove the valve outlet tubing by releasing the clamp.

6) Remove the inlet hose and water valve.

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

8) Open the water supply tap.

9) Plug in the icemaker or connect the power source.

10) Check for leaks.

11) Replace the panels in their correct positions.

Note: When replacing parts, disassemble as shown in Fig. 7 and replace the defective parts.

12. ACTUATOR MOTOR

1) Remove the top panel and front panel.

2) Push the reset switch on the control box to open the water pan.

3) Unplug the icemaker or disconnect the power source.

4) Remove the extension spring (actuator motor side) from the cam.

5) Disconnect the actuator motor leads in the wiring channel.

6) Remove the actuator motor bracket.

7) Remove the spring pin securing the shaft to the cam.

   Note: The spring pin is not provided for the auxiliary code G1 or later of IM-100/130/240.

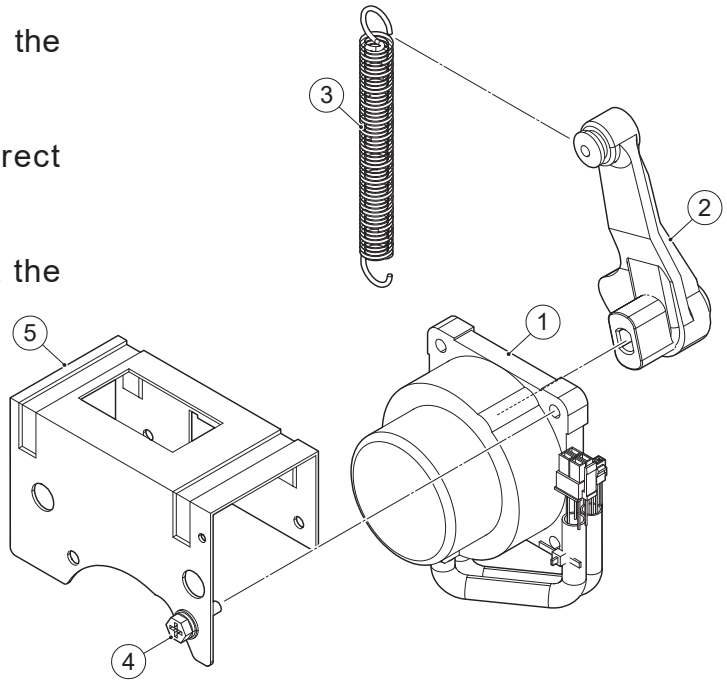
8) Remove the actuator motor.

9) Install the new actuator motor in the reverse order of the removal procedure.

10) Check that the cam can move in the proper range.

11) Replace the panels in their correct positions.

12) Plug in the icemaker or connect the power source.



1 Actuator Motor
2 Cam (A)
3 Spring
4 Hex Head Bolt
5 Actuator Motor Bracket

Fig. 16

13. CAM

[a] CAM (A) - ACTUATOR MOTOR SIDE

Refer to “12. ACTUATOR MOTOR”.

Note: The spring pin is not provided for the auxiliary code G1 or later of IM-100/130/240.

[b] CAM (B) - REAR SIDE

1) Remove the top panel and front panel.

2) Push the reset switch on the control box to open the water pan.

3) Unplug the icemaker or disconnect the power source.

4) Remove the extension spring from the cam (B).

5) Remove the split pin from the cam shaft.

6) Remove the cam (B).

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

8) Replace the panels in their correct positions.

9) Plug in the icemaker or connect the power source.

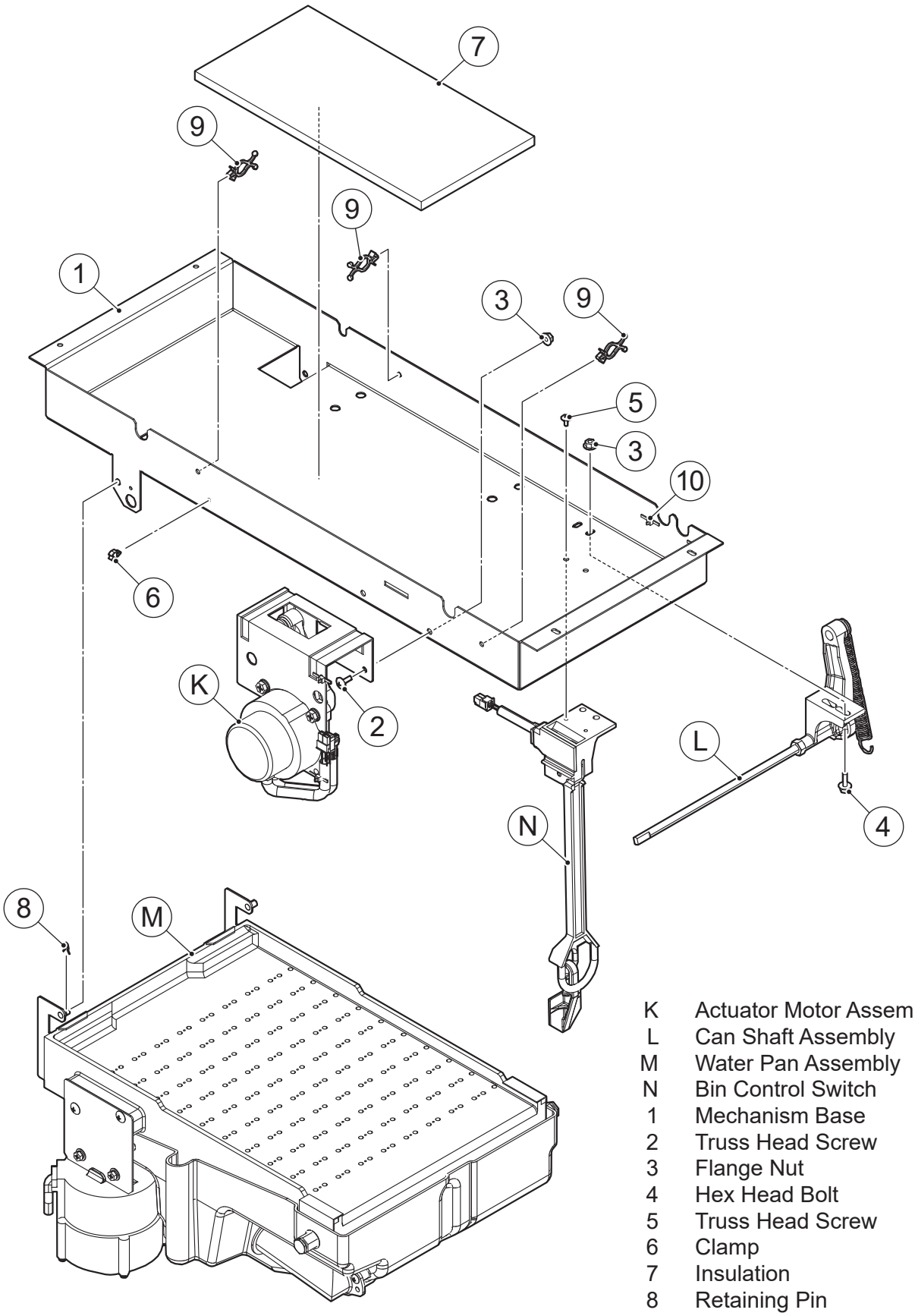


Fig. 17

K	Actuator Motor Assembly
L	Can Shaft Assembly
M	Water Pan Assembly
N	Bin Control Switch
1	Mechanism Base
2	Truss Head Screw
3	Flange Nut
4	Hex Head Bolt
5	Truss Head Screw
6	Clamp
7	Insulation
8	Retaining Pin
9	Clamp
10	Tie

14. UV-LED AND UV-FM

⚠ WARNING

Before maintaining UV-LED or UV-FM, be sure to unplug the icemaker or disconnect the power source.

