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REVISED: —

SERVICE MANUAL

HOSHIZAKI MODULAR CRESCENT CUBER

MODEL KM-1201DU

KM-1201DWU

KM-1201DSU

HOSHIZAKI AMERICA, INC.

FOREWORD

This Service Manual contains the specifications and information in regard to transporting, unpacking, installing, operating and servicing the machine. You are encouraged to read it thoroughly in order to obtain maximum performance. You will find details on the construction, installation and maintenance.

If you encounter any problem not covered in this Service Manual, feel free to contact Hoshizaki America, Inc. We will be happy to provide whatever assistance is necessary.

Keep this Service Manual handy, and read it again when questions arise.

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I. SPECIFICATIONS

1. NAMEPLATE

See NAMEPLATE for electrical and refrigeration specifications.
Locate the Nameplate on the upper part of the Rear Panel.

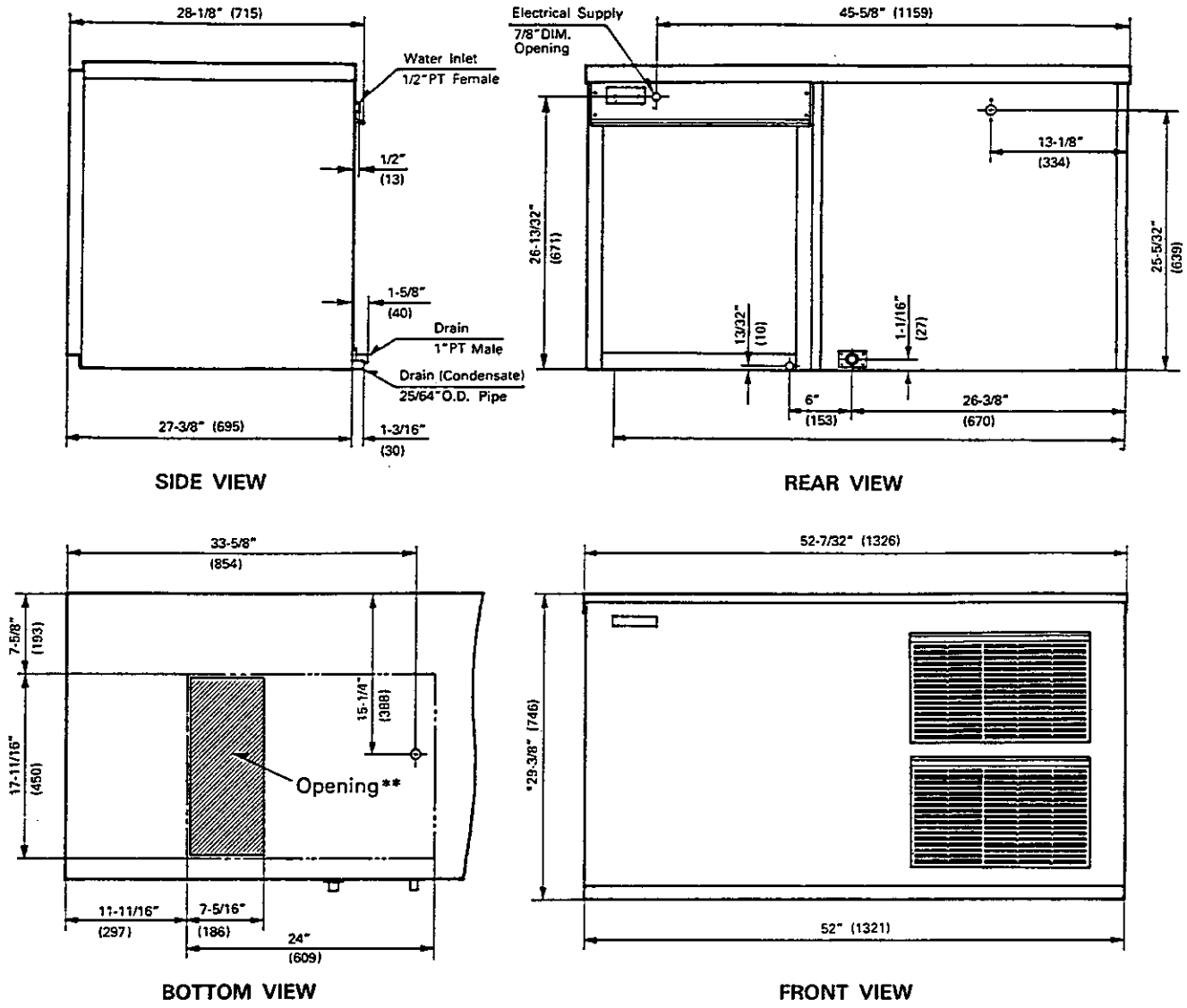
Fig. 1 Nameplate

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

2. DIMENSIONS AND CONNECTIONS

KM-1201DU (Air-cooled)

Unit: Inch (mm)



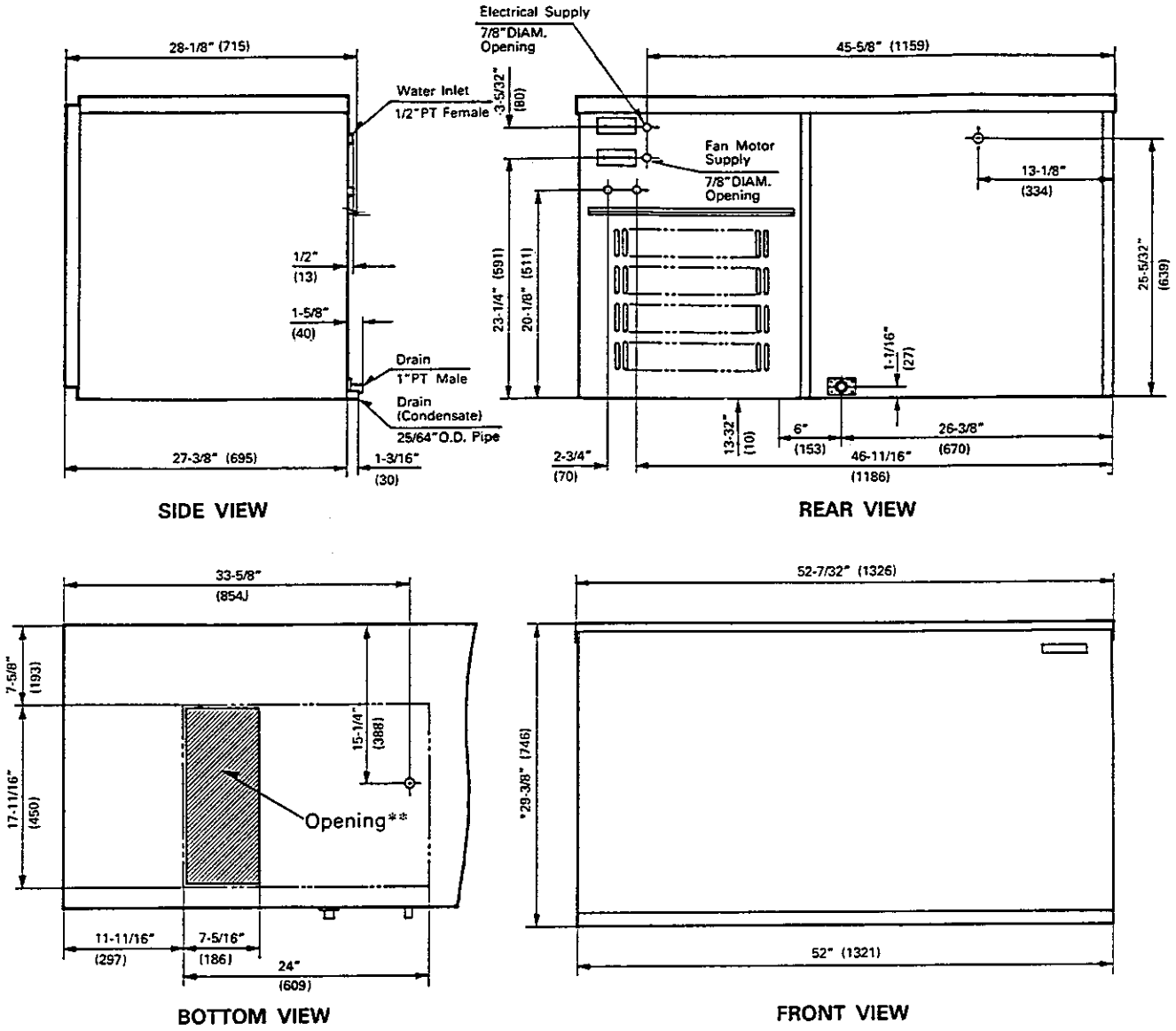
NOTE: *28-1/4" High, without Top Panel.

**When used with the storage bin, not recommended by Hoshizaki America, Inc., the space of the opening in dotted lines is necessary.

Fig. 2 Dimensions and Connections – KM-1201DU

KM-1201DSU (Air-cooled Remote)

Unit: Inch (mm)



