
NO. M006-749

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**HOSHIZAKI
SELF-CONTAINED
CRESCENT CUBER**

**MODEL KM-61BAH
 KM-101BAH
 KM-151BAH
 KM-151BWH**

SERVICE MANUAL

IMPORTANT

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

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

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

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Web Site: www.hoshizaki.com

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

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

IMPORTANT

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

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I. SPECIFICATIONS

1. SPECIFICATIONS

[a] KM-61BAH

AC SUPPLY VOLTAGE	115/60/1			
AMPERAGE	3.4A (5 Min. Freeze AT 104°F / WT 80°F)			
MINIMUM CIRCUIT AMPASITY	15A			
MAXIMUM FUSE SIZE	15A			
APPROXIMATE ICE PRODUCTION PER 24 HR. lbs./day (kg/day) Reference without *marks	Ambient	WATER TEMP. (°F)		
	Temp.(°F)	50	70	90
	70	*71 (32)	65 (29)	58 (26)
	80	66 (30)	57 (26)	51 (23)
	90	65 (29)	*50 (23)	44 (20)
	100	64 (29)	49 (22)	*38 (17)
SHAPE OF ICE	Crescent Cube			
ICE PRODUCTION PER CYCLE	1.7 lbs. (0.75 kg) , 80 pcs.			
APPROXIMATE STORAGE CAPACITY	38 lbs. (17 kg)			
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F		
ELECTRIC W (kWH/100 lbs.)	220(10.6)	220(7.4)		
WATER gal./24HR (gal./100 lbs.)	10(20.6)	23(32.0)		
EXTERIOR DIMENSIONS (WxDxH)	17.75" x 24" x 39" (450 x 610 x 990 mm) Including 6" legs			
EXTERIOR FINISH	Stainless Steel, Galvanized Steel (Rear)			
WEIGHT	Net 92 lbs. (42 kg), Shipping 117 lbs. (53 kg)			
CONNECTIONS - ELECTRIC	Cord Connection			
- WATER SUPPLY	Inlet	1/2" FPT		
- DRAIN	Outlet	3/4" FPT		
CUBE CONTROL SYSTEM	Float Switch			
HARVESTING CONTROL SYSTEM	Hot Gas and Water, Thermistor and Timer			
ICE MAKING WATER CONTROL	Timer Controlled. Overflow Pipe			
COOLING WATER CONTROL	N/A			
BIN CONTROL SYSTEM	Mechanical Level Switch with Delay			
COMPRESSOR	Hermetic, Model QA51K13GAU6-E0GS			
CONDENSER	Air-Cooled, Fin and tube type			
EVAPORATOR	Vertical type, Stainless Steel and Copper			
REFRIGERANT CONTROL	Capillary Tube			
REFRIGERANT CHARGE	R134a, 6.4 oz. (180g)			
DESIGN PRESSURE	High 250PSIG, Low 150PSIG			
P.C. BOARD CIRCUIT PROTECTION	High Voltage Cut-out (Internal)			
COMPRESSOR PROTECTION	Auto-reset Overload Protector (Internal)			
LOW WATER PROTECTION	Float Switch			
ACCESSORIES -SUPPLIED	Ice Scoop, 6" leg 4 pcs			
ACCESSORIES -REQUIRED	N/A			
OPERATING CONDITIONS	VOLTAGE RANGE	104 - 127 V		
	AMBIENT TEMP.	45-100°F		
	WATER SUPPLY TEMP.	45- 90°F		
	WATER SUPPLY PRESSURE	10-113 PSIG		
DRAWING NO. (DIMENSION)	3Y2452			

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

[b] KM-101BAH

AC SUPPLY VOLTAGE	115/60/1			
AMPERAGE	5.2A (5 Min. Freeze AT 104°F / WT 80°F)			
MINIMUM CIRCUIT AMPASITY	15A			
MAXIMUM FUSE SIZE	15A			
APPROXIMATE ICE PRODUCTION PER 24 HR. lbs./day (kg/day) Reference without *marks	Ambient	WATER TEMP. (°F)		
	Temp.(°F)	50	70	90
	70	*115 (52)	107 (49)	97 (44)
	80	109 (50)	97 (44)	87 (40)
	90	107 (49)	*88 (40)	78 (35)
	100	106 (48)	86 (39)	*69 (31)
SHAPE OF ICE	Crescent Cube			
ICE PRODUCTION PER CYCLE	2.31 lbs. (1.05 kg) , 110 pcs.			
APPROXIMATE STORAGE CAPACITY	53 lbs. (24 kg)			
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F		
ELECTRIC W (kWH/100 lbs.)	340(9.4)	330(6.8)		
WATER gal./24HR (gal./100 lbs.)	20(23.0)	47(40.9)		
EXTERIOR DIMENSIONS (WxDxH)	23.75" x 24" x 39" (603 x 610 x 990 mm) Including 6" legs			
EXTERIOR FINISH	Stainless Steel, Galvanized Steel (Rear)			
WEIGHT	Net 106 lbs. (48 kg), Shipping 136 lbs. (62 kg)			
CONNECTIONS - ELECTRIC	Cord Connection			
- WATER SUPPLY	Inlet	1/2" FPT		
- DRAIN	Outlet	3/4" FPT		
CUBE CONTROL SYSTEM	Float Switch			
HARVESTING CONTROL SYSTEM	Hot Gas and Water, Thermistor and Timer			
ICE MAKING WATER CONTROL	Timer Controlled. Overflow Pipe			
COOLING WATER CONTROL	N/A			
BIN CONTROL SYSTEM	Mechanical Level Switch with Delay			
COMPRESSOR	Hermetic, Model QA91K22CAU6-E0GS			
CONDENSER	Air-Cooled, Fin and tube type			
EVAPORATOR	Vertical type, Stainless Steel and Copper			
REFRIGERANT CONTROL	Capillary Tube			
REFRIGERANT CHARGE	R134a, 7.8 oz. (220g)			
DESIGN PRESSURE	High 250PSIG, Low 150PSIG			
P.C. BOARD CIRCUIT PROTECTION	High Voltage Cut-out (Internal)			
COMPRESSOR PROTECTION	Auto-reset Overload Protector (Internal)			
LOW WATER PROTECTION	Float Switch			
ACCESSORIES -SUPPLIED	Ice Scoop, 6" leg 4 pcs			
ACCESSORIES -REQUIRED	N/A			
OPERATING CONDITIONS	VOLTAGE RANGE	104 - 127 V		
	AMBIENT TEMP.	45-100°F		
	WATER SUPPLY TEMP.	45- 90°F		
	WATER SUPPLY PRESSURE	10-113 PSIG		
DRAWING NO. (DIMENSION)	3Y2453			

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[c] KM-151BAH

AC SUPPLY VOLTAGE	115/60/1			
AMPERAGE	7.0A (5 Min. Freeze AT 104°F / WT 80°F)			
MINIMUM CIRCUIT AMPASITY	15A			
MAXIMUM FUSE SIZE	15A			
APPROXIMATE ICE PRODUCTION PER 24 HR. lbs./day (kg/day) Reference without *marks	Ambient	WATER TEMP. (°F)		
	Temp.(°F)	50	70	90
	70	*146 (66)	139 (63)	129 (58)
	80	140 (64)	129 (59)	119 (54)
	90	139 (63)	*121 (55)	111 (50)
100	137 (62)	119 (54)	*101 (46)	
SHAPE OF ICE	Crescent Cube			
ICE PRODUCTION PER CYCLE	2.75 lbs. (1.25 kg) , 130 pcs.			
APPROXIMATE STORAGE CAPACITY	78 lbs. (36 kg)			
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F		
ELECTRIC W (kWH/100 lbs.)	420(8.4)	390(6.4)		
WATER gal./24HR (gal./100 lbs.)	22(17.8)	50(34.5)		
EXTERIOR DIMENSIONS (WxDxH)	23.75" x 28" x 39" (603 x 712 x 990 mm) Including 6" legs			
EXTERIOR FINISH	Stainless Steel, Galvanized Steel (Rear)			
WEIGHT	Net 117 lbs. (53 kg), Shipping 150 lbs. (68 kg)			
CONNECTIONS - ELECTRIC	Cord Connection			
- WATER SUPPLY	Inlet	1/2" FPT		
- DRAIN	Outlet	3/4" FPT		
CUBE CONTROL SYSTEM	Float Switch			
HARVESTING CONTROL SYSTEM	Hot Gas and Water, Thermistor and Timer			
ICE MAKING WATER CONTROL	Timer Controlled. Overflow Pipe			
COOLING WATER CONTROL	N/A			
BIN CONTROL SYSTEM	Mechanical Level Switch with Delay			
COMPRESSOR	Hermetic, Model QA125K29CAU6-E0GS			
CONDENSER	Air-Cooled, Fin and tube type			
EVAPORATOR	Vertical type, Stainless Steel and Copper			
REFRIGERANT CONTROL	Thermostatic Expansion Valve			
REFRIGERANT CHARGE	R134a, 8.5 oz. (240g)			
DESIGN PRESSURE	High 250PSIG, Low 150PSIG			
P.C. BOARD CIRCUIT PROTECTION	High Voltage Cut-out (Internal)			
COMPRESSOR PROTECTION	Auto-reset Overload Protector (Internal)			
LOW WATER PROTECTION	Float Switch			
ACCESSORIES -SUPPLIED	Ice Scoop, 6" leg 4 pcs			
ACCESSORIES -REQUIRED	N/A			
OPERATING CONDITIONS	VOLTAGE RANGE	104 - 127 V		
	AMBIENT TEMP.	45-100°F		
	WATER SUPPLY TEMP.	45- 90°F		
	WATER SUPPLY PRESSURE	10-113 PSIG		
DRAWING NO. (DIMENSION)	3Y2454			

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

[d] KM-151BWH

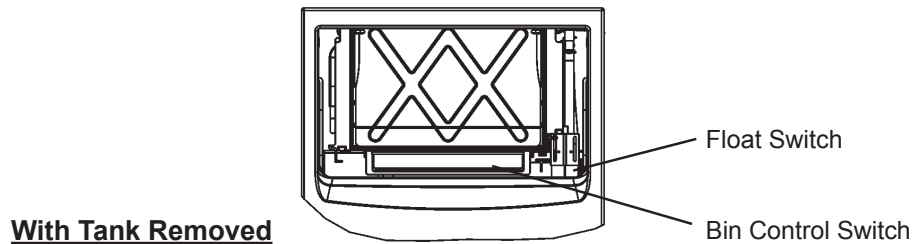
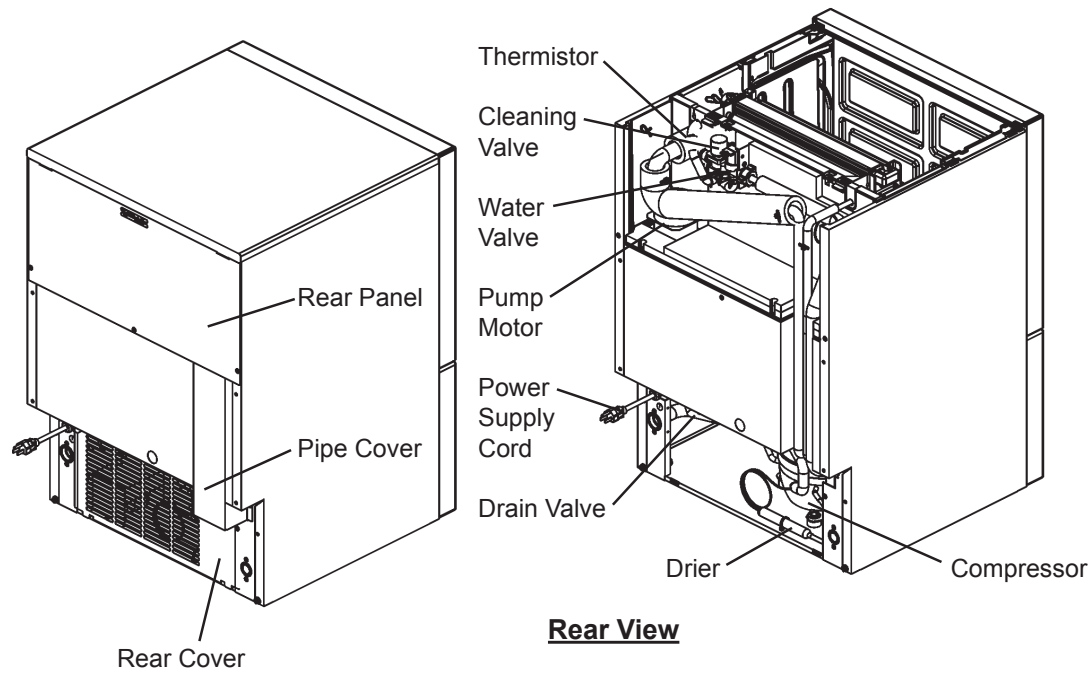
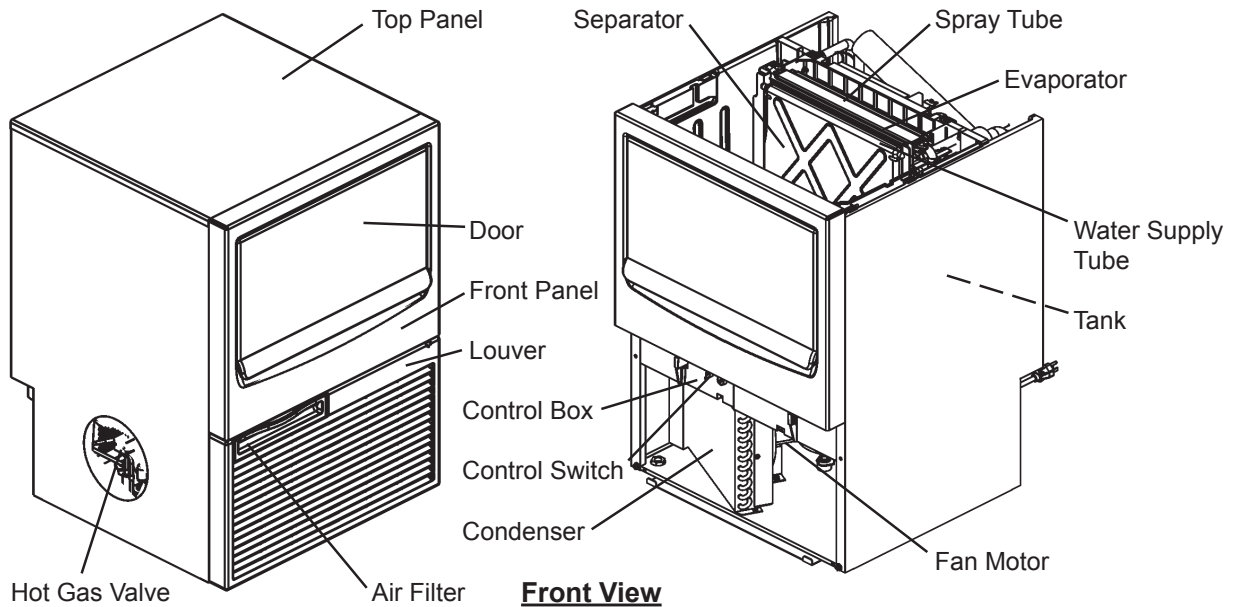
AC SUPPLY VOLTAGE	115/60/1		
AMPERAGE	6.8A (5 Min. Freeze AT 104°F / WT 80°F)		
MINIMUM CIRCUIT AMPASITY	15A		
MAXIMUM FUSE SIZE	15A		
APPROXIMATE ICE PRODUCTION PER 24 HR. lbs./day (kg/day) Reference without *marks	Ambient Temp.(°F)	WATER TEMP. (°F)	
		50	70
	70	*146 (66)	141 (64)
	80	142 (65)	135 (61)
	90	141 (64)	*130 (59)
	100	141 (64)	125 (57)
		129 (58)	*121 (55)
SHAPE OF ICE	Crescent Cube		
ICE PRODUCTION PER CYCLE	2.75 lbs. (1.25 kg) , 130 pcs.		
APPROXIMATE STORAGE CAPACITY	78 lbs. (36 kg)		
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F	
ELECTRIC W (kWH/100 lbs.)	395(7.3)	390(6.5)	
POT. WATER gal./24HR (gal./100 lbs.)	29(25.0)	52(36.0)	
COND. WATER gal./24HR (gal./100 lbs.)	181(140)	103(71)	
EXTERIOR DIMENSIONS (WxDxH)	23.75" x 28" x 39" (603 x 712 x 990 mm)		
	Including 6" legs		
EXTERIOR FINISH	Stainless Steel, Galvanized Steel (Rear)		
WEIGHT	Net 121 lbs. (55 kg), Shipping 154 lbs. (70 kg)		
CONNECTIONS - ELECTRIC	Cord Connection		
- WATER SUPPLY	Inlet	1/2" FPT	
- DRAIN	Outlet	3/4" FPT	
CONDENSER WATER	Inlet	1/2" FPT	
	Outlet	1/2" FPT	
CUBE CONTROL SYSTEM	Float Switch		
HARVESTING CONTROL SYSTEM	Hot Gas and Water, Thermistor and Timer		
ICE MAKING WATER CONTROL	Timer Controlled. Overflow Pipe		
COOLING WATER CONTROL	N/A		
BIN CONTROL SYSTEM	Mechanical Level Switch with Delay		
COMPRESSOR	Hermetic, Model QA125K29CAU6-E0GS		
CONDENSER	Water-Cooled, tube type		
EVAPORATOR	Vertical type, Stainless Steel and Copper		
REFRIGERANT CONTROL	Thermostatic Expansion Valve		
REFRIGERANT CHARGE	R134a, 10.7 oz. (290g)		
DESIGN PRESSURE	High 250PSIG, Low 150PSIG		
P.C. BOARD CIRCUIT PROTECTION	High Voltage Cut-out (Internal)		
COMPRESSOR PROTECTION	Auto-reset Overload Protector (Internal)		
LOW WATER PROTECTION	Float Switch		
ACCESSORIES -SUPPLIED	Ice Scoop, 6" leg 4 pcs		
ACCESSORIES -REQUIRED	N/A		
OPERATING CONDITIONS	VOLTAGE RANGE	104 - 127 V	
	AMBIENT TEMP.	45-100°F	
	WATER SUPPLY TEMP.	45- 90°F	
	WATER SUPPLY PRESSURE	10-113 PSIG	
DRAWING NO. (DIMENSION)	372097		

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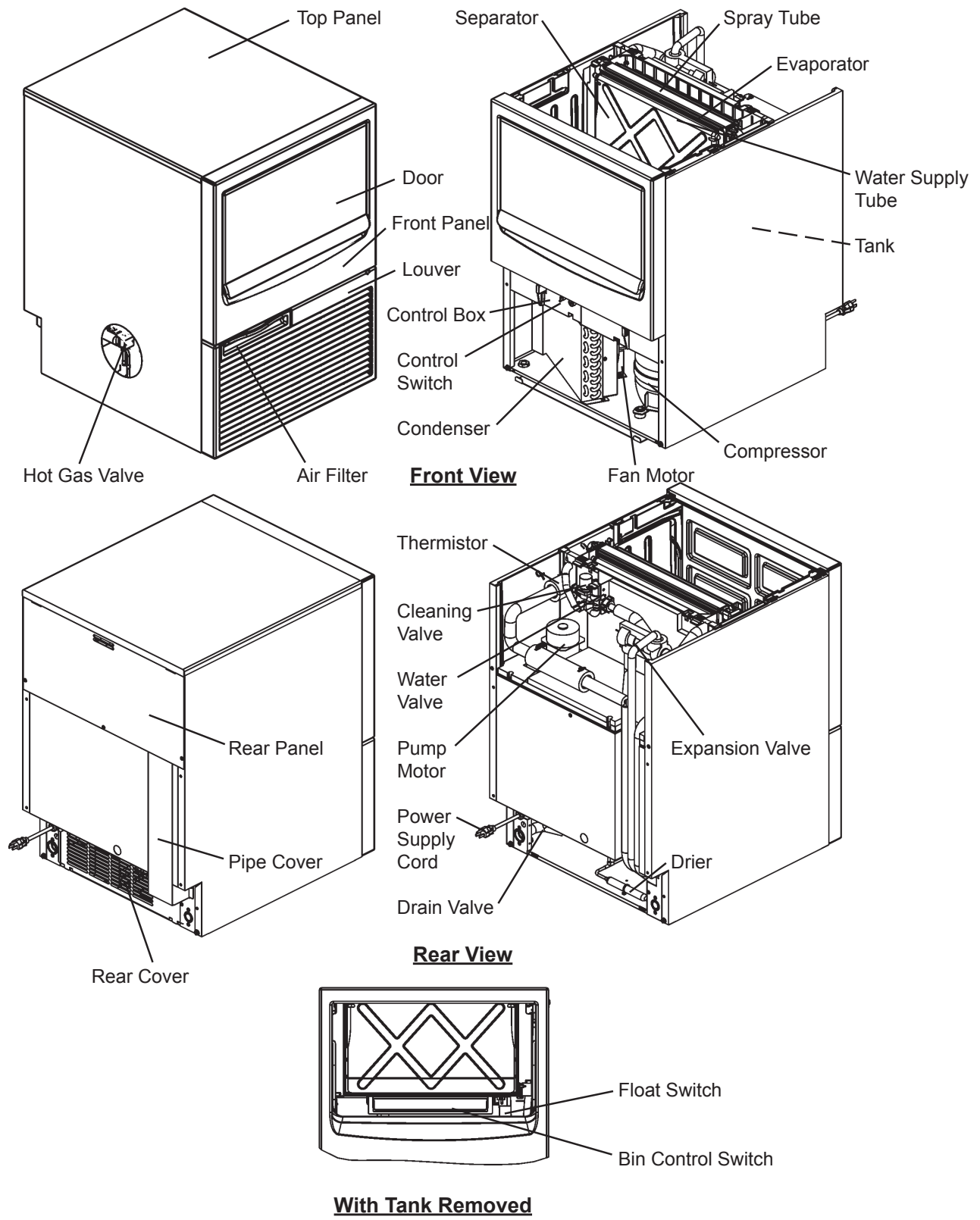
II. GENERAL INFORMATION

1. CONSTRUCTION

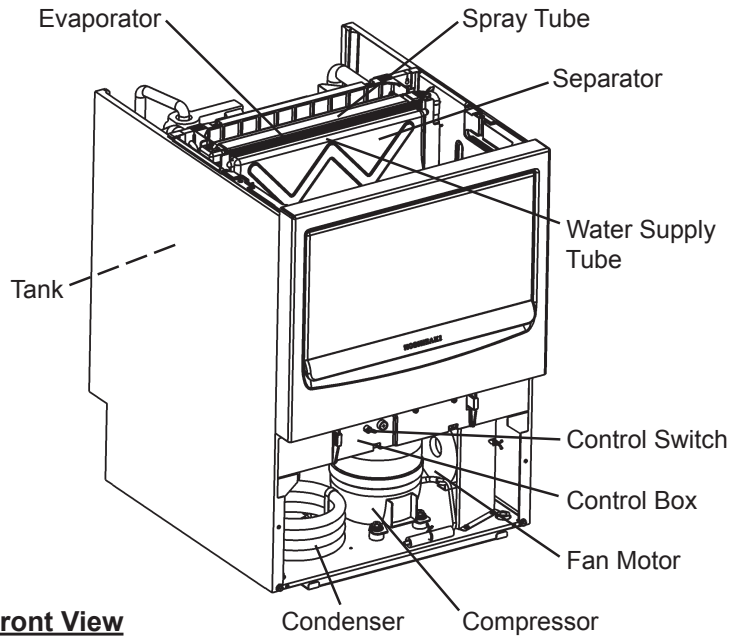
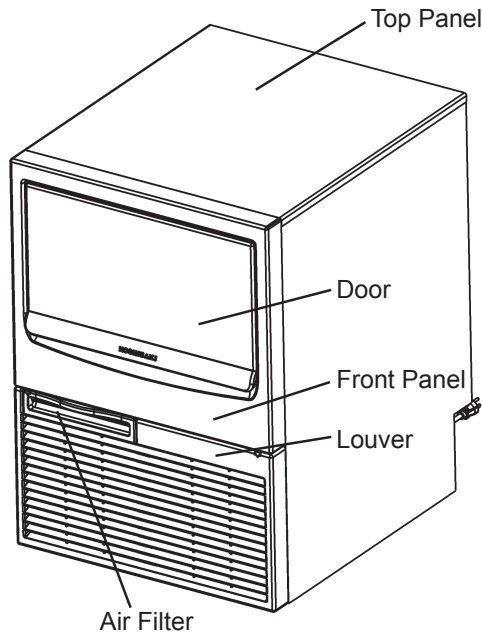
[a] KM-61BAH, KM-101BAH



