
NO. E1AP-433

ISSUED: APR. 30, 1997

REVISED: JUL. 29, 2005



**HOSHIZAKI
SELF-CONTAINED CUBER**

MODEL	IM-21	IM-100
	IM-25	IM-130
	IM-30	IM-160
	IM-45	IM-240
	IM-65	

SERVICE MANUAL

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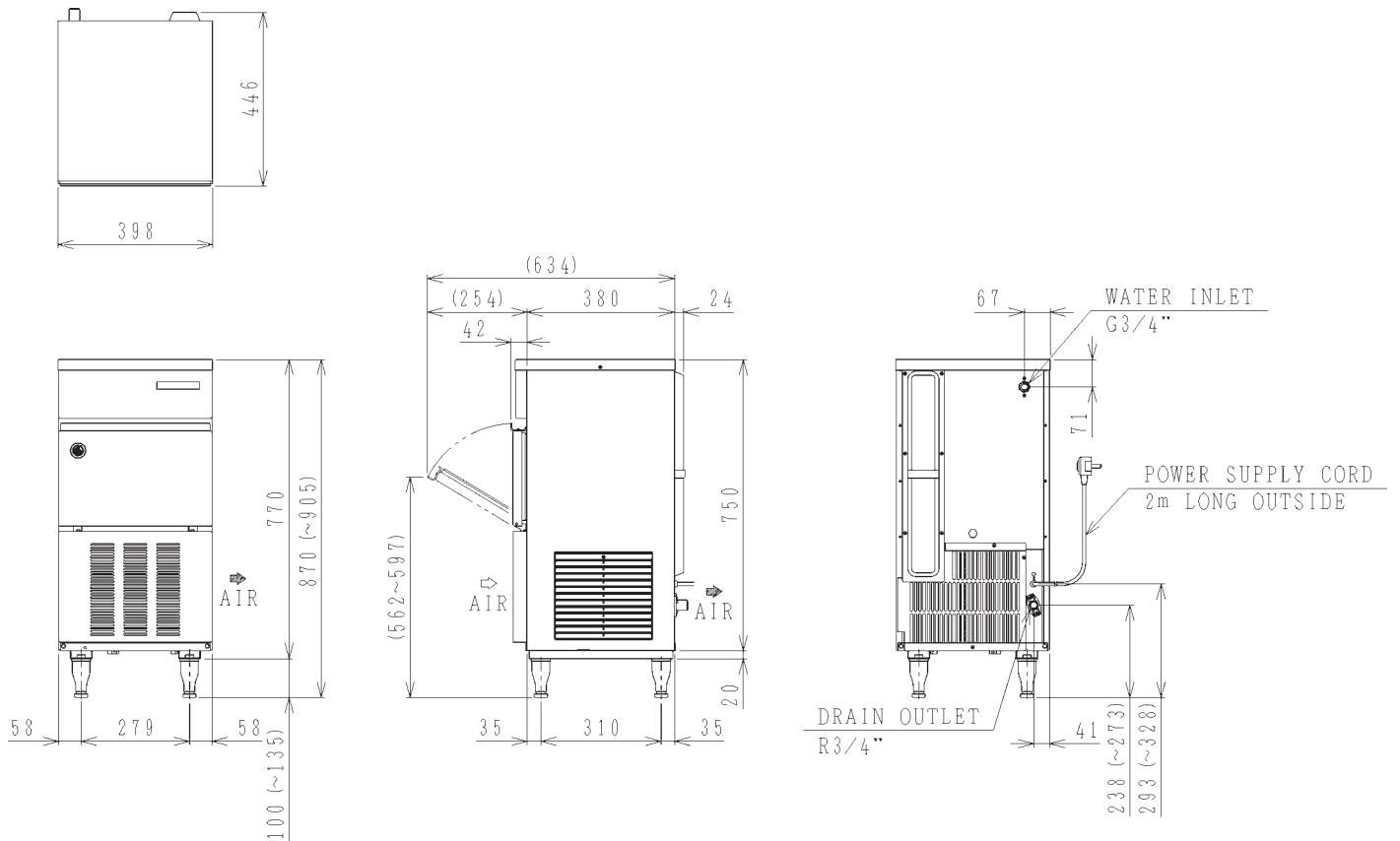
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I. SPECIFICATIONS

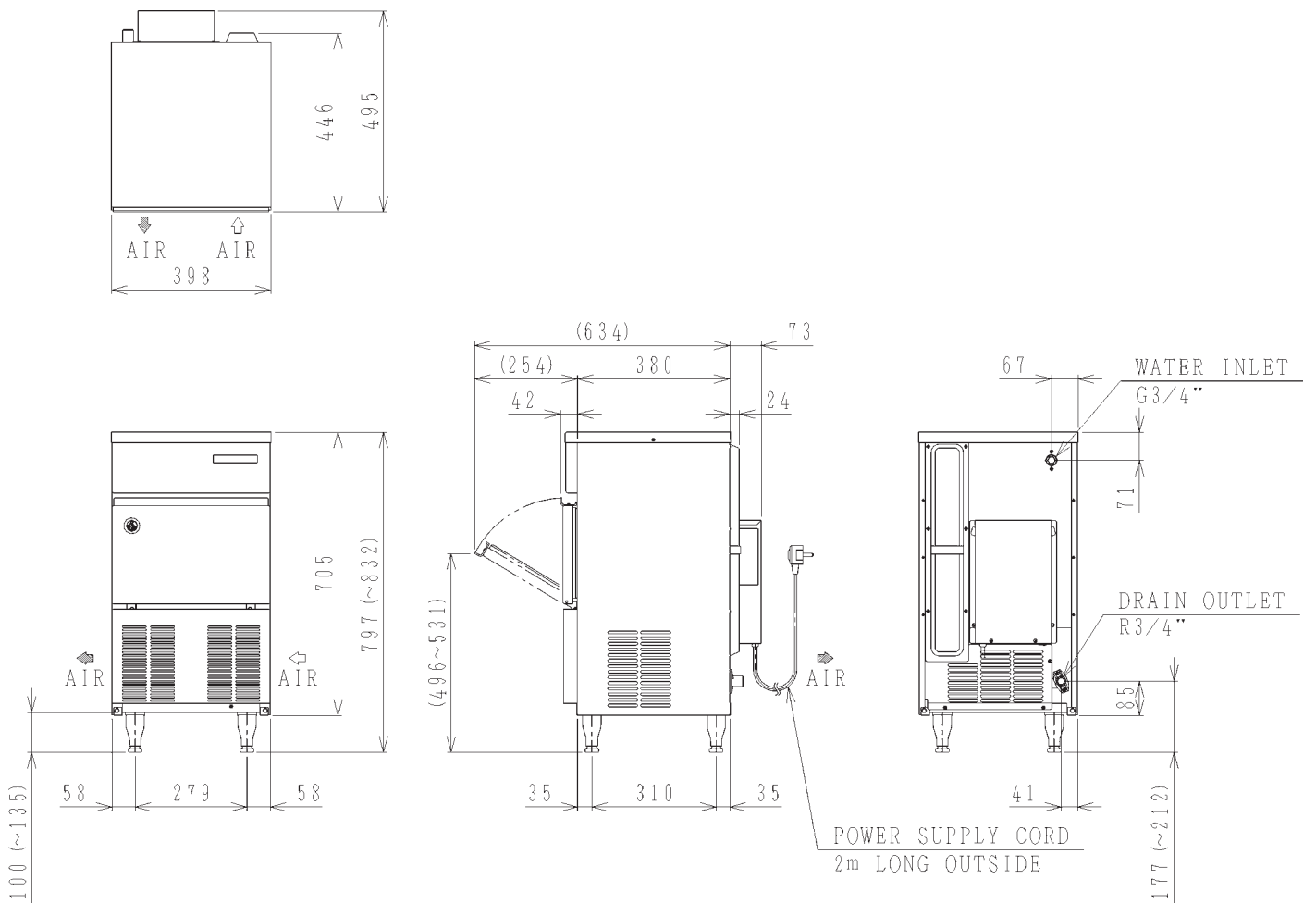
1. DIMENSIONS/CONNECTIONS

[a] IM-25LE (Air-cooled)



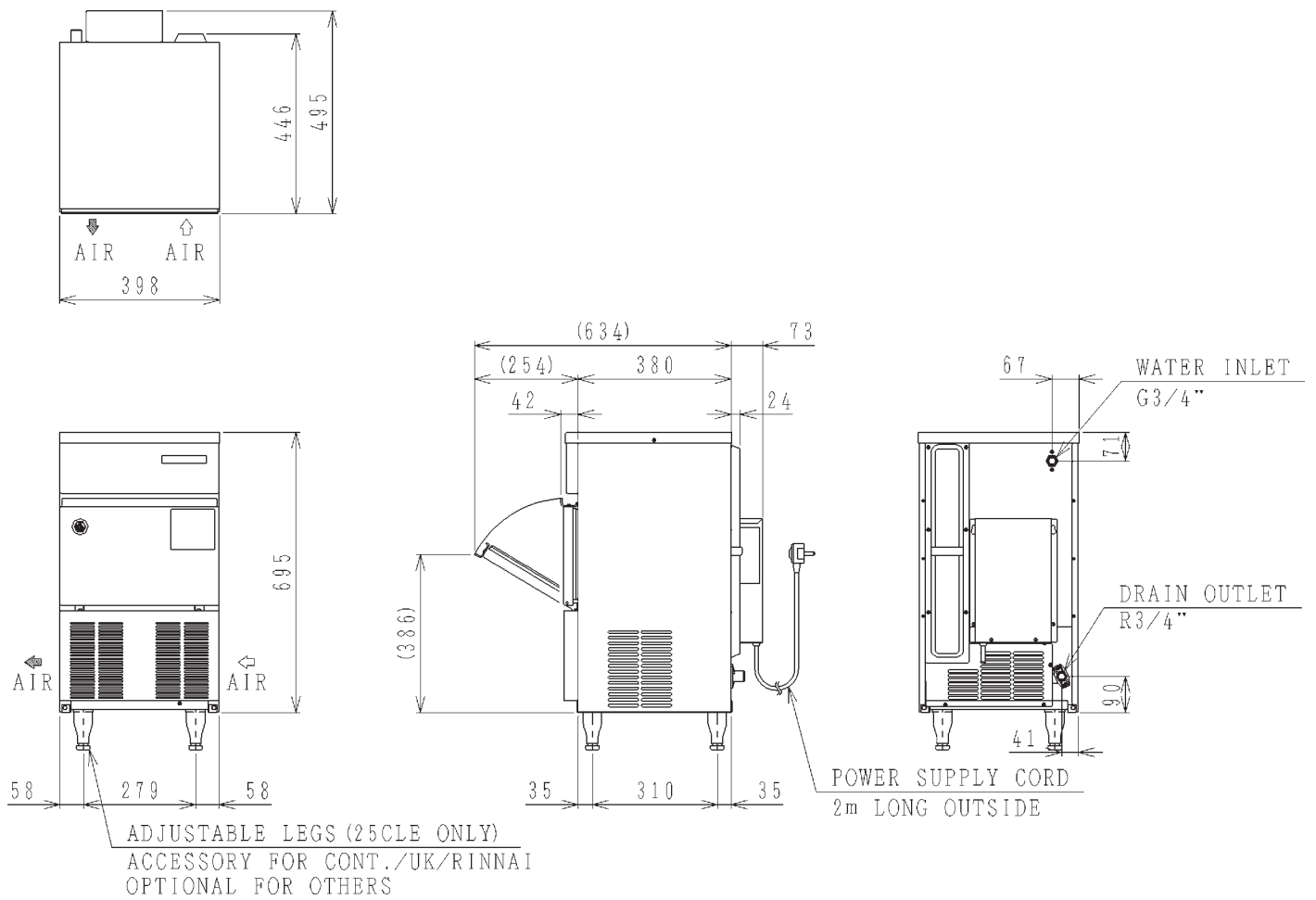
[b] IM-25CLE* (Air-cooled)

*Until March 2000 production (Auxiliary Code: K-1)

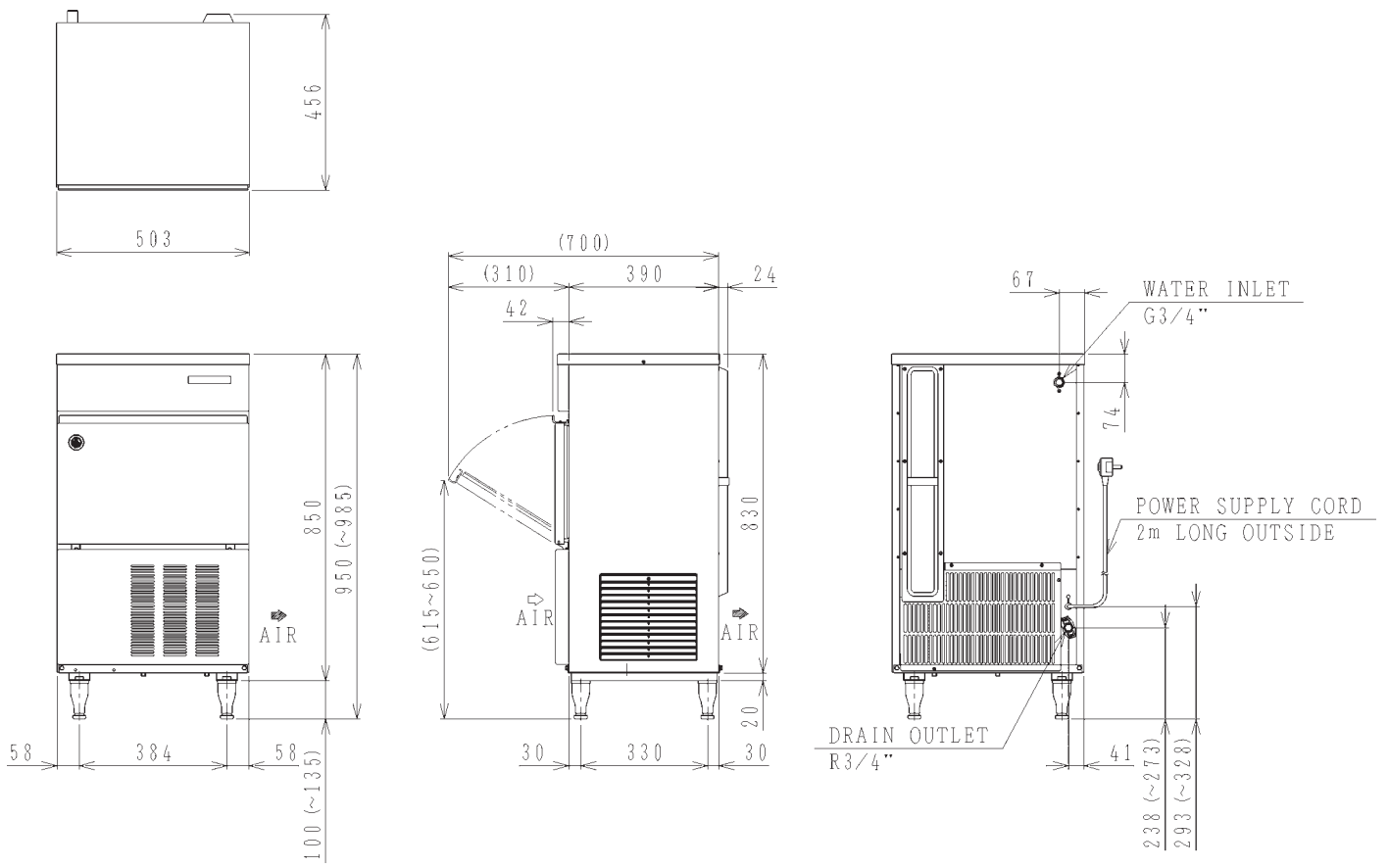


[c] IM-21CLE, IM-25CLE*, IM-30CLE (Air-cooled)

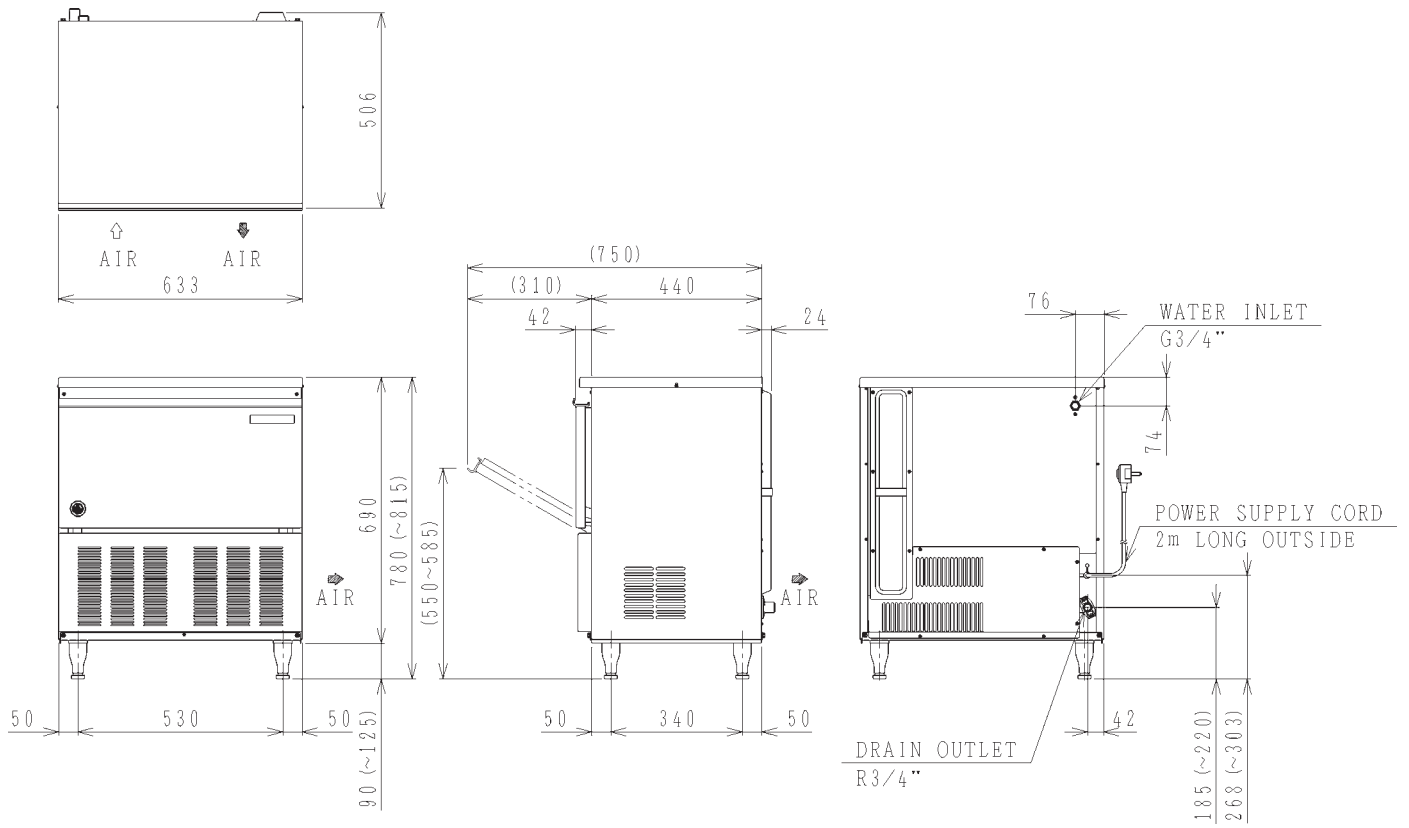
*From April 2000 production (Auxiliary Code: K-2)



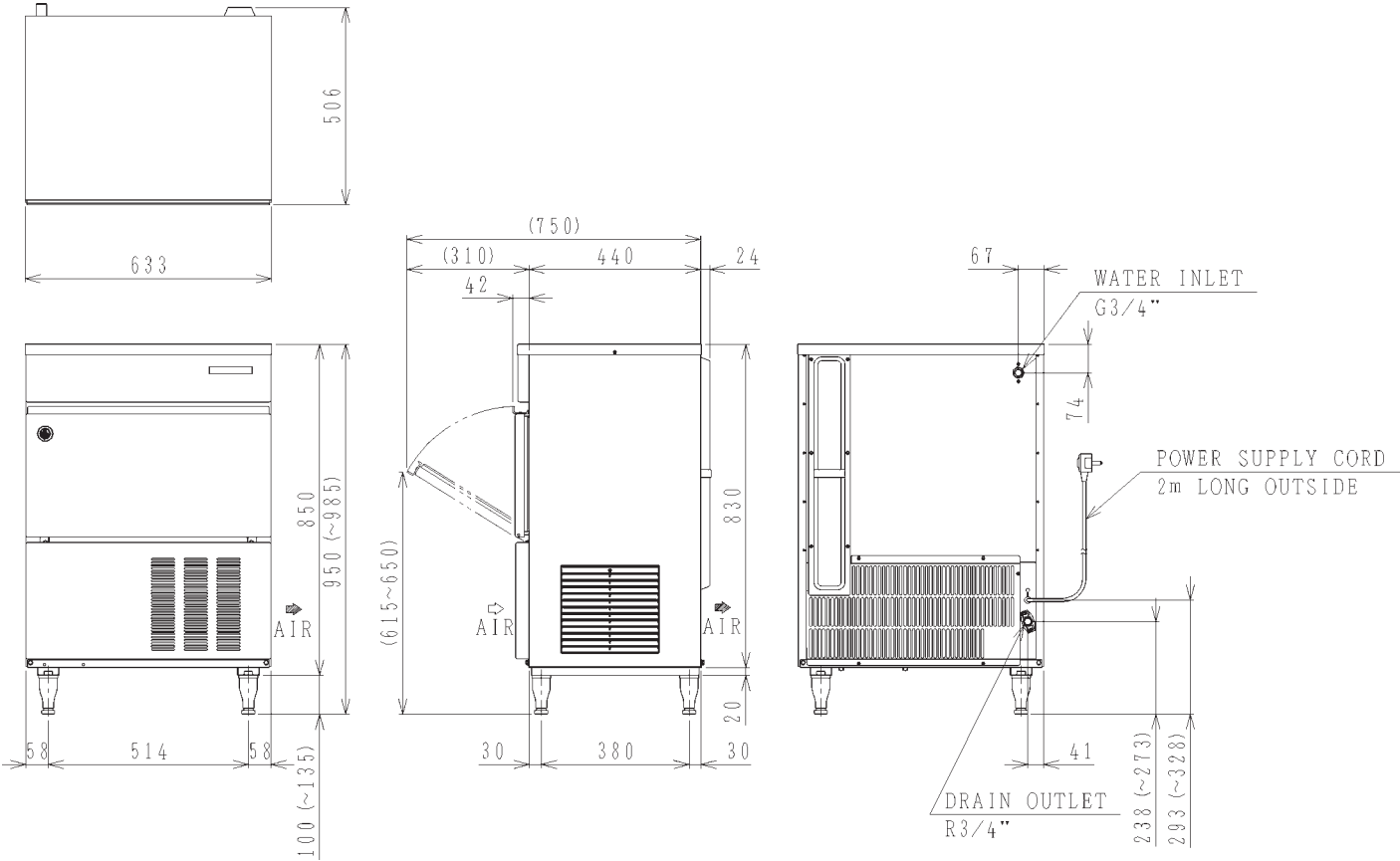
[d] IM-45LE (Air-cooled)



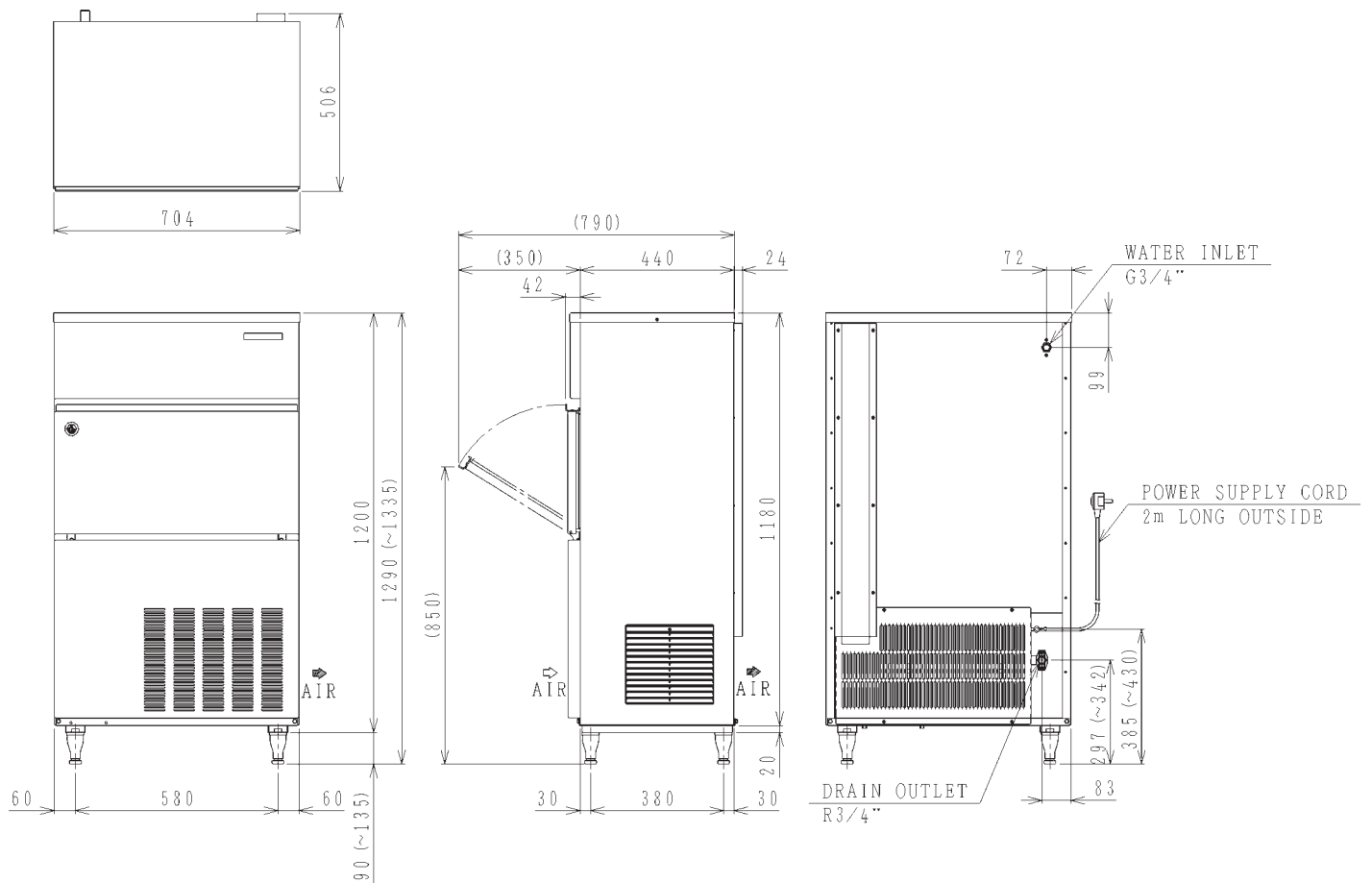
[e] IM-45CLE-25 (Air-cooled)



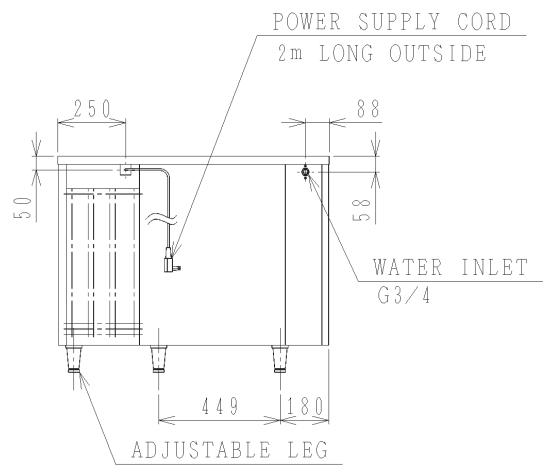
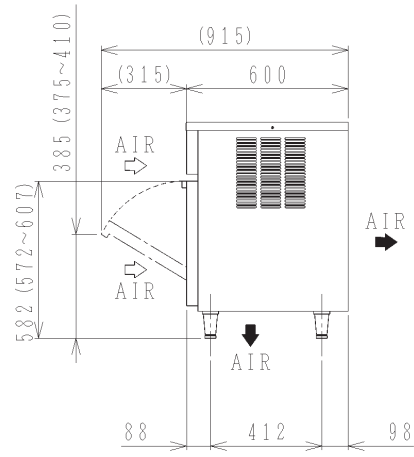
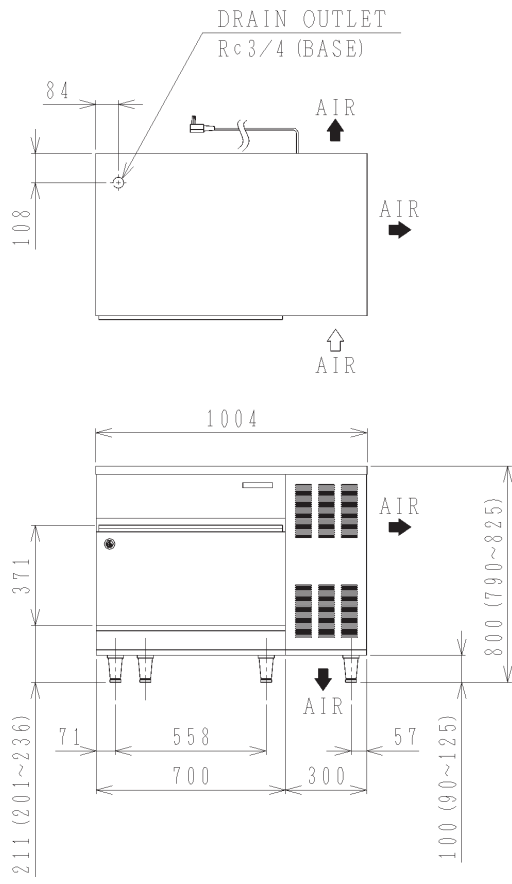
[f] IM-65LE (Air-cooled)



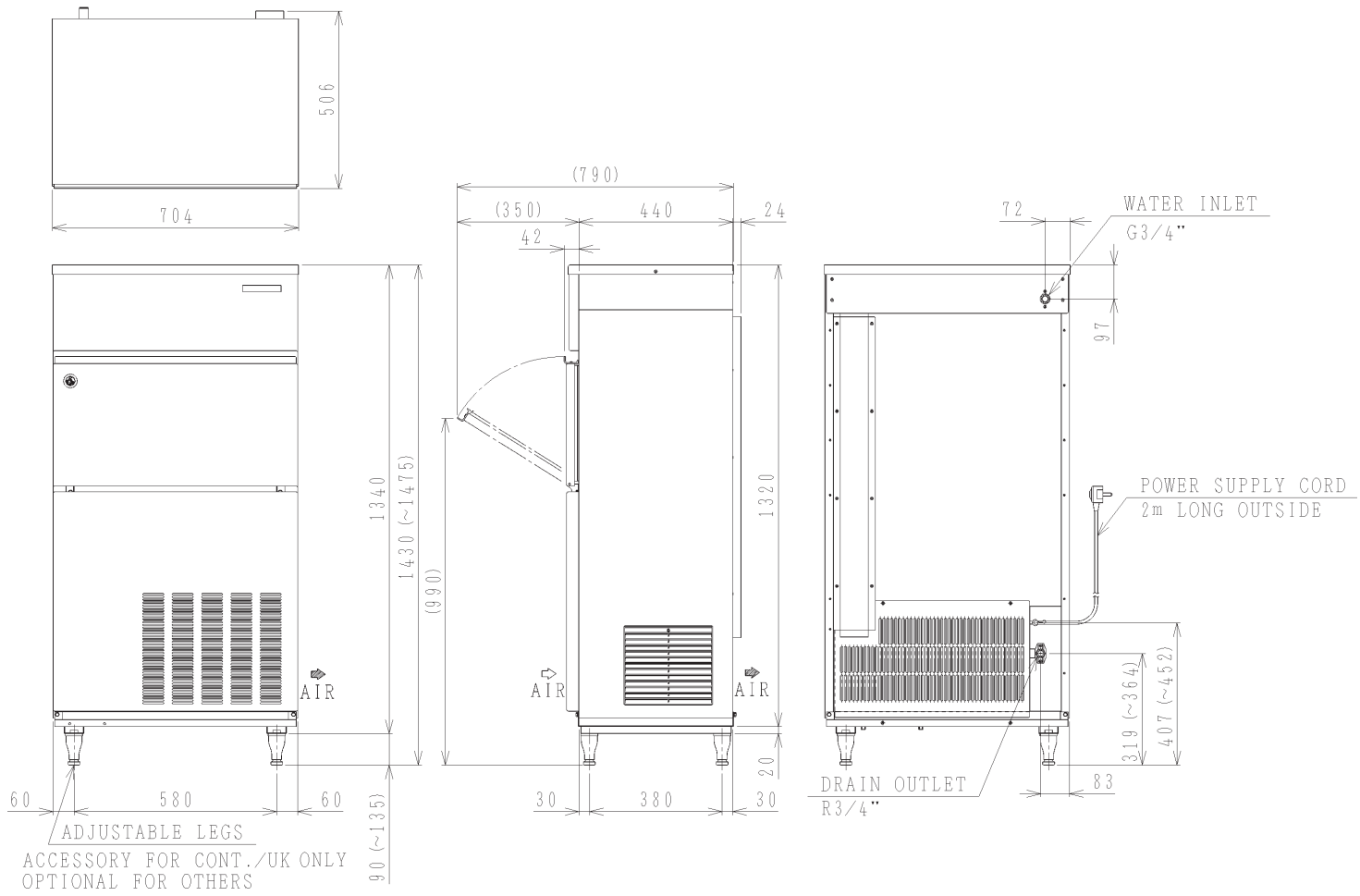
[g] IM-100LE, IM-130LE, IM-130ME (Air-cooled)



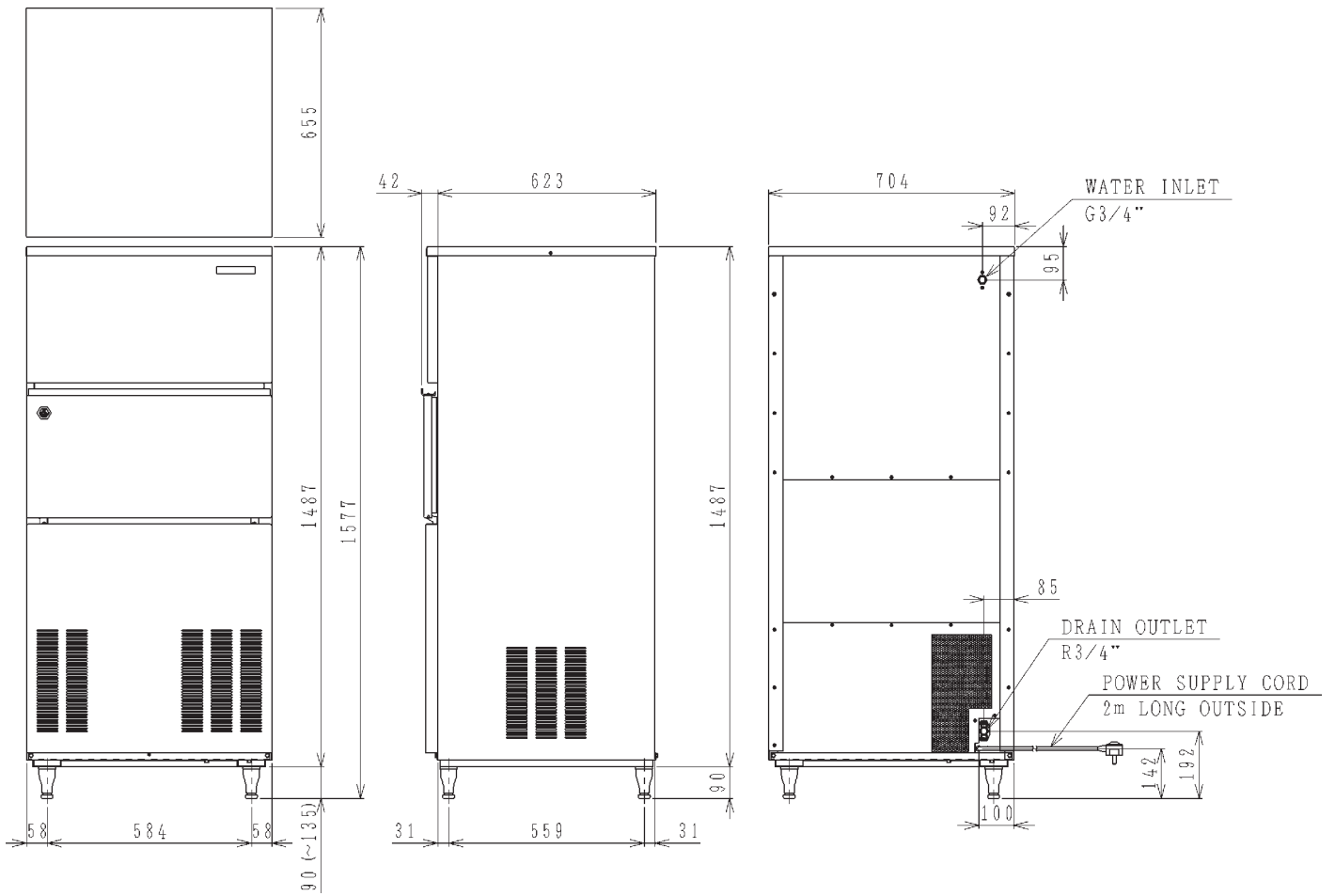
[h] IM-100CLE (Air-cooled)



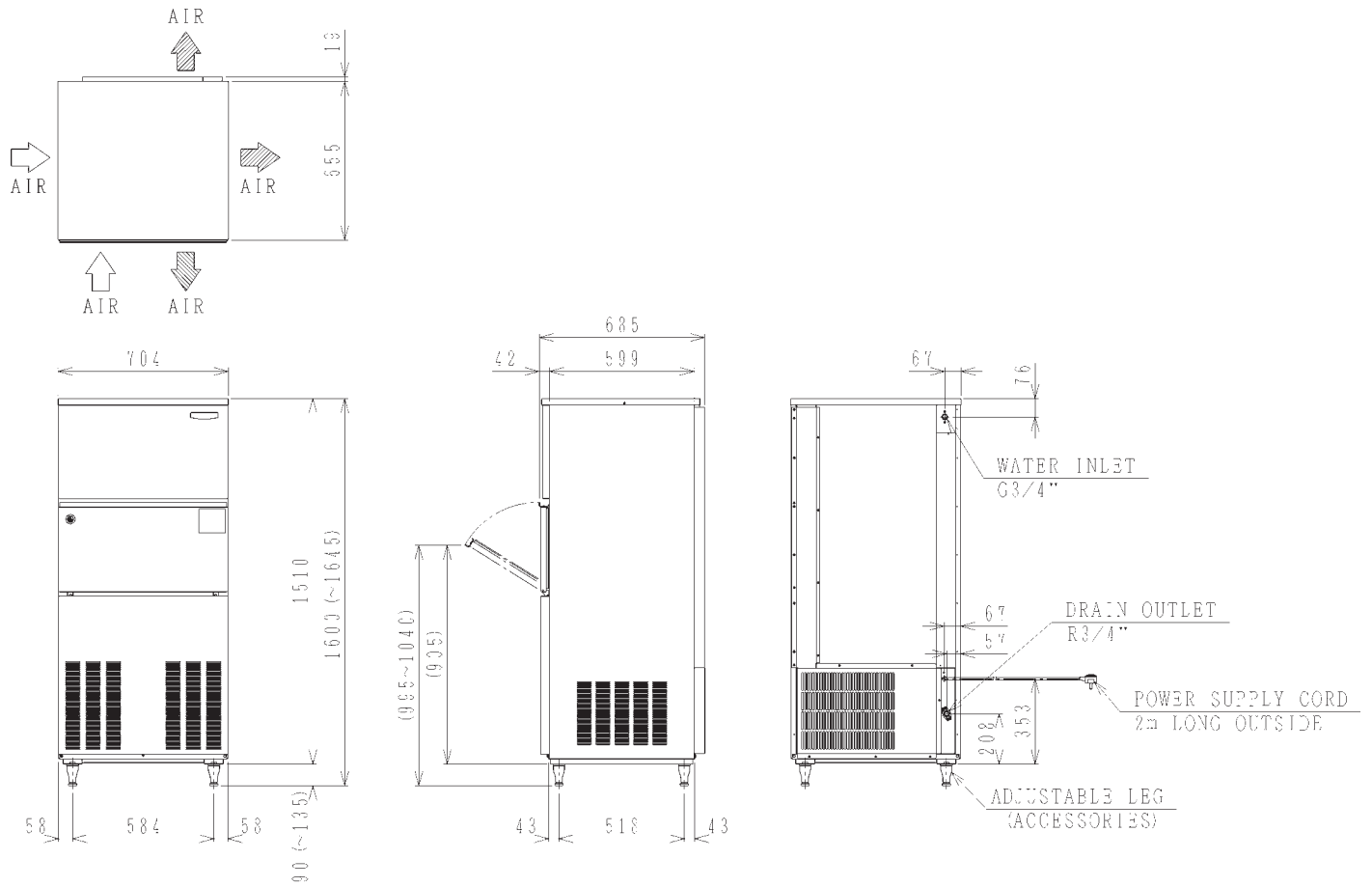
[i] IM-160ME (Air-cooled)



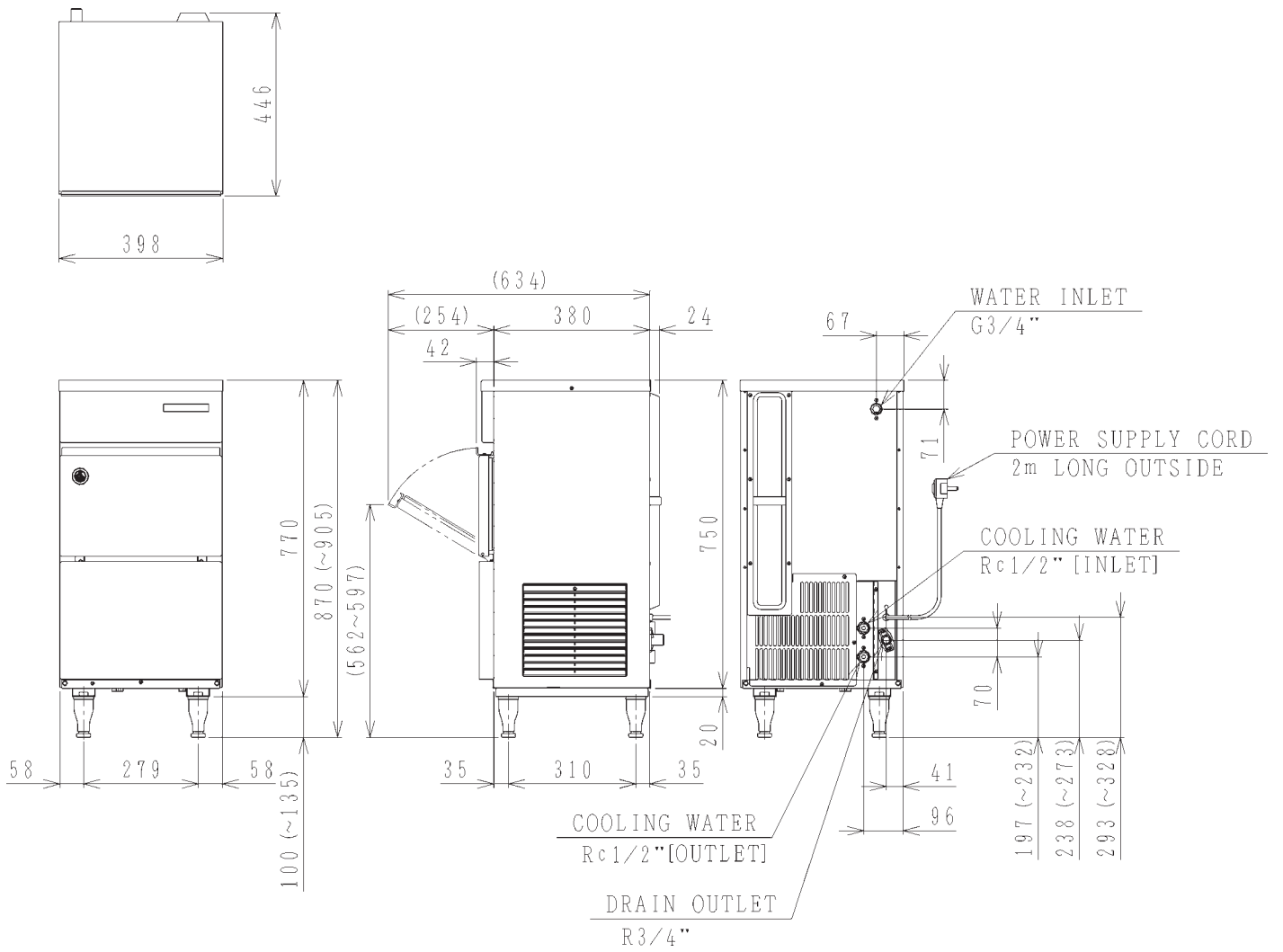
[j] IM-240ME (Air-cooled)