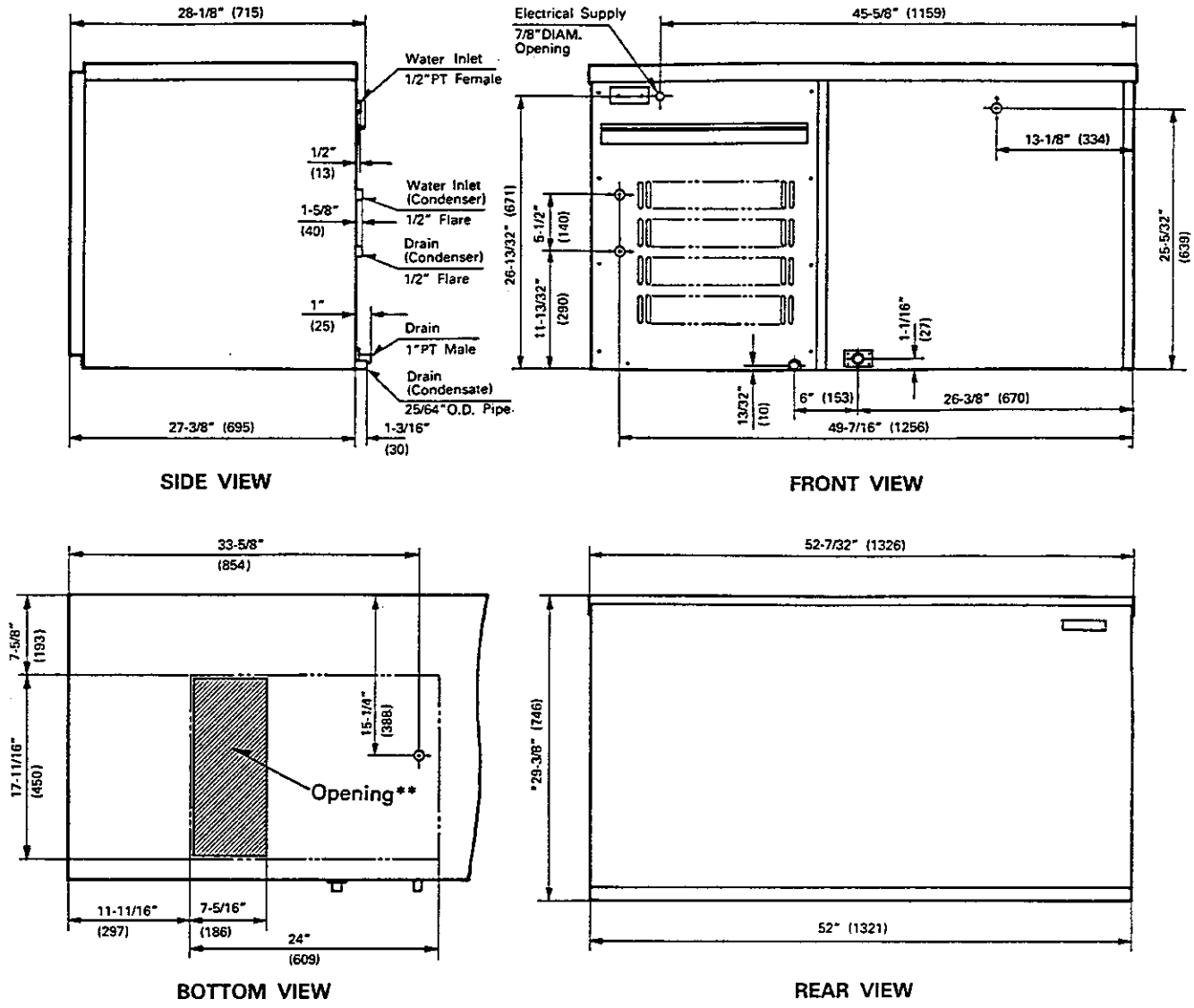
NOTE: *28-1/4" High, without Top Panel.

**When used with the storage bin, not recommended by Hoshizaki America, Inc., the space of the opening in dotted lines is necessary.

Fig. 3 Dimensions and Connections – KM-1201DSU

KM-1201DWU (Water-cooled)

Unit: Inch (mm)



NOTE: *28-1/4" High, without Top Panel.

**When used with the storage bin, not recommended by Hoshizaki America, Inc., the space of the opening in dotted lines is necessary.

Fig. 4 Dimensions and Connections – KM-1201DWU

3. SPECIFICATIONS

SPEC NO. 85036	ISSUED: MAY 31, 1985
MODEL: HOSHIZAKI MODULAR CRESCENT CUBER KM-1201DU	
NAMEPLATE RATING	
AC SUPPLY VOLTAGE	115/230V 3 Wire 60Hz 1 Phase
AMPERES	13A (5 min. Freeze. 104°F/80°F)
MAXIMUM FUSE SIZE	20A
MINIMUM CIRCUIT AMPACITY	20A
DESIGN PRESSURE	High 310PSI, Low 240PSI
REFRIGERANT	R502 4 lbs (1800 g)
DIMENSIONS (H x D x W)	29-3/8" x 27-3/8" x 52-7/32"
STORAGE BIN	Optional extra
CONNECTIONS	
ELECTRICAL	Permanent-connected
WATER SUPPLY & DRAIN	Supply Inlet 1/2" Female Drain Outlet 1" Male Condensate 25/64" OD Pipe
EXTERIOR	Stainless Steel, Galvanized Steel (Rear)
ACCESSORIES	Scoop, Bracket (Bin Control Bulb), Manual, Fastener & Instruction
WEIGHT	Net 347 lbs (158 kg) Gross 374 lbs (170 kg)
REFRIGERATION	
ICEMAKING SYSTEM	Vertical Evaporator
COMPRESSOR	Hermetic 1400W, KL187JD-3U
CONDENSER	Air-cooled
EVAPORATOR	Stainless Steel, Copper
DEFROST	Hot gas and water dual
REFRIGERANT CONTROL	Thermostatic Expansion Valve
HEAD PRESSURE CONTROL	None
SUCTION PRESSURE CONTROL	Suction Pressure Regulator
CONDENSER WATER CONTROL	None
ELECTRICAL	
CUBE CONTROL	Float Switch
DEFROST CONTROL	Thermistor and Timer
WATER SUPPLY CONTROL	Timer
BIN CONTROL	Thermostat
PROTECTIONS	
COMPRESSOR	Overload (Auto reset)
REFRIGERATION	High Pressure Switch
LIMITATIONS	
AMBIENT TEMPERATURE	Min. 45°F – Max. 100°F
WATER TEMPERATURE	Min. 45°F – Max. 90°F
VOLTAGE VARIATION	Rated Voltage ±10%
WATER SUPPLY PRESSURE	Min. 7PSI – Max. 113PSI
ICE PRODUCTION (MAX. CUBE SIZE)	
PER 24HR	1150 lbs (70/50°F), 904 (90/70)
PER CYCLE	28.6 lbs. 1140 Pcs.
FREEZE CYCLE TIME	32 min (70/50°F), 42.5 (90/70)
ELECTRICAL CONSUMPTION	2580W (90/70°F, Average)
WATER CONSUMPTION PER 24HR	423 gal (70/50°F), 238 (90/70)

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

SPECIFICATIONS

SPEC NO. 85035 ISSUED: MAY 31, 1985

MODEL: HOSHIZAKI MODULAR CRESCENT CUBER
KM-1201DSU

NAMEPLATE RATING	
AC SUPPLY VOLTAGE	115/230V 3 Wire 60Hz 1 Phase
AMPERES	13A (5 min. Freeze, 104°F/80°F)
MAXIMUM FUSE SIZE	20A
MINIMUM CIRCUIT AMPACITY	20A
DESIGN PRESSURE	High 320PSI, Low 240PSI
REFRIGERANT	R502 11 lbs 1 oz (5000 g)
(Total Unit Charge including Condenser)	29-3/8" x 27-3/8" x 52-7/32"
DIMENSIONS (H x D x W)	Optional extra
STORAGE BIN	
CONNECTIONS	Permanent-connected
ELECTRICAL	Supply Inlet 1/2" Female
WATER SUPPLY & DRAIN	Drain Outlet 1" Male Condensate 25/64" OD Pipe
EXTERIOR	Stainless Steel, Galvanized Steel (Rear)
ACCESSORIES	Scoop, Bracket (Bin Control Bulb), Coupling, Manual, Fastener & Instruction
WEIGHT	Net 321 lbs (146 kg) Gross 374 lbs (170 kg)
REFRIGERATION	
ICEMAKING SYSTEM	Vertical Evaporator
COMPRESSOR	Hermetic 1400W, KL187JD-3U
CONDENSER	Air-cooled
EVAPORATOR	Stainless Steel, Copper
DEFROST	Hot gas and water dual
REFRIGERANT CONTROL	Thermostatic Expansion Valve
HEAD PRESSURE CONTROL	Condensing Pressure Regulator
SUCTION PRESSURE CONTROL	Suction Pressure Regulator
CONDENSER WATER CONTROL	None
ELECTRICAL	
CUBE CONTROL	Float Switch.
DEFROST CONTROL	Thermistor and Timer
WATER SUPPLY CONTROL	Timer
BIN CONTROL	Thermostat
PROTECTIONS	
COMPRESSOR	Overload (Auto reset)
REFRIGERATION	High Pressure Switch. Fusible Plug (Relief at 221°F)
LIMITATIONS	
AMBIENT TEMPERATURE	Min. 45°F – Max. 100°F
WATER TEMPERATURE	Min. 45°F – Max. 90°F
VOLTAGE VARIATION	Rated Voltage ±10%
WATER SUPPLY PRESSURE	Min. 7PSI – Max. 113PSI
ICE PRODUCTION (MAX. CUBE SIZE)	
PER 24HR	1150 lbs (70/50°F), 904 (90/70)
PER CYCLE	28.6 lbs, 1440 Pcs.
FREEZE CYCLE TIME	32 min (70/50°F), 42.5 (90/70)
ELECTRICAL CONSUMPTION	2580W (90/70°F, Average)
WATER CONSUMPTION PER 24HR	423 gal (70/50°F), 238 (90/70)

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

SPECIFICATIONS

SPEC NO. 85039 ISSUED: MAY 31. 1985

MODEL: HOSHIZAKI MODULAR CRESCENT CUBER
KM-1201DWU

NAMEPLATE RATING	
AC SUPPLY VOLTAGE	115/230V 3 Wire 60Hz 1 Phase
AMPERES	12A (5 min. Freeze. 104°F/80°F)
MAXIMUM FUSE SIZE	20A
MINIMUM CIRCUIT AMPACITY	20A
DESIGN PRESSURE	High 270PSI. Low 225PSI
REFRIGERANT	R502 2 lbs 7 oz (1100 g)
DIMENSIONS (H x D x W)	29-3/8" x 27-3/8" x 52-7/32"
STORAGE BIN	Optional extra
CONNECTIONS	
ELECTRICAL	Permanent-connected
WATER SUPPLY & DRAIN	Supply Inlet 1/2" Female
	Drain Outlet 1" Male
	Condensate 25/64" OD Pipe
	Condenser Inlet 1/2" Flare
	Condenser Outlet 1/2" Flare
EXTERIOR	Stainless Steel, Galvanized Steel (Rear)
ACCESSORIES	Scoop, Bracket (Bin Control Bulb), Manual, Fastener & Instruction
WEIGHT	Net 330 lbs, Gross 374 lbs
REFRIGERATION	
ICEMAKING SYSTEM	Vertical Evaporator
COMPRESSOR	Hermetic 1400W, KL187JD-3U
CONDENSER	Water-cooled
EVAPORATOR	Stainless Steel, Copper
DEFROST	Hot gas and water dual
REFRIGERANT CONTROL	Thermostatic Expansion Valve
SUCTION PRESSURE CONTROL	Suction Pressure Regulator
CONDENSER WATER CONTROL	Water Regulator
ELECTRICAL	
CUBE CONTROL	Float Switch
DEFROST CONTROL	Thermistor and Timer
WATER SUPPLY CONTROL	Timer
BIN CONTROL	Thermostat
PROTECTIONS	
COMPRESSOR	Overload (Auto reset)
REFRIGERATION	High Pressure Switch
LIMITATIONS	
AMBIENT TEMPERATURE	Min. 45°F – Max. 100°F
WATER TEMPERATURE	Min. 45°F – Max. 90°F
VOLTAGE VARIATION	Rated Voltage ±10%
WATER SUPPLY PRESSURE	Min. 7PSI – Max. 113PSI
ICE PRODUCTION (MAX. CUBE SIZE)	
PER 24HR	1150 lbs (70/50°F). 975 (90/70)
PER CYCLE	28.6 lbs. 1440 Pcs.
FREEZE CYCLE TIME	32 min (70/50°F). 39.5 (90/70)
ELECTRICAL CONSUMPTION	2390W (90/70°F. Average)
WATER CONSUMPTION PER 24HR	1090 gal (70/50°F). 1376 (90/70)

