ICE MATE

COMMERCIAL SELF-CONTAINED RHOMBIC ICE MAKER

SRM-650AB
SRM-650AB-14

SERVICE MANUAL

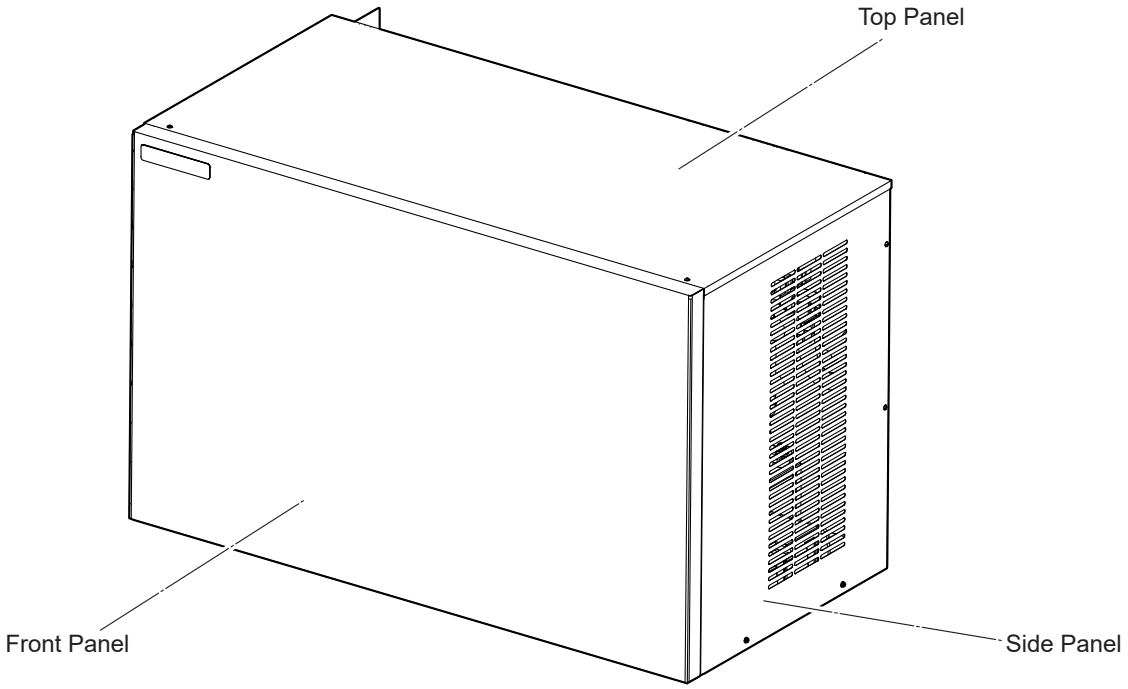
M213-001(073125)

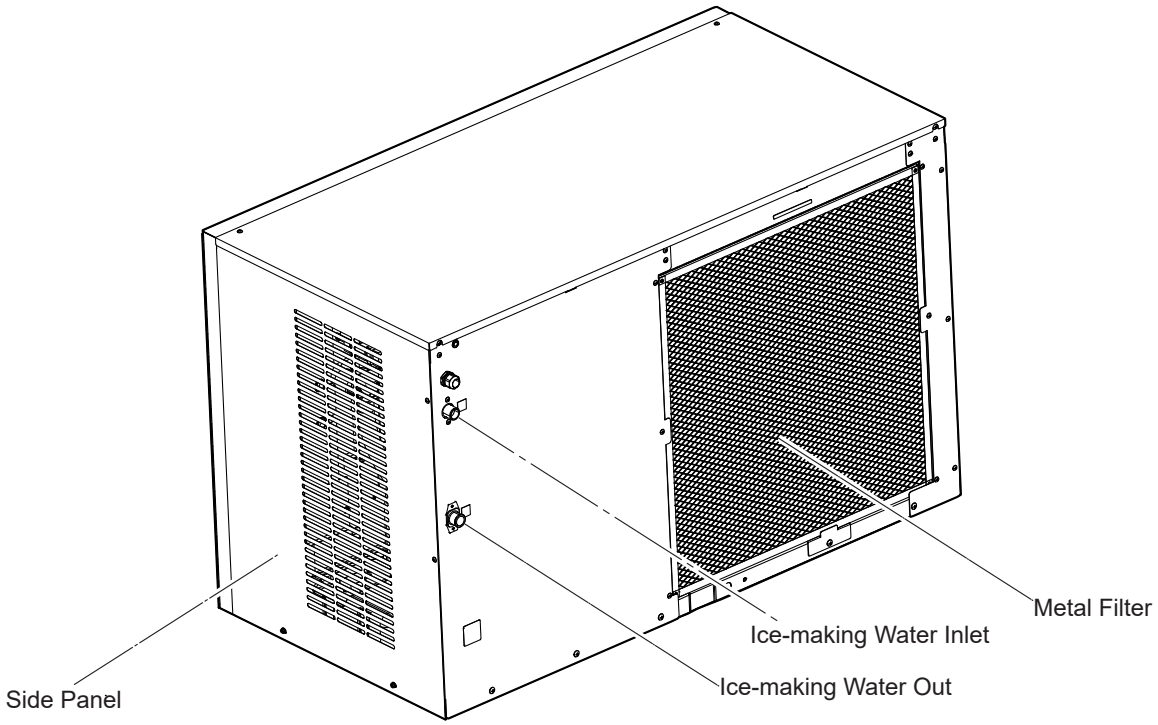
CONTENTS

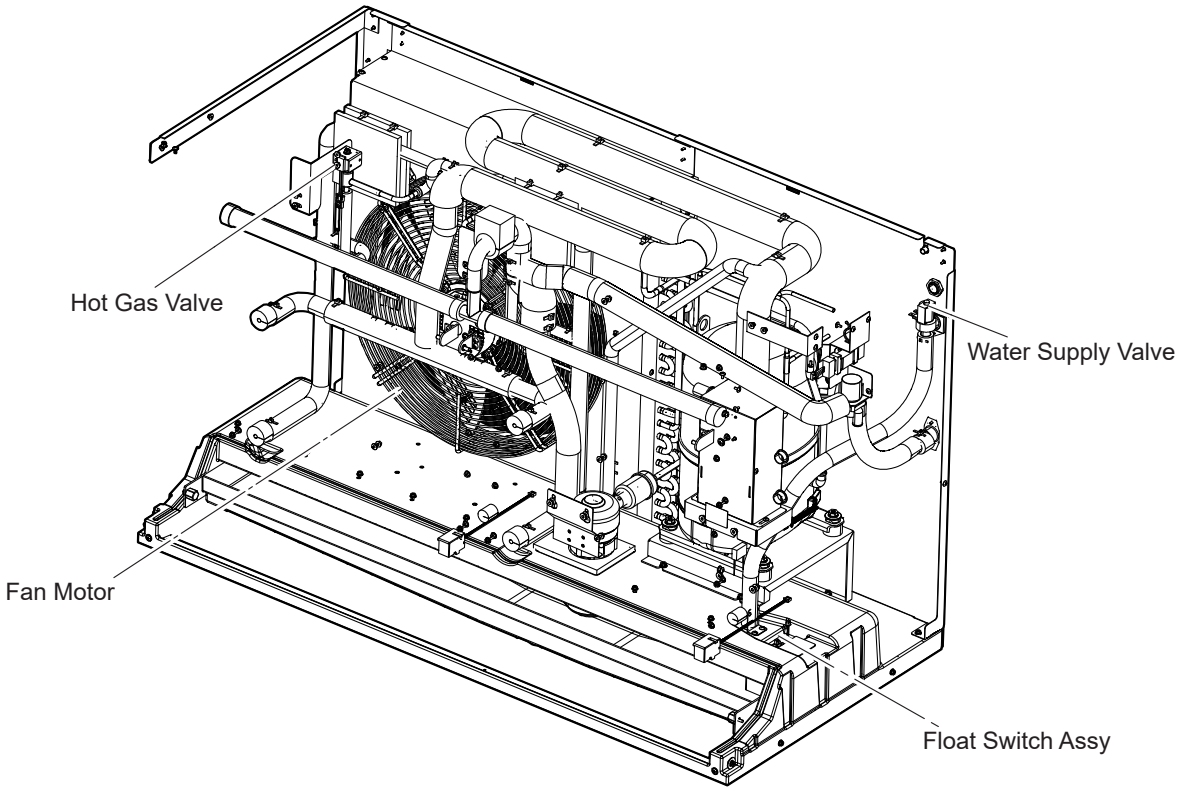
Ⅰ .GENERAL INFORMATION

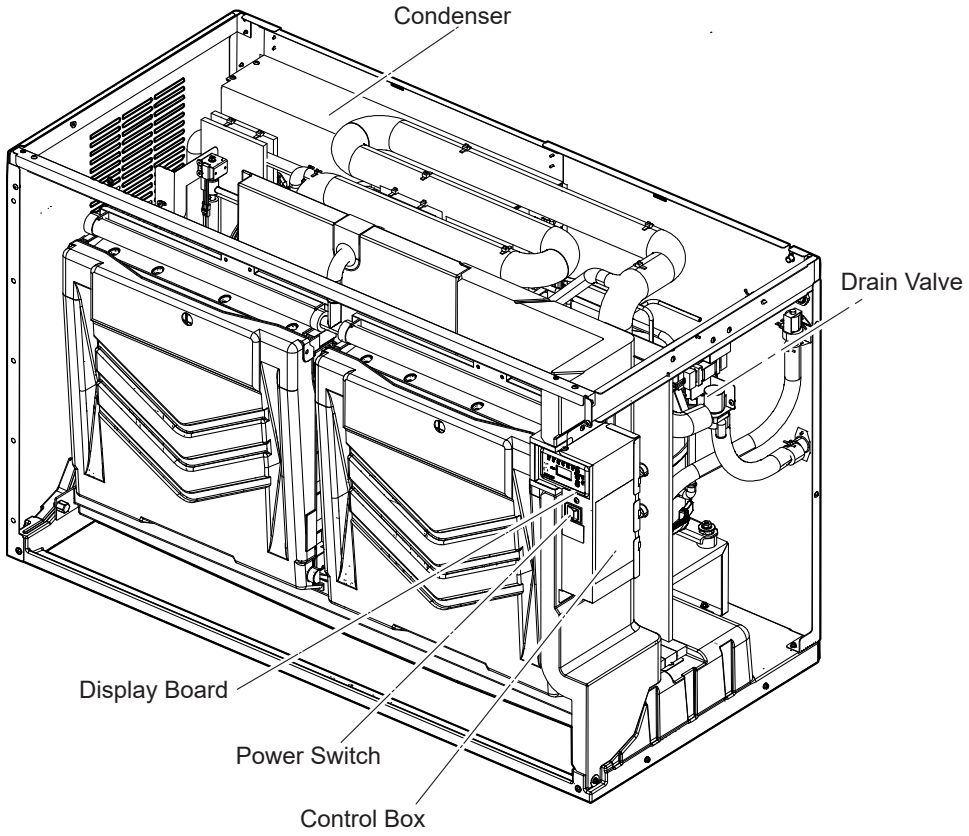
1.CONSTRUCTION

[a]SRM-650AB(-14)