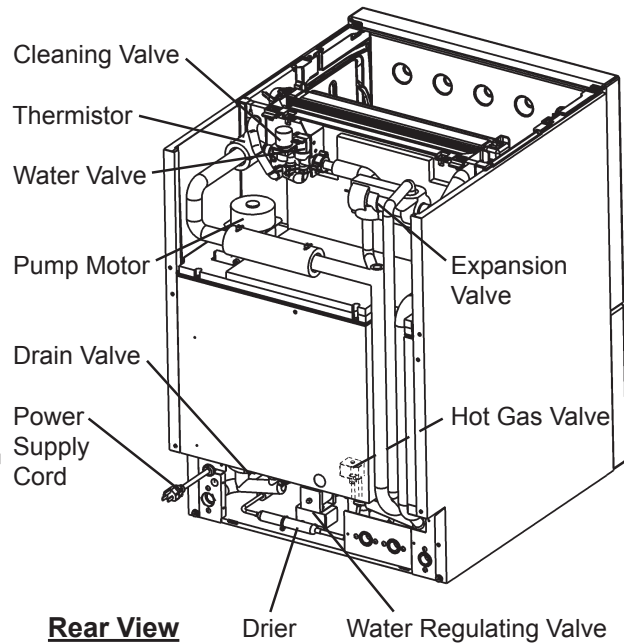
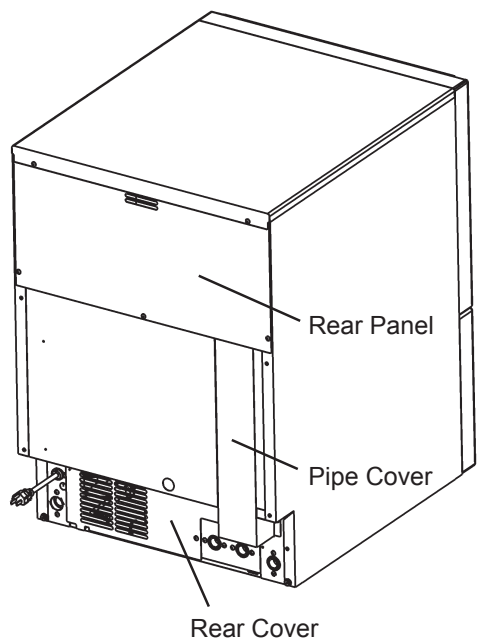
[b] KM-151BAH



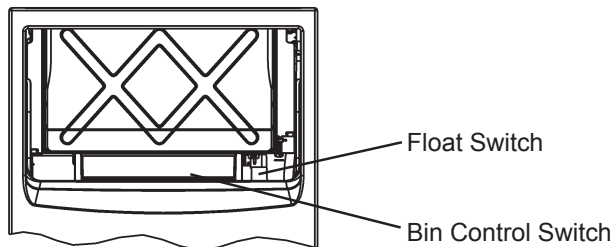
[c] KM-151BWH



Front View

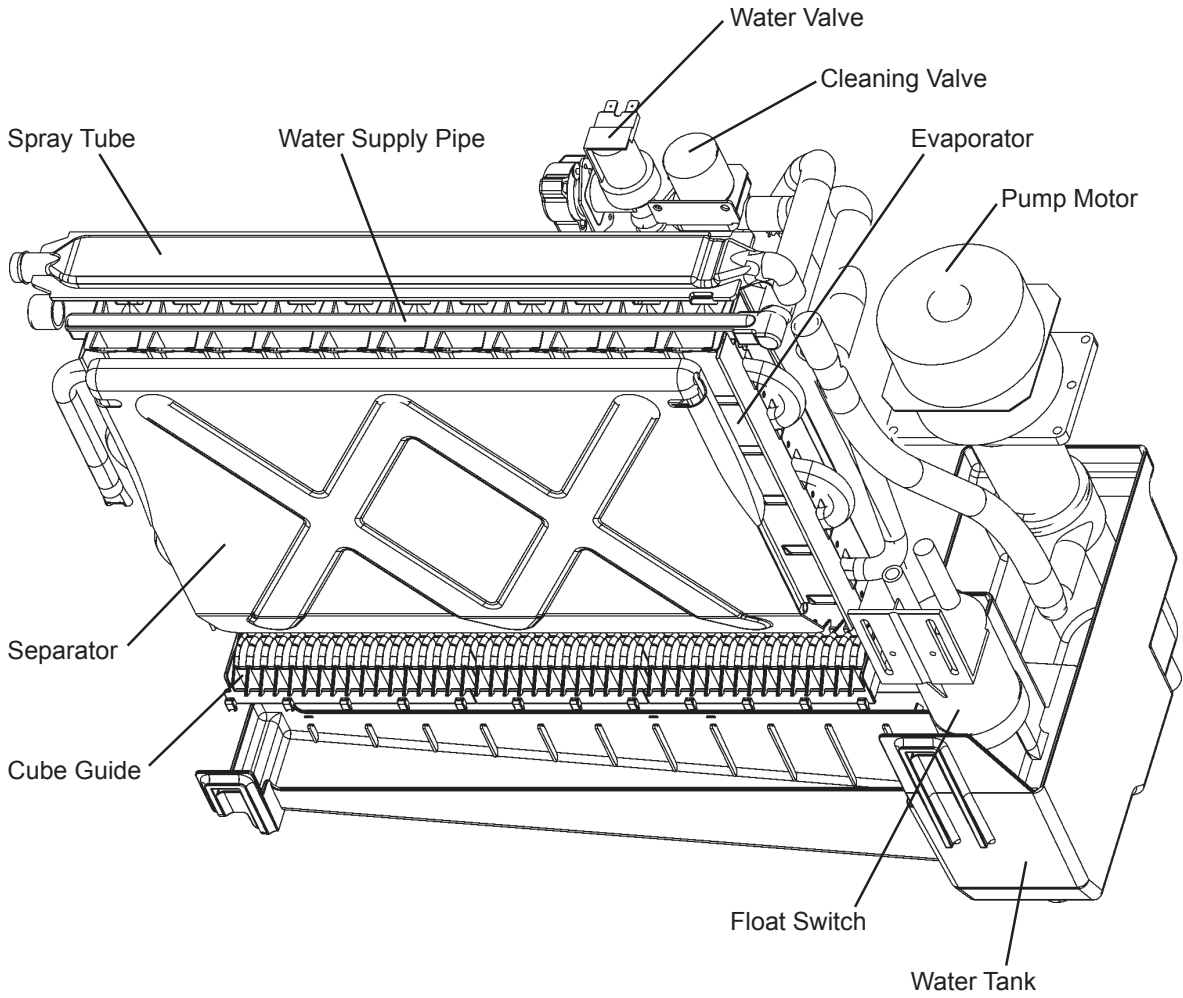


Rear View



With Tank Removed

[d] ICEMAKING COMPARTMENT



2. SEQUENCE OF OPERATION

The steps in the sequence are as outlined below. When power is supplied, a 5 second delay occurs at startup. Note that the order of the LEDs from the outer edge of the board is 5, 6, 8, 4, 7.

[a] ONE MINUTE FILL CYCLE

LED 8 is on. WV opens and the fill period begins. After 1 minute, the board checks for a closed F/S. If F/S is closed, the harvest cycle begins. If not, WV will remain energized through additional 1 minute cycles until water enters the sump and F/S closes. This serves as a low water safety to protect the water pump.

[b] INITIAL HARVEST CYCLE

LEDs 5, 6, and 8 are on. WV remains open, Comp energizes, HGV opens, and harvest begins. As the evaporator warms, the thermistor located on the suction line checks for a 48°F (9°C) temperature. When 48°F (9°C) is reached, a 3.9 kΩ signal turns the harvest over to the adjustable harvest timer which is factory set for normal conditions. The timer has settings of 60, 90, 120, and 180 seconds (S1 dip switch 1 & 2). When the harvest timer completes its count down, the harvest cycle is complete and the freeze cycle starts. The minimum total time allowed by the board for a complete harvest cycle is 2 minutes. WV is open during harvest for a maximum of 6 minutes or the length of harvest minus 0, 10, 30, or 50 seconds (adjustable by S1 dip switch 7 & 8), whichever is shorter. LED 8 goes off when WV closes. PM energizes and runs for the last 0, 10, 30, or 50 seconds of harvest depending on S1 dip switch 7 & 8 setting. LED 7 comes on when PM energizes. At the end of harvest, the control board checks the position of F/S and proceeds to the freeze cycle if it is closed or calls for a 1-minute fill if it is open.

[c] FREEZE CYCLE

LEDs 5 & 7 are on. Comp continues to run, PM and FMS energize, HGV closes and the freeze cycle starts. For the first 5 minutes after the thermistor temperature reaches 36°F (2°C), the control board will not accept a signal from F/S. This minimum freeze period acts as a short cycle protection. At the end of this period, F/S assumes control. As the evaporator cools, the thermistor located on the suction line checks the temperature and PM stops (see "III. 3. TIMING CHART" for details). This is to prevent slushing. As ice builds on the evaporator the water level in the sump lowers. The freeze continues until F/S opens and terminates ice production.

[d] DRAIN CYCLE

LEDs 4, 5, and 6 are on. Comp continues to run, HGV opens, and FMS de-energizes. PM stops. DV opens for 20 seconds to drain out the water tank. Drain cycle always occurs on the 2nd harvest after startup. Then, depending on the control board setting, drain cycle occurs every cycle, or every 2nd, 5th, or 10th cycle (S1 dip switch 5 & 6).

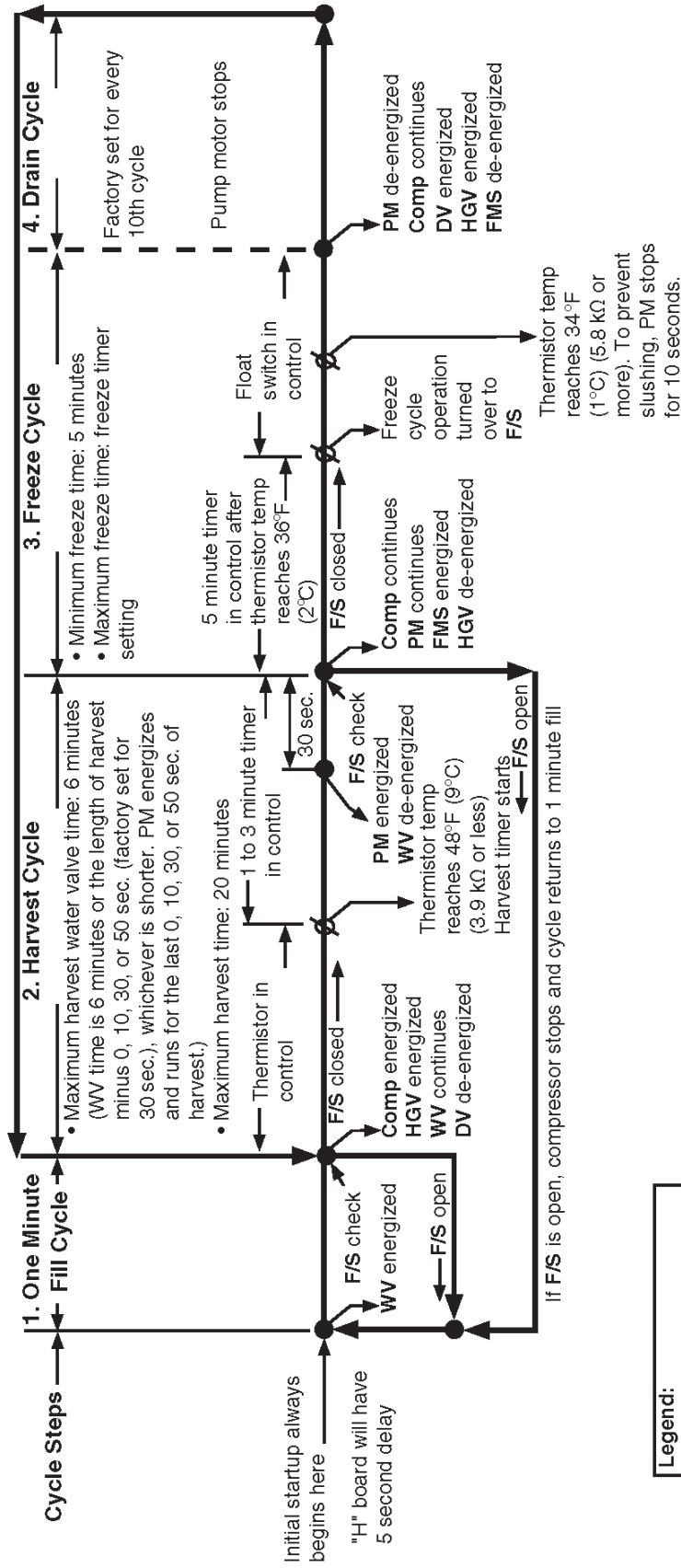
[e] NORMAL HARVEST CYCLE

LEDs 5, 6, and 8 are on. Comp continues to run, HGV remains open and WV opens. As the evaporator warms, the thermistor reaches 48°F (9°C). The control board then receives the thermistor's 3.9 kΩ signal and starts the harvest timer. WV is open during harvest for a maximum of 6 minutes or the length of harvest minus 0, 10, 30, or 50 seconds (adjustable by S1 dip switch 7 & 8), whichever is shorter. LED 8 goes off when WV closes. PM energizes and runs for the last 0, 10, 30, or 50 seconds of harvest depending on S1 dip switch 7 & 8 setting. LED 7 comes on when PM energizes. At the end of harvest, the control board checks the position of F/S and proceeds to the freeze cycle if it is closed or calls for a 1-minute fill if it is open.

The unit continues to cycle through [c], [d], and [e] sequence until the bin control is activated and shuts the unit down. When the bin control is activated, the "POWER OK" LED flashes.

Legend: **Comp**—compressor; **DV**—drain valve; **FMS**—self-contained fan motor; **F/S**—float switch; **HGV**—hot gas valve; **PM**—pump motor; **WV**—inlet water valve

Sequence Flow Chart and Component Operation



Legend:
 Comp—compressor
 DV—drain valve
 FMS—self-contained fan motor
 F/S—float switch
 HGV—hot gas valve
 PM—pump motor
 WV—inlet water valve

Components Energized when the Control Switch is in the WASH Position
 When the control switch is placed in the "WASH" position, power is supplied to the pump motor and cleaning water valve.
 This operation is used to circulate cleaner and sanitizer over both the inside and outside surfaces of the evaporator.

3. CONTROL BOARD

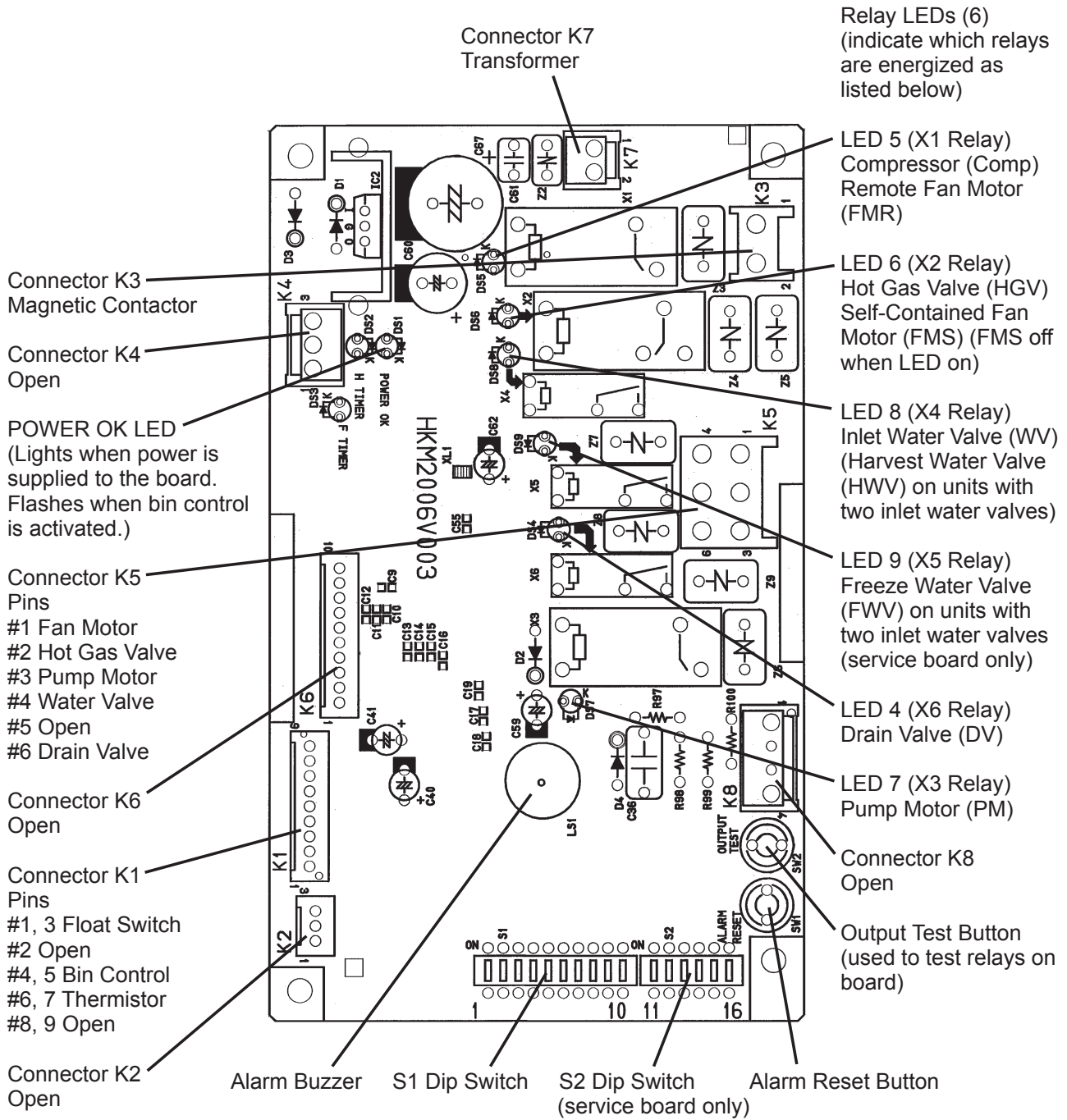
- * A HOSHIZAKI exclusive solid-state control is employed in KM-61BAH, KM-101BAH, KM-151BAH and KM-151BWH Crescent Cubers.
- * All models are pretested and factory-adjusted.

CAUTION

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

[a] CONTROL BOARD LAYOUT

"H" Control Board



Control Board		
Auxiliary Code	V0 or Earlier	V1 or Later
Factory Part Number	P00013-03	P01771-01
Service Part Number	P00013-02	P01771-02
Type	HKM2006V003	

[b] FEATURES

a) Maximum Water Supply Period - 6 minutes

The inlet water valve will be open during harvest for 6 minutes or the length of harvest minus 0, 10, 30, or 50 seconds (adjustable by S1 dip switch 7 & 8), whichever is shorter.

b) Harvest Backup Timer and Freeze Timer

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

The freeze timer shuts down the icemaker if, for two cycles in a row, the freeze cycle takes longer than the time specified to complete. The control board will signal this problem using 3 beeps every 3 seconds. The time is factory set using S1 dip switch 9 & 10.

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

c) High Temperature Safety

The temperature of the suction line in the refrigeration circuit is limited by the high temperature safety. This protects the unit from excessively high temperatures. If the evaporator temperature rises above $127^{\circ}\text{F} \pm 7^{\circ}\text{F}$ ($53^{\circ}\text{C} \pm 4^{\circ}\text{C}$), the thermistor operates the safety. This shuts down the circuit and the icemaker automatically stops.

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

d) Low Water Safety

The control board checks the position of the float switch at the end of the initial one minute water fill cycle and at the end of each harvest cycle.

If the float switch is in the up position (electrical circuit closed), the control board changes to the next cycle. If the float switch is in the down position (electrical circuit open), the control board changes to additional one minute water fill cycles until water enters the sump and the float switch closes. When the float switch closes, the control board changes to the next cycle. The unit will not start without adequate water in the sump. This serves as a low water safety to protect the water pump.

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

e) High Voltage and Low Voltage Cut-outs

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

If miswiring (especially on single phase 3 wire models) causes excessive voltage ($147\text{Vac} \pm 5\%$ or more) on the control board, the high voltage cut-out shuts down the circuit in 3

seconds and the icemaker automatically stops. The control board will signal this problem using 7 beeps every 3 seconds.

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

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

f) LED Lights and Audible Alarm Safeties

The control board includes LED indicator lights, audible alarm safeties, and an output test feature. The "POWER OK" LED indicates control voltage and will remain on unless a control voltage problem occurs. The "POWER OK" LED flashes continuously when the bin is full and DV energizes for a maximum of 5 minutes to drain the water tank.

At startup, a 5 second delay occurs to stabilize the circuit. LEDs 4 through 8 energize and sequence from initial startup as listed in the table below. Note that the order of the LEDs from the outer edge of the board is 5, 6, 8, 4, 7. For more information, see "2. SEQUENCE OF OPERATION".

Sequence Step	LED	Energized Components	Time LEDs are On		
			Min.	Max.	Avg.
1 Minute Fill Cycle	8	WV			60 seconds
Harvest Cycle	5, 6, 8	WV, HGV, Comp	2 minutes	20 minutes	3 to 5 minutes
Last 0, 10, 30, or 50 seconds (adjustable by dip switch) of harvest, WV de-energizes and PM energizes (LEDs 5, 6, and 7 are on)					
Freeze Cycle	5, 7	Comp, PM, FMS	5 minutes	freeze timer setting	30 to 35 minutes
Drain	5, 6, 4	Comp, HGV, DV	10 seconds	20 seconds	factory default setting

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

No. of Beeps (every 3 sec.)	Type of Alarm	Notes
1	High Evaporator Temp. (temperature > 127°F) (53°C)	Check for harvest problem (stuck HGV or relay), hot water entering unit, stuck HM, or shorted thermistor.
2	Harvest Backup Timer (harvest > 20 min. for two cycles in a row)	Check for open thermistor, HGV not opening, TXV leaking by, low charge, inefficient Comp, or WRV leaking by.
3	Freeze Timer (freeze > specified setting for two cycles in a row) Timer is factory set using S1 dip switch 9 & 10	Check for a float switch stuck closed (up), WV leaking by, HGV leaking by, PM not pumping, TXV not feeding properly, low charge, or inefficient Comp.
To reset the above safeties, press the "ALARM RESET" button with the power supply on.		

6	Low Voltage (92Vac ± 5% or less)	"POWER OK" LED will turn off if voltage protection operates.
7	High Voltage (147Vac ± 5% or more)	The control voltage safeties automatically reset when voltage is corrected.

Legend: **Comp**—compressor; **DV**—drain valve; **FMS**—self-contained fan motor; **HGV**—hot gas valve; **PM**—pump motor; **TXV**—thermostatic expansion valve; **WRV**—water regulating valve; **WV**—inlet water valve

[c] CONTROLS AND ADJUSTMENTS

a) Default Dip Switch Settings

The dip switch is factory-adjusted to the following positions:

S1 Dip Switch No.	1	2	3	4	5	6	7	8	9	10
KM-61BAH KM-151BAH	OFF	OFF	ON	ON	ON	ON	OFF	ON	OFF	ON
KM-101BAH	ON	OFF	ON	ON	ON	ON	OFF	ON	OFF	ON
KM-151BWH	OFF	OFF	ON	ON	ON	ON	OFF	ON	ON	OFF

If the S2 dip switch is mounted on the control board, all should be left in the "OFF" position.

S1 Dip Switch

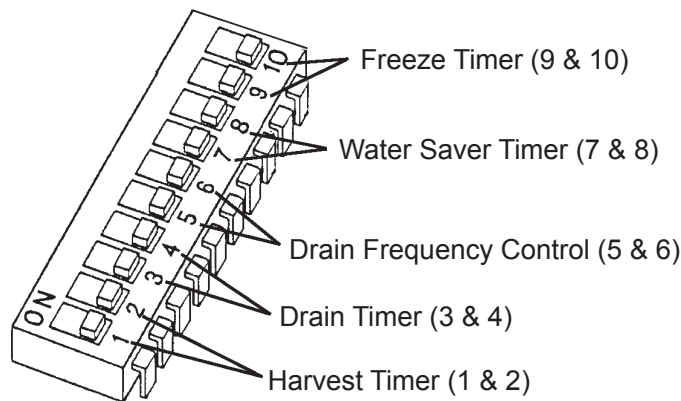


Fig. 1

b) Harvest Timer (S1 dip switch 1 & 2)

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

No adjustment is required under normal use, as the harvest timer is adjusted to the suitable position. However, a setting longer than the factory setting may be advised in cases where the flush provided at harvest needs to be prolonged for extra cleaning. Before changing this setting, call the HOSHIZAKI Technical Support Department at

1-800-233-1940 for recommendations. Keep in mind that setting the harvest timer to a longer setting will decrease 24 hour production.

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

c) Drain Timer (S1 dip switch 3 & 4)

Once every ten freeze cycles, the drain valve opens to drain the water tank for the time determined by the drain timer. These switches also determine the time to delay completion of a defrost cycle, i.e. the minimum defrost time. Do not change this setting, or the unit will not operate properly or produce high quality ice.