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

CONDENSER UNIT MODEL S-0454

Unit: Inch (mm)

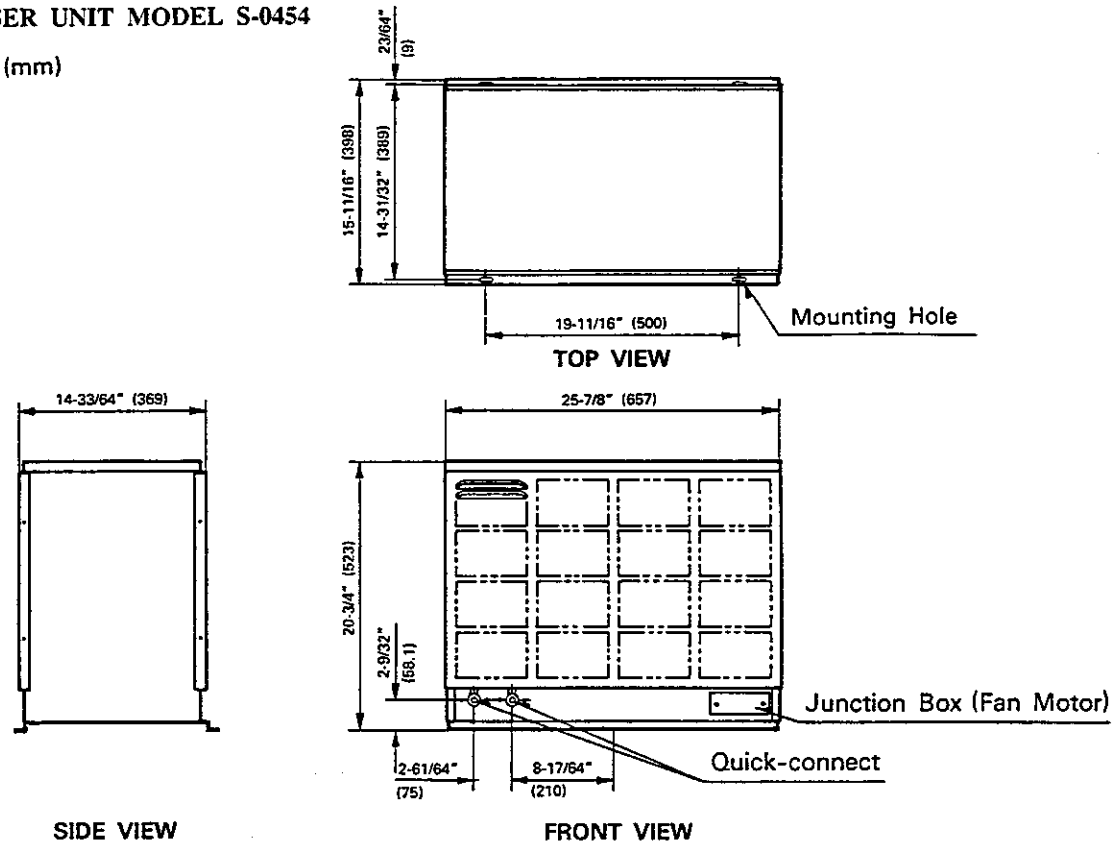


Fig. 5 Condenser Unit

SPECIFICATIONS

SPEC NO. 85038	ISSUED: MAY 31, 1985
MODEL: HOSHIZAKI CONDENSER UNIT S-0454	
DIMENSIONS (H x D x W)	20-3/4" x 15-11/16" x 25-7/8" (527 mm x 398 mm x 657 mm)
EXTERIOR	Galvanized steel, with Polyester backed-on enamel
ACCESSORIES	Female Coupling (Self Seal)
WEIGHT	Net 59.5 lbs (27 kg) Gross 66 lbs (30 kg)
CONNECTIONS	
FAN LEADS	Permanent-connected (Junction Box)
REFRIGERANT	Quick-connect Aeroquip couplings
CONDENSER	Air-cooled
HEAD PRESSURE CONTROL	Condensing Pressure Regulator
REFRIGERANT CHARGE	R502 4 lbs 7 oz (2000 g)
AMBIENT CONDITION	Full weather
LIMITATIONS	
AIR TEMPERATURE	Min. −20°F (−29°C) – Max. +110°F (+43°C)
VOLTAGE VARIATION	Min. 103V – Max. 132V (through the icemaker)

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

II. GENERAL INFORMATION

1. CONSTRUCTION

a. KM-1201DU (Air-cooled)

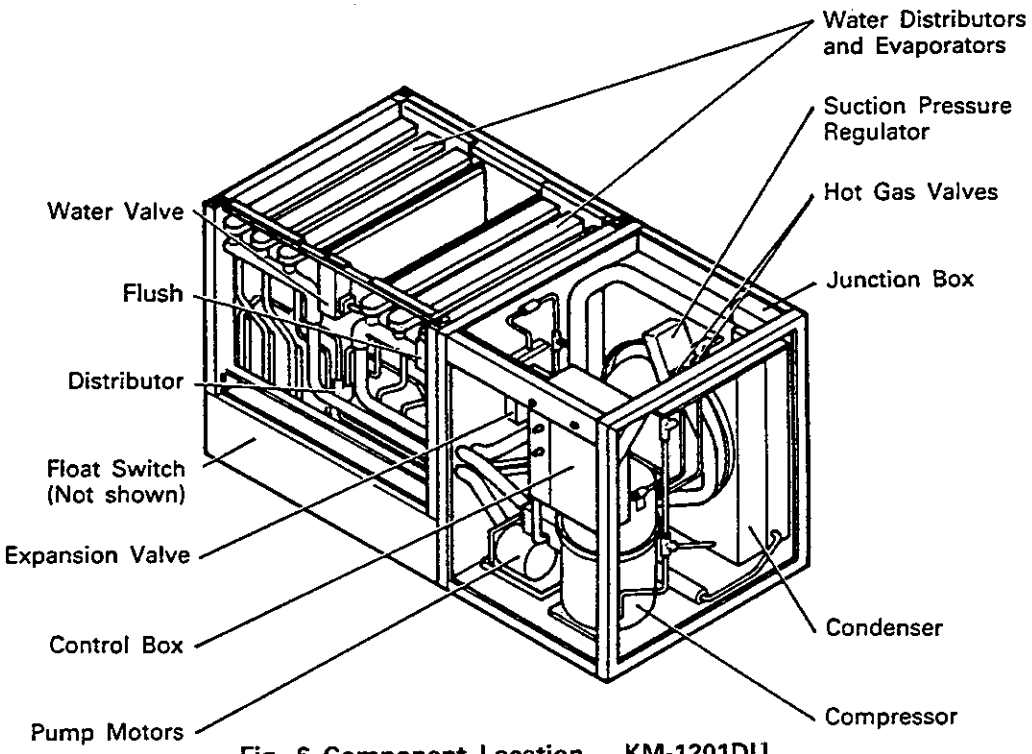


Fig. 6 Component Location – KM-1201DU

b. KM-1201DWU (Water-cooled)

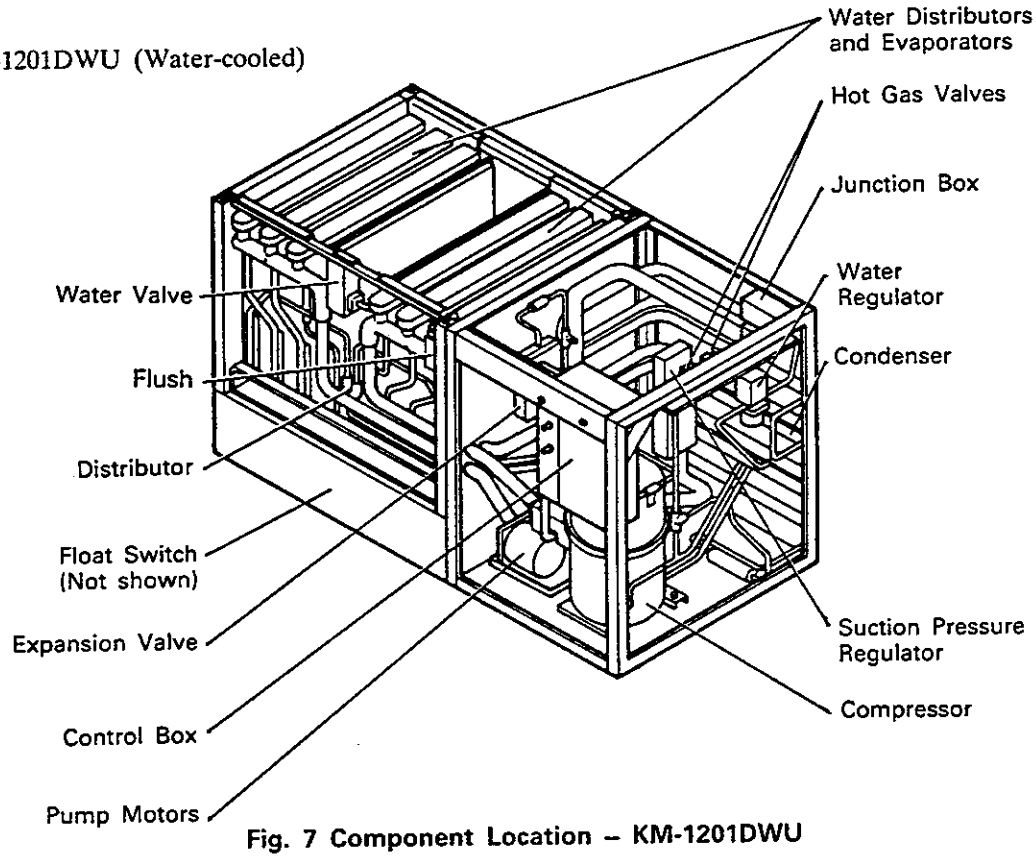


Fig. 7 Component Location – KM-1201DWU

c. KM-1201DSU (Air-cooled Remote)