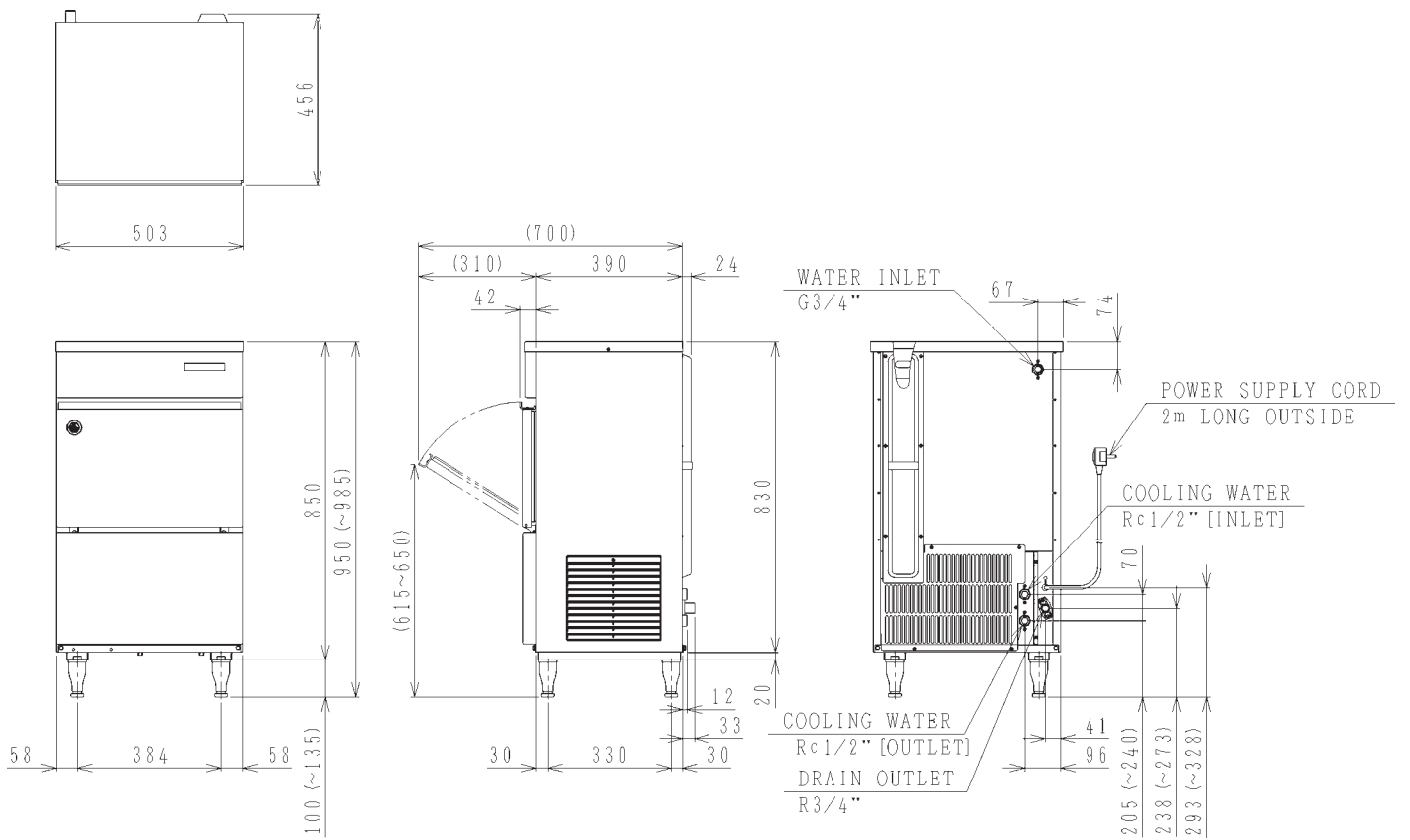
[k] IM-240M2E (Air-cooled)



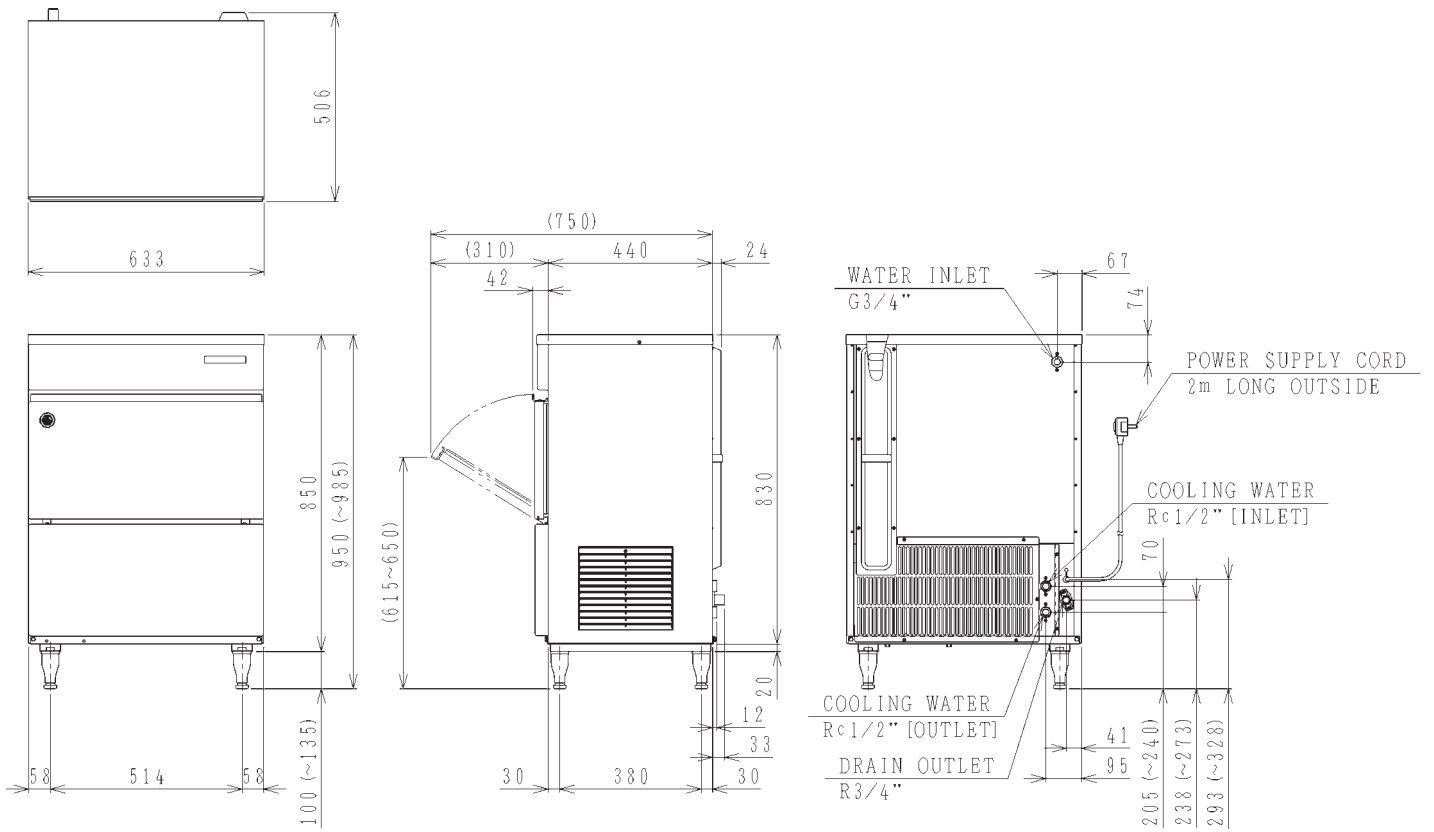
[I] IM-25WLE, IM-30WLE (Water-cooled)



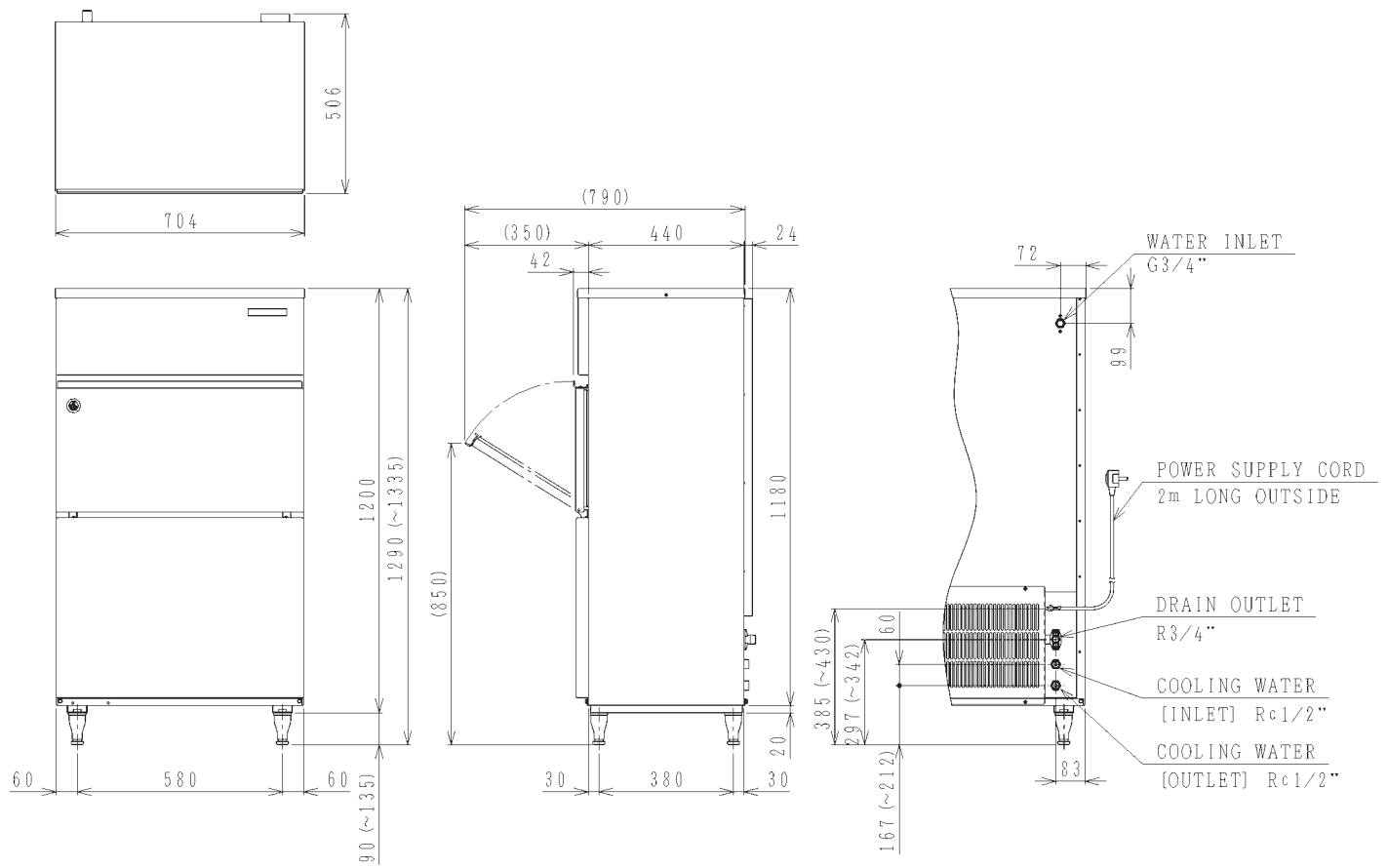
[m] IM-45WLE (Water-cooled)



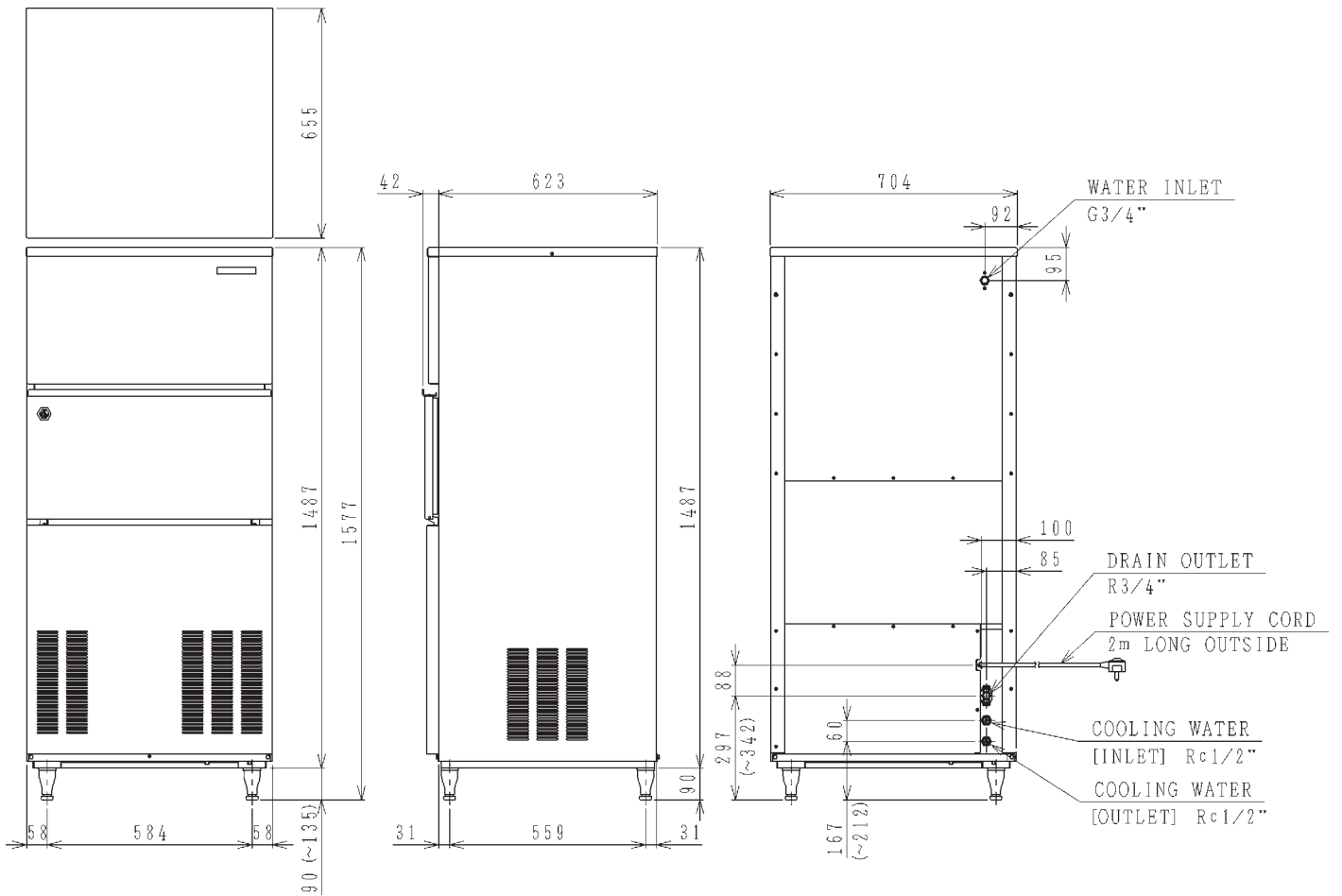
[n] IM-65WLE (Water-cooled)



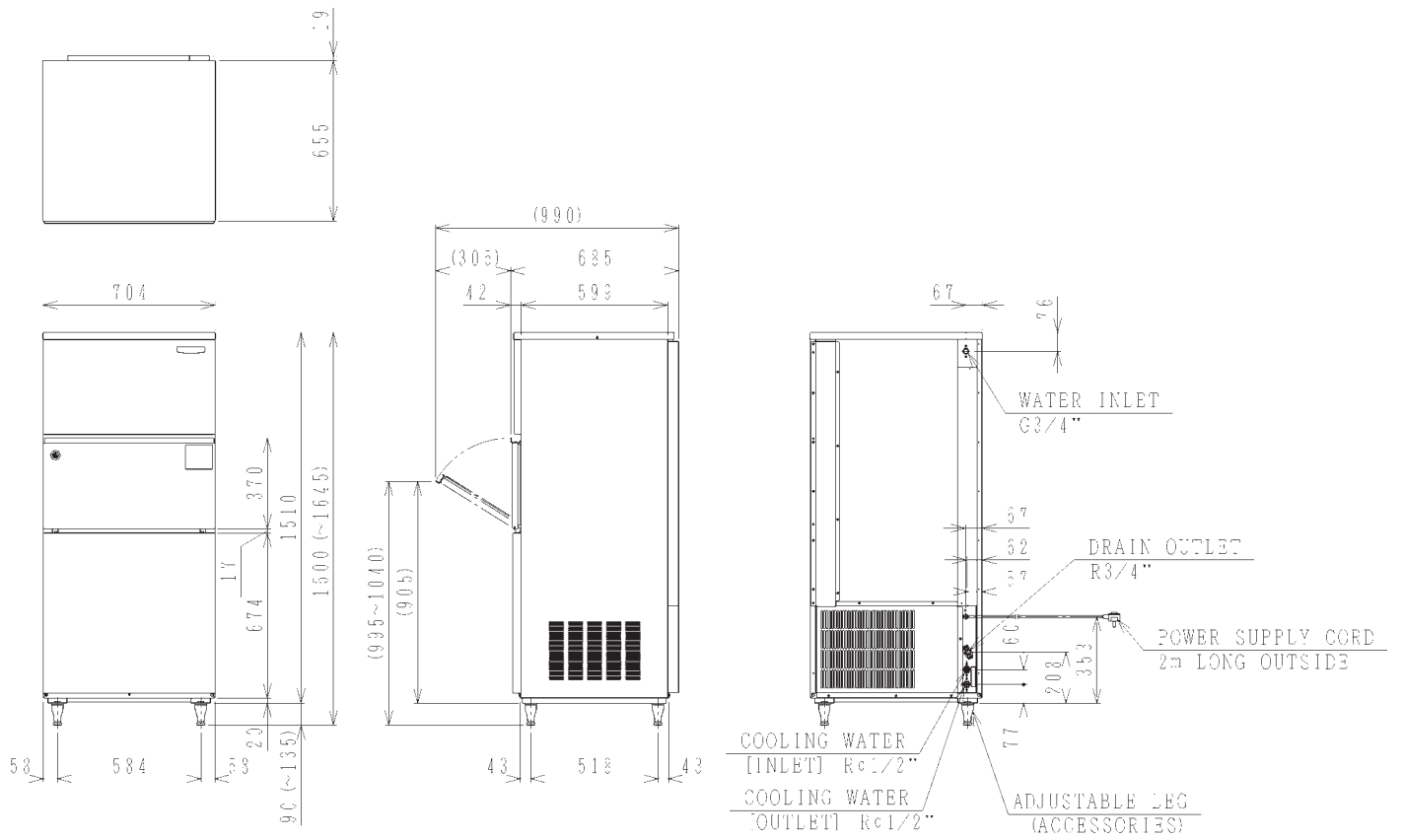
[o] IM-100WLE, IM-130WLE, IM-130WME (Water-cooled)



[p] IM-240WME (Water-cooled)



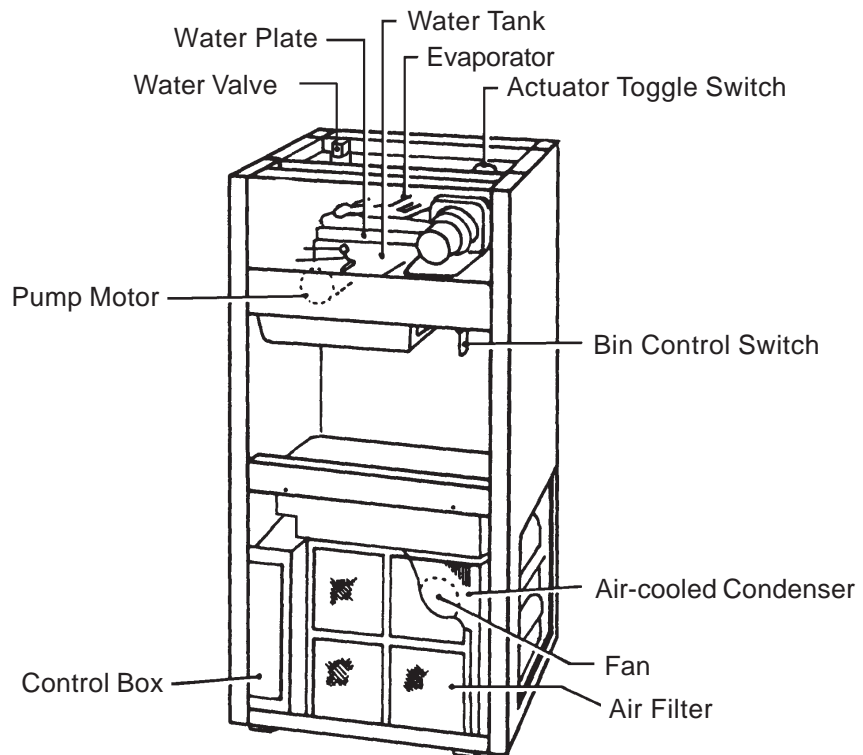
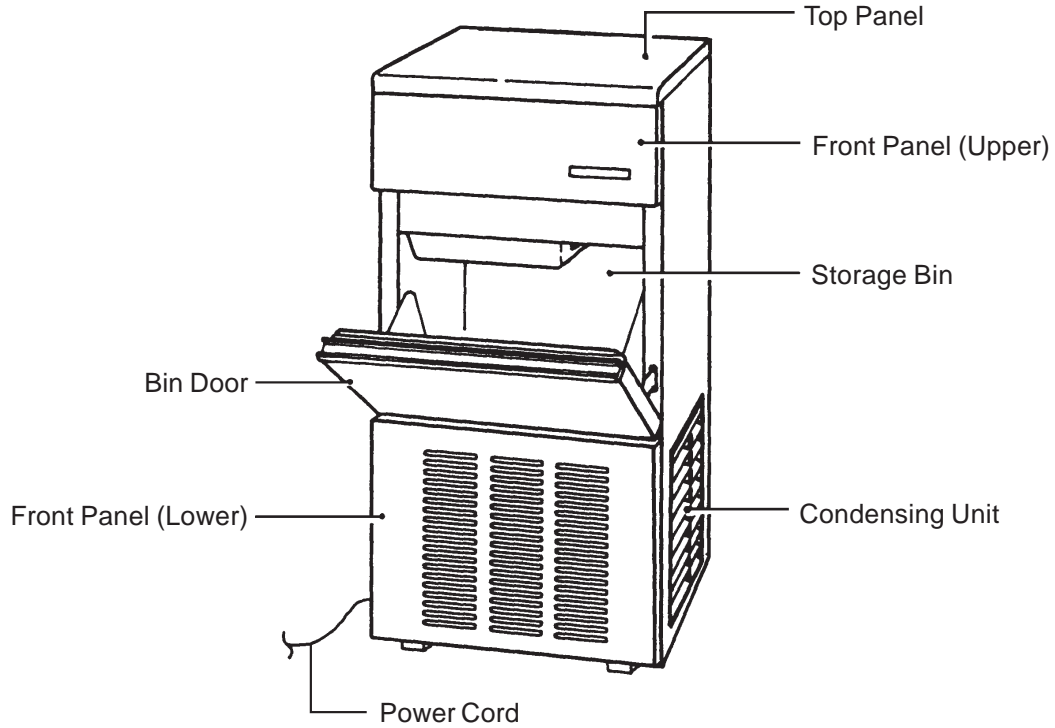
[q] IM-240WM2E (Water-cooled)



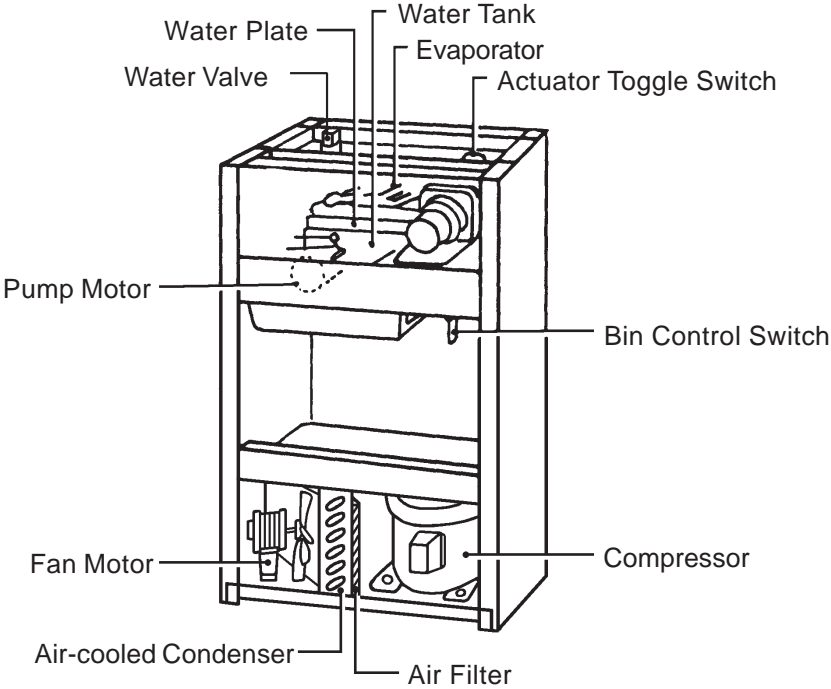
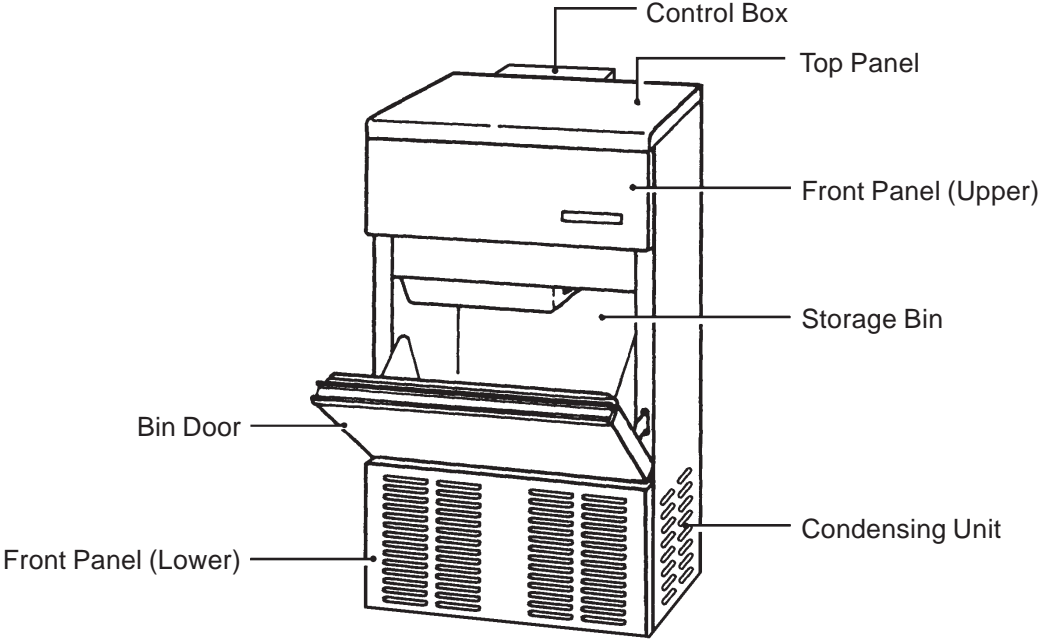
II. GENERAL INFORMATION

1. CONSTRUCTION

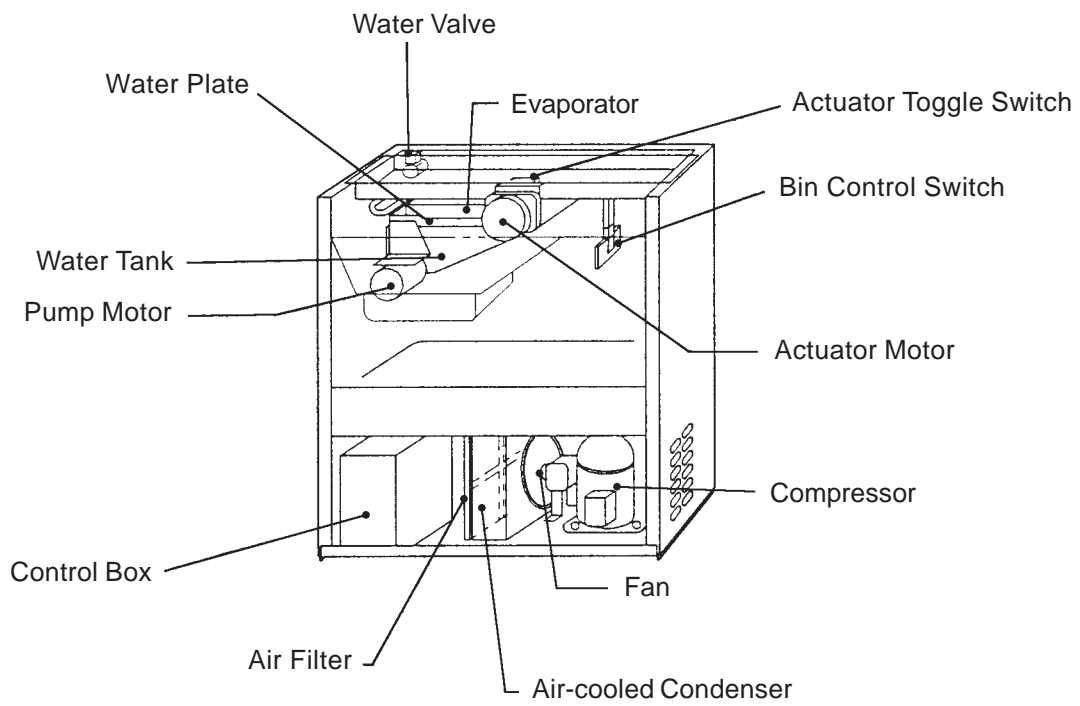
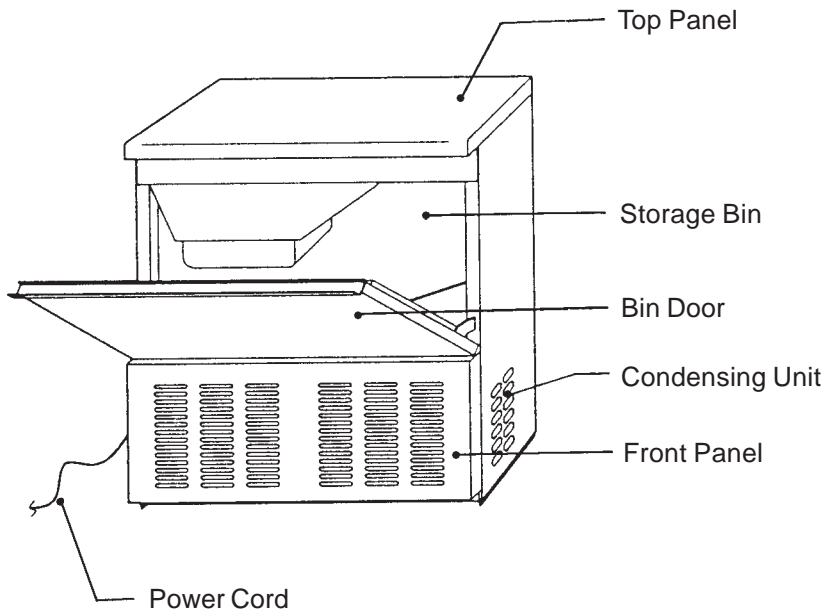
[a] IM-25LE, IM-45LE, IM-65LE, IM-100LE, IM-130LE, IM-130ME, IM-160ME



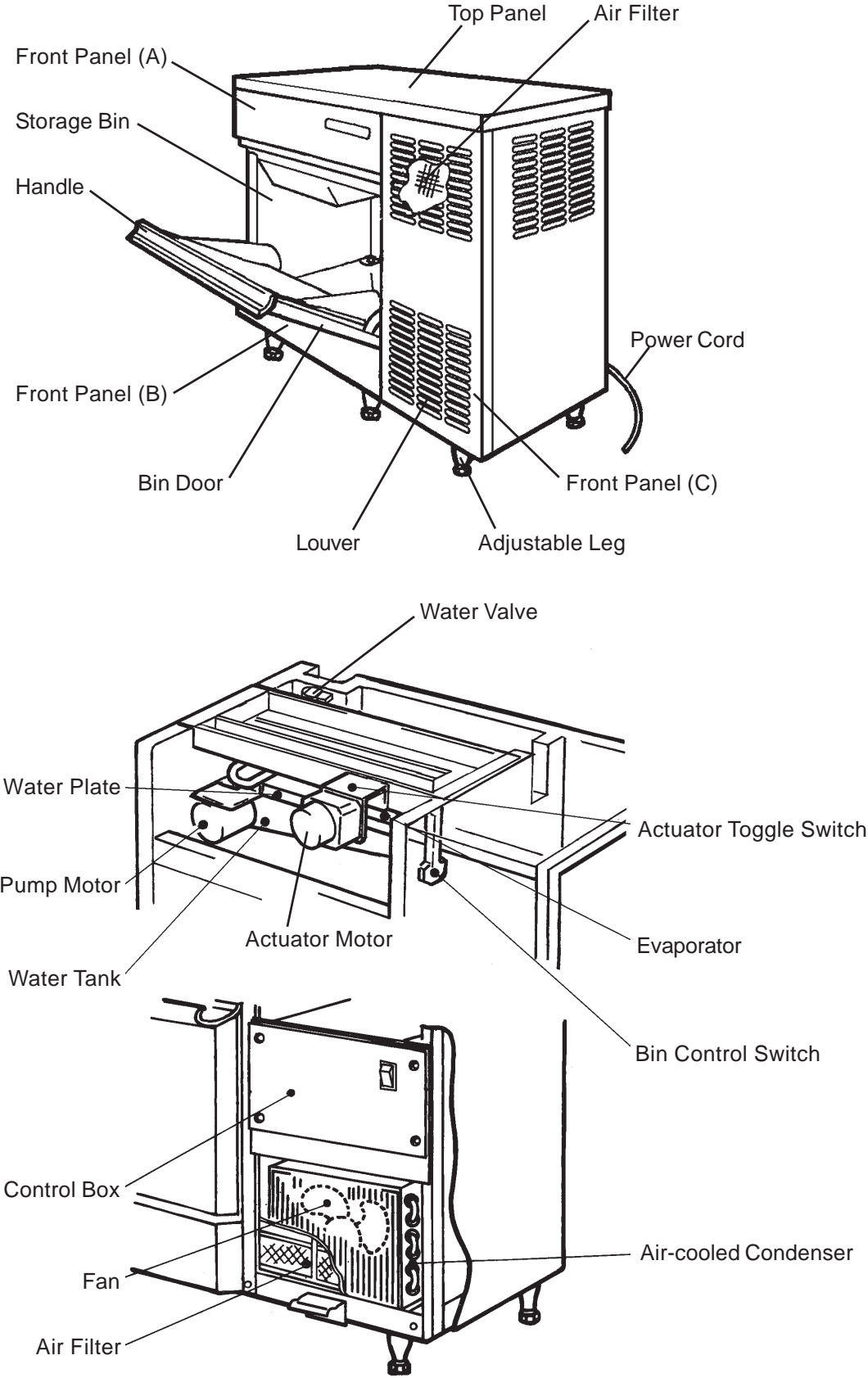
[b] IM-21CLE, IM-25CLE, IM-30CLE



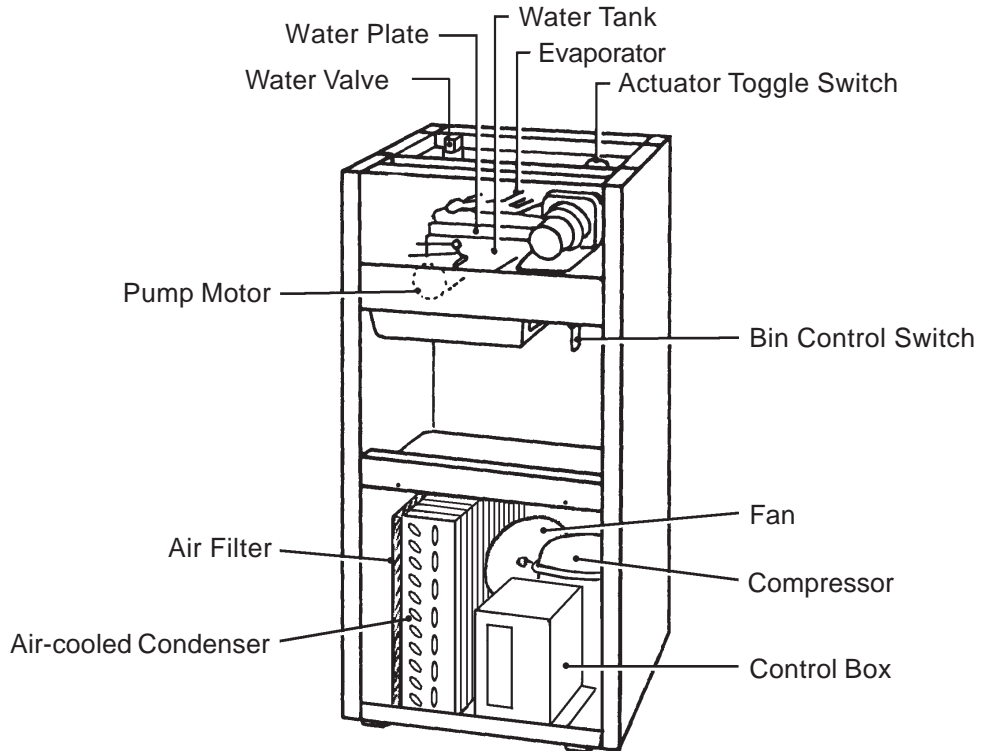
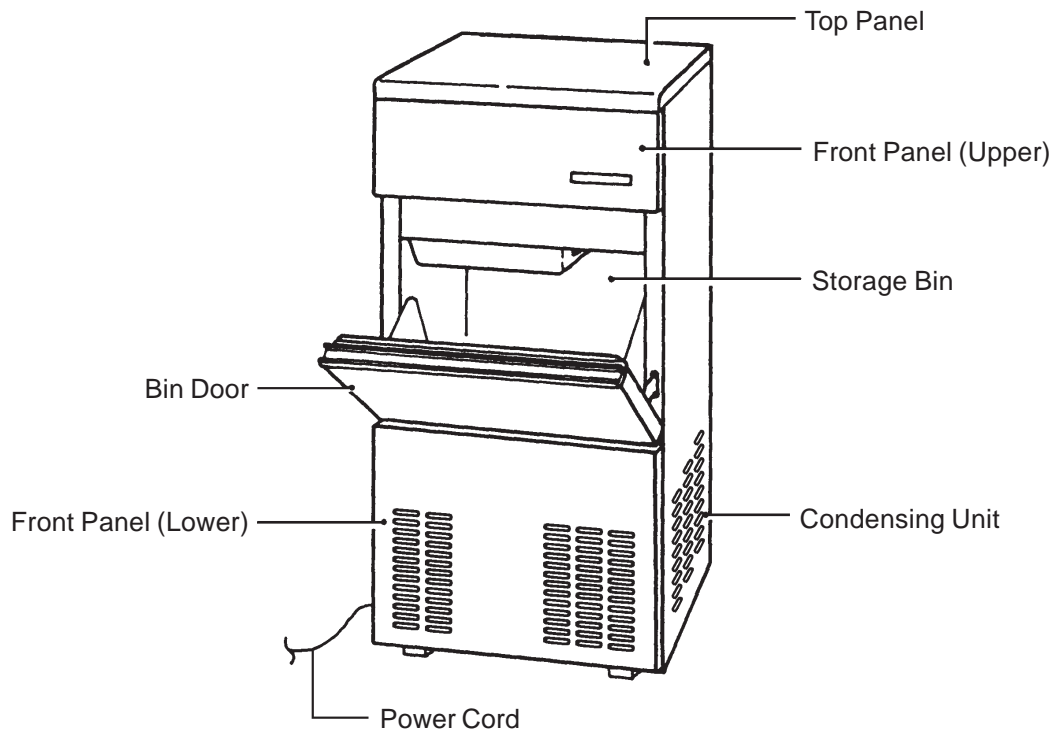
[c] IM-45CLE-25



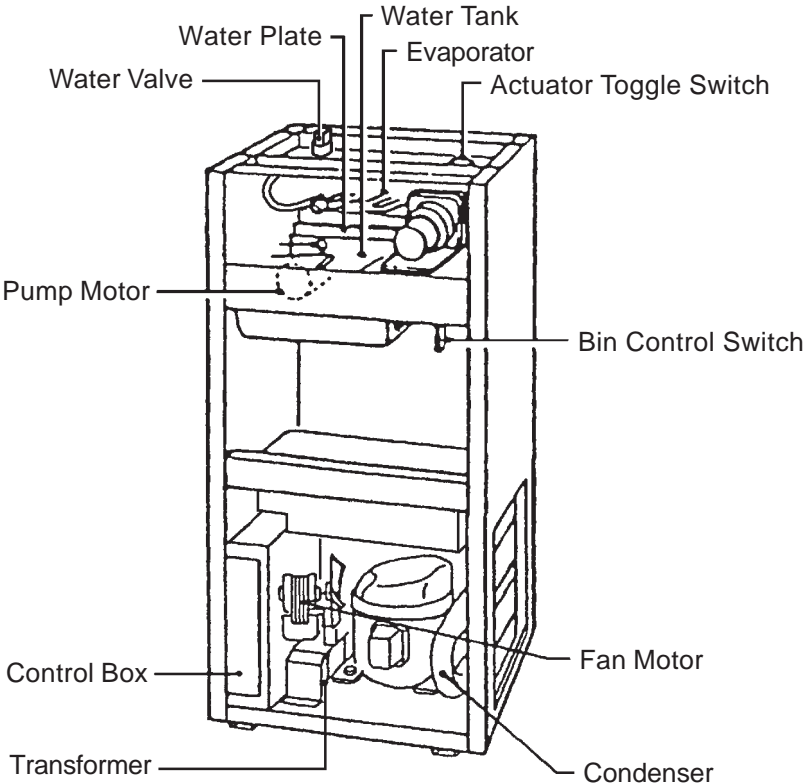
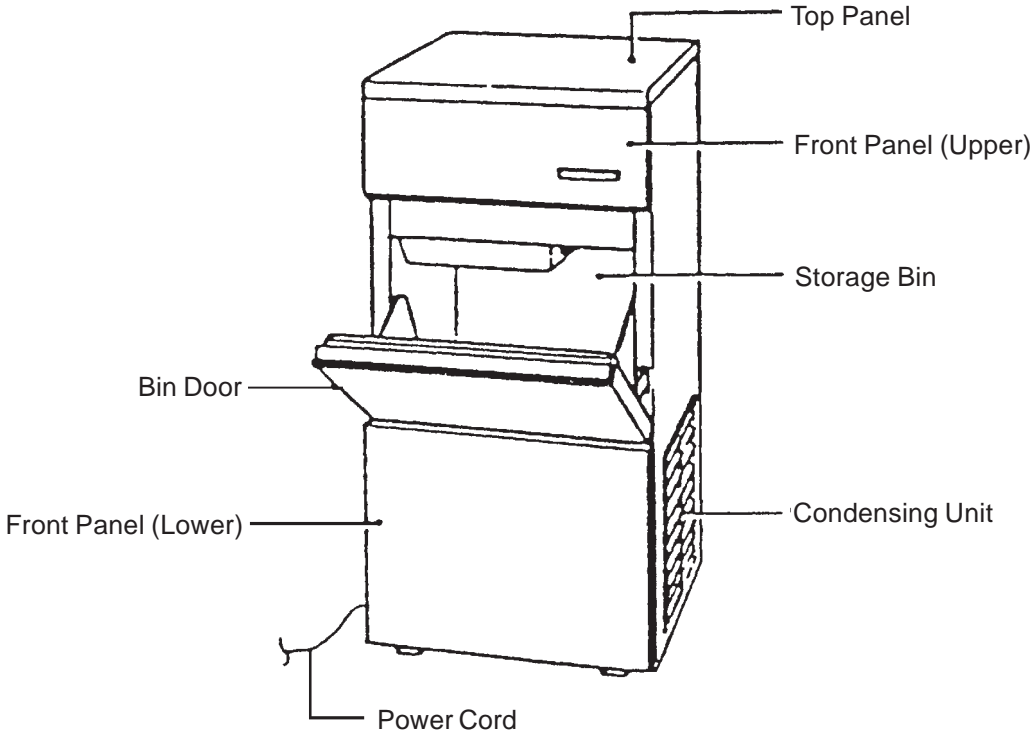
[d] IM-100CLE



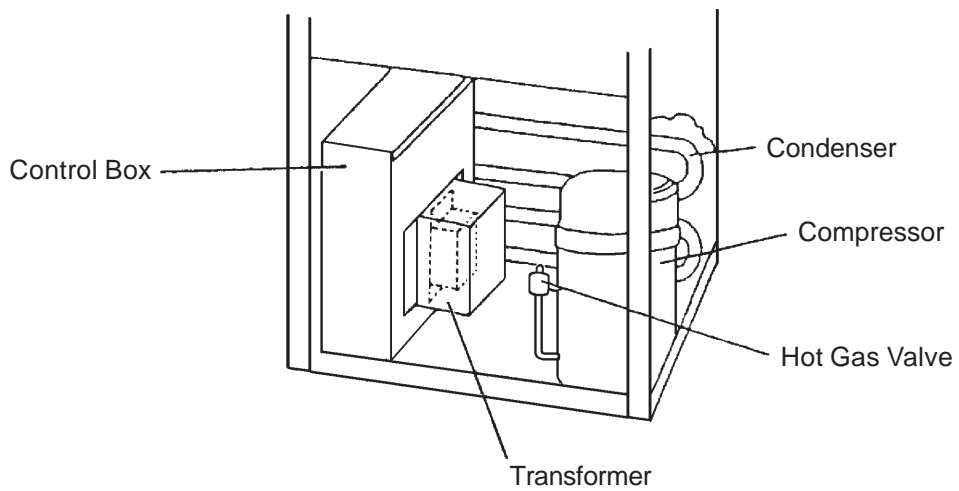
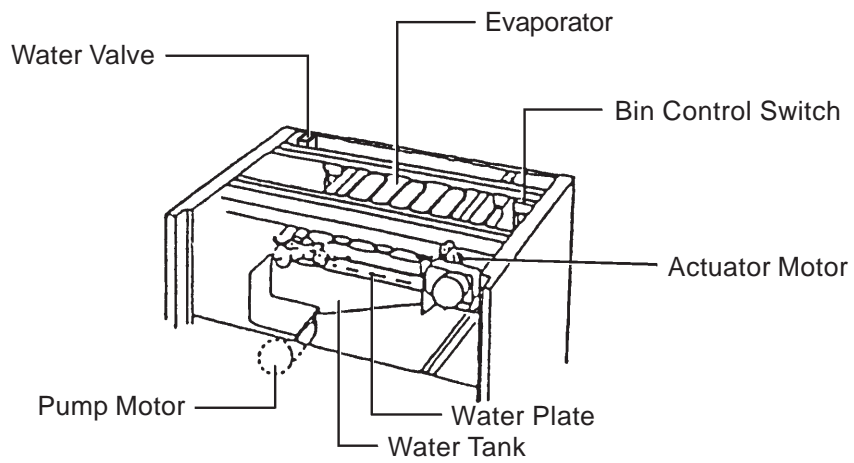
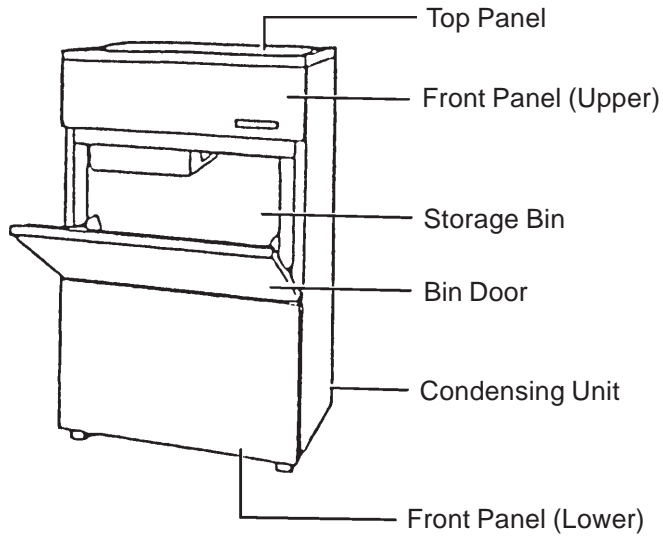
[e] IM-240ME, IM-240M2E



[f] IM-25WLE, IM-30WLE, IM-45WLE, IM-65WLE



[g] IM-100WLE, IM-130WLE, IM-130WME, IM-240WME, IM-240WM2E



2. CONTROLLER BOARD

Note: Refer to the “Hoshizaki IM Cuber Controller Board Service Manual” (E1AX-676) for the new Controller Board used for the later models (from Auxiliary Code “E-1”).