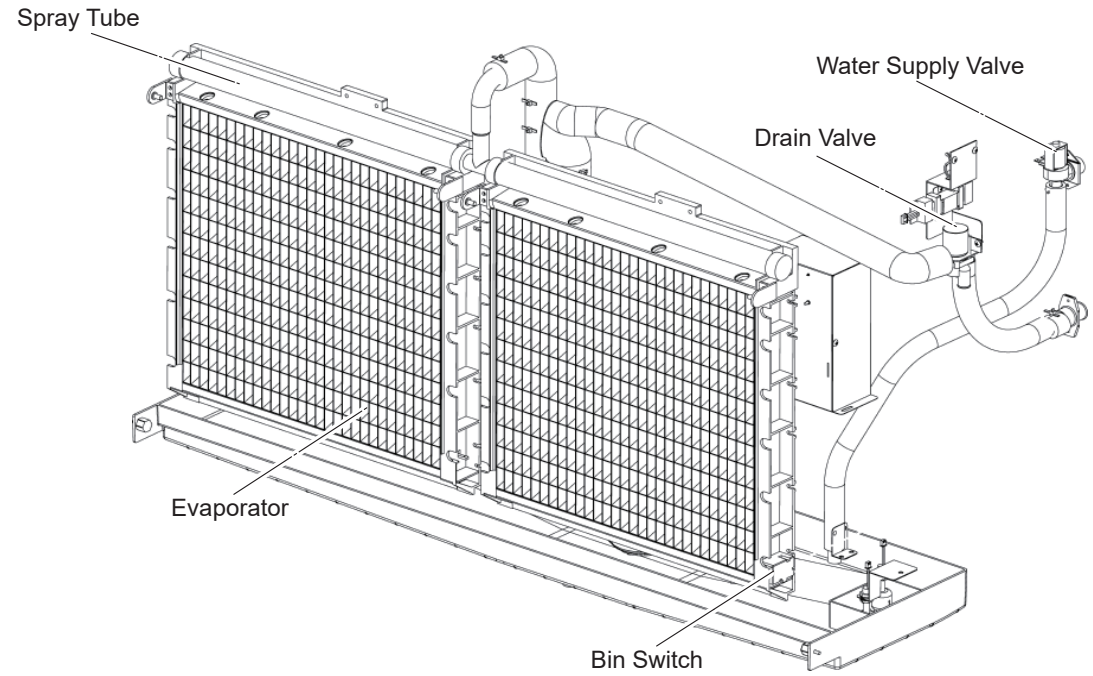


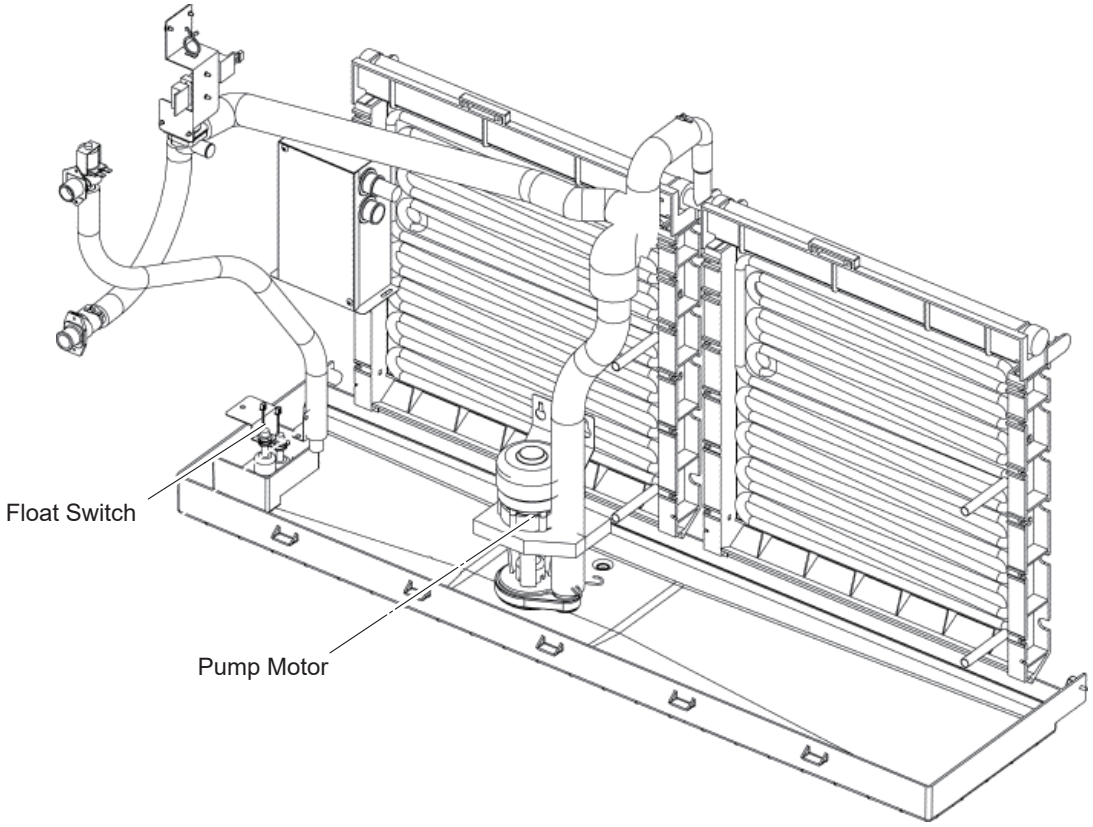



Hot Gas Valve
Water Supply Valve
Fan Motor
Float Switch Assy


Condenser
Drain Valve
Display Board
Power Switch
Control Box

[b]ICE MAKING MECHANISM





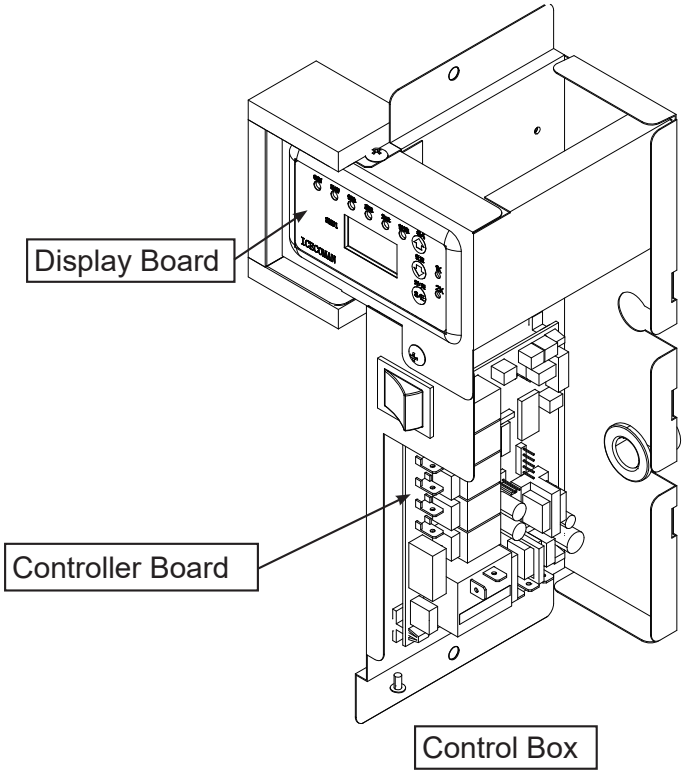
2.CONTROLLER BOARD

*SRM series of commercial self-contained rhombic ice maker are generally controlled by solid state circuits in the domestic market.

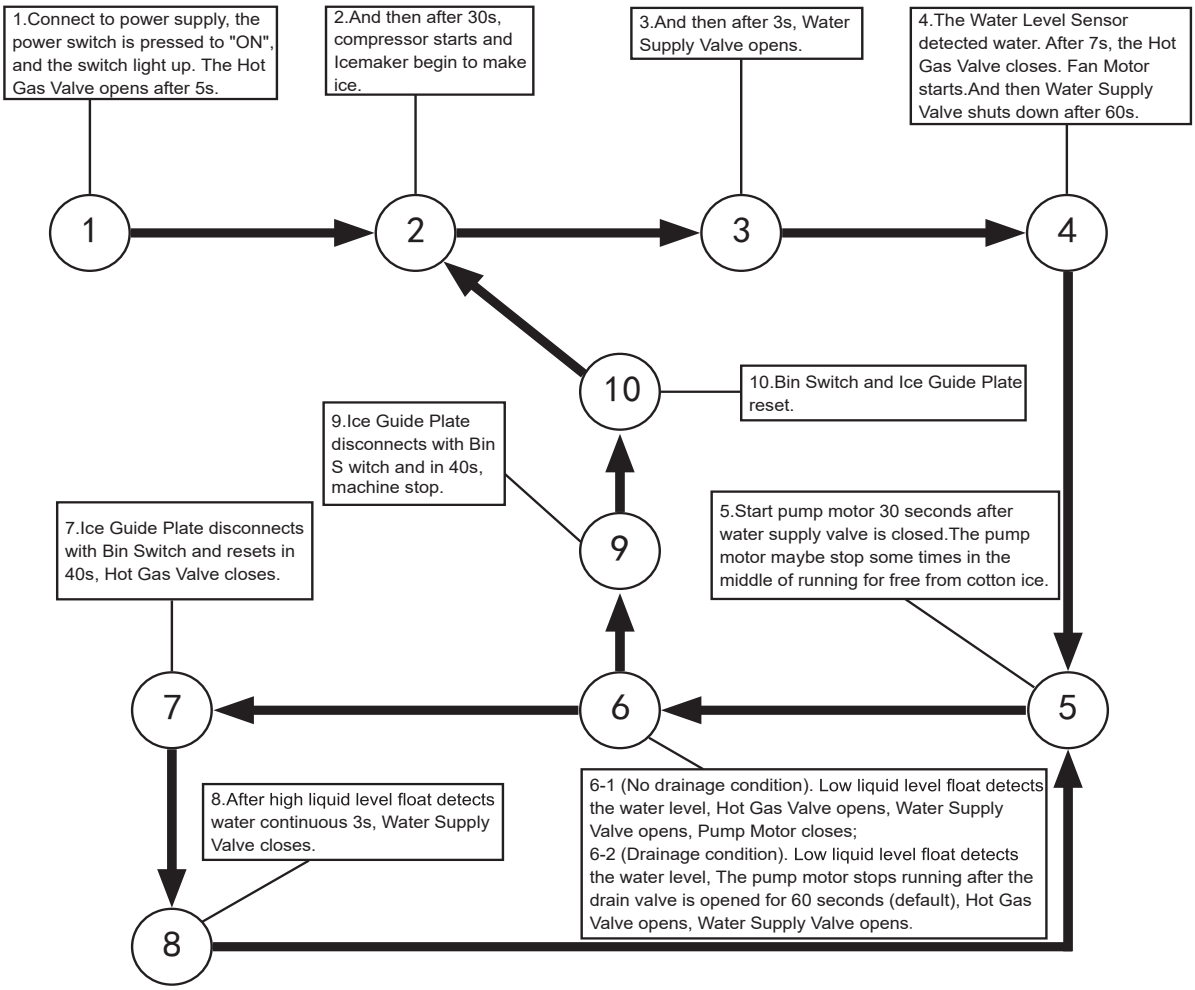
*All types of machines have been completely commissioned before leaving the factory.

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

NOTICE
1.The controller board is fragile, handle with care.
2.The controller board is equipped with an integrated circuit, which may cause a failure due to a static electricity. In order to avoid generating static electricity, do not touch the metal part on the controller board when repairing or replacing the controller board. This point is very important.
3.Do not touch controller board and electronic components on the back of the controller board to prevent damage to the controller board. When you take it, you can only hold the edge of the controller board.
4.Do not change the wires and connection.
5.Do not repair the electronic components or parts on the controller board at the job site (except for replacement of the fuse).Please replace the whole controller board when the controller board is malfunction.
6.Do not short-circuit the power supply when the voltage is tested. And never short the terminal or modify the terminal.
7.Do not miss the ground wire assembly when the controller board is replaced.