[a] UV-LED

1) Unplug the icemaker or disconnect the power source.

2) Disconnect the connectors of the UV-LED and UV-FM.

3) Remove the water pan from the water pan assembly.

4) Remove the screw securing the LED holder.

5) Remove the UV-LED.

4) Install the new UV-LED in the reverse order of the removal procedure.

Note: When the total operating time reaches 10,000 hours, the 7-segment display shows the error code "AL". Replace the UV-LED with a new one to maintain sanitation effectiveness.

[b] UV-FM

1) Unplug the icemaker or disconnect the power source.

2) Disconnect the connectors of the UV-LED and UV-FM.

3) Remove the water pan from the water pan assembly.

4) Remove the duct guard and UV-FM.

5) Install the new UV-FM in the reverse order of the removal procedure.

Instructions for Upgrading from Standard Model

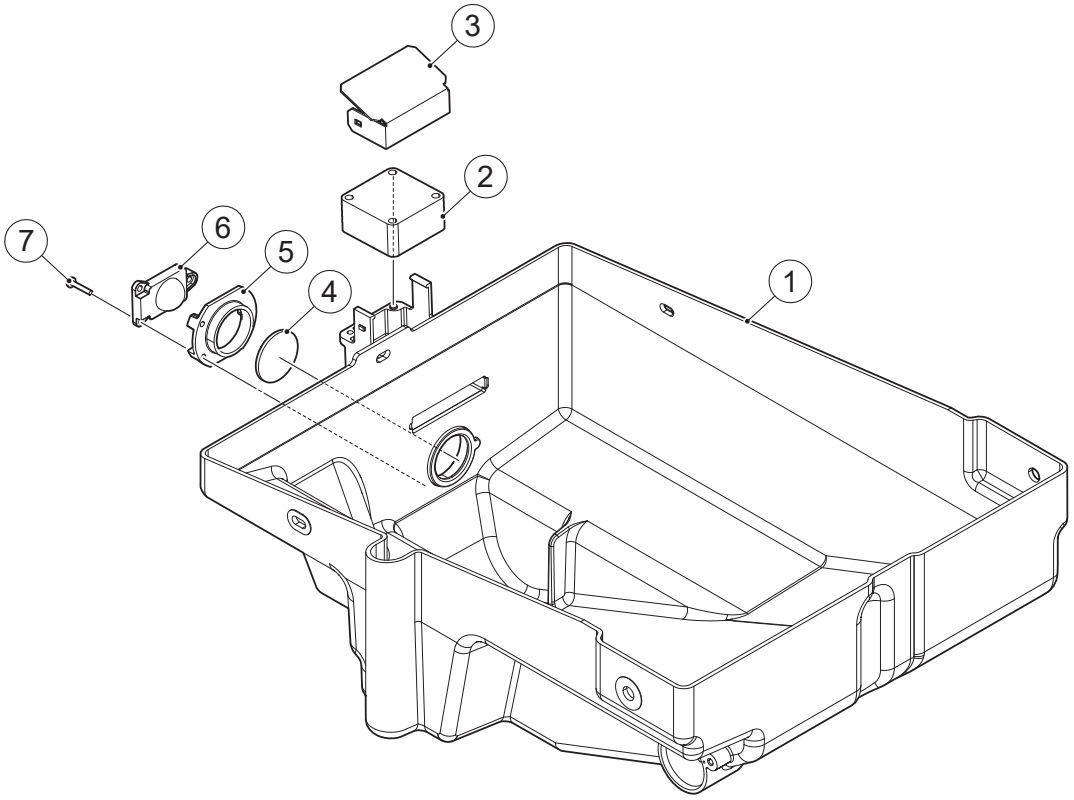
1) Unplug the icemaker or disconnect the power source.

2) Remove the water pan assembly.

3) Install the water pan AD3.

4) Connect the UV-LED to the connector with brown and orange wires.

5) Connect the UV-FM to the connector with red, black and yellow wires.



Water Pan AD3

1	Water Tank
2	Fan Motor
3	Duct Guard
4	Window Gasket
5	LED Holder
6	UV-LED
7	Pan Head Machine Screw

Fig. 18

15. WATER SUPPLY PIPE

1) Unplug the icemaker or disconnect the power source.

2) Remove the top panel.

3) Remove the screw from the pipe bracket.

4) Remove the silicone tube from the water supply pipe.

5) Pull the water supply pipe toward you to remove it from the mechanism base.

6) Install the new water supply pipe in the reverse order of the removal procedure.

7) Replace the top panel in its correct position.

8) Plug in the icemaker or connect the power source.

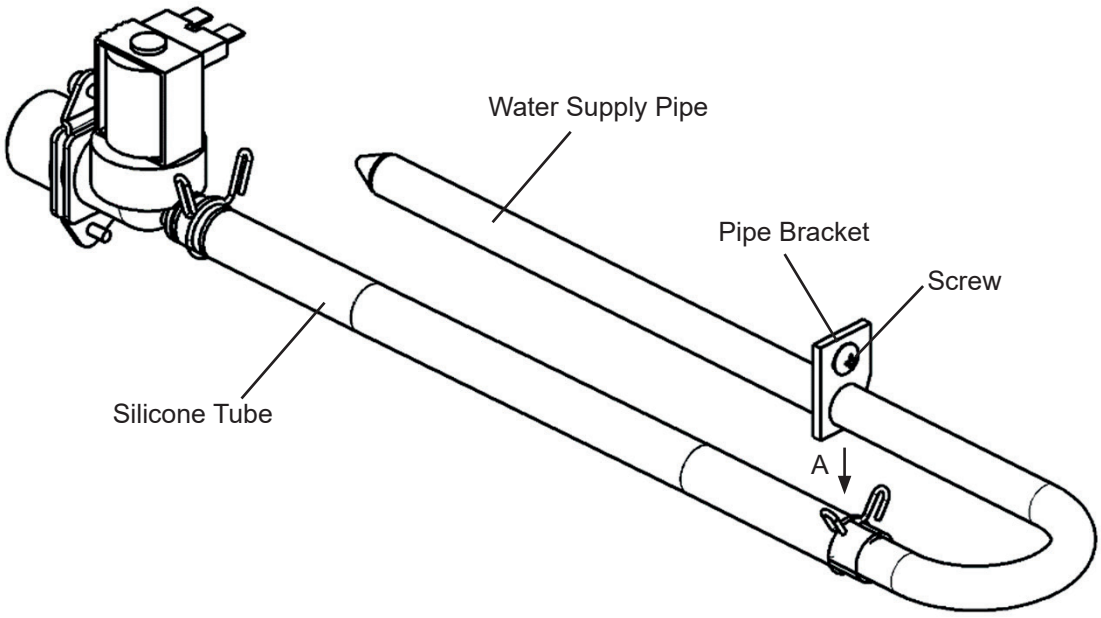


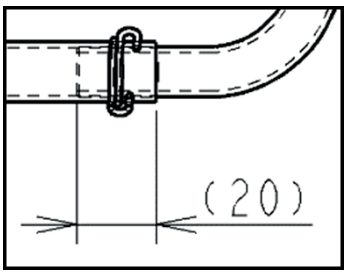
Fig. 19

[Installation procedure]

1) Insert the water supply pipe into the hole in the mechanism base.

2) Insert the water supply pipe into the silicone tube by 20 mm.

   Note: If the pipe is inserted too much, tensile stress may cause damage to the adhesive joint of the pipe bracket.



View A

3) Secure the pipe bracket to the mechanism base using the screw.

   Note: Tighten the screw last to reduce strain stress on the adhesive joint of the pipe bracket.

16. CONTROLLER BOARD AND SWITCHING REGULATOR

IMPORTANT

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

1) Unplug the icemaker or disconnect the power source.