IMPORTANT

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

CAUTION

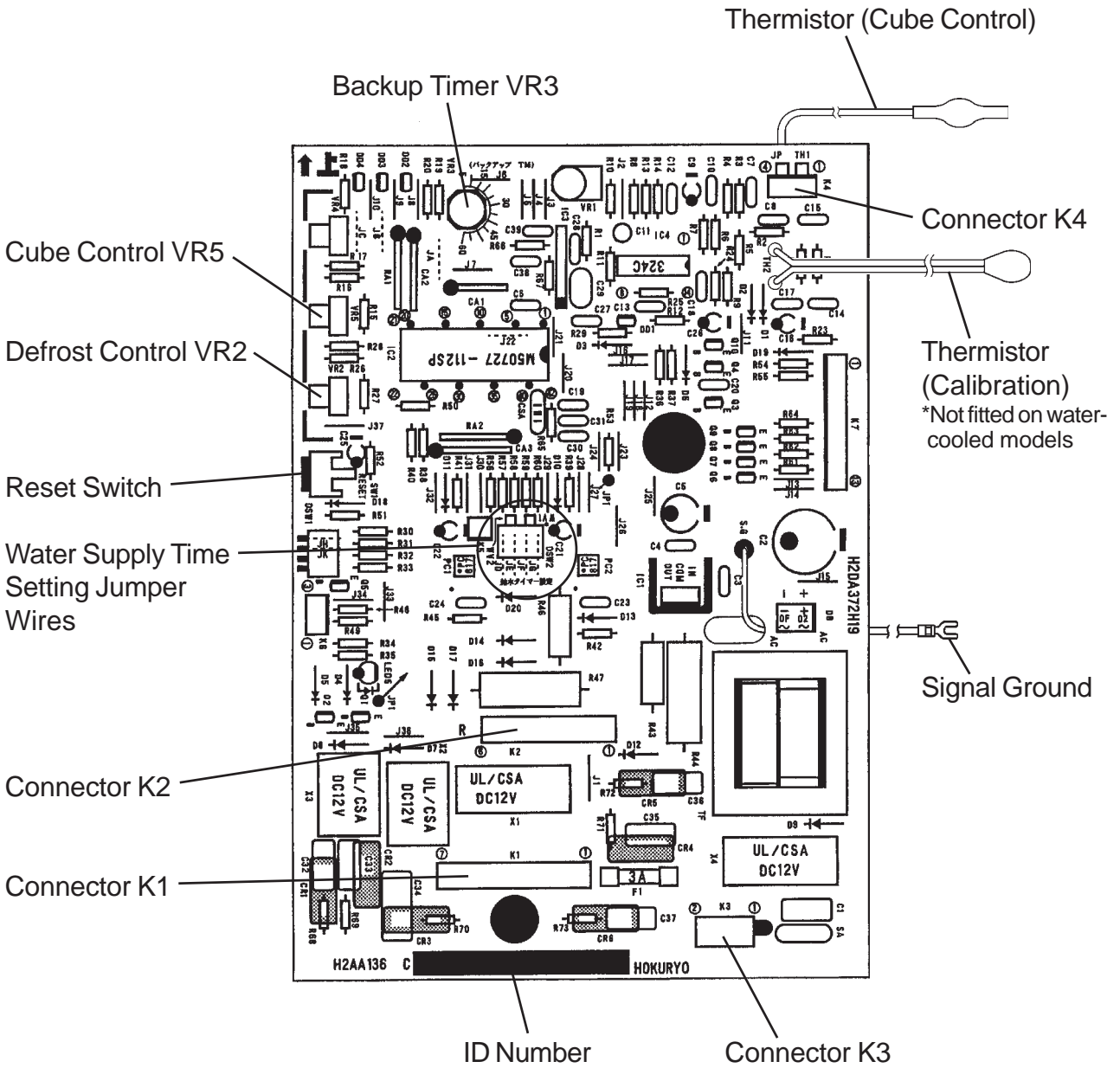
1. Check that the icemaker has been earthed properly. If not, the Controller Board will not work properly.
2. Do not change wiring and connections, or the Controller Board will not work properly.
3. Do not touch the reverse side of the Controller Board and tiny electronic devices on it.
4. Do not repair the electronic devices and parts on the Controller Board in the field. Replace the whole board assembly when it fails.
5. To get static free, always touch the metal part of the icemaker before servicing. Electrostatic Discharge will cause severe damage to the Controller Board.
6. The Signal Ground Wire must be connected to the Shield Plate when replacing the Controller Board after service.
7. The Controller Board is fragile. Handle with care.

* Do not drop the board on the floor.

* Make sure that the board is placed correctly into the guides in the Control Box. Mis-alignment could cause breakage when replacing the Control Box Cover.

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

[a] CONTROLLER BOARD LAYOUT

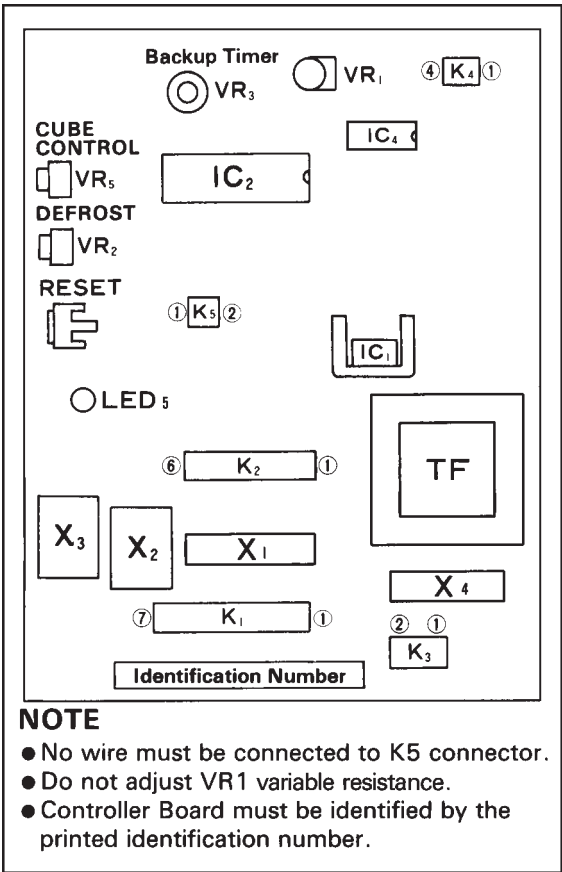


Model	ID No.	Thermistor (Calibration)
IM-21CLE, IM-25LE, IM-25CLE, IM-30CLE IM-45LE, IM-45CLE-25, IM-65LE	C10	Yes
IM-100LE, IM-130LE, IM-130ME, IM-160ME	C02	Yes
IM-25WLE, IM-30WLE, IM-45WLE, IM-65WLE	C12	No
IM-100WLE, IM-130WLE, IM-130WME IM-240ME, IM-240WME, IM-240M2E IM-240WM2E	C03	No

See the diagram on the right for layout of the Controller Board.

- VR: Variable Resistor
No. 2 through No. 5 adjustable
- K: Connector
- IC: Integrated Circuit Chip
- LED: Light Emitting Diode
Indicator Lamp
- TF: Transformer
- X: Relay
- RESET: Reset Button

To check the operation of the board, push the Reset Button only during the freeze cycle.



NOTE

- No wire must be connected to K5 connector.
- Do not adjust VR1 variable resistance.
- Controller Board must be identified by the printed identification number.

Relay

- X1 - Actuator Motor and Pump Motor
- X2 - Hot Gas Valve and Fan Motor
- X3 - Water Valve
- X4 - Compressor

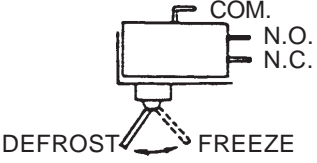
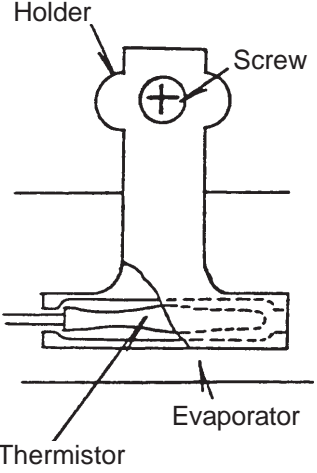
Control

- VR2 - Defrost Control
- VR3 - Backup Timer
- VR5 - Cube Control

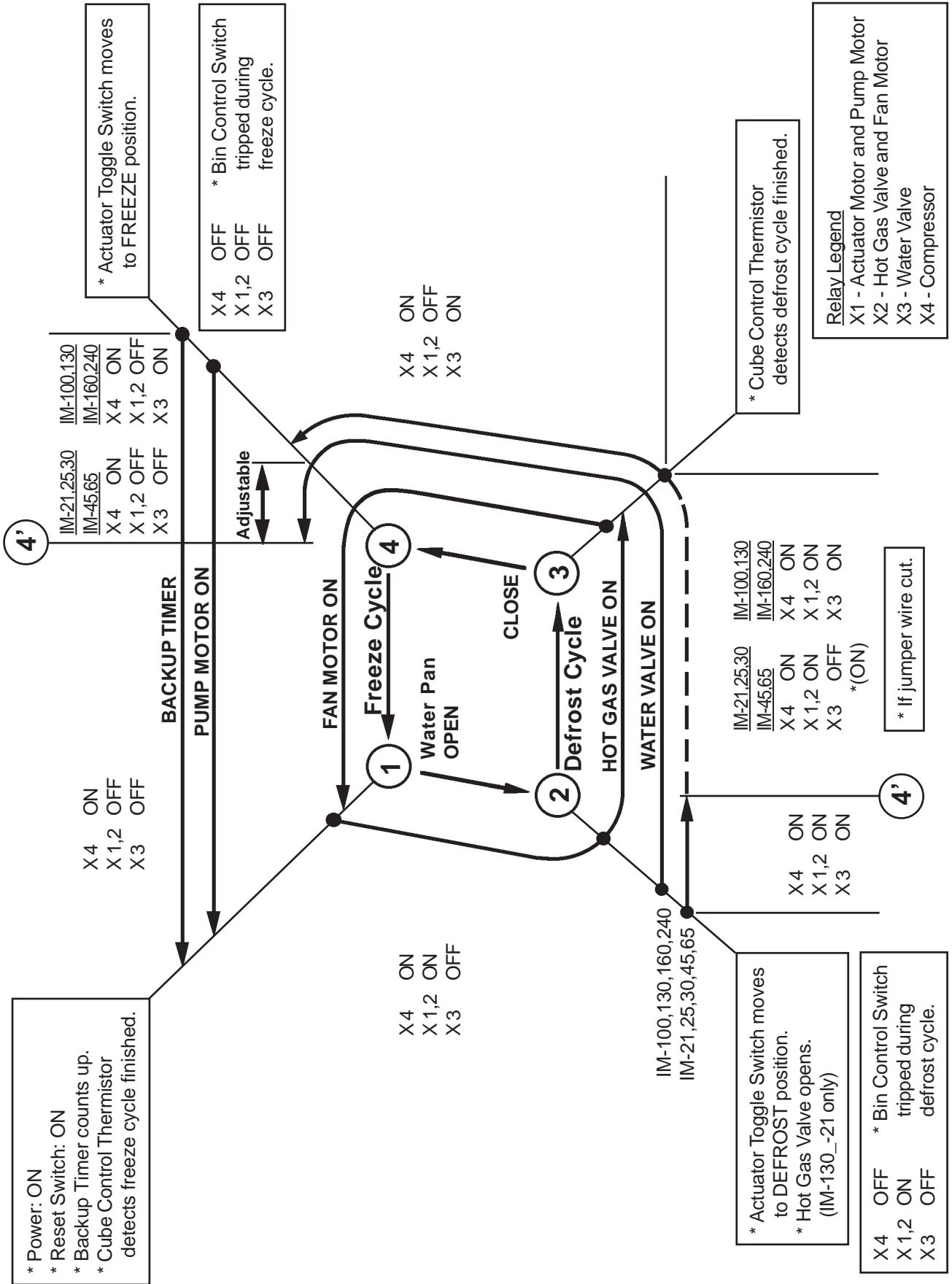
All the controls are factory-adjusted. Do not change setting except when replacing the board or if the setting has changed. Refer to “[e] CONTROLS AND ADJUSTMENT.”

[b] BEFORE CHECKING CONTROLLER BOARD

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

Component	Procedure	Normal
<p>1. Actuator Toggle Switch</p> 	<p>Manually set the switch in the FREEZE and DEFROST positions, and check the continuity.</p>	<p>DEFROST COM-NO Open COM-NC Closed</p> <p>FREEZE COM-NO Closed COM-NC Open</p>
<p>2. Thermistor (on Evaporator)</p> 	<p style="text-align: center;">CAUTION</p> <p style="text-align: center;">Thermistor Sensor part is fragile, glass sealed. Handle with care.</p> <ul style="list-style-type: none"> * Disconnect the Connector K4 on the board. * Remove the screw and the Thermistor Holder on the Evaporator. * Immerse the Sensor part in a glass containing ice and water for 5 minutes. * Check the resistance between K4 Connector Pins. * Replace the Thermistor in its correct position. * Connect K4. 	<p style="text-align: center;">5 -7 kilohms</p>
<p>3. Bin Control Switch</p>	<p>Manually set the Micro Switch in the TRIP and RESET positions, and check the period.</p>	<p>Approx. TRIP(Closed) 10 sec. RESET(Open) 80 sec.</p>

[c] SEQUENCE - LED INDICATORS ON/OFF PATTERN



[d] FAULT DIAGNOSIS

Check the status of the Service Lamp on the Controller Board (LED-5, See “[c] SEQUENCE”) by removing the Control Box Cover.

Lamp ON - Water Plate closed

This tends to indicate the Back-up Timer has stopped machine operation during the freeze cycle. High ambient and water temperatures are an obvious cause. But check out each component that could result in an extended freezing time (See guide below).

Lamp ON - Water Plate open



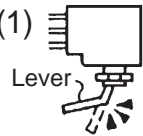






The Timer has stopped the machine because of an excessive defrost time. See the guide below to check out the probable cause.


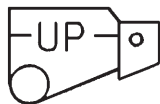


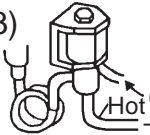





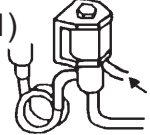




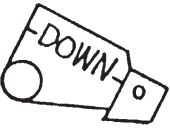
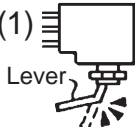


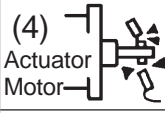

Lamp flashing ON/OFF

If on the first cycle, check out the Cam operation and/or Toggle Switch. If the machine has been in service for some time, the Controller Board may be at fault.

REMEMBER: Hoshizaki controllers are very reliable. They also control every component’s operation. So if a component malfunctions, the controller will respond. Do not replace controllers in an attempt to shorten the diagnostic process and not before carefully checking the actual fault and possible cause.

When the icemaker stops, the Controller Board Interlock Indicator shows possible faults.

PATTERN	INTERLOCK INDICATOR	WATER TANK POSITION	POSSIBLE CAUSE	REMEDY
1	 <p>Flashing</p>	 <p>Only First Cycle</p>	(1)  <p>Actuator Toggle Switch Lever bent</p>	Replace Actuator Toggle Switch
			(2)  <p>Cam Arm (A) broken</p>	Replace
		 <p>OR</p>	(3)  <p>Defective Actuator Motor</p>	Replace
			(4)  <p>Defective Controller Board</p>	Replace

PATTERN	INTERLOCK INDICATOR	WATER TANK POSITION	POSSIBLE CAUSE	REMEDY
2		 Freeze Cycle	(1)  Clogged Air Filter and/or Condenser	Clean or replace
			(2)  Water leak from Water Solenoid Valve	Replace
			(3)  Gas leak from Hot Gas Solenoid Valve	Replace
			(4)  Fan Motor stopped	Replace
			(5)  Gas leak	Check for leak
			(6)  Compressor stopped	Replace Comp. Starting Capacitor
3		 Defrost Cycle	(1)  Hot Gas Solenoid Valve closed and will not open	Replace
			(2)  Gas leak	Check for leak
			(3)  Compressor stopped	Replace Comp. Starting Capacitor
4		 OR 	(1)  Actuator Toggle Switch Lever bent	Replace Actuator Toggle Switch
			(2)  Cam Arm (A) broken	Replace
			(3)  Defective Actuator Motor	Replace
			(4)  Cam Pin damaged	Replace Cam Pin and Cam Arm (A)
			(5)  Defective Cube Control Thermistor	Replace

[e] CONTROLS AND ADJUSTMENT

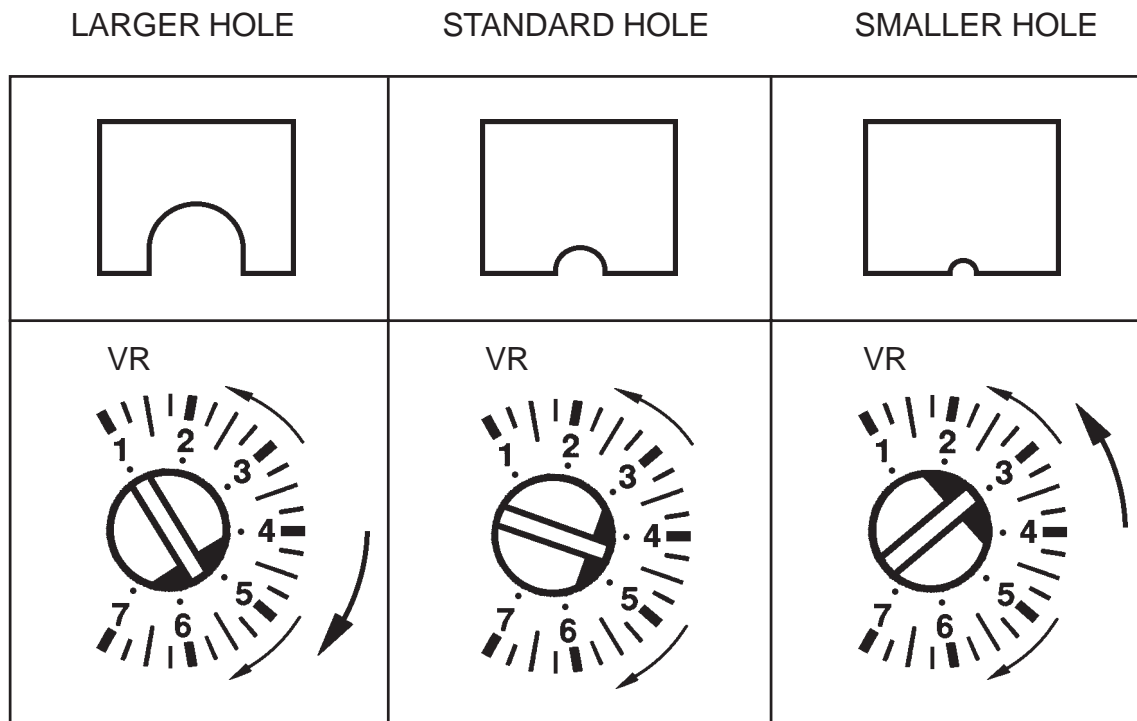
1) Cube Control (VR5)

A cube control on the Controller Board is factory adjusted to produce constant cubes all year around.

When the user needs ice cubes with smaller or larger diameter holes, adjust the Variable Resistor VR5 (Cube Control) using a miniature flat blade screwdriver.

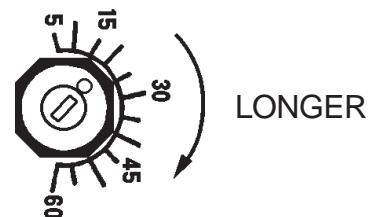
CAUTION

When adjusting the Variable Resistor VR5 for smaller dimple cubes, it may be necessary to also increase the water supply time to melt away fragments of ice obstructing the Water Plate which could prevent cubes falling into the Bin.



2) Backup Timer (VR3)

A backup timer is set to stop the freezing process when the freeze cycle time extends beyond approx. 45 minutes (high ambient or water temperature). Adjustment will not be required under normal use.



3) Defrost Control (VR2)

The defrost control regulates the time period between ice-drop and actuator motor restart. Any adjustment will not be required for normal operation. Factory setting is shown in the table below. When servicing or replacing the controller board, adjust the Variable Resistor VR2 using a miniature flat blade screwdriver.



Approximate Period (sec.)

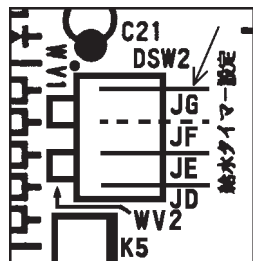
Ambient Temp.	IM-21CLE IM-25LE IM-25CLE IM-25WLE IM-30CLE IM-30WLE	IM-45LE IM-45CLE-25 IM-45WLE	IM-65LE IM-65WLE	IM-100LE IM-130LE IM-130ME IM-160ME	IM-100WLE IM-130WLE IM-130WME IM-240ME IM-240WME
30°C	20	20	20	20	20
20°C	30	40	40	35	30
10°C	60	80	60	90	40

4) Water Supply Control

When adjusting the Variable Resistor VR5 (Cube Control) for smaller dimple cubes, it may be necessary to adjust the water supply time setting as well, following the instruction below.

Note: 1. See “II. 2. [a] CONTROLLER BOARD LAYOUT” for location of the Jumper Wires.
 2. Any adjustment will not be required under normal use. If an insufficient water supply results in production of cloudy ice, check to see if the Filter of the Water Valve is clogged or water pressure is reduced.

a. IM-21CLE, IM-25LE/WLE, IM-25CLE, IM-30CLE/WLE, IM-45LE/WLE, IM-45CLE-25, IM-65LE/WLE

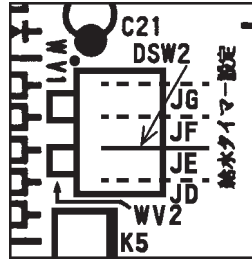


Cut the jumper wire JG (marked by arrow) by a nipper. Water supply time will be continuous when the Water Plate is open.

Normal setting = 15 sec. with Water Plate open

- b. IM-100LE/WLE, IM-130LE/WLE, IM-130ME/WME, IM-160ME, IM-240ME/WME, IM-240M2E/WM2E

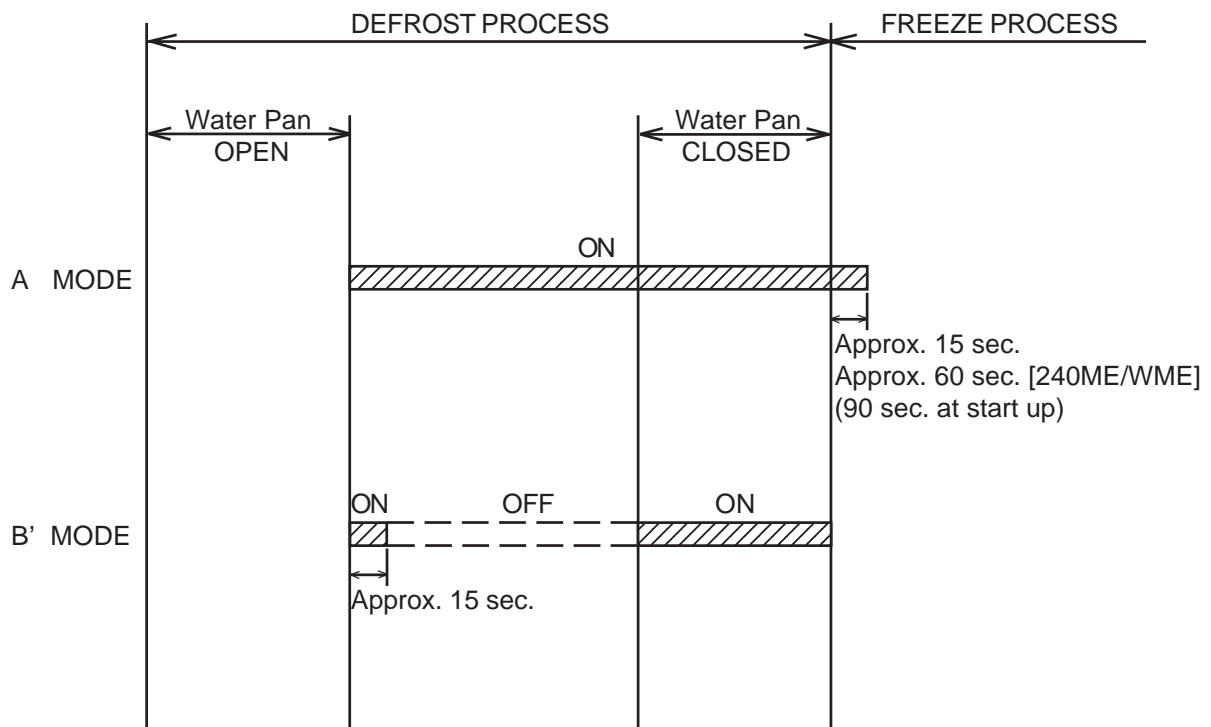
Note: In some areas where excessively hard water (approx. 250 ppm or more) results in production of cloudy ice, change the water supply time setting as follows.



Cut the jumper wire JE (marked by arrow) by a nipper. Water supply time will be 60 sec. when the Water Plate is closed. The jumper wire JE for IM-240ME/WME (except IM-240M2E/WM2E) has already been cut at factory adjustment.

Normal setting = 15 sec. with Water Plate closed

Controller Board	Mode	Model
C10	B'	IM-21CLE, IM-25LE, IM-25CLE, IM-30CLE, IM-45LE, IM-45CLE-25, IM-65LE
C12	B'	IM-25WLE, IM-30WLE, IM-45WLE, IM-65WLE
C02	A	IM-100LE, IM-130LE, IM-130ME, IM-160ME
C03	A	IM-100WLE, IM-130WLE, IM-130WME IM-240ME, IM-240WME, IM-240M2E, IM-240WM2E

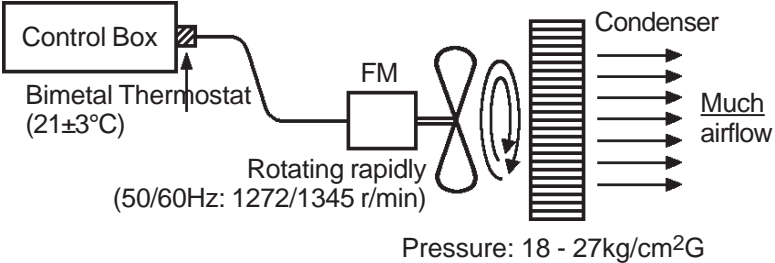
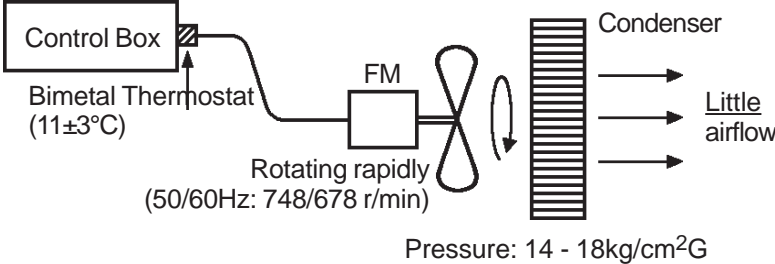


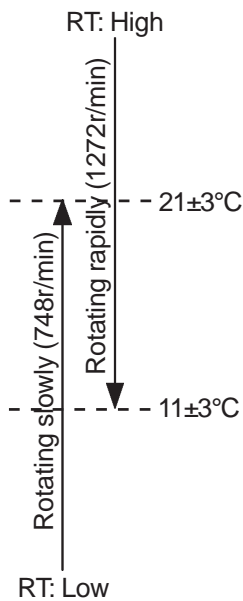
3. FAN MOTOR CONTROL - 240ME/M2E ONLY

The Condenser Fan Motor rotates at two speeds. The Motor is operated by Relay X6 which is in turn controlled by the Bimetal Thermostat which is attached to the Control Box. When the Relay is energised (Thermostat contacts closed), the Motor operates at approximately half speed. When the Relay is de-energised (Thermostat contacts open), the Motor operates at full speed.

Half speed = $11 \pm 3^\circ\text{C}$

Full speed = $21 \pm 3^\circ\text{C}$ (1272 R.P.M.)

<p>Construction & Features</p>	<ol style="list-style-type: none"> 1) Employs dual-speed fan motor control. 2) Bimetal thermostat slows down fan motor rotation (less airflow) at low temperatures to prevent excessive condensation. 3) $\pm 5\%$ of new refrigerant charge has been evaluated at RT 1 - 40°C. 4) Reduced refrigerant charge (less than half) solves troubles with remaining refrigerant at low temperatures.
<p>High Temp. Condition (RT Min. 10°C)</p>	
<p>Low Temp. Condition (RT Max. 10°C)</p>	



III. INSTALLATION INSTRUCTIONS

WARNING

The installation must be carried out by qualified personnel, in accordance with current regulations, according to the manufacturer's instructions.

1. UNPACKING

WARNING

Children should not be allowed in reach of the packaging elements (plastic bags and expanded polystyrene) as they are potential sources of danger.

CAUTION

Remove shipping carton, tape(s) and packing. If packing material is left in the icemaker, it will not work properly.

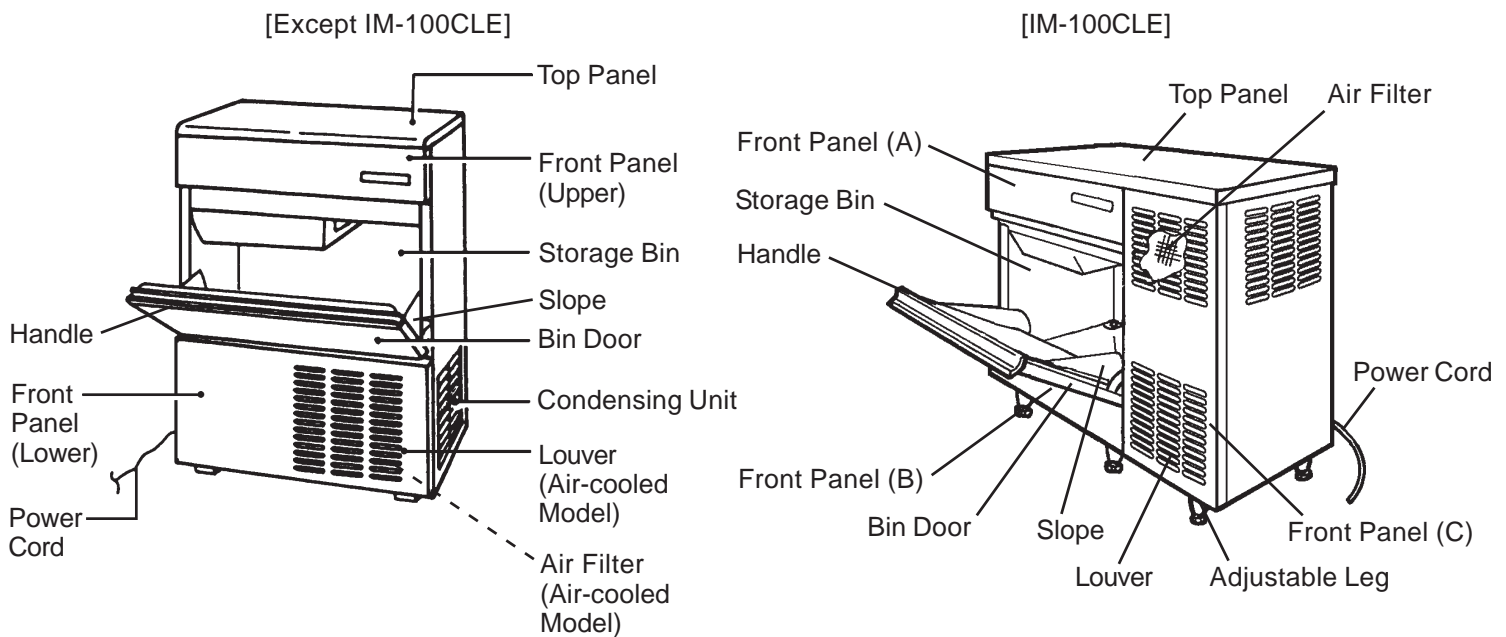


Fig. 1

- 1) After removing the packaging, make sure that the icemaker is in good condition. If in doubt, please do not use the equipment.
- 2) Remove shipping tape holding the Door and Front Panel.

3) Remove the protective plastic film from the exterior. If the icemaker is exposed to the sun or to heat, remove the film after the icemaker cools.

4) Remove the package of accessories, and check the contents:

a) Installation Kit (Air-Cooled except IM-100CLE)	
Inlet Hose	1
Outlet Hose	1
Installation Kit (Water-Cooled)	
Inlet Hose	2
Outlet Hose	2
1/2-3/4 Nipple	2
Installation Kit (IM-100CLE)	
Inlet Hose	1
Outlet Hose	1
3/4-3/4 Nipple	1
Elbow	1
b) Scoop	1
c) Adjustable Leg* (Except IM-21, 100CLE)	4
* Provided for Europe/General(G50)/RINNAI only	
Adjustable Leg (IM-100CLE)	6

5) Remove shipping tape holding the Bin Control Switch by opening the Bin Door and reaching in (see Fig. 2).

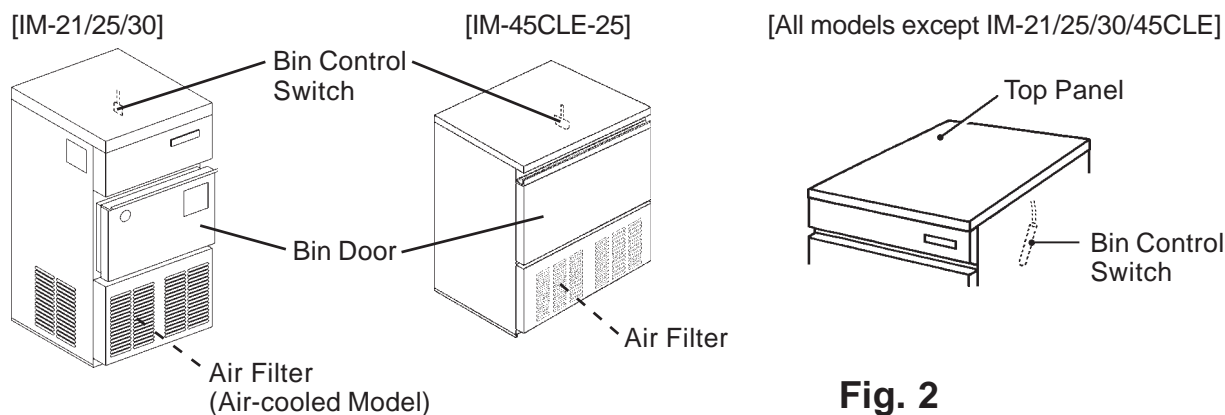


Fig. 2

2. LOCATION

WARNING

1. This icemaker is not intended for outdoor use. Normal operating ambient temperature should be within 1°C to 40°C. Normal operating water temperature should be within 5°C to 35°C. Operation of the icemaker, for extended periods, outside of these normal temperature ranges may affect production capacity.
2. The icemaker should not be located next to ovens, grills or other high heat producing equipment.

3. The location should provide a firm and level foundation for the equipment at normal counter top height.
4. Allow 15 cm clearance at rear, sides and top for proper air circulation and ease of maintenance and/or service should they be required.
5. This appliance is not suitable for installation in an area where a water jet could be used and where dripping is not allowed.
6. Do not place anything on top of the icemaker or in front of the Louver.
7. This icemaker will not work at subfreezing temperatures. To prevent damage to the water supply line, drain the icemaker when air temperature is below zero (see “IV. 2. PREPARING THE ICEMAKER FOR LONG STORAGE”).

3. INSTALLATION

- * Incorrect installation can cause harm to people, animals or things, for which the manufacturer cannot be held responsible.
- * Place the icemaker in the selected permanent site.

4. ELECTRICAL CONNECTIONS

WARNING

THIS APPLIANCE MUST BE EARTHED.

This icemaker requires an earth that meets the national and local electrical code requirements. To prevent possible severe electrical shock injury to individuals or extensive damage to equipment, install a proper earth wire to this icemaker. Remove the plug from the mains socket before any maintenance, repairs or cleaning is undertaken.

- * This icemaker must have a separate power supply or receptacle of 220 - 240V.
- * The main control box fuse is rated at 5A and should only be replaced by a qualified service engineer.
- * Usually an electrical permit and services of a licensed electrician are required.
- * If the supply cord and the plug should need to be replaced, it should only be done by a qualified service engineer.

For the U.K. and the Republic of Ireland only

* The wires in the mains lead are coloured in accordance with the following code:

Green & Yellow = Earth
Blue = Neutral
Brown = Live

As the colours of the wire in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

The wire which is coloured Green-and-Yellow must be connected to the terminal in the plug which is marked with the letter E or by the symbol $\underline{\text{E}}$ or coloured Green or Green-and-Yellow. The wire which is coloured Blue must be connected to the terminal which is marked with the letter N or coloured Black. The wire which is coloured Brown must be connected to the terminal which is marked with the letter L or coloured Red.

* Should the socket outlets in the installation site not be suitable for the plug supplied with your product, the plug must be removed (cut off if it is moulded on plug) and an appropriate plug fitted.

If the non-rewirable plug has been cut from the power supply cord, it must be disposed of. There should be no attempt to reuse it. Inserting such a plug into a socket elsewhere presents a serious risk of electrical shock.

* The non-rewirable plug must never be used without a fuse cover being fitted.

The correct replacement for the detachable fuse cover is identifiable from the manufacturer's reference number stamped on the plug.

Supply of replacement fuse covers can be obtained from Hoshizaki Parts/Service Centres.

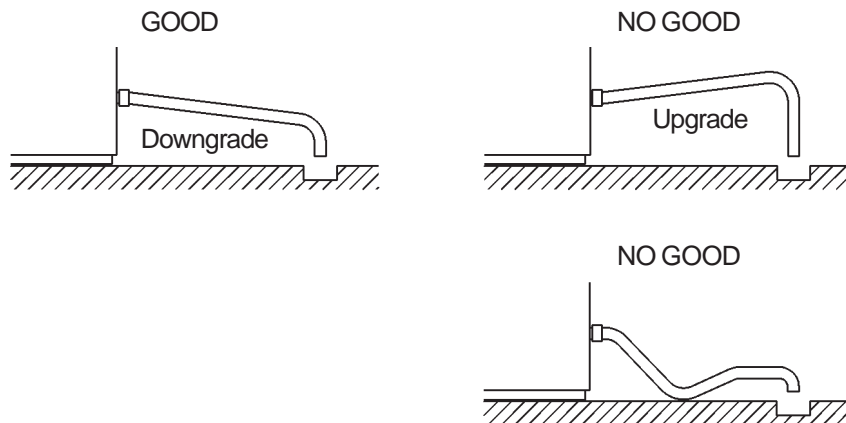
Fuses should be rated at 10A and approved to BS 1362.

5. WATER SUPPLY AND DRAIN CONNECTIONS

(For the U.K. only, the connections must be in accordance with current requirements of the Model Water Byelaws 1986 SI No. 1147)

- * Only potable water should be used for this icemaker.
- * Water supply pressure should be minimum 0.5 bar and maximum 8 bar. If the pressure exceeds 8 bar, use a pressure reducing valve. Do NOT throttle back the supply tap.
- * A plumbing permit and services of a licensed plumber may be required in some areas.
- * On water-cooled models, a back flow preventer may be required in the cooling water circuit.
- * Water should drain into an open trap.
- * The icemaker drain is gravity flow, so ensure drain pipe has an adequate pitch or fall.
- * To prevent a backflow into the Storage Bin, the outlet hose must be laid as shown in Fig. 3.