[a]RUNNING ORDER



IMPORTANT
1.Water Supply Valve opens and continuously inlets water for 5 minutes. If high liquid level float cannot detect the water, the machine will shut down.
2.If in Harvest process (not initial process), Bin Switch does not move, the maximum Harvest time is no more than 5 minutes.
3.No water level was detected on the low level floating ball during the ice making process,the maximum icemaking time is no more than 40 minutes.
4.In the process of ice making, Fan Motor will stop when the outlet temperature of the condenser is below 10.5°C, and Fan Motor will run when the condenser outlet temperature is higher than 11°C.
5.At the end of the ice making, the setting temperature of condenser outlet is: 30°C(When the value is less than 30°C, the maximum delay time of the fan motor is 30s before the Harvest process finishes.).
6.In Harvest process, Fan Motor runs when the outlet temperature of the condenser is higher than 38°C, and Fan Motor stops when the outlet temperature of the condenser is below 35°C.
7. When the outlet temperature of the condenser is higher than 70°C, the machine will shut down and performs high temperature protection.
8.If air temperature is too low, Item 7. 8 will reverse.
9.System pressure exceeding [28.4 +1.5/0 bar] will stop for protection.
10.In the ice making process, the Evap. Sensor can control Pump Motor’s on-off by detecting temperature.

Please refer to the sequence diagram in details.

[b]CONTROL FUNCTION

1.Harvest Control Timer

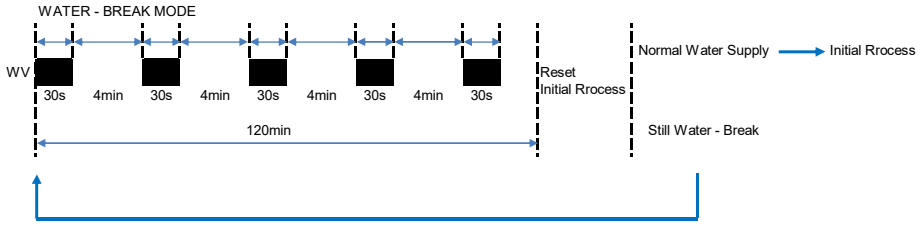
If Harvest Process takes more than 5min accumulatively over 3 times, Harvest Control Timer will turn the icemaker down. The icemaker can automatically repower or reset after 120 min.

2.Icemaking Control Timer

If icemaking process takes more than 40 minutes accumulatively over 10 times, Icemaking Control Timer will turn Icemaker down. The icemaker can automatically repower or reset after 120 min.

3.Water shortage Protection Timer

If during Harvest Process, Water Supply Tube opens more than the setting time (5 min),The high liquid level float is not detected,Ice maker will enters Water shortage Protection Timer. In that case, during the shut down process, Water Supply Valve will open for 30s each 4 min until the water in tank is detected and the machine enters the Initial Process. If no water gets into water tank during the shutdown process, the machine will automatically enter the initial process after 120min.



4.Full ice Protection Timer

Full ice Protection Timer will turn machine down if Ice Guide Plate opens more than 40s and does not reset. If Ice Guide Plate resets, the machine will start automatically.

5.Overload Protection

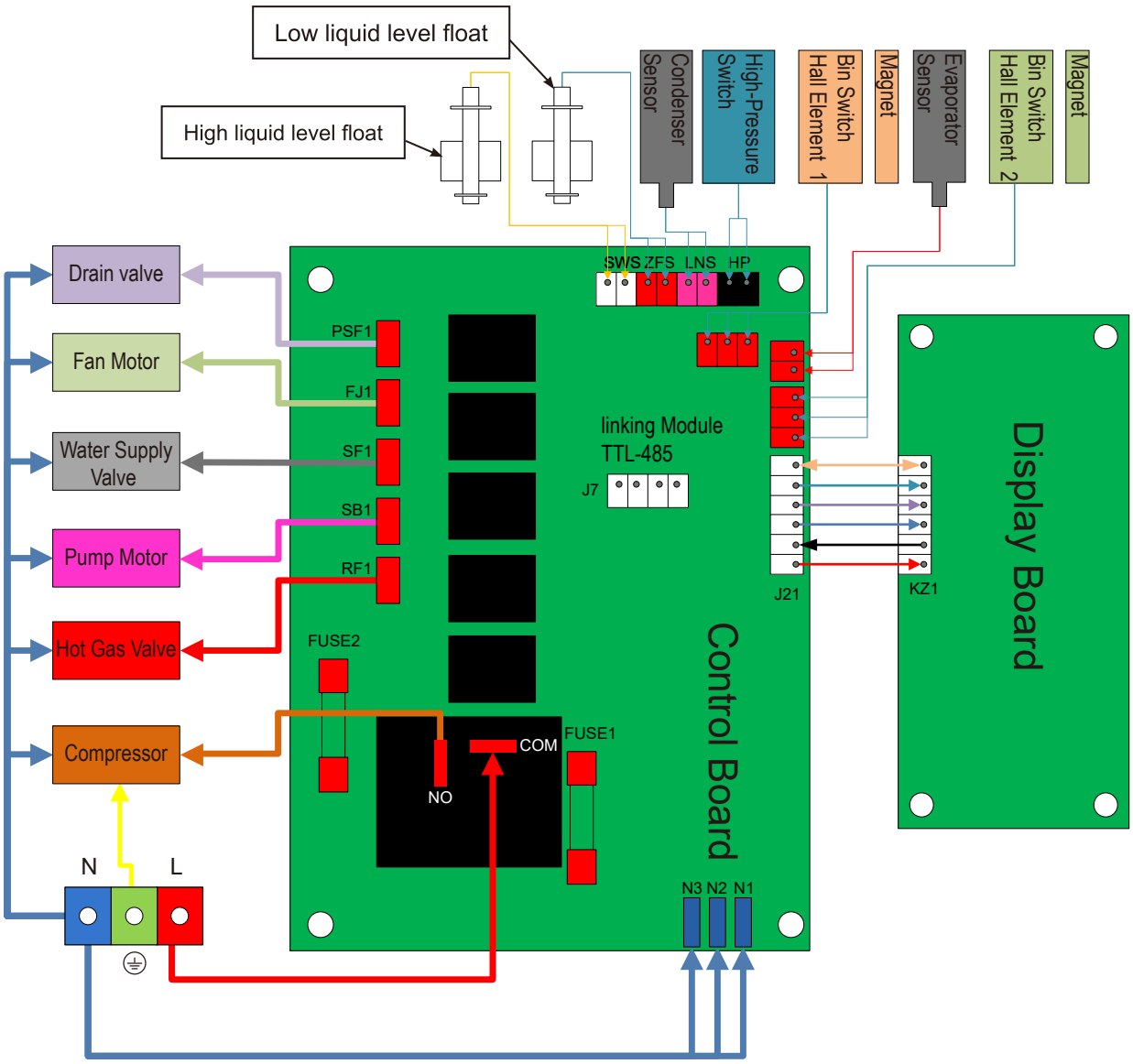
The load in the refrigeration circuit is controlled by high pressure switch and the compressor overload protector. If the air temperature is too high or the refrigeration circuit is blocked, the system pressure is too high and exceeds the set value of the high pressure switch[28.4+1.5/0 bar], the icemaker will shut down automatically. The high pressure switch will be closed only when the system pressure balance is below [22.6 ± 1.5 bar]. If the compressor overload protector closes and air temperature and refrigeration circuit recoveries, the icemaker will automatically restart after the compressor temperature drops.

*Above related settings are set before the product is out of the factory, and just trained professionals can adjust the settings.

Item	Judge Condition
The end of icemaking	1.The low liquid level float detects the water level. 2.Drainage setting time: drainage finished (with drainage). 3.Condenser outlet setting temperature: 30°C (If the value is less than that value, the maximum delay time of the fan motor OFF before Harvest process is 30s).
Icemaking process	When the condenser outlet temperature ≤10.5°C: Fan Motor stops. When the condenser outlet temperature ≥11°C: Fan Motor runs.
Harvest process	When the condenser outlet temperature ≥38°C: Fan Motor runs. When the condenser outlet temperature ≤35°C: Fan Motor stops.
Failure cycle mode	A. When the accumulative triggering times of Standby Timer in Icemaking process =10 times, Icemaker stops for protection; B. When the accumulative triggering times of Spare Timer in Harvest process =3 times, the machine is stopped for protection; A, B count independently; Power reset and restart, counter resets zero, enter the initial process.

High temperature protection	When the system pressure rises to 2.84MPaG, the high-tension switch is disconnected and the machine is shut down for protection. After high pressure protection, the system pressure drops to 2.26mpag, the high-tension switch is closed, and the ice machine starts automatically.
During shutdown protection, the reset method:	1.2 hours after shutdown protection; 2.Repower.

[c]CONTROLLER BOARD LAYOUT



[Note:The fan motor and condenser outlet thermistor are used only for air cooled model]

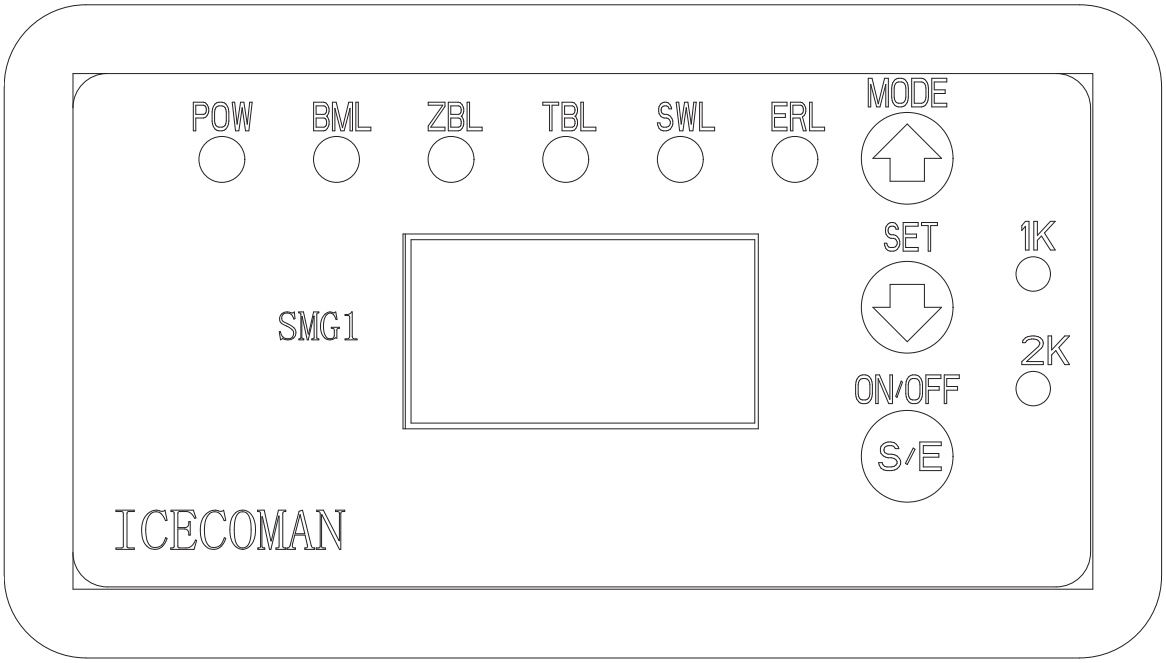
[d]CONTROL AND ADJUSTMENT

1.Control Program

Control Program has been debugged before leaving the factory,If you need to debug the control program, you must contact professional after-sales personnel.

The control and debugging of the icemaker consists Control Board and Display Board. These two parts are transmitted by a six-core wire.

Definition of display board buttons:
MODE: Mode/setup plus button, it is a mode function in normal state, and push button ends the current state.
SET: Set/set subtraction.
ON/OFF: Switch / set / exit button, push the button to turn on/off icemaker during normal state.