Dip Switch Setting		Time (seconds)	
No. 3	No. 4	T1	T2
OFF	OFF	10	120
ON	OFF	10	180
OFF	ON	20	120
ON	ON	20	180

T1: Time to drain the water tank
T2: Harvest timer at drain

Drain cycle always occurs on the 2nd harvest after startup. Then, depending on the drain frequency control setting (dip switch 5 & 6), drain cycle occurs every cycle, or every 2nd, 5th, or 10th cycle.

d) Drain Frequency Control (S1 dip switch 5 & 6)

The water tank drains at the frequency set by the drain frequency control. The drain frequency control is factory-adjusted to drain the water tank every 10 cycles, and no adjustment is required. However, where water quality is bad and the icemaker needs a drain more often, the drain frequency can be adjusted as shown in the table below.

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

e) Water Saver Timer (S1 dip switch 7 & 8)

The water saver timer allows the water valve to close and the pump motor to circulate water in the tank during the final part of harvest. The water valve is open during harvest for a maximum of 6 minutes or the length of harvest minus 0, 10, 30, or 50 seconds (determined by the water saver timer setting), whichever is shorter. When the water valve closes, the pump motor energizes and runs for the time determined by the water saver timer setting.

The water saver timer is factory-adjusted, and no adjustment is required.

Dip Switch Setting		Time (seconds)
No. 7	No. 8	
OFF	OFF	0
ON	OFF	10
OFF	ON	30
ON	ON	50

f) Freeze Timer (S1 dip switch 9 & 10)

CAUTION

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

The freeze timer setting determines the maximum allowed freeze time to prevent possible freeze-up issues. Upon termination of freeze timer, machine initiates the harvest cycle. After 2 consecutive timer terminations, machine will shut down, possibly indicating a problem.

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

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

[d] CONTROL BOARD CHECK PROCEDURE

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

- 1) Check the dip switch settings to assure that S1 dip switch 3, 4, 7, 8, 9, & 10 are in the factory default position. S1 dip switch 1, 2, 5, & 6 are cleaning adjustments and the settings are flexible.

- 2) Move the control switch to the "ICE" position and check for proper control voltage. If the "POWER OK" LED is on, the control voltage is good. If the "POWER OK" LED is off, check the control transformer circuit. If no voltage is present, check the power supply circuit.
- 3) To perform a relay sequence test, turn on the power switch while pressing the "OUTPUT TEST" button. The correct lighting sequence should be 5, 6, 7, 8, 4. Some components (e.g., the compressor) will cycle during test. Each LED comes on for 5 seconds. LED 5 is on while LED 6 is on. Following the output test sequence, the icemaker will resume normal operation beginning with the 1 minute fill cycle.

[e] CONTROL BOARD REPLACEMENT

The dip switches should be adjusted to the factory default settings as outlined in this manual. If the S2 dip switch is mounted on the control board, all should be left in the "OFF" position.

4. HARVEST CONTROL - THERMISTOR

A thermistor (semiconductor) is used as a harvest control sensor and anti-slush sensor. The resistance varies depending on the suction line temperatures. The thermistor detects the temperature of the evaporator outlet to start the harvest timer or momentarily stop the pump motor during the freeze cycle. No adjustment is required. If necessary, check for resistance between thermistor leads, and visually check the thermistor mounting, located on the suction line next to the evaporator outlet.

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

Check a thermistor for resistance by using the following procedure:

- 1) Disconnect the connector K1 on the board.
- 2) Remove the thermistor. See "V. 17. THERMISTOR".
- 3) Immerse the thermistor sensor portion in a glass containing ice and water for 2 or 3 minutes.
- 4) Check for resistance between the thermistor leads. Normal reading is within 3.5 to 7 kΩ. Replace the thermistor if it exceeds the normal reading.

5. BIN CONTROL

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

[a] EXPLANATION OF OPERATION

The bin control is connected to the K1 connector (pins 4 & 5) on the control board. When the bin control is calling for ice (proximity switch closed; "POWER OK" LED on), the control board continues icemaking operations. When the bin control is activated in the bin full position (proximity switch open; "POWER OK" LED flashing), the control board drains and shuts down the unit. However, to prevent incomplete batches of ice from forming on the evaporator, the control board will only shut down the machine during the freeze cycle before the five minute timer expires. The five minute timer starts counting down when the thermistor temperature reaches 36°F (2°C). If, during the freeze cycle, ice pushes in the lever after the five minute timer expires, the control board will allow the machine to complete the freeze cycle and the following harvest cycle before shutting down the machine.

[b] BIN CONTROL CHECK PROCEDURE

- 1) Clear any ice away from the bin control.
- 2) Make sure the control switch is in the "ICE" position.
- 3) Check that the "POWER OK" LED on the control board is on.
- 4) Activate the bin control actuator (press the actuator in). Check that the "POWER OK" LED flashes.
- 5) Disconnect the bin control at the 2-pin connector attached to the black wires (located in the circle in Fig. 2) coming from the K1 connector (pins 4 & 5) on the control board.
- 6) Check for continuity across the bin control leads. When calling for ice, the bin control proximity switch should be closed. If open, replace the bin control. Activate the bin control actuator (press the actuator in), check for continuity across the bin control leads. The bin control proximity switch should be open. If closed, replace the bin control.

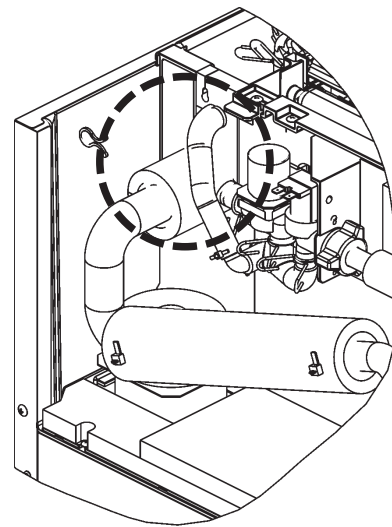


Fig. 2

- 7) Reconnect the 2-pin connector. Allow the machine to cycle into the freeze cycle. In the first 5 minutes of the freeze cycle, activate the bin control actuator (press the actuator in). The "POWER OK" LED should flash and the machine should turn off. If not, replace the control board.

6. SWITCHES

Control Switch

The control switch is located at the left front of the unit. Remove the air filter to access the control switch. This switch is used to place the machine into one of three modes: "OFF" (center position), "ICE" (right position), and "WASH" (left position).

1) "OFF"

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

2) "ICE"

This position applies power to the unit causing the automatic icemaking process to begin. Refer to "2. SEQUENCE OF OPERATION" for further details.

3) "WASH"

When the control switch is placed in the "WASH" position, power is supplied to the pump motor and cleaning water valve. This allows cleaning and/or sanitizing solutions (see "VI. CLEANING AND MAINTENANCE INSTRUCTIONS") to circulate throughout the water system and down the inside and outside of the evaporator plates.

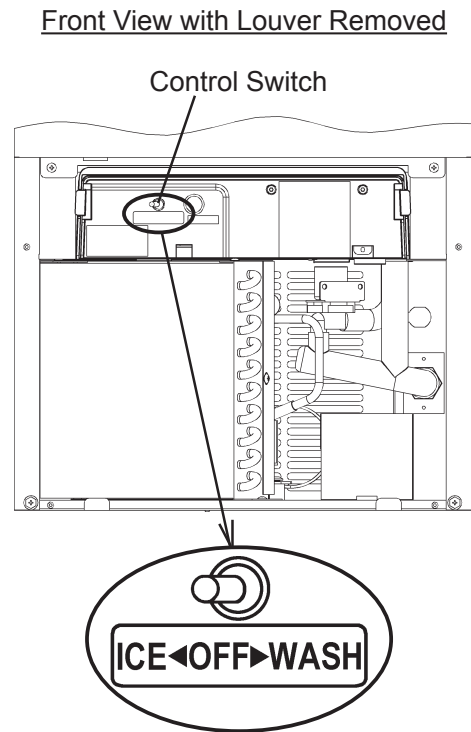
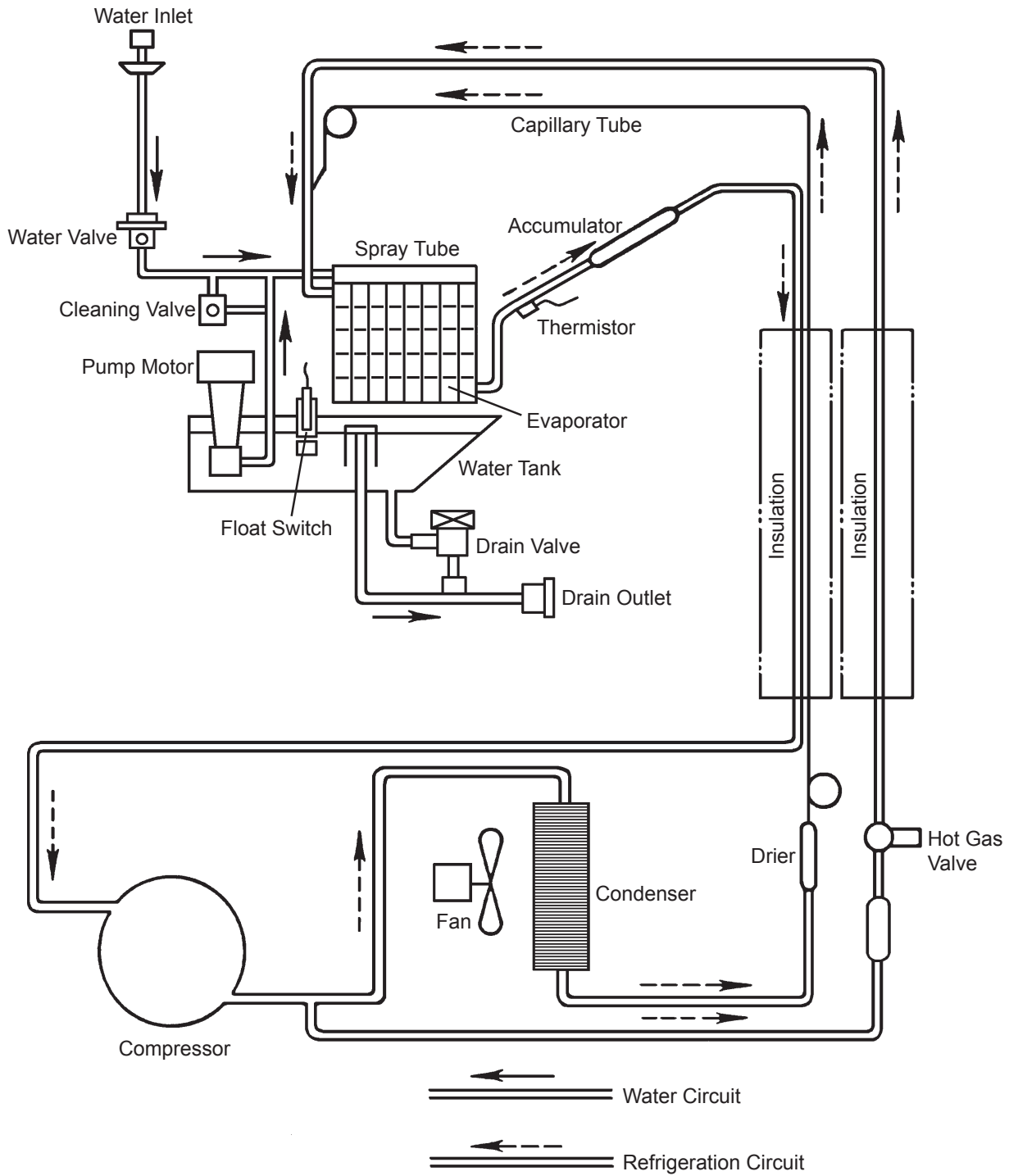