[Except IM-100CLE]



[IM-100CLE]

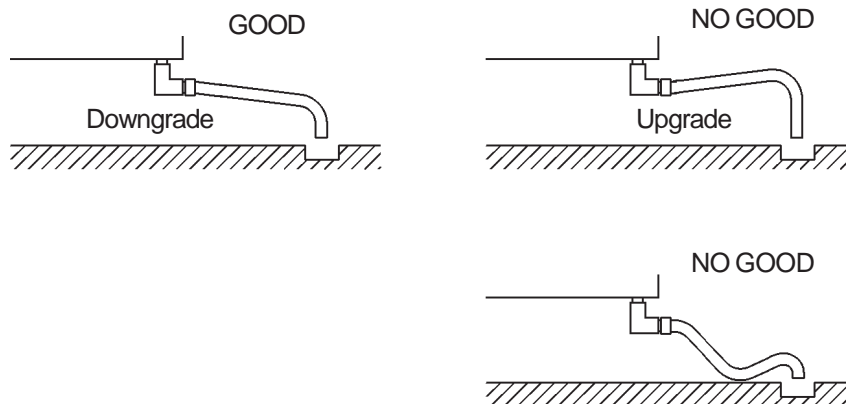


Fig. 3

[Air-Cooled Model Except IM-100CLE]

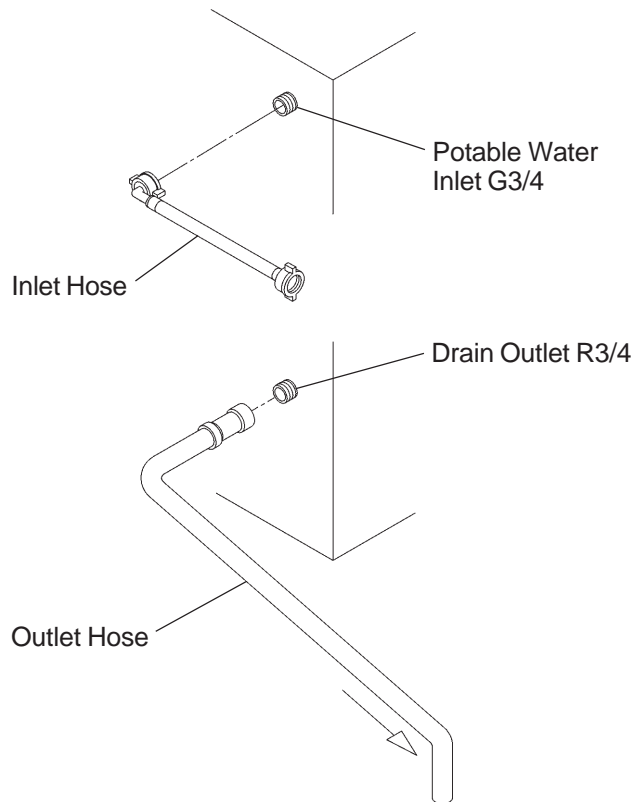


Fig. 4

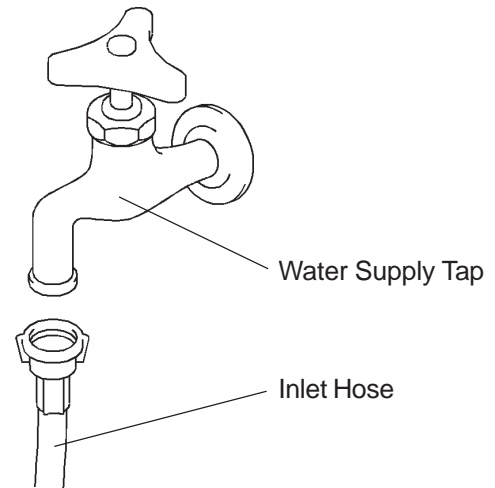


Fig. 5

- 1) Attach the angled end of white flexible inlet hose (accessory) onto the G3/4 fitting on the rear of the icemaker as indicated (Fig. 4), ensuring rubber sealing washer is correctly positioned. Hand tighten sufficiently to provide leak free joint.
- 2) Attach the other end of inlet hose to the water tap (Fig. 5), noting washer is correctly positioned before hand tightening as above. It is a wise precaution to have a stop valve within easy reach.
- 3) Hand tighten grey flexible outlet hose (accessory) onto the R3/4 fitting on the rear of the icemaker as indicated (Fig. 4), ensuring rubber sealing washer is correctly positioned to obtain a leak free joint. The pipe can be cut to length as necessary to suit position of main drain.

Note: Jointing compounds should be approved and suitable for potable water use.

[IM-100CLE]

- 1) Attach the angled end of white flexible inlet hose (accessory) onto the G3/4 fitting on the rear of the icemaker as indicated (Fig. 6), ensuring rubber sealing washer is correctly positioned. Hand tighten sufficiently to provide leak free joint.

- 2) Attach the other end of inlet hose to the water tap (Fig. 5), noting washer is correctly positioned before hand tightening as above. It is a wise precaution to have a stop valve within easy reach.
- 3) Connect the 3/4-3/4 nipple (accessory) to the elbow (accessory) as indicated (Fig. 7). P.T.F.E. tape and/or a suitable sealing compound should be used to obtain a leak free joint.
- 4) Tighten the 3/4-3/4 nipple and elbow onto the Rc3/4 fitting on the bottom of the icemaker as indicated (Fig. 6). P.T.F.E. tape and/or a suitable sealing compound should be used to obtain a leak free joint.
- 5) Use a pipe jointing compound (for PVC) to joint the outlet hose with PVC pipe (accessory) to the elbow as indicated (Fig. 8). The pipe can be cut to length as necessary to suit position of main drain.

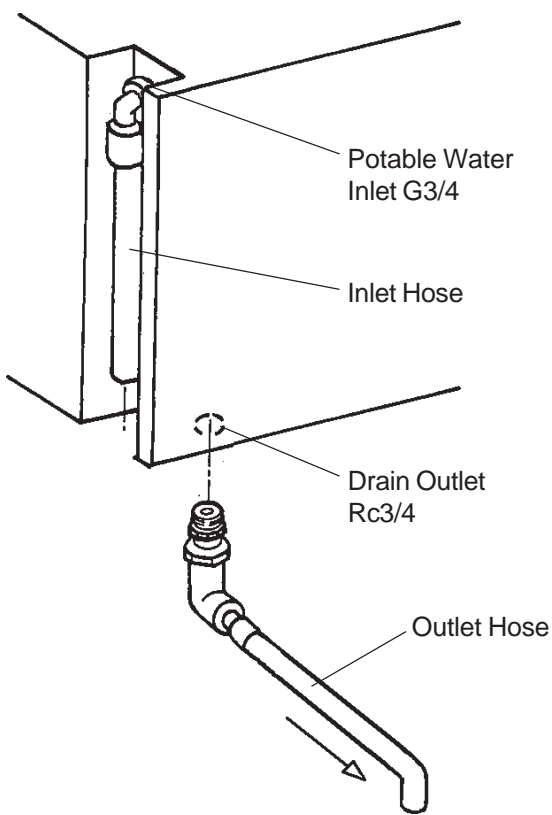


Fig. 6

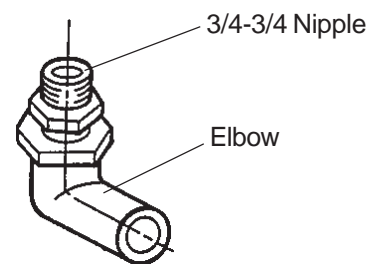


Fig. 7

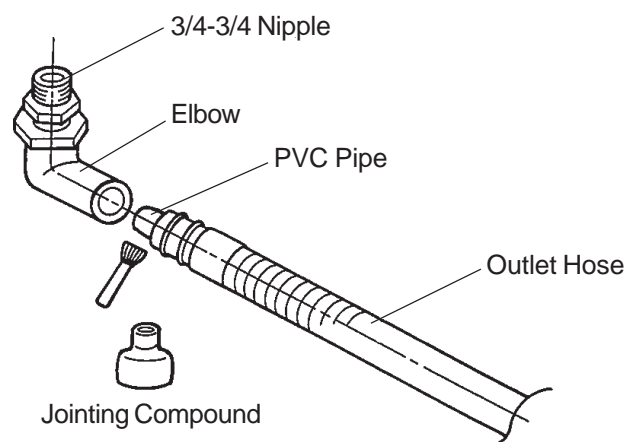


Fig. 8

[WATER-COOLED MODEL]

* Hoshizaki recommends that the water-cooled Condenser should be connected to a closed circuit recirculating type cooling system utilizing a tower, water chiller or similar (see Fig. 9 and 10). Water make up should be via a ball valve/break tank arrangement.

- * Whilst connecting a water-cooled Condenser to a mains water (potable) supply will not affect the performance of the machine, it will most certainly cause a high use/waste of a valuable resource and is not recommended.
- * The services of a licensed or coded plumber should be used to ensure a correct installation.
- * The connections should be made properly in compliance with the applicable national or local regulations.

[a] Standard connections according to WRC regulations in U.K. (Fig. 9 and 10)

- * When selecting a Cooling Tower, refer to the following peak values of heat flow in the Condenser:

Model	IM-25W, IM-30W, IM-45W:	290 - 755W
	IM-65W:	875W
	IM-100W, IM-130W:	1165W
	IM-240W:	5235W

- * Pipes between the Cooling Tower and the icemaker should be at least 20 mm DIA to reduce pressure loss, even though the icemaker fittings are 13 mm DIA.
- * Pressure loss in the water circuit inside the unit will be 5 to 6 m when the cooling water flows at the ratio of 4 to 5 lit/min.
- * Select a Circulating Pump referring to the above values of heat flow.
- * Do not use a Cascade Pump, or the Water Regulator will vary the flow and stop it during the defrost cycle.
- * The Strainer must be cleaned periodically.

[Icemaker Connections]

- 1) Attach the angled end of white flexible inlet hose (accessory) to the G3/4 fitting on the rear of the icemaker as indicated, ensuring rubber sealing washer is correctly positioned. Hand tighten sufficiently to provide leak free joint.
- 2) Attach the other end of inlet hose to the water tap (Fig. 5), noting washer is correctly positioned before hand tightening as above.

Note: If filtration or treatment is used, ensure icemaker section only is on treated water supply, not the Condenser.

- 3) Attach grey flexible outlet hose (accessory) to the R3/4 fitting on the rear of the icemaker as indicated, confirming fitment of rubber washer before finally hand tightening the joint. This pipe can be cut to length as necessary to suit position of main drain (Fig. 3).

- 4) By means of a suitable spanner or wrench, tighten the 1/2-3/4 nipples (accessory) into the Rc1/2 fittings on the rear of the icemaker as indicated. P.T.F.E. tape and/or a suitable sealing compound should be used to obtain a leak free joint.

Note: Jointing compounds should be approved and suitable for potable water use.

- 5) Connect the Condenser cooling circuit to the free ends of 1/2-3/4 nipples as indicated (Fig. 9), using a suitable rigid type pipe.

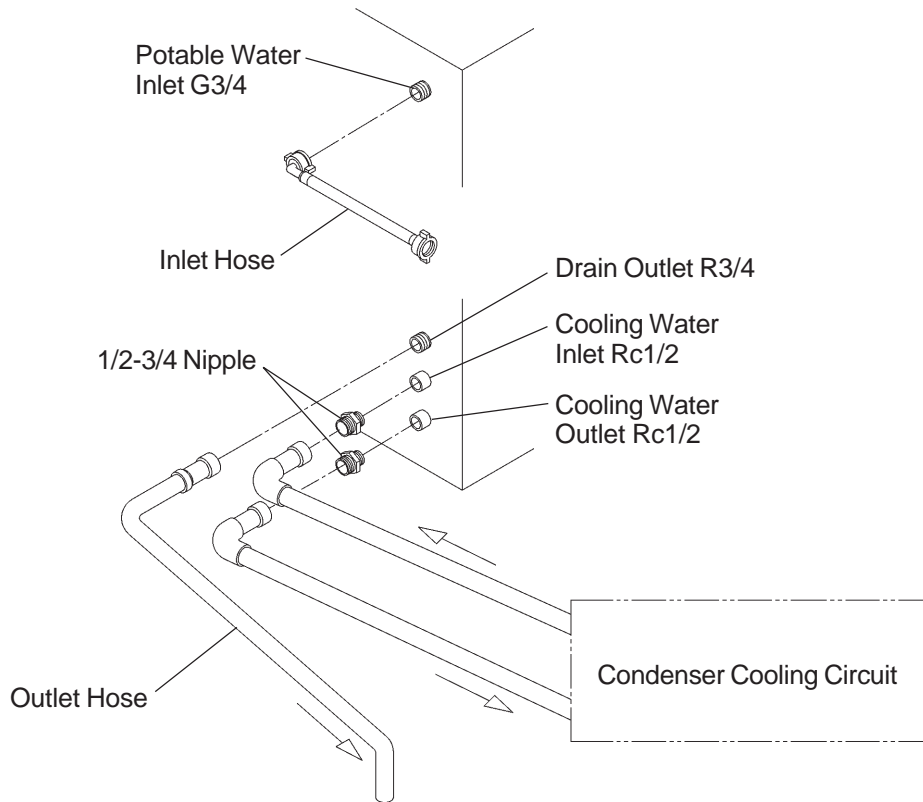


Fig. 9

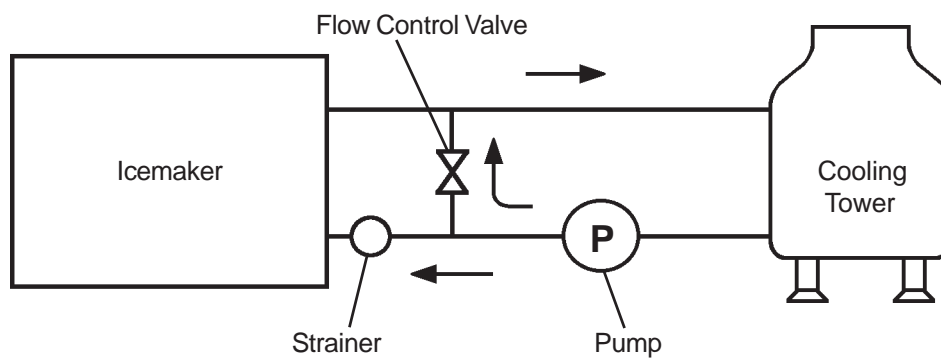


Fig. 10

* The opening pressure of the Water Regulator should be 7 bar. The high-side pressure during the defrost cycle will be 4 - 5 bar at an ambient temperature of 10°C and water temperature of 5°C. If the Water Regulator is adjusted to let the cooling water flow during the defrost cycle, ice will not be harvested properly.

* When adjusting the Water Regulator to increase the pressure or to lower the temperature of the cooling water, do not exceed the following ranges to prevent erosion in the water circuit:

Flow Speed: 2 m/sec or less
Flow Rate: 5.9 lit/min or less

* Water flow can be reduced down to 60%. The differential between the inlet and outlet water temperatures will increase (to 8°C with 60% water flow), but the cooling capacity will decrease. Be sure to keep enough capacity in summer.

Note: When installing a Flow Control Valve as shown in Fig. 10, the condition at the Cooling Water Inlet should not exceed the following ranges:

Water Temperature: 30°C or less
Water Pressure: 0.5 bar or more
Flow Rate: 8 - 10 lit/min

[b] Connections according to regulations other than WRC by utilising accessory hoses (Fig. 11)

- 1) Follow the instructions from 1) to 4) in [a] above.
- 2) For Condenser connections, use supplied accessory hoses and make the same connections as 1) to 3) in [a] above to the free end of 1/2-3/4 nipples as indicated (Fig. 11).

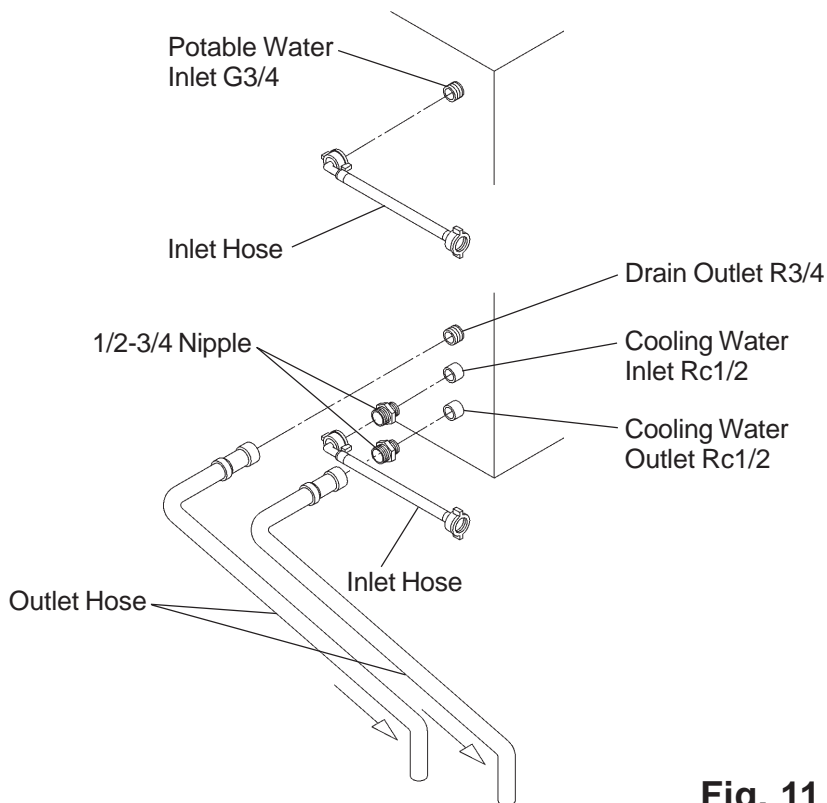


Fig. 11

6. FINAL CHECK LIST

- 1) Is the icemaker level?
- 2) Is the icemaker in a site where ambient temperatures are a minimum of 1°C and maximum 40°C all year around?
- 3) Is there at least 15 cm clearance around the icemaker for easy maintenance and service?
- 4) Have all shipping carton, tape(s) and packing been removed from the icemaker?
- 5) Have all electrical and piping connections been made?
- 6) Has the power supply voltage been tested or checked against the nameplate rating?
Has a proper earth been installed to the icemaker?
- 7) Has the water supply pressure been checked to ensure a minimum of 0.5 bar and maximum 8 bar?
- 8) Have the Compressor hold-down bolts and all refrigerant lines been checked against vibration and possible failure?
- 9) Have the Bin Control Switch been checked for correct operation? When the icemaker is running, push the Detector of the Bin Control Switch. The icemaker should stop within 10 seconds.

IV. OPERATING INSTRUCTIONS

WARNING

1. This icemaker is designed to produce and store edible ice. To keep the icemaker hygienic:
 - * Wash your hands before removing ice. Use the Plastic Scoop provided (accessory).
 - * The Storage Bin is for ice use only. Do not store anything else in the Bin.
 - * Clean the Storage Bin before use (see "V. 1. PERIODICAL CLEANING").
 - * Keep the Scoop clean. Clean it by using a neutral cleaner and rinse thoroughly.
 - * Close the Door after removing ice to prevent entrance of dirt, dust or insects into the Storage Bin.

2. The use of any electrical equipment involves the observance of some fundamental rules. In particular:
 - * Instances of high humidity and moisture increase the risk of electrical short circuits and potential electrical shocks. If in doubt, disconnect the icemaker.
 - * Do not pull the power cord in order to disconnect the icemaker from the feed network.
 - * This appliance is not suitable for unsupervised use by young children or aged or infirm persons.

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

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

1. START UP

- 1) Disconnect the power supply.

- 2) Open the water tap.

- 3) Connect the power supply and energise.

- 4) The following should occur in sequence:
 - a) Compressor will start (Hot Gas Valve open).
 - b) Water Pan will fully open.
 - c) Water Solenoid will open.
 - d) Water Pan will start to close (Hot Gas Valve closed).
 - e) Water Pan fully closed - Pump Motor will start.
 - f) Water Solenoid will close.

IMPORTANT

1. Check the conditions and quality of the ice production.
2. Do not use ice produced in the trial run. It might be contaminated with foreign matter in the water circuit. Discard or flush down the drain.

2. PREPARING THE ICEMAKER FOR LONG STORAGE

WARNING

Drain the icemaker to prevent damage to the water supply line at subfreezing temperatures, using air or carbon dioxide. Shut off the icemaker until proper air temperature is resumed.

[a] IM-21, IM-25, IM-30, IM-45, IM-65

- 1) Close the water supply tap, and remove the Inlet Hose.
- 2) Remove the Front Panels (Upper and Lower).
- 3) Push the Reset Switch in the Control Box, or disconnect power source and reconnect after 3 minutes.
- 4) The Water Pan will open, and then the Actuator Toggle Switch will turn to the "DEFROST" position in 40 seconds. (Click sound will be heard.)
- 5) Blow out the water supply line immediately after the Water Pan has opened.

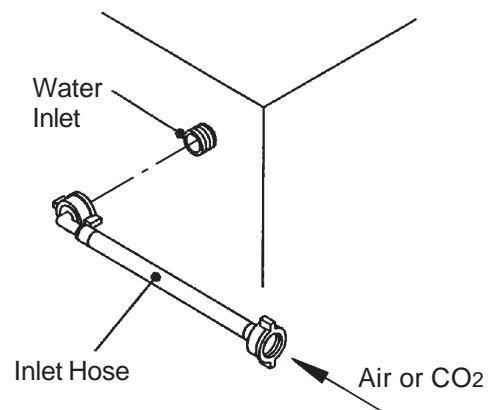


Fig. 12

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

- 6) Unplug the icemaker with the Actuator Toggle Switch in the "DEFROST" position.
- 7) Remove all ice from the Storage Bin, and clean the Bin.
- 8) Replace the panels in their correct positions.
- 9) Replace the Inlet Hose in its correct position.

[b] IM-100, IM-130, IM-160, IM-240

- 1) Close the water supply tap, and remove the Inlet Hose.
- 2) Remove the Front Panels (Upper and Lower).
- 3) Remove the screw located on the front of the Water Tank.
- 4) Move the Tank Drain Pipe to the drain position. See Fig. 13.
- 5) Push the Reset Switch in the Control Box, or disconnect power source and reconnect after 3 minutes.
- 6) The Water Pan will open, and then the Actuator Toggle Switch will turn to the "DEFROST" position in 40 seconds. (Click sound will be heard.)
- 7) Blow out the water supply line immediately after the Water Pan has opened.

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

- 8) Unplug the icemaker with the Actuator Toggle Switch in the "DEFROST" position.
- 9) Move the Tank Drain Pipe to the normal position, and secure it with the screw.
- 10) Remove all ice from the Storage Bin, and clean the Bin.
- 11) Replace the panels in their correct positions.
- 12) Replace the Inlet Hose in its correct position.

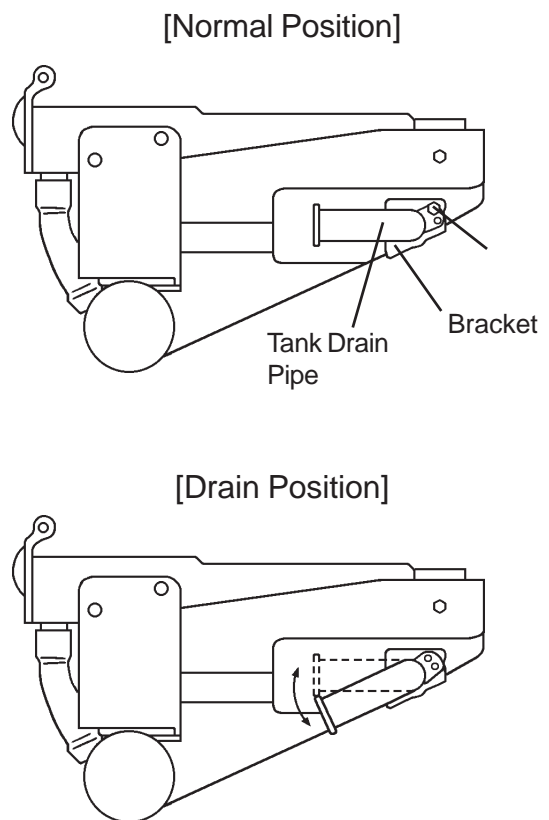


Fig. 13

3. BIN CONTROL

Bin Control Switch is mounted on the upper side of the Storage Bin. This switch will turn off the unit automatically when the Storage Bin is full of ice.

Handle the Bin Control Switch carefully, because the switch assembly is fragile. Especially on removing ice, do not touch or poke with a scoop.

Keep away from the Water Plate or Drain Pan to prevent jamming.

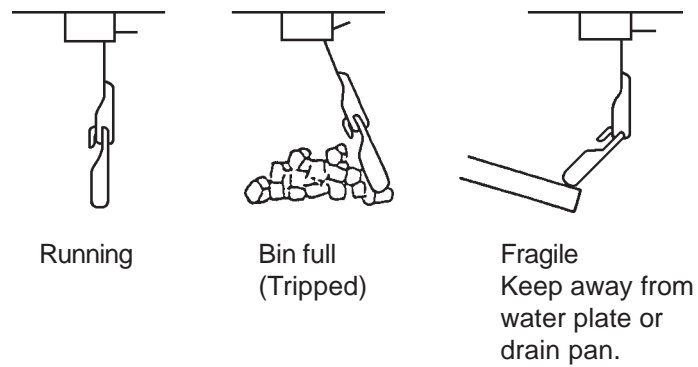


Fig. 14

[a] BIN CONTROL SWITCH ASSEMBLY

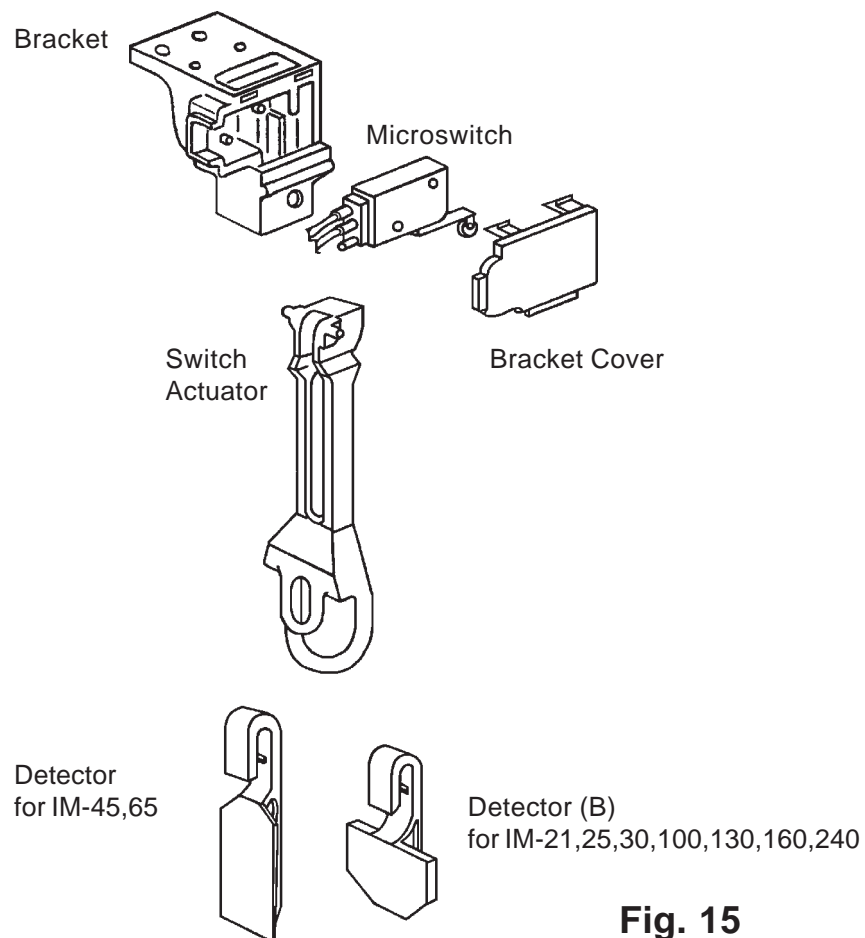


Fig. 15

[b] REMOVAL

BRACKET COVER

Push the two Pawls and remove the Bracket Cover.

SWITCH

Pull out the Switch, holding the Rubber Leads Cap. Handle with care.

SWITCHACTUATOR

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

DETECTOR

Push out the Detector, holding the Switch Actuator.

[c] REASSEMBLING

SWITCHACTUATOR

Insert the lower Shaft and push it along the U Notch. Check that the Switch Actuator moves free.

SWITCH & BRACKET COVER

Place the Switch Lever first, and then attach the Switch in position. Insert the guide and push the Bracket Cover to lock.

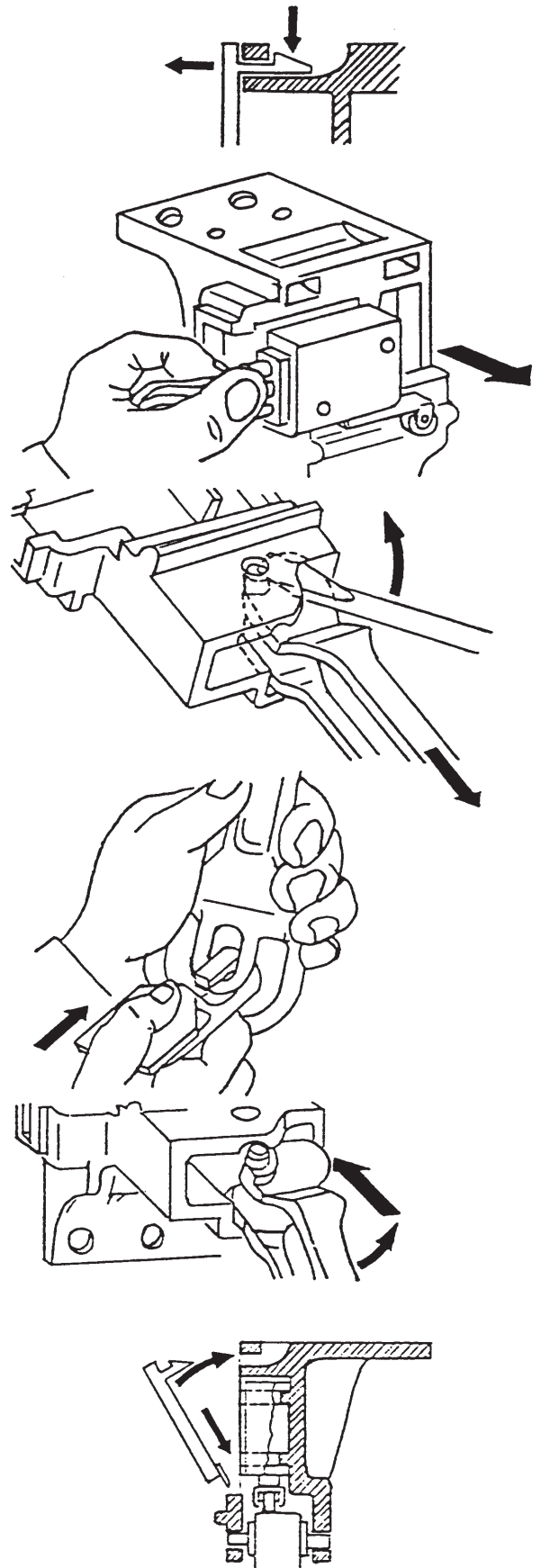


Fig. 16

V. MAINTENANCE INSTRUCTIONS

WARNING

1. Before carrying out any cleaning or maintenance operations, unplug the icemaker from the electrical supply network.
2. Before handling or using cleaning solutions, check the guidelines on the product for advice on suitable personal protective clothing, gloves, goggles, etc.
3. Clean and sanitize the icemaker water system at least twice a year, and check and clean the Condenser at least once a year.
4. This appliance must not be cleaned by use of a water jet.

1. PERIODICAL CLEANING

[1] Exterior

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

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

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

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

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

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

- 1) Open the Storage Bin Door, and remove all ice.
- 2) Wash the Bin liner with a neutral non-abrasive cleaner. Rinse thoroughly.

- 3) Soak a clean cloth with the neutral cleaner, and wipe both sides of the Slope and the Door inner surface. Wipe off the cleaner with a clean damp cloth.
- 4) Either mix 3 litres of water with 11 ml of 5.25% sodium hypochlorite solution in a suitable container or the recommended Hoshizaki sanitiser as directed.
- 5) Soak a clean sponge or cloth with the solution, and wipe the Bin liner, Bin Door and Slope.
- 6) Rinse thoroughly with fresh water and a clean cloth to wipe off the solution. Close the Bin Door.

Note: Some solutions may cause damage to the Bin liner surfaces or corrosion on the metal parts. Always rinse the sanitiser unless directed otherwise by Hoshizaki guidelines.

[4] Air Filter (Air-Cooled Model Only)

A plastic mesh Air Filter is fitted to remove dirt or dust from the air, preventing the Condenser from getting clogged. As the Filter becomes dirty, air circulation through the Condenser will be reduced, affecting the icemaker's performance.

Remove and clean the Air Filter at least twice per month:

- 1) Unscrew [except IM-25/45/65LE/100CLE] and remove the Front Panel (Lower).

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

- 2) Remove the Air Filter.
- 3) Clean the Air Filter by using a vacuum cleaner. When severely clogged, use warm water and a neutral cleaner to wash the Air Filter.
- 4) Rinse and dry the Air Filter thoroughly, and place it back in position.

2. WATER VALVE

- 1) Unplug the icemaker or disconnect the power source.
- 2) Close the water supply tap.
- 3) Remove the Top Panel and Front Panel (Upper).
- 4) Disconnect the Inlet Hose from the Water Valve.
- 5) Remove the Mesh Filter from the Water Valve.
- 6) Clean the Mesh using a brush.
- 7) Replace the Mesh and Inlet Hose in their correct positions.
- 8) Open the water supply tap.
- 9) Plug in the icemaker or connect the power source.
- 10) Check for leaks.
- 11) Replace the panels in their correct positions.

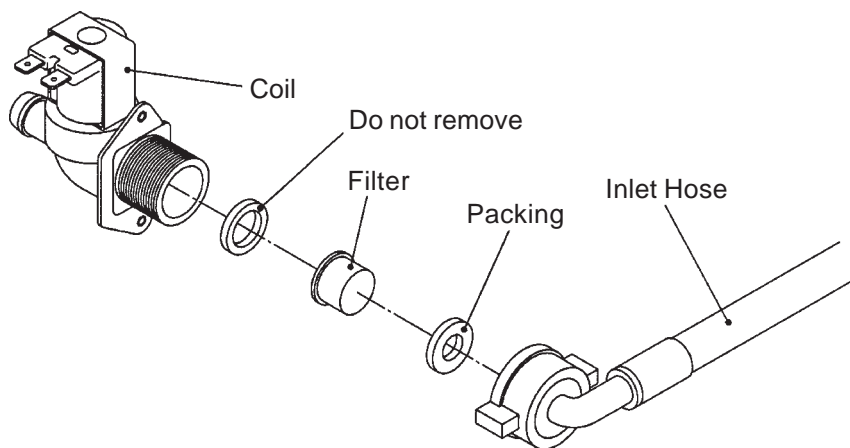


Fig. 17

3. WATER-COOLED CONDENSER

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

1) Prepare the following:

Cleaning solution [Read and follow any instructions on label or bottle.]

Pump Container for solution

Hose

Hose bands

Two fittings [R1/2 - 3/8" DIA]

Two fittings [3/8" flare - 3/8" DIA]

CAUTION

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

- 2) Remove the panels and check for leaks from the water line.
- 3) Unplug the icemaker or disconnect the power source, and close the water supply tap.
- 4) Disconnect the cooling water inlet and outlet pipings and attach fittings to connect hoses.
- 5) Disconnect the inlet and outlet tubings of the Water Regulator and replace the Water Regulator by fittings.
- 6) Connect hoses as shown in Fig. 18 and secure them by hose bands.
- 7) Fill the container with the cleaning solution.
- 8) Run the pump motor and circulate the solution for a period recommended in the instructions on label or bottle of the cleaner.
- 9) Rinse the water circuit.
- 10) Reverse the above procedure in steps 2) through 6).
- 11) Check the icemaking capacity referring to "VI. 3. PERFORMANCE DATA".

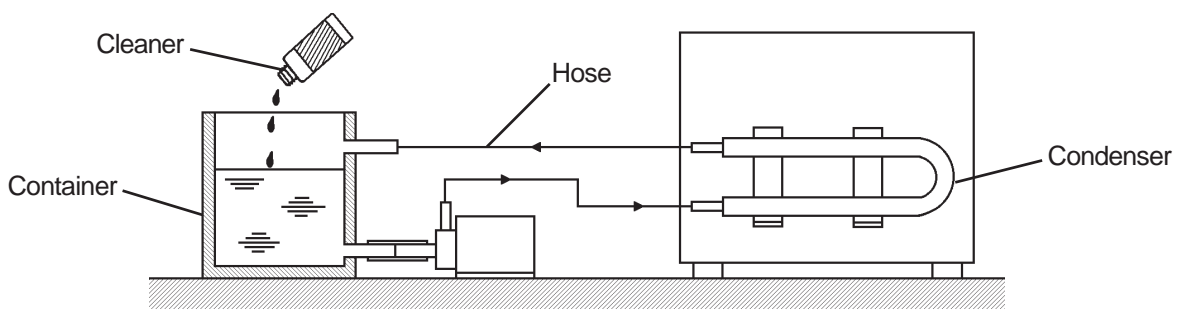


Fig. 18

4. ICEMAKING WATER SYSTEM

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

CAUTION

1. Do not touch the Washing Switch with damp hands.
2. Always wear rubber gloves, eye protectors, apron, etc. for safe handling of the cleaner and sanitizer.
3. Use the cleaners and sanitizers recommended by Hoshizaki. Contact your local Hoshizaki office for further details. (The instructions below give an example of those recommended cleaners and sanitizers.)
4. Never mix cleaning and sanitizing solutions in an attempt to shorten cleaning time.
5. Wipe off any splashed or spilt cleaner/sanitizer immediately.
6. Do not use any ammonia type cleaners on any part of the icemaker.
7. When the ambient and water temperatures are 10°C or below, the Water Pan may remain open. Warm the icemaking compartment up to 20°C around the Thermistor.
8. Be sure to follow the cleaning and sanitizing instructions below.

- 1) Use a suitable container to dilute the cleaner (“Nickel-Safe Ice Machine Cleaner” by The Rectorseal Corporation) into the following concentration:

IM-21 - 65

Mix 79 ml of the cleaner with 3.8 litres of water.

IM-100/130/160

Mix 157 ml of the cleaner with 7.6 litres of water.

IM-240

Mix 236 ml of the cleaner with 11.4 litres of water.

- 2) Open the Storage Bin Door, and remove all the ice to avoid contaminating by the cleaner.
- 3) Remove the Front and Top Panels.
- 4) If the icemaker is in a defrost cycle, wait until a freeze cycle starts.
- 5) Remove the screw, and move the Tank Drain Pipe to the drain position. See Fig. 10. (IM-100/130/160/240 only)

6) Push the Bin Control Switch to the right into the “bin full” position. Hold the switch until the icemaker stops in 10 seconds. See Fig. 19.

7) When the icemaker stops, release the Bin Control Switch into the “running” position. See Fig. 20. (The icemaker will restart in 80 seconds, and the Water Pan will start to open.)

8) Close the water supply tap.

9) After the ice has dropped and the Water Pan begins to close, move the Washing Switch on the bottom [IM-21/25/30CLE only] or right side [except IM-21/25/30CLE] of the Control Box to the “WASH” position. See Fig. 21.

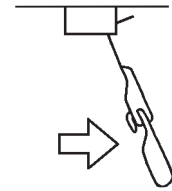


Fig. 19

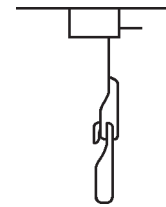
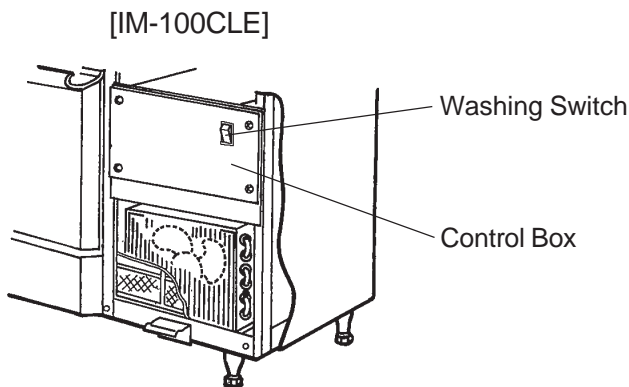
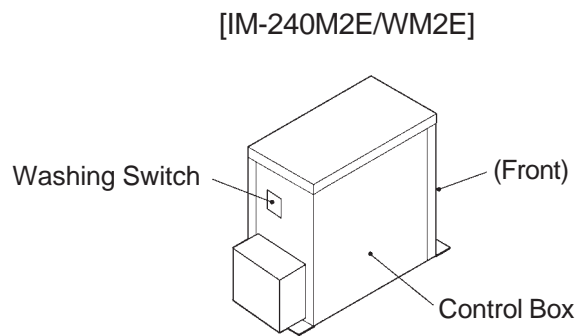
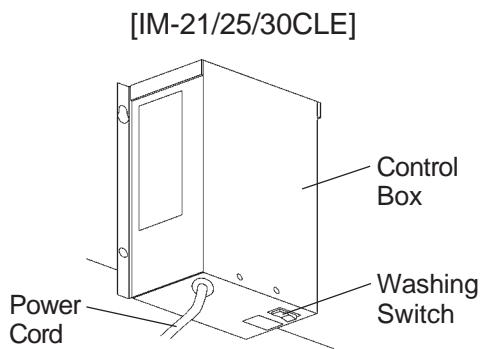


Fig. 20



[Except IM-21/25/30/100CLE, 240M2E/WM2E]

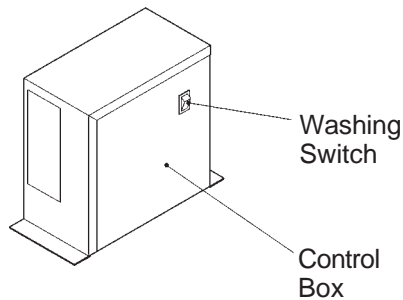


Fig. 21

- 10) As soon as the Water Pan closes, pour the cleaning solution prepared in 1) carefully into the Water Pan. Do not splash or spill the solution onto the other parts.
- 11) Circulate the cleaning solution for 30 minutes. Open the water supply tap, and repeat the above steps 6) and 7).
- 12) When the Water Pan closes again, circulate water for 5 minutes. For IM-100/130/160/240 only, pour clean water into the Water Pan until it floods from the Overflow Pipe.
- 13) Repeat the above steps 6), 7) and 12) at least three times to rinse thoroughly.

SANITIZING INSTRUCTIONS

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

- 14) Use a suitable container to dilute 5.25% sodium hypochlorite solution into the following concentration:

IM-21 - 65

Mix 15 ml of the sodium hypochlorite solution with 3.8 litres of water.

IM-100/130/160

Mix 30 ml of the sodium hypochlorite solution with 7.6 litres of water.

IM-240

Mix 44 ml of the sodium hypochlorite solution with 11.4 litres of water.

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

- 15) Repeat the above steps 5), 6) and 7), and close the water supply tap.
- 16) As soon as the Water Pan closes, pour the sanitizing solution prepared in 14) carefully into the Water Pan. Do not splash or spill the solution onto the other parts.
- 17) Circulate the solution for 15 minutes. Open the water supply tap, and repeat the above steps 6) and 7).
- 18) When the Water Pan closes again, circulate water for 5 minutes. For IM-100/130/160/240 only, pour clean water into the Water Pan until it floods from the Overflow Pipe.
- 19) Repeat the above steps 6), 7) and 18) at least three times to rinse thoroughly.
- 20) Move the Tank Drain Pipe to the normal position, and secure it with the screw. See Fig. 13. (IM-100/130/160/240 only)
- 21) Repeat the above steps 6) and 7) again. When the icemaker stops, move the Washing Switch to the "ICE" position. See Fig. 22. (The



Fig. 22

icemaker will resume icemaking process.)

22) Replace the Front Panel and Top Panel in their correct positions.

23) Complete Storage Bin cleaning as detailed in V. 1. [3].