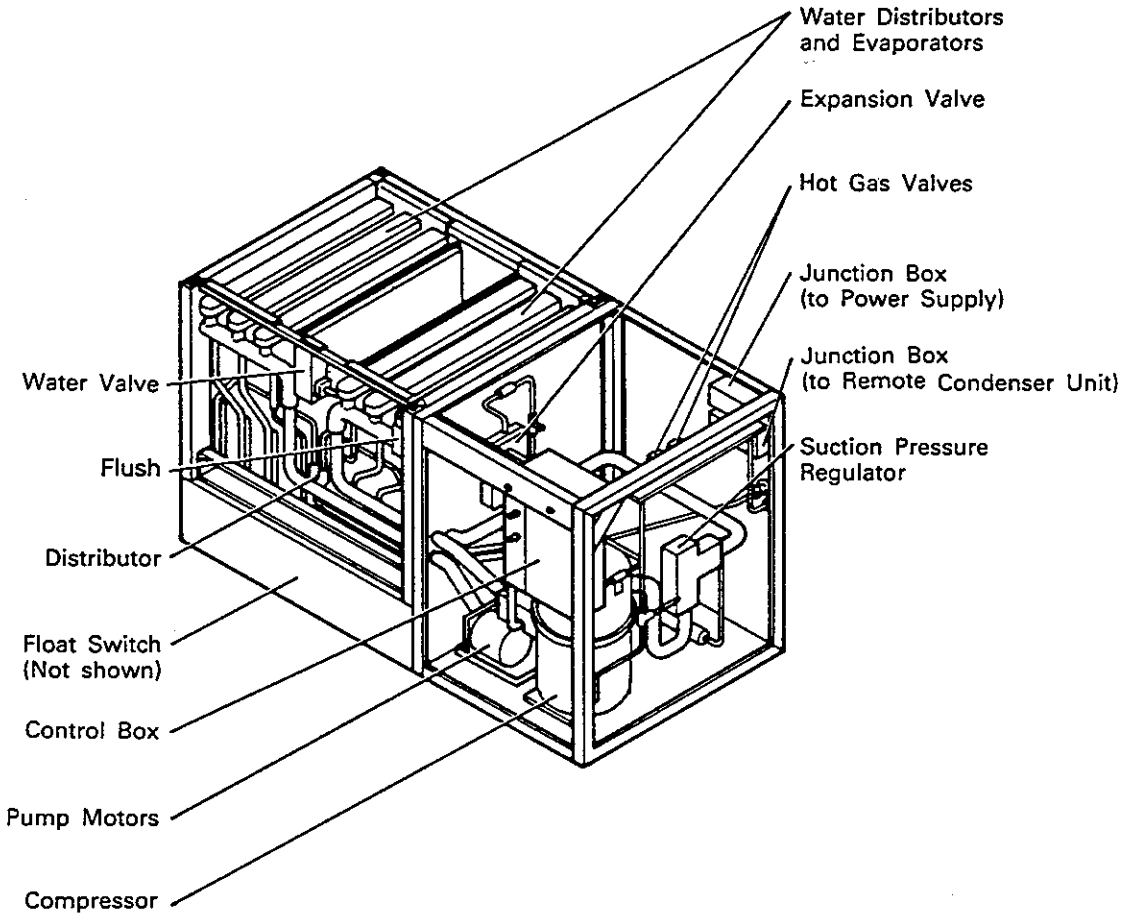


Fig. 8 Component Location – KM-1201DSU

2. CONTROLLER BOARD

a. Solid-State Control

1) A HOSHIZAKI EXCLUSIVE solid-state control is employed in KM-1201DU, -1201DWU and -1201DSU, modular crescent cubers. This control includes a Micro Processor (LSI), developed by HOSHIZAKI.

2) A Printed Circuit Board (hereafter called "Controller Board") includes a stable and high-quality control system.

3) Any complicated adjustment is not required. All models are pretested and factory adjusted.

b. Controller Board

CAUTION

1. FRAGILE, handle very carefully.
2. A controller board contains CMOS integrated circuits, which are SUSCEPTIBLE TO FAILURE DUE TO STATIC DISCHARGE. It is especially important to touch the metal part of the unit when handling or replacing the board.
3. Do not touch the electronic devices on the board, or the back of the board to prevent damage to the board.
4. Do not change wiring and connections. Especially, never misconnect K2 and K3, because the same connector is used for thermistor and Float Switch.
5. Do not fix the electronic devices or parts on the board in the field. Always replace the whole board assembly when it goes bad.

A controller board, Part Code 431225-02, is used for KM-1201 Series.

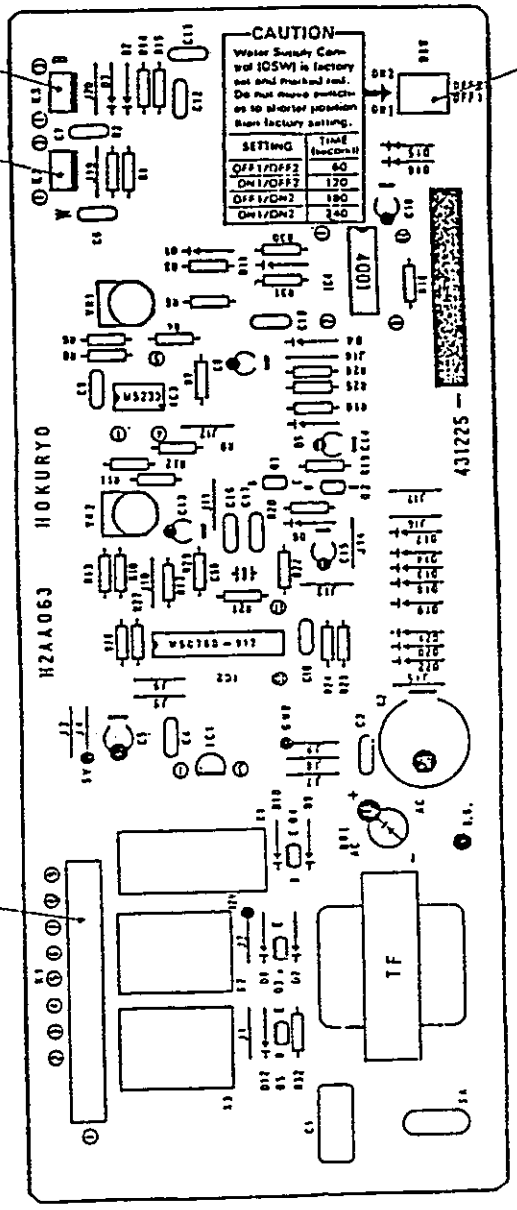
Part Code	Model	*Max. Period	**High Temp. Safety
431225-02	KM-1201DU KM-1201DSU KM-1201DWU	4 minute	131±7°F

Note: * Maximum Water Supply Period
Water solenoid valve opening, in Defrost (Harvest) Cycle, is limited by maximum period. Water valve can not be opened exceeding the maximum period. And water valve closes even within maximum, when defrost cycle is completed.

**High Temperature Safety
The temperature of suction line in the refrigerant circuit is limited by High Temperature Safety.
Thermistor detects to complete the defrost cycle. After the defrost starts, the temperature rises, and the ice making starts working in normal operation.
If the connection of thermistor is loosen, or thermistor lead is broken, or the other trouble happens, thermistor doesn't detect properly. Therefore, the defrost cycle continues, and the temperature gets higher.
But after High Temperature Safety operates, the current does not get flown to the ice maker automatically, and the ice maker stops. And then, if you turn off the ice maker, and turn on it again, the ice maker operates again. And the temperature gets higher, and High Temperature Safety operates again.
Thus, the suction line is prevented from the excessive rising in the temperature.

Connector K3
Cube Control
(Float Switch)

Connector K2
Defrost Control
(Thermistor)



*Dip Switch DSW
Water Supply
Control (Timer)

Connector K1
Pin #1 thru #9

#1 Power (Grounded)
#2 Open
#3 Magnetic Contactor
#4,5 Open
#6 Power (line, Bin Control)
#7 Water Valve
#8 Hot Gas Valve
#9 Pump (& Fan Motor)

Fig. 9 Controller Board

Note: *Adjustable, Min. 1 minute to Max. 4 minute.

c. Sequence

1st Cycle

IMPORTANT
Board never accepts completion signal within first 5 minute in freeze cycle.

1. Unit energized and wash switch to ICE position. Defrost cycle starts.

2. In more than 1 minute and thermistor reads 43°F. Water Supply Control starts counting.

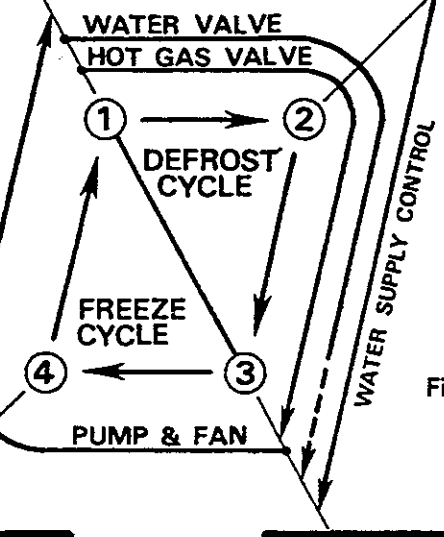


Fig. 10 Sequence–1st Cycle

*Signal from Cube Control

4. Thermistor reads 41°F and after first 5 minute.
*Ready to complete freeze cycle.

3. Water supply control stops counting. Defrost cycle is completed and freeze cycle starts.

2nd Cycle and after

IMPORTANT
Board never accepts completion signal within first 5 minute in freeze cycle.