Fig. 3

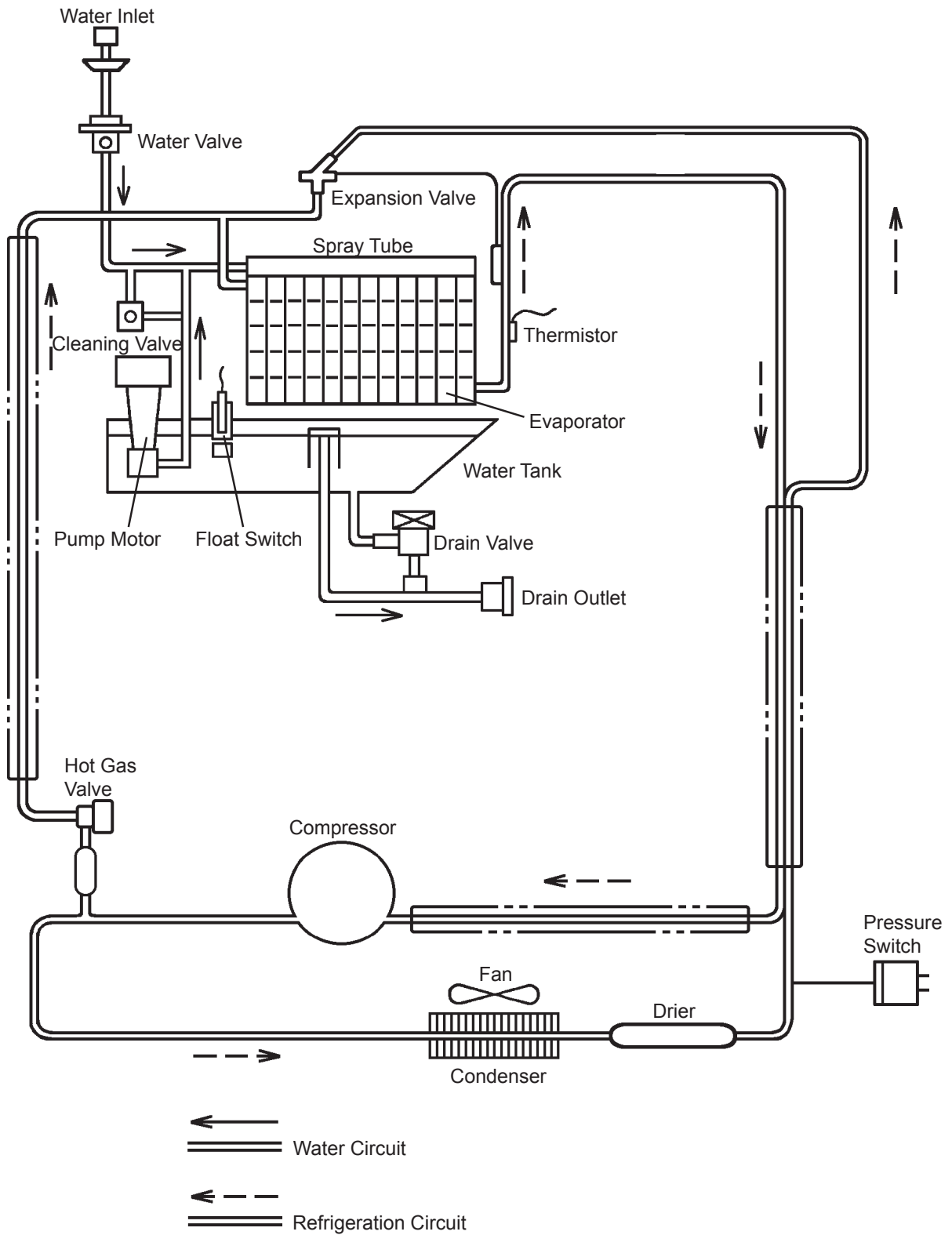
III. TECHNICAL INFORMATION

1. WATER CIRCUIT AND REFRIGERANT CIRCUIT

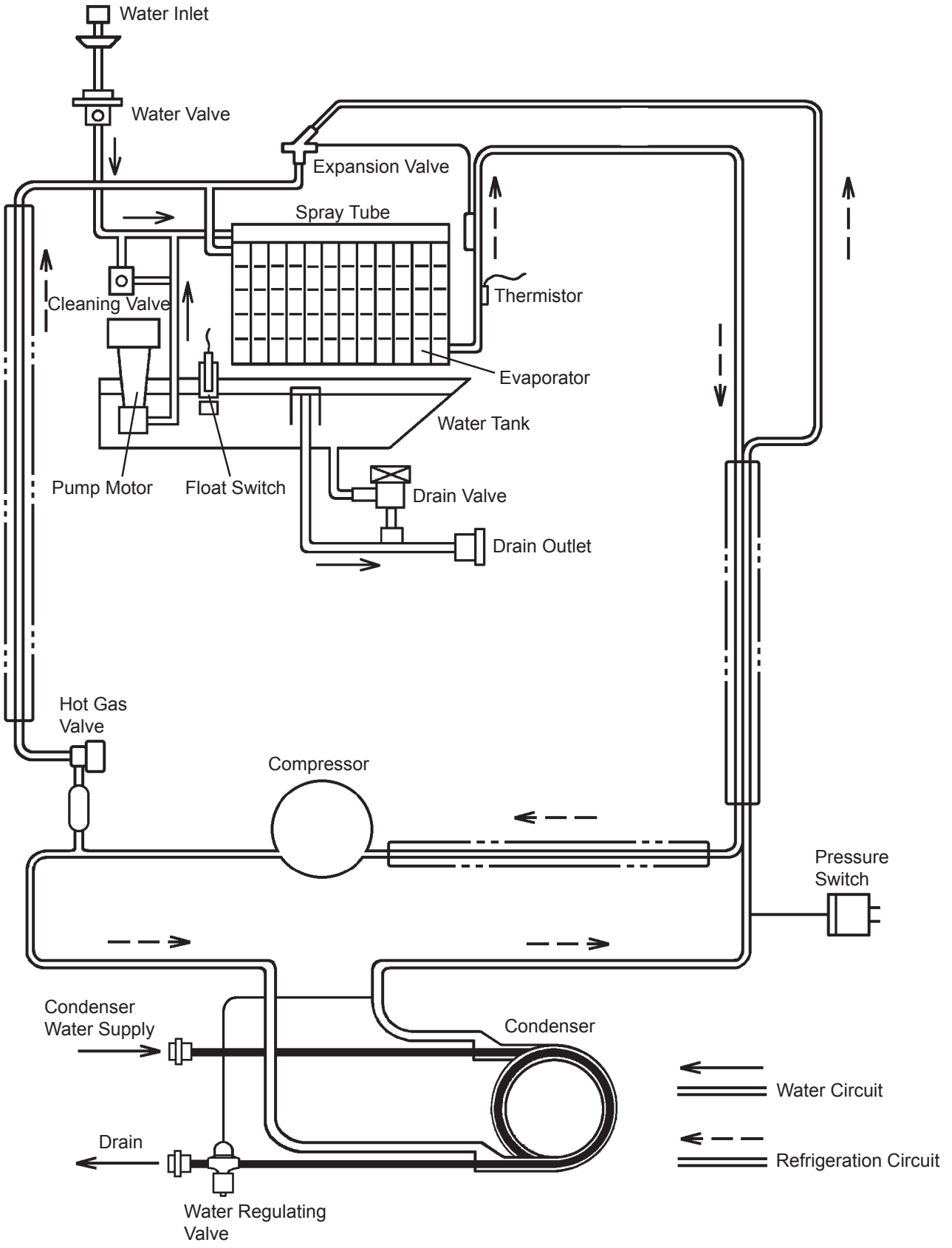
[a] KM-61BAH, KM-101BAH



[b] KM-151BAH

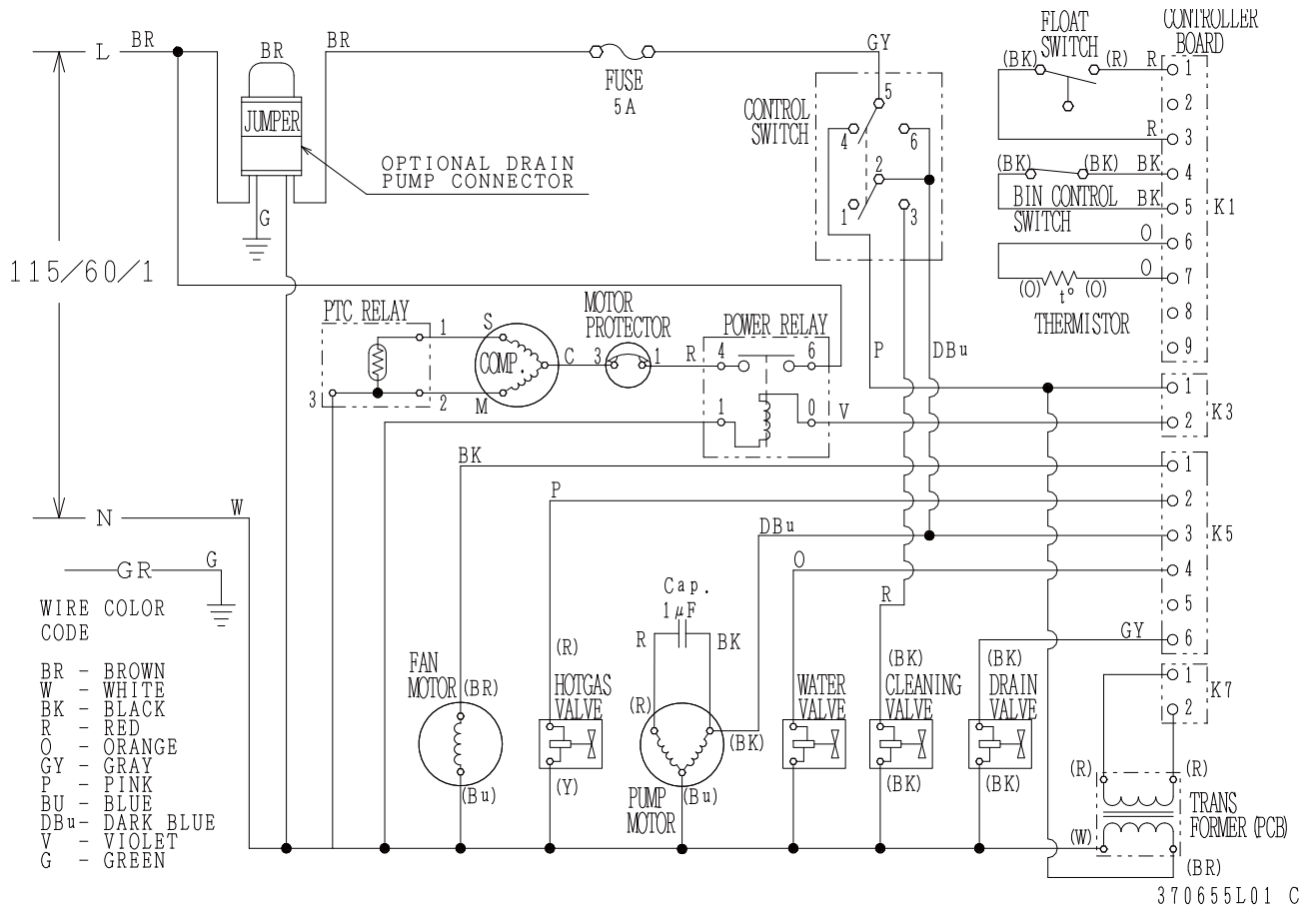


[c] KM-151BWH

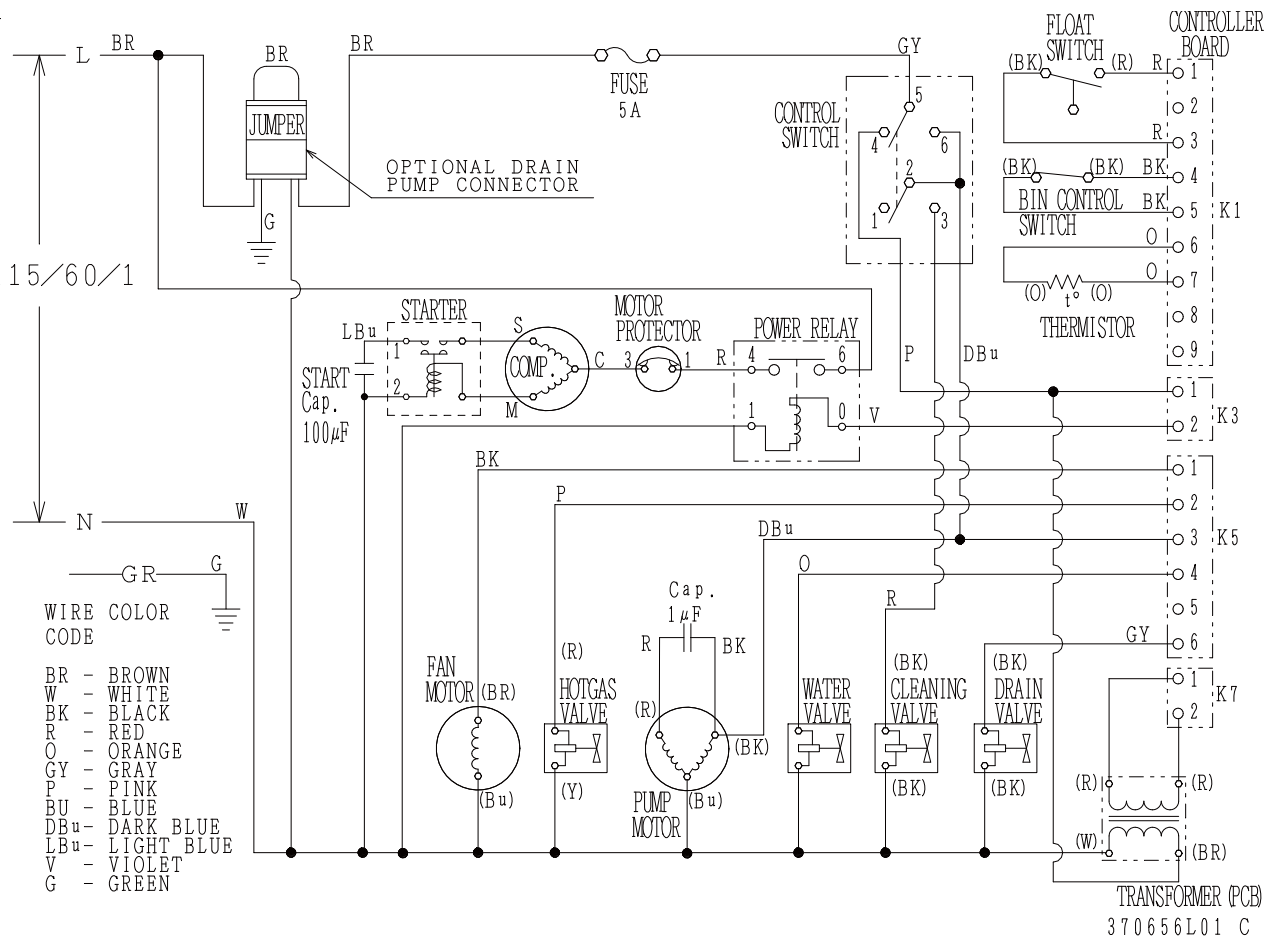


2. WIRING DIAGRAM

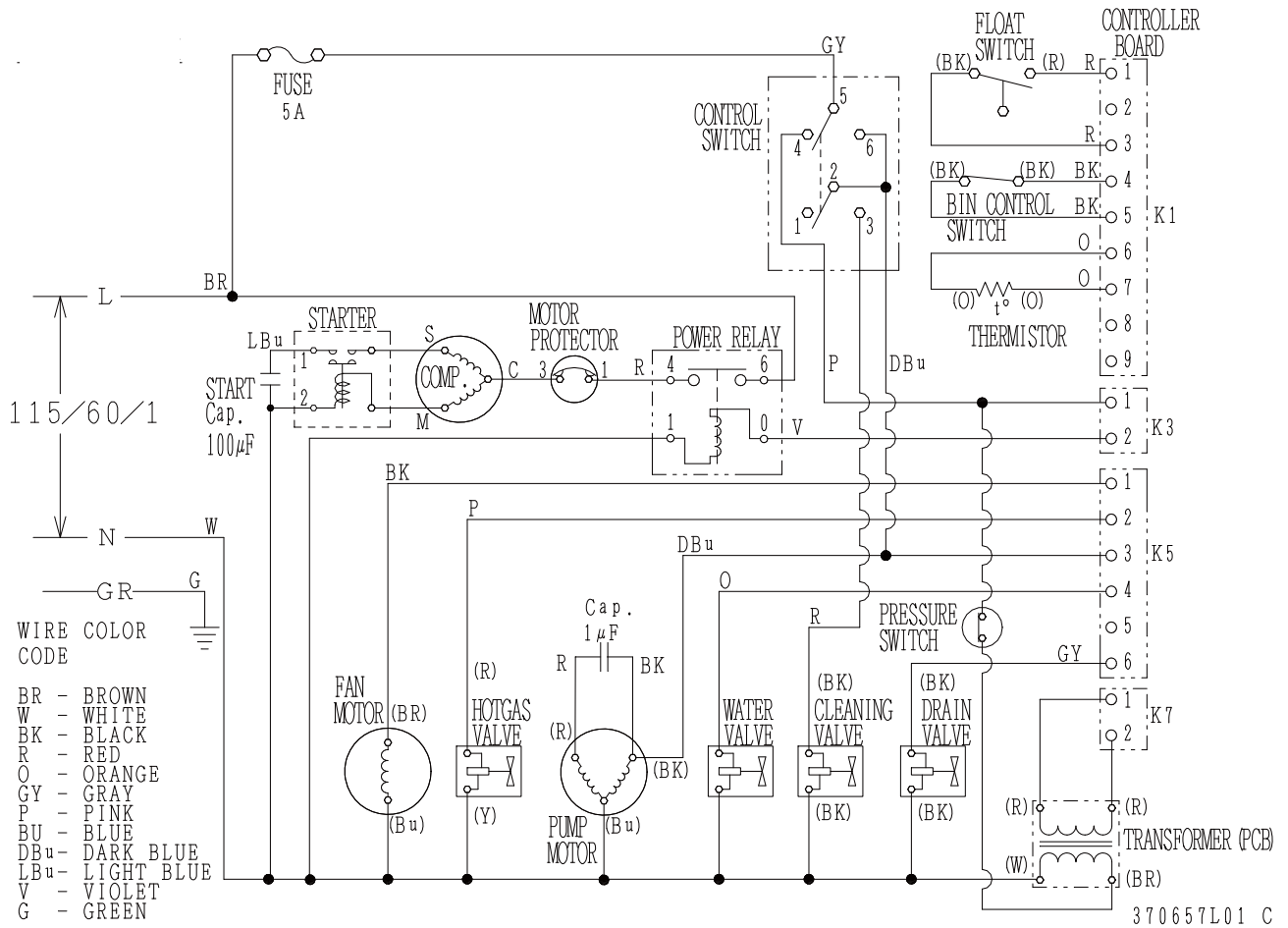
[a] KM-61BAH



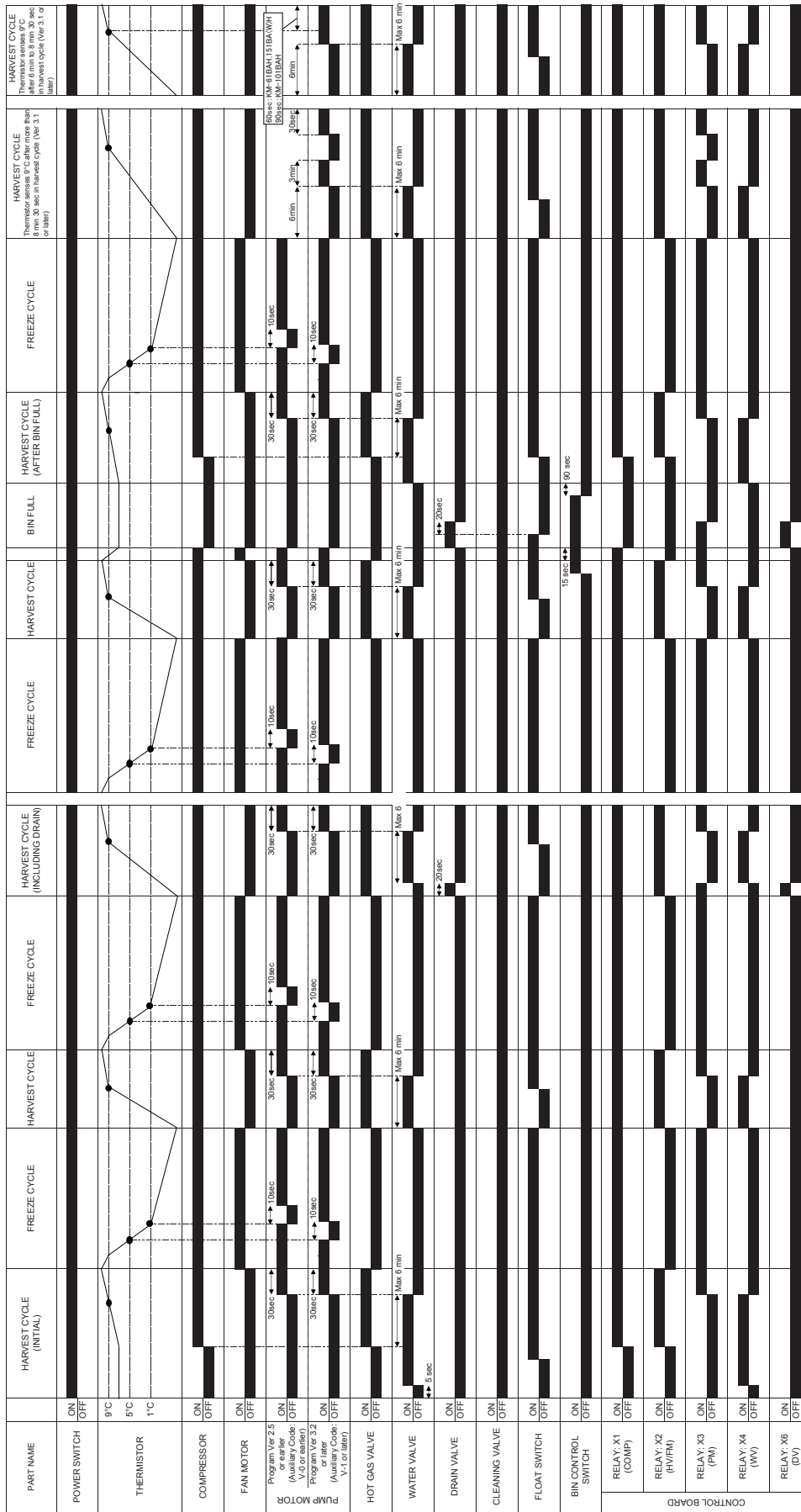
[b] KM-101BAH



[c] KM-151BAH, KM-151BWH



3. TIMING CHART



4. PERFORMANCE DATA

[a] KM-61BAH

APPROXIMATE ICE PRODUCTION PER 24 HR.	AMBIENT TEMP. (°F/°C)	WATER TEMP. (°F/°C)					
		50/10		70/21		90/32	
	70/21	71	<u>32</u>	65	<u>29</u>	58	<u>26</u>
	80/27	66	<u>30</u>	57	<u>26</u>	51	<u>23</u>
	90/32	65	<u>29</u>	50	<u>23</u>	44	<u>20</u>
lbs./day kg./day	100/38	64	<u>29</u>	49	<u>22</u>	38	<u>17</u>
APPROXIMATE ELECTRIC CONSUMPTION	70/21	220		220		224	
	80/27	220		220		226	
	90/32	220		220		225	
watts	100/38	222		221		230	
APPROXIMATE WATER CONSUMPTION PER 24 HR.	70/21	23	<u>0.09</u>	19	<u>0.07</u>	18	<u>0.07</u>
	80/27	20	<u>0.08</u>	14	<u>0.05</u>	15	<u>0.06</u>
	90/32	19	<u>0.07</u>	10	<u>0.04</u>	10	<u>0.04</u>
gal./day m ³ /day	100/38	15	<u>0.06</u>	10	<u>0.04</u>	9	<u>0.04</u>
FREEZING CYCLE TIME	70/21	31		34		41	
	80/27	34		39		47	
	90/32	34		43		51	
min.	100/38	37		44		58	
HARVEST CYCLE TIME	70/21	2.5		2.4		2.0	
	80/27	2.4		2.2		2.0	
	90/32	2.4		2.0		2.0	
min.	100/38	2.2		2.0		2.0	
HEAD PRESSURE	70/21	104	<u>7.3</u>	119	<u>8.4</u>	135	<u>9.5</u>
	80/27	115	<u>8.1</u>	139	<u>9.7</u>	153	<u>10.8</u>
	90/32	119	<u>8.4</u>	155	<u>10.9</u>	171	<u>12.0</u>
PSIG kg/cm ² G	100/38	121	<u>8.5</u>	159	<u>11.2</u>	185	<u>13.0</u>
SUCTION PRESSURE	70/21	10	<u>0.7</u>	11	<u>0.8</u>	14	<u>1.0</u>
	80/27	11	<u>0.8</u>	13	<u>0.9</u>	17	<u>1.2</u>
	90/32	11	<u>0.8</u>	15	<u>1.1</u>	18	<u>1.3</u>
PSIG kg/cm ² G	100/38	12	<u>0.9</u>	16	<u>1.1</u>	21	<u>1.5</u>

TOTAL HEAT OF REJECTION FROM CONDENSER 1,600 BTU/h [AT 90°F (32°C) / WT 70°F (21°C)]

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

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

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

[c] KM-151BAH

APPROXIMATE ICE PRODUCTION PER 24 HR.	AMBIENT TEMP. (°F/°C)	WATER TEMP. (°F/°C)					
		50/10		70/21		90/32	
	70/21	146	<u>66</u>	139	<u>63</u>	129	<u>58</u>
	80/27	140	<u>64</u>	129	<u>59</u>	119	<u>54</u>
	90/32	139	<u>63</u>	121	<u>55</u>	111	<u>50</u>
lbs./day <u>kg./day</u>	100/38	137	<u>62</u>	119	<u>54</u>	101	<u>46</u>
APPROXIMATE ELECTRIC CONSUMPTION	70/21	390		399		409	
	80/27	397		410		420	
	90/32	399		420		430	
watts	100/38	400		422		440	
APPROXIMATE WATER CONSUMPTION PER 24 HR.	70/21	50	<u>0.19</u>	42	<u>0.16</u>	39	<u>0.15</u>
	80/27	44	<u>0.17</u>	31	<u>0.12</u>	32	<u>0.12</u>
	90/32	42	<u>0.16</u>	22	<u>0.08</u>	21	<u>0.08</u>
<u>gal./day</u> <u>m³/day</u>	100/38	33	<u>0.12</u>	21	<u>0.08</u>	20	<u>0.08</u>
FREEZING CYCLE TIME	70/21	21		23		25	
	80/27	22		24		27	
	90/32	23		26		29	
min.	100/38	23		27		31	
HARVEST CYCLE TIME	70/21	3.3		2.9		2.0	
	80/27	3.0		2.4		2.0	
	90/32	2.9		2.0		2.0	
min.	100/38	2.5		2.0		2.0	
HEAD PRESSURE	Float Switch	114	<u>8.0</u>	128	<u>9.0</u>	148	<u>10.4</u>
	80/27	124	<u>8.8</u>	146	<u>10.3</u>	167	<u>11.8</u>
	90/32	128	<u>9.0</u>	161	<u>11.3</u>	182	<u>12.8</u>
PSIG <u>kg/cm²G</u>	100/38	132	<u>9.3</u>	166	<u>11.7</u>	202	<u>14.2</u>
SUCTION PRESSURE	70/21	12	<u>0.8</u>	13	<u>0.9</u>	14	<u>1.0</u>
	80/27	13	<u>0.9</u>	14	<u>1.0</u>	15	<u>1.1</u>
	90/32	13	<u>0.9</u>	15	<u>1.1</u>	16	<u>1.1</u>
PSIG <u>kg/cm²G</u>	100/38	13	<u>0.9</u>	15	<u>1.1</u>	17	<u>1.2</u>

TOTAL HEAT OF REJECTION FROM CONDENSER 3,840 BTU/h [AT 90°F (32°C) / WT 70°F (21°C)]

Note: Pressure data is recorded at 5 minutes into freezing cycle.
The data not in **bold** should be used for reference only.

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

[d] KM-151BWH

APPROXIMATE ICE PRODUCTION PER 24 HR.	AMBIENT TEMP. (°F/°C)	WATER TEMP. (°F/°C)					
		50/10		70/21		90/32	
	70/21	146	<u>66</u>	141	<u>64</u>	136	<u>62</u>
	80/27	142	<u>65</u>	135	<u>61</u>	131	<u>59</u>
	90/32	141	<u>64</u>	130	<u>59</u>	125	<u>57</u>
lbs./day <u>kg./day</u>	100/38	141	<u>64</u>	129	<u>58</u>	121	<u>55</u>
APPROXIMATE ELECTRIC CONSUMPTION	70/21	390		391		396	
	80/27	391		393		399	
	90/32	391		395		400	
watts	100/38	393		396		405	
APPROXIMATE WATER CONSUMPTION PER 24 HR.	70/21	155	<u>0.59</u>	171	<u>0.65</u>	217	<u>0.82</u>
	80/27	167	<u>0.63</u>	192	<u>0.73</u>	252	<u>0.95</u>
	90/32	171	<u>0.65</u>	210	<u>0.79</u>	265	<u>1.00</u>
gal./day <u>m³/day</u>	100/38	206	<u>0.78</u>	223	<u>0.84</u>	315	<u>1.19</u>
FREEZING CYCLE TIME	70/21	25		26		28	
	80/27	26		28		30	
	90/32	26		29		31	
min.	100/38	27		29		33	
HARVEST CYCLE TIME	70/21	3.5		3.2		2.0	
	80/27	3.3		2.8		2.0	
	90/32	3.2		2.5		2.2	
min.	100/38	2.8		2.4		2.0	
HEAD PRESSURE	Float Switch	150	<u>10.5</u>	151	<u>10.6</u>	157	<u>11.0</u>
	80/27	150	<u>10.6</u>	151	<u>10.6</u>	160	<u>11.3</u>
	90/32	151	<u>10.6</u>	152	<u>10.7</u>	160	<u>11.2</u>
PSIG <u>kg/cm²G</u>	100/38	154	<u>10.8</u>	154	<u>10.8</u>	167	<u>11.7</u>
SUCTION PRESSURE	70/21	13	<u>0.9</u>	13	<u>0.9</u>	14	<u>1.0</u>
	80/27	13	<u>0.9</u>	14	<u>1.0</u>	14	<u>1.0</u>
	90/32	13	<u>0.9</u>	14	<u>1.0</u>	15	<u>1.0</u>
PSIG <u>kg/cm²G</u>	100/38	13	<u>0.9</u>	14	<u>1.0</u>	15	<u>1.1</u>

TOTAL HEAT OF REJECTION FROM CONDENSER 3,840 BTU/h [AT 90°F (32°C) / WT 70°F (21°C)]

Note: Pressure data is recorded at 5 minutes into freezing cycle.
The data not in **bold** should be used for reference only.

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

IV. SERVICE DIAGNOSIS

1. 10-MINUTE DIAGNOSTIC PROCEDURE

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

- 1) Turn power off and access the control box. Clear any ice from the bin control actuator located in the bin.
- 2) Turn power on and place the control switch in the "ICE" position. A 5 second delay occurs. The "POWER OK" LED on the control board comes on. If the "POWER OK" LED is flashing (indicating a full bin), check the bin control. See "II. 5. [b] BIN CONTROL CHECK PROCEDURE."
- 3) One Minute Fill Cycle – The inlet water valve is energized. After 1 minute, the control board checks the float switch. If the float switch is closed, the unit cycles to harvest. If closed, continue to step 4. If the float switch is open, the unit repeats the 1 minute fill cycle until water enters and the float switch closes (low water safety protection during initial start up and at the end of each harvest). **Diagnosis:** If the water valve does not open, check for no supply voltage at water valve terminals, bad coil, or plugged screen or external filter (no water flow). If unit fails to start harvest, check for open float switch or bad 1 minute timer in board.
- 4) Initial Harvest Cycle – The inlet water valve remains energized, contactor coil energizes to start the compressor (and fan motor on a remote condenser unit), and the hot gas valve energizes. The evaporator warms and the thermistor senses 48°F (9°C). The control board then receives the thermistor's 3.9 kΩ signal and turns operation of harvest over to the harvest timer. The timer completes counting (1 to 3 minutes). The unit then cycles to freeze. **Diagnosis:** Check if compressor is running, hot gas valve is open, water valve still open. Average harvest cycle at factory setting is 2 to 3 minutes. How long does initial harvest last? 1.5 minutes after initial harvest begins, touch the compressor discharge line. Is it hot? If not check refrigerant pressures and compressor operation. If it is hot, touch the inlet line to the evaporator. Is it hot? If it is hot and the freeze cycle is not starting, check the harvest timer adjustment, the thermistor for open circuit, the discharge line temperature, compressor efficiency, and if the hot gas valve is fully open.
- 5) Freeze Cycle – The compressor remains energized, pump motor, (line valve if applicable), and fan motor energize. The inlet water valve and hot gas valve de-energize. The unit is held in freeze by a 5 minute short cycle protection timer which

starts after the thermistor temperature reaches 36°F (2°C). After this period, the freeze cycle operation is transferred to the float switch for freeze termination. During the first 5 minutes of freeze, confirm that the evaporator temperature drops. After the minimum freeze period, disconnect the float switch at the 2-pin connector attached to the red wires. See Fig. 2 for general location. The unit should immediately switch to the drain cycle. **Diagnosis:** If the evaporator is not cold, check to see if the hot gas valve is still open or if the expansion valve (on KM-151BAH, KM-151BWH only) is not opening properly, if the water valve is continuing to fill the reservoir, if there are improper unit pressures or an inoperative compressor. If the unit remains in freeze with the float switch removed, replace the board.

Note: Normal freeze cycle will last 0 to 40 minutes depending on model and conditions. Cycle times and pressures should follow performance data provided in this manual.

6) Drain Cycle – The compressor remains energized, the hot gas valve energizes, the fan motor de-energizes. The drain valve energizes, allowing water to drain from the tank for 20 seconds. This removes contaminants from the water tank. **Diagnosis:** If the drain valve does not open, check the circuit. Check for proper voltage. If water does not drain out, check and clean the tubing at the drain valve and then check and clean the valve assembly.

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

Note: Unit continues to cycle until bin control is satisfied or power is turned off. (The drain cycle can be adjusted to occur every cycle, or every 2, 5, or 10 cycles. The factory default is every 10 cycles.) The unit always restarts at the 1 minute fill cycle.

2. NO ICE PRODUCTION

PROBLEM	POSSIBLE CAUSE	REMEDY	
[1] The icemaker will not start.	a) Power Supply	1. OFF position.	1. Move to ON position.
		2. Loose connections.	2. Tighten.
		3. Bad contacts.	3. Check for continuity and replace.
		4. Voltage too high.	4. Check and get recommended voltage.
		5. Unplugged.	5. Plug in.
	b) Fuse (inside fused disconnect, if any)	1. Blown out.	1. Check for short circuit and replace.
	c) Control Switch	1. OFF or WASH position.	1. Move to ICE position.
		2. Bad contacts.	2. Check for continuity and replace.
	d) Bin Control Switch	1. Tripped with bin filled with ice.	1. Remove ice.
		2. Defective reed switch.	2. Check for continuity and replace.
	e) High Pressure Control (KM-151 only)	1. Bad contacts.	1. Check for continuity and replace.
	f) Transformer	1. Thermal fuse blown out or coil winding opened.	1. Replace.
	g) Wiring to Control Board	1. Loose connections or open.	1. Check for continuity and replace.
	h) Thermistor	1. Leads shorted or open and High Temperature Safety operates. If open, unit will start but have long harvest cycle.	1. See "II. 4. HARVEST CONTROL - THERMISTOR".
	i) Hot Gas Solenoid Valve	1. Continues to open in freeze cycle and High Temperature Safety operates.	1. Check for power off in freeze cycle and replace.
	j) Water Supply Line	1. Water supply off and water supply cycle does not finish.	1. Check and get recommended pressure. Check for water supply.
k) Inlet Water Valve	1. Mesh filter or orifice gets clogged and water supply cycle does not finish.	1. Clean. Replace if necessary.	
	2. Coil winding opened.	2. Replace.	
	3. Wiring to Water Valve.	3. Check for loose connection or open, and replace.	
l) Control Board	1. Defective.	1. See "II. 3. [d] CONTROL BOARD CHECK PROCEDURE".	

PROBLEM	POSSIBLE CAUSE		REMEDY
[2] Water continues to be supplied, and the icemaker will not start.	a) Float Switch	1. Connector disconnected.	1. Reconnect.
		2. Leads opened or defective switch.	2. Check and replace.
		3. Float does not move freely.	3. Clean or replace.
	b) Control Board	1. Defective.	1. Replace.
[3] Compressor will not start or operates intermittently.	a) Control Switch	1. WASH position.	1. Move to ICE position.
		2. Bad contacts.	2. Check and replace.
	b) High Pressure Control (KM-151 only)	1. Dirty Air Filter or Condenser.	1. Clean.
		2. Ambient temperature too warm.	2. Reduce ambient temperature.
		3. Refrigerant overcharged.	3. Recharge.
		4. Fan not operating.	4. See chart 2 - [6].
		5. Refrigerant line or components plugged.	5. Clean and replace Drier.
		6. Condenser water pressure too low or off (KM-151BWH only).	6. Check and get recommended pressure.
	c) Overload Protector	1. Bad contacts.	1. Check for continuity and replace.
		2. Voltage too low.	2. Increase voltage.
		3. Refrigerant overcharged or undercharged.	3. Recharge.
	d) Starter	1. Bad contacts.	1. Check and replace.
		2. Coil winding opened.	2. Replace.
	e) Start Capacitor	1. Defective.	1. Replace.
	f) Power Relay	1. Bad contacts.	1. Check for continuity and replace.
		2. Coil winding opened.	2. Replace.
	g) Compressor	1. Wiring to Compressor.	1. Check for loose connection or open, and replace.
		2. Defective.	2. Replace.
		3. Protector tripped.	3. Reduce temperature and verify cause.
	h) Control Board	1. Defective.	1. See "II. 3. [d] CONTROL BOARD CHECK PROCEDURE".
	i) Condenser, Air Filter	1. Clogged with dirt and dust.	1. Clean and unclog.
[4] Water continues to be supplied in freeze cycle.	a) Inlet Water Valve	1. Diaphragm does not close.	1. Check for water leaks with icemaker off. Replace if necessary.
	b) Control Board	1. Defective.	1. See "II. 3. [d] CONTROL BOARD CHECK PROCEDURE".