2) Remove the front panel.

3) Unscrew and remove the control box cover.

4) Disconnect all the connectors from the controller board and switching regulator.

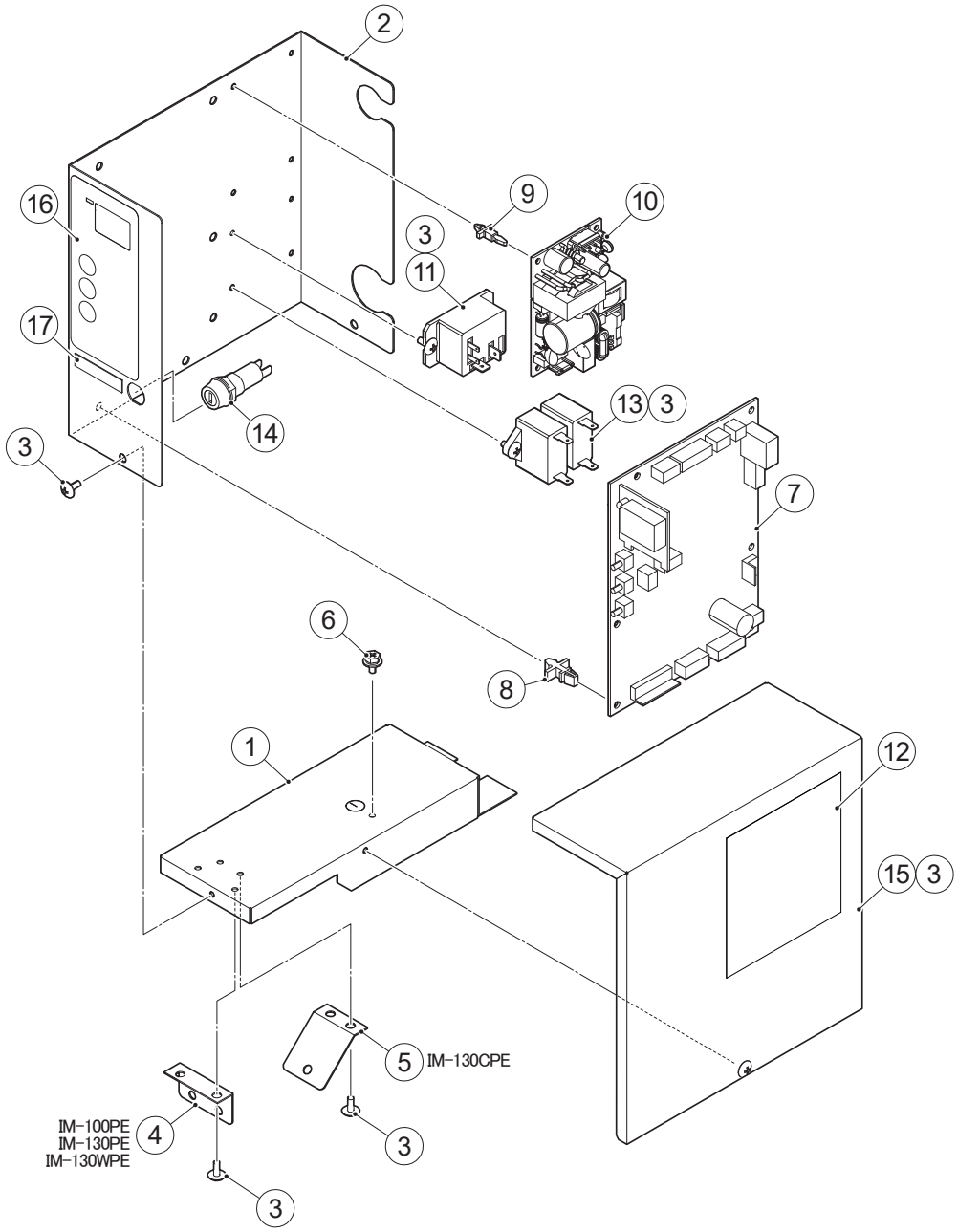
5) Remove the controller board and switching regulator from the four board supports for connection to the control box.

6) Install the new controller board and switching regulator in the reverse order of the removal procedure.

7) Replace the front panel in its correct position.

8) Plug in the icemaker or connect the power source.

9) The icemaker restarts in the model setting mode. Set the model code according to the controller board service manual.



1	Control Box (A)	10	Switching Regulator
2	Control Box (B)	11	Power Relay
3	Truss Head Screw	12	Wining Label
4	Control Box Mount	13	Capacitor
5	Control Box Mount	14	Fuse
6	Hex Head Bolt	15	Control Box Cover
7	Controller Board	16	Control Label
8	Board Support	17	Fuse Label
9	Board Support		

Fig. 20

17. THERMISTOR FOR CUBE CONTROL

1) Unplug the icemaker or disconnect the power source.

2) Remove the top and front panels.

3) Remove the connector CN13 on the controller board, referring to "16. CONTROLLER BOARD AND SWITCHING REGULATOR".

4) Unscrew and remove the thermistor holder and thermistor, located on the evaporator (front side).

5) Install the new thermistor in the reverse order of the removal procedure, by using a sealant (high-thermal conduct type). See Fig. 21.

Note: Recommended sealant is KE4560RTV, manufactured by Shin-Etsu Silicones. When other type of sealant used, the cube size and performance will be changed. Do not use silicone sealant as this will insulate the thermistor.

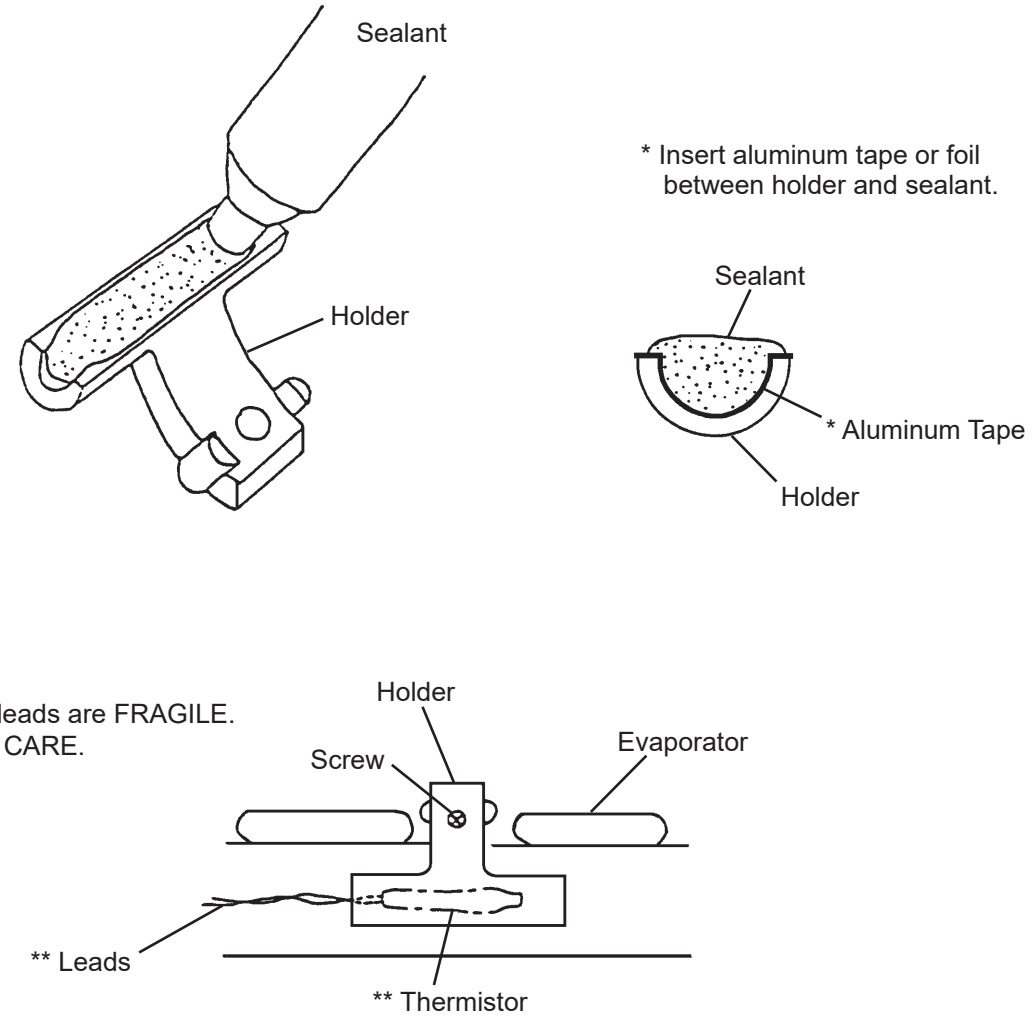


Fig. 21

18. FAN MOTOR

1) Unplug the icemaker or disconnect the power source.