1. Float switch opens and signals to complete freeze cycle.

2. Thermistor reads 43°F. Water Supply Control starts counting.

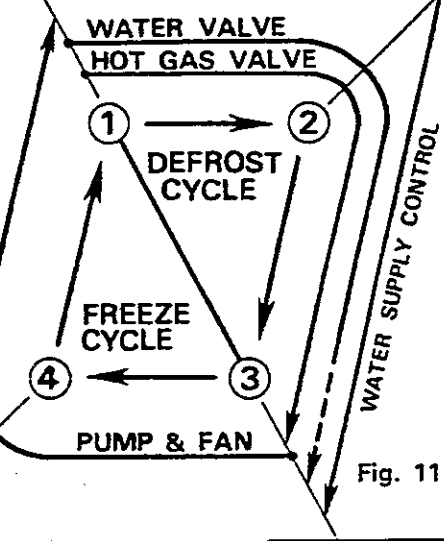


Fig. 11 Sequence–2nd Cycle and after

4. Thermistor reads 41°F and after first 5 minute. Ready to complete freeze cycle.

3. Water supply control stops counting. Defrost cycle is completed and freeze cycle starts.

d. Controls and Adjustment

1) Cube Control

A float switch, located next to water pump, signals to complete the freeze cycle. This switch is factory adjusted to the lowest position, or Maximum Cube Size position. Setting to upper position makes cube size smaller.

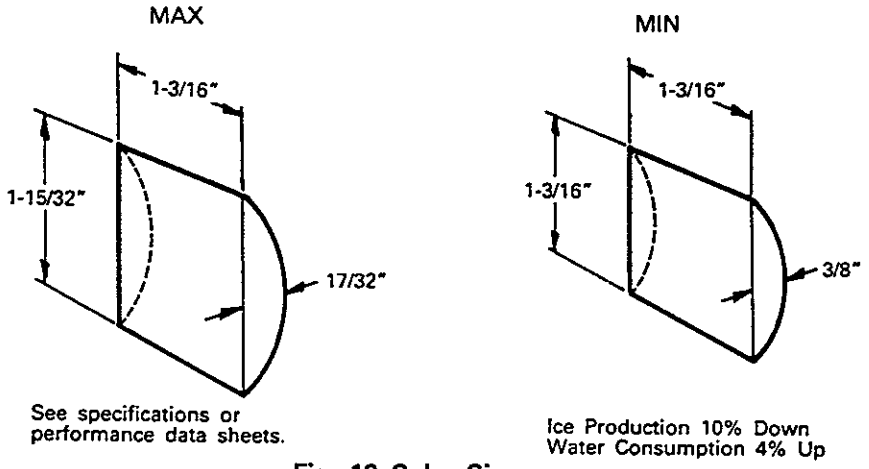


Fig. 12 Cube Size

2) Defrost Control

A thermistor (Semiconductor) is used for defrost control sensor, resistance of which varies depending on suction pipe temperatures. No adjustment is required. If necessary check for resistance between thermistor leads, and visually check thermistor attachment portion, located on suction pipe next to evaporator outlet.

Temperature (°F)	Resistance (kOhm)
0	14.401
10	10.613
32	6.000
50	3.871
70	2.474
90	1.633

Check a thermistor for resistance using the following procedures.

(i) Disconnect the connector K2 on the board.

(ii) Remove the thermistor. See "e. Removal and Replacement of Thermistor".

(iii) Immerse the thermistor sensor portion in a glass containing ice and water for 2 or 3 minutes.

(iv) Check for a resistance between thermistor leads. Normal reading is 3.5 to 7 kOhm. Replace the thermistor, if it exceeds the normal reading.

3) Water Supply Control

No adjustment is required under normal use, as the control is factory adjusted to the suitable position. Adjust, if necessary where water quality is bad, to longer position by setting the dip switch referring the following table.

Hardness (ppm)	Setting
200 or less	Factory Setting
200 - 250	OFF1/ON2 (3 minute)
250 - 300	ON1/ON2 (4 minute)
300 or more	Install a water softener

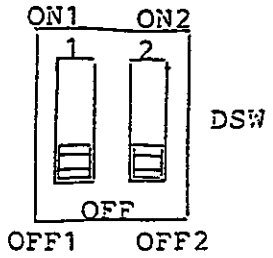


Fig. 13 Water Supply Control

4) Bin Control

CAUTION

When ambient temperatures are below 45°F, bin control thermostat operates to stop the icemaker. The icemaker operates continuously when the thermostat is set to CONTINUOUS OPERATION RANGE. Then the icemaker will not stop even if the ice storage bin is filled with ice. This might cause severe damage to the icemaker resulting in failure.

No adjustment is required under normal use, as bin control is factory adjusted. Adjust, if necessary, so that the icemaker stops automatically in approximately 6 to 10 second after ice contacts the bin control thermostat bulb, which is attached to a bracket near bin opening.

e. Removal and Replacement of Thermistor

CAUTION

1. FRAGILE, handle very carefully.
2. Always use a recommended sealant (High Thermal Conductive Type), Model KE4560RTV manufactured by SHINETSU SILICONE, Part Code 60Y000-11, or equivalent.
3. Always use a recommended foam insulation (Non-absorbent Type) or equivalent.

(1) Disconnect power source.

(2) Remove the front panel.

(3) Disconnect thermistor leads from K2 connector on the controller board.

(4) Locate thermistor attachment portion on the suction pipe next to evaporator outlet.

(5) Remove screw and strap holding thermistor attachment.

(6) Remove foam insulation covering thermistor holder.

(7) Remove thermistor holder and thermistor.

(8) Scrape away old sealant on the thermistor holder and suction pipe.

(9) Smoothly apply recommended sealant (KE4560RTV, Part Code 60Y000-11) to thermistor holder concave.

(10) Wipe off moisture or condensate on the suction pipe.

(11) Attach a new thermistor to the suction pipe very carefully to prevent damage to the leads. And secure it using thermistor holder and recommended foam insulation.

(12) Secure insulation using plastic cable ties.

(13) Secure thermistor attachment portion using strap and screw.

(14) Place connector and front panel in position.

(15) Connect power source.

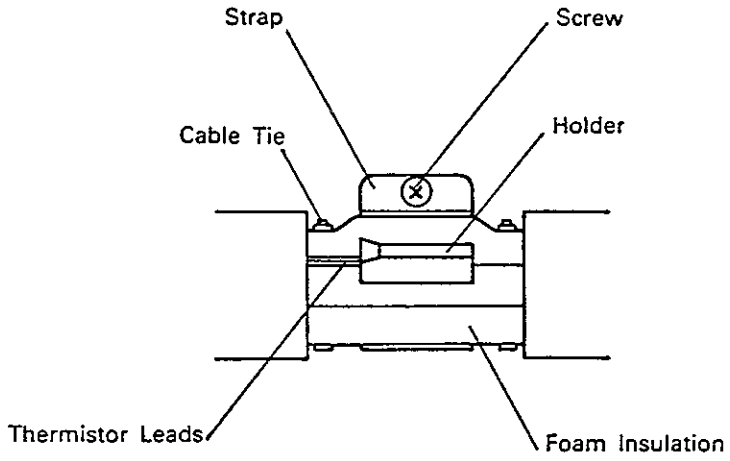


Fig. 14 Thermistor Attachment

f. Checking Controller Board

1) Visually check sequence with the icemaker operating.

2) Visually check using the following procedures.

(i) Adjust water supply control to minimum position. Disconnect thermistor and float switch leads from the controller board. Connect 1 kOhm - 3.5 kOhm resistor to connector K2 pins (#1 and #2) and energize the unit.

In 2 minute ± 40 second, unit should start freeze cycle.

(ii) Remove resistor from K2 pins, and connect thermistor and float switch leads. Energize unit and disconnect thermistor after defrost cycle is completed, or in freeze cycle, but before 5 minute of ice production completed. And then disconnect float switch before 5 minute ± 50 second of total freezing time.

The unit should go into defrost cycle after 5 minute ± 50 second of total freezing time.

(iii) Reconnect thermistor and float switch leads to the controller board, and energize unit. After 5 minute of ice production, disconnect thermistor leads, and then float switch.

At this point, unit should start defrost cycle.

Output	Between
Pump (& Fan Motor)	#1 and #9
Hot Gas Valve	#1 and #8
Water Valve	#1 and #7
Magnetic Contactor	#1 and #3

III. INSTALLATION AND OPERATING INSTRUCTIONS

1. CHECKS BEFORE INSTALLATION

WARNING

Remove shipping cartons, tapes and packing. If any is left in the icemaker, it will not work properly.

* Remove the panels to prevent damage when installing the icemaker.
* Remove the package containing accessories.
* Remove the protective plastic film on the Panels. If the icemaker is exposed to the sun or heat, remove the film after the icemaker has cooled.
* Check that refrigerant lines do not rub or touch lines or other surfaces, and that fan blade moves freely.
* Check that the compressor is snug on all mounting pads.
* See NAMEPLATE, located on the rear panel. Check that your source voltage corresponds with the voltage specified on the nameplate.

2. LOCATION

WARNING

This icemaker is not designed for outdoor installation. Air temperatures should be below 100°F (38°C) or above 45°F (7°C). Water temperatures should be below 90°F (32°C) or above 45°F (7°C). Extended periods of operation at temperatures exceeding these limitations will constitute misuse resulting in loss of warranty coverage.

1. Position the icemaker in a selected permanent site.
   * Maximum air temperature 100°F (38°C)
     Minimum air temperature 45°F (7°C)
   * Maximum water temperature 90°F (32°C)
     Minimum water temperature 45°F (7°C)
   * Keep away from heat, and locate near the potable water source and drain.
   * Always avoid a site where dripping is not allowed.
   * More than 6" (15 cm) clearance at rear, sides and top for easy maintenance and service.

CAUTION

1. This icemaker will not work at sub-freezing temperatures. To prevent damage to the water supply line, always drain the icemaker when air temperature is below 32°F (0°C).
2. It is especially important that the icemaker/storage bin is leveled in both left-to-right and front-to-rear directions. This otherwise might cause problems in production of smaller or irregular shaped cubes, or of overflow into the ice storage bin.