PROBLEM	POSSIBLE CAUSE		REMEDY
[5] No water comes from Spray Tubes. Water Pump will not start, or freeze cycle time is too short.	a) Water Supply Line	1. Water pressure too low and water level in Water Tank too low.	1. Check and get recommended pressure.
	b) Inlet Water Valve	1. Dirty mesh filter or orifice and water level in Water Tank too low.	1. Clean.
	c) Water System	1. Water leaks.	1. Check connections for water leaks, and replace.
		2. Clogged.	2. Clean.
	d) Pump Motor	1. Motor winding opened.	1. Replace.
		2. Bearing worn out.	2. Replace.
		3. Wiring to Pump Motor.	3. Check for loose connection or open, and replace.
4. Defective Capacitor.		4. Replace.	
e) Control Board	1. Defective.	1. See "II. 3. [d] CONTROL BOARD CHECK PROCEDURE".	
[6] Fan Motor will not start, or is not operating.	a) Fan Motor	1. Motor winding opened.	1. Replace.
		2. Bearing worn out.	2. Replace.
		3. Wiring to Fan Motor.	3. Check for loose connection or open, and replace.
		4. Fan blade bound (locked Fan Motor).	4. Check and replace.
	b) Control Board	1. Defective.	1. See "II. 3. [d] CONTROL BOARD CHECK PROCEDURE".
[7] All components run but no ice is produced.	a) Refrigerant	1. Undercharged.	1. Check for leaks and recharge.
		2. Air or moisture trapped.	2. Replace Drier, and recharge.
	b) Compressor	1. Defective.	1. Replace.
	c) Hot Gas Solenoid Valve	1. Continues to open in freeze cycle.	1. Check and replace.
	d) Water Supply Line (KM-151BWH only)	1. Condenser water pressure too low or off and Pressure Control opens and closes frequently.	1. Check and get recommended pressure.
	e) Water Regulating Valve (KM-151BWH only)	1. Set too high.	1. Adjust or replace. See "VI. 7. WATER REGULATING VALVE".

3. EVAPORATOR IS FROZEN UP

PROBLEM	POSSIBLE CAUSE		REMEDY
[1] Freeze cycle time is too long.	a) Float Switch	1. Leads shorted or defective switch.	1. Check and replace.
		2. Float does not move freely.	2. Clean or replace.
	b) Inlet Water Valve	1. Diaphragm does not close.	1. Check for water leaks with icemaker off. Replace if necessary.
	c) Control Board	1. Defective.	1. See "II. 3. [d] CONTROL BOARD CHECK PROCEDURE".
[2] All ice formed on Evaporator does not fall into bin in harvest cycle.	a) Evaporator	1. Scaled up.	1. Clean.
	b) Water Supply Line	1. Water pressure too low.	1. Check and get recommended pressure.
	c) Inlet Water Valve	1. Dirty mesh filter or orifice.	1. Clean.
		2. Diaphragm does not close.	2. Check for water leaks with icemaker off. Replace if necessary.
	d) Ambient and/or water temperature	1. Too cool.	1. Increase temperature.
	e) Thermistor	1. Out of position or loose attachment.	1. See "VI. 16. THERMISTOR".
	f) Control Board	1. Harvest Timer is set too short.	1. Adjust longer, referring to "II. 4. HARVEST CONTROL - THERMISTOR".
2. Defective.		2. See "II. 3. [d] CONTROL BOARD CHECK PROCEDURE".	
[3] Others	a) Spray Tubes	1. Clogged.	1. Clean.
		2. Out of position.	2. Place in position.
	b) Water System	1. Dirty.	1. Clean.
	c) Refrigerant	1. Undercharged.	1. Check for leaks and recharge.
	d) Expansion Valve (KM-151 only)	1. Bulb out of position or loose attachment.	1. Place in position.
		2. Defective.	2. Replace.
	e) Hot Gas Solenoid Valve	1. Coil winding opened.	1. Replace.
		2. Plunger does not move.	2. Replace.
		3. Wiring to Hot Gas Valve.	3. Check for loose connection or open, and replace.
f) Water Supply Line	1. Too small; requires 3/8" OD line dedicated per machine.	1. Increase water supply line size.	
g) Water Filter	1. Flow rate too small.	1. Replace with filter that has larger flow rate.	

4. LOW ICE PRODUCTION

PROBLEM	POSSIBLE CAUSE	REMEDY
[1] Freeze cycle time is long.	a) See chart 2 - [3] and check dirty Air Filter or Condenser, ambient or water temperature, water pressure, Condenser Water Regulating Valve (KM-151BWH) and refrigerant charge.	
	b) See chart 3 - [1] and check Float Switch, Inlet Water Valve, and Control Board.	
[2] Harvest cycle time is long.	a) See chart 3 - [2] and check Control Board, Thermistor, Evaporator, ambient and/or water temperature, water supply line, and Inlet Water Valve.	

5. ABNORMAL ICE

PROBLEM	POSSIBLE CAUSE	REMEDY	
[1] Small cubes	a) Cube Guide, Water Tank	1. Out of position. Circulated water falls into bin.	
		1. Check that Cube Guide is properly installed on Water Tank and tank is fixed securely with snaps.	
[2] Cloudy or irregular cubes	b) See chart 2 - [5] and check water supply line, Inlet Water Valve, water system, Pump Motor, and Control Board.		
	a) See chart 3 - [1] and - [3] and check Float Switch, Inlet Water Valve, Control Board, Spray Tubes, water system, refrigerant charge and Expansion Valve.		
	b) Spray Guide	1. Dirty.	1. Clean.
	c) Water Quality	1. High hardness or contains impurities.	1. Install a water filter or softener.

6. OTHER

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

V. REMOVAL AND REPLACEMENT

1. SERVICE FOR REFRIGERANT LINES

[a] SERVICE INFORMATION

1) Allowable Compressor Opening Time and Prevention of Lubricant Mixture [R134a]

The compressor must not be opened more than 15 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 [R134a]

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 lower 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 R134a has possibly drawn in air, the drier must be replaced. Be sure to use a drier designed for R134a.

3) Handling of Handy Flux [R134a]

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

4) Oil for Processing of Copper Tubing [R134a]

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 R134a

Some parts used for refrigerants other than R134a are similar to those for R134a. But never use any parts unless they are specified for R134a because their endurance against the refrigerant have not been evaluated. Also, for R134a, do not use any parts that have been used for other refrigerants. Otherwise, wax and chlorine remaining on the parts may adversely affect R134a.

6) Replacement Copper Tubing [R134a]

The copper tubes currently in use are suitable for R134a. 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 [R134a]

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 R134a.

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 R134a to suddenly react with oxygen and explode. Be sure to use nitrogen to prevent explosion.

[b] REFRIGERANT RECOVERY

No refrigerant Access Valve is provided in the unit. Install a proper Access Valve on the low-side line (ex. Compressor Process Pipe). Recover the refrigerant from the Access Valve, and store it in a proper container. Do not discharge the refrigerant into the atmosphere.

[c] EVACUATION AND RECHARGE

- 1) Attach Charging Hoses, a Service Manifold and a Vacuum Pump to the system.
- 2) Turn on the Vacuum Pump.
- 3) Allow the Vacuum Pump to pull down to a 29.9”Hg vacuum. Evacuating period depends on the pump capacity.
- 4) Close the Low-side Valve on the Service Manifold.
- 5) Disconnect the Vacuum Pump, and attach a Refrigerant Charging Cylinder. Remember to loosen the connection, and purge the air from the Hose. See the Nameplate for the required refrigerant charge.
- 6) Open the Low-side Valve. Do not invert the Charging Cylinder. A liquid charge will damage the Compressor.
- 7) Turn on the icemaker when charging speed gets slow. Turn off the icemaker when the Low-side Gauge shows approximately 0 kg/cm². Do not run the icemaker at vacuum pressures. Close the Low-side Valve when the Charging Cylinder gets empty.

- 8) Repeat steps 4) through 7), if necessary, until the required amount of refrigerant has entered the system.
- 9) Close the Refrigerant Access Valve, and disconnect the Hoses, Service Manifold, etc.
- 10) Cap the Access Valve to prevent possible leak.

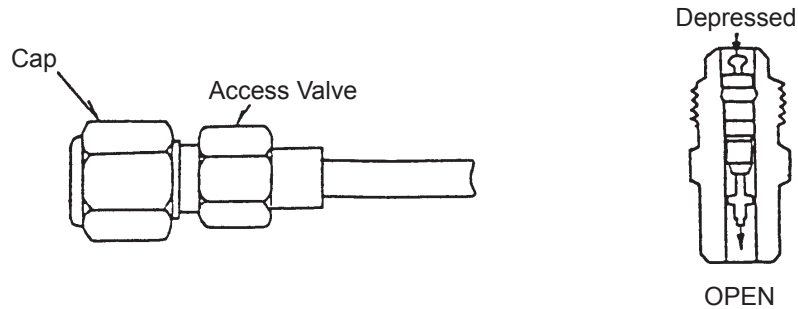


Fig. 4

2. BRAZING

DANGER

1. Refrigerant R134a itself is not explosive or poisonous. However, when exposed to high temperatures (open flames), R134a can be decomposed to form hydrofluoric acid and carbonyl fluoride both of which are hazardous.
2. Always recover the refrigerant and store it in a proper container. Do not discharge the refrigerant into the atmosphere.
3. Do not use silver alloy or copper alloy containing Arsenic.
4. Do not use R134a as a mixture with pressurized air for leak testing. Refrigerant leaks can be detected by charging the unit with a little refrigerant, raising the pressure with nitrogen and using an electronic leak detector.

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

3. COMPRESSOR

WARNING

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

IMPORTANT

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

- 1) Unplug the icemaker or disconnect the power source.
- 2) Remove the Louver and Rear Cover.
- 3) Recover the refrigerant and store it in a proper container, if required by an applicable law (see “1. [b] REFRIGERANT RECOVERY”).
- 4) Remove the Terminal Cover on the Compressor, and disconnect Solderless Terminals.
- 5) Disconnect the Discharge and Suction Pipes using brazing equipment.
- 6) Remove the Hold-down Bolts, Washers and Rubber Grommets.
- 7) Slide and remove the Compressor. Unpack the new Compressor package.
- 8) Attach the Rubber Grommets of the previous Compressor.
- 9) Clean the Suction and Discharge Pipes with an abrasive cloth/paper.
- 10) Place the Compressor in position, and secure it using the Bolts and Washers.
- 11) Remove Plugs from the Compressor Suction and Discharge Pipes.
- 12) Braze the Access, Suction and Discharge lines (Do not change this order), with nitrogen gas flowing at a pressure of 3 - 4 PSIG.
- 13) Install the new Drier (see “4. DRIER”).
- 14) Check for leaks using nitrogen gas (140 PSIG) and soap bubbles.
- 15) Evacuate the system and charge it with refrigerant (see “1. [c] EVACUATION AND

RECHARGE”).

- 16) Connect the Solderless Terminals and replace the Terminal Cover in its correct position.
- 17) Refit the Louver and Rear Cover in their correct positions.
- 18) Plug in the icemaker or connect the power source.

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

4. DRIER

IMPORTANT

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

- 1) Unplug the icemaker or disconnect the power source.
- 2) Remove the Rear Cover.
- 3) Recover the refrigerant and store it in a proper container, if required by an applicable law (see “1. [b] REFRIGERANT RECOVERY”).
- 4) Remove the Drier Holder, if any, and pull the Drier toward you for easy service.
- 5) Remove the Drier using brazing equipment.
- 6) Braze the new Drier, with the arrow on the Drier in the direction of the refrigerant flow. Use nitrogen gas at a pressure of 3 - 4 PSIG when brazing tubings. Braze in an Access Valve using a tee if necessary.
- 7) Check for leaks using nitrogen gas (140 PSIG) and soap bubbles.
- 8) Evacuate the system and charge it with refrigerant (see “1. [c] EVACUATION AND RECHARGE”).
- 9) Refit the Rear Cover in its correct position.
- 10) Plug in the icemaker or connect the power source.

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

5. HOT GAS VALVE

CAUTION

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

IMPORTANT

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

- 1) Unplug the icemaker or disconnect the power source.
- 2) Remove the Rear Cover.
- 3) Recover the refrigerant and store it in a proper container, if required by an applicable law (see "1. [b] REFRIGERANT RECOVERY").
- 4) Disconnect the Hot Gas Valve leads.
- 5) Remove the screw and the Solenoid Coil.
- 6) Remove the valve and Drier using brazing equipment.
- 7) Braze the new Hot Gas Valve with nitrogen gas flowing at a pressure of 3 - 4 PSIG.

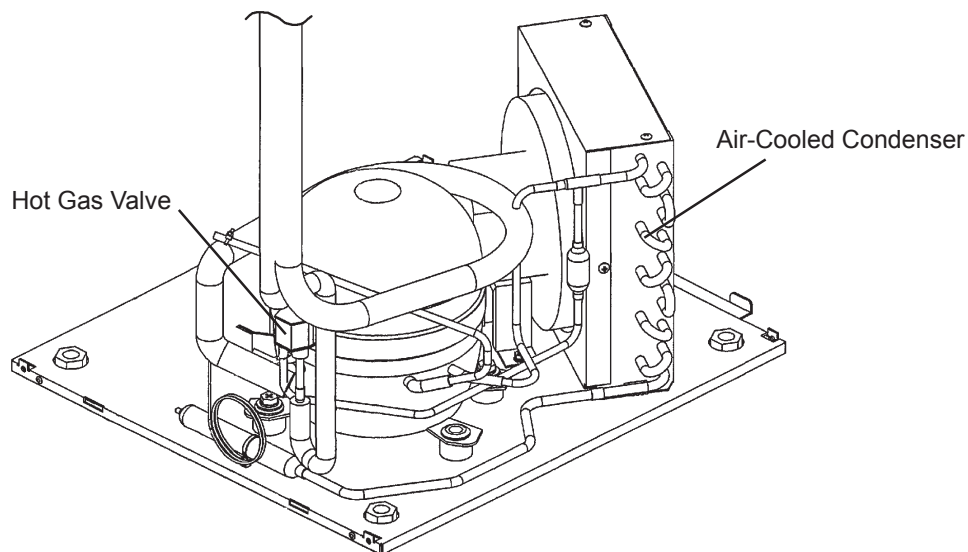


Fig. 5

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 274°F.

- 8) Install the new Drier (see “4. DRIER”).
- 9) Check for leaks using nitrogen gas (140 PSIG) and soap bubbles.
- 10) Evacuate the system and charge it with refrigerant (see “1. [c] EVACUATION AND RECHARGE”).
- 11) Attach the Solenoid Coil to the valve body, and secure it with the screw.
- 12) Connect the lead wires.
- 13) Refit the panels in their correct positions.
- 14) Plug in the icemaker or connect the power source.

6. EXPANSION VALVE - KM-151BAH, KM-151BWH ONLY

IMPORTANT

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

- 1) Unplug the icemaker or disconnect the power source.
- 2) Remove the Top Panel, Rear Panel and Rear Cover.
- 3) Recover the refrigerant and store it in a proper container, if required by an applicable law (see "1. [b] REFRIGERANT RECOVERY").
- 4) Remove the Expansion Valve using brazing equipment. Protect the Evaporator and pipes from excessive heat with damp cloths or similar.
- 5) Remove the Insulation Hose from the Expansion Valve Sensor (Bulb) and remove the Bulb.
- 6) Remove the Drier using brazing equipment.
- 7) Braze in the new Expansion Valve. Protect the body of the valve from excessive heat, and use nitrogen at a pressure of 3 - 4 PSIG when brazing.
- 8) Install the new Drier (see "4. DRIER").
- 9) Check for leaks using nitrogen gas (140 PSIG) and soap bubbles.
- 10) Evacuate the system and charge it with refrigerant (see "1. [c] 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.

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 238°F.

Top Rear View with Top and Rear Panels Removed

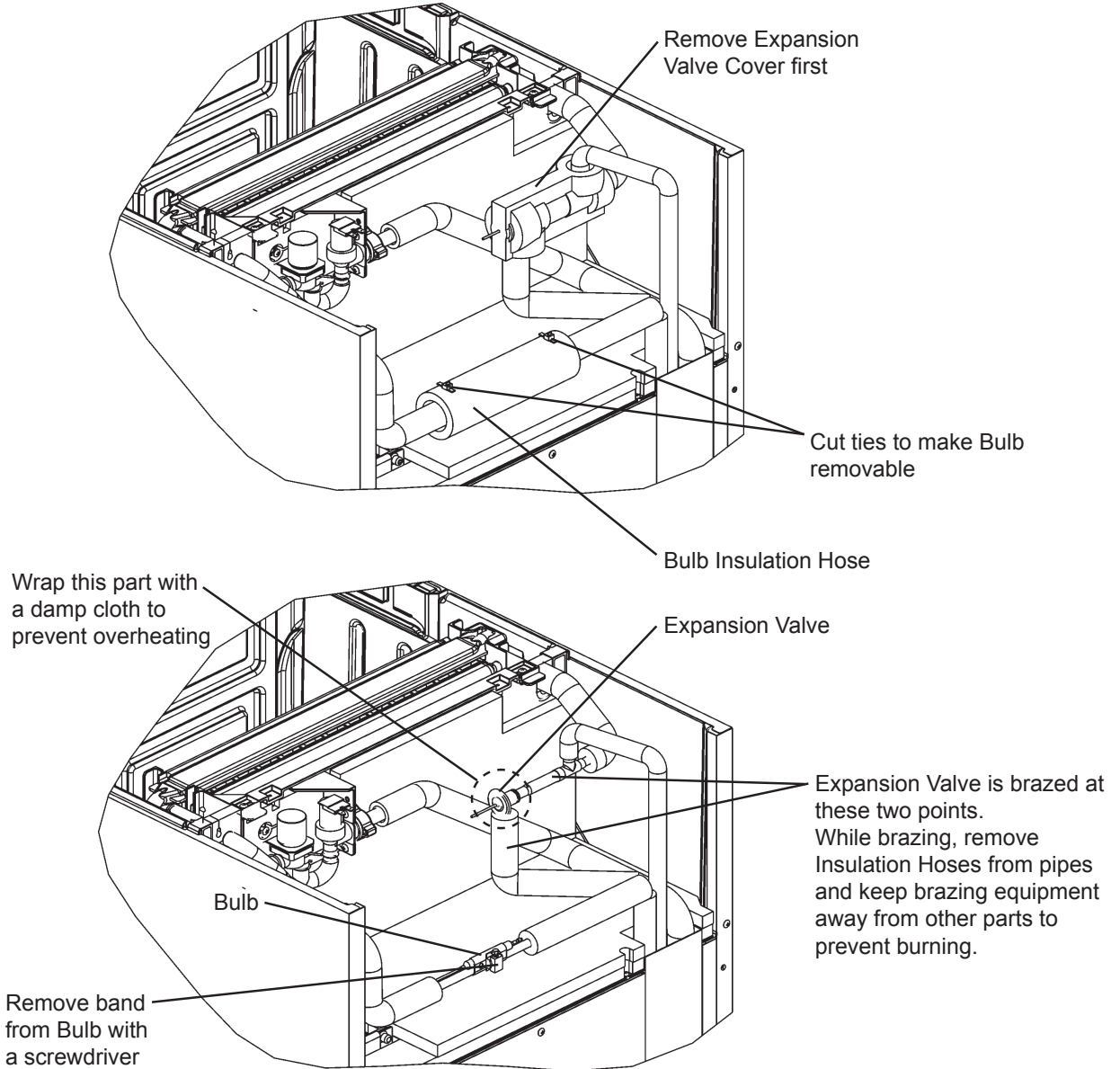


Fig. 6

7. WATER REGULATING VALVE - KM-151BWH ONLY

IMPORTANT

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

- 1) Unplug the icemaker or disconnect the power source.
- 2) Close the water supply line Shout-off Valve.
- 3) Remove the Louver, Top Panel, Rear Panel, Rear Cover and Pipe Cover.
- 4) Recover the refrigerant and store it in a container, if required by applicable law (see “1. [b] REFRIGERANT RECOVERY”).
- 5) Remove the Inlet Nut for the Water Valve.
- 6) Remove the four bolts securing the body at the front and rear.
- 7) Lift up the front of the body, and place a block between the body and base to allow space for servicing.

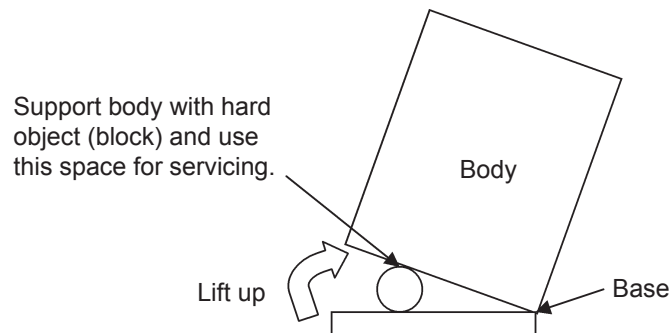


Fig. 7

- 8) Disconnect the Capillary Tube at the Condenser outlet.
- 9) Disconnect the flare connections of the Water Valve.
- 10) Unscrew the Bracket, and remove the Water Valve from the Bracket.
- 11) Install the new Water Valve.

- 12) Remove the Drier using brazing equipment.
- 13) Install the new Drier (see "4. DRIER").
- 14) Braze all fittings with nitrogen gas flowing at a pressure of 3 - 4 PSIG.
- 15) Check for leaks using nitrogen gas (140 PSIG) and soap bubbles.
- 16) Evacuate the system, and charge it with refrigerant (see "1. [c] EVACUATION AND RECHARGE").
- 17) Reconnect the flare connections.
- 18) Replace the Inlet Nut for the Water Valve.
- 19) Open the water supply line Shut-off Valve.
- 20) Check for water leaks.
- 21) Secure the body with the four bolts.
- 22) Replace the panels in their correct positions.
- 23) Plug in the icemaker or connect the power source.

8. ADJUSTMENT OF WATER REGULATING VALVE - KM-151BWH ONLY

The Water Regulating Valve (also called "Water Regulator") is factory-adjusted. No adjustment is required under normal use. Adjust the Water Regulator, if necessary, using the following procedures.

- 1) Prepare a thermometer to check the Condenser drain temperature. Attach a pressure gauge to the high-side line of the system.
- 2) Five minutes after a freeze cycle starts, confirm that the thermometer reads 104°F to 115°F (40°C to 46°C). If it does not, rotate the adjustment screw by using a flat blade screwdriver until the temperature is in the proper range. See Fig. 4. Next, check that the reference pressure is in the range indicated in the Head Pressure table in the Performance Data section. If it is not in the proper range, verify the refrigerant charge.
- 3) Check that the Condenser drain temperature is stable.

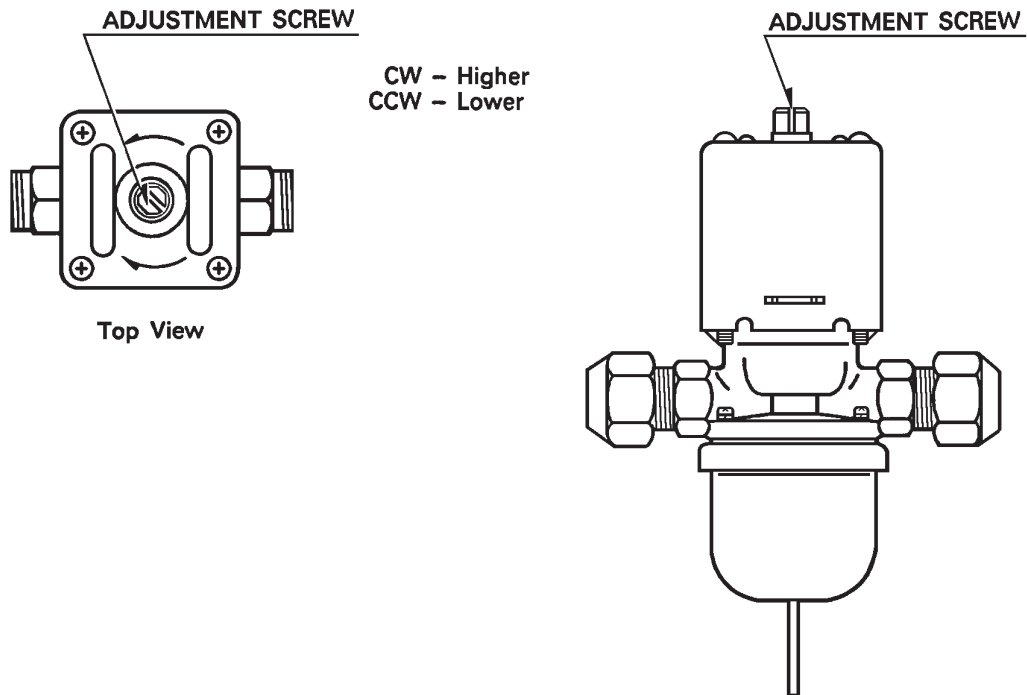


Fig. 8

9. WATER-COOLED CONDENSER - KM-151BWH ONLY

IMPORTANT

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

- 1) Unplug the icemaker or disconnect the power source.
- 2) Close the water supply line Shout-off Valve.
- 3) Remove the Louver, Top panel, Rear Panel, Rear Cover and Pipe Cover.
- 4) Recover the refrigerant and store it in a container, if required by applicable law (see "1. [b] REFRIGERANT RECOVERY")
- 5) Remove the Inlet Nut for the Water Valve.
- 6) Remove the four bolts securing the body at the front and rear.