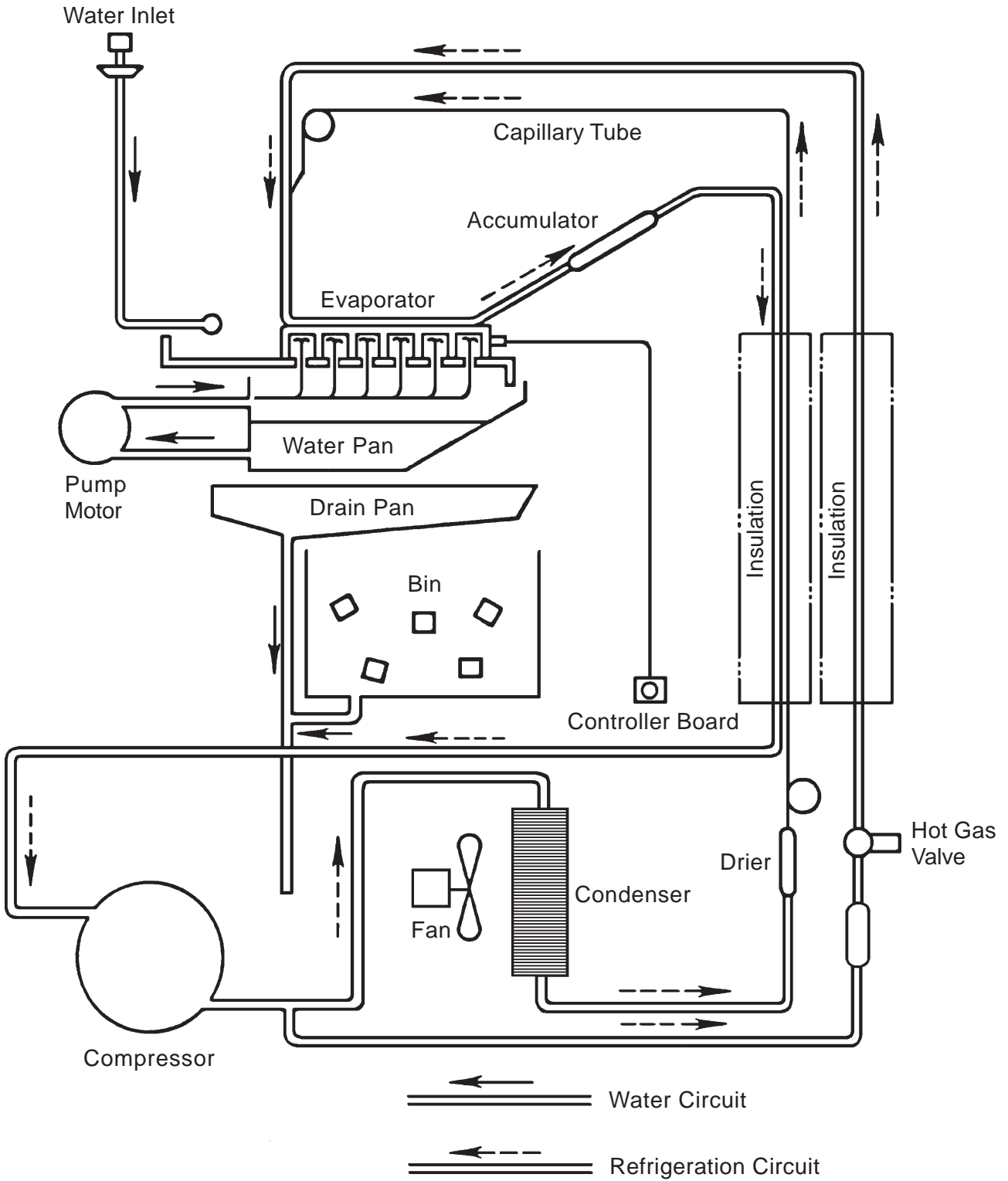
IMPORTANT

Be sure to operate the Bin Control Switch as specified in 11) and 17) within 40 minutes after the Water Pan closes. After 40 minutes pass, the interlock will operate to stop the icemaker. (It will not reset automatically.) If the interlock should operate, disconnect the power source and then reconnect it.

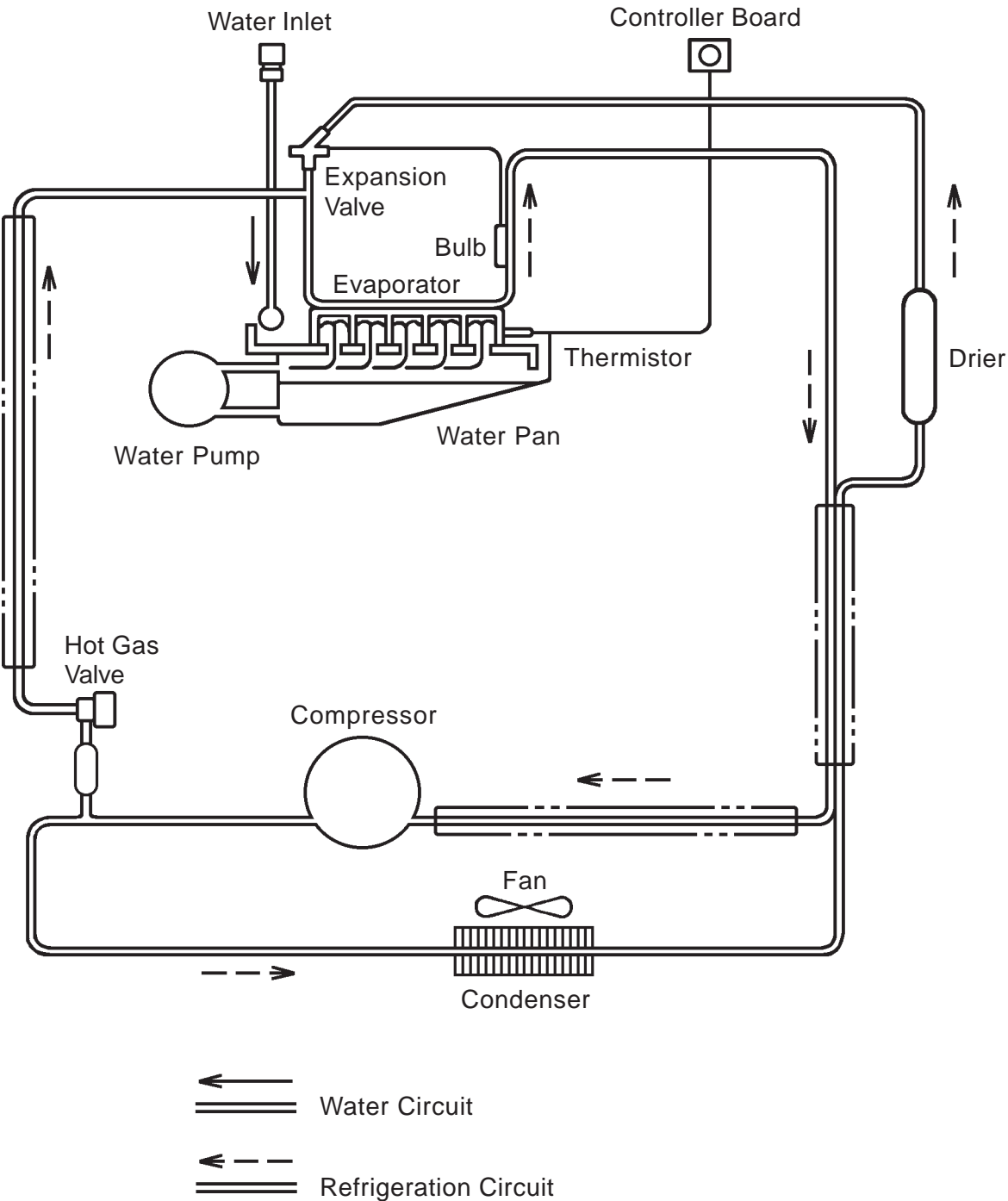
VI. TECHNICAL INFORMATION

1. WATER CIRCUIT AND REFRIGERANT CIRCUIT

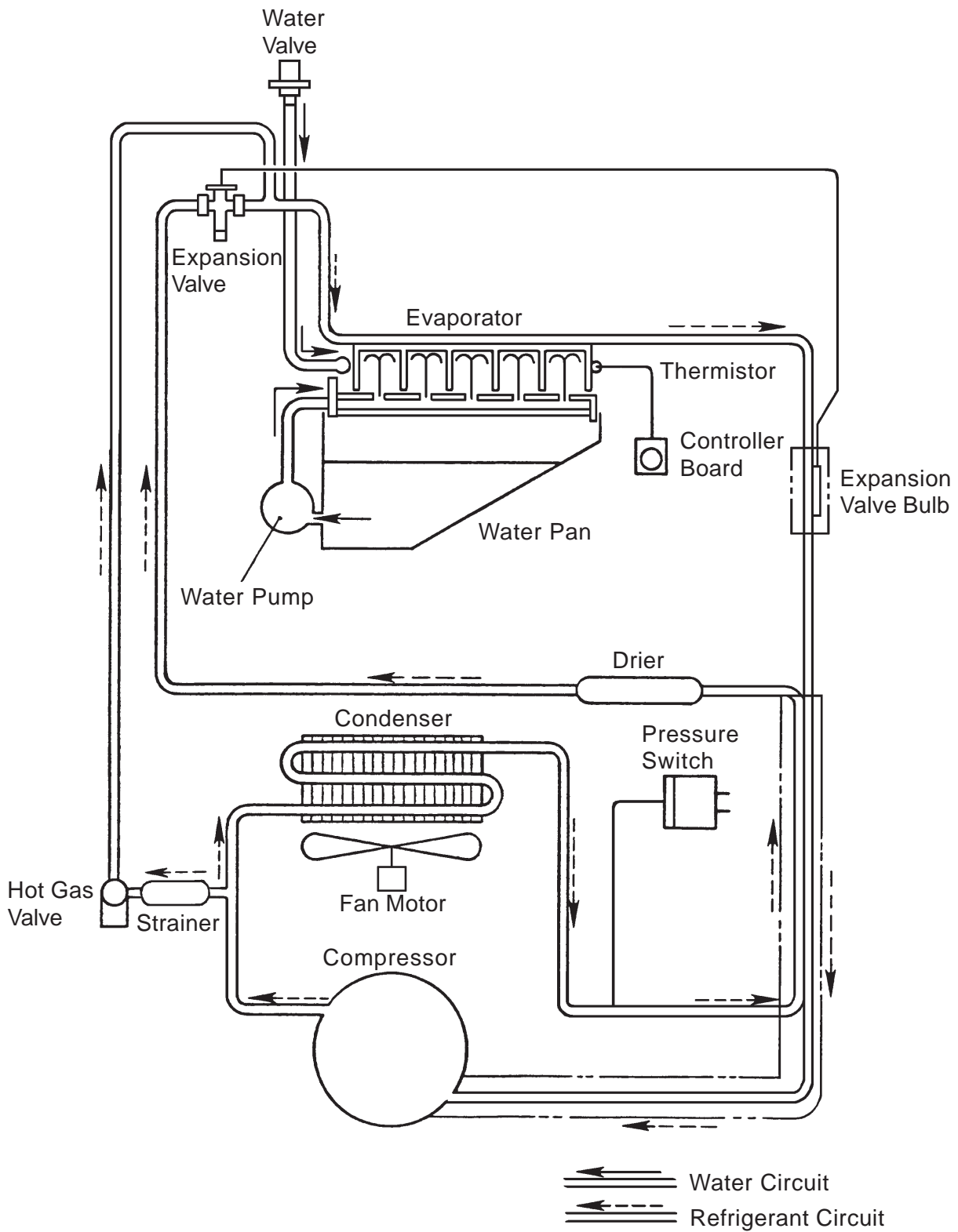
[a] IM-21CLE, IM-25LE, IM-25CLE, IM-30CLE, IM-45LE, IM-45CLE-25, IM-65LE
(Air-cooled)



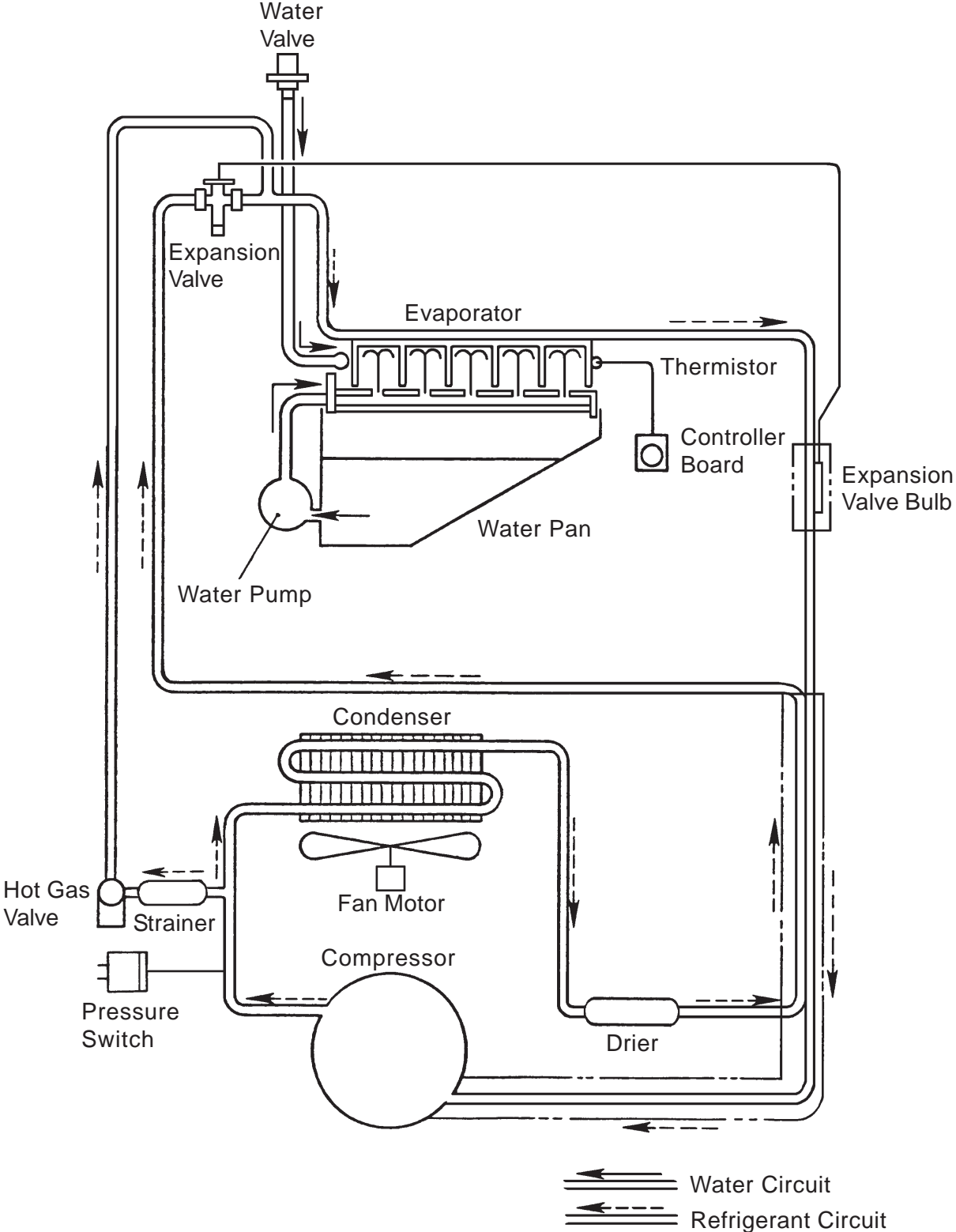
[b] IM-100LE, IM-100CLE, IM-130LE, IM-130ME, IM-160ME (Air-cooled)



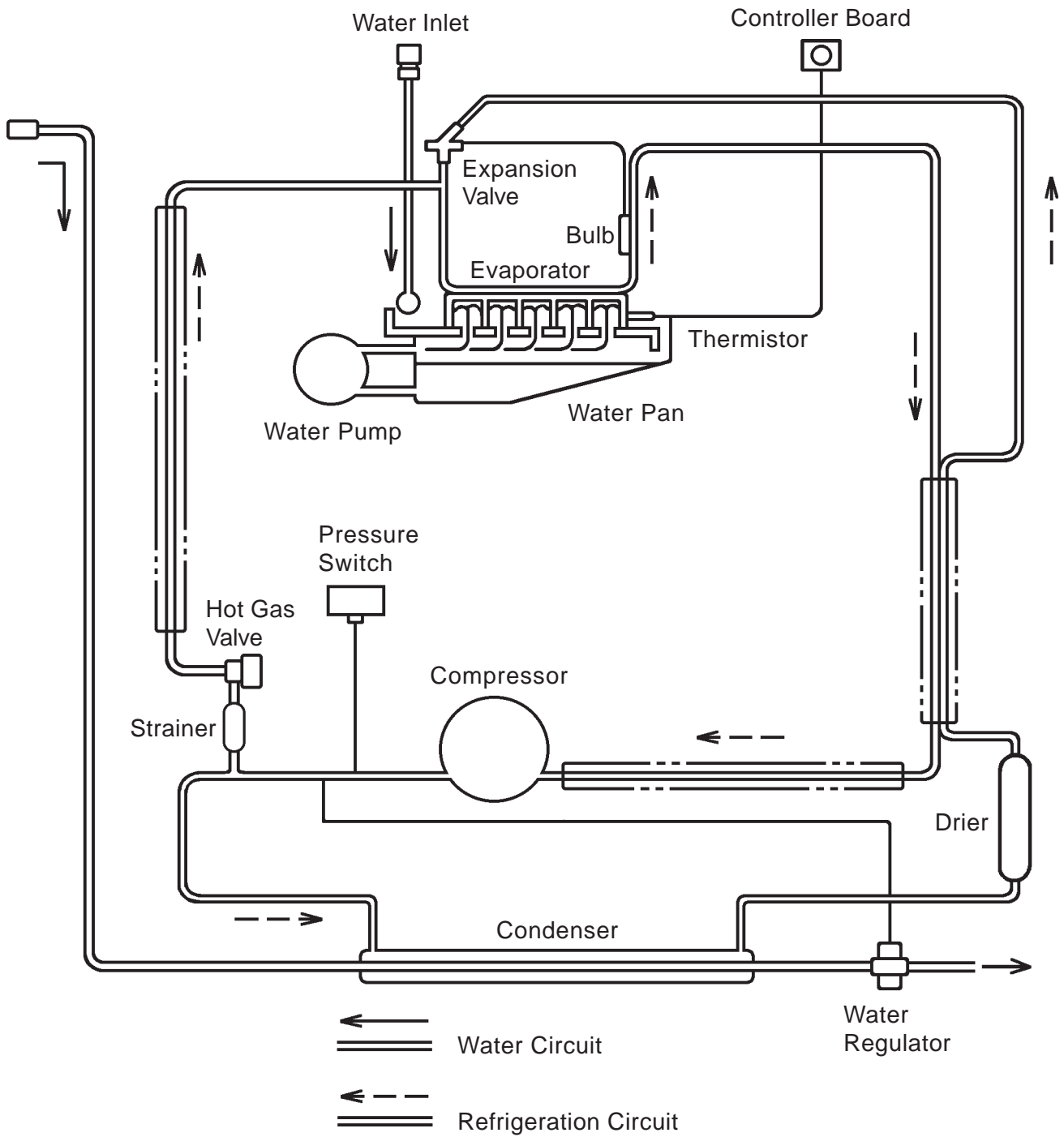
[c] IM-240ME (Air-cooled)



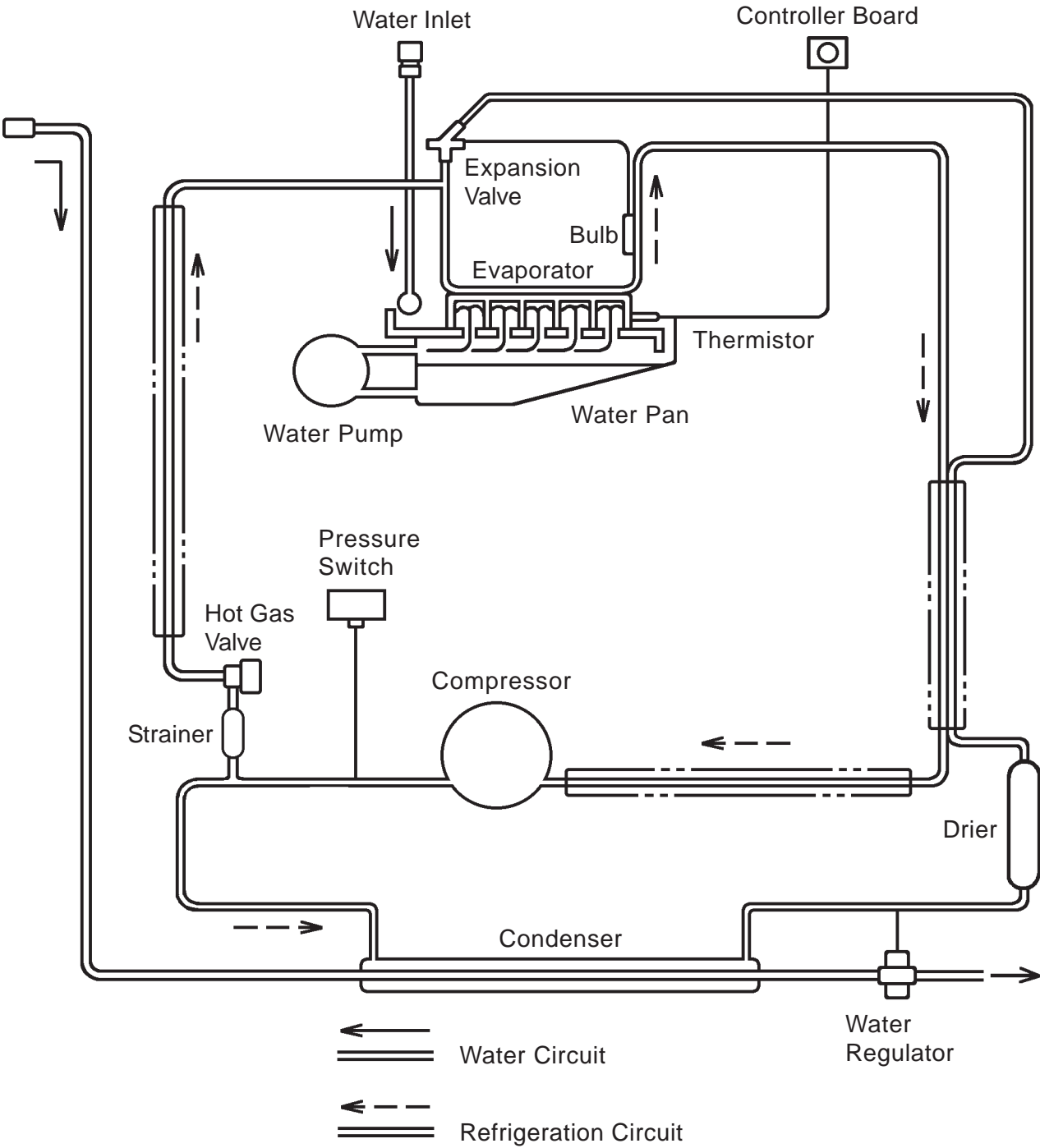
[d] IM-240M2E (Air-cooled)



[e] IM-25WLE, IM-30WLE, IM-45WLE, IM-65WLE, IM-100WLE, IM-130WLE, IM-130WME, IM-240WME (Water-cooled)

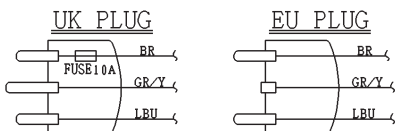
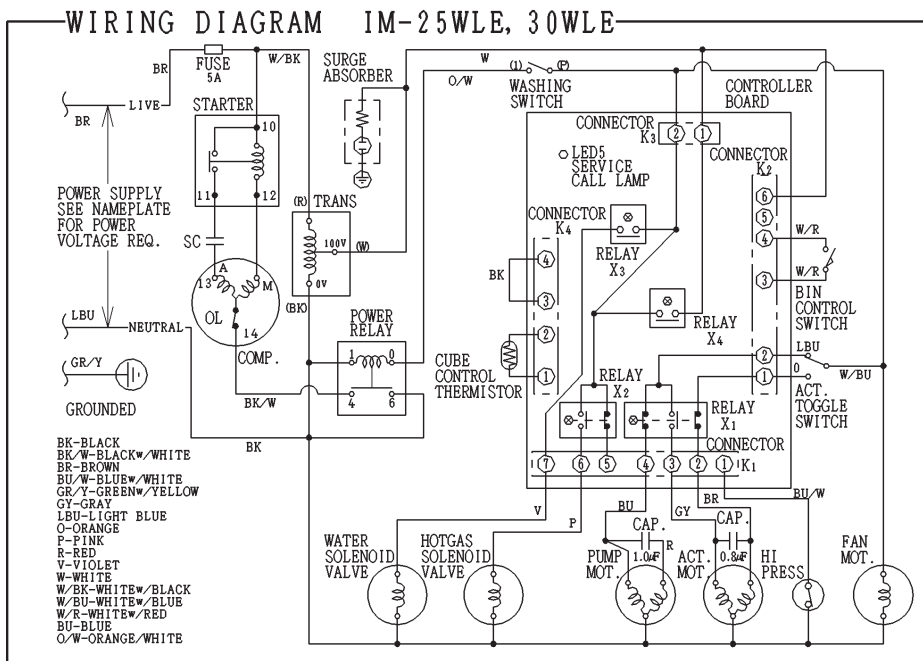
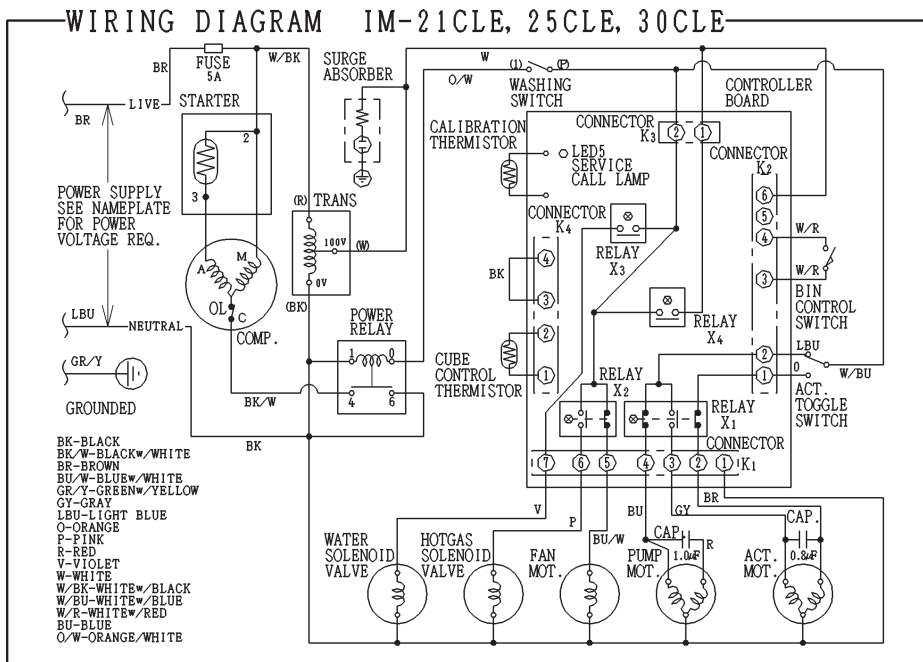


[f] IM-240WM2E (Water-cooled)



2. WIRING DIAGRAM

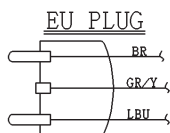
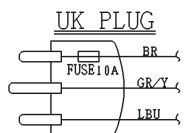
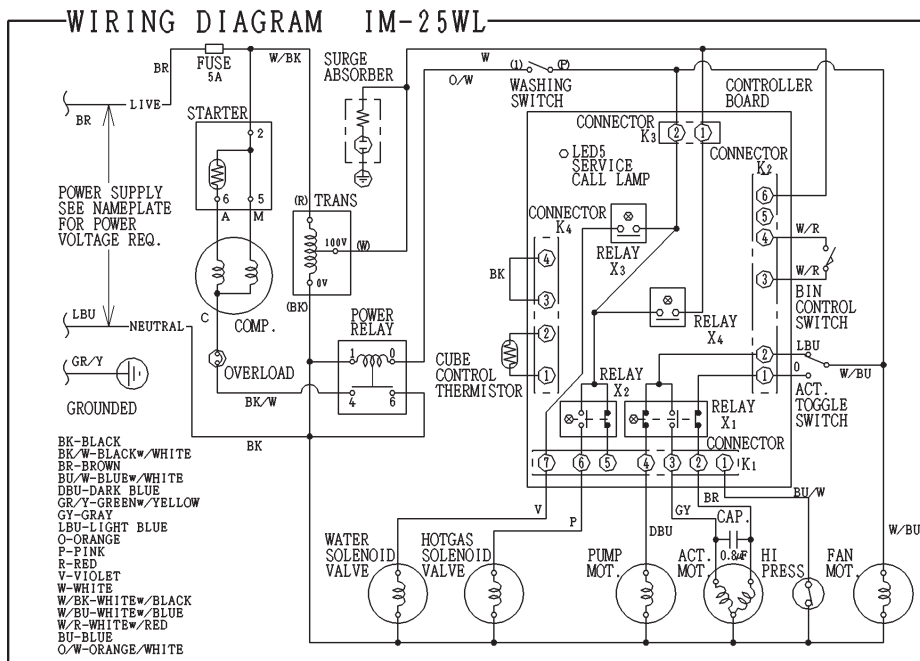
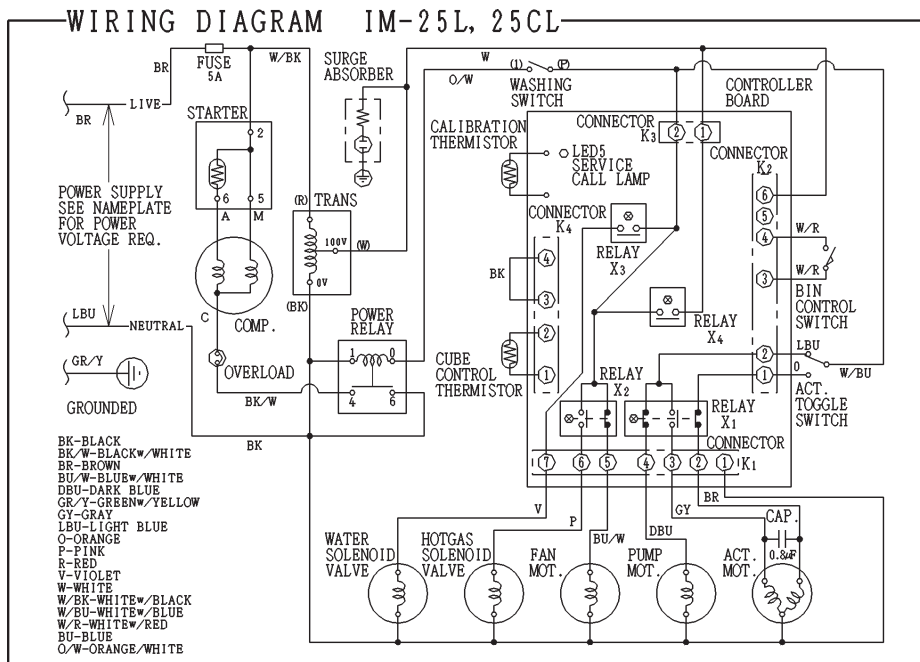
[a] IM-21CLE, IM-25LE, IM-25CLE, IM-30CLE, IM-25WLE, IM-30WLE



(NOTE)

1. THE WASHING SWITCH IS PROVIDED ONLY FROM THE AUXILIARY CODE "H-1".
2. THE CAP.-PUMP MOT. IS PROVIDED ONLY FROM THE AUXILIARY CODE "K-1". (25CLE, 25WLE, 30CLE, 30WLE)
3. THE FAN MOT. HAS BEEN ELIMINATED FROM THE AUXILIARY CODE "K-1". (25WLE, 30WLE)

[b] IM-25L, IM-25CL, IM-25WL

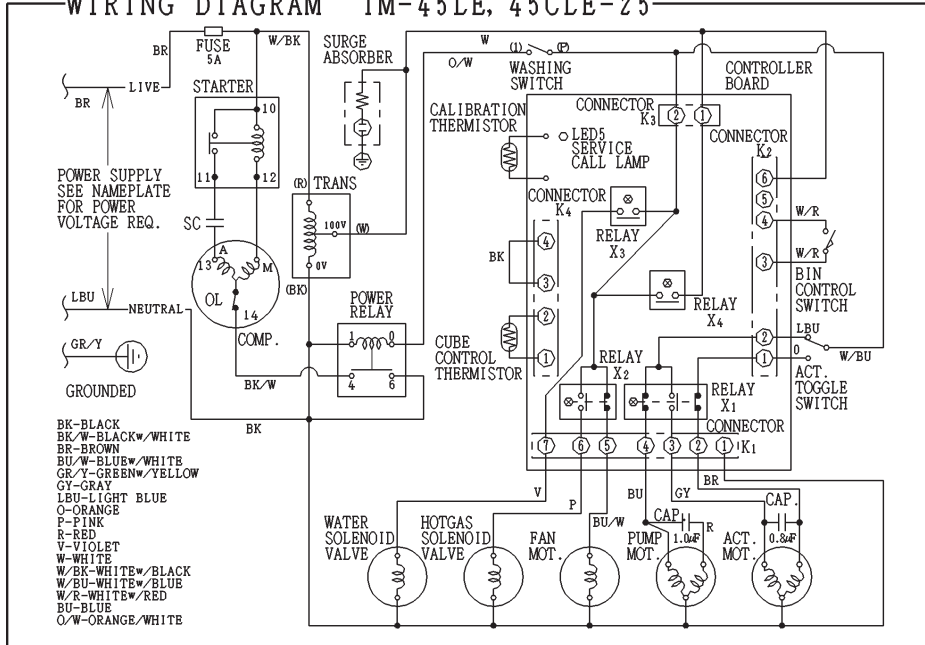


(NOTE)

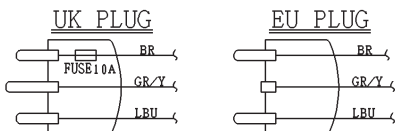
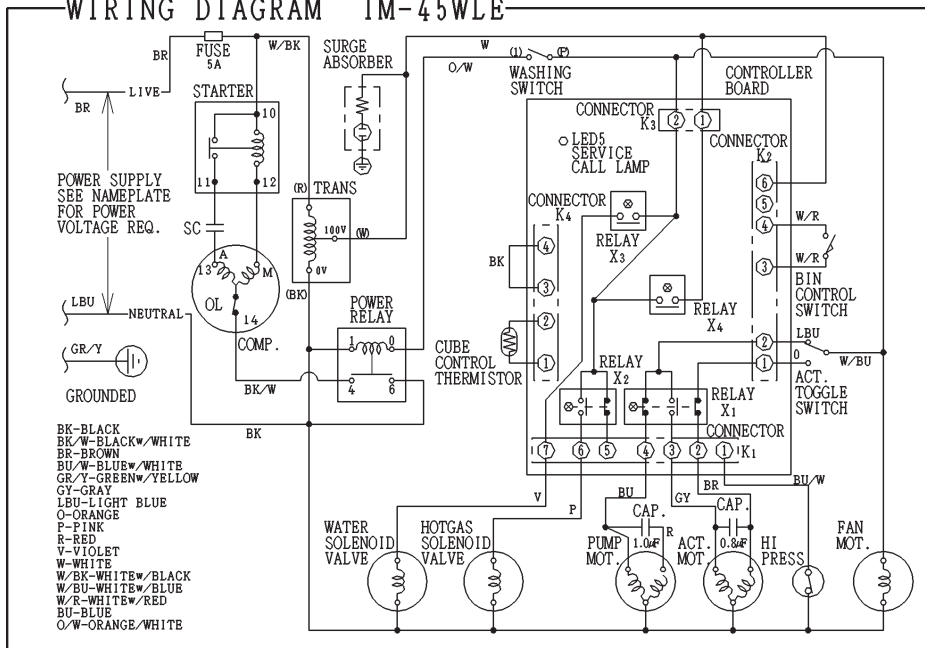
1. THE WASHING SWITCH IS PROVIDED ONLY FROM THE AUXILIARY CODE "H-1".
2. THE CAP.-PUMP MOT. IS PROVIDED ONLY FROM THE AUXILIARY CODE "K-1". (25CL, 25WL)
3. THE FAN MOT. HAS BEEN ELIMINATED FROM THE AUXILIARY CODE "K-1". (25WL)

[c] IM-45LE, IM-45CLE-25, IM-45WLE

WIRING DIAGRAM IM-45LE, 45CLE-25



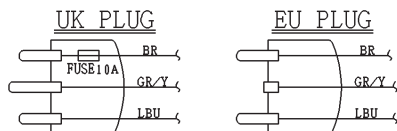
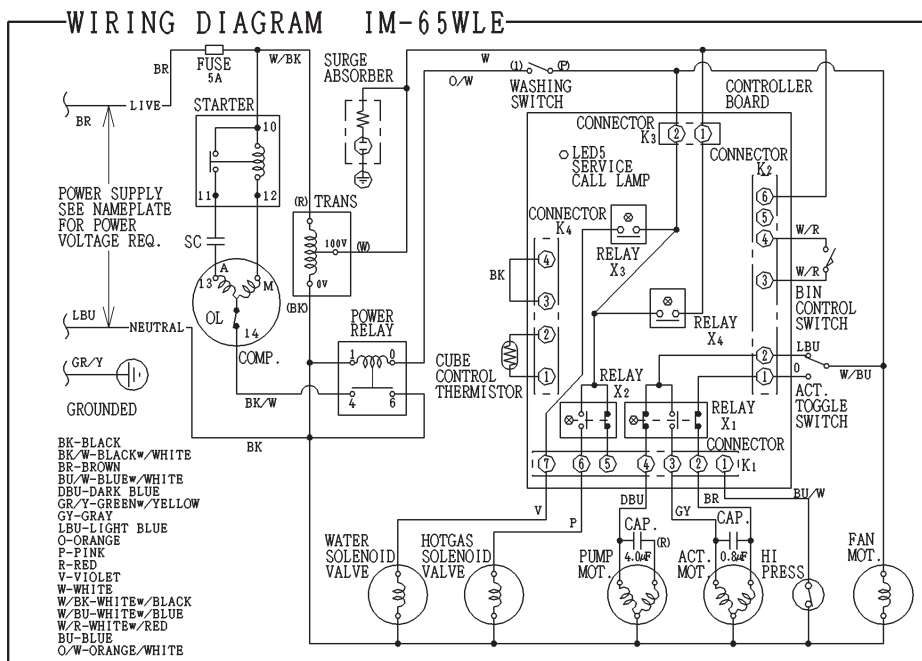
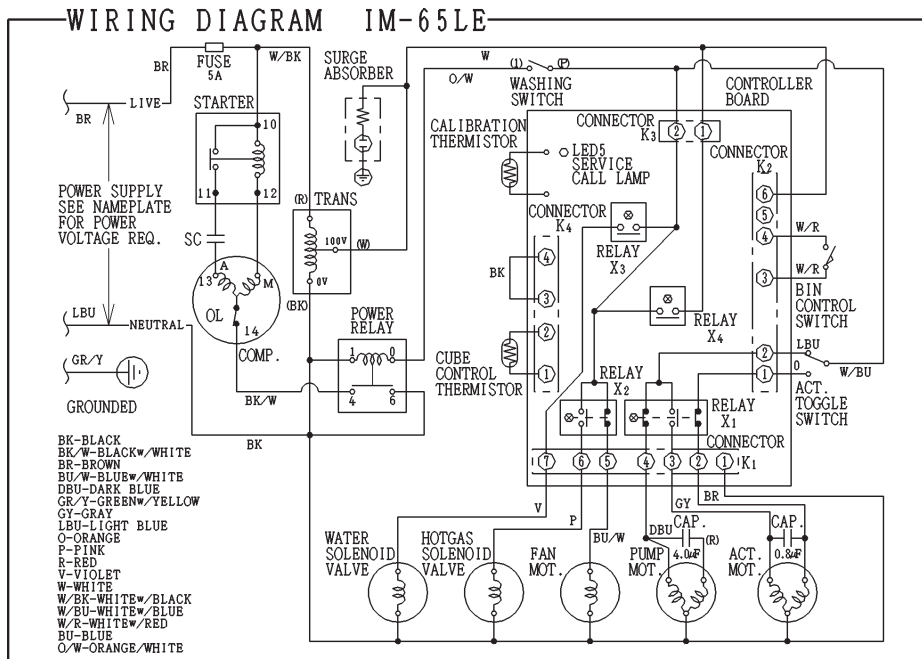
WIRING DIAGRAM IM-45WLE



(NOTE)

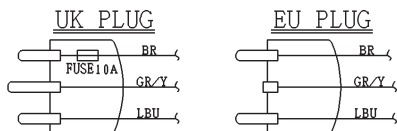
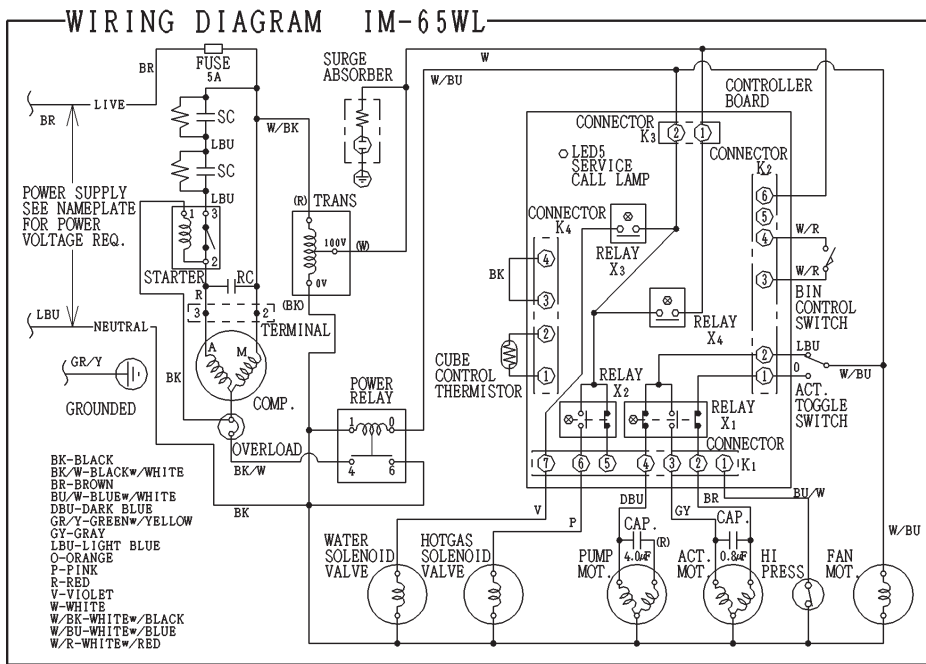
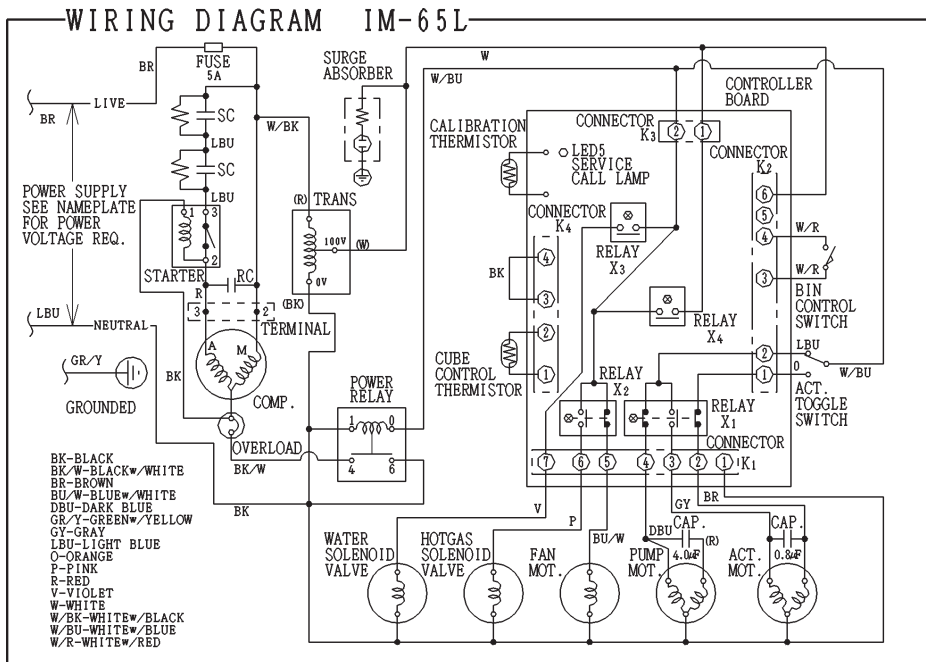
1. THE WASHING SWITCH IS PROVIDED ONLY FROM THE AUXILIARY CODE "H-1".
2. THE CAP.-PUMP MOT. IS PROVIDED ONLY FROM THE AUXILIARY CODE "K-1".
3. THE FAN MOT. HAS BEEN ELIMINATED FROM THE AUXILIARY CODE "K-1". (45WLE)

[d] IM-65LE, IM-65WLE



- (NOTE)
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 2. THE FAN MOT. HAS BEEN ELIMINATED FROM THE AUXILIARY CODE "K-1". (65WLE)

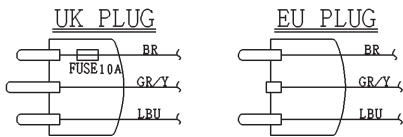
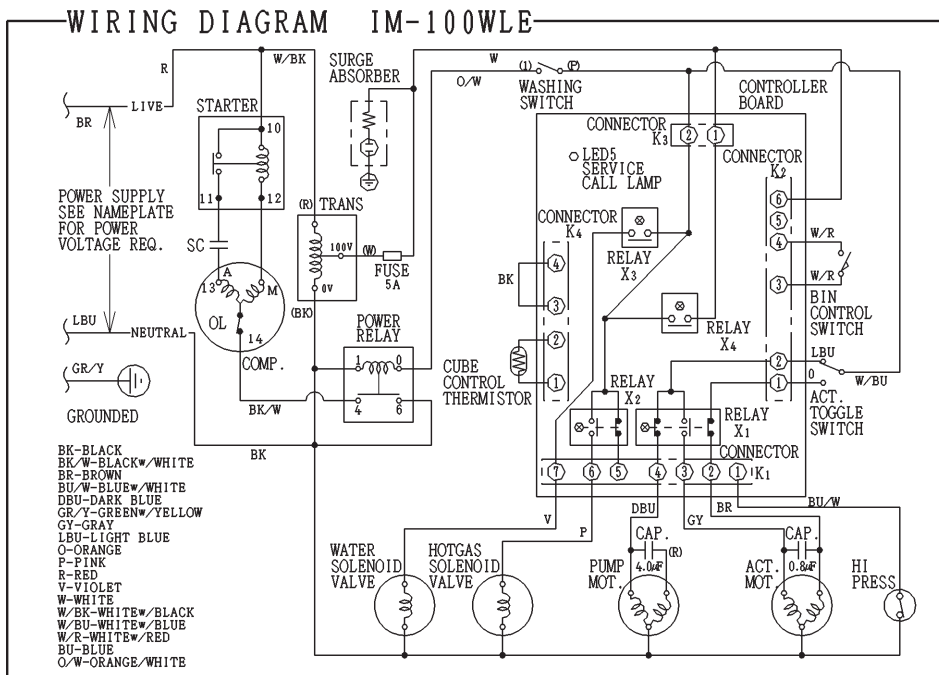
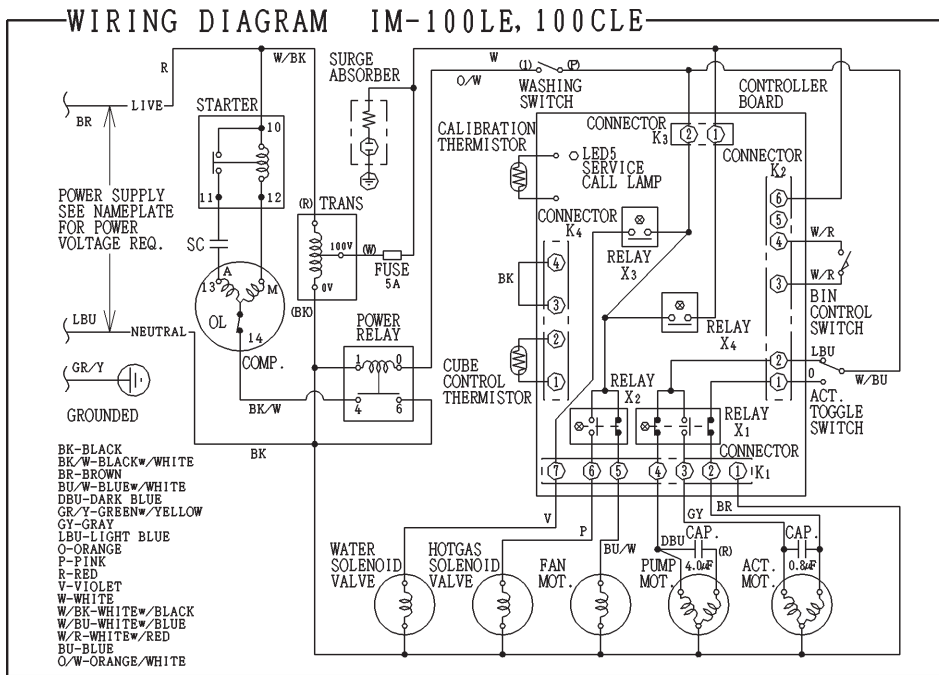
[e] IM-65L, IM-65WL



(NOTE)
 1. THE WASHING SWITCH IS PROVIDED ONLY FROM THE AUXILIARY CODE "H-1".