2) Remove the front and rear panels.

3) Disconnect the connector of the fan motor.

4) Remove the fan motor bracket and the fan motor.

5) Cut the leads of the fan motor allowing enough lead length to reconnect using closed end connectors.

6) Install the new fan motor in the reverse order of the removal procedure.

7) Refit the panels in their correct positions.

8) Plug in the icemaker or connect the power source.

19. DRAIN PUMP

[a] DRAIN PUMP

1) Remove the rear panel.

2) Remove the four screws securing the drain pump.

3) Remove the drain hose and insulation.

4) Remove the pressure switch tube.

5) Disconnect the harnesses for the drain pump and pressure switch.

6) Remove the drain pump.

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

[b] PRESSURE SWITCH

1) Remove the rear panel.

2) Remove the screw securing the bracket.

3) Remove the pressure switch tube.

4) Disconnect the pressure switch harness.

5) Remove the pressure switch.

6) Install the new pressure switch in the reverse order of the removal procedure.

[c] FLOAT SWITCH

1) Remove the rear panel.

2) Disconnect the relay connector of the float switch.

3) Remove the drain hose and insulation.

4) Remove the pressure switch tube.

5) Remove the six screws from the top of the drain pump to take off the cover with the float switch attached.

6) Remove the nut for the float switch.

7) Remove the float switch.

8) Install the new float switch in the reverse order of the removal procedure.

[d] PRESSURE SWITCH TUBE

1) Remove the rear panel.

2) Remove the screw securing the pressure switch bracket.

3) Remove the pressure switch tube.

4) Install the new tube in the reverse order of the removal procedure.

Recommended Replacement Frequency

Drain pump:	3 years
Pressure switch tube:	1 - 3 years depending on water hardness
Float switch:	7 years
Pressure switch:	7 years
One-way valve:	7 years

Instructions for Upgrading from Standard Model

1) Unplug the icemaker or disconnect the power source.

2) Remove the rear panel.

3) Remove the drain pump bracket and drain hose.

4) Connect the drain hose from the storage bin to the drain pump.

5) Connect the pressure switch tube from the pressure switch to the drain pump.

6) Instal the pressure switch with the bracket.

7) Connect the drain pump harness (black and white wires).

8) Connect the float switch harness to the connector with black and white wires.

9) Install the drain pump bracket for the drain pump model.

10) Refit the rear panel.