- 7) Lift up the front of the body, and place a block between the body and base to allow space for servicing.
- 8) Disconnect the copper tubes at the inlet and outlet.
- 9) Remove the screws and take off the Condenser.
- 10) Install the new Condenser.
- 11) Remove the Drier using brazing equipment.
- 12) Install the new Drier (see "4. DRIER").
- 13) Braze all fittings with nitrogen gas flowing at a pressure of 3 - 4 PSIG.
- 14) Check for leaks using nitrogen gas (140 PSIG) and soap bubbles.
- 15) Evacuate the system, and charge it with refrigerant (see "1. [c] EVACUATION AND RECHARGE").
- 16) Reconnect the flare connections.
- 17) Replace the Inlet Nut for the Water Valve.
- 18) Open the water supply line Shut-off Valve.
- 19) Check for water leaks.
- 20) Secure the body with the four bolts.
- 21) Replace the panels in their correct positions.
- 22) Plug in the icemaker or connect the power source.

10. FAN MOTOR

- 1) Unplug the icemaker or disconnect the power source.
- 2) Remove the Louver.
- 3) Disconnect the Connector of the Fan Motor lead.
- 4) Remove the two screws securing the Fan Motor Bracket and pull out the Fan Motor in the arrow direction. To prevent deformation, do not hit the Fan on the Condenser or other parts.
- 5) Install the new Fan Motor in the reverse order of the removal procedure.
- 6) Refit the Louver in its correct position.
- 7) Plug in the icemaker or connect the power source.

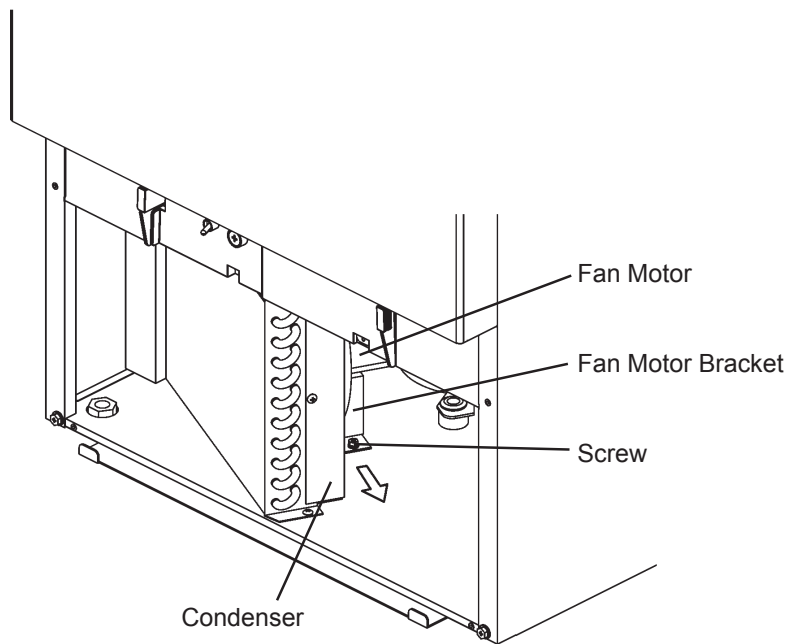


Fig. 9

11. PUMP MOTOR

- 1) Unplug the icemaker or disconnect the power source.
- 2) Remove the Top Panel and unscrew the Rear Panel.
- 3) Disconnect the Connector of the Pump Motor lead.
- 4) Remove the Water Tank (see "19. WATER TANK").
- 5) Remove the ties connecting the Pump Motor discharge outlet and pull off the Silicone Hose. Do not lose the Orifice coming off with the Hose.

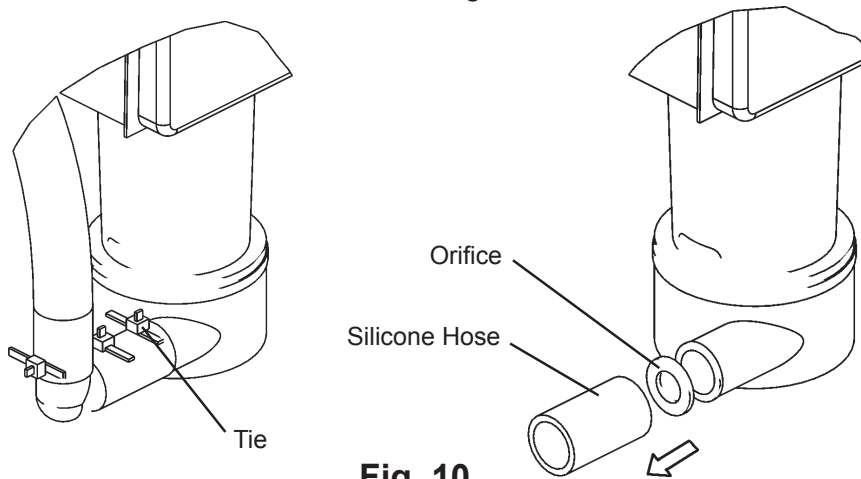


Fig. 10

- 6) Remove the screw securing the Pump Motor. Shift the Case to the center to release it from the Stopper, and lift off the Pump Motor.

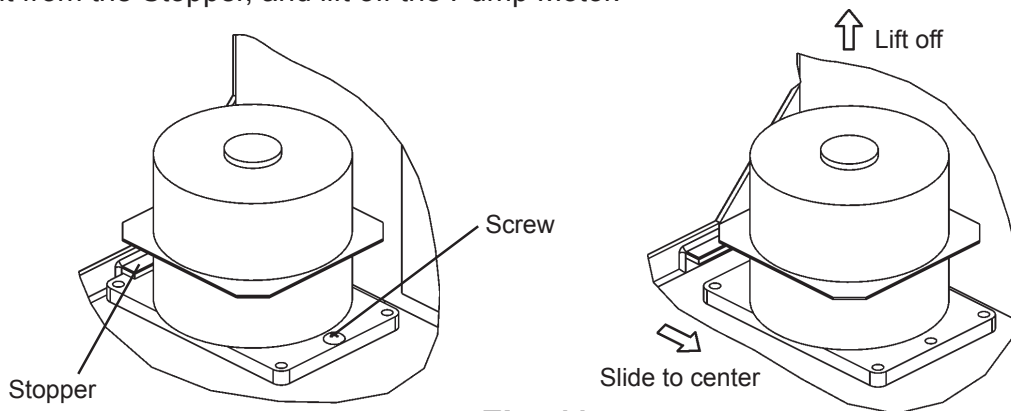


Fig. 11

- 7) Install the new motor in the reverse order of the removal procedure.
- 8) Plug in the icemaker or connect the power source, and check for leaks.
- 9) Refit the panels in their correct positions.

12. WATER VALVE

- 1) Unplug the icemaker or disconnect the power source.
- 2) Close the water supply tap.
- 3) Remove the Top Panel and unscrew the Rear Panel.
- 4) Disconnect the Tab Terminals.
- 5) Pinch and lower the Hose Clamp.
- 6) Disconnect the Rubber Hose from the Water Valve. Put a towel under the Water Valve to receive water coming out.
- 7) Turn the Inlet Nut in the arrow direction to remove it from the Water Valve. Do not lose the Gasket inside.
- 8) Remove the two mounting screws.
- 9) Install the new valve in the reverse order of the removal procedure.
- 10) Tighten the Inlet Nut to a torque of 70 in•lbs ($\pm 5\%$) to prevent water leaks.
- 11) Open the water supply tap.
- 12) Plug in the icemaker or connect the power source.
- 13) Check for leaks.
- 14) Refit the panels in their correct positions.

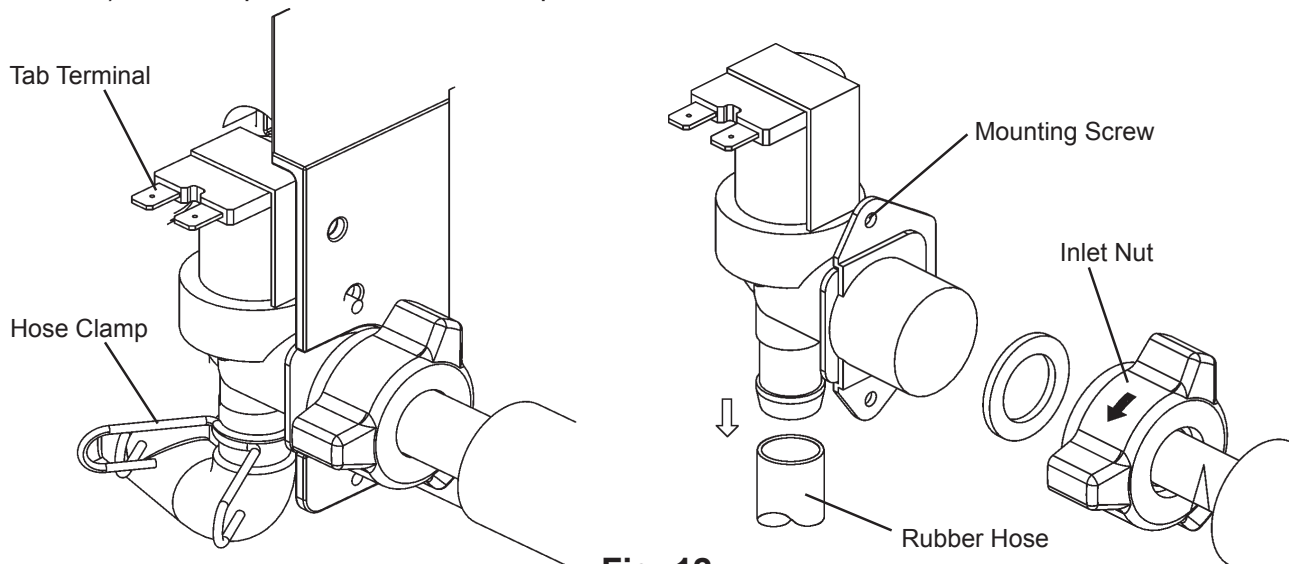


Fig. 12

13. CLEANING VALVE

- 1) Unplug the icemaker or disconnect the power source.
- 2) Remove the Top Panel and unscrew the Rear Panel.
- 3) Disconnect the Connectors (or Tab Terminals) of the Cleaning Valve lead.
- 4) Pinch and shift the two Hose Clamps.
- 5) Disconnect the Hoses from the Cleaning Valve. Put a towel under the Cleaning Valve to receive any water coming out and prevent it from splashing out.
- 6) Remove the mounting screw.
- 7) Install the new valve in the reverse order of the removal procedure.
- 8) Plug in the icemaker or connect the power source.
- 9) Check for leaks.
- 10) Refit the panels in their correct positions.

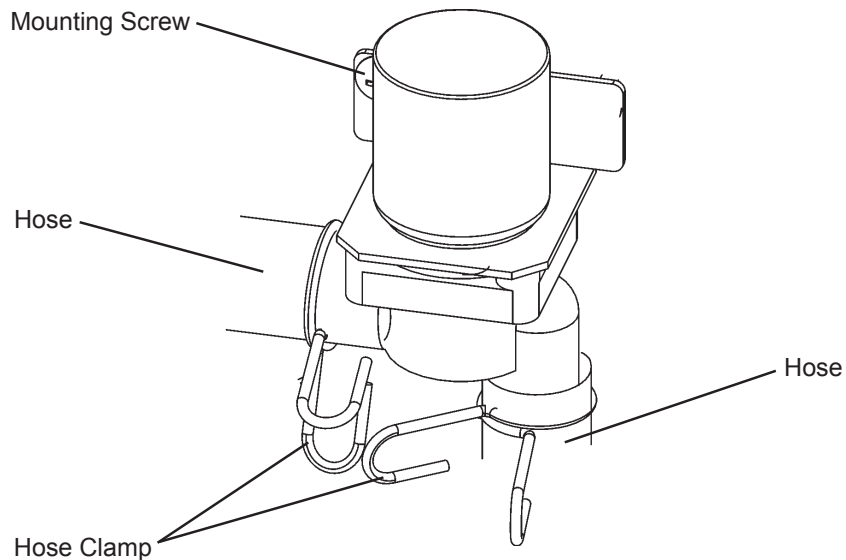


Fig. 13

14. DRAIN VALVE

- 1) Unplug the icemaker or disconnect the power source.
- 2) Close the water supply tap.
- 3) Drain the Water Tank (see “19. WATER TANK”).
- 4) Disconnect any rigid (fixed) pipe for water supply and drain connections.
- 5) Unscrew the Rear Cover. Pull out the unit for easy access to the Drain Valve.
- 6) Disconnect the Connectors (or Tab Terminals) of the Drain Valve lead.
- 7) Pinch and shift the two Hose Clamps.
- 8) Disconnect the Hoses from the Drain Valve. Put a towel under the Drain Valve to receive any water coming out and prevent it from splashing out.
- 9) Remove the two mounting screws.
- 10) Install the new valve in the reverse order of the removal procedure.
- 11) Reconnect the water supply and drain connections, if disconnected in step 4).
- 12) Open the water supply tap.
- 13) Plug in the icemaker or connect the power source.
- 14) Check for leaks.
- 15) Refit the panels in their correct positions.

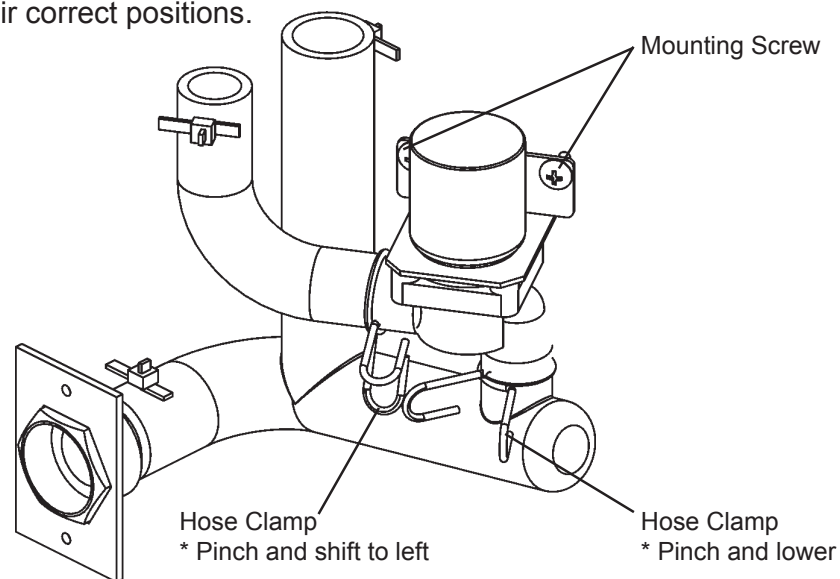


Fig. 14

15. FLOAT SWITCH

[a] KM-61BAH, KM-101BAH

- 1) Unplug the icemaker or disconnect the power source.
- 2) Remove the Top Panel and unscrew the Rear Panel.
- 3) Disconnect the Connector of the Float Switch lead and remove the lead wire from the grommet opening.
- 4) Remove the Water Tank (see "19. WATER TANK").
- 5) Remove the screw securing the Float Switch.
- 6) Install the new Float Switch in the reverse order of the removal procedure.
- 7) Refit the panels in their correct positions.
- 8) Plug in the icemaker or connect the power source.

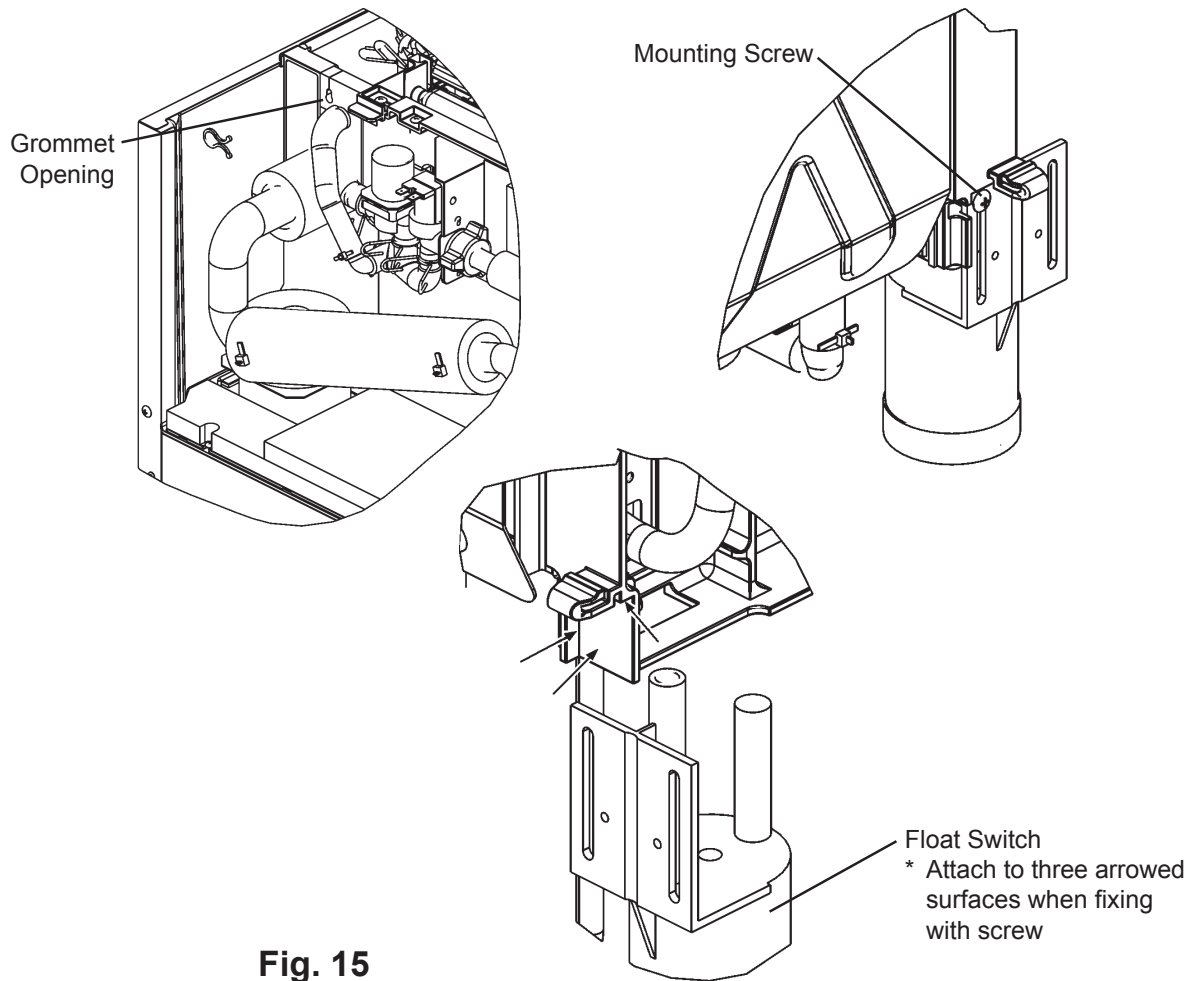


Fig. 15

[b] KM-151BAH, KM-151BWH

- 1) Unplug the icemaker or disconnect the power source.
- 2) Remove the Top Panel and unscrew the Rear Panel.
- 3) Disconnect the Connector of the Float Switch lead (gray).
- 4) The Float Switch is located behind the Pump Motor. Pinch where indicated (1) and pull it forward diagonally (2) to unhook the Float Switch.

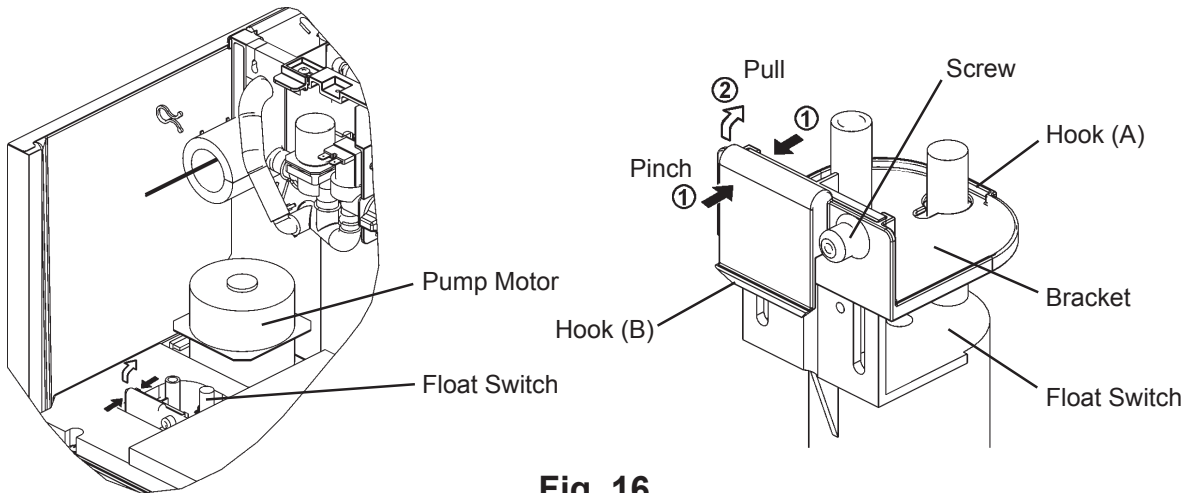


Fig. 16

- 5) Remove the screw securing the Float Switch to the Bracket.
- 6) Attach the new Float Switch to the Rail of the Bracket. Secure them with the screw by fitting the round end of the slot to the screw hole.

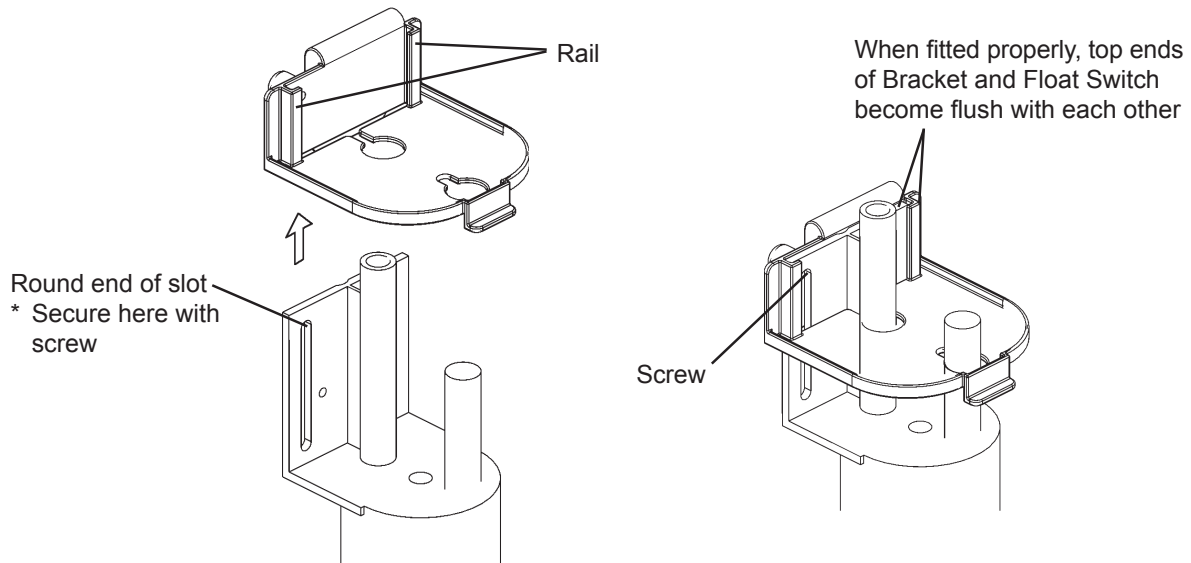


Fig. 17

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

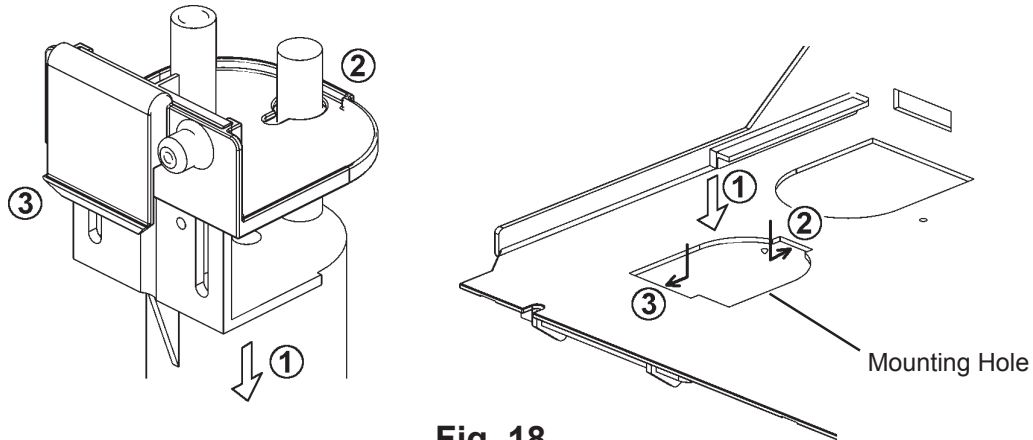


Fig. 18

16. BIN CONTROL SWITCH

- 1) Unplug the icemaker or disconnect the power source.
- 2) Remove the Top Panel and unscrew the Rear Panel.
- 3) Disconnect the Connector of the Bin Control Switch lead (black) covered with a silicone hose and remove the lead wire from the Grommet.
- 4) Remove the Water Tank (see “19. WATER TANK”). The Bin Control Switch is located as shown below when viewed from the front.