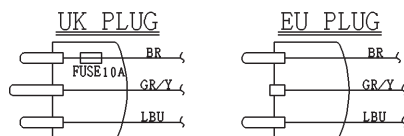
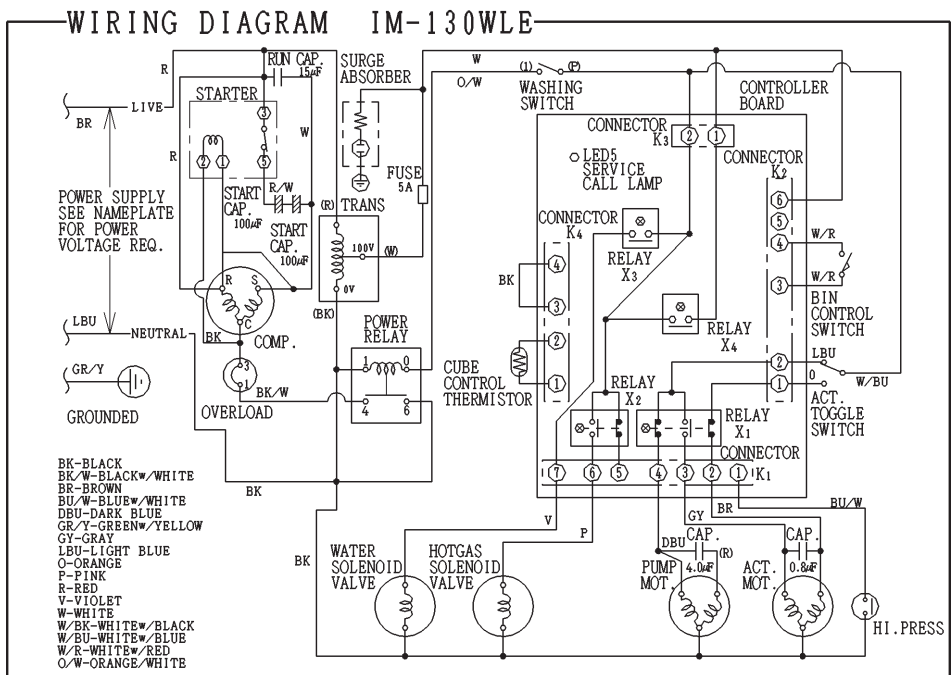
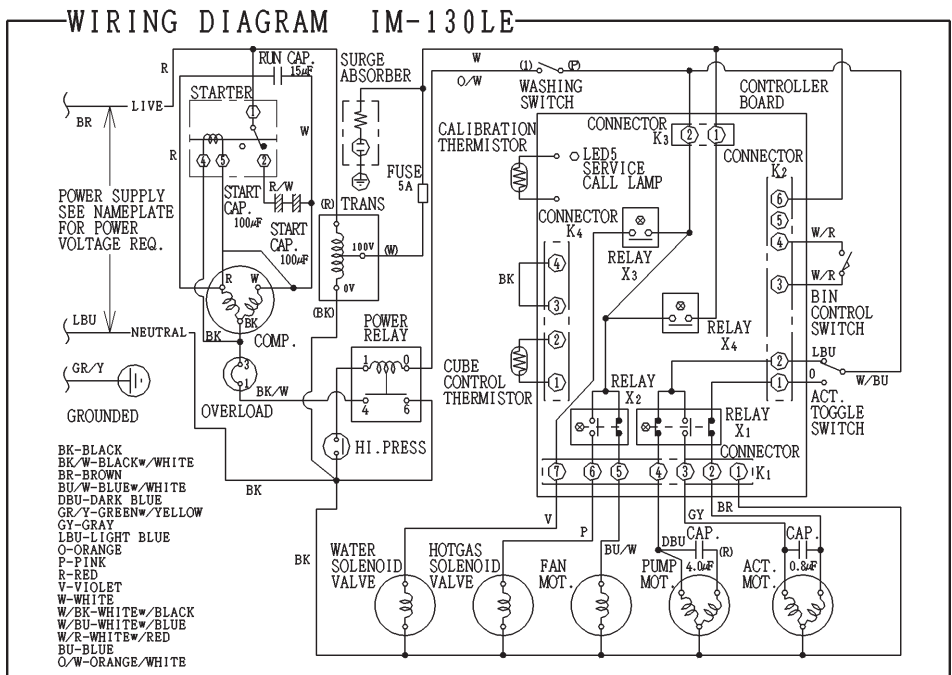
[f] IM-100LE, IM-100CLE, IM-100WLE

Note: The Washing Switch is provided only after the Auxiliary Code "H-0".



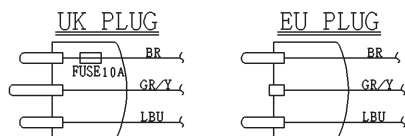
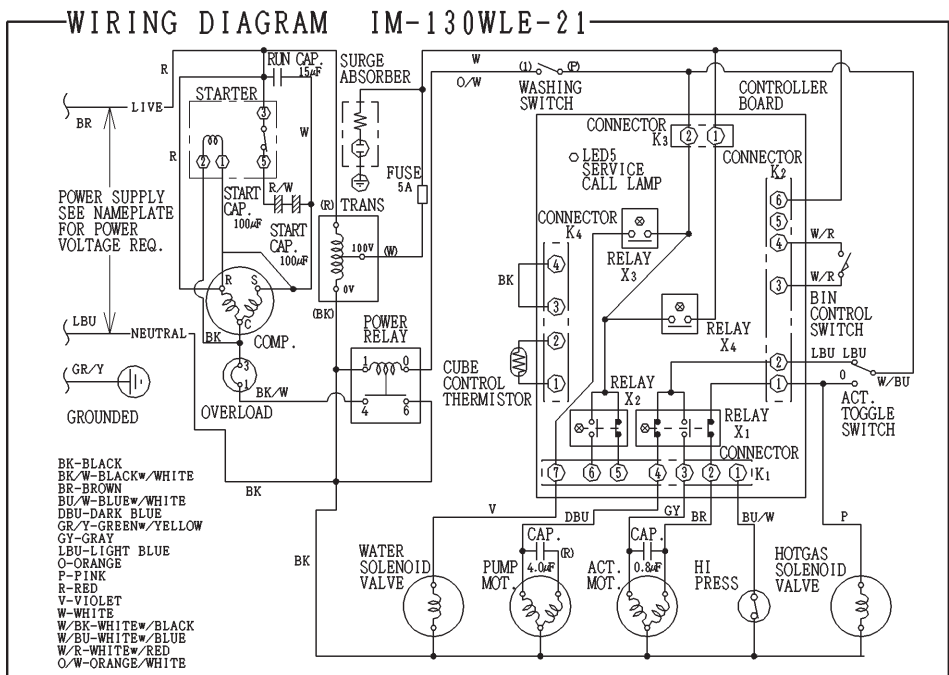
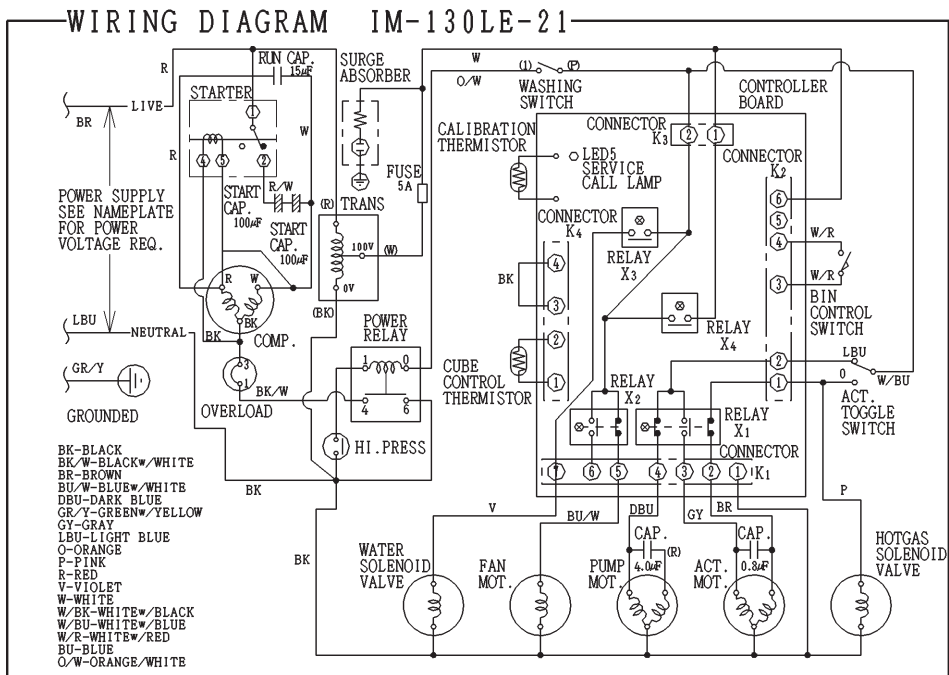
[g] IM-130LE, IM-130WLE

Note: The Washing Switch is provided only after the Auxiliary Code "H-0".



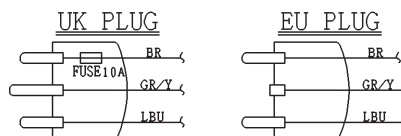
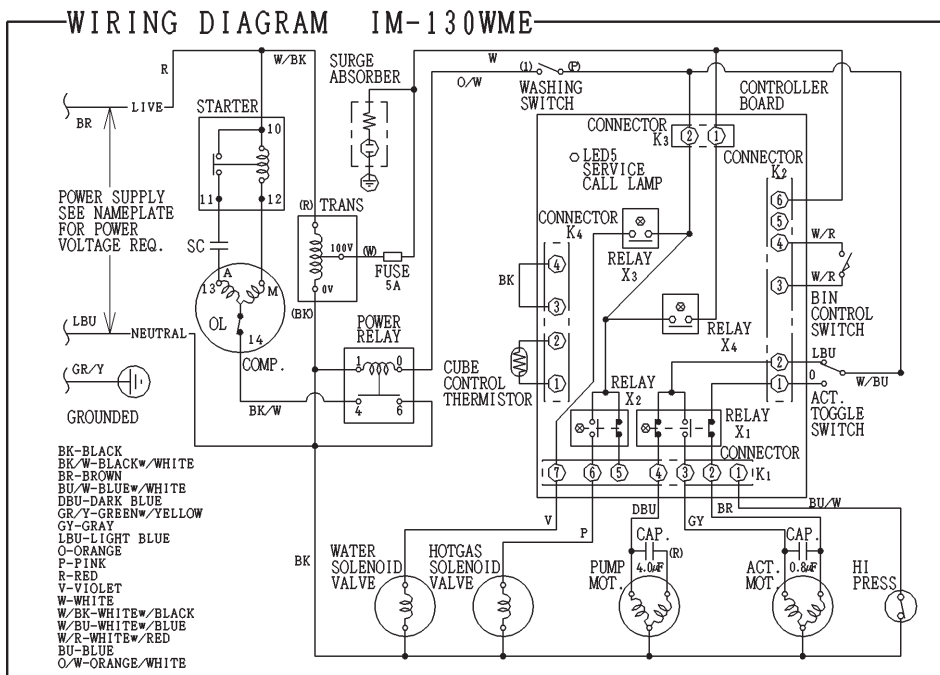
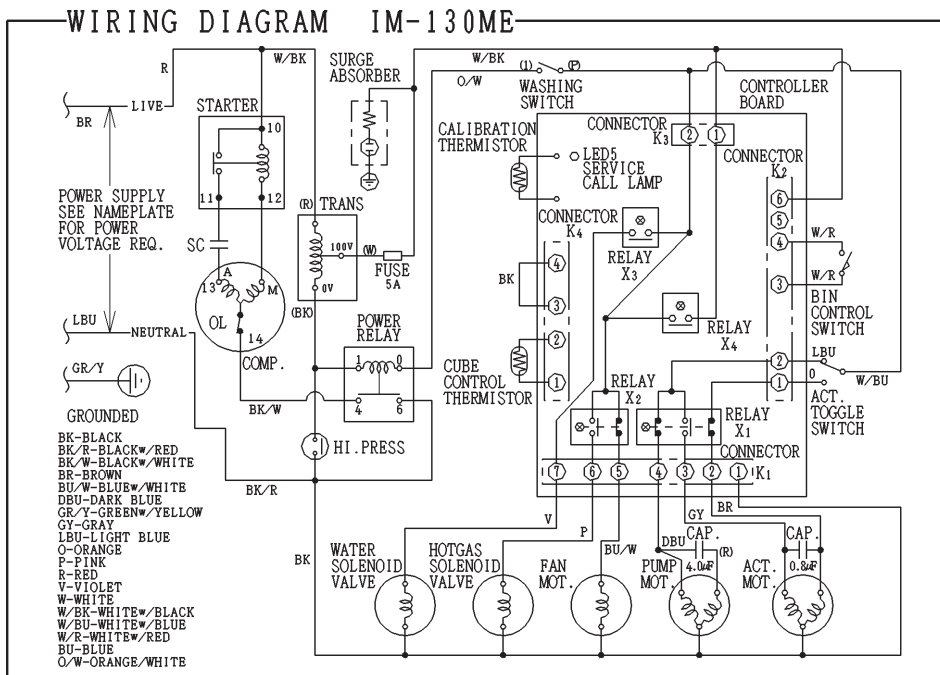
[h] IM-130LE-21, IM-130WLE-21

Note: The Washing Switch is provided only after the Auxiliary Code "H-0".



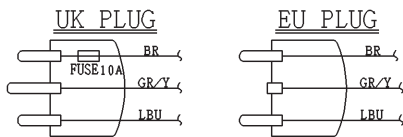
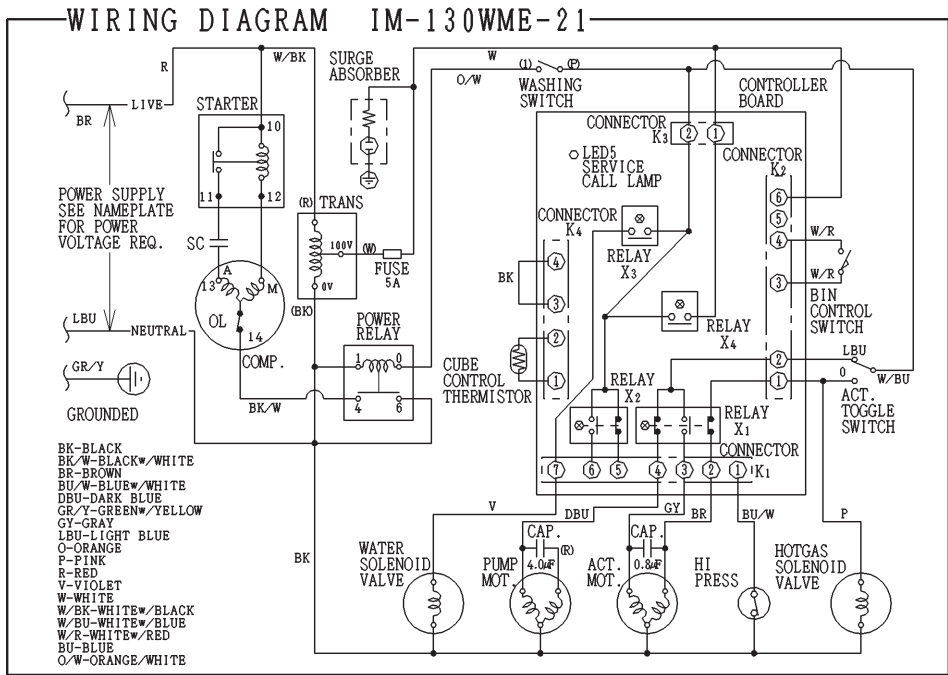
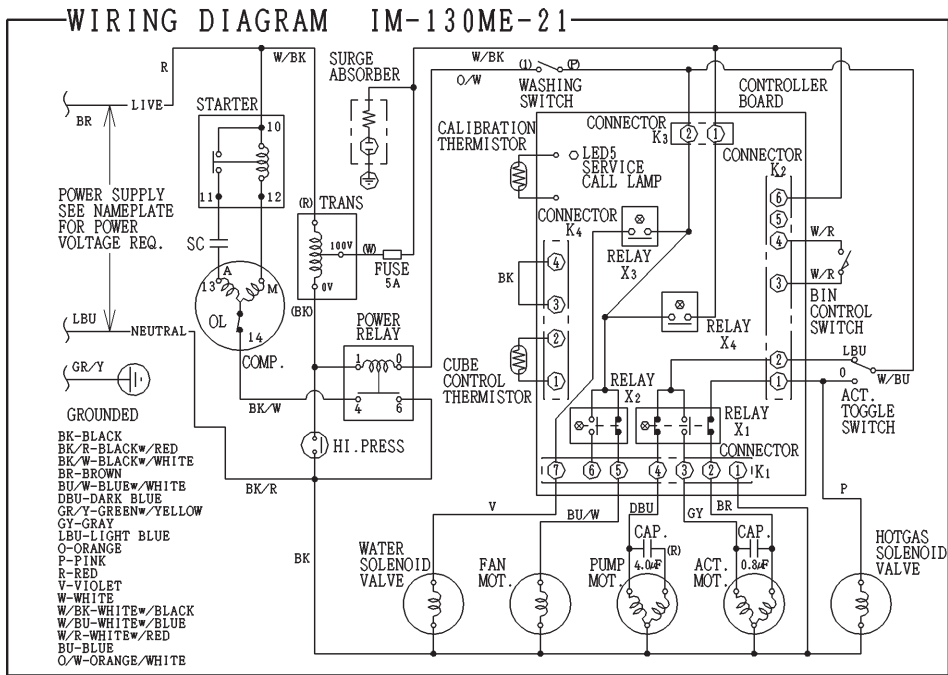
[i] IM-130ME, IM-130WME

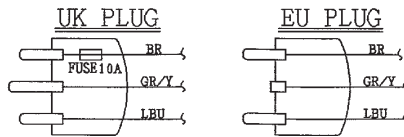
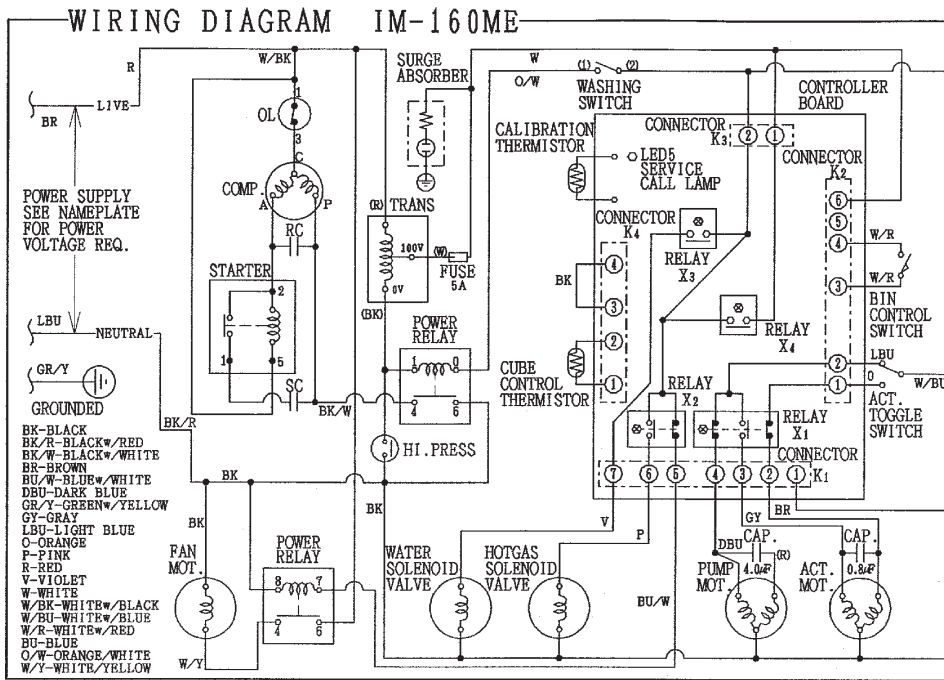
Note: The Washing Switch is provided only after the Auxiliary Code "H-0".



[J] IM-130ME-21, IM-130WME-21

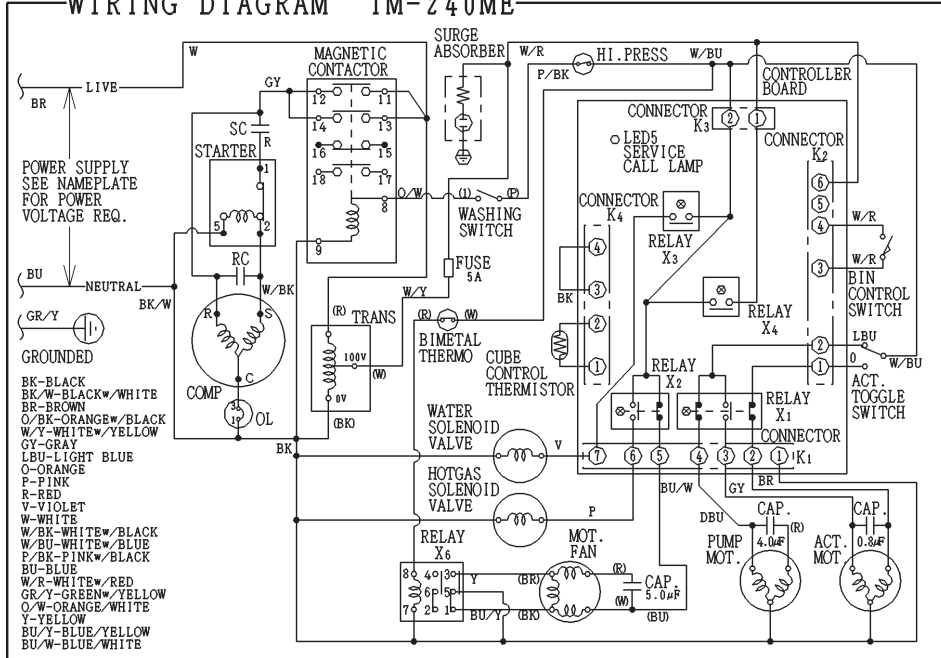
Note: The Washing Switch is provided only after the Auxiliary Code "H-0".



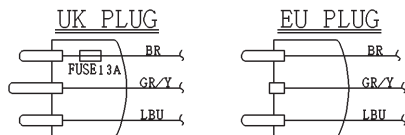
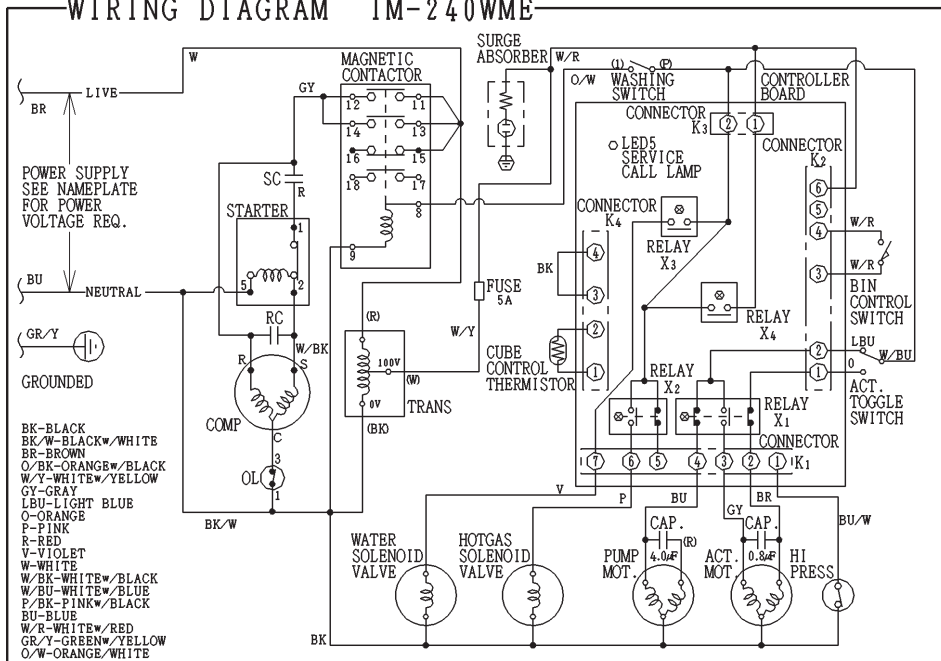


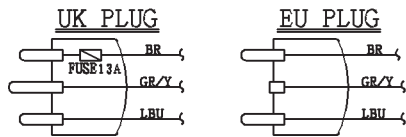
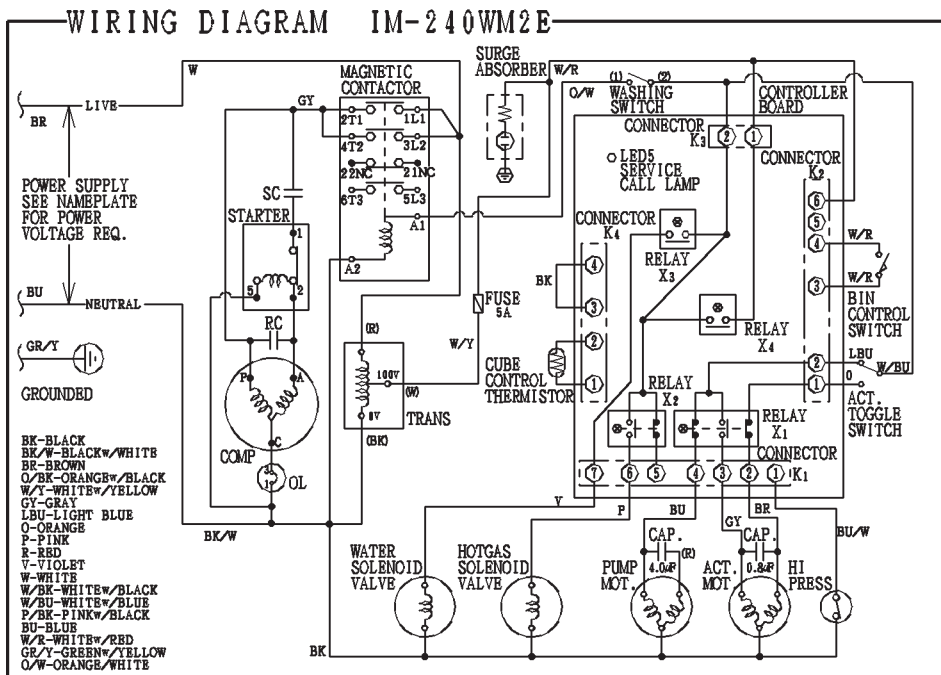
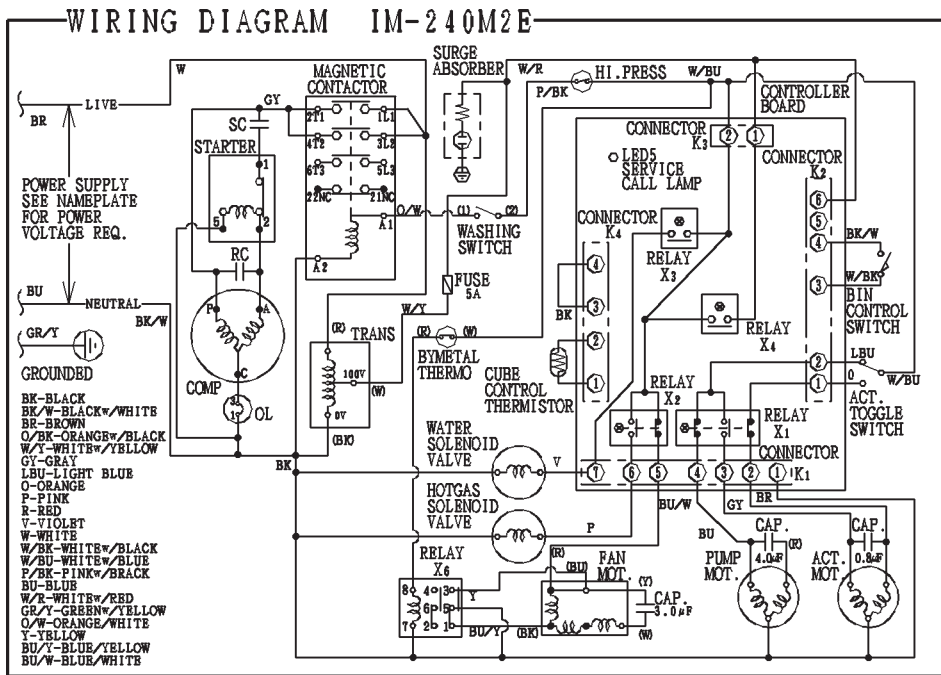
[I] IM-240ME, IM-240WME

WIRING DIAGRAM IM-240ME



WIRING DIAGRAM IM-240WME





3. PERFORMANCE DATA

(Ice Production = Capacity when shipped from factory)

(*Values for icemaking water only. Use a cooling tower for cooling water.)

Model	Ambient Temp. (°C)	10	21	32	38
	Water Temp. (°C)	10	15	21	32
IM-21CLE (50Hz)	Ice Production (kg/d)	22	19	16	13
	Freeze Cycle Time (min)	15.6	20	27.5	34.5
	Defrost Cycle Time (min)	6	5	2.5	2
	Water Consumption (lit/h)	5.3	4.6	3.8	3.2
	Electric Consumption (W)	200	220	240	260
	Head Pressure [peak] (bar)	7.2	10	13.2	17
IM-25CLE (50Hz)	Ice Production (kg/d)	22	21	18	14
	Freeze Cycle Time (min)	17	25	33.5	50
	Defrost Cycle Time (min)	6	4	2	2
	Water Consumption (lit/h)	4.4	4.2	3.6	2.8
	Electric Consumption (W)	230	250	270	280
	Head Pressure [peak] (bar)	7	10	14	17.5
IM-25CLE-25 (50Hz)	Ice Production (kg/d)	17	18	15	13
	Freeze Cycle Time (min)	18	18.5	24	28
	Defrost Cycle Time (min)	5	3	2	2
	Water Consumption (lit/h)	6.2	5.3	4.1	2.9
	Electric Consumption (W)	230	250	270	280
	Head Pressure [peak] (bar)	6	9	11.5	13
IM-25LE (50Hz)	Ice Production (kg/d)	26	23	18	14
	Freeze Cycle Time (min)	12.5	17	24	32
	Defrost Cycle Time (min)	6	4	2.5	2
	Water Consumption (lit/h)	6.2	5.4	4.3	3.4
	Electric Consumption (W)	240	240	280	300
	Head Pressure [peak] (bar)	6	9	12.5	14.5
IM-25LE-25 (50Hz)	Ice Production (kg/d)	23	19	16	12
	Freeze Cycle Time (min)	10	11.5	15.5	20.5
	Defrost Cycle Time (min)	4	3	2	2
	Water Consumption (lit/h)	8.2	7.9	6.6	5.2
	Electric Consumption (W)	240	240	280	300
	Head Pressure [peak] (bar)	6	9	12.5	14.5
IM-25L (60Hz)	Ice Production (kg/d)	24	23	20	16
	Freeze Cycle Time (min)	18	21	26.5	34
	Defrost Cycle Time (min)	6	4	2.5	2
	Water Consumption (lit/h)	3.9	3.6	3.1	2.5
	Electric Consumption (W)	240	250	270	280
	Head Pressure [peak] (bar)	6	9	12.5	14.5
IM-25L-25 (60Hz)	Ice Production (kg/d)	19	20	17	15
	Freeze Cycle Time (min)	15.5	16.5	21	24
	Defrost Cycle Time (min)	5	3	2	2
	Water Consumption (lit/h)	7.7	8.1	6.8	6.1
	Electric Consumption (W)	250	260	270	280
	Head Pressure [peak] (bar)	6	9	12	14
IM-25WLE (50Hz)	Ice Production (kg/d)	32	30	28	26
	Freeze Cycle Time (min)	12	13.5	14.5	16.3
	Defrost Cycle Time (min)	3	2.5	2.5	2
	Water Consumption (lit/h)*	7.6	7.2	6.7	6.3
	Electric Consumption (W)	235	235	245	340
	Head Pressure [median] (bar)	9.5	9.5	9.5	9.5

(Ice Production = Capacity when shipped from factory)

(*Values for icemaking water only. Use a cooling tower for cooling water.)

Model	Ambient Temp. (°C)	10	21	32	38
	Water Temp. (°C)	10	15	21	32
IM-25WLE-25 (50Hz)	Ice Production (kg/d)	25	23	22	21
	Freeze Cycle Time (min)	10.5	12	13.2	14.5
	Defrost Cycle Time (min)	3.5	3	2.5	2
	Water Consumption (lit/h)*	8.3	7.9	7.3	6.9
	Electric Consumption (W)	215	220	225	255
	Head Pressure [median] (bar)	9.5	9.5	10	10.5
IM-25WL (60Hz)	Ice Production (kg/d)	26	24	22	21
	Freeze Cycle Time (min)	19.5	22	24	25.5
	Defrost Cycle Time (min)	2.5	2	2	2
	Water Consumption (lit/h)*	4.1	3.8	3.5	3.3
	Electric Consumption (W)	230	240	250	260
	Head Pressure [median] (bar)	9.2	9.5	10	10.2
IM-30CLE (50Hz)	Ice Production (kg/d)	28	24	19	15
	Freeze Cycle Time (min)	13	16.5	23	30
	Defrost Cycle Time (min)	4	3	2	2
	Water Consumption (lit/h)	6.7	5.8	4.6	3.6
	Electric Consumption (W)	240	250	270	280
	Head Pressure [peak] (bar)	6	8	12	13
IM-30CLE-25 (50Hz)	Ice Production (kg/d)	24	20	17	11
	Freeze Cycle Time (min)	10	13	17	27
	Defrost Cycle Time (min)	3.5	3	2	2
	Water Consumption (lit/h)	8.6	7.2	6.1	4
	Electric Consumption (W)	240	250	270	280
	Head Pressure [peak] (bar)	6	8	12	13
IM-30WLE (50Hz)	Ice Production (kg/d)	32	30	28	26
	Freeze Cycle Time (min)	12	13.5	14.5	16.3
	Defrost Cycle Time (min)	3	2.5	2.5	2
	Water Consumption (lit/h)*	7.6	7.2	6.7	6.3
	Electric Consumption (W)	235	235	245	340
	Head Pressure [median] (bar)	9.5	9.5	9.5	9.5
IM-30WLE-25 (50Hz)	Ice Production (kg/d)	25	23	22	21
	Freeze Cycle Time (min)	10.5	12	13.2	14.5
	Defrost Cycle Time (min)	3.5	3	2.5	2
	Water Consumption (lit/h)*	8.3	7.9	7.3	6.9
	Electric Consumption (W)	215	220	225	255
	Head Pressure [median] (bar)	9.5	9.5	10	10.5
IM-45CLE (50Hz)	Ice Production (kg/d)	44	40	32	26
	Freeze Cycle Time (min)	15	19	25	31
	Defrost Cycle Time (min)	4.5	2.5	2	2
	Water Consumption (lit/h)	11.7	10.6	8.5	6.9
	Electric Consumption (W)	280	300	320	340
	Head Pressure [peak] (bar)	6	9	12	15
IM-45CLE-25 (50Hz)	Ice Production (kg/d)	41	37	32	28
	Freeze Cycle Time (min)	12.5	16	19	22
	Defrost Cycle Time (min)	4	2.5	2	2
	Water Consumption (lit/h)	11.6	10.4	8.3	8
	Electric Consumption (W)	280	300	320	350
	Head Pressure [peak] (bar)	6	9	12	15

(Ice Production = Capacity when shipped from factory)

(*Values for icemaking water only. Use a cooling tower for cooling water.)

Model	Ambient Temp. (°C)	10	21	32	38
	Water Temp. (°C)	10	15	21	32
IM-45LE (50Hz)	Ice Production (kg/d)	44	40	33	29
	Freeze Cycle Time (min)	15.6	19	27	31
	Defrost Cycle Time (min)	4	3	2.5	2
	Water Consumption (lit/h)	11.2	10.8	8.8	5.9
	Electric Consumption (W)	310	340	360	390
	Head Pressure [peak] (bar)	5.5	9	12.5	15
IM-45LE (60Hz)	Ice Production (kg/d)	38	37	33	29
	Freeze Cycle Time (min)	21	23	27	31
	Defrost Cycle Time (min)	4.5	3	2.5	2
	Water Consumption (lit/h)	7.6	7.5	6.5	5.9
	Electric Consumption (W)	310	340	360	390
	Head Pressure [peak] (bar)	5.5	9	12.5	15
IM-45LE-25 (50Hz)	Ice Production (kg/d)	39	35	28	24
	Freeze Cycle Time (min)	13.5	16.5	22	26
	Defrost Cycle Time (min)	4	3	2.5	2
	Water Consumption (lit/h)	12.9	11.3	9.2	8.2
	Electric Consumption (W)	310	340	360	390
	Head Pressure [peak] (bar)	5.5	9	12.5	15.5
IM-45LE-25 (60Hz)	Ice Production (kg/d)	38	36	31	27
	Freeze Cycle Time (min)	16	19	23	27
	Defrost Cycle Time (min)	4.5	3	2.5	2
	Water Consumption (lit/h)	9.4	8.8	7.6	6.7
	Electric Consumption (W)	310	340	360	390
	Head Pressure [peak] (bar)	5.5	9	12.5	15.5
IM-45WLE (50Hz)	Ice Production (kg/d)	47	45	42	39
	Freeze Cycle Time (min)	15	16.5	18	20
	Defrost Cycle Time (min)	3.5	3	2.5	2
	Water Consumption (lit/h)*	12.5	11.7	11.3	10.4
	Electric Consumption (W)	270	280	295	315
	Head Pressure [median] (bar)	11.5	11.5	11.5	11.5
IM-45WLE (60Hz)	Ice Production (kg/d)	44	41	39	36
	Freeze Cycle Time (min)	18.4	20.5	22.2	24.8
	Defrost Cycle Time (min)	3.5	3	2.5	2
	Water Consumption (lit/h)*	8.8	8.2	7.8	7.2
	Electric Consumption (W)	295	310	330	360
	Head Pressure [median] (bar)	11.5	11.5	11.5	11.5
IM-45WLE-25 (50Hz)	Ice Production (kg/d)	40	38	36	32
	Freeze Cycle Time (min)	14	15.5	17	21
	Defrost Cycle Time (min)	3	2.5	2	2
	Water Consumption (lit/h)*	12.5	12	11.3	10
	Electric Consumption (W)	285	290	295	310
	Head Pressure [median] (bar)	10.5	10.5	11.5	11.5
IM-65LE (50Hz)	Ice Production (kg/d)	63	56	46	42
	Freeze Cycle Time (min)	15	18	24	27
	Defrost Cycle Time (min)	4.5	4	3	2
	Water Consumption (lit/h)	15.4	13.7	11.3	10.4
	Electric Consumption (W)	400	420	470	510
	Head Pressure [peak] (bar)	8.5	10	14	18.5

(Ice Production = Capacity when shipped from factory)

(*Values for icemaking water only. Use a cooling tower for cooling water.)