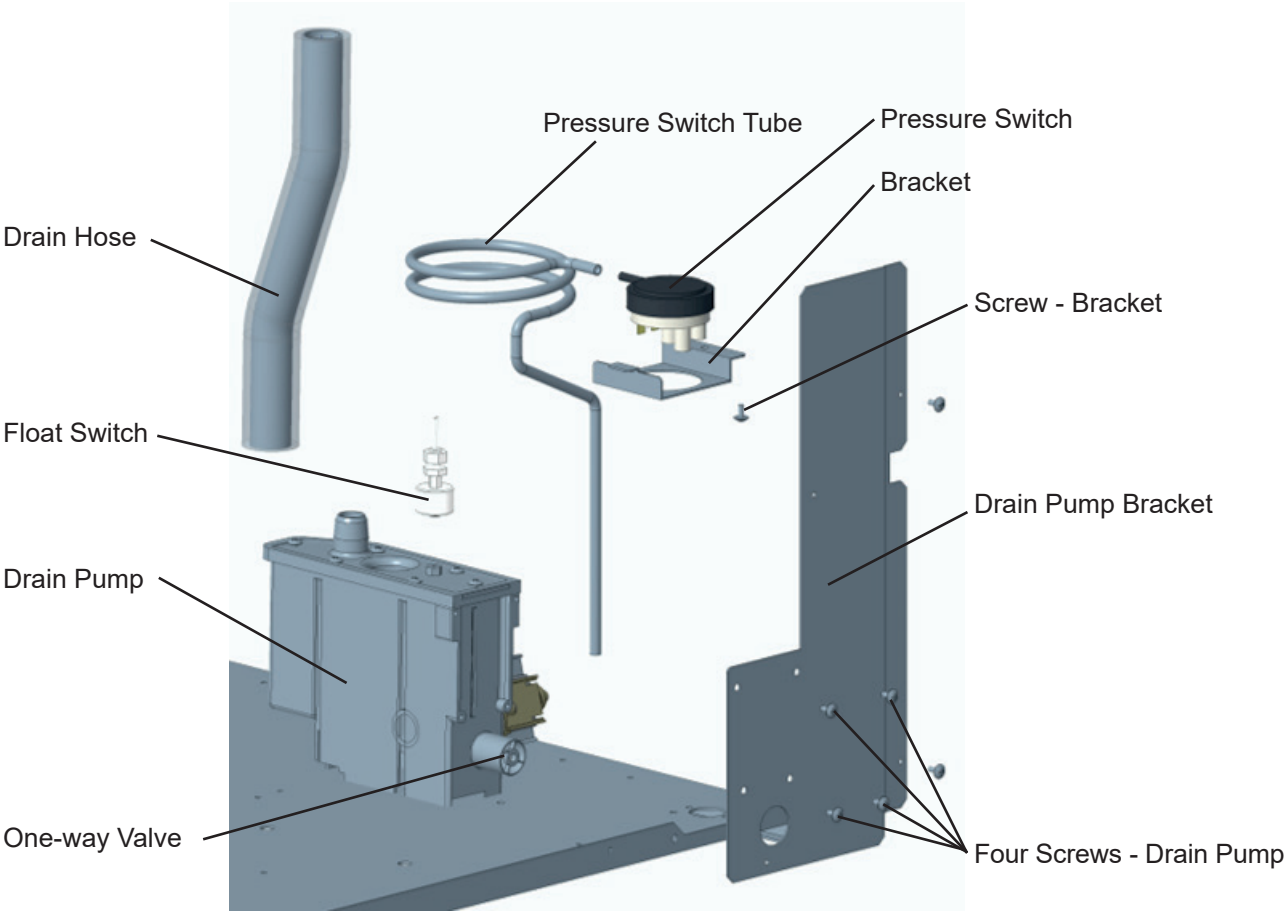


Fig. 22

APPENDIX

Maintenance Mode Descriptions

Category	No.	Item	Description
Basic	1	Defrost completion temp	Temperature to complete defrost cycle (detected by cube control thermistor). **Note) Do not set the temp low.**
	2	Integrated constant 1 (temp)	Target integrated value inside controller board is determined by constants 1 and 2. Temperature in freeze cycle is integrated, and freeze cycle continues until target integrated value is reached. Basically, the smaller constant 1 gets, the bigger integrated value and the smaller dimple diameter become.
	3	Integrated constant 2 (time)	Target integrated value inside controller board is determined by constants 1 and 2. Time in freeze cycle is integrated, and freeze cycle continues until target integrated value is reached. Basically, the smaller constant 2 gets, the smaller integrated value and the bigger dimple diameter become.
	4	Ambient temp correction operating temp for integrated value	Upper temperature limit to trip control to ensure minimum dimple size in low temp conditions like at 1°C / wt 5°C.
	5	Ambient temp correction rate for integrated value	Percentage of integrated value in low temp conditions against target integrated value to ensure minimum dimple size in low temp conditions like at 1°C / wt 5°C based on integrated value inside controller board determined by constants 1 and 2.
	6	Freeze backup timer	Timer setting to forcibly complete freeze cycle if cube control thermistor cannot sense freeze completion temp.
Drain Pump	7	Float Switch Detection time	Detection time until error is indicated. **Note) Do not set the time low.**
Water supply	10	Defrosting water supply time (water temp less than 13°C)	Time to supply defrosting water to melt ice on water pan at water supply temp less than 13°C. When set to 99”, defrosting water keeps running until defrost cycle ends.
	11	Defrosting water supply time (water temp 13℃ or more)	Time to supply defrosting water to melt ice on water pan at water supply temp of 13°C or more.
	12	Icemaking water supply time	Time to supply icemaking water depending on partial or full drain flush.
	13	Water temp measurement correction value	Setting to correct difference between water temp measured by cube control thermistor and actual water temp.
	15	Additional ice making water supply time	Time to supply additional icemaking water required after pump motor starts following normal icemaking water supply time (necessary for IM-240 type).
	17	Defrost water control	Selection of defrosting water control. When set to "0", normal control as described for No. 11 above. When set to "1", control timing is segmented into two.
	18	Defrost completion temp correction	Set defrost completion temp correction value when defrosting water control setting is changed.
Bin control	21	Double stack bin control	Selection of bin control in case of double stack application.

Category	No.	Item	Description
Auto cleaning	24	Cleaning Water temp	Set temp for cleaning water temperature. Cleaning Water is heated until set temp reaches (detected by cube control thermistor).
	25	Cleaning operation time	Pump motor keeps running until set time reaches.
	26	Number of rinsing	Rinse operation keep running until set number reaches. Repeatedly supply water, running pump and drain water to rinse out detergent. **Note) Do not set the number low.**
	27	Rinsing time	The time for pump motor running. To rinse out the detergent on evaporator and water circuit. **Note) Do not set the number low.**
	28	Evaporator drain time	The time until the rinsing water drop into the tank. To prevent the rinsing water splash into the bin when water plate opening. **Note) Do not set the time low.**
	29	Tank Drain time	Water plate keep opening until the time reaches. **Note) Do not set the time low.**
Model	30	Type	Selection of fan motor type. **Note) Do not adjust.**
Defrost cycle low temp control	34	Operating temp	Set temp for continuous fan motor operation in defrost cycle to lower temp inside control box if ambient temp at the beginning of defrost cycle exceeds set point.
Water Regulator	36	Error detecting temp	Thermistor temp (water regulator outlet) in case of water regulator error and cooling water failure for water-cooled model.
Pump motor	41	Normal target rpm	Normal pump motor rotation speed set with the first two digits of rotation speed. e.g. 3800 r/min = "38" When freeze cycle integrated value against target is less than low speed rotation condition (setting No. 42), pump motor operates at target rotation speed. When integrated value is low speed rotation condition (setting No. 42) or higher, target rotation speed is decreased by low speed rotation rate (setting No. 43).
	42	Low speed rotation condition	Condition to decrease target pump motor rotation speed in freeze cycle.
	43	Low speed rotation rate	Percentage against target rotation speed (setting No. 41)

Category	No.	Item	Description
Slush Ice	50	Pump off time	Pump off time for slush ice control to stop pump after 30 sec at "Operating temp +1" ≧ evaporator temp ≧ "Operating temp". Refrigerate evaporator before icemaking water supercools, and form ice core. When set to "0", pump motor keeps running. When both, pump off time (setting No. 50) and water supply time (setting No. 51) set to "0", slush ice control is canceled.
	51	Water supply time	Time to supply water while pump is off for slush ice control. If slush ice is too much and cannot be prevented solely by pump off in No. 50, water is supplied while pump is off to slightly raise tank water temp.
	52	Pump on time	Pump on time for slush ice control to run pump after pump off operation. When set to "0", pump motor keep "off".
	53	Operating temp	Set temp to enable slush ice control.
	54	Cancellation temp	Set temp to disable slush ice control. The operation of pump on/off keeps until cube control thermistor temp reaches cancellation temp.
Hard Water	60	Operating condition	Condition to operate cloudy ice control in hard water application indicated in percentage against target integrated value. After icemaking water supply starts, ice begins to form and freeze cycle integrated value reaches a certain level. Then, additional water is supplied to dilute concentrated icemaking water in water tank.
	61	Water supply time	Time to supply water for hard water control.
Ice left in water pan	70	Operating temp	Upper limit of operating temp to control ice left in water pan at the end of freeze cycle. Decrease amount of defrosting water by reducing ice left in opening water pan after freeze cycle.
	71	Hot gas valve on time	Hot gas valve opening time to control ice left in water pan.
Ice bridge	73	Hot gas valve off time	Time to keep hot gas valve closed after 20 sec in defrost cycle. Prevent ice bridge in bin by delaying ice dropping time
Low temp in defrost cycle	74	Operating temp	Upper temperature limit at the beginning of defrost cycle.
UV sanitation	75	UV Device selection	Selection for UV device is installed or not. "0: No" means "Not installed", "1: Yes" means "Installed".
	76	Operation ambient temp	Condition to enable sanitation control.
	77	Air sanitation time	Set time for Air sanitation operation time.
	78	Water sanitation time	Set time for Water sanitation operation time. Water sanitation is operated after Air sanitation.
	79	Control interval	UV sanitation interval. When set to "2", there is no operation for 2 hour.
High Pressure	80	Sensed temp	Temperature sensed by condenser thermistor. **Note) Do not adjust.**
Cleaning Notice	81	Condenser cleaning notice	Set time to indicate the recommendation time to clean condenser and filter.
	82	Cleaning notice	Set time to indicate the recommendation time to clean water circuit.