The indicator on Display Board and its function definition:

	POW	BML	ZBL	TBL	SWL	REL	1k	2k
Definition of indicator	Power	Full ice	Ice making	Harvest	Water level	Fault	Time 1000s	Time 2000s
Color	Green	Red	Green	Yellow	White red	Red	Red	Red

[e]WORKFLOW TABLE

State	Accessing conditions	Indicator light	Digital display	Working load	Duration	Instructions
Initialization	Supply power	All turn on	888	---	1s	Just on 1s and then off
Sensor self-inspection: If all sensors are normal	Power,reset or OFF state, push ON/OFF and turn on the machine	All turn off	E05 always on: water level is ok E12 always on: The low liquid level float is normal E78 always on: condenser sensor is ok E9A always on: Evaporation sensor is normal E01 always on: bin switch is OK E06 always on: Pressure is normal		5s	The digital tubes take turns to show E05- E12-E78-E9A-E01-E06,and the characters are always on.
Sensor self-inspection: If the sensor are abnormal	Power, reset or OFF state, push ON/OFF and turn on the machine	All turn off	E05 blinks:water is not enough in tank. E12 blinks:low level float is connected E07 blinks:The condenser sensor is in open circuit E09 blinks:Evaporation temperature sensor short circuit E10 blinks:Evaporation temperature sensor open circuit E01 blinks:The bin switch is open E06 blinks:Pressure switch is open		25s	The digital tubes take turns to show E05-E12- E07-E09-E10-E01-E06,and constant lighting of characters indicates normal; blink of characters indicates exception. (E05 and E12 blink work normally by default)
Soft start	Self-inspection completion	POW & TBL turn on	Display Board times	RF	30s	High and low pressure balance
Initial process	Soft start ends	POW & TBL turn on	Display Board times	RF,YSJ,SF	The pressure balance time reaches 30s. The compressor starts and the water valve starts to fill 3 seconds after the timing. The water inlet valve closes 3 seconds after the high liquid level floating ball detects the water level, and the hot air valve closes 5 seconds after the timing	
Pre-cooling process	After Hot Gas Valve closes	POW & ZBL turn on	Display Board times	YSJ,FJ,SB	After 30s when Water Supply Valve closes. Pump Motor turn on and pre-cooling process finish. Fan Motor works according with setting temperature.	
Basic icemaking process	Pre - cooling process ends	POW & ZBL turn on	Display Board times	YSJ,FJ,SB	Default is 6 minutes	The low level float is invalid in this time
Icemaking process	Basic icemaking process ends	POW & ZBL turn on	Display Board times	YSJ,FJ,SB	The longest ice making time is 40 minutes	In this time, the high level float is invalid, while the low level float is valid. And Fan Motor works according with setting temperature.
Deicing detection process	In Icemaking process	POW & ZBL turn on	Display Board times. When the starting of Harvest process,Display board become 0.	YSJ,FJ,SB	20s	The low level floating ball detects that the water level lasts for more than 20 seconds, during which the fan motor works under the set temperature
Drainage process (skip this process if there is no drainage)	Low level float detects ice making process complete	Power supply, ice making when the drainage function of ice making seconds flash	Monitor timing reset after the drainage, drainage end when the ice collection display timing reset	YSJ,FJ, SB,PSF	The default time is 60s and the maximum time is 90s	When the drainage period is set to 0, or the drainage time is set to 0, there is no drainage process, the drainage period and drainage time are adjustable, and the fan motor works in a controlled manner according to the set temperature during this process
Harvest process	The low level floating ball detects that the ice making process is complete or the drainage process is complete	POW & TBL turn on	Harvest times	YSJ,RF,SF	The maximum time is 5 minutes by default	In Harvest process, Water Supply Valve opens. When the high level float detects the water level, the feed valve continues to work for 3 seconds
Full ice detection process	End of Harvest process	POW & ZBL turn on	Harvest times	YSJ,RF,SF	40s	If Ice Guide Plate opens more than 40s.program turns into Full ice detection process. If Ice Guide Plate happen to reset in 40s.icemaker will get into pre-cooling process
Full ice process	Full ice signal	POW & BML turn on	FU1	All loads close	Until end full ice process	Ice Guide Plate opens more than 40s and don't happen to reset in 40s

[f]FAULT CODE AND ANALYSIS

Fault code	Content	Fault phenomenon	Indicator lights	Loads close	Analysis	Checking points, treatment
E01	Full ice error	Ice Guide Plate or Bin Switch are abnormal	Fault	YES	1.Ice Guide Plate absence 2.Pole of magnet is opposite 3.Bin switch is broken	Check and repair.
E02	Icemaking error	Cumulative 10 times of icemaking exceeds the maximum setting time (40 minutes), it will happen overtime fault of icemaking.	Fault	YES	1.High ambient temperature 2.Condenser clogging 3.Refrigerant leakage 4.Water shortage in tank	Check whether the condenser cooling system or icemaking system leaks. Check Spray Tube and whether water tank leaks.
E03	Harvest error	Cumulative 3 times of icemaking exceeds the maximum setting time (5 minutes), it will happen overtime fault of Harvest.	Fault	YES	1.Hot gas valve failure 2.Condensation temperature is too low 3.Ice thickness is too thick or too thin 4.Water in tank is too little	Check hot gas circuit, ice thickness sensor and water circuit.
E04	High temperature error	Temperature which condenser sensor detects is higher than setting limit of 70°C.	Fault	YES	1.The ambient temperature too high 2.Fan motor damage is breakdown 3.Condenser clogging 4.Filter blockage	Check the related parts
E05	Water supply error	Fault in water lack	Fault	YES	1.Water Supply Valve un-opened 2.Low inlet water pressure 3.Water Supply Valve failure 4.Tank leakage 5.The high liquid level float is damaged	1.Check the water supply pressure,Water,Supply Valve, and Water Tank. 2.Adjust the parts which installed badly and change the broken parts
E06	High pressure error	Excessive condensation pressure	Fault	YES	1.The ambient temperature is too high 2.Condenser fan motor is damaged 3.Condenser is blocked 4.Air filter is blocked 5.Pressure switch is in bad contact or damaged	1.Check relevant parts or replace defective parts 2.Clean the condenser and filter screen
E07	Condenser sensor error	Condenser sensor is in un-open	Fault	YES	1.Sensor is breakdown 2.Connector has problems	1.Change the sensor 2.Check connection of the sensor
E08	Condenser sensor error	Condenser sensor is in short circuit	Fault	YES	1.Short circuit of the sensor 2.There is dust on the connector	1.Change the sensor 2.Cleaning connector
E12	The low liquid level float error	The low liquid level float is faulty	---	---	1.The low liquid level float is damaged 2.Connector problem	1.Detect low level float or replace defective products 2.Verify that the float is properly connected

When the machine shutdown due to faults, display board will show the fault code. Push MODE, or let machine restart automatically after120min.
If the machine stops due to water lack, machine can automatically reset when water supply return to normal.

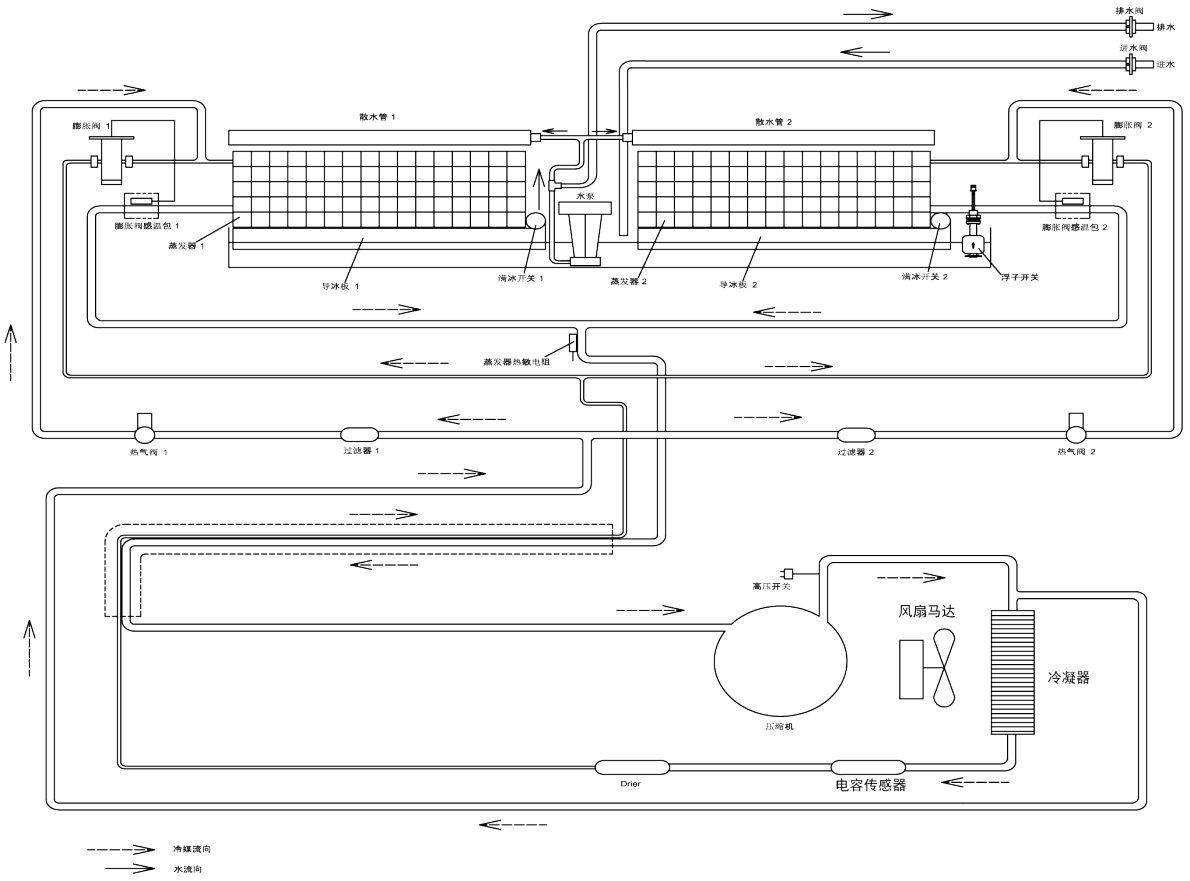
[g]SETTABLE ITEMS ON CONTROLLER BOARD

Settable item	Channel	Display data	Corresponding parameters scope	Default	Note
Sensitivity of low level float to detect water level	1	00 ～ 19	Grade 00 ～ 19	110 Grade 10	The default level is 10 Detection of water level, independent of water quality, no need to adjust.
The longest time of ice making	2	40	40min	240 40min	If icemaking time is more than this time, the machine can automatically get into Harvest process. **(fixed value)**
The longest time of Harvest	3	05	5min	305 5min	If Harvest time is more than this time,the machine can automatically get into icemaking process. **(fixed value)**
The up-limited temperature of pump motor stop.	4	-20 ～ 00	-20 ～ 00°C	400 0°C	If the temperature which Evap. Sensor detects is between the up-limited and low-limited temperature,Pump Motor stops. Setting:400,503
The low-limited temperature of pump motor stop.	5	-21 ～ -01	-21 ～ -01°C	503 -3°C	
Condenser temperature before Harvest	6	26 ～ 35	26 ～ 35°C	630 30°C	If the temperature is lower the setting value before Harvest,Fan Motor will stop for 30s **(No change)**
Reaction time of Evap. Sensor	7	00 ～ 60	0 ～ 60s	710 10s	The time which Evap. Sensor detecting temperature is lower the setting value in icemaking process.
Stop time of pump motor	8	00 ～ 60	0 ～ 60s	815 15s	The time each time the pump motor stops working in ice making
Water shortage protection time	9	00 ～ 09	00 ～ 15 min	905 5 min	Continuous water supply time exceeds the setting time, water shortage protection. **(No change)**
Stop times of pump motor		00 ～ 15	00 ～ 15 times	905 5 times	In the ice making process, the most stop times of pump motor.
Initial water inlet delay	A	00 ～ 90	0 ～ 90S	A03 3s	At the start of power,the continues adding time after Water Level Sensor detects water. (fixed value)
Water inlet delay	P	00 ～ 90	0 ～ 90S	P03 3s	In Harvest process,the continues adding time after Water Level Sensor detects water. (fixed value)
Drainage cycle	C	00 ～ 90	00 ～ 09 times	C03 3 times	Ice making process drainage cycle setting, factory default 3 cycle forced drainage. (Adjustable setting according to water quality)
Drainage time	H	00 ～ 90	0 ～ 90S	H60 60s	Before deicing, the factory default setting drainage time is 60 seconds. (Adjustable setting according to water quality)
Device ID address	F	1-FF (Hexadecimal)	1-255	F01	Device communication address

*The above items have been set before production leaving factory. If need adjustment , please operate under the guidance of the trained professionals.