2. Level the icemaker/storage bin.

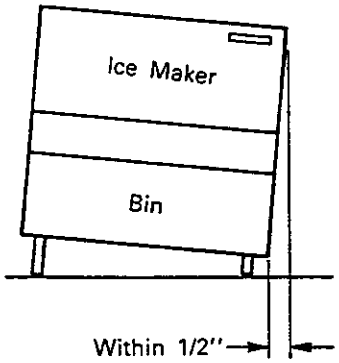


Fig. 15 Level

3. SETUP

1. Unpack the storage bin, and attach 4 (four) adjustable legs provided (bin accessory), to the bottom of the storage bin.
2. Position the storage bin in a selected permanent site.
3. Unpack the icemaker, and remove all shipping cartons, tapes and packing.
4. Remove the panels to prevent damage when installing the icemaker.
   a. Front Panel ..... Lift up and toward you.
   b. Top Panel ..... Remove screws, and lift off.
   c. Side Panel (R) ..... Slide toward you a little bit, and lift off.
   d. Separating Panel ..... Remove a thumbscrews, and toward you.
5. Attach the icemaker to the top of the storage bin, and place the side panel (R) in position.
6. Secure the icemaker, by using 2 (two) mounting brackets and 4 (four) screws provided.
7. Level the icemaker/storage bin in both the left-to-right and front-to-rear directions.
8. Attach and place the bin control thermostat bulb in position.
   a. Route the thermostat capillary tubing through the hole, located in the center of the icemaker, using the rubber bushing provided.
   b. Secure the thermostat bulb to the mounting bracket, by using 2 (two) plastic straps and 2 (two) screws provided.
   c. Secure the mounting bracket to the bottom of the ice maker by using 2 (two) thumbscrews provided.
   d. Hold the thermostat capillary tubing in position, by using a plastic tie provided.
9. Place the top panel and front panel in position, and secure the front panel by using screws provided.

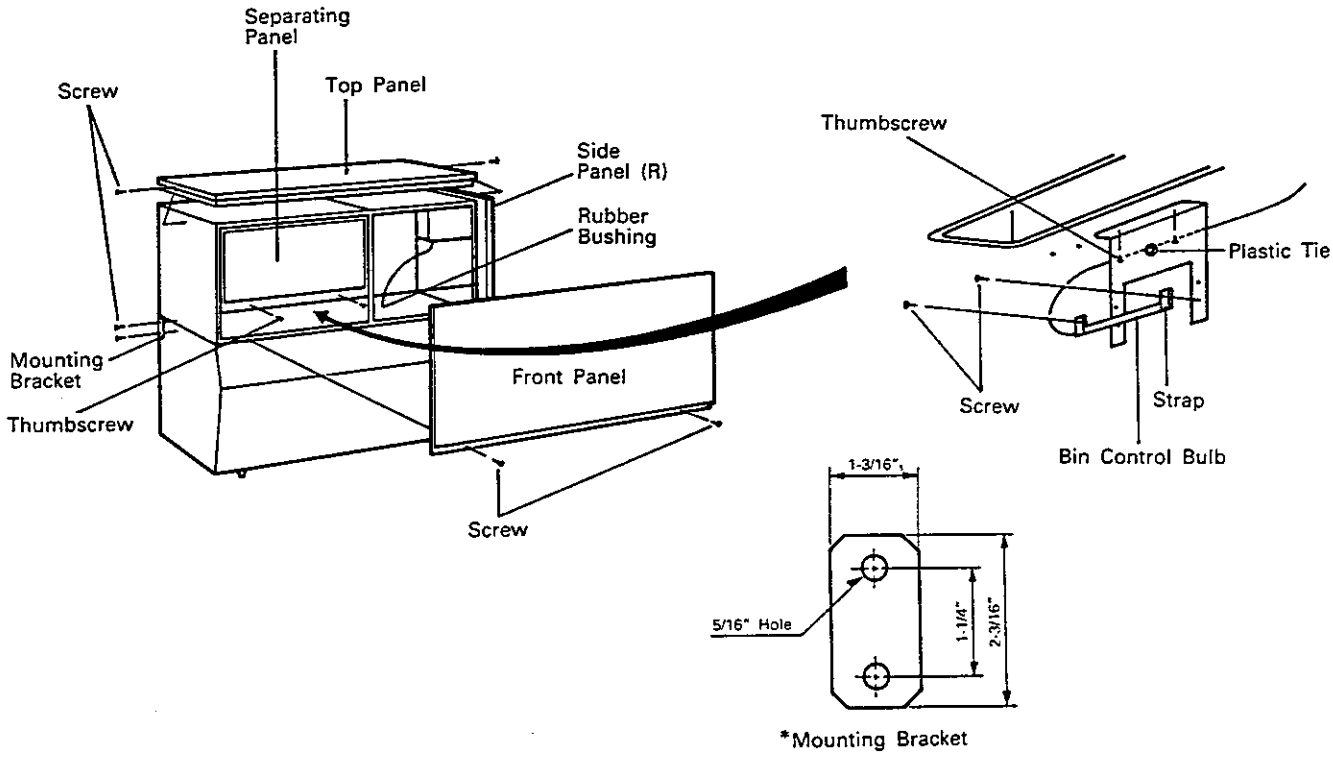


Fig. 16 Setup

4. INSTALLATION OF SECOND UNIT

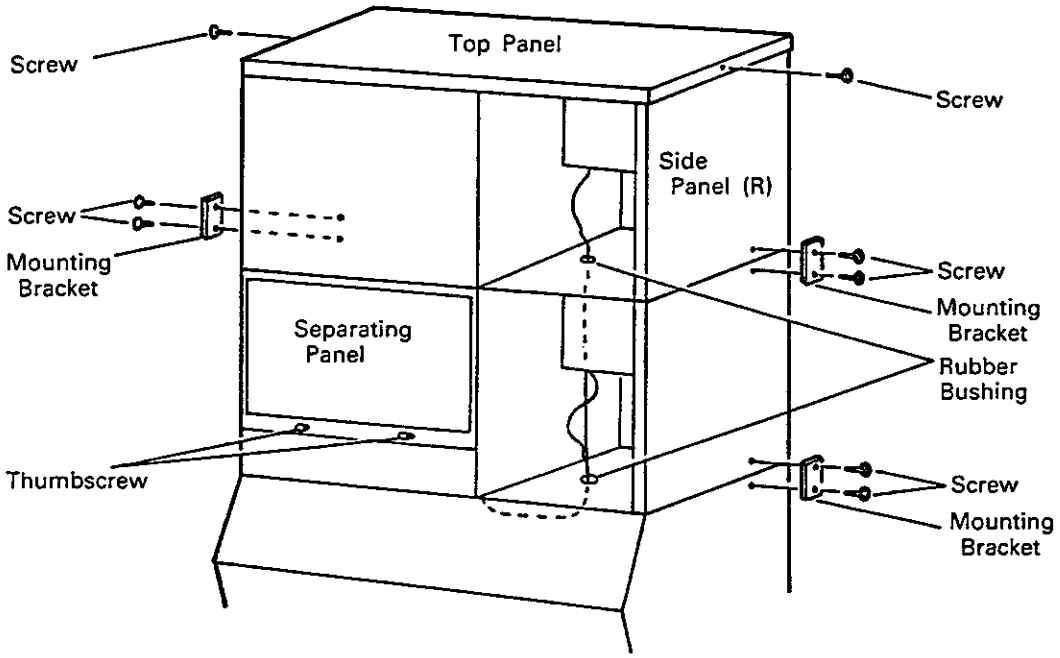


Fig. 16 Installation of Second Unit

1. See "SET UP" for the lower unit installation.
2. Remove the front panel and top panel of the lower unit. The top panel is not required when installing a second icemaker.
3. Unpack a second icemaker (Upper unit), and remove the panels.
4. Attach the upper unit to the top of the lower unit. Be very careful to prevent damage to the lower unit.
5. Secure the upper unit to the lower unit by using 2 (two) mounting brackets and 4 (four) screws provided.
6. Route the bin control thermostat capillary tubing of the upper unit through the hole, located in the center of the icemaker, and by using the rubber bushing provided. And attach the thermostat bulb routing through the lower unit to the bottom of the lower unit, and secure by using mounting bracket, 2 (two) plastic straps and 2 (two) screws and a thumbscrew provided.
7. Place the top panels and front panels in position, and secure the front panels by using 2 (two) screws provided.

5. INSTALLATION OF REMOTE CONDENSER UNIT

a. CHECKS BEFORE INSTALLATION

- Unpack and remove shipping cartons, tapes and packing.
- Remove the top panel and tape holding an accessories package.
- Take out the accessories package.
- Check that refrigerant lines do not rub or touch lines or other surfaces, and that fan blade moves freely.

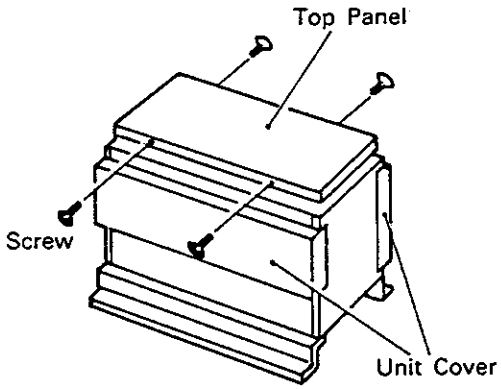


Fig. 17 Condenser Unit

- Recommended parts or materials listed below are required individually.

  POWER CORD: A 14 AWG, 2 (two) conductors power supply cord is required for the fan motor wiring, between the icemaker and the remote condenser unit.

  COPPER TUBING: A size refrigeration copper tubing (Phosphorus deoxidized) are required for refrigerant lines.

  3/8" OD x 5/16" ID, 2 Pcs.

  PIPE INSULATION: Withstands temperature up to 250°F.

  BOLT: 4 (four) 5/16"-18 UN Hex Head Bolts are required for securing the remote condenser unit.

- DO NOT remove the unit cover before installation is completed, in order to prevent damage to the air-cooled condenser.

b. LOCATION

This remote condenser unit, model S-0454, must be positioned in a selected permanent site as follows.

- Firm and flat site.
- Dry and good ventilated around.
- More than 24 (twenty-four) inch clearance in both front and back, for easy maintenance and service.
- Maximum Air Temperature 110°F (+43°C)
  Minimum Air Temperature −20°F (−29°C)
- Maximum Refrigerant Line Length 33 (thirty-three) ft.