Maitenance Mode Settings

Category	No.	Item	21CPE	30CPE	30CPE-25	30CWPE	30CWPE-25
Basic	1	Defrost completion temp	5	5	5	5	5
	2	Integrated constant 1 (temp)	-14.5	-14.5	-11	-15.5	-11
	3	Integrated constant 2 (time)	17	14	10	16	14
	4	Ambient temp correction operating temp for integrated value	20	20	20	30	20
	5	Ambient temp correction rate for integrated value	90	100	90	90	90
	6	Freeze backup timer	45	45	45	45	45
Drain Pump	7	Float Switch Detection time	5	5	5	5	5
Water supply	10	Defrosting water supply time (water temp less than 13°C)	15	15	15	15	15
	11	Defrosting water supply time (water temp 13°C or more)	6	6	6	6	6
	12	Icemaking water supply time	22	22	22	22	22
	13	Water temp measurement correction value	8	8	8	6	8
	15	Additinal ice making water supply time	0	0	0	0	0
	17	Defrost water control	0	0	0	0	0
	18	Defrost completion temp correction	0	0	0	0	0
Bin control	21	Double stack bin control	1	1	1	1	1
Auto cleaning	24	Cleaning Water temp	25	25	25	25	25
	25	Cleaning operation time	3	3	3	3	3
	26	Number of rinsing	3	3	3	3	3
	27	Rinsing time	2	2	2	2	2
	28	Evaporator drain time	3	3	3	3	3
	29	Tank Drain time	1	1	1	1	1
Model	30	Type	2	2	2	2	2
Defrost cycle low temp control	34	Operating temp	20	70	70	45	70
Water Regulator	36	Error detecting temp	0	0	0	0	0
Pump motor	41	Normal target rpm	38	38	38	38	38
	42	Low RPM operating condition	90	90	90	90	90
	43	Low RPM ratio	70	70	70	70	70
Slush Ice	50	Pump off time	10	0	12	10	15
	51	Water supply time	0	0	0	0	0
	52	Pump on time	20	30	30	20	30
	53	Operating temp	4	4	4	5	4
	54	Cancellation temp	0	1	2	3	2
Hard Water	60	Operating condition	10	10	10	10	10
	61	Water supply time	0	0	0	0	0
Ice left in water pan	70	Operating temp	25	30	30	32	30
	71	Hot gas valve on time	5	5	5	5	5
Ice bridge	73	Hot gas valve off time	0	0	0	0	0
Low temp in defrost cycle	74	Operating temp	0	0	0	0	0
UV sanitation	75	UV Device selection	0	0	0	0	0
	76	Operation ambient temp	20	20	20	20	20
	77	Air sanitation time	45	45	45	45	45
	78	Water sanitation time	20	20	20	20	20
	79	Control interval	2	2	2	2	2
High Pressure	80	Sensed temp	63	63	63	63	63
Cleaning Notice	81	Condenser cleaning notice	4	4	4	4	4
	82	Cleaning notice	44	44	44	44	44

Software version: **1.0.3**

Category	No.	Item	45PE	45PE-25	45WPE	45WPE-25	45CPE	45CPE-25
Basic	1	Defrost completion temp	6	6	6	6	6	6
	2	Integrated constant 1 (temp)	-19	-15	-19.5	-11	-17.5	-17
	3	Integrated constant 2 (time)	14	12	14	17	15	14
	4	Ambient temp correction operating temp for integrated value	24	30	33	33	22	30
	5	Ambient temp correction rate for integrated value	95	90	90	100	92	90
	6	Freeze backup timer	45	45	45	45	45	45
Drain Pump	7	Float Switch Detection time	5	5	5	5	5	5
Water supply	10	Defrosting water supply time (water temp less than 13°C)	15	15	15	15	15	15
	11	Defrosting water supply time (water temp 13°C or more)	7	7	7	7	7	7
	12	Icemaking water supply time	22	22	22	22	22	22
	13	Water temp measurement correction value	6	7	6	6	6	6
	15	Additinal ice making water supply time	0	0	0	0	0	0
	17	Defrost water control	0	0	0	0	0	0
	18	Defrost completion temp correction	0	0	0	0	0	0
Bin control	21	Double stack bin control	1	1	1	1	1	1
Auto cleaning	24	Cleaning Water temp	25	25	25	25	25	25
	25	Cleaning operation time	3	3	3	3	3	3
	26	Number of rinsing	3	3	3	3	3	3
	27	Rinsing time	2	2	2	2	2	2
	28	Evaporator drain time	3	3	3	3	3	3
	29	Tank Drain time	1	1	1	1	1	1
Model	30	Type	2	2	0	0	2	2
Defrost cycle low temp control	34	Operating temp	45	45	45	45	45	45
Water Regulator	36	Error detecting temp	0	0	0	0	0	0
Pump motor	41	Normal target rpm	38	38	38	38	38	38
	42	Low RPM operating condition	30	30	30	30	30	30
	43	Low RPM ratio	80	80	80	80	80	80
Slush Ice	50	Pump off time	30	30	30	0	15	30
	51	Water supply time	0	0	0	0	0	0
	52	Pump on time	20	20	20	20	0	20
	53	Operating temp	5	5	6	6	3	5
	54	Cancellation temp	2	2	2	1	2	2
Hard Water	60	Operating condition	10	10	10	10	10	10
	61	Water supply time	0	0	0	0	0	0
Ice left in water pan	70	Operating temp	30	30	30	15	30	30
	71	Hot gas valve on time	10	10	10	10	10	10
Ice bridge	73	Hot gas valve off time	0	0	0	0	0	0
Low temp in defrost cycle	74	Operating temp	0	0	0	0	0	0
UV sanitation	75	UV Device selection	0	0	0	0	0	0
	76	Operation ambient temp	20	20	20	20	20	20
	77	Air sanitation time	45	45	45	45	45	45
	78	Water sanitation time	20	20	20	20	20	20
	79	Control interval	2	2	2	2	2	2
High Pressure	80	Sensed temp	63	63	63	63	63	63
Cleaning Notice	81	Condenser cleaning notice	4	4	4	4	4	4
	82	Cleaning notice	44	44	44	44	44	44

Software version: **1.0.3**

Category	No.	Item	65PE	65PE-25	65PE-LM	65PE-Q	65WPE	65WPE-25	65WPE-Q
Basic	1	Defrost completion temp	6	6	7	7	6	6	7
	2	Integrated constant 1 (temp)	-18	-19	-19	-19	-19.5	-17	-18
	3	Integrated constant 2 (time)	15	12	45	45	14	12	40
	4	Ambient temp correction operating temp for integrated value	25	25	35	35	20	20	32
	5	Ambient temp correction rate for integrated value	93	100	80	80	90	100	85
	6	Freeze backup timer	45	45	60	60	45	45	60
Drain Pump	7	Float Switch Detection time	5	5	5	5	5	5	5
Water supply	10	Defrosting water supply time (water temp less than 13°C)	90	15	50	50	15	15	50
	11	Defrosting water supply time (water temp 13°C or more)	12	10	40	40	7	7	40
	12	Icemaking water supply time	29	29	0	0	29	29	0
	13	Water temp measurement correction value	6	6	2	2	7	7	2
	15	Additinal ice making water supply time	0	0	0	0	0	0	0
	17	Defrost water control	0	0	0	0	0	0	0
	18	Defrost completion temp correction	0	0	0	0	0	0	0
Bin control	21	Double stack bin control	1	1	1	1	1	1	1
Auto cleaning	24	Cleaning Water temp	25	25	25	25	25	25	25
	25	Cleaning operation time	3	3	3	3	3	3	3
	26	Number of rinsing	3	3	3	3	3	3	3
	27	Rinsing time	2	2	2	2	2	2	2
	28	Evaporator drain time	3	3	3	3	3	3	3
	29	Tank Drain time	1	1	1	1	1	1	1
Model	30	Type	2	2	2	2	0	0	0
Defrost cycle low temp control	34	Operating temp	70	70	48	48	70	70	48
Water Regulator	36	Error detecting temp	0	0	0	0	0	0	0
Pump motor	41	Normal target rpm	38	38	38	38	38	38	38
	42	Low RPM operating condition	30	30	30	30	30	30	30
	43	Low RPM ratio	80	80	80	80	80	80	80
Slush Ice	50	Pump off time	10	5	0	0	20	10	15
	51	Water supply time	5	0	0	0	0	0	0
	52	Pump on time	0	20	20	20	20	20	20
	53	Operating temp	3	4	4	4	6	6	6
	54	Cancellation temp	2	2	2	2	2	2	2
Hard Water	60	Operating condition	30	30	50	50	10	10	50
	61	Water supply time	10	0	2	2	0	0	2
Ice left in water pan	70	Operating temp	50	50	50	50	50	30	50
	71	Hot gas valve on time	2	0	5	5	2	0	5
Ice bridge	73	Hot gas valve off time	0	0	0	0	0	0	0
Low temp in defrost cycle	74	Operating temp	0	0	0	0	0	0	0
UV sanitation	75	UV Device selection	0	0	0	0	0	0	0
	76	Operation ambient temp	20	20	20	20	20	20	20
	77	Air sanitation time	45	45	45	45	45	45	45
	78	Water sanitation time	20	20	20	20	20	20	20
	79	Control interval	2	2	2	2	2	2	2
High Pressure	80	Sensed temp	63	63	63	63	63	63	63
Cleaning Notice	81	Condenser cleaning notice	4	4	4	4	4	4	4
	82	Cleaning notice	44	44	44	44	44	44	44