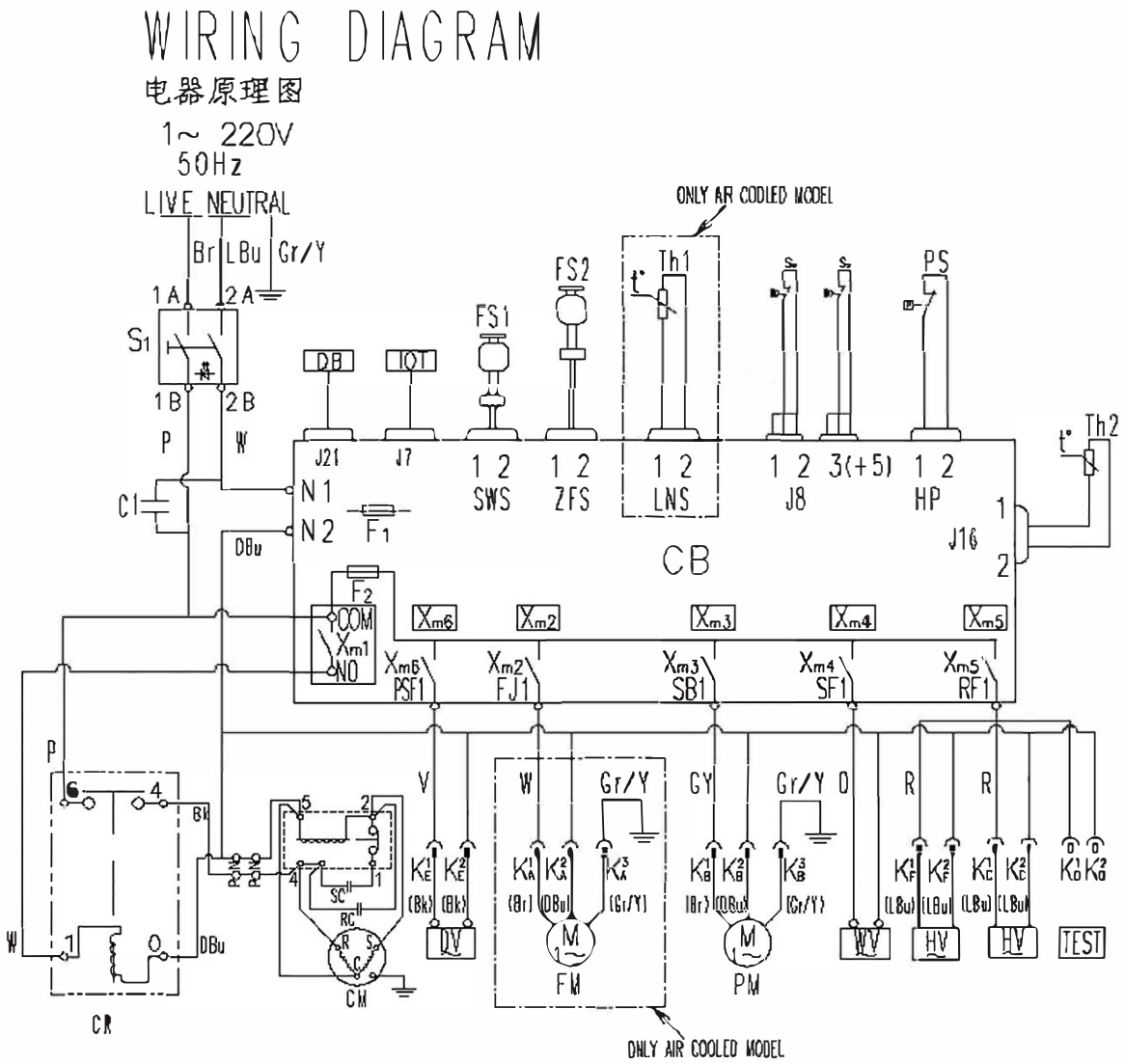
II .TECHNICAL INFORMATION

1.WATER CIRCUIT AND REFRIGERATION CIRCUIT



2.WIRING DIAGRAM

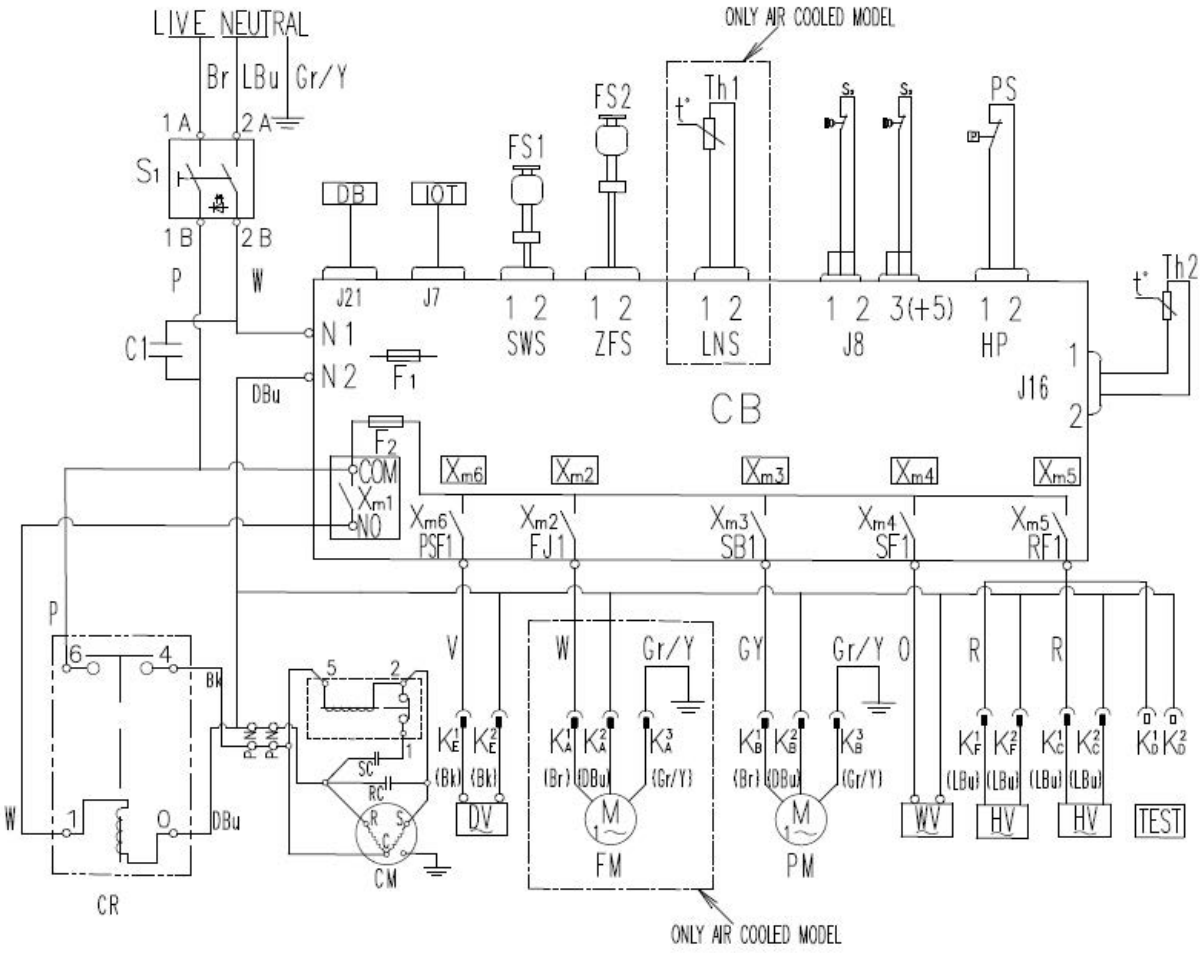
SRM-650AB
SRM-650AB-14



WIRING DIAGRAM

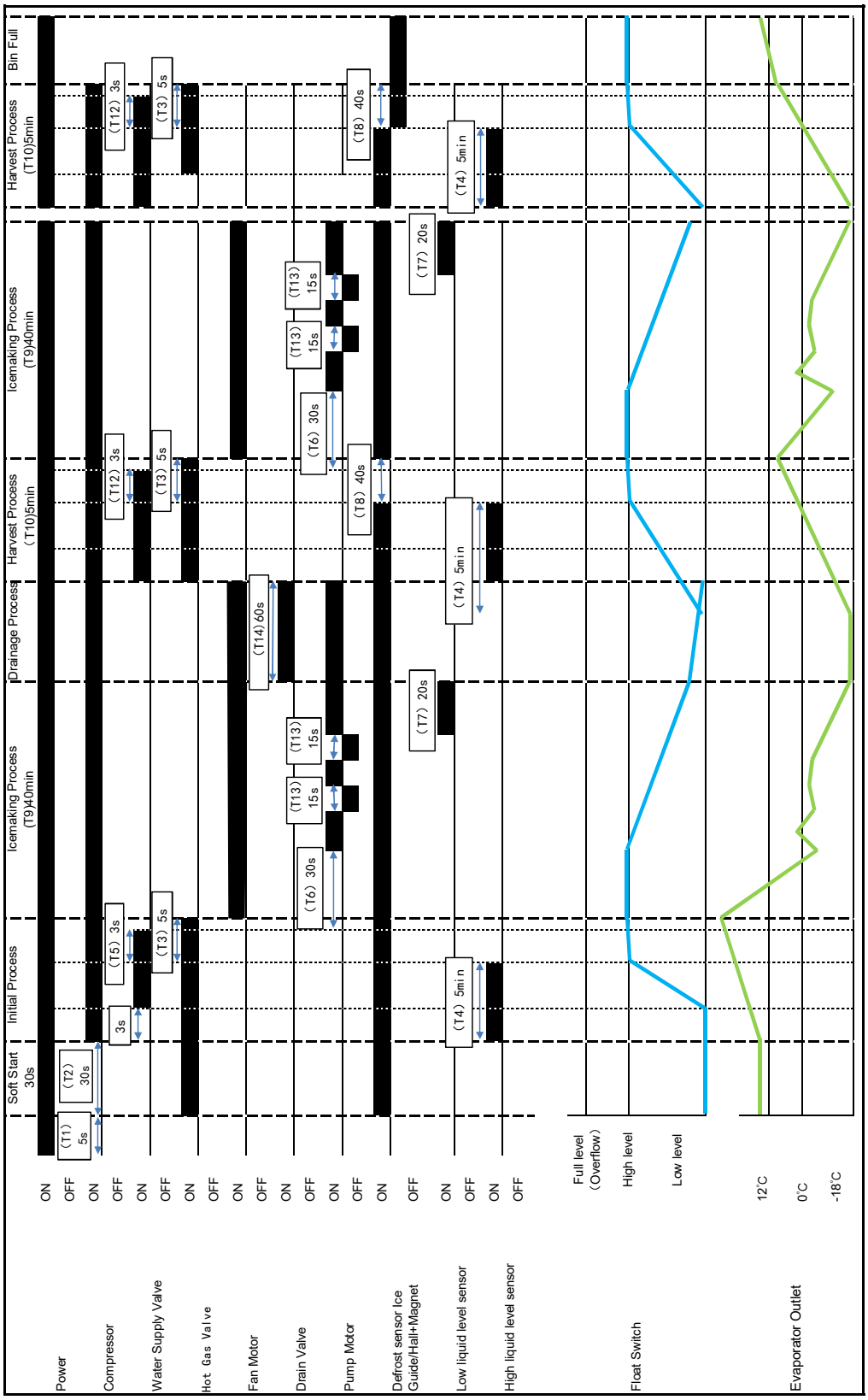
电器原理图

1～ 220V
60Hz



3.TIMER CHART

[a]ICE MAKING AND DEICING PROCESS AT NORMAL TEMPERATURE



[b]TIMER

Item	Time	Note
T1 : Power On Self-Test	5s	
T2 : Soft start, high and low pressure balance	30s	
T3 : Initial Process- Hot Gas Valve	5s	
T4 : The initial process of the OFF timer - sensor for water cutting(spare timer for water inlet)	5 min	After water inlet stops,icemaker gets into water broken mode,Water Supply Valve opens 30s each 4min,Check whether the water is normal by using the high liquid level floating ball, It continues for 120min.
T5 : Initial Process-Water inlet valve delay closing	3s	
T6 : Pump Motor delay start	30s	
T7 : Low level float (detect completion of icemaking)	20s	
T8 : Bin Switch	40s	
T9 : Spare timer for icemaking process	40min	
T10: Spare timer for Harvest process	5 min	
T11: Prohibition time of icemaking end	6 min	
T12: Water Supply Valve delays closure	3s	
T13:Pump motor stop timer	15s	
T14:Drainage time	60s	It can be set manually.