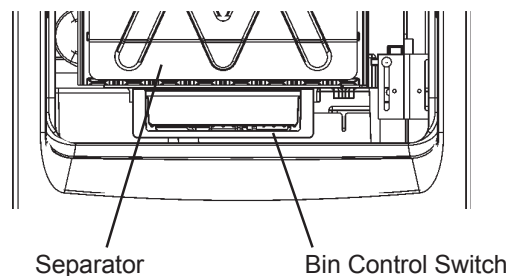


Fig. 19

- 5) Pull down and remove the lead wire from the retainer on the right side of the Bin Control Switch.
- 6) Hold both sides of the Bin Control Switch and pull it toward you.

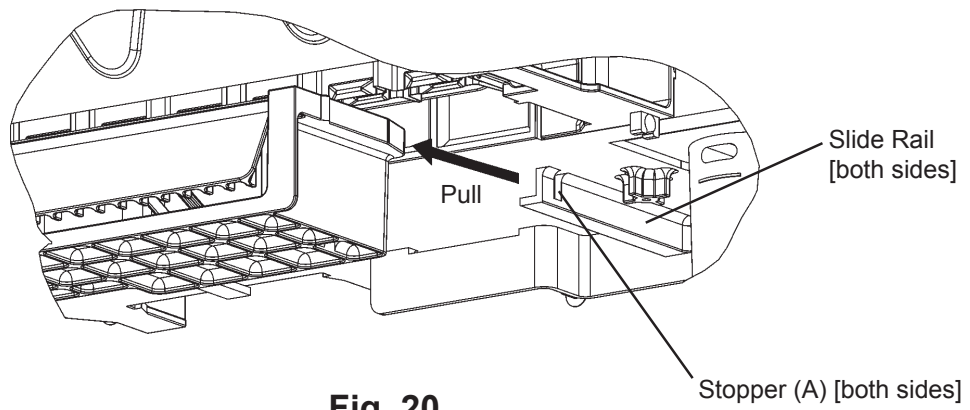
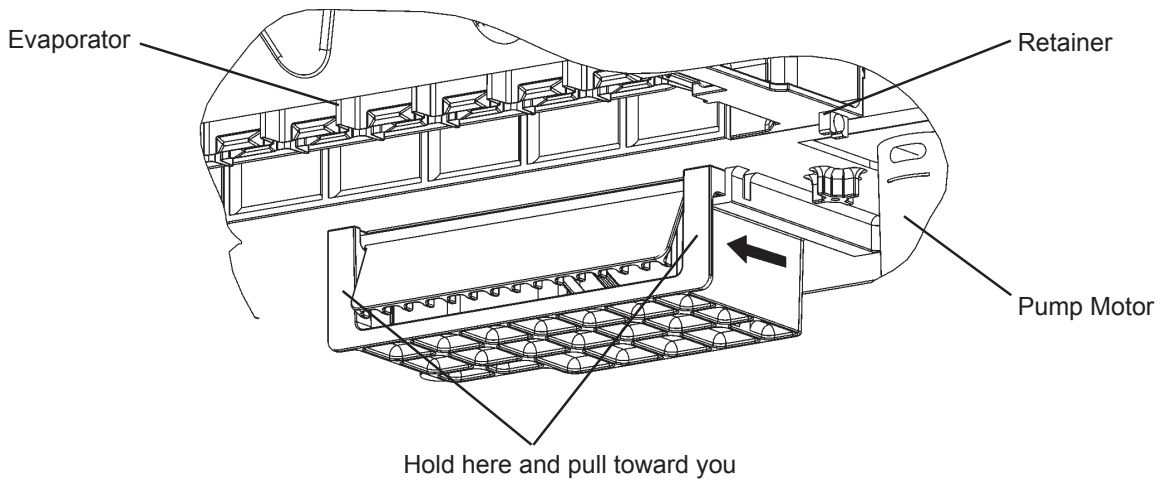


Fig. 20

7) The Bin Control Switch (KM-61BAH) pulled out of the Storage Bin has the internal structure as shown below.

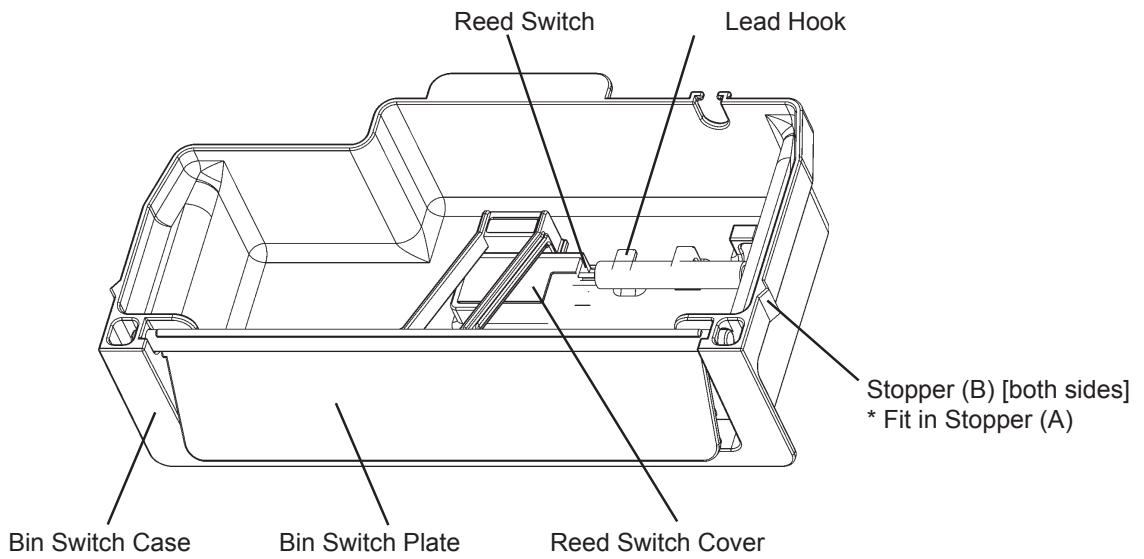


Fig. 21

8) To remove the Bin Switch Plate, slightly flex both sides and pull the Shaft toward you.

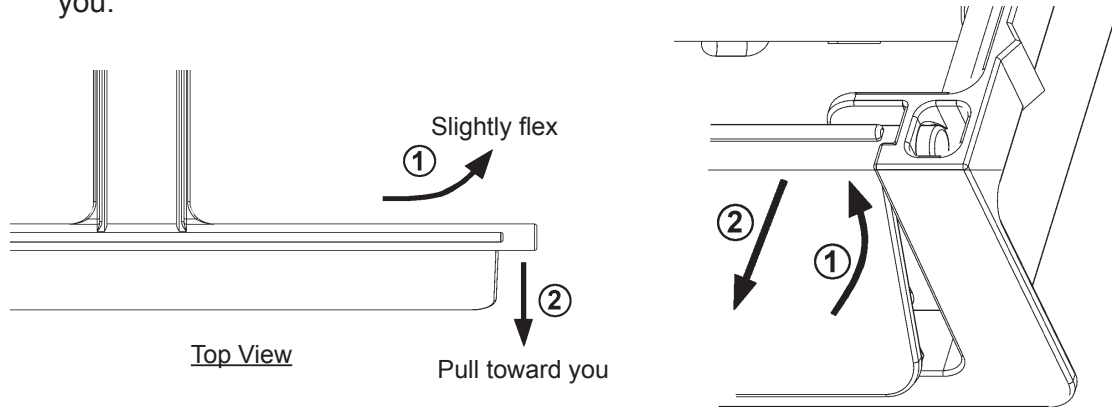


Fig. 22

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

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

17. THERMISTOR

- 1) Unplug the icemaker or disconnect the power source.
- 2) Remove the Top Panel and unscrew the Rear Panel.
- 3) Disconnect the Connector of the Thermistor lead (orange).
- 4) Remove the Ties, Insulation, Thermistor Holder, and Thermistor in this order.
- 5) Remove the old sealant from the Thermistor Holder and Suction Pipe.
- 6) Wipe off any moisture or condensation from the Suction Pipe surfaces.
- 7) Press a tube of the sealant KE4560RTV, manufactured by Shin-Etsu Silicones, to the recess of the Thermistor Holder. Slowly squeeze the sealant out of the tube and spread it smoothly in the recess. Do not use any sealant other than the above.
- 8) Attach the new Thermistor in position on the Suction Pipe and press down the Thermistor Holder over the Thermistor. Be careful not to damage the Thermistor lead. Cover the parts with the Insulation and secure them with the Ties. Keep the Thermistor inside the Thermistor Holder. After the Thermistor Holder is fitted, do not pull the Thermistor lead to move the Thermistor.
- 9) Refit the removed parts in the reverse order of the removal procedure.
- 10) Plug in the icemaker or connect the power source.

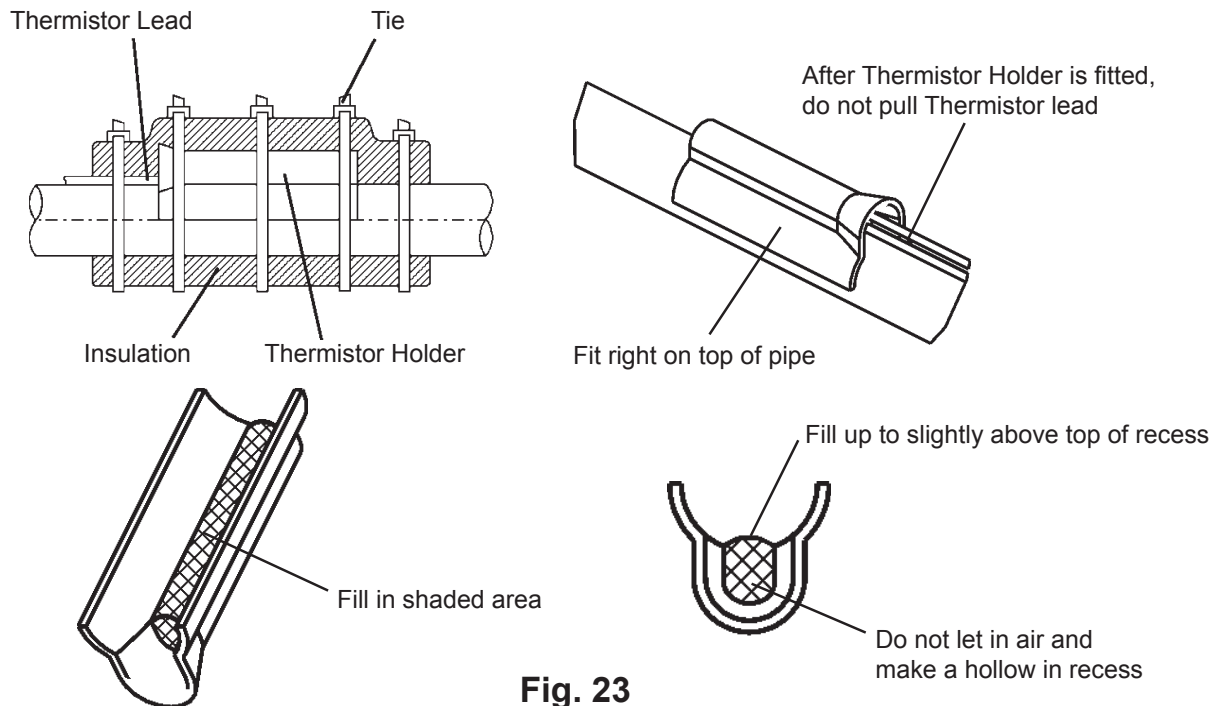


Fig. 23

18. CONTROL BOX

- 1) Unplug the icemaker or disconnect the power source.
- 2) Remove the Louver.
- 3) Tilt the Tabs inward at the same time on both sides of the Control Box and pull the Control Box toward you. Tilting only one Tab will not work.
- 4) To refit the Control Box, push it in horizontally.

Note: After replacing the components inside the Control Box, connect and tie the wires properly in their correct position. Especially make sure that the Harness does not press the Push Buttons on the Control Board.

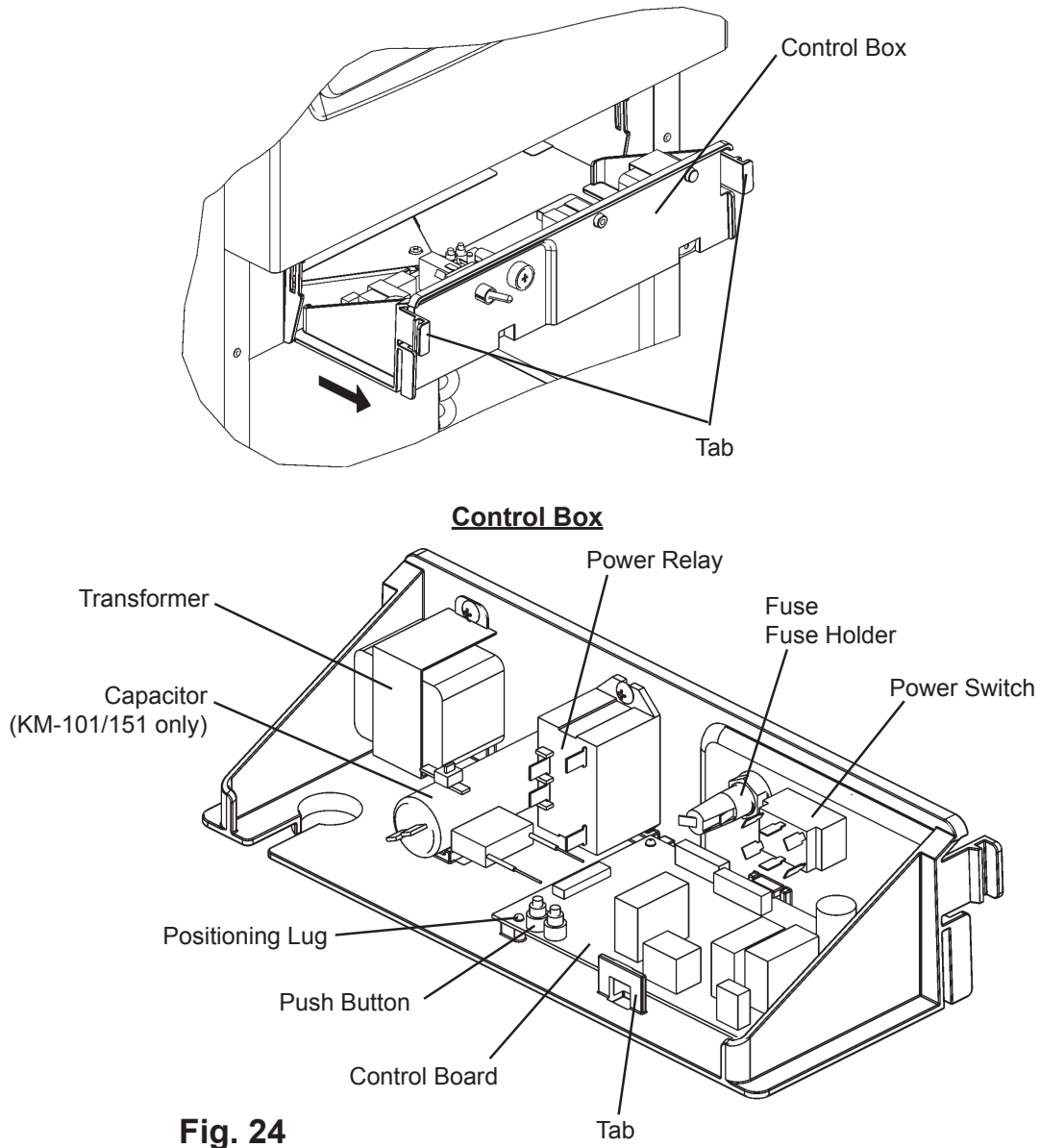


Fig. 24

[a] POWER SWITCH

- 1) Disconnect the Tab Terminals and remove the Nut securing the Power Switch.
- 2) Install the new Switch in the reverse order of the removal procedure.
- 3) To prevent miswiring, check the terminal numbers and lead wire colors with the Wiring Label.

[b] FUSE

- 1) Use a phillips head screwdriver to remove the Fuse Holder Cap and take out the Fuse.
- 2) Install the new Fuse in the reverse order of the removal procedure.

[c] FUSE HOLDER

- 1) Disconnect the Tab Terminal and remove the Nut securing the Fuse Holder.
- 2) Install the new Fuse Holder in the reverse order of the removal procedure.

[d] CONTROL BOARD

- 1) Disconnect all the Connectors.
- 2) Pull the Tab to release the Control Board.
- 3) Lift off the Control Board.
- 4) To refit the Control Board, fit its four corner holes on the positioning lugs inside the Control Box and secure the Control Board with the Tab.
- 5) When reconnecting the Connectors, do not push them too hard. The Control Board may be damaged.

[e] POWER RELAY

- 1) Disconnect the Tab Terminals, remove the mounting screw, and lift off the Power Relay from the fit at the bottom.
- 2) Install the new Relay in the reverse order of the removal procedure.

- 3) To prevent miswiring, check the terminal numbers and lead wire colors with the Wiring Label.

[f] COMPRESSOR CAPACITOR - EXCEPT KM-61BAH

- 1) Disconnect the Tab Terminals and cut the Tie.
- 2) Install the new Capacitor in the reverse order of the removal procedure. Use a cable tie to secure the Capacitor tightly.

[g] CONTROL BOARD TRANSFORMER

- 1) Disconnect the Connectors and Closed End Connectors connecting the Control Board. (The Tie securing the harness may be removed. But be careful not to break the lead wires.)
- 2) Remove the mounting screw and lift off the Transformer from the fit at the bottom.
- 3) Install the new Transformer in the reverse order of the removal procedure.

19. WATER TANK

- 1) Unplug the icemaker or disconnect the power source. Remove all ice from the Storage Bin.
- 2) Drain out the Water Tank by pulling off the Overflow Pipe from the Water Tank bottom and the Silicone Hose from the Storage Bin bottom.

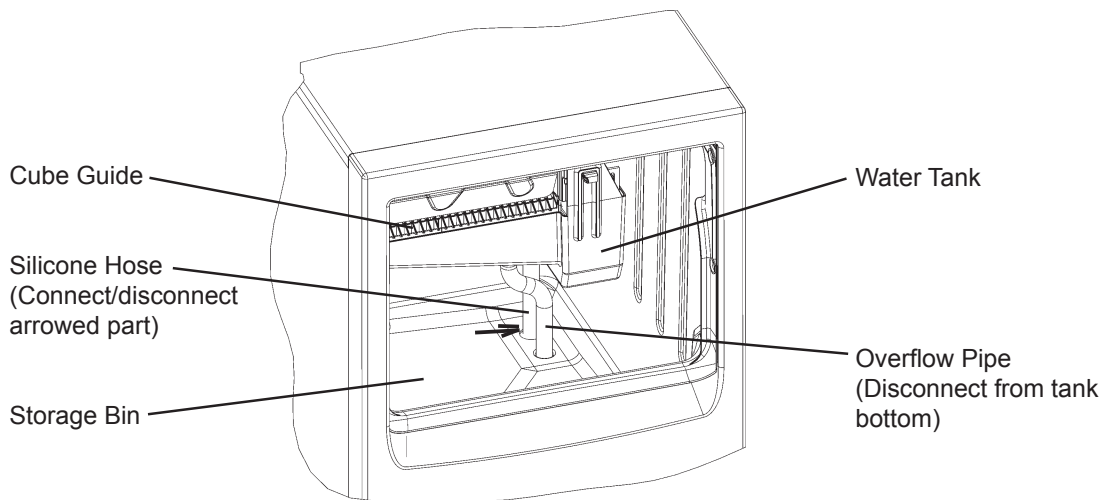


Fig. 25

- 3) Pinch and push down the Snaps on both sides of the Bracket to unhook the Water Tank from the square holes, and pull it about 1" toward you.

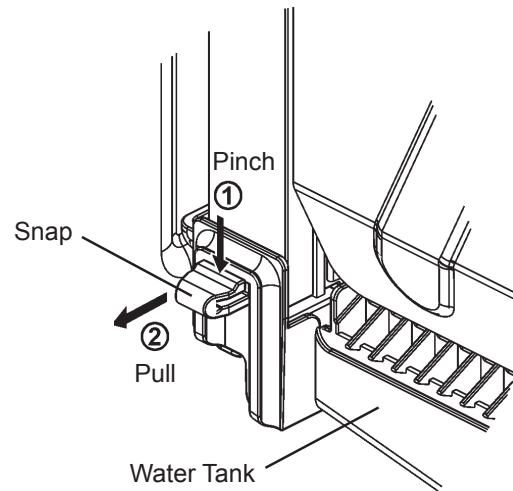


Fig. 26

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

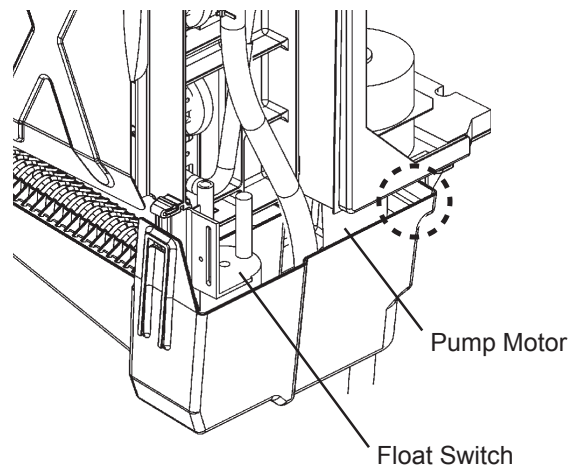


Fig. 27

- 5) Tilt the right side of the Water Tank and pull it toward you. Do not hit the Pump Motor or Float Switch. Slightly twist the left side of the Water Tank inward and pull it toward you.

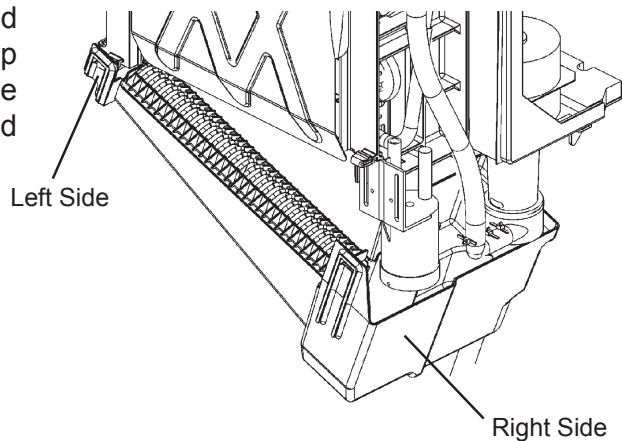


Fig. 28

- 6) Slide the left side of the Water Tank to release it from the Bracket Rail, lift down the entire Water Tank, and pull it toward you out of the Storage Bin. Do not hit the other components.
- 7) Refit the Water Tank in the reverse order of the removal procedure (left, right, top, rear).
- 8) Plug in the icemaker or connect the power source.

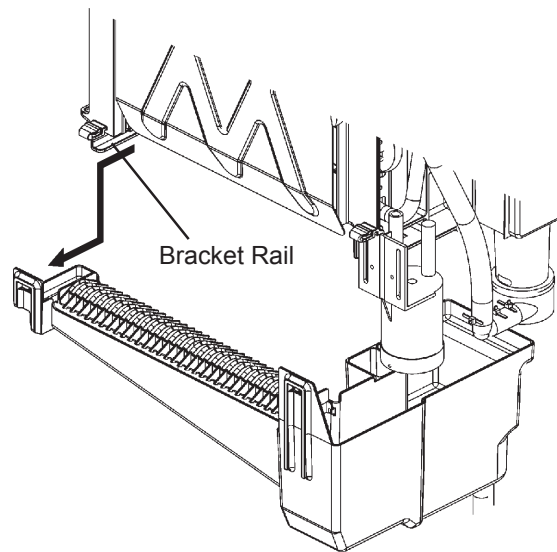


Fig. 29

20. CUBE GUIDE

- 1) Remove the Water Tank (see "19. WATER TANK").
- 2) Lift off the Cube Guide out of the Water Tank.
- 3) To refit the Cube Guide, fit the Notches on both sides to the Stoppers in the Water Tank.
- 4) The unit is provided with two or three Cube Guides (quantity varies depending on model). Be sure to locate the Vertical Flanges on the outside edges.