Model	Ambient Temp. (°C)	10	21	32	38
	Water Temp. (°C)	10	15	21	32
IM-65LE (60Hz)	Ice Production (kg/d)	54	52	43	38.5
	Freeze Cycle Time (min)	19	22	28.5	32.5
	Defrost Cycle Time (min)	6	4	3	2.5
	Water Consumption (lit/h)	10.2	9.8	8.1	7.3
	Electric Consumption (W)	400	420	470	510
	Head Pressure [peak] (bar)	8.5	10	14	18.5
IM-65LE-25 (50Hz)	Ice Production (kg/d)	56	52	42	36
	Freeze Cycle Time (min)	13.5	15	20.5	25
	Defrost Cycle Time (min)	4	3.5	2.5	2
	Water Consumption (lit/h)	17.5	16.3	12.9	11.1
	Electric Consumption (W)	360	390	430	470
	Head Pressure [peak] (bar)	6	10	13	15.5
IM-65L (60Hz)	Ice Production (kg/d)	56	52	43	38.5
	Freeze Cycle Time (min)	18	22	28.5	32
	Defrost Cycle Time (min)	6	4	3	3
	Water Consumption (lit/h)	10.6	9.8	8.1	7.3
	Electric Consumption (W)	370	390	430	450
	Head Pressure [peak] (bar)	5.5	8.5	12	14
IM-65WLE (50Hz)	Ice Production (kg/d)	63	55	52	50
	Freeze Cycle Time (min)	16.2	18.5	20.3	22
	Defrost Cycle Time (min)	3	3.5	3	2
	Water Consumption (lit/h)*	15.4	13.8	12.9	12.5
	Electric Consumption (W)	380	390	400	420
	Head Pressure [median] (bar)	9	9	9	9
IM-65WLE (60Hz)	Ice Production (kg/d)	51	54	50	48
	Freeze Cycle Time (min)	23.5	22.5	25	26
	Defrost Cycle Time (min)	3	2.5	2	2
	Water Consumption (lit/h)*	9.6	10.2	9.4	9.1
	Electric Consumption (W)	465	475	480	500
	Head Pressure [median] (bar)	10	10	10.5	10.5
IM-65WLE-25 (50Hz)	Ice Production (kg/d)	62	56	51	47
	Freeze Cycle Time (min)	13	14	16.5	18.5
	Defrost Cycle Time (min)	2.5	2.5	2	2
	Water Consumption (lit/h)*	19.6	17.5	15.8	14.7
	Electric Consumption (W)	390	400	410	430
	Head Pressure [median] (bar)	8.5	9	9	9.5
IM-65WLE-25 (60Hz)	Ice Production (kg/d)	60	58	55	50
	Freeze Cycle Time (min)	15	16	17.5	19.5
	Defrost Cycle Time (min)	3	2.5	2	2
	Water Consumption (lit/h)*	14.2	13.8	13.1	11.9
	Electric Consumption (W)	465	475	480	500
	Head Pressure [median] (bar)	10	10	10.5	10.5
IM-65WL (60Hz)	Ice Production (kg/d)	53	52	49	47.5
	Freeze Cycle Time (min)	21	22	24.5	26
	Defrost Cycle Time (min)	4.5	4	3	2.5
	Water Consumption (lit/h)*	10	9.8	9.3	8.9
	Electric Consumption (W)	360	380	410	410
	Head Pressure [median] (bar)	9.5	9.5	10	10

(Ice Production = Capacity when shipped from factory)

(*Values for icemaking water only. Use a cooling tower for cooling water.)

Model	Ambient Temp. (°C)	10	21	32	38
	Water Temp. (°C)	10	15	21	32
IM-100LE (50Hz)	Ice Production (kg/d)	95	93	84	75
	Freeze Cycle Time (min)	21	23	26	30
	Defrost Cycle Time (min)	4	2.5	2	2
	Water Consumption (lit/h)	31.5	17.4	11.8	10.4
	Electric Consumption (W)	600	610	630	680
	Head Pressure [peak] (bar)	7	9.5	13	15.5
IM-100LE (60Hz)	Ice Production (kg/d)	82	85	75	65
	Freeze Cycle Time (min)	28	28	32.5	38
	Defrost Cycle Time (min)	4	2.5	2	2
	Water Consumption (lit/h)	25.7	15.4	10.6	9.1
	Electric Consumption (W)	620	630	700	760
	Head Pressure [peak] (bar)	7	10.5	15	18
IM-100LE-23 (50Hz)	Ice Production (kg/d)	79	77	70	60
	Freeze Cycle Time (min)	17.5	19.5	22	26.5
	Defrost Cycle Time (min)	4	2.5	2	2
	Water Consumption (lit/h)	36.6	20.2	13.8	11.6
	Electric Consumption (W)	600	610	630	680
	Head Pressure [peak] (bar)	7	9.5	13.5	16
IM-100LE-23 (60Hz)	Ice Production (kg/d)	72	73	69	56
	Freeze Cycle Time (min)	22	23	25	31.5
	Defrost Cycle Time (min)	4	2.5	2	2
	Water Consumption (lit/h)	31.6	18.8	13.5	10.9
	Electric Consumption (W)	620	630	700	760
	Head Pressure [peak] (bar)	7	10.5	15	18
IM-100LE-21 (50Hz)	Ice Production (kg/d)	98	95	87	75
	Freeze Cycle Time (min)	11	12.5	14.5	17.2
	Defrost Cycle Time (min)	4	2.5	2	2
	Water Consumption (lit/h)	52.4	29.6	20	17.3
	Electric Consumption (W)	600	610	630	680
	Head Pressure [peak] (bar)	7	10.5	14.5	18
IM-100WLE (50Hz)	Ice Production (kg/d)	97	95	88	80
	Freeze Cycle Time (min)	21.5	22	24.5	27.7
	Defrost Cycle Time (min)	3	3	2.5	2
	Water Consumption (lit/h)*	22.8	22.3	16.5	11.2
	Electric Consumption (W)	530	535	540	565
	Head Pressure [median] (bar)	10.5	10.5	11	11
IM-100WLE (60Hz)	Ice Production (kg/d)	93	90	84	78
	Freeze Cycle Time (min)	24	26	28.5	31
	Defrost Cycle Time (min)	3.5	3	2.5	2.5
	Water Consumption (lit/h)*	21.6	18.5	12.5	11.6
	Electric Consumption (W)	520	610	630	655
	Head Pressure [median] (bar)	10.5	10.5	11	11
IM-100WLE-23 (50Hz)	Ice Production (kg/d)	84	80	78	72
	Freeze Cycle Time (min)	17.5	20	21	21.6
	Defrost Cycle Time (min)	2.5	2.5	2	2
	Water Consumption (lit/h)*	22.2	19.8	14.4	14
	Electric Consumption (W)	530	535	540	565
	Head Pressure [median] (bar)	11	11	11	11

(Ice Production = Capacity when shipped from factory)

(*Values for icemaking water only. Use a cooling tower for cooling water.)

Model	Ambient Temp. (°C)	10	21	32	38
	Water Temp. (°C)	10	15	21	32
IM-100WLE-23 (60Hz)	Ice Production (kg/d)	84	83	78	69
	Freeze Cycle Time (min)	22.5	20	22	25
	Defrost Cycle Time (min)	3	2.5	2	2
	Water Consumption (lit/h)*	21.6	16.2	10.5	9.3
	Electric Consumption (W)	520	610	630	655
	Head Pressure [median] (bar)	11	11	11	11
IM-100WLE-21 (50Hz)	Ice Production (kg/d)	96	88	82	75
	Freeze Cycle Time (min)	12.5	14	15	17
	Defrost Cycle Time (min)	2.5	2.5	2.5	2
	Water Consumption (lit/h)*	29.6	26.9	25.4	17.4
	Electric Consumption (W)	555	555	575	575
	Head Pressure [median] (bar)	9.5	9.5	10	10
IM-100CLE-23 (50Hz)	Ice Production (kg/d)	79	77	70	60
	Freeze Cycle Time (min)	17.5	19.5	22	26.5
	Defrost Cycle Time (min)	4	2.5	2	2
	Water Consumption (lit/h)	36.6	20.2	13.8	11.6
	Electric Consumption (W)	550	575	630	680
	Head Pressure [peak] (bar)	6.5	9	13.2	14.5
IM-130LE (50Hz)	Ice Production (kg/d)	125	105	92	80
	Freeze Cycle Time (min)	15.5	20	24	27.5
	Defrost Cycle Time (min)	3.5	2.5	2	2
	Water Consumption (lit/h)	35.4	19.8	12.8	11.2
	Electric Consumption (W)	660	670	690	720
	Head Pressure [peak] (bar)	10.5	14	17.5	21
IM-130LE-23 (50Hz)	Ice Production (kg/d)	100	90	76	70
	Freeze Cycle Time (min)	13	17	20.5	22.5
	Defrost Cycle Time (min)	3.5	2	2	2
	Water Consumption (lit/h)	40.8	17.4	14.7	13.5
	Electric Consumption (W)	530	535	540	565
	Head Pressure [peak] (bar)	11	11	11	11
IM-130LE-21 (50Hz)	Ice Production (kg/d)	110	100	87	73
	Freeze Cycle Time (min)	11	12	14.5	18
	Defrost Cycle Time (min)	3.5	2.5	2	2
	Water Consumption (lit/h)	46.4	30.7	20	16.6
	Electric Consumption (W)	650	670	690	720
	Head Pressure [peak] (bar)	10.5	14	17.5	21
IM-130WLE (50Hz)	Ice Production (kg/d)	118	108	103	95
	Freeze Cycle Time (min)	16.5	19	20.5	23
	Defrost Cycle Time (min)	3.5	3	2.5	2
	Water Consumption (lit/h)*	33.6	25.4	19.4	13.3
	Electric Consumption (W)	640	660	690	710
	Head Pressure [median] (bar)	15.5	16	16.5	16.5
IM-130WLE-23 (50Hz)	Ice Production (kg/d)	100	95	92	85
	Freeze Cycle Time (min)	14	15.5	16	18
	Defrost Cycle Time (min)	3	2.5	2.5	2
	Water Consumption (lit/h)*	32.8	24.7	24	16.6
	Electric Consumption (W)	640	660	690	710
	Head Pressure [median] (bar)	15.5	16	16.5	16.5

(Ice Production = Capacity when shipped from factory)

(*Values for icemaking water only. Use a cooling tower for cooling water.)

Model	Ambient Temp. (°C)	10	21	32	38
	Water Temp. (°C)	10	15	21	32
IM-130WLE-21 (50Hz)	Ice Production (kg/d)	124	120	117	105
	Freeze Cycle Time (min)	10	10.5	10.5	12
	Defrost Cycle Time (min)	3	2.5	2	2
	Water Consumption (lit/h)*	43	34.2	26.5	23.6
	Electric Consumption (W)	650	670	700	720
	Head Pressure [median] (bar)	15.5	16	16.5	16.5
IM-130ME (50Hz)	Ice Production (kg/d)	130	104	88	79
	Freeze Cycle Time (min)	19	22.5	27.5	30.5
	Defrost Cycle Time (min)	3.5	2.5	2	2
	Water Consumption (lit/h)	29.9	17.9	11.2	10
	Electric Consumption (W)	610	650	700	710
	Head Pressure [peak] (bar)	12.6	17	21	23
IM-130ME-23 (50Hz)	Ice Production (kg/d)	100	90	76	62
	Freeze Cycle Time (min)	13.5	16.5	20.5	25.5
	Defrost Cycle Time (min)	3.5	2.5	2	2
	Water Consumption (lit/h)	39.6	23.4	14.8	12
	Electric Consumption (W)	610	650	700	710
	Head Pressure [peak] (bar)	13	17	21	23
IM-130ME-21 (50Hz)	Ice Production (kg/d)	110	100	87	73
	Freeze Cycle Time (min)	10	12	14.5	18
	Defrost Cycle Time (min)	3.5	2.5	2	2
	Water Consumption (lit/h)	46.4	30.7	20	16.6
	Electric Consumption (W)	610	650	700	710
	Head Pressure [peak] (bar)	13	17	21	23
IM-130WME (50Hz)	Ice Production (kg/d)	125	112	105	100
	Freeze Cycle Time (min)	14.5	17.5	19.5	21
	Defrost Cycle Time (min)	4	3	2.5	2
	Water Consumption (lit/h)*	42.5	30.4	23.3	14.4
	Electric Consumption (W)	580	590	610	650
	Head Pressure [median] (bar)	18	18	18.2	18.4
IM-130WME-23 (50Hz)	Ice Production (kg/d)	100	95	92	80
	Freeze Cycle Time (min)	13.5	15	15.5	19
	Defrost Cycle Time (min)	3.5	3	3	2.5
	Water Consumption (lit/h)*	39.6	31	30.2	20.7
	Electric Consumption (W)	580	590	610	650
	Head Pressure [median] (bar)	18	18	18.2	18.4
IM-160ME (50Hz)	Ice Production (kg/d)	160	128	110	98
	Freeze Cycle Time (min)	11	17	21.5	24.5
	Defrost Cycle Time (min)	3.5	3	2	2
	Water Consumption (lit/h)*	46.4	27.9	14.1	12.5
	Electric Consumption (W)	910	930	1020	1170
	Head Pressure [peak] (bar)	13	17	22	26
IM-240ME (50Hz)	Ice Production (kg/d)	240	230	210	185
	Freeze Cycle Time (min)	12.5	15.3	18.6	21.4
	Defrost Cycle Time (min)	5.5	3.5	2	2
	Water Consumption (lit/h)	27.1	20.9	12.5	11.3
	Electric Consumption (W)	1120	1200	1330	1450
	Head Pressure [peak] (bar)	16	17.5	23	26

(Ice Production = Capacity when shipped from factory)

(*Values for icemaking water only. Use a cooling tower for cooling water.)

Model	Ambient Temp. (°C)	10	21	32	38
	Water Temp. (°C)	10	15	21	32
IM-240ME (60Hz)	Ice Production (kg/d)	190	210	200	175
	Freeze Cycle Time (min)	15.8	17	21	24.3
	Defrost Cycle Time (min)	5.5	4	2	2
	Water Consumption (lit/h)	31.3	20.9	14.6	10.7
	Electric Consumption (W)	1450	1500	1600	1640
	Head Pressure [peak] (bar)	16.3	17.8	23.3	26.3
IM-240ME-23 (50Hz)	Ice Production (kg/d)	225	215	195	175
	Freeze Cycle Time (min)	10	11.7	14.8	16.7
	Defrost Cycle Time (min)	4.5	3.5	2	2
	Water Consumption (lit/h)	29.2	23	14.6	14.1
	Electric Consumption (W)	1120	1200	1330	1450
	Head Pressure [peak] (bar)	16	17.5	23	26
IM-240ME-21 (50Hz)	Ice Production (kg/d)	217	210	190	170
	Freeze Cycle Time (min)	10	10	11.1	13.2
	Defrost Cycle Time (min)	3	3	2.5	2
	Water Consumption (lit/h)	29.2	24.2	16.7	15.1
	Electric Consumption (W)	1120	1200	1330	1450
	Head Pressure [peak] (bar)	16	17.5	23	26
IM-240ME-21 (60Hz)	Ice Production (kg/d)	220	210	180	185
	Freeze Cycle Time (min)	10.2	11.4	14.3	14.3
	Defrost Cycle Time (min)	3.5	3	2.5	2
	Water Consumption (lit/h)	32.1	24.6	20.4	17.3
	Electric Consumption (W)	1450	1500	1600	1640
	Head Pressure [peak] (bar)	16.3	17.8	23.3	26.3
IM-240M2E (50Hz)	Ice Production (kg/d)	240	230	210	185
	Freeze Cycle Time (min)	12.5	15.3	18.6	21.4
	Defrost Cycle Time (min)	5.5	3.5	2	2
	Water Consumption (lit/h)*	42	25.2	14.3	12
	Electric Consumption (W)	1120	1200	1330	1450
	Head Pressure [median] (bar)	16	17.5	23	26
IM-240M2E (60Hz)	Ice Production (kg/d)	190	210	200	175
	Freeze Cycle Time (min)	15.8	17	21	24.3
	Defrost Cycle Time (min)	5.5	3.5	2	2
	Water Consumption (lit/h)*	48	36	16.5	12.6
	Electric Consumption (W)	1450	1500	1600	1640
	Head Pressure [median] (bar)	16.3	17.8	23.3	26.3
IM-240M2E-23 (5Hz)	Ice Production (kg/d)	225	215	195	175
	Freeze Cycle Time (min)	10	11.7	14.8	16.7
	Defrost Cycle Time (min)	4.5	3.5	2	2
	Water Consumption (lit/h)*	42.5	25.5	14.9	12.6
	Electric Consumption (W)	1120	1200	1330	1450
	Head Pressure [median] (bar)	16	17.5	23	26
IM-240M2E-23 (60Hz)	Ice Production (kg/d)	200	195	180	150
	Freeze Cycle Time (min)	12	13.5	16.3	20
	Defrost Cycle Time (min)	4.5	3.5	2	2
	Water Consumption (lit/h)*	49	36.5	16.5	12.6
	Electric Consumption (W)	1450	1500	1600	1640
	Head Pressure [median] (bar)	16.3	17.8	23.3	26.3

(Ice Production = Capacity when shipped from factory)

(*Values for icemaking water only. Use a cooling tower for cooling water.)

Model	Ambient Temp. (°C)	10	21	32	38
	Water Temp. (°C)	10	15	21	32
IM-240M2E-21 (50Hz)	Ice Production (kg/d)	217	210	190	170
	Freeze Cycle Time (min)	10	10	11.1	13.2
	Defrost Cycle Time (min)	3	3	2.5	2
	Water Consumption (lit/h)*	43	25.5	15	12.5
	Electric Consumption (W)	1120	1200	1330	1450
	Head Pressure [median] (bar)	16	17.5	23	26
IM-240M2E-21 (60Hz)	Ice Production (kg/d)	220	210	180	185
	Freeze Cycle Time (min)	10	11.4	14.3	14.3
	Defrost Cycle Time (min)	3.5	3	2.5	2
	Water Consumption (lit/h)	50	36	17	13.3
	Electric Consumption (W)	1450	1500	1600	1640
	Head Pressure [peak] (bar)	16.3	17.8	23.3	26.3
IM-240WME (50Hz)	Ice Production (kg/d)	235	215	200	185
	Freeze Cycle Time (min)	15	16.5	18.5	21
	Defrost Cycle Time (min)	3.5	3.5	3	2.5
	Water Consumption (lit/h)*	30	23.8	18.4	13.8
	Electric Consumption (W)	1250	1250	1300	1300
	Head Pressure [median] (bar)	19	19	19	19
IM-240WME-23 (50Hz)	Ice Production (kg/d)	210	202	185	175
	Freeze Cycle Time (min)	12	13.2	15.2	16.7
	Defrost Cycle Time (min)	3.5	3	2.5	2
	Water Consumption (lit/h)*	30.4	24.6	17.1	14.1
	Electric Consumption (W)	1250	1250	1300	1300
	Head Pressure [median] (bar)	19	19	19	19
IM-240WME-23 (60Hz)	Ice Production (kg/d)	190	185	175	160
	Freeze Cycle Time (min)	13.7	14.7	16.2	18.4
	Defrost Cycle Time (min)	3.5	3	2.5	2
	Water Consumption (lit/h)*	26.9	22.8	18.3	13.8
	Electric Consumption (W)	1430	1450	1500	1550
	Head Pressure [median] (bar)	19.4	19.4	19.5	20
IM-240WME-21 (50Hz)	Ice Production (kg/d)	215	207	195	180
	Freeze Cycle Time (min)	10	10	10.8	12.4
	Defrost Cycle Time (min)	3.5	3	2.5	2
	Water Consumption (lit/h)*	31.7	27.1	23	18.3
	Electric Consumption (W)	1250	1250	1300	1300
	Head Pressure [median] (bar)	19	19	19	19
IM-240WME-21 (60Hz)	Ice Production (kg/d)	205	195	190	185
	Freeze Cycle Time (min)	11.3	12.5	13.4	13.8
	Defrost Cycle Time (min)	3.5	3	2.5	2.5
	Water Consumption (lit/h)*	34.2	28.8	24.2	20.9
	Electric Consumption (W)	1430	1450	1500	1550
	Head Pressure [median] (bar)	19.4	19.4	19.5	20
IM-240WM2E (50Hz)	Ice Production (kg/d)	235	215	200	185
	Freeze Cycle Time (min)	15	16.5	18.5	21
	Defrost Cycle Time (min)	3.5	3.5	3	2.5
	Water Consumption (lit/h)*	30	23.8	18.4	13.8
	Electric Consumption (W)	1250	1250	1300	1300
	Head Pressure [median] (bar)	19	19.2	19.3	20

(Ice Production = Capacity when shipped from factory)

(*Values for icemaking water only. Use a cooling tower for cooling water.)

Model	Ambient Temp. (°C)	10	21	32	38
	Water Temp. (°C)	10	15	21	32
IM-240WM2E-23 (50Hz)	Ice Production (kg/d)	210	202	185	175
	Freeze Cycle Time (min)	12	13.2	15.2	16.7
	Defrost Cycle Time (min)	3.5	3	2.5	2
	Water Consumption (lit/h)*	30.4	24.6	17.1	14.1
	Electric Consumption (W)	1250	1250	1300	1300
	Head Pressure [median] (bar)	19	19.2	19.3	20
IM-240WM2E-23 (60Hz)	Ice Production (kg/d)	190	185	175	160
	Freeze Cycle Time (min)	13.7	14.7	16.2	18.4
	Defrost Cycle Time (min)	3.5	3	2.5	2
	Water Consumption (lit/h)	26.9	22.8	18.3	13.8
	Electric Consumption (W)	1430	1450	1500	1550
	Head Pressure [peak] (bar)	19.4	19.4	19.5	20
IM-240WM2E-21 (50Hz)	Ice Production (kg/d)	215	207	195	180
	Freeze Cycle Time (min)	10	10	10.8	12.4
	Defrost Cycle Time (min)	3.5	3	2.5	2
	Water Consumption (lit/h)	31.7	27.1	23	18.3
	Electric Consumption (W)	1250	1250	1300	1300
	Head Pressure [peak] (bar)	19	19.2	19.3	20
IM-240WM2E-21 (60Hz)	Ice Production (kg/d)	205	195	190	185
	Freeze Cycle Time (min)	11.3	12.5	13.4	13.8
	Defrost Cycle Time (min)	3.5	3	2.5	2.5
	Water Consumption (lit/h)	34.2	28.8	24.2	20.9
	Electric Consumption (W)	1430	1450	1500	1550
	Head Pressure [peak] (bar)	19.4	19.4	19.5	20

Suction Pressure and Evaporator Temp. (Air-cooled Models)

		50Hz			
MODEL	Ambient Temp. (°C)	10	21	32	38
	Water Temp. (°C)	10	15	21	32
IM-25LE IM-25CLE	Suction Pressure Peak (bar)	1.0	1.0	1.5	2.0
	Evaporator Inlet Temp. (°C)	-17	-16	-14	-14
IM-45LE IM-45CLE	Suction Pressure Peak (bar)	1.5	1.5	2.0	2.5
	Evaporator Inlet Temp. (°C)	-16	-14	-13	-11
IM-65LE	Suction Pressure Peak (bar)	1.0	1.5	2.0	2.0
	Evaporator Inlet Temp. (°C)	-13	-13	-11	-11
IM-100LE	Suction Pressure Peak (bar)	1.5	2.0	2.5	2.5
	Evaporator Inlet Temp. (°C)	-16	-15	-14	-13
IM-100CLE	Suction Pressure Peak (bar)	2.5	3.5	5.0	5.0
	Evaporator Inlet Temp. (°C)	-21	-20	-18	-18
IM-130ME	Suction Pressure Peak (bar)	3.5	4.0	4.0	4.5
	Evaporator Inlet Temp. (°C)	-19	-17	-15	-14
IM-160ME	Suction Pressure Peak (bar)	3.0	3.5	4.5	5.5
	Evaporator Inlet Temp. (°C)	-20	-18	-17	-16
IM-240ME IM-240M2E	Suction Pressure Peak (bar)	3.0	3.5	4.0	4.5
	Evaporator Inlet Temp. (°C)	-20	-18	-16	-14

		60Hz			
MODEL	Ambient Temp. (°C)	10	21	32	38
	Water Temp. (°C)	10	15	21	32
IM-25L	Suction Pressure Peak (bar)	1.0	1.0	1.5	1.5
	Evaporator Inlet Temp. (°C)	-16	-16	-15	-14
IM-45LE	Suction Pressure Peak (bar)	1.0	1.5	2.0	2.5
	Evaporator Inlet Temp. (°C)	-16	-16	-14	-10
IM-65LE	Suction Pressure Peak (bar)	1.0	1.5	1.5	2.0
	Evaporator Inlet Temp. (°C)	-12	-12	-11	-10
IM-100LE	Suction Pressure Peak (bar)	1.5	2.0	2.5	2.5
	Evaporator Inlet Temp. (°C)	-16	-16	-15	-15
IM-240ME IM-240M2E	Suction Pressure Peak (bar)	3.0	3.5	4.0	4.5
	Evaporator Inlet Temp. (°C)	-20	-18	-17	-16

Note: The above data are only for reference in servicing. Actual readings may be slightly different for each product.

Suction Pressure = Peak readings in freezing cycle

Evaporator Inlet Temp. = 5 minutes before completion of freezing cycle

Suction Pressure and Evaporator Temp. (Water-cooled Models)

		50Hz			
MODEL	Ambient Temp. (°C)	10	21	32	38
	Water Temp. (°C)	10	15	21	32
IM-25WLE	Suction Pressure Peak (bar)	1.0	1.5	2.0	2.5
	Evaporator Inlet Temp. (°C)	-16	-15	-14	-14
IM-45WLE	Suction Pressure Peak (bar)	1.5	2.0	2.5	3.0
	Evaporator Inlet Temp. (°C)	-15	-15	-14	-13
IM-65WLE	Suction Pressure Peak (bar)	1.5	2.0	2.0	3.0
	Evaporator Inlet Temp. (°C)	-17	-16	-15	-14
IM-100WLE	Suction Pressure Peak (bar)	1.5	2.0	2.0	2.5
	Evaporator Inlet Temp. (°C)	-16	-16	-15	-14
IM-130WME	Suction Pressure Peak (bar)	3.5	4.0	4.5	5.0
	Evaporator Inlet Temp. (°C)	-17	-16	-16	-15
IM-240WME IM-240WM2E	Suction Pressure Peak (bar)	3.5	3.8	4.0	4.5
	Evaporator Inlet Temp. (°C)	-20	-18	-16	-14

		60Hz			
MODEL	Ambient Temp. (°C)	10	21	32	38
	Water Temp. (°C)	10	15	21	32
IM-25WL	Suction Pressure Peak (bar)	1.0	1.5	2.0	2.0
	Evaporator Inlet Temp. (°C)	-20	-20	-19	-18
IM-45WLE	Suction Pressure Peak (bar)	1.5	2.0	2.0	3.0
	Evaporator Inlet Temp. (°C)	-16	-16	-15	-14
IM-65WLE	Suction Pressure Peak (bar)	1.0	1.5	2.0	2.5
	Evaporator Inlet Temp. (°C)	-19	-18	-16	-15
IM-100WLE	Suction Pressure Peak (bar)	1.5	1.5	2.0	2.0
	Evaporator Inlet Temp. (°C)	-17	-17	-16	-15
IM-240WME IM-240WM2E	Suction Pressure Peak (bar)	3.5	3.8	4.0	4.5
	Evaporator Inlet Temp. (°C)	-18	-18	-18	-18

Note: The above data are only for reference in servicing. Actual readings may be slightly different for each product.

Suction Pressure = Peak readings in freezing cycle

Evaporator Inlet Temp. = 5 minutes before completion of freezing cycle

VII. SERVICE DIAGNOSIS

1. NO ICE PRODUCTION

PROBLEM	CHECK	POSSIBLE CAUSE	REMEDY
[1] The icemaker will not start.	a) Power Source	1. OFF position.	1. Move to ON position.
		2. Loose connections.	2. Tighten.
		3. Bad contacts.	3. Check for continuity and replace.
	b) Power Cord	1. Loose connection.	1. Tighten.
		2. Open circuit - damaged.	2. Repair or replace.
	c) Fuse	1. Blown out.	1. Replace.
	d) Bin Control	1. Tripped with Bin filled with ice.	1. Remove ice.
		2. Out of position.	2. Place in position.
		3. Fused contacts.	3. Check for continuity and replace.
	e) High Pressure Control (water-cooled, 240ME)	1. Bad contacts.	1. Check for continuity and replace.
	f) Transformer	1. Coil winding opened.	1. Replace.
	g) Wiring to Controller Board	1. Loose connections or open.	1. Check for continuity and repair or replace.
	h) Thermistor	1. Leads short-circuit or open and High Temperature Safety (Backup Timer) operates.	1. See "II. 2. [b] BEFORE CHECKING CONTROLLER BOARD".
	i) Hot Gas Solenoid Valve	1. Continues to open in freeze cycle and High Temperature Safety (Backup Timer) operates.	1. Check for power OFF in freeze cycle and replace.
j) Water Supply Line (water-cooled)	1. Water supply OFF and water supply cycle does not finish.	1. Check for recommended pressure.	
	2. Condenser water pressure too low or OFF and Pressure Control opens and closes frequently.	2. Check for recommended pressure.	
k) Water Solenoid Valve	1. Mesh filter or orifice gets clogged and water supply cycle does not finish.	1. Clean.	
	2. Coil winding opened.	2. Replace.	
	3. Wiring to Water Valve.	3. Check for loose connection or open, and replace.	
l) Controller Board	1. Defective.	1. See "II. 2. CONTROLLER BOARD".	
[2] Compressor will not start, or operates intermittently.	a) High Pressure Control (water-cooled, 240ME)	1. Condenser water temperature too warm (water-cooled).	1. Check for recommended temperature.
		2. Refrigerant overcharged.	2. Recharge.

PROBLEM	CHECK	POSSIBLE CAUSE	REMEDY
[2] (Continued)		3. Condenser water pressure too low or OFF (water-cooled).	3. Check for recommended pressure.
	b) Water Regulator (water-cooled)	1. Set too high.	1. Adjust lower.
		2. Clogged or defective.	2. Clean or replace.
	c) Overload Protector	1. Bad contacts.	1. Check for continuity and replace.
		2. Voltage too low.	2. Check for recommended voltage.
		3. Refrigerant overcharged or undercharged.	3. Recharge.
	d) Starter	1. Defective.	1. Replace.
	e) Start Capacitor or Run Capacitor	1. Defective.	1. Replace.
	f) Power Relay (Magnetic Contactor for 240ME/WME)	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 repair or replace.	
	2. Defective.	2. Replace.	
h) Air Filter, Condenser	1. Clogged.	1. Clean.	
[3] Compressor runs, but other components will not start.	a) Control Circuit	1. Loose connection or broken wire.	1. Repair or replace.
[4] Fan Motor will not run.	a) Wiring	1. Loose connection or broken wire.	1. Repair or replace.
	b) Actuator Toggle Switch	1. Defective.	1. Replace.
	c) Thermistor, Controller Board	1. See "II. 2. CONTROLLER BOARD".	
[5] Water continues to be supplied in freeze cycle.	a) Water Solenoid Valve	1. Diaphragm does not close.	1. Check for water leaks with icemaker OFF.
	b) Controller Board	1. Defective.	1. See "II. 2. CONTROLLER BOARD".
[6] Water does not circulate.	a) Water Supply Line	1. Water pressure too low and water level in Water Tank too low.	1. Check for recommended pressure.
	b) Water Solenoid 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 repair.
		2. Clogged.	2. Clean (See "V. 4. ICEMAKING WATER SYSTEM").
	d) Pump Motor	1. Motor winding opened.	1. Replace.
2. Bearing worn out.		2. Replace.	

PROBLEM	CHECK	POSSIBLE CAUSE	REMEDY
[6] (Continued)		3. Wiring to Pump Motor.	3. Check for loose connection or open, and replace.
		4. Defective or bound impeller.	4. Replace and clean.
		5. Mechanical Seal worn out.	5. Check and replace.
	e) Controller Board	1. Defective.	1. See "II. 2. CONTROLLER BOARD".
	f) Actuator Toggle Switch	1. Defective.	1. Replace.
	g) Discharge Tube	1. Clogged.	1. Clean.
2. Out of position.		2. Place in position.	
[7] All components run, but no ice is produced.	a) Refrigerant	1. Undercharged.	1. Check for leaks and recharge.
		2. Air or moisture trapped.	2. Replace Drier, and recharge.
	b) Compressor	1. Defective valve.	1. Replace Compressor.
	c) Hot Gas Solenoid Valve	1. Continues to open in freeze cycle.	1. Check and replace.
	d) Expansion Valve	1. Continues to close in freeze cycle.	1. Check and replace.
[8] Water Pan will not open.	a) Wiring	1. Loose connection or broken wire.	1. Repair or replace.
	b) Actuator Toggle Switch	1. Defective.	1. Replace.
	c) Actuator Motor, Run Capacitor	1. Defective.	1. Replace.
	d) Thermistor, Controller Board	1. See "II. 2. CONTROLLER BOARD".	
[9] Water Pan will not close.	a) See [8] above.		
	b) Hot Gas Valve	1. Defective.	1. Replace.

2. LOW ICE PRODUCTION

PROBLEM	CHECK	POSSIBLE CAUSE	REMEDY
[1] Freeze cycle time is too long.	a) Water Supply	1. Low pressure.	1. Check for recommended pressure.
	b) Water Temperature	1. Too high.	1. Check for recommended water temperature.
	c) Water Quality	1. High hardness or contains impurities.	1. Install a water filter or scale treatment.
		2. Lime is deposited inside Cooling Water Tubing.	2. Clean.
	d) Refrigerant Charge	1. Overcharged or undercharged.	1. Recharge correctly and check for leaks.
	e) Refrigerant Circuit	1. Excessive moisture.	1. Replace Drier and recharge correctly.
	f) Thermistor, Controller Board	1. See "II. 2. CONTROLLER BOARD".	
	g) Air Filter, Condenser	1. Clogged.	1. Clean.
[2] Takes too long for Water Pan to close.	a) Evaporator	1. Scaled up.	1. Clean or remove scale.
	b) Refrigerant Charge	1. Undercharged.	1. Check for leaks and recharge correctly.
	c) Hot Gas Valve	1. Defective.	1. Replace.
	d) Thermistor, Controller Board	1. See "II. 2. CONTROLLER BOARD".	
	e) Water Regulating Valve	1. Clogged.	1. Clean.
		2. Defective.	2. Repair or replace.
	f) Fan Motor	1. Runs during defrost cycle.	1. Check wiring and Actuator Toggle Switch.

3. ABNORMAL ICE

PROBLEM	CHECK	POSSIBLE CAUSE	REMEDY
[1] Large-hole cubes.	a) Water Supply Line	1. Low pressure.	1. Check for recommended pressure.
	b) Ambient or Water Temperature	1. Too high.	1. Check for recommended temperatures.
	c) Air Filter, Condenser	1. Clogged.	1. Clean.
	d) Water Valve	1. Clogged.	1. Clean.
	e) Pump Motor	1. Leaks.	1. Repair or replace.
		2. Mechanical Seal worn out.	2. Replace.
	f) Refrigerant Charge	1. Undercharged.	1. Check for leaks and recharge correctly.
	g) Thermistor, Controller Board	1. See "II. 2. CONTROLLER BOARD".	
h) Expansion Valve	1. Poorly adjusted.	1. Readjust.	
[2] Cloudy cubes.	a) Water Supply Line	1. Low pressure.	1. Check for recommended pressure.
		2. Clogged.	2. Check Strainer and clean.
	b) Water Quality	1. High hardness or contains impurities.	1. Install a water filter or scale treatment.
		2. Lime is deposited inside Cooling Water Tubing.	2. Clean.
	c) Water Valve	1. Clogged.	1. Clean.
	d) Water System	1. Scaled up.	1. Clean or remove scale.
	e) Water Plate	1. Jet hole clogged.	1. Clean.
	f) Pump Motor	1. Leaks.	1. Replace.
		2. Bearings worn out.	2. Replace.
3. Mechanical Seal worn out.		3. Replace.	
g) Thermistor, Controller Board	1. See "II. 2. CONTROLLER BOARD".		
[3] Slab does not break into separate cubes.	a) Extension Spring	1. Over-extended.	1. Replace.
	b) Clearance between Evaporator and Water Plate	1. Too much.	1. Readjust.
	c) Evaporator	1. Dirty or scaled up.	1. Clean or remove scale.
	d) Thermistor, Controller Board	1. See "II. 2. CONTROLLER BOARD".	

4. OTHERS

PROBLEM	CHECK	POSSIBLE CAUSE	REMEDY
[1] Icemaker will not stop when Bin is filled with ice.	a) Bin Control Switch	1. Out of position. 2. Bad contacts.	1. Place in position. 2. Check for continuity and replace.
	b) Controller Board	1. See "II. 2. CONTROLLER BOARD".	
[2] Abnormal noise	a) Pump Motor	1. Bearing worn out.	1. Replace.
	b) Actuator Motor	1. Gears worn out.	1. Replace.
	c) 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.
d) Compressor	1. Mounting pad out of position.	1. Reinstall.	
e) Refrigerant Lines	1. Rubbing or touching on other surfaces.	1. Secure or reset pipes.	
[3] Ice in Storage Bin often melts.	a) Bin Drain	1. Plugged.	1. Clean.
[4] Fan Motor does not change speed (240ME only).	a) Bimetal Thermostat	1. Defective.	1. Replace.
	b) Fan Relay X6	1. Welded contacts or defective coil.	1. Replace.

VIII. ADJUSTMENT

1. EXPANSION VALVE

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

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

CAUTION

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

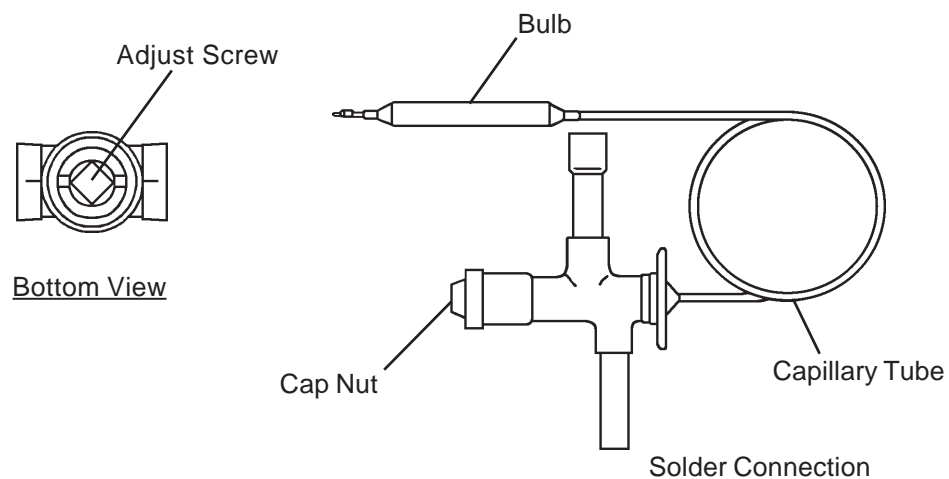


Fig. 23

2. WATER REGULATING VALVE - WATER-COOLED MODEL ONLY

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

- 1) Attach a pressure gauge to high-side line, or prepare a thermometer to check Condenser drain temperature.
- 2) Rotate the Adjust Screw using a flat blade screwdriver so that the pressure gauge shows 10 bar [IM-25WLE, IM-30WLE, IM-45WLE, IM-65WLE, IM-100WLE], 16 bar [IM-130WLE, IM-130WME] or 19 bar [IM-240WME, IM-240WM2E], or the thermometer reads 38 - 40°C, 5 minutes after Freeze Cycle starts.
When the pressure or temperature exceeds the above, rotate the Adjust Screw counterclockwise.
- 3) Check that the pressure or temperature holds.

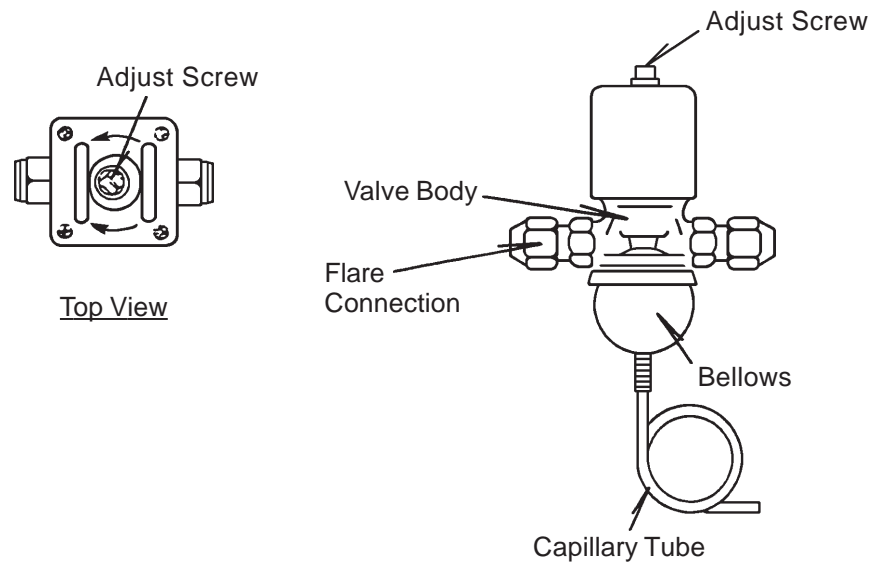


Fig. 24

IX. REMOVAL AND REPLACEMENT

1. SERVICE FOR REFRIGERANT LINES

[a] SERVICE INFORMATION

1) Allowable Compressor Opening Time and Prevention of Lubricant Mixture [R134a/R404A]

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

2) Treatment for Refrigerant Leak [R134a/R404A]

If a refrigerant leak occurs in the low side of an ice maker, air may be drawn in. Even if the low side pressure is higher than the atmospheric pressure in normal operation, a continuous refrigerant leak will eventually 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/R404A has possibly drawn in air, the drier must be replaced. Be sure to use a drier designed for R134a/R404A.

3) Handling of Handy Flux [R134a/R404A]

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

4) Oil for Processing of Copper Tubing [R134a/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 R134a/R404A

Some parts used for refrigerants other than R134a/R404A are similar to those for R134a/R404A. But never use any parts unless they are specified for R134a/R404A because their endurance against the refrigerant have not been evaluated. Also, for R134a/R404A, do not use any parts that have been used for other refrigerants. Otherwise, wax and chlorine remaining on the parts may adversely affect R134a/R404A.

6) Replacement Copper Tubing [R134a/R404A]

The copper tubes currently in use are suitable for R134a/R404A. But do not use them if oily inside. The residual oil in copper tubes should be as little as possible. (Low residual oil type copper tubes are used in the shipped units.)

7) Evacuation, Vacuum Pump and Refrigerant Charge [R134a/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 R134a/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 R22, R134a or R404A to suddenly react with oxygen and explode. Be sure to use nitrogen to prevent explosion.

[b] REFRIGERANT RECOVERY

The refrigerant must be recovered if required by an applicable law. 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.

When replacing the Drier, take the opportunity to also fit a High-side Access Valve for ease of charging liquid refrigerant.

[c] EVACUATION AND RECHARGE

- 1) Attach Charging Hoses, a Service Manifold and a Vacuum Pump to the system. If possible, use Quick Release Connectors onto the Access Valves (especially on the high side).
- 2) Turn on the Vacuum Pump.
- 3) Allow the Vacuum Pump to pull down to a 760 mmHg vacuum. Evacuating period depends on the pump capacity.
- 4) Close the Low-side and High-side Valves on the Service Manifold.
- 5) Disconnect the Vacuum Pump, and attach a Refrigerant Charging Cylinder to accurately weigh in the liquid charge. Remember to purge any air from the Charging Hose. See the Nameplate for the required refrigerant charge.
- 6) Open the High-side Valve on the Gauge Manifold, and accurately measure in the liquid charge. Close the valve on the Charging Cylinder before closing the High-side Manifold Valve. Any remaining liquid in the line can be charged into the low side.

Note: Always charge in the liquid stage, as many refrigerants are blends and vapour charging will affect the blend consistency (eg. R404A).

- 7) Turn on the icemaker. Release the High-side Access Connector, and allow pressure in the charging line to slowly enter the low side of the system. Cap off the High-side Access Valve. When pressure reduces on the low side, disconnect the low side charging line and cap off the Access Valve.
- 8) Always cap the Access Valves to prevent a refrigerant leak.
- 9) Always thoroughly leak test all joints and valve caps.
- 10) Avoid charging large quantities of liquid into the low side in case of damage to the Compressor.