III .FAULT DIAGNOSIS

1.NO ICE MAKING

Fault Phenomenon	Probable Cause		Processing Method
[1]Ice maker does not start	a) Power Supply	1.“OFF” position	1.Push Power Switch“ON”
		2. Connection loose	2.Fasten connector
		3.Poor contact	3.Check the conduction and replace the broken parts
		4.Excessive voltage	4.Check and use the proposed voltage
		5.No connect plug	5.Connect the plug
	b) Bin Switch	1.Work when Bin storage is full	1.Take out the ice
		2.Fault of Bin Switch	2.Check the conduction and replace the broken parts
	c) Ice Guide Plate	1. Magnetism of magnet in the Plate becomes weaken	1.Replace the Plate
	d) Connection of Control Board	1.Wires loose or electric circuit opens	1.Check the conduction and replace the broken parts
	e) Control Board	1.Fault	1.Refer to “ II .2[d]CONTROL AND ADJUSTMENT
[2]Water continuously flow into, but the ice maker can’t start	a) Water circuit	1.Water Supply close,no water flow in.	1.Check Water Supply system and connect right water pressure. Check Water Supply state.
		2.Water leakage or water pressure is low.	2.Check and connect to normal water pressure
	b) Water Supply Valve	1.Filter or Inlet are blocked, water cannot get into the machine normally.	1.Clean 2.Change Water Supply Valve if necessary
		2.Coil winding opens	2.Replace
		3.Water Supply Valve connection	3.Check connection of Water Supply Valve wires. Change the broken parts.
	c) Float switch	1.Connector opens	1.Return to the original position
		2.Circuit open or Power Switch breakdown	2.Check and replace
	d) Water Tank	1.Water leakage	1.Check that the sink is in good condition,Change the part if necessary.
	e) Control Board	1.Fault	1.Refer to “ II .2[d]CONTROL AND ADJUSTMENT”
[3]Compressor does not start or run continuously	a) Overload protector	1.Poor contact	1.Check the conduction and replace the broken parts
		2.Excessive low voltage	1.Check the conduction and replace the broken parts
		3.Refrigerant is too much or not enough	3.Refill refrigerant
	b) Starter	1.Poor contact	1.Check and replace
		2.Coil winding opens	2.Replace
	c) Starting capacitor	1.Fault	1.Replace
	d) Power relay	1.Poor contact	1.Check and replace
		2.Coil winding opens	2.Replace
	e) Compressor	1.Compressor connection	1.Check the connection and change the broken parts
		2.Fault	2.Replace
		3.Protector works	3.Reduce temperature and find out reason
	f) Condenser, Air filter	1.Clogged with dirt	1.Cleaning
	g) Drier, Capillary	1.Clogging	1.Replace and refill refrigerant
	h) Control Board	1.Fault	1.Refer to “ II .2[d]CONTROL AND ADJUSTMENT”
[4]Water supply does not stop during icemaking process	a) Water Supply Valve	1.Diaphragm of Water Supply Valve does not close	1.Check the leakage during icemaking process. Change parts if necessary.
	b) Control Board	1.Fault	1.Refer to “ II .2[d]CONTROL AND ADJUSTMENT”

[5]No water from spray tube. Pump Motor does not start or ice-making time is too short.	a) Water supply circuit	1.Water pressure is too low, water in tank is too little.	1.Check and connect proper water pressure
		2.Water leakage	2.Check connector. Change parts if necessary.
		3.Clogging	3.Cleaning
	b) Water supply valve	1.Filter or inlet is blocked. Water in tank is too little.	1.Cleaning
		2.Coil open circuit or bad terminal contact	2.Check the conduction and replace the broken parts
	c) Pump motor	1.Coil winding opens	1.Replace
		2.Bearing wear	2.Replace
		3.Pump motor connection	3.Check the connection and change the broken parts
		4.The blade is entangled or in malfunction	4.Replace and clean
	d) Control board	1.Fault	1.Refer to “ II .2[d]CONTROL AND ADJUSTMENT”
	e) float switch	1.Floating ball fault	1.Adjust or replace the float
[6]Fan motor does not start or run normally.	a) Fan motor	1.Coil winding opens	1.Replace
		2.Bearing wear	2.Replace
		3.Fan motor connection	3.Check the connection and change the broken parts
		4.The blade is entangled (locking fan motor)	4.Check and replace
	b) Control board	1.Fault	1.Refer to “ II .2[d]CONTROL AND ADJUSTMENT”
[7]All components can run, but no ice-making	a) Refrigerant	1.not enough	1.Check leakage and refill it
		2.Air or moisture	2.Refill the refrigerant after replacing the drier
	b) Compressor	1.Fault	1.Replace
	c) Hot Gas Valve	1.Hot Gas Valve cannot close during icemaking process	1.Check and replace

2.EVAPORATOR FREEZING

Fault Phenomenon	Probable Cause		Processing Method
[1]Ice making time is too long	a) float switch	1.Low liquid level float is faulty	1.Check the connection and change the broken parts.
	b) Water Supply Valve	1.Diaphragm of Water Supply Valve does not close	1.Check the water leakage of the ice maker in the shutdown state 2.Change the inlet valve as required
		2.Filter or Inlet are blocked, water cannot get into the machine normally	2.Clean or change as required
	c) Water Tank	1.Tank leakage	1.Check Tank and change if necessary
	d) Water pressure	1.Low water supply pressure	1.Connect normal water pressure
	e) Control board	1.Fault	1.Refer to “ II .2[d]CONTROL AND ADJUSTMENT”
[2]Not all ice drop during Harvest process	a) Evaporator	1.Form scale deposit	1.Cleaning
	b)Ambient temperature and / or water temperature	1.Too low	1.Raise the temperature.
	c) The water supply circuit	1.Water pressure is too low. Water in tank is too little.	1.Check and connect to normal water pressure
		2.Filter or inlet is blocked. Water level is too low.	2.Clean
	d) float switch	1.Floating ball bad	1.Check or replace
[3]Others	a) Spray tube	1.Clogging	1.Cleaning
		2.Dislocation	2.Return to correct position
	b) Water circuit	1.Dirt	1.Cleaning
	c) Refrigerant	1.Not enough	1.Check leakage and refill it
	d) Hot Gas Valve	1.Coil winding opens	1.Replace
		2.The plunger does not move	2.Replace
	e) Place	1.The ice maker was not leveled	1.Level the icemaker

3.LOW ICE PRODUCTION

Fault Phenomenon	Possible Reasons and Processing Method
[1]Ice making time is too long	a) See 1-[3] and check Compressor and its accessories, Air filter and Condenser, Drier, and Control board
	b) See 2-[1] part, check Ice thickness sensor,Water supply valve, Water tank, water pressure and Control board
[2]Harvest time is too long	a) See 2-[2] part, check Evaporator, ambient temperature and water temperature, Water supply circuit, Ice thickness sensor

4.ABNORMAL ICE

Fault Phenomenon	Probable Cause		Processing Method
[1]Ice size is too small	a) Ice guide plate, Water tank	1.Dislocation, water spraying in storage	1.Check assembled location of Ice guide plate.
	b) See1-[5] part, check Water supply, Water supply valve, Pump motor and float switch		
b) See1-[5] part, check Water supply, Water supply valve, Pump motor and float switch	a) See partial content of 2-[1]、[3], check Ice thickness sensor, Water supply valve, Water tank, water pressure,Control board, Spray tube, water circuit, refrigerant filling quantity, level set		
	b) Spray tube	1.Dirt	1.Cleaning
	c) Water quality	1.Hardness is too high or Water contains impurities.	1.Install Water cleaner.

5.OTHERS

Fault Phenomenon	Probable Cause		Probable Cause
[1]Icemaker cannot stop after storage full	a) Bin switch	1.Bin switch wire is in short circuit	1.Replace
		2. Magnetism disappearance	2.Replace
	b) Control board	1.Fault	1.Refer to “ II .2[d]CONTROL AND ADJUSTMENT”
[2]Too much noise	a) Pump motor	1.Bearing wear	1.Replace
	b) Fan motor	1.Bearing wear	1.Replace
		2.Fan blade deformation	2.Replace fan blade
		3.Fan blade cannot rotate normally	3.Replace
	c) Compressor	1.Bearing wear or valve damage	1.Replace
		2.Gasket is removed or lack of fixed bolts	2.Reinstallation
	d) Refrigeration circuit	1.Friction or touch to copper tubes or other surface	1.Return to the original position
[3]Ice melting speed in storage is too fast	a) Ice storage bin drain water	1.Clogging	1.Cleaning
	b) Door of ice storage bin	1.Close the door	1.Close the door

IV . REMOVAL AND REPLACEMENT

1.REPAIR OF REFRIGERATION CIRCUIT

[a]SERVICE INFORMATION

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

The compressor must not be opened more than 30min in replacement or service. The changed compressor must be the same type with the original.

2)Treatment for Refrigerant Leak[R404A]

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

3)Use Portable Welder[R404A]

Repair of the refrigeration circuit needs weld, and a general portable welding machine can be used. But when welding the circuit, must avoid Access valve.

4)Oil for Processing of Copper Tubing[R404A]

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

5)Service Parts for R404A

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

6)Replacement Copper Tube[R404A]

The copper tubes currently in use are suitable for R404A. But do not use them if oily inside. The residual oil in copper tubes should be as little as possible.

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

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

8)Refrigerant Leak Check

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

[b]REFRIGERANT RECOVERY

There is a correct Access valve which is on the low-side (such as Copper tube – process) of refrigeration circuit in icemaker. Recover the refrigerant by this Charge port and set the refrigerant into one suitable container. Do not discharge the refrigerant into the atmosphere.

[c]EVACUATION AND RECHARGE

1)Attach a charging hose of gauge manifold to a vacuum pump and the low-side access valve.

2)turn on the vacuum pump.

3)Allowing the vacuum pump to pull down to a 760mmHg vacuum. Evacuating period depends on the pump capacity

4)Close the low-side on the gauge manifold.

5)Disconnect the vacuum pump, and attach a refrigerant charging cylinder, must purge any air from the charging hose. See the nameplate for the required refrigerant charge.

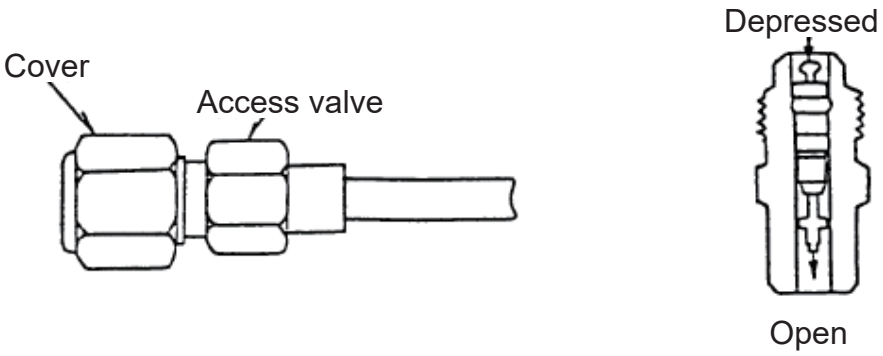
6)Open low-side valve. Do not place refrigerant charging upside down, otherwise the filled liquid may damage the compressor.