Software version: **1.0.3**

Category	No.	Item	IM-100PE	IM-130PE	IM-130PE-23	IM-130PE-32	IM-130WPE	IM-130WPE-23
Basic	1	Defrost completion temp	6	6	5	7	7	7
	2	Integrated constant 1 (temp)	-22	-25	-19	-27	-26.5	-19
	3	Integrated constant 2 (time)	14	14	13	18	14	18
	4	Ambient temp correction operating temp for integrated value	20	20	20	42	29	35
	5	Ambient temp correction rate for integrated value	95	90	90	95	96	95
	6	Freeze backup timer	45	45	45	45	45	45
Drain Pump	7	Float Switch Detection time	5	5	5	5	5	5
Water supply	10	Defrosting water supply time (water temp less than 13°C)	90	90	90	90	90	90
	11	Defrosting water supply time (water temp 13℃ or more)	30	30	30	30	30	30
	12	Icemaking water supply time	28	28	28	28	28	28
	13	Water temp measurement correction value	10	10	10	8	8	8
	15	Additinal ice making water supply time	0	0	0	0	0	0
	17	Defrost water control	0	0	0	0	0	0
	18	Defrost completion temp correction	0	0	0	0	0	0
Bin control	21	Double stack bin control	1	1	1	1	1	1
Auto cleaning	24	Cleaning Water temp	25	25	25	25	25	25
	25	Cleaning operation time	3	3	3	3	3	3
	26	Number of rinsing	3	3	3	3	3	3
	27	Rinsing time	6	6	6	6	6	6
	28	Evaporator drain time	2	2	2	2	2	2
	29	Tank Drain time	12	12	12	12	12	12
Model	30	Type	3	3	3	3	1	1
Defrost cycle low temp control	34	Operating temp	61	45	45	45	48	48
Water Regulator	36	Error detecting temp	0	0	0	0	0	0
Pump motor	41	Normal target rpm	18	18	18	27	18	18
	42	Low RPM operating condition	30	30	20	90	30	30
	43	Low RPM ratio	70	70	70	70	70	70
Slush Ice	50	Pump off time	0	0	0	0	20	0
	51	Water supply time	0	0	0	0	0	0
	52	Pump on time	20	20	20	20	20	10
	53	Operating temp	5	5	5	5	5	5
	54	Cancellation temp	2	2	2	2	2	2
Hard Water	60	Operating condition	10	10	10	10	10	10
	61	Water supply time	0	0	0	0	0	0
Ice left in water pan	70	Operating temp	25	20	20	30	32	44
	71	Hot gas valve on time	10	10	10	10	0	0
Ice bridge	73	Hot gas valve off time	0	0	0	0	0	0
Low temp in defrost cycle	74	Operating temp	0	20	20	20	0	20
UV sanitation	75	UV Device selection	0	0	0	0	0	0
	76	Operation ambient temp	20	20	20	20	20	20
	77	Air sanitation time	45	45	45	45	45	45
	78	Water sanitation time	20	20	20	20	20	20
	79	Control interval	2	2	2	2	2	2
High Pressure	80	Sensed temp	63	63	63	63	63	63
Cleaning Notice	81	Condenser cleaning notice	4	4	4	4	4	4
	82	Cleaning notice	44	44	44	44	44	44

Software version: **1.0.3**

Category	No.	Item	IM-130CPE	IM-130CPE-23	IM-130CPE-32	IM-130APE	IM-130APE-23
Basic	1	Defrost completion temp	6	4	6	6	6
	2	Integrated constant 1 (temp)	-19	-19	-20.5	-18	-17
	3	Integrated constant 2 (time)	17	16	19	21	20
	4	Ambient temp correction operating temp for integrated value	26	20	26	16	25
	5	Ambient temp correction rate for integrated value	90	90	95	95	90
	6	Freeze backup timer	45	45	45	45	45
Drain Pump	7	Float Switch Detection time	5	5	5	5	5
Water supply	10	Defrosting water supply time (water temp less than 13°C)	90	90	90	90	90
	11	Defrosting water supply time (water temp 13℃ or more)	30	30	30	30	30
	12	Icemaking water supply time	28	28	28	28	28
	13	Water temp measurement correction value	10	10	10	10	10
	15	Additinal ice making water supply time	0	0	0	0	0
	17	Defrost water control	0	0	0	0	0
	18	Defrost completion temp correction	0	0	0	0	0
Bin control	21	Double stack bin control	1	1	1	1	1
Auto cleaning	24	Cleaning Water temp	25	25	25	25	25
	25	Cleaning operation time	3	3	3	3	3
	26	Number of rinsing	3	3	3	3	3
	27	Rinsing time	6	6	6	6	6
	28	Evaporator drain time	2	2	2	2	2
	29	Tank Drain time	12	12	12	12	12
Model	30	Type	3	3	3	3	3
Defrost cycle low temp control	34	Operating temp	61	45	61	45	45
Water Regulator	36	Error detecting temp	0	0	0	0	0
Pump motor	41	Normal target rpm	18	18	18	18	18
	42	Low RPM operating condition	30	20	30	30	30
	43	Low RPM ratio	70	70	70	70	70
Slush Ice	50	Pump off time	20	20	25	15	15
	51	Water supply time	0	0	0	0	0
	52	Pump on time	0	0	0	0	0
	53	Operating temp	3	3	3	3	3
	54	Cancellation temp	1	1	1	2	2
Hard Water	60	Operating condition	10	10	10	10	10
	61	Water supply time	6	6	6	6	6
Ice left in water pan	70	Operating temp	20	20	20	20	20
	71	Hot gas valve on time	10	10	10	10	0
Ice bridge	73	Hot gas valve off time	0	0	20	0	0
Low temp in defrost cycle	74	Operating temp	0	20	10	20	20
UV sanitation	75	UV Device selection	0	0	0	0	0
	76	Operation ambient temp	20	20	20	20	20
	77	Air sanitation time	45	45	45	45	45
	78	Water sanitation time	20	20	20	20	20
	79	Control interval	2	2	2	2	2
High Pressure	80	Sensed temp	63	63	63	63	63
Cleaning Notice	81	Condenser cleaning notice	4	4	4	4	4
	82	Cleaning notice	44	44	44	44	44