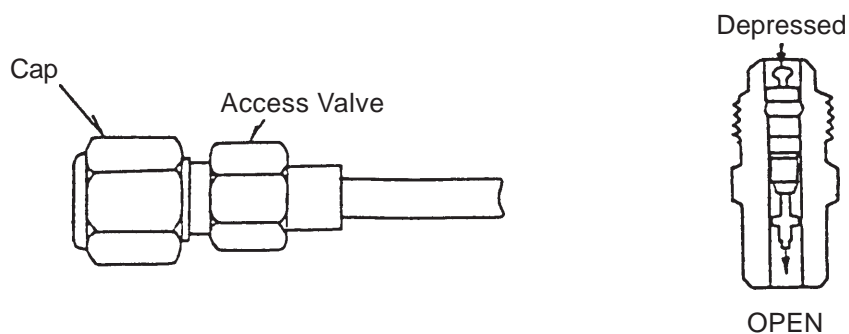


Fig. 25

2. COMPRESSOR

- 1) Unplug the icemaker or disconnect the power source.
- 2) Remove the Louver (Right Side) or Front Panel (Lower) and Rear Mesh.
- 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 or solder the Access, Suction and Discharge lines (Do not change this order), with nitrogen gas flowing at a pressure of 0.2 - 0.3 bar.
- 13) Install the new Drier (See "3. DRIER").
- 14) Check for leaks using nitrogen gas (10 bar) 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) Replace the Louver or Front Panel and Rear Mesh 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.

3. DRIER

- 1) Unplug the icemaker or disconnect the power source.
- 2) Remove the Rear Mesh.
- 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 or solder the new Drier, with the arrow on the Drier in the direction of the refrigerant flow. Use nitrogen gas at a pressure of 0.2 - 0.3 bar when brazing tubings. Braze in an Access Valve using a tee if necessary.
- 7) Check for leaks using nitrogen gas (10 bar) and soap bubbles.
- 8) Evacuate the system and charge it with refrigerant (See "1. [c] EVACUATION AND RECHARGE").
- 9) Replace the Rear Mesh 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.

4. EXPANSION VALVE

IMPORTANT

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

- 1) Unplug the icemaker or disconnect the power source.
- 2) Remove the Top, Front (Upper) and Rear Mesh Panels.
- 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 Expansion Valve Sensor (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 0.2 - 0.3 bar when brazing.
- 8) Braze or solder the new Drier (See "3. DRIER").
- 9) Check for leaks using nitrogen gas (10 bar) 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.

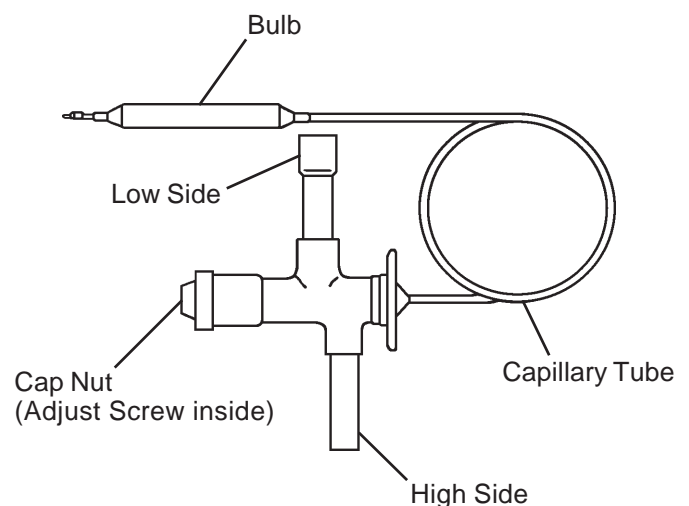


Fig. 26

5. EVAPORATOR

IMPORTANT

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

- 1) Unplug the icemaker or disconnect the power source.
- 2) Remove the Top, Front (Upper) and Rear Mesh Panels.
- 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 Water Pan Assembly, referring to "8. WATER PAN ASSEMBLY."
- 5) Disconnect the solder connections on the Evaporator using brazing equipment. Protect the Expansion Valve from excessive heat.
- 6) Remove the four nuts holding the Evaporator.
- 7) Install the new Evaporator, and secure it with the Bolts, Collars (Spacer) and Nuts.
- 8) Remove and replace the Drier (See "3. DRIER").
- 9) Braze pipes, with nitrogen gas flowing at a pressure of 0.2 - 0.3 bar.
- 10) Check for leaks using nitrogen gas (10 bar) and soap bubbles.
- 11) Evacuate the system and charge it with refrigerant (See "1. [c] EVACUATION AND RECHARGE").
- 12) Replace the panels in their correct positions.
- 13) Plug in the icemaker or connect the power source.

6. HOT GAS VALVE

IMPORTANT

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

- 1) Unplug the icemaker or disconnect the power source.
- 2) Remove the Louver (Right Side) and Rear Mesh 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 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 0.2 - 0.3 bar.

WARNING

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

- 8) Install the new Drier (See "3. DRIER").
- 9) Check for leaks using nitrogen gas (10 bar) 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 leads.
- 13) Replace the panels in their correct positions.
- 14) Plug in the icemaker or connect the power source.

7. WATER REGULATING VALVE - WATER-COOLED MODEL ONLY

[a] VALVE BODY

- 1) Unplug the icemaker or disconnect the power source.
- 2) Close the water supply tap.
- 3) Remove the Front Panel (Lower) and Louver (Left Side).
- 4) Disconnect the flare connections of the Water Regulating Valve.
- 5) Remove the valve from the Bracket.
- 6) Install a new Water Regulating Valve.
- 7) Connect the flare connections.
- 8) Open the water supply tap.
- 9) Check for water leaks.
- 10) Replace the Front Panel and Louver in their correct positions.
- 11) Plug in the icemaker or connect the power source.

[b] WHOLE VALVE

IMPORTANT

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

- 1) Unplug the icemaker or disconnect the power source.
- 2) Close the water supply tap.
- 3) Remove the Front Panel (Lower), Louver (Left Side) and Rear Mesh Panel.
- 4) Recover the refrigerant and store it in a proper container, if required by an applicable law (See "1. [b] REFRIGERANT RECOVERY").
- 5) Cut off the Copper Tube near the Capillary Tube solder connection, using a pipe cutter.

- 6) Cut off the Capillary Tubes of the Valve and High-pressure Switch, using a file and pliers. Be careful not to damage the Capillary Tube end.
- 7) Disconnect the flare connections from the Bracket.
- 8) Remove the screws and the valve from the Bracket.
- 9) Install the new valve, and insert the Capillary Tubes into the Copper Tube.
- 10) Web the Copper Tube end, and braze or solder the Copper Tube and Capillary Tubes together.
- 11) Install the new Drier (See “3. DRIER”).
- 12) Check for leaks using nitrogen gas (10 bar) and soap bubbles.
- 13) Evacuate the system and charge it with refrigerant (See “1. [c] EVACUATION AND RECHARGE”).
- 14) Connect the flare connections.
- 15) Open the water supply tap.
- 16) Check for water leaks.
- 17) Replace the panels in their correct positions.
- 18) Plug in the icemaker or connect the power source.

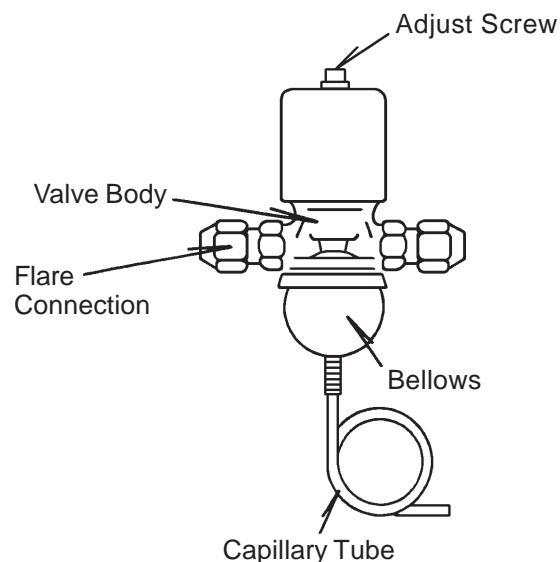
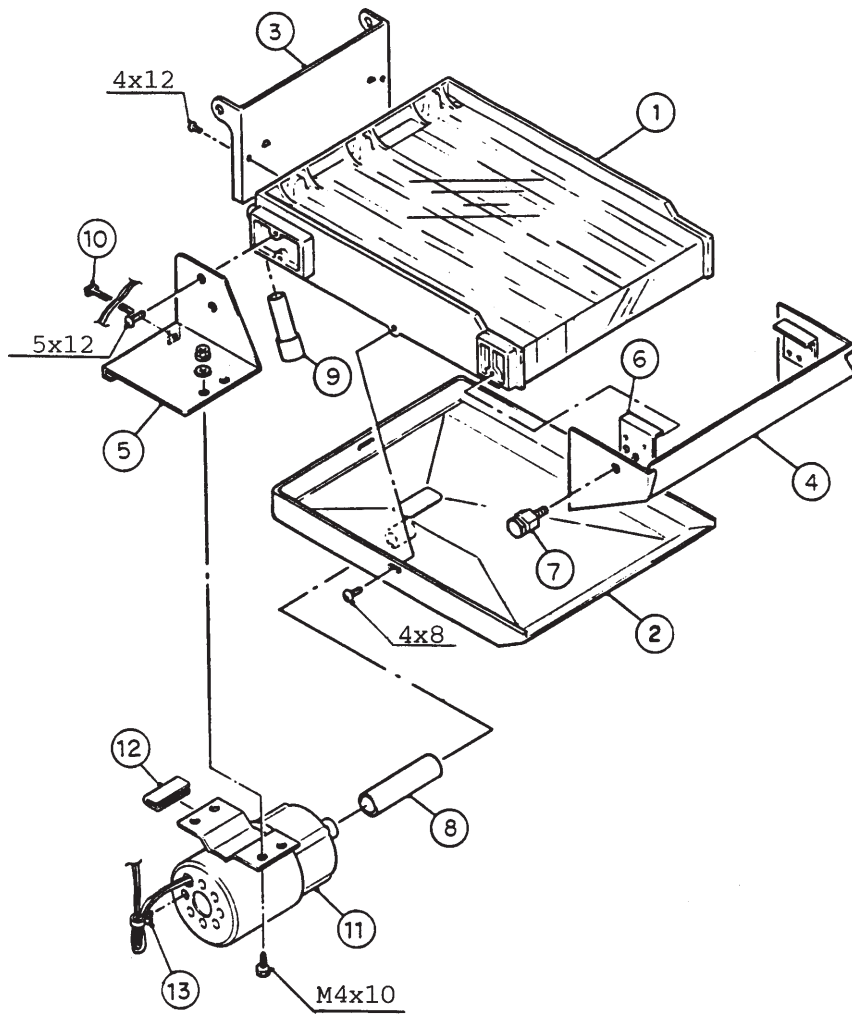


Fig. 27

8. WATER PAN ASSEMBLY

- 1) Remove the Top Panel and Front Panel (Upper).
- 2) Remove the Front Panel (Lower) [except IM-21/25/30CLE], and push the Reset Switch on the Control Box to open the Water Pan.
- 3) Unplug the icemaker or disconnect the power source.
- 4) Disconnect the Pump Motor leads in the Wiring Channel.
- 5) Remove the two Extension Springs from the Cam Arms.
- 6) Remove the Water Plate Bracket and the Water Pan Assembly.
- 7) Remove the two Spring Hook Screws from the Water Tank.
- 8) Remove the screws and the Water Plate Bracket.
- 9) Remove the Pump Suction and Discharge Tubings.
- 10) Remove the Pump Motor Bracket from the Water Plate.
- 11) Install the new Water Plate or Water Tank in the reverse order of the removal procedure.
- 12) Replace the panels in their correct positions.
- 13) Plug in the icemaker or connect the power source.



INDEX NO.	DESCRIPTION
-----------	-------------

1	Water Plate
2	Water Tank
3	Water Plate Bracket
4	Drain Guide
5	Pump Motor Bracket
6	Friction Plate
7	Spring Hook Screw
8	Pump Tubing (Suction)
9	Pump Tubing (Discharge)
10	Clamp - nylon tie
11	Water Pump Assembly
12	U-Packing

Fig. 28

9. PUMP MOTOR

- 1) Unplug the icemaker or disconnect the power source.
- 2) Remove the Top Panel and Front Panel (Upper).
- 3) Disconnect the Pump Motor leads in the Wiring Channel.
- 4) Remove screws and the Pump Motor from the Bracket.
- 5) Disconnect the Pump Suction and Discharge Tubings.
- 6) Disassemble the Pump Motor and check the Motor or parts.
- 7) Install the new motor or parts in the reverse order of the removal procedure.
- 8) Plug in the icemaker or connect the power source, and check for leaks.
- 9) Replace the panels in their correct positions.

INDEX NO.	DESCRIPTION
1	Pump Motor
2	Retainer
3	Mechanical Seal
4	O-ring
5	Fixing Plate for O-ring
6	Packing
7	Impeller
8	Pin
9	Cover

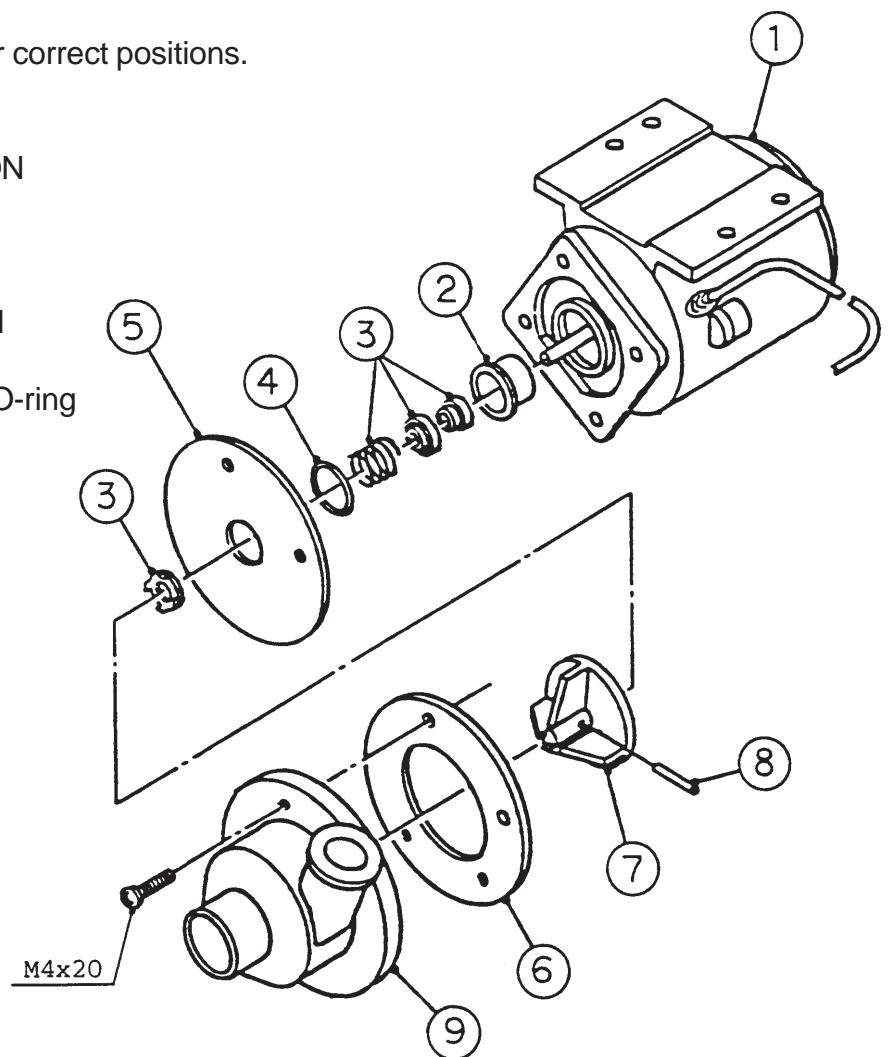


Fig. 29

10. WATER VALVE

- 1) Close the water supply tap.
- 2) Unplug the icemaker or disconnect the power source.
- 3) Remove the Top Panel.
- 4) Disconnect the Receptacle (leads) from the Water Valve.
- 5) Remove the Valve Outlet tubing by releasing the Clamp.
- 6) Remove the Inlet Hose and Water Valve.
- 7) Install the new valve in the reverse order of the removal procedure.
- 8) Open the water supply tap.
- 9) Plug in the icemaker or connect the power source.
- 10) Check for leaks.
- 11) Replace the Top Panel in its correct position.

Note: When replacing parts, disassemble as shown in Fig. 17 (page 54) and replace the defective parts.

11. ACTUATOR MOTOR

- 1) Remove the Top Panel and Front Panel (Upper).
- 2) Remove the Front Panel (Lower) [except IM-21/25/30CLE], and push the Reset Switch on the Control Box to open the Water Pan.
- 3) Unplug the icemaker or disconnect the power source.
- 4) Remove the Extension Spring (Actuator Motor side) from the Cam Arm.
- 5) Disconnect the Actuator Motor leads in the Wiring Channel.
- 6) Remove the Actuator Motor Bracket.
- 7) Remove the Spring Pin securing the Shaft to the Cam Arm.
- 8) Remove the Actuator Motor.
- 9) Install the new Actuator Motor in the reverse order of the removal procedure.
- 10) Check and adjust so that the Cam Arm normally moves the Actuator Toggle Switch to the "FREEZE" and "DEFROST" positions (See "II. 2. [b] BEFORE CHECKING CONTROLLER BOARD").
- 11) Replace the panels in their correct positions.
- 12) Plug in the icemaker or connect the power source.

12. CAM ARM

[a] CAM ARM (A) - ACTUATOR MOTOR SIDE

Refer to "11. ACTUATOR MOTOR."

[b] CAM ARM (B) - REAR SIDE

- 1) Remove the Top Panel and Front Panel (Upper).
- 2) Remove the Front Panel (Lower) [except IM-21/25/30CLE], and push the Reset Switch on the Control Box to open the Water Pan.
- 3) Unplug the icemaker or disconnect the power source.
- 4) Remove the Extension Spring from the Cam Arm (B).
- 5) Remove the Split Pin from the Cam Shaft.
- 6) Remove the Cam Arm (B).
- 7) Install the new Cam in the reverse order of the removal procedure.
- 8) Replace the panels in their correct positions.
- 9) Plug in the icemaker or connect the power source.

13. ACTUATOR TOGGLE SWITCH

- 1) Unplug the icemaker or disconnect the power source.
- 2) Remove the Top Panel and Front Panel (Upper).
- 3) Remove the Hex Nut holding the Actuator Toggle Switch.
- 4) Cut off the Nylon Tie holding the Vinyl Cover Bag.
- 5) Disconnect the Receptacle of the leads.
- 6) Install the new Actuator Toggle Switch in the reverse order of the removal procedure.

Note: Be sure to secure the Vinyl Cover Bag.

- 7) Replace the panels in their correct positions.
- 8) Plug in the icemaker or connect the power source.

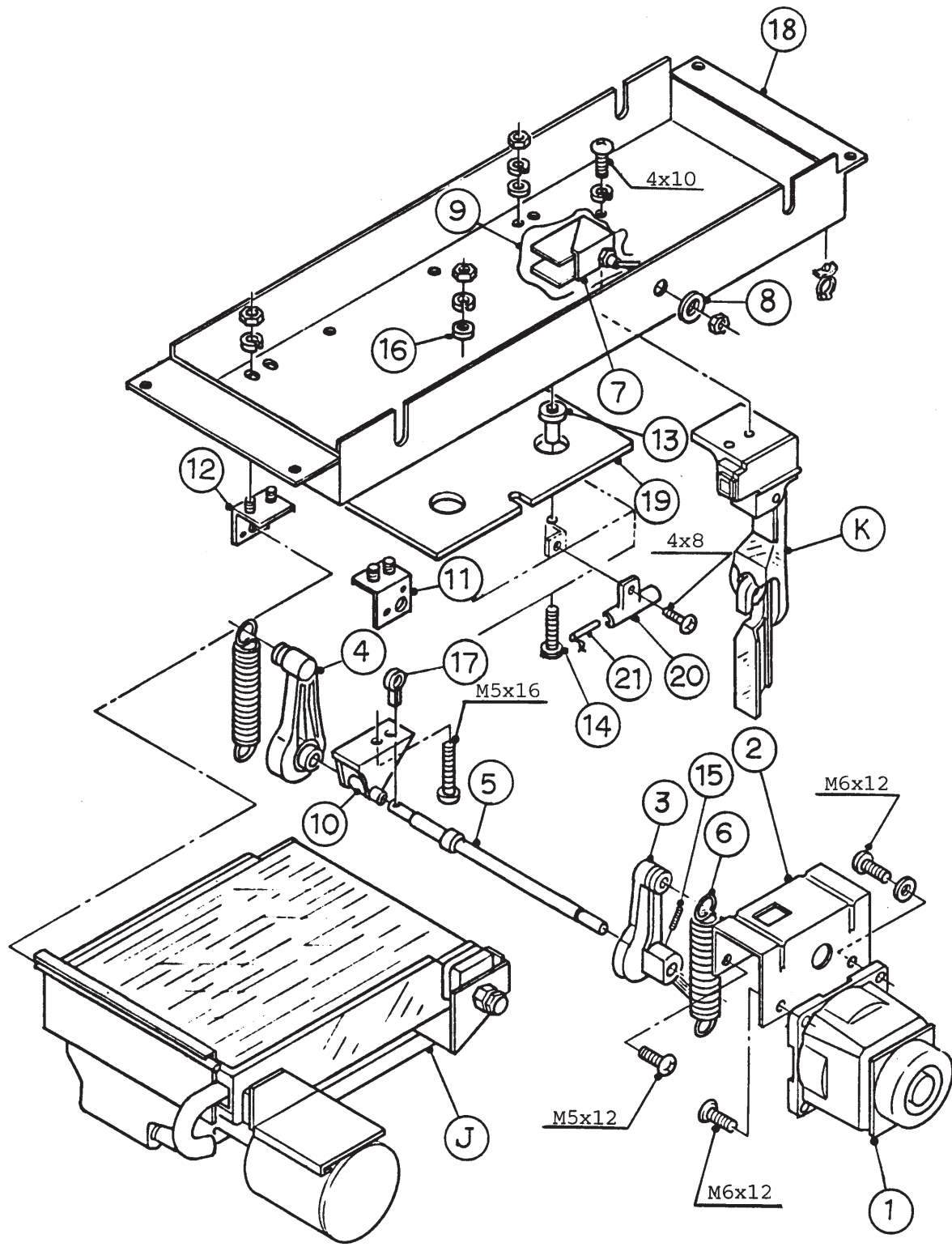


Fig. 30

ICEMAKING ASSEMBLY AND CAM MECHANISM

INDEX NO.	DESCRIPTION
J	Water Pan Assembly
K	Bin Control Switch Assembly
1	Actuator Motor
2	Actuator Motor Bracket
3	Cam Arm (A)
4	Cam Arm (B)
5	Cam Shaft
6	Extension Spring
7	Actuator Toggle Switch
8	Switch Washer
9	Switch Cover
10	Cam Shaft Bearing
11	Bearing (A)
12	Bearing (B)
13	Collar - Spacer
14	Bolt
15	Pin (A)
16	Washer
17	Pin (B)
18	Base
19	Insulation
20	Thermistor Holder
21	Thermistor (Cube Control)

14. CONTROLLER BOARD

IMPORTANT

A single type Controller Board is supplied as a Service Board. Some modifications and adjustment will be required to fit the icemaker models. Do not repair any parts and electronic devices on the Controller Board in the field. Replace the whole board with a new Service Board.

[a] MODIFICATION

1) Check that the Service Board package includes:

Controller Board	1 pc.
Label	1 pc.
Instruction Sheet	1 pc.

2) Modify the Service Board referring to the Instruction Sheet attached.

[b] REPLACEMENT

1) Unplug the icemaker or disconnect the power source.

2) Remove the Front Panel (Lower) [except IM-21/25/30CLE].

3) Remove screws and the Control Box Cover.

4) Pull the Shield Plate slightly toward you, and disconnect the Signal Ground wire.

5) Pull out the Controller Board half way, and disconnect the Connectors K1, K2, K3 and K4.

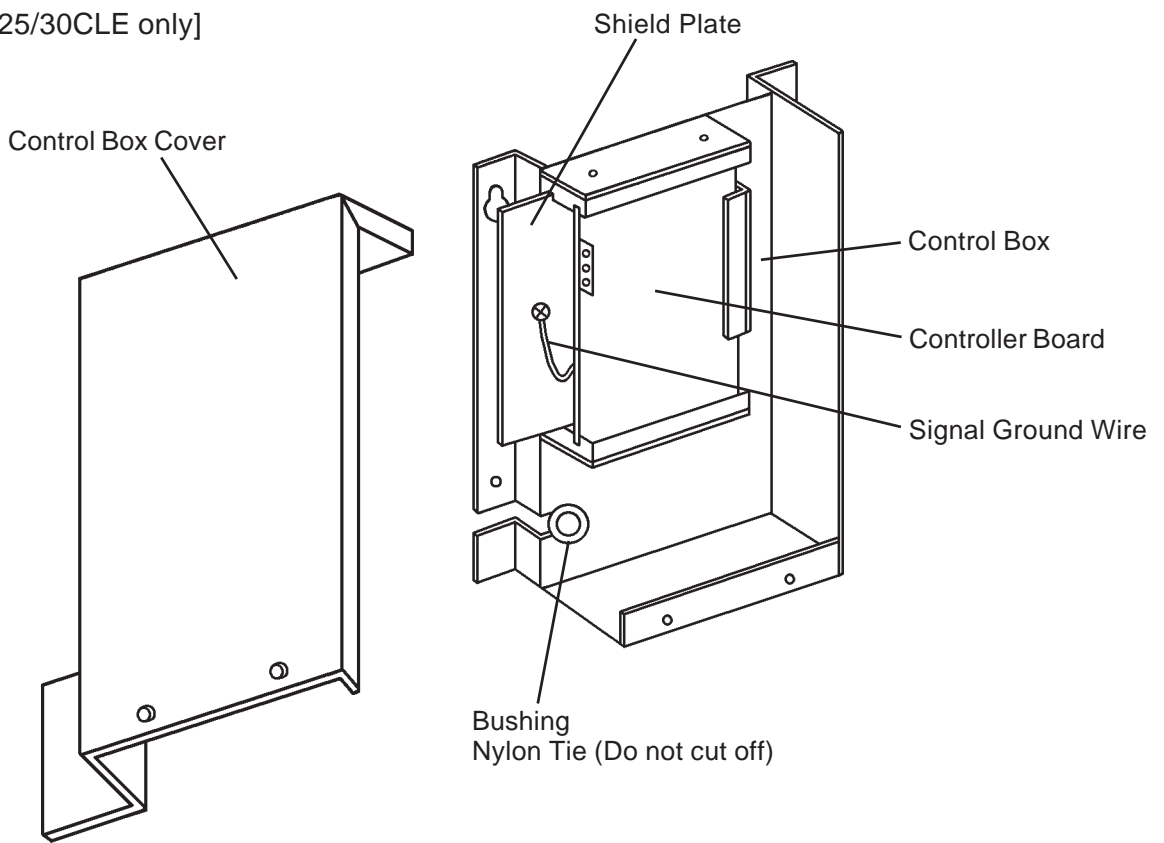
6) Pull out and remove the Controller Board from the Control Box.

7) Install the new Controller Board and reassemble the Control Box in the reverse order of the removal procedure.

8) Replace the panel in its correct position.

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

[IM-21/25/30CLE only]



[Except IM-21/25/30CLE]

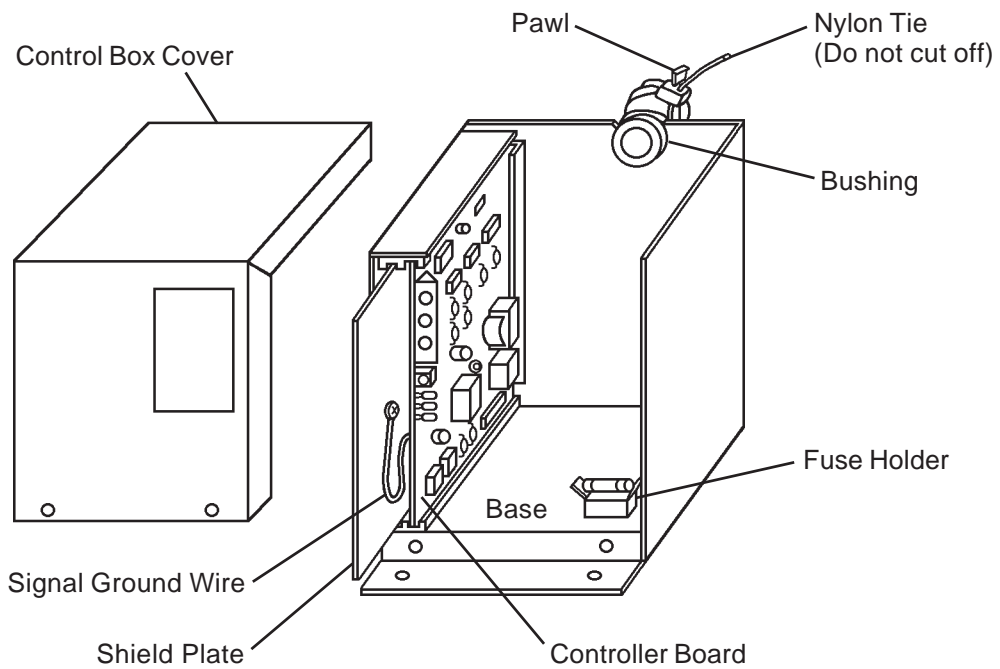
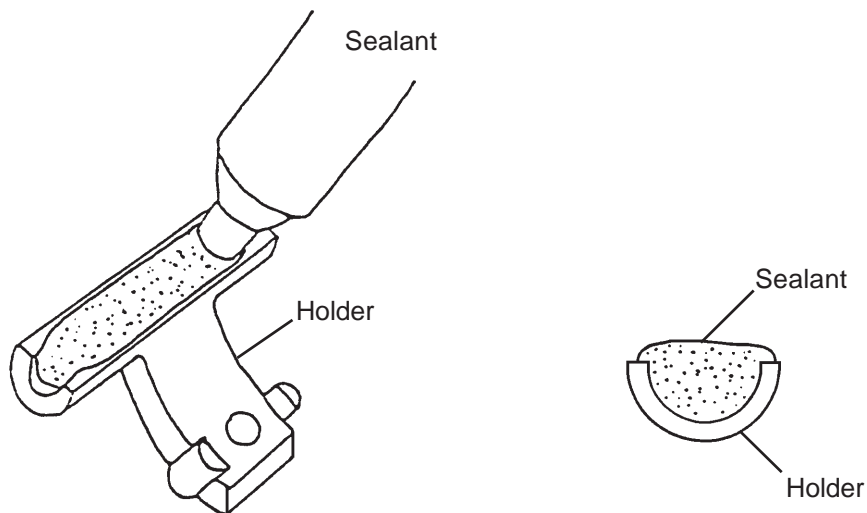


Fig. 31

15. THERMISTOR FOR CUBE CONTROL

- 1) Unplug the icemaker or disconnect the power source.
- 2) Remove the Top Panel, Front Panel and Pipe Cover (Rear).
- 3) Remove the Connector K4 on the Controller Board, referring to “14. [b] REPLACEMENT.”
- 4) Unscrew and remove the Thermistor Holder and Thermistor, located on the Evaporator (Front Side).
- 5) Install the new thermistor in the reverse order of the removal procedure, by using a sealant (High-thermal Conduct Type). See Fig. 32.

Note: Recommended sealant is KE4560RTV, manufactured by SINETSU SILICON. When other type of sealant used, the cube size and performance will be changed. Do not use silicone sealant as this will insulate the Thermistor.



* Thermistor and Leads are FRAGILE.
HANDLE WITH CARE.

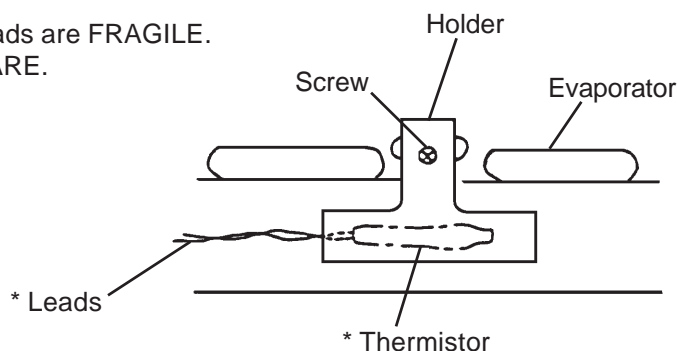


Fig. 32

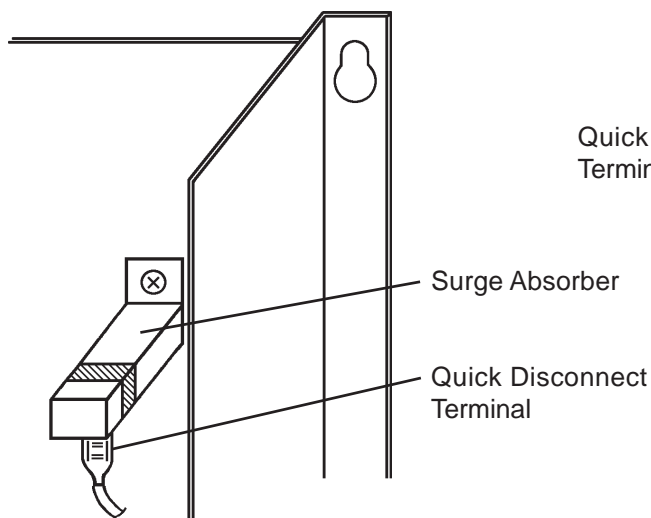
16. SURGE ABSORBER

- 1) Turn off the Control Switch or disconnect the power source.
- 2) Remove the Front Cover [except IM-21/25/30CLE].
- 3) Remove two screws at the front bottom of the Control Box, and remove the Control Box Cover.
- 4) Remove the Quick Disconnect Terminal from the Surge Absorber.
- 5) Remove the screw securing the Surge Absorber.
- 6) Remove the Surge Absorber.
- 7) Install the new Surge Absorber in the reverse order of the removal procedure.

Note: Function of Surge Absorber

By-passes a surge coming through the power supply line, caused by a thunderbolt, in order to protect the electronic components.

[IM-21/25/30CLE only]



[Except IM-21/25/30CLE]

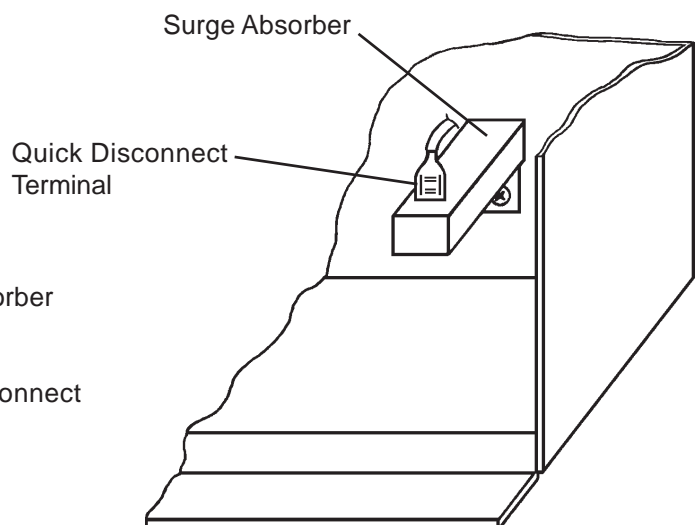


Fig. 33

17. FAN MOTOR - AIR-COOLED MODEL ONLY

[a] EXCEPT IM-21/25/30CLE

- 1) Unplug the icemaker or disconnect the power source.
- 2) Remove the Front Panel (Lower) and Louver (Right Side).
- 3) Remove the Control Box.
- 4) Disconnect the Connector of the Fan Motor.
- 5) Remove the Fan Motor Bracket and the Fan Motor.
- 6) Cut the leads of the Fan Motor allowing enough lead length to reconnect using closed end connectors.
- 7) Install the new Fan Motor in the reverse order of the removal procedure.
- 8) Replace the panels in their correct positions.
- 9) Plug in the icemaker or connect the power source.

[b] IM-21/25/30CLE ONLY

- 1) Unplug the icemaker or disconnect the power source. Pull out the icemaker to the front, if the surrounding space does not allow a tilt to the right.
- 2) Unscrew and remove the Front Panel (Lower) and Fan Motor Guard.
- 3) Cut the clamped ends (closed end connectors) of the Fan Motor leads near the Compressor terminal. Uncoat the cut lead ends with a wire stripper.
- 4) Remove the hexagon bolt securing the Fan Motor Bracket (Front).
- 5) Lift up the left side of the icemaker, and hold it in position using a spacer at the bottom. Remove the hexagon bolt securing the Fan Motor Bracket (Rear) on the base bottom.
- 6) Remove and replace the Fan Motor Assembly from the front of the icemaker.
- 7) Fix the Fan Motor Bracket (Rear) with the hexagon bolt [M6x16] on the base bottom. Lift up the left side of the icemaker, and remove the spacer at the bottom.
- 8) Fix the Fan Motor Bracket (Front) with the hexagon bolt [M6x12] on the base top.
- 9) Connect and clamp the Fan Motor leads, and bind them again as they were.

CAUTION

Keep the leads away from any moving parts (ex. fan), hot parts and sharp edges.

- 10) Replace the Fan Motor Guard and Front Panel (Lower) in their correct positions, and fix them with the machine screws.
- 11) Push the icemaker back in position, if it has been pulled out for service. Plug in the icemaker or connect the power source.

Icemaker Front View

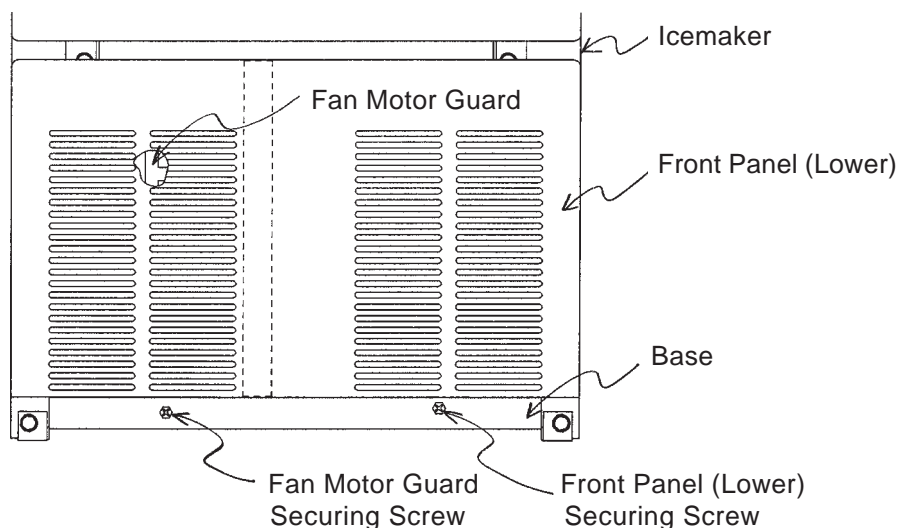


Fig. 34

Refrigeration Circuit
Top View

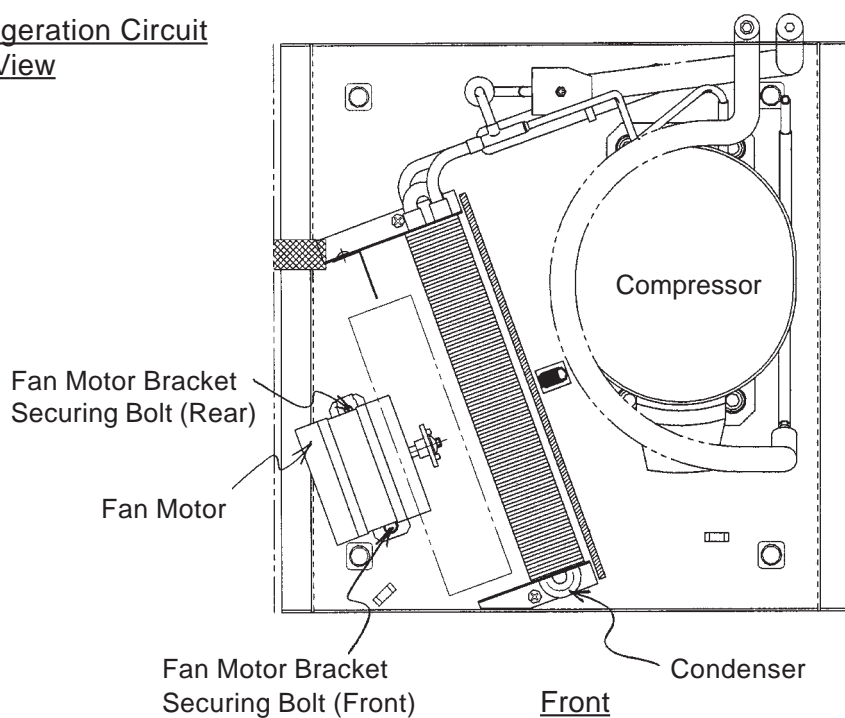


Fig. 35

- Note: 1. While removing and fitting the securing bolt of the Fan Motor Bracket (Rear), hold the icemaker in position using a spacer at the bottom to prevent overturn.
2. Tighten the securing bolts with a spanner or the like.
 3. The securing bolts for the Fan Motor Brackets are different in length. Do not mix them up. (See Fig. 37)
 4. Do not let the Fan Blade edges touch the Condenser Air Board or other parts.
 5. Fit the U Nut in the proper direction as shown below.

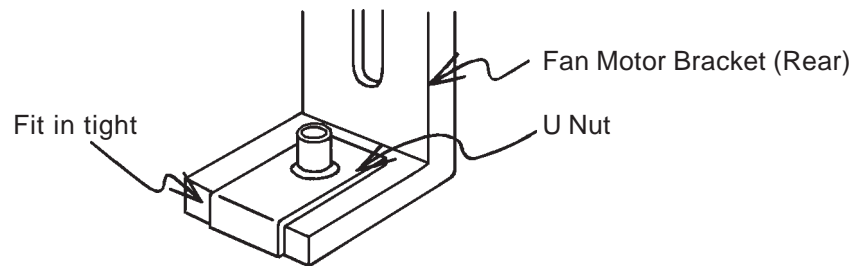


Fig. 36

Replacement

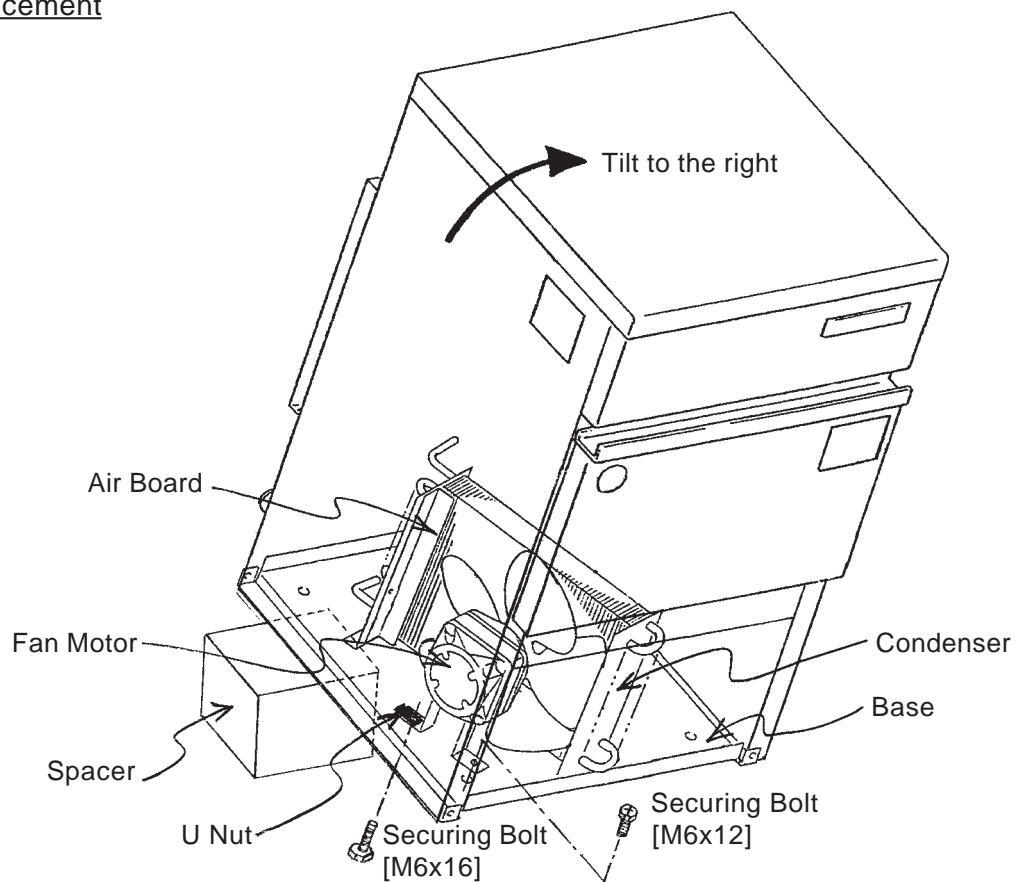


Fig. 37

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