7)After refrigerant filling speed drop down, power icemaker. When low pressure gauge displays 0 bar, turn icemaker down. Do not turn on the machine at vacuum pressure. After charging pump is full of vacuum, close the low-side valve.

8)Repeat steps 4 to 7 as required until sufficient refrigerants are filled in the system.

9)Close the refrigerant access valve, disconnect the hose and gauge manifold.

10)Cover the access valve to prevent the refrigerant leakage.



2.WELDING

⚠ DANGER
1.Refrigerant R404A is not explosive and nontoxic. However, when it contacts the high temperature (flame), the R404A can decompose into harmful substances.
2.Must recover the refrigerant and put it into the suitable container, and do not discharge the refrigerant into the atmosphere directly.
3.Do not use the silver alloy or copper alloy within arsenic.
4.Do not use R404A within high pressure air to detect leakage. Charge a little refrigerant and use nitrogen to make high pressure to detect leakage.

3.COMPRESSOR

⚠ WARNING
The compressor terminal protection cover must be installed in the correct position. Otherwise, when the ice maker operates under high temperature and high humidity conditions, it may trigger electric shock, short circuit, fire, or shorten the life of the machine.

IMPORTANT
Must change drier to new one when open the closed refrigeration system each time. Do not change drier to new one before change all other parts.

1)Unplug the icemaker or disconnect the power source.

2)Remove the front panel, top panel and right panel.

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 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.

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)Blowing into the nitrogen at air pressure of 0.2-0.3 bar, welding connection pipes, discharge and suction pipes at same time (do not change the order of the pipes connection).

13)Install the new drier (see "4. DRIER").

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

15)Connect the terminal and install the terminal protection cover to the correct position.

16)Evacuating the system and charge it with refrigerant (See "1. [c] EVACUATION AND RECHARGE").

17)Replace the panels in their correct positions.

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

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

4.DRIER

IMPORTANT
Must change drier to new one when open the closed refrigeration system each time. Do not change drier to new one before change all other parts.

1)Unplug the icemaker or disconnect the power source.

2)Remove the front panel, top panel and right panel.

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

4)Cut the cable ties securing the filter dryer1.

5)Remove the drier using welding equipment.

6)Welding the new drier with the arrow on the drier in the direction of the refrigerant flow. Use nitrogen gas at the pressure of 0.2 – 0.3 bar when welding pipes.

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

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

9)Replace the panels in their correct positions.

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

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

5.HOT GAS VALVE

NOTICE
Must use the same length and diameter hot gas valve copper tube to make sure the icemaker can operate at the best state, when change the copper tube for hot gas valve.

IMPORTANT
Must change drier to new one when open the closed refrigeration system each time. Do not change drier to new one before change all other parts.

1)Unplug the icemaker or disconnect the power source.

2)Remove the front panel, top panel and right panel.

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 screws and hot gas valve coil.

6)Remove the hot gas valve and the drier using welding equipment.

7)Welding the new hot gas valve with nitrogen gas flowing at the pressure of 0.2 – 0.3 bar.

WARNING
Always protect the valve body by using a damp cloth to prevent the valve from overheating. Do not weld the valve body exceeding 120°C.

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

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

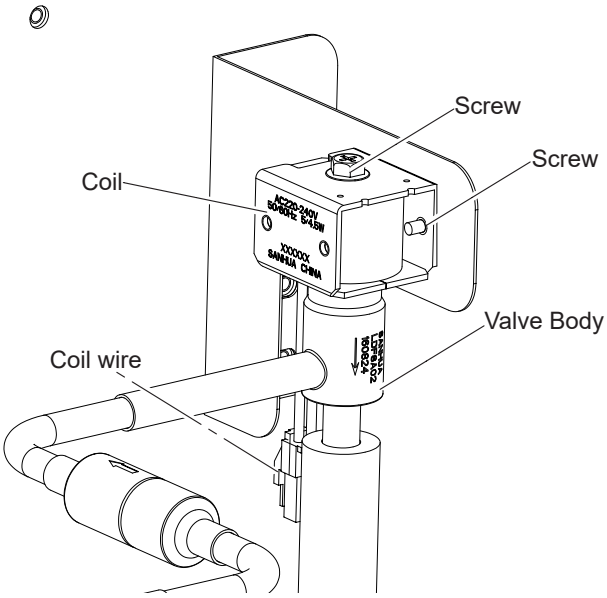
10)Evacuating the system and charge it with refrigerant (See “1. [c] EVACUATION AND RECHARGE”).

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

12)Connect the leads.

13)Replace the panels in their correct positions.

14)Plug in the power cord of the ice maker or switch on the power supply.



6.FAN MOTOR

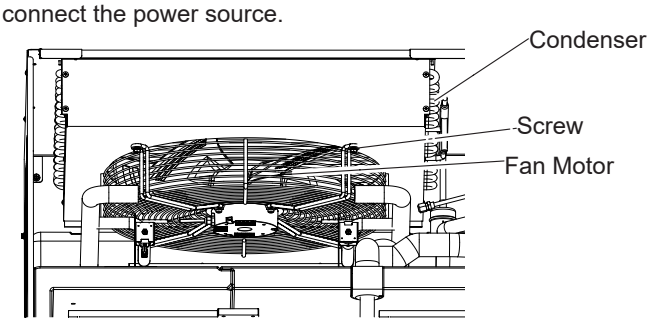
1)Unplug the icemaker or disconnect the power source.

2)Disconnect the connector of the fan motor and cut the fastening tie of the fan motor.

3)Remove the fixed screws of fan motor bracket, Lift out the fan motor. Pulling does not touch the condenser or other parts to protect the fan blade not deformation.

4)Install the new fan motor in the opposite order of disassembly.

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



7.DRAIN VALVE

1)Unplug the icemaker or disconnect the power source.

2)Turn off water taps.

3)Remove the top panel and side panel.

4)Disconnect the drain valve wire.

5)Cut the cable ties at the entrance and exit sides.

6)Remove the rubber hoses at the inlet and outlet sides.

7)Remove the two mounting screws.

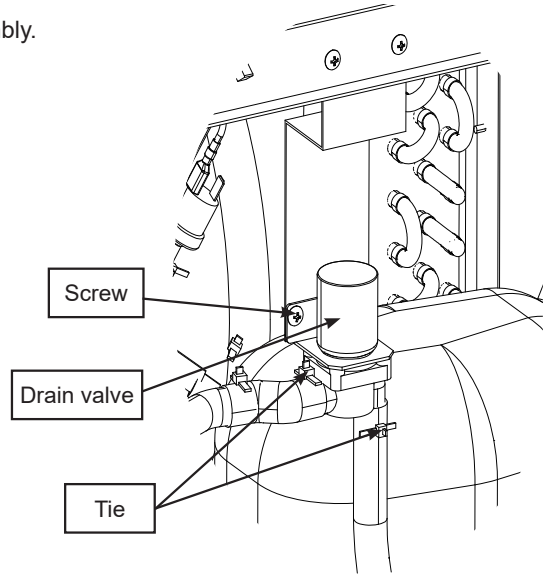
8)Install the water supply valve in the opposite order of disassembly.

9)Open the tap.

10)Connect the power source.

11)Check leakage.

12)Replace the panels in their correct positions.



8.PUMP MOTOR

1Unplug the icemaker or disconnect the power source.

2)Remove the top panel,Loosen the fixed screws of the pump.

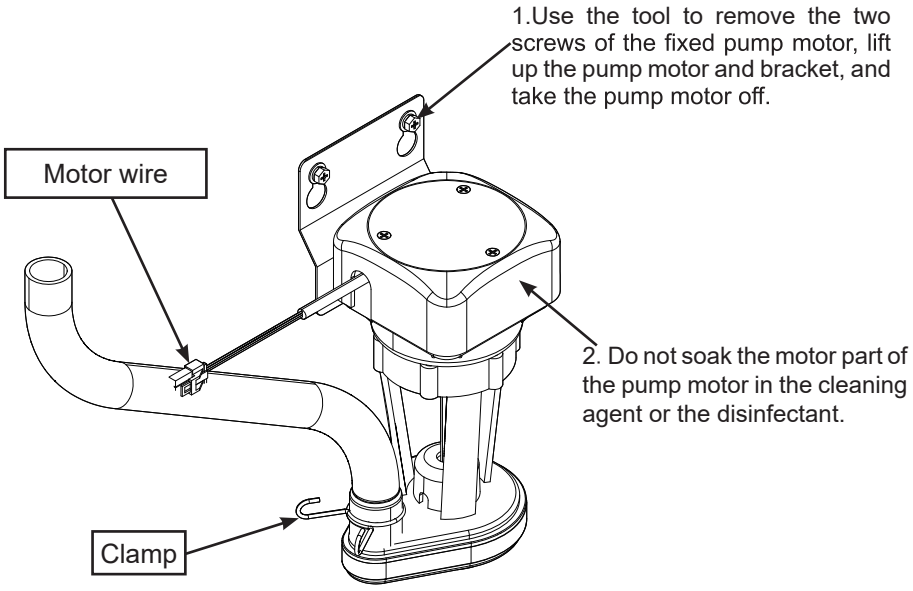
3)Disconnect the connector of pump motor.

4)Remove the pump motor from the tank, loosen the clamp and pull out the pump motor connection pipe.

5)Install the new pump motor in the opposite order of disassembly.

6)Plug in the icemaker or connect the power source and check leakage.

7)Replace the panels in their correct positions.



9.WATER SUPPLY VALVE

1)Unplug the icemaker or disconnect the power source.

2)Turn off the tap,Unscrew the feed valve supply pipe nut connector.

3)Remove the fixed screws for the top panel and rear panel.

4)Disconnect the Terminal.

5)Cut the cable tie fastening the silicone hose at the water inlet valve outlet.

6)Remove the silicone hose.

7)Remove the two fixed screws from the water inlet valve.

8)Install the water supply valve in the opposite order of disassembly.

9)Tighten the inlet nut with the torque of 7.85N·m (±5%) to prevent leakage.

10)Open the tap.

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

12)Check leakage.

13)Replace the panels in their correct positions.

10.EXPANSION VALVE

IMPORTANT
Water in the refrigeration loop may exceed the capacity of the dryer and freeze in the expansion valve. Be sure to install a new filter dryer each time you turn on the sealed refrigeration system. Do not replace the filter dryer until all other servicing or replacement operations have been completed.

1)Shut off the power.

2)Remove the top panel and side panel.

3)Recycle refrigerant and store it in an approved container.

4)Remove the heat insulation material and temperature sensing package on the return pipe.

5)Disconnect the expansion valve and place the new expansion valve in place.

6)Remove the filter dryer and place the new filter dryer in place.

7)While brazing all fittings, purge with a nitrogen stream at a pressure of 20 to 30kPa.

⚠DANGER
To prevent expansion valve from overheating, be sure to protect valve body with a wet cloth. Brazing temperature of valve body shall not exceed 120°C.

8)Use an electronic leak detector or soap bubble to check for leaks. Charge a small amount of refrigerant into the system (if using an electronic leak detector) and then use nitrogen to raise the pressure (970kPa). Do not mix R404A with compressed air during leak testing.

9)The system is vacuumized and filled with refrigerant. For air - and water-cooled models, refer to the nameplate for required refrigerant filling quantity.

10)Install the expansion valve temperature sensing kit to its original position on the return pipe. The temperature sensing bag should be directly above the pipe. Be sure to tighten the temperature pack with a clamp and bracket and insulate it.

11)Wrap expansion valve with thermal insulation.

12)Reinstall side plates and top plate.

13)Open the power supply.