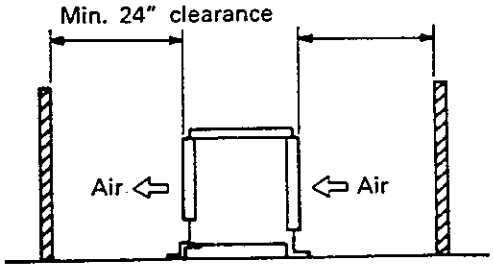


Fig. 18 Location – Condenser Unit

Note: If installation exceeds these limitations recommended, the icemaker will not work, or reduce performance will results.

c. INSTALLATION

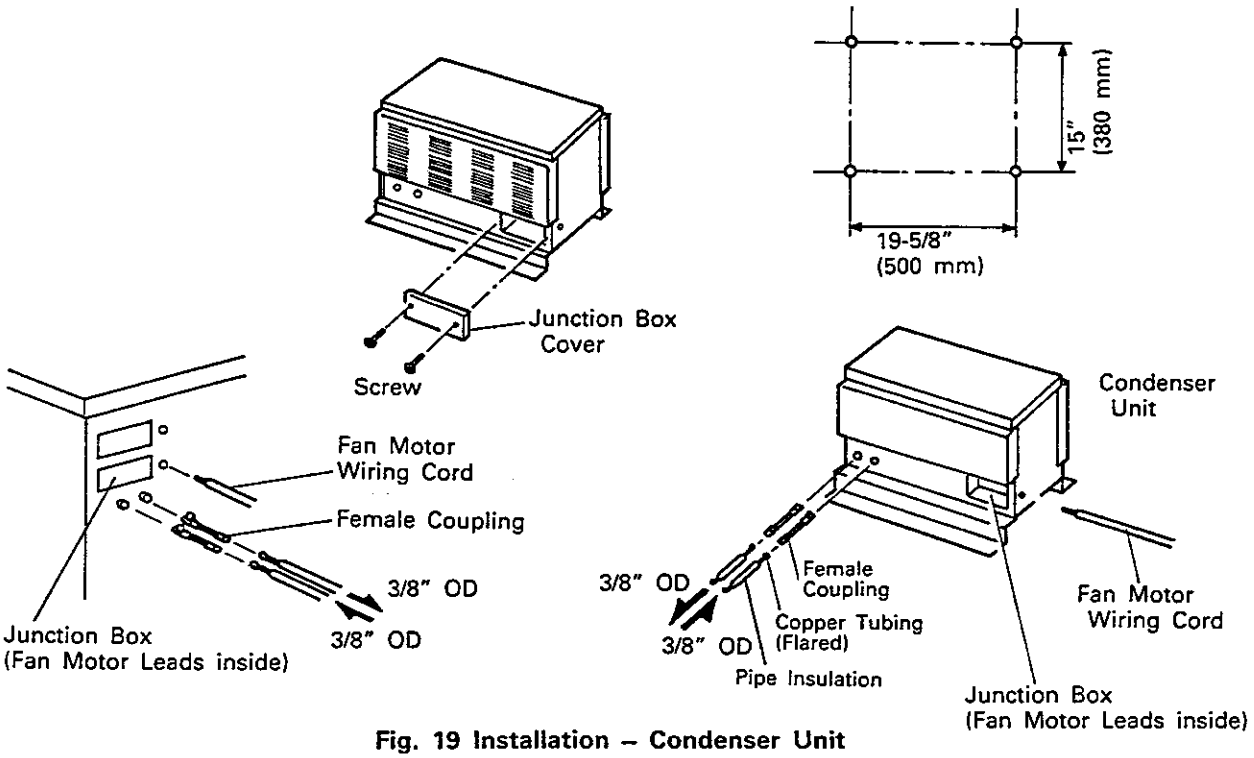


Fig. 19 Installation – Condenser Unit

1. 4 (four) mounting holes are provided with this remote condenser unit. Secure the condenser unit by using 4 (four) bolts.
2. Install enough length of 2 (two) copper tubing and power cord, between the icemaker and the condenser unit. The two copper tubings should be insulated separately.
3. Flare-connect the two copper tubings to the female couplings provided with the icemaker and the condenser unit respectively.
4. Evacuate the two refrigerant lines assembled above. Use the refrigerant access valves on the female couplings provided with the icemaker side. Charge refrigerant gas at pressure of 15–30 PSI, into the two refrigerant lines after evacuation.
5. Remove plastic caps protecting the male and female couplings. Attach the two refrigerant lines to the male couplings provided with the icemaker and the condenser unit. One refrigerant line must be connected to the "IN", and the other to the "OUT" respectively.
6. Remove screws and the junction box covers of the condenser unit and icemaker.
7. Connect the fan motor leads (pig tail) in the junction box to the power cord installed, by using wire connectors.
8. Place the junction box cover in position.

d. STACKING CONDENSER UNIT

1. Secure the lower remote condenser unit.
2. Remove the top panel of the lower condenser unit. Keep the 4 (four) screws for the top panel to be used.
3. Attach the upper remote condenser unit to the top of the lower condenser unit.
4. Secure the upper condenser unit by using the 4 (four) screws for the top panel of the lower condenser unit.
5. Install refrigerant lines, and make fan motor leads connections for each unit, as mentioned above "INSTALLATION".

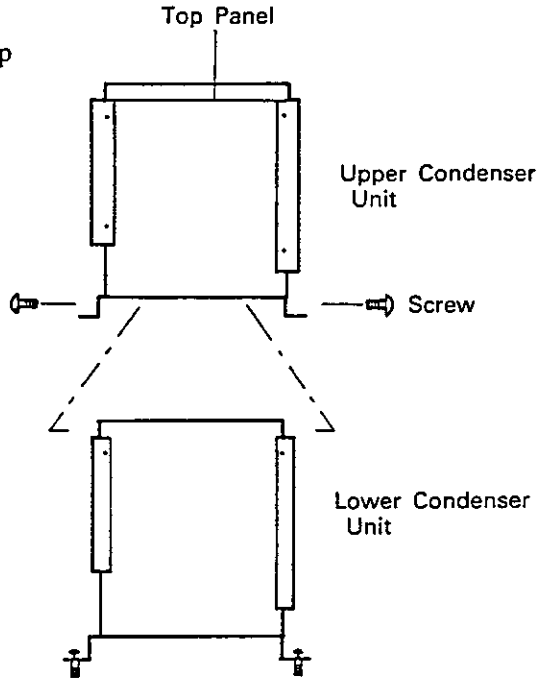


Fig. 20 Stacking Condenser Unit

6. ELECTRICAL CONNECTION

WARNING

1. Electrical connection must be made in accordance with instructions on the "WARNING" tag, provided with pig tail lead in the junction box.
2. This icemaker requires a ground that meets the national and local electrical code requirements. To prevent possible severe electrical shock injury to individuals or extensive damage to the equipment, install a proper ground wire to the icemaker.

1. A WHITE lead must be connected to the neutral conductor of the power source. Miswiring results in severe damage to the icemaker.
2. This icemaker must have a separate power supply or receptacle of proper capacity. See NAMEPLATE.

   Note: Use an optional transformer unit for 2 wire system (230VAC 60Hz 1 Phase), where 3 wire system is not available.
3. An electrical permit and a licensed electrician are required.

WARNING

ELECTRICAL CONNECTION

A white lead must be connected to the grounded conductor of the power source.
Miswiring results in severe damage to the icemaker.
(See Fig.)

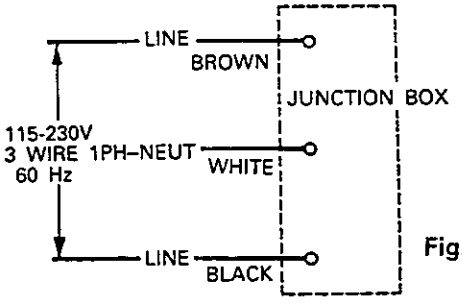


Fig. 21 Electrical Connection

7. WATER SUPPLY AND DRAIN CONNECTIONS – See Fig. 22

WARNING

To prevent damage to the pump assembly, do not operate this icemaker when the water supply is OFF, or is below 7 PSI (0.5 kg/cm^2), the recommended water pressure. Stop the icemaker until proper water pressure is resumed.

1. Water supply inlet is 1/2"PT female thread.

   Note: On water-cooled model, a 1/2" flared union fitting is provided for Condenser Water Inlet.

2. A water supply line shut-off valve and drain valve must be installed. A minimum of 5/8" OD copper tubing is recommended for the water supply lines. And an optional strainer should be installed next to the water supply inlet in the water supply line.
   Note: HOSHIZAKI recommended optional strainer,
   Part Code 311166A01

3. Water supply pressure should be minimum 7 PSI (0.5 kg/cm^2) and maximum 113 PSI (8 kg/cm^2). If the pressure exceeds 113 PSI, use a pressure reducing valve.

4. Drain outlet for icemaker dump is 1"PT male thread. Drain for condensate is 25/64" OD pipe. Icemaker drain and condenser drain piping connections must be made separately from bin drain.

   Note: On water-cooled model, a 1/2"PT flared union fitting is provided for Condenser Drain Outlet.