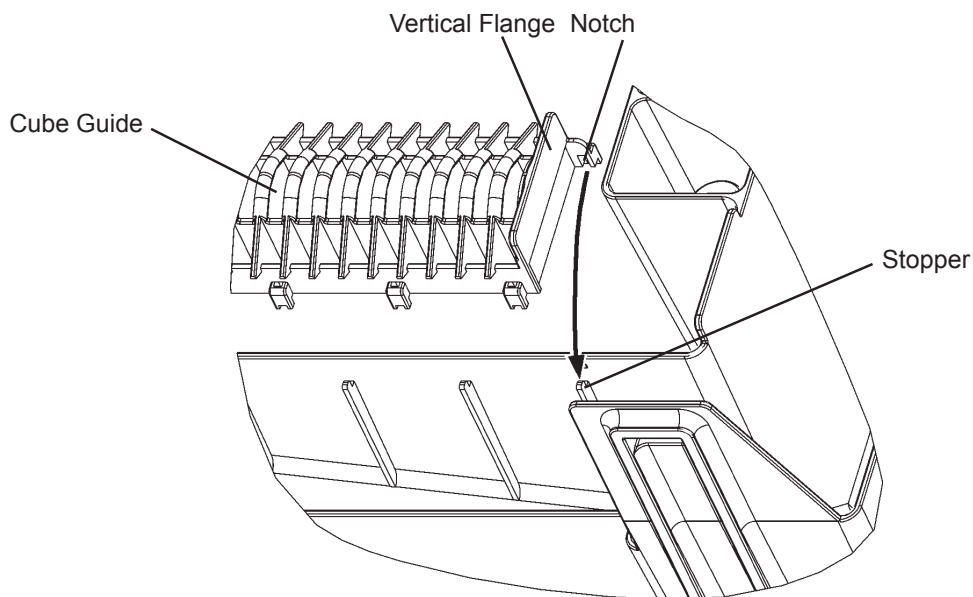


Fig. 30

21. SEPARATOR

- 1) Unplug the icemaker or disconnect the power source.
- 2) Remove the screws at the rear and take off the Top Panel.
- 3) Hold both sides of the Separator from the top. Bend the Front Separator into a U-shape and remove it from the Shaft of the Evaporator Bracket. Bend the Rear Separator into an inverted U-shape and lift it off the Shaft of the Evaporator Bracket.
- 4) Refit the Separator in the reverse order of the removal procedure. Check that the Separator is fit correctly on the Shaft and can swing like a pendulum.
- 5) Plug in the icemaker or connect the power source.

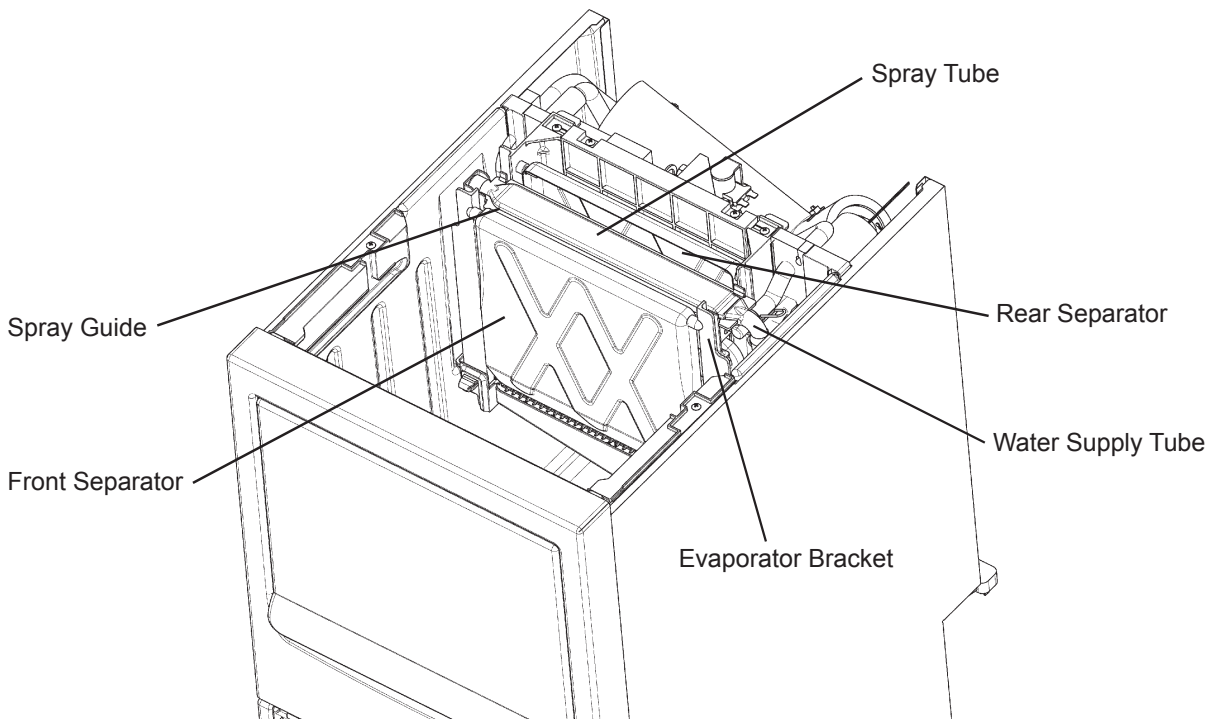


Fig. 31

22. SPRAY TUBE, WATER SUPPLY PIPE, SPRAY GUIDE

- 1) Unplug the icemaker or disconnect the power source. Remove the Top Panel.
- 2) Push the Tabs on both sides to release the Spray Tube.
- 3) Remove the end of the Spray Tube from the Bracket.
- 4) Pinch and lower the Hose Clamp and disconnect the Hose. The Spray Tube is easily cleanable by removing the black rubber cap on the end.

- 5) The Water Supply Pipe is located right under the Spray Tube. Remove the Water Supply Pipe from the Evaporator, pinch and shift the Hose Clamp, and disconnect the Hose.
- 6) The Spray Guide is located under the Water Supply Pipe. Pull off the Spray Guide from the Evaporator Plate.
- 7) Refit the removed parts in the reverse order of the removal procedure. Check for water leaks.

IMPORTANT

Fit the Spray Guide securely and tightly on the Evaporator fin. Otherwise, cloudy or irregular ice cubes or performance reduction may be caused.

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

23. DOOR

- 1) Remove the Top Panel.
- 2) Move the Door to fit the Door Shaft in the inlet of the Door Channel. Slide up the Door to release it from the Door Channel.
- 3) Refit the Door in the reverse order of the removal procedure. Do not forget to fit the Collar on the Door Shaft, or the Door will not open or close smoothly.

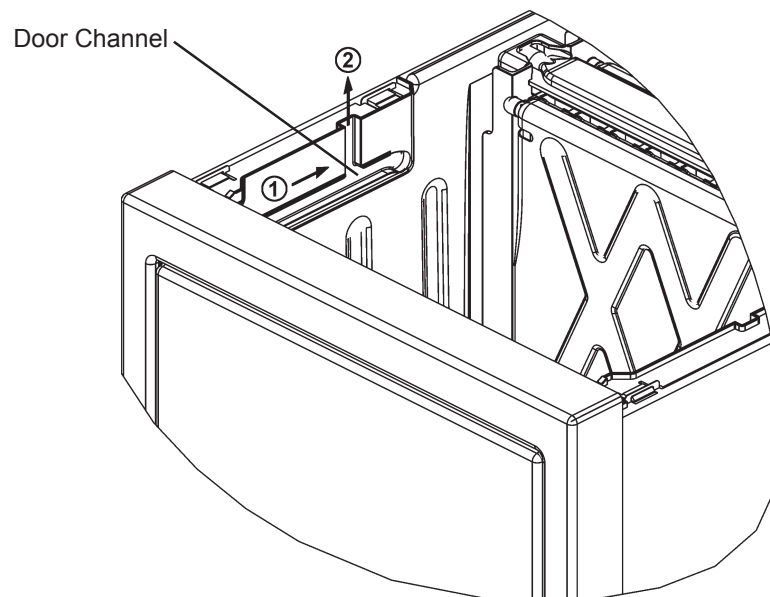


Fig. 32

VI. CLEANING AND MAINTENANCE INSTRUCTIONS

IMPORTANT

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

1. CLEANING

WARNING

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

[a] CLEANING PROCEDURE

- 1) Dilute 5 fl. oz. (148 ml) of recommended cleaner Hoshizaki "Scale Away" or "LIME-A-WAY" (Economics Laboratory, Inc.) with 1 gallon (3.8 lit.) of water.
- 2) Remove the Air Filter. Remove all ice from the Evaporator and the Storage Bin.

Note: To remove cubes on the Evaporator, move the Control Switch on the Control Box to the "OFF" position and move it back to the "ICE" position after 3 minutes. The defrost cycle starts and the cubes will be removed from the Evaporator.

- 3) Move the Control Switch to the "OFF" position. Open the Door.
- 4) Disconnect the Silicone Hose to drain the water. See Fig. 25. Reconnect the Silicone Hose back in its correct position after all of the water has drained.
- 5) Pour the cleaning solution into the Water Tank. Move the Control Switch to the "WASH" position. Close the Door.

- 6) After 30 minutes, move the Control Switch to the “OFF” position.
- 7) Same as step 4.
- 8) Move the Control Switch to the “ICE” position to fill the Water Tank with water.
- 9) After 3 minutes, move the Control Switch to the “WASH” position.
- 10) After 5 minutes, move the Control Switch to the “OFF” position.
- 11) Same as step 4.
- 12) Repeat steps 8 through 11 three more times to rinse thoroughly.
- 13) Disconnect the Silicone Hose and Overflow Pipe. Remove the Water Tank. See “V. 19. WATER TANK” for details.
- 14) Pull the Cube Guides (quantity varies depending on model) upward to remove them from the Water Tank. They are snapped in place. See Fig. 33. Refer to “V. 20. CUBE GUIDE” for details.

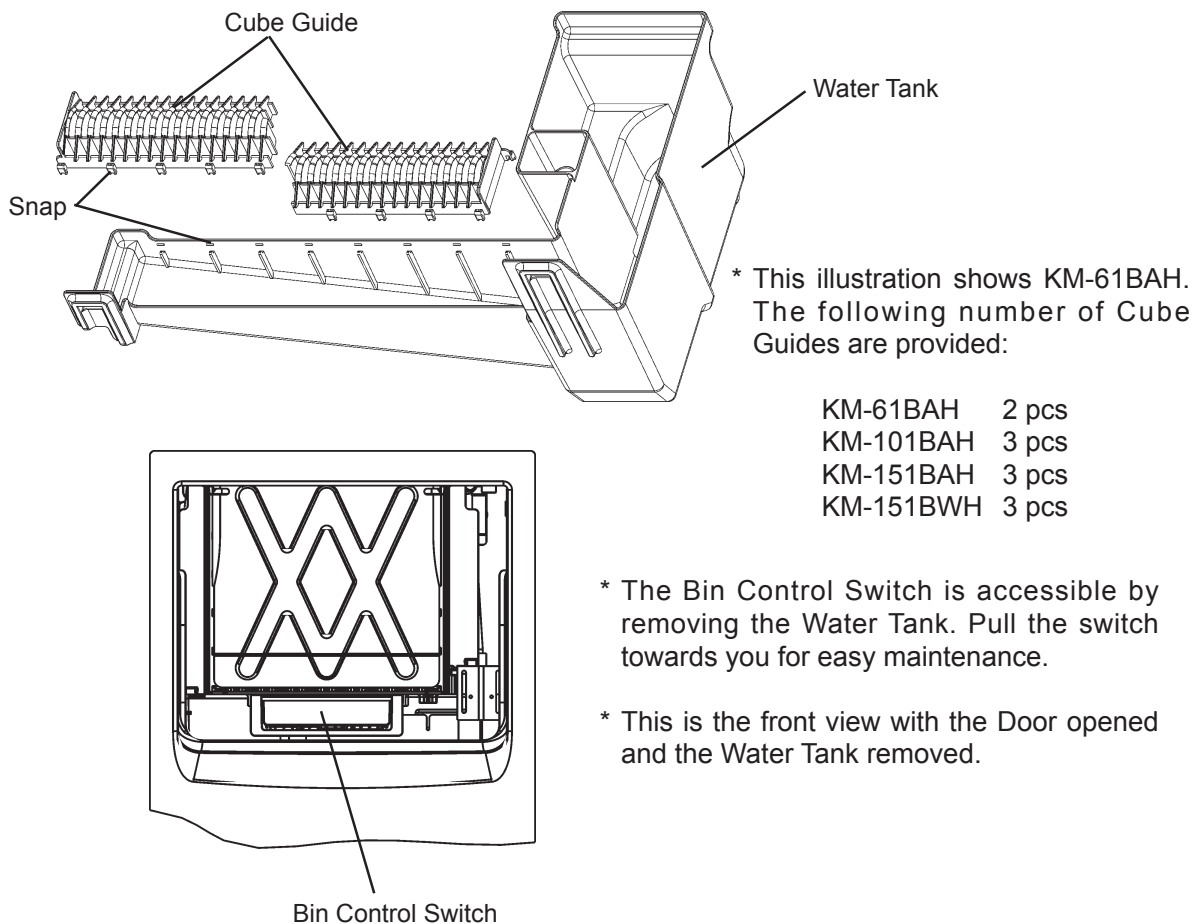


Fig. 33

- 15) Same as step 1.
- 16) Wash the Bin Control Switch, Water Tank, Float Switch, Cube Guide, Silicone Hose and Overflow Pipe by using a nylon scouring pad, brushes and the cleaning solution. In addition to the removed parts, also wash the bin liner and Bracket (L) (R) with the solution.
- 17) Discard the cleaning solution and rinse the parts thoroughly with water.

[b] SANITIZING PROCEDURE - Following Cleaning Procedure

- 1) Dilute approximately 0.5 fl. oz. (15 ml or 1 tbs) of a 5.25% sodium hypochlorite solution (chlorine bleach) with 1 gallon (3.8 lit.) of warm water. Using a chlorine test strip or other method, confirm that you have a concentration of about 200 ppm.
- 2) Soak the removed parts from step 16 above in a clean container containing the sanitizing solution. After allowing the parts to soak for 10 minutes, wash them with the solution. Also wash the bin liner, Bracket (L) (R) with the solution.
- 3) Discard the sanitizing solution and rinse the parts thoroughly with water.
- 4) Replace the removed parts in their correct positions in the reverse order of which they were removed.
- 5) Same as step 1.
- 6) Pour the sanitizing solution into the Water Tank, and allow the sanitizer to sit for 10 minutes.
- 7) Move the Control Switch to the "WASH" position. Close the Door.
- 8) After 15 minutes, move the Control Switch to the "OFF" position. Open the Door.
- 9) Disconnect the Silicone Hose to drain the water. Reconnect the Silicone Hose back in its correct position after all of the water has drained.
- 10) Repeat steps 5 through 9 one time. Repeat steps 8 through 11 in the Cleaning Procedure three times to rinse thoroughly.
- 11) Flush the Storage Bin with water.
- 12) Move the Control Switch to the "ICE" position, and start the automatic icemaking process.
- 13) Close the Door. Replace the Air Filter in its correct position.

2. MAINTENANCE

[a] EXTERIOR PANELS

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

[b] STORAGE BIN AND SCOOP

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

[c] AIR FILTER

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

[d] CONDENSER

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

3. PREPARING THE ICEMAKER FOR LONG STORAGE

IMPORTANT

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

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

[a] On KM-151BWH only, first remove the water from the Water-cooled Condenser:

- 1) Remove the Air Filter if it has not already been removed.
- 2) Move the Control Switch on the Control Box to the “OFF” position.
- 3) Wait 3 minutes.
- 4) Move the Control Switch to the “ICE” position.
- 5) Allow 5 minutes for the icemaker to fill with water and the Water Pump to start operating.
- 6) Close the Water-cooled Condenser water supply line Shut-off Valve.
- 7) Open the Drain Valve for the Water-cooled Condenser water supply line.
- 8) Allow the line to drain by gravity.
- 9) Attach compressed air or carbon dioxide supply to the Condenser water line Drain Valve.
- 10) Blow the Water-cooled Condenser out, using compressed air or carbon dioxide until water stops coming out.

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

- 1) Remove the Air Filter if it has not already been removed.
- 2) Move the Control Switch on the Control Box to the “OFF” position.

- 3) Wait 3 minutes.
- 4) Close the potable water supply line Shut-off Valve and open the potable water supply line Drain Valve. See Fig. 34.
- 5) Allow the line to drain by gravity.
- 6) Attach compressed air or carbon dioxide supply to the potable water supply line Drain Valve.
- 7) Move the Control Switch to the "ICE" position.
- 8) Quickly blow the potable water supply line out using compressed air or carbon dioxide.

[c] Drain the potable Water Tank:

- 1) Turn off the power supply at the breaker box.
- 2) Move the Control Switch on the Control Box to the "OFF" position.
- 3) Open the Door. Disconnect the Silicone Hose to drain the water. See Fig. 25.
- 4) Reconnect the Silicone Hose back in its correct position after all of the water has drained.
- 5) Remove all ice from the Storage Bin and clean the Storage Bin.
- 6) Close the Door.
- 7) Place the Air Filter in its correct position.
- 8) Close the potable water supply line Drain Valve.

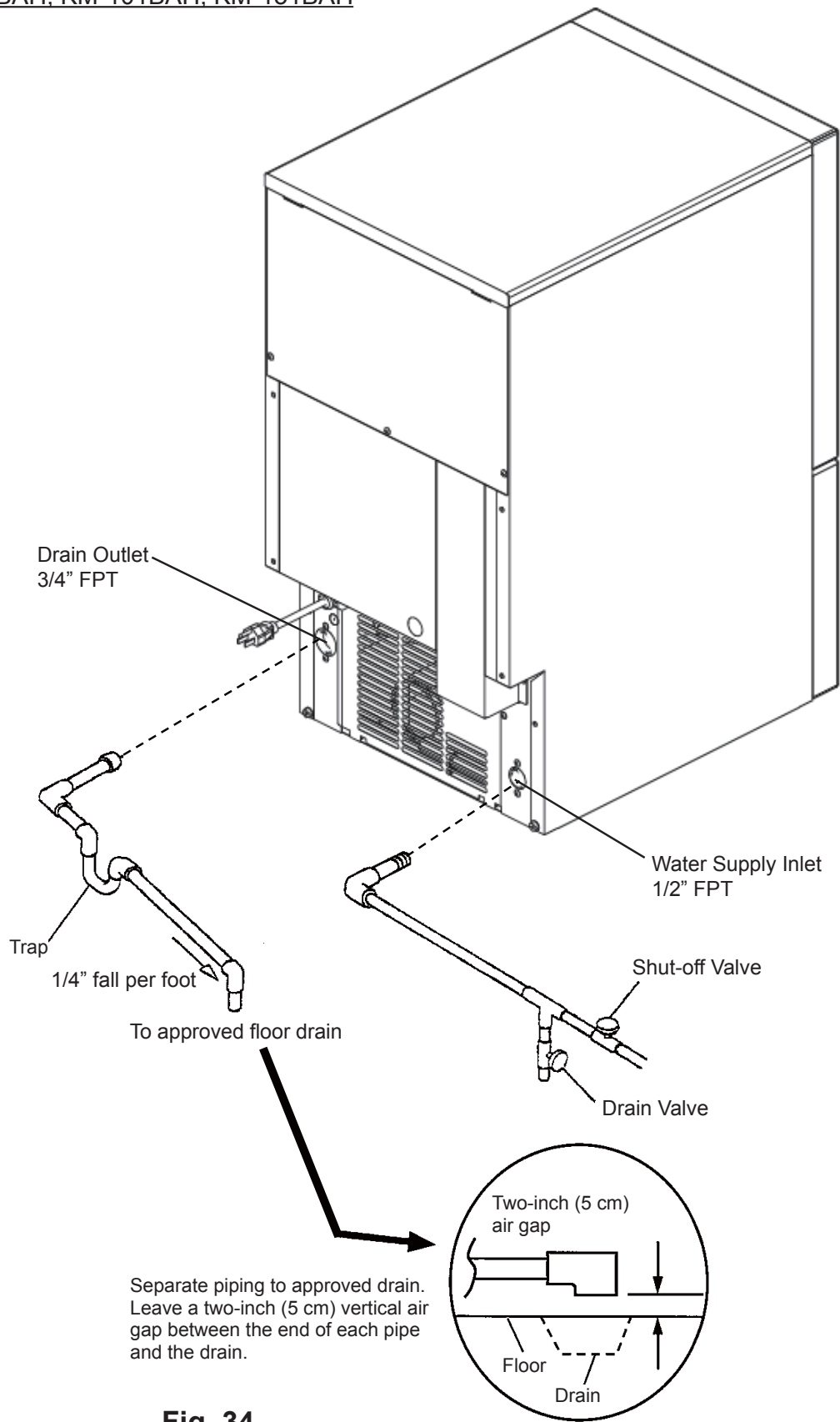


Fig. 34

KM-151BWH

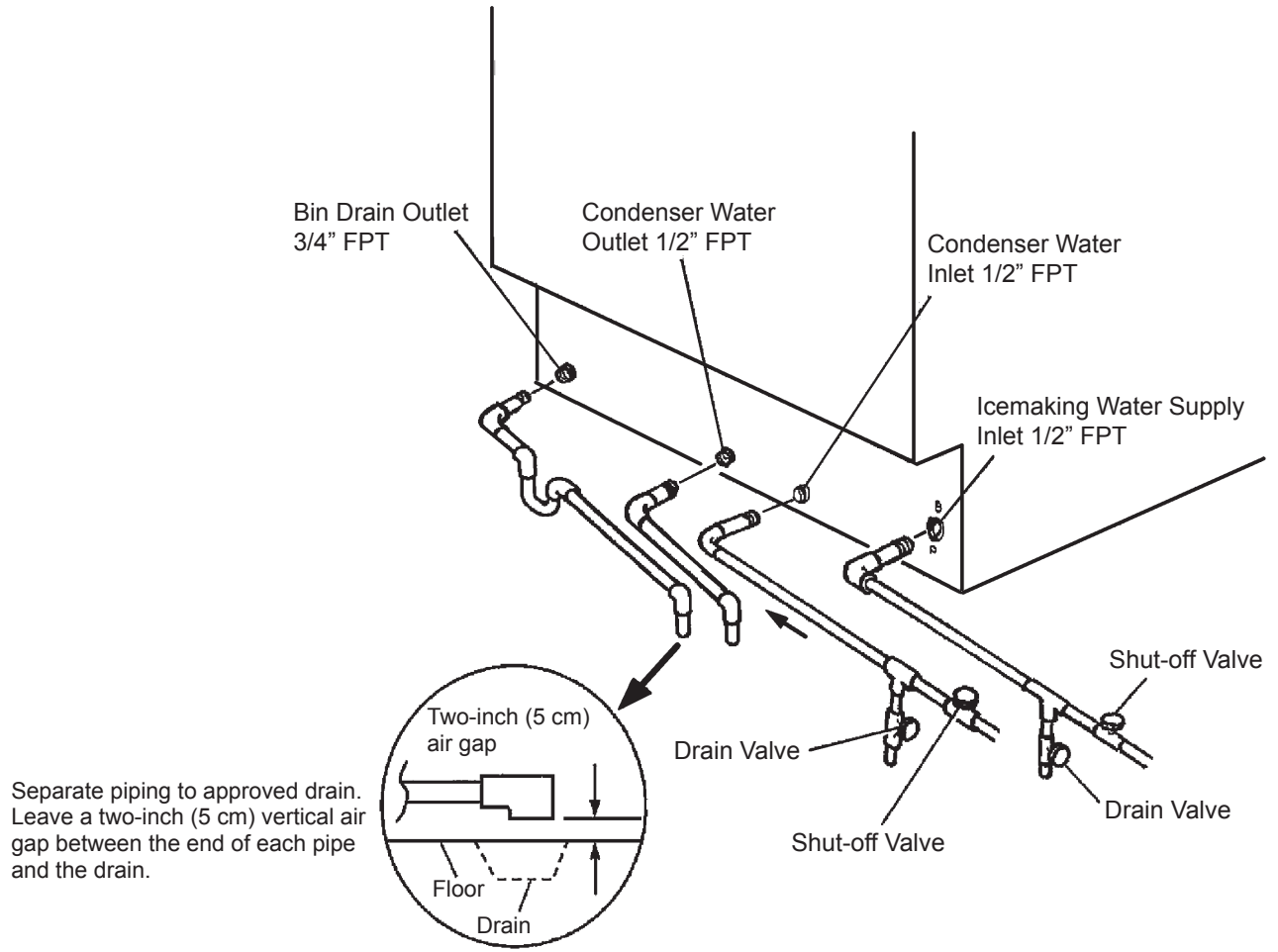


Fig. 35