11.BIN SWITCH

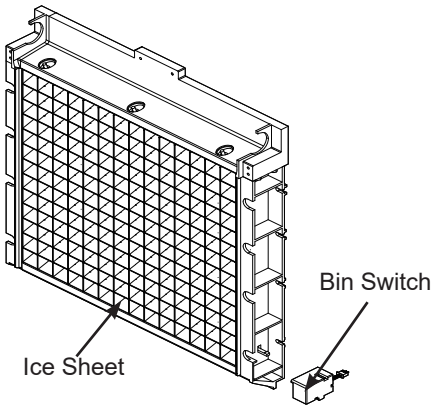
1)Unplug the icemaker or disconnect the power source.

2)Remove front panel, louver, rear panel and the control box.

3)Disconnect the bin switch lead and take bin switch out.

4)Install the bin switch in the opposite order of disassembly.

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



12.SENSOR（EVAPORATOR SENSOR，CONDENSER SENSOR）

1)Unplug the icemaker or disconnect the power source.

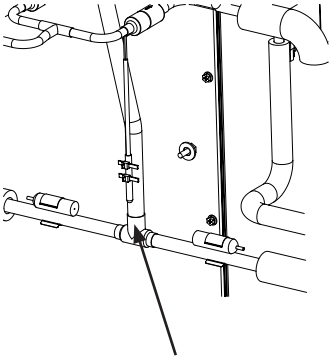
2)Remove the front panel, top panel, side panel and the control box.

3)Open the control box and disconnect sensors leads.

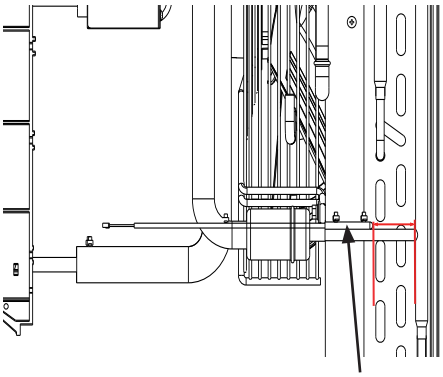
4)Cut off the sensor fixed tie, tear off the aluminum foil tape, and remove sensors.

5)Install the new sensors and replace the aluminum foil tape in the opposite order of disassembly.

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



The tail distance of Evap. Sensor is about 35mm from the foaming body



The condenser sensor is about 50mm away from copper tube.

13.CONTROL BOARD

1)Unplug the icemaker or disconnect the power source.

2)Remove the front panel, top panel and right panel.

3)Remove the control case cover and pull out the connection terminal on the control board.

4)Connecting the terminal in the opposite order of disassembly, and must make sure correct connection (connect terminal refer III.4 WIRING DIAGRAM)

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

14.WATER TANK

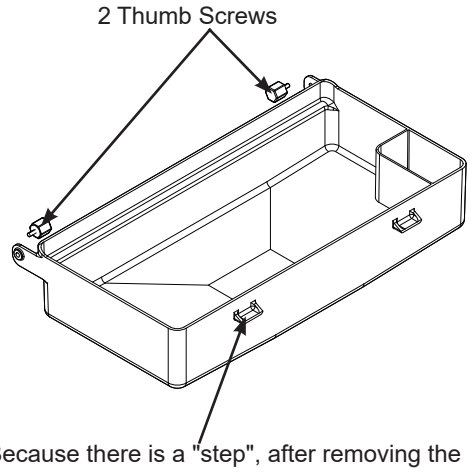
1)In the “OFF” state, long press the “mode” button for 3s to enter automatic drainage. During the drainage process, press the “Mode” button to manually stop drainage and wait for the water in the tank to be emptied (or a small amount of residual water at the bottom).

2)Unplug the power cord or disconnect the power supply to remove all ice stored in the refrigerator.

3)Remove 2 six thumb screws of the fixed tank and remove the tank.

4)Install the tank in the opposite order of disassembly.

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



Because there is a "step", after removing the thumb screw, drag the sink to the front first, and then remove the sink to avoid the floating ball.

15.SPRAY TUBE

1)Unplug the icemaker or disconnect the power source.

2)Remove the front panel, top panel.

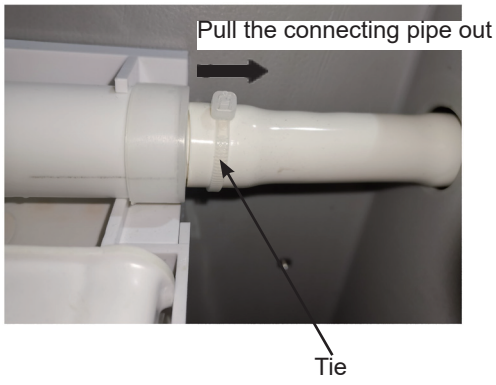
3)Cut off the fastening straps of the loose water pipe and water supply pipe, hold the loose water pipe and pull out the connecting pipe.

4)Install the cleaned or replace the new spray tube.

The outer pipe holes of the spray tube pipe must be vertically downwards and secured with cable ties.

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

7)Check leakage.



IMPORTANT
Must firmly assembly the spray tube at the correct location and the mark line on the spray tube can be used as reference alignment. Otherwise, ice may be bad or the capacity of the machine may be weaken.

16.FLOAT SWITCH

1)Unplug the icemaker or disconnect the power source.

2)Remove the front panel, top panel, side panel and the control box.

3)Unplug the float terminal from the control board（two）.

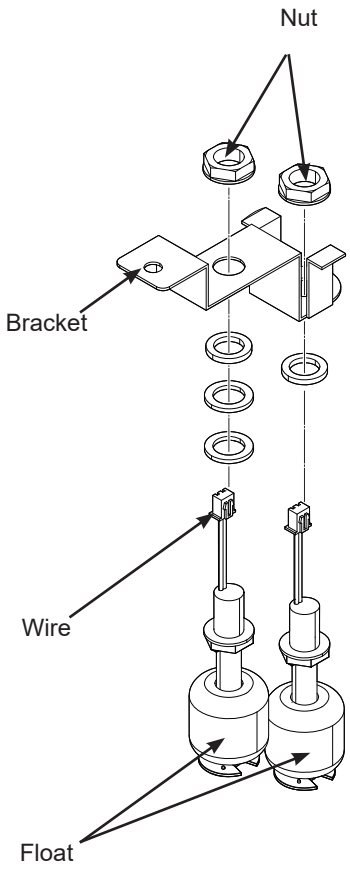
4)Unscrew the fixing screw of the float switch bracket and take out the float switch assembly.

5)Remove the nut of the float switch and remove it for inspection or replacement.

6)Install float switch in reverse order of removal.

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

Note: The two float have the same specifications, pay attention to the connection sequence with the control board when replacing.



V .CLEANING AND MAINTENANCE INSTRUCTIONS

IMPORTANT
After any maintenance for icemaker, must make sure all components, fasteners and screws firmly fixed at the correct position.

⚠ WARNING
1.Must plug in the icemaker or connect the power source when clean or maintenance.
2.Forbid use water jet to wash the icemaker.

NOTICE
When using a neutral solution or sodium hypochlorite solution, please fully read and understand the incidental instructions to prevent potential health problems.

1.CLEANING

⚠ WARNING
1.The manufacturer recommends ice maker should be cleaned least twice every year. Clean more times at some areas due to water quality.
2.Do not use cleaning agent with ammonia to avoid damage the machine or injury the operator.
3.Wear anti solvent gloves during operating, prevent skin from cleaning agent or disinfection.
4.In order to ensure safety and maximize the effect, cleaners and disinfectants are used immediately after diluted.
5.Do not put plastic parts into water more than 40°C or dishwasher to protect the parts.
6.Ice maker can use after water clean all cleaning agent and disinfectant.

[a]CLEANING PROCEDURE

1)After all ice dropped at the end of Harvest process, unplug the power and stop water in, open the door of storage, remove the top panel and rear cover and remove all the ice.

NOTICE
1.Do not use any tool to remove the ice on the evaporator to protect the evaporator.
2.Do not use the liquid with alcohol to clean or disinfect the icemaker to protect plastic parts.

2)Empty the water in the tank and water circuit system, and then remove the water supply tube, the pump connection,connect tees and drainpipes, etc.

3)Remove the floating ball,spray tube,pump motor, bin switch,tank and so on.

4)Use soft brush soaked in a neutral detergent, a sponge or a clean cloth to carefully clean the surface of the dismantled parts (inner surface of water tube also should be cleaned). Then clean them with clean water.

NOTICE
1.During cleaning spray tube, the inner tube must be taken out. Use soft brush dipped in a neutral detergent, cleaning cloth or sponge to clean and then rinsed with water.
2.The evaporator can't be disassembled. Use the soft brush, sponge or clean cloth soaked by the neutral detergent to clean it carefully.
3.Just clean the components included water circuit system of pump motor and float switch, All the electrical parts cannot be immersed in the cleaning agent. Please avoid them carefully.
4.Cleaning agents must be the food class or recommended by the manufacturer.
5.Some solutions may damage the inner surface of the ice machine or corrode the metal parts. Cleaning liquid should be cleaned at any time unless specified instruction by the manufacturer.

[b]DISINFECTION STEPS – DISINFECTION AFTER CLEANING

1)Pure 3L water into suitable container and mixed 11mL concentration of 5.25% sodium hypochlorite solution or a disinfectant recommended by the manufacturer. Dip the removed parts(Float switch, spray tube,Connect the tee,pump motor,water tank and so on） into the disinfection to disinfect and keep them in disinfection 10min.

NOTICE
All the electrical parts cannot be immersed in the cleaning agent. Do not disinfect the bin switch.

2)Use a clean sponge or cloth soaked in a solution to wipe inner surface and door of storage.

3)After the disinfection, rinse thoroughly with clean water to confirm that there is no residual disinfectant.

4)Install all parts in the opposite order of disassembly, finally close the door, restore the water supply and power supply.

NOTICE
Usually use automatic cleaning mode, please refer to the instructions for details, timely disassemble the sink to clean.

2.MAINTENANCE

[a]TOP PANEL AND SIDE PANELS

To prevent rust, clean with clean soft cloth. Use a wet cloth with a neutral detergent to wipe the grease and dust on it.

NOTICE
1.Do not use hard brushes, wire brushes, nor detergents, gasoline, banana water, acetone and other organic solvents. Do not use boiling water or acid and alkali cleaners to clean the machine.
2.Do not rinse with spray water when cleaning, so as not to affect the insulation of electrical appliances.

[b]STORAGE AND SCOOP

1)Wash your hands before you take the ice. Use the specific scoop (accessory) to take ice.

2)Storage only for store ice. Do not place other things in storage.

3)Keep scoop clean. Totally wash the scoop with spray water after using neutral detergent.

4)Totally wash the bin storage with spray water after using neutral detergent.

[c]AIR FILTER

The metal air filter can filter dirt or dust in the air to prevent clog condenser. If air filter is clogged, the capacity of ice maker will decrease. Wash the filter at least twice every month.

1)Remove the air filter from the back

2)Use vacuum cleaner to clean the air filter. If the air filter is seriously blocked, please clean it

with warm water and neutral detergent.

3)Thoroughly rinse and dry air filter.

NOTICE
After cleaning, replace the air filter.

[d]CONDENSER

Air - cool condenser usually is cleaned once to twice every year. Use soft brush or cleaner with brush to brush the condenser in direction of fin to protect the condenser.

3.NO ICE MAKING FOR A LONG TIME

IMPORTANT
When no ice making for a long time, take the ice in storage out, drain all water in water circuit system. Wash and dry the storage. Use air or CO2 to drain all water in the machine to prevent damage the water circuit system when air temperature is below 0°C. Turn the power off until proper air temperature comes.

If icemaker no use just for two or three days, please push the power switch to “OFF”.

(except air temperature is below 0°C)

1)Push the power switch to “OFF” after Harvest process finished. Unplug the icemaker or disconnect the power source.

2)Turn off the tap and remove the water inlet hose.

3)Take out all the ice in the storage and clean the storage.

4)Remove the water tank and drain it.

5)After draining all the water, close door of storage.