Software version: **1.0.3**

Category	No.	Item	IM-240PE	IM-240PE-23	IM-240WPE	IM-240WPE-23	IM-240APE
Basic	1	Defrost completion temp	6	6	6	6	5
	2	Integrated constant 1 (temp)	-19	-21.5	-19	-17.5	-20
	3	Integrated constant 2 (time)	15	13	17	13	12
	4	Ambient temp correction operating temp for integrated value	32	38	30	30	35
	5	Ambient temp correction rate for integrated value	90	95	100	100	100
	6	Freeze backup timer	45	45	45	45	45
Drain Pump	7	Float Switch Detection time	5	5	5	5	5
Water supply	10	Defrosting water supply time (water temp less than 13°C)	90	95	90	95	95
	11	Defrosting water supply time (water temp 13℃ or more)	30	30	30	30	30
	12	Icemaking water supply time	30	30	30	30	30
	13	Water temp measurement correction value	10	10	12	9	10
	15	Additinal ice making water supply time	22	22	22	22	22
	17	Defrost water control	0	0	0	0	0
	18	Defrost completion temp correction	0	0	0	0	0
Bin control	21	Double stack bin control	1	1	1	1	1
Auto cleaning	24	Cleaning Water temp	25	25	25	25	25
	25	Cleaning operation time	3	3	3	3	3
	26	Number of rinsing	3	3	3	3	3
	27	Rinsing time	6	6	6	6	6
	28	Evaporator drain time	2	2	2	2	2
	29	Tank Drain time	12	12	12	12	12
Model	30	Type	3	3	1	1	3
Defrost cycle low temp control	34	Operating temp	61	61	45	45	61
Water Regulator	36	Error detecting temp	0	0	0	0	0
Pump motor	41	Normal target rpm	24	24	24	18	22
	42	Low RPM operating condition	30	30	30	30	30
	43	Low RPM ratio	70	70	70	70	70
Slush Ice	50	Pump off time	10	0	10	0	15
	51	Water supply time	0	0	0	0	0
	52	Pump on time	0	20	0	20	20
	53	Operating temp	3	5	3	5	2
	54	Cancellation temp	2	2	2	2	1
Hard Water	60	Operating condition	10	10	10	10	10
	61	Water supply time	15	15	15	15	15
Ice left in water pan	70	Operating temp	27	43	20	50	20
	71	Hot gas valve on time	10	10	0	0	10
Ice bridge	73	Hot gas valve off time	0	0	0	0	0
Low temp in defrost cycle	74	Operating temp	10	20	0	0	10
UV sanitation	75	UV Device selection	0	0	0	0	0
	76	Operation ambient temp	20	20	20	20	20
	77	Air sanitation time	45	45	45	45	45
	78	Water sanitation time	20	20	20	20	20
	79	Control interval	2	2	2	2	2
High Pressure	80	Sensed temp	63	63	63	63	63
Cleaning Notice	81	Condenser cleaning notice	4	4	4	4	4
	82	Cleaning notice	44	44	44	44	44

Software version: **1.0.3**

Category	No.	Item	IM-240APE-23	IM-240APE-32	IM-240AWPE	IM-240AWPE-23	IM-240DPE
Basic	1	Defrost completion temp	6	6	6	6	6
	2	Integrated constant 1 (temp)	-18	-21	-20	-18	-21
	3	Integrated constant 2 (time)	14	17	11	15	12
	4	Ambient temp correction operating temp for integrated value	25	30	30	30	35
	5	Ambient temp correction rate for integrated value	85	90	100	95	100
	6	Freeze backup timer	45	45	45	45	45
Drain Pump	7	Float Switch Detection time	5	5	5	5	5
Water supply	10	Defrosting water supply time (water temp less than 13°C)	90	95	95	95	90
	11	Defrosting water supply time (water temp 13℃ or more)	30	30	30	30	30
	12	Icemaking water supply time	30	30	30	30	30
	13	Water temp measurement correction value	10	7	11	8	9
	15	Additinal ice making water supply time	22	22	22	22	22
	17	Defrost water control	0	0	0	0	0
	18	Defrost completion temp correction	0	0	0	0	0
Bin control	21	Double stack bin control	1	1	1	1	1
Auto cleaning	24	Cleaning Water temp	25	25	25	25	25
	25	Cleaning operation time	3	3	3	3	3
	26	Number of rinsing	3	3	3	3	3
	27	Rinsing time	6	6	6	6	6
	28	Evaporator drain time	2	2	2	2	2
	29	Tank Drain time	12	12	12	12	12
Model	30	Type	3	3	1	1	3
Defrost cycle low temp control	34	Operating temp	61	61	45	45	61
Water Regulator	36	Error detecting temp	0	0	0	0	0
Pump motor	41	Normal target rpm	22	22	22	21	22
	42	Low RPM operating condition	30	30	60	60	30
	43	Low RPM ratio	70	70	65	65	70
Slush Ice	50	Pump off time	0	20	10	30	20
	51	Water supply time	0	0	0	0	0
	52	Pump on time	0	0	0	20	0
	53	Operating temp	3	3	2	5	3
	54	Cancellation temp	1	1	1	2	1
Hard Water	60	Operating condition	10	10	10	10	10
	61	Water supply time	5	15	15	15	15
Ice left in water pan	70	Operating temp	20	22	50	50	40
	71	Hot gas valve on time	10	10	10	0	10
Ice bridge	73	Hot gas valve off time	0	0	0	0	0
Low temp in defrost cycle	74	Operating temp	10	15	0	0	10
UV sanitation	75	UV Device selection	0	0	0	0	0
	76	Operation ambient temp	20	20	20	20	20
	77	Air sanitation time	45	45	45	45	45
	78	Water sanitation time	20	20	20	20	20
	79	Control interval	2	2	2	2	2
High Pressure	80	Sensed temp	63	63	63	63	63
Cleaning Notice	81	Condenser cleaning notice	4	4	4	4	4
	82	Cleaning notice	44	44	44	44	44

Software version: **1.0.3**

Category	No.	Item	IM-240DPE-23	IM-240DPE-32	IM-240DWPE	IM-240DWPE-23	IM-240DWPE-32
Basic	1	Defrost completion temp	6	5	6	6	6
	2	Integrated constant 1 (temp)	-19	-20.5	-19.5	-16.5	-21
	3	Integrated constant 2 (time)	12	17	13	21	16
	4	Ambient temp correction operating temp for integrated value	35	35	30	30	30
	5	Ambient temp correction rate for integrated value	100	100	95	100	100
	6	Freeze backup timer	45	45	45	45	45
Drain Pump	7	Float Switch Detection time	5	5	5	5	5
Water supply	10	Defrosting water supply time (water temp less than 13°C)	95	90	95	95	95
	11	Defrosting water supply time (water temp 13°C or more)	30	30	30	30	30
	12	Icemaking water supply time	30	28	30	30	30
	13	Water temp measurement correction value	9	9	10	9	11
	15	Additinal ice making water supply time	22	22	22	22	22
	17	Defrost water control	0	0	0	0	0
	18	Defrost completion temp correction	0	0	0	0	0
Bin control	21	Double stack bin control	1	1	1	1	1
Auto cleaning	24	Cleaning Water temp	25	25	25	25	25
	25	Cleaning operation time	3	3	3	3	3
	26	Number of rinsing	3	3	3	3	3
	27	Rinsing time	6	6	6	6	6
	28	Evaporator drain time	2	2	2	2	2
	29	Tank Drain time	12	12	12	12	12
Model	30	Type	3	3	1	1	1
Defrost cycle low temp control	34	Operating temp	61	61	45	45	45
Water Regulator	36	Error detecting temp	0	0	0	0	0
Pump motor	41	Normal target rpm	22	22	22	21	22
	42	Low RPM operating condition	30	30	60	70	70
	43	Low RPM ratio	70	70	70	70	70
Slush Ice	50	Pump off time	0	15	20	30	10
	51	Water supply time	0	0	0	0	5
	52	Pump on time	20	0	0	20	0
	53	Operating temp	5	3	3	5	3
	54	Cancellation temp	2	2	1	2	2
Hard Water	60	Operating condition	10	10	10	10	10
	61	Water supply time	15	15	15	15	15
Ice left in water pan	70	Operating temp	40	40	60	50	50
	71	Hot gas valve on time	0	10	2	0	0
Ice bridge	73	Hot gas valve off time	15	0	0	0	0
Low temp in defrost cycle	74	Operating temp	15	10	0	0	0
UV sanitation	75	UV Device selection	0	0	0	0	0
	76	Operation ambient temp	20	20	20	20	20
	77	Air sanitation time	45	45	45	45	45
	78	Water sanitation time	20	20	20	20	20
	79	Control interval	2	2	2	2	2
High Pressure	80	Sensed temp	63	63	63	63	63
Cleaning Notice	81	Condenser cleaning notice	4	4	4	4	4
	82	Cleaning notice	44	44	44	44	44