5. Drain must be 1/4" fall per 1' on horizontal runs to get a good flow.

6. A plumbing permit and a licensed plumber are required.

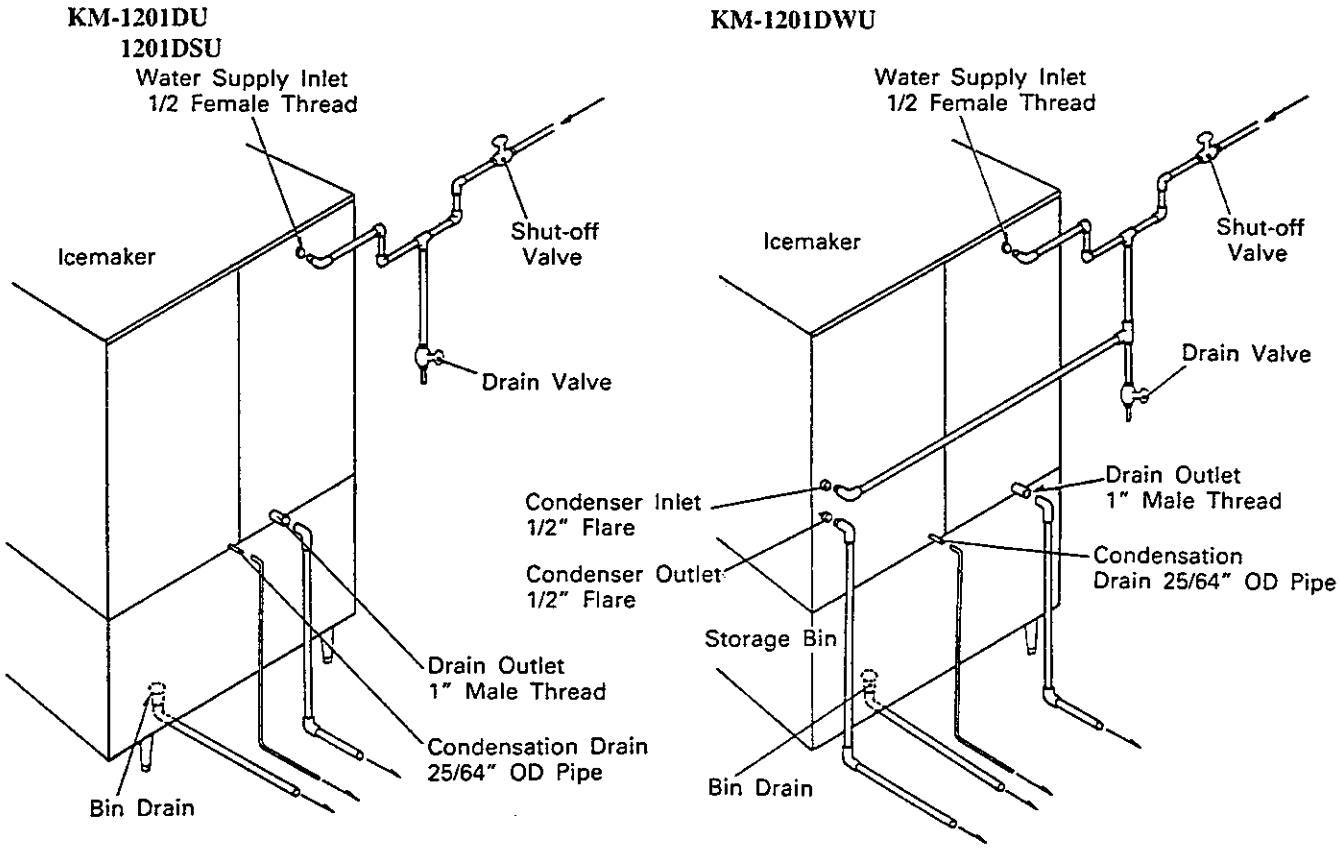


Fig. 22 Water Supply and Drain Connections

8. FINAL CHECK LIST

1. Is the icemaker level?
2. Is the icemaker in a site where ambient temperatures are a minimum of 45°F (7°C) and maximum 100°F (38°C) all year around?
3. Is there at least 6 inch (15 cm) clearance around the icemaker for easy maintenance or service?
4. Have all shipping tapes, packing and carton been removed from the icemaker?
5. Have all electrical and piping connections been made?
6. Has the power supply voltage been checked or tested against the nameplate rating? And has a proper ground been installed to the icemaker?
7. Are the water supply line shut-off valve and drain valve installed? And has the water supply pressure been checked to ensure a minimum of 7 PSI (0.5 kg/cm^2) and maximum 113 PSI (8 kg/cm^2)?
8. Have hold-down bolts and all refrigerant lines been checked against vibration and possible failure?
9. Has the bin control switch been checked to work normally?
10. Has the ice storage bin been cleaned and wiped with a clean cloth?
11. Has the user been given the instruction manual, and instructed on how to operate the icemaker and the importance of periodic maintenance recommended?
12. Has the user been given the name and telephone number of the authorized service agency?

9. STARTUP

WARNING

1. All parts are factory-adjusted. Improper adjustments may result in failure.
2. Wait for at least 3 (three) minutes before restarting the icemaking process to prevent damage to the Compressor.

1. Open the water supply line shut-off valve.
2. Remove the front panel.
3. Move the toggle ON-OFF "CONTROL SWITCH", located on the control box, to the WASH position.
4. Turn on the power supply switch, and start washing process for 10 (ten) minutes.
5. Turn off the icemaker, and remove the separating panel.
6. Remove the cap, located on the right, bottom part of the water tank. And then drain the water tank. See Fig.
7. Place the cap and separating panel in position.
8. Clean the storage bin.
9. Turn on the power supply switch, and move the "CONTROL SWITCH" to the ICE position. And start automatic icemaking process.
10. Place the front panel in position.

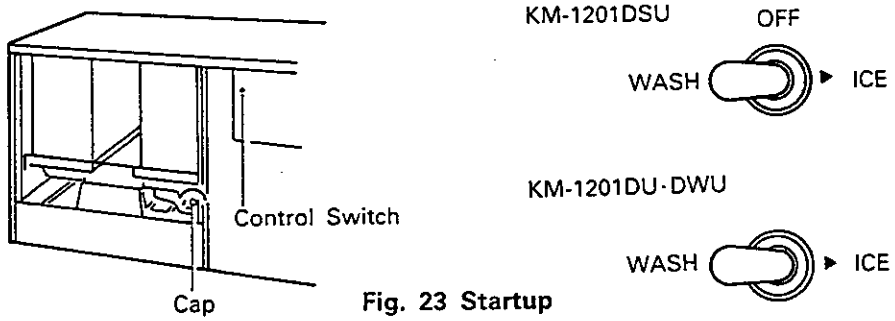


Fig. 23 Startup

10. SHUTOFF

WARNING

When shutting off the icemaker for a period, drain the water tank and remove ice from the storage bin. The storage bin should be clean and dry. Drain the icemaker to prevent damage to the water supply line at sub-freezing temperatures, using a foot or hand pump. Shut off the icemaker until proper air temperature is resumed.

1. Close the water supply line shut-off valve.
2. Remove the front panel and separating panel.
3. Move the toggle ON-OFF "CONTROL SWITCH", located on the control box, to the WASH position. On air-cooled remote model KM-1201DSU, move the toggle ON-OFF "CONTROL SWITCH", located on the control box, to the OFF position.
4. Turn off the power supply switch.
   On air-cooled remote model KM-1201DSU, always turn off the icemaker by moving the "CONTROL SWITCH", located on the control box, to the OFF position, and with the power supply switch in the ON position, when shutting off the icemaker for a few days. This energizes the crankcase heater during shutoff in order to protect the compressor.
5. Remove the cap, located on the right, bottom part of the water tank. And then drain the water tank.
6. Place the cap and separating panel in position.
7. Remove ice from the storage bin, and clean up.
8. Place the front panel in position.

Note: When shutting off the icemaker at sub-freezing temperature, run the icemaker with the water supply line shut-off valve closed, and blow out the water inlet line, by using air pressure.

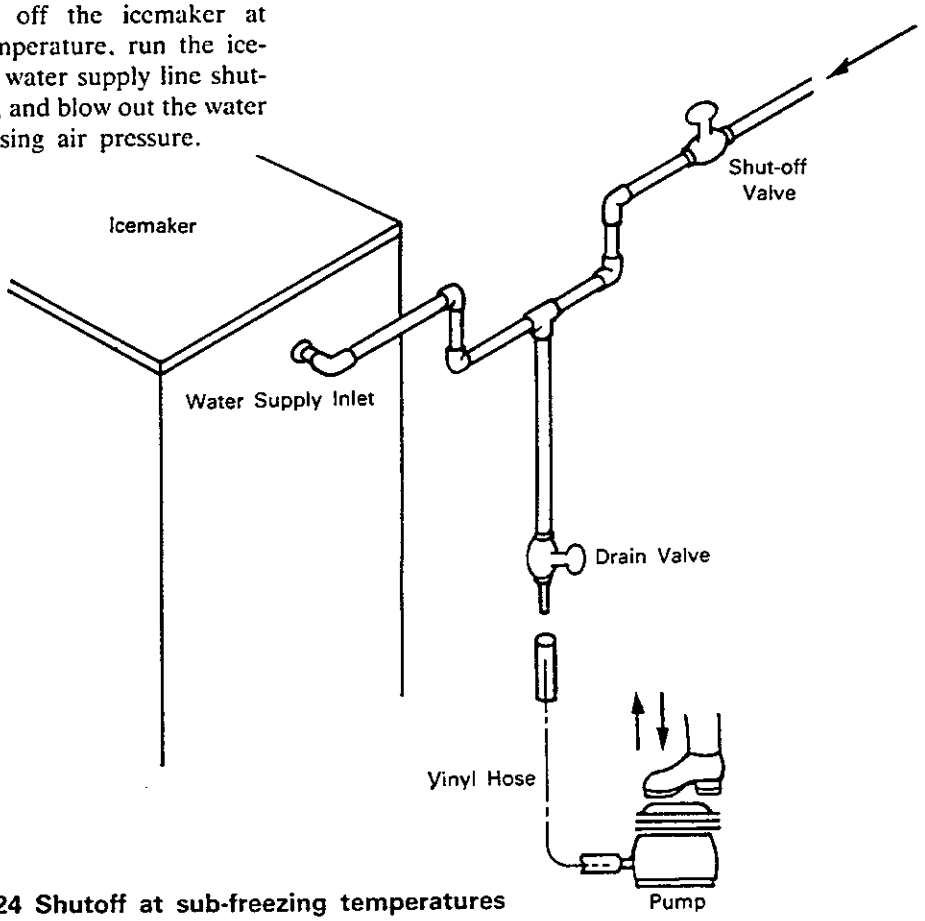


Fig. 24 Shutoff at sub-freezing temperatures

IV. MAINTENANCE AND CLEANING INSTRUCTIONS

1. CLEANING INSTRUCTIONS

WARNING

1. Clean and sanitize the icemaker Water System at least once a month, by using a recommended cleaner and sanitizer.
2. DO NOT use any Ammonia-type cleaner, to prevent injury to individuals.
3. Always wear Liquid-proof gloves for safe handling of the cleaning and sanitizing solution, to prevent irritation in case of contact with skin.

Cleaning Procedure

1. Disconnect the power source, and close the water supply line shut-off valve.
2. Dilute approximately 32 fl oz of cleaner ("LIME-A-WAY", Economics Laboratory, Inc. recommended) with 6 gal of water.
3. Remove the front panel and separating panel.
4. Remove all ice from the icemaker and storage bin.
5. Remove the cap, located on the right, bottom part of the water tank. And drain the water tank.
6. Place the cap in position.
7. Pour the cleaning solution into the water tank.
8. Place the separating panel in position.
9. Move the toggle ON-OFF "CONTROL SWITCH", located on the control box, to the WASH position.
10. Turn on the icemaker, and start washing process.
11. Turn off the icemaker in 30 (thirty) minutes.
12. Remove the separating panel and cap, located on the right, bottom part of the water tank. And drain the water tank. And then place the cap and separating panel in position.
13. Open the water supply line shut-off valve.
14. Turn on the icemaker and start rinse process. Turn off the icemaker in 8 (eight) minutes. Remove the separating panel and cap, located on the right, bottom part of the water tank. And drain the water tank. And then place the cap and separating panel in position.
15. Repeat the above step No. 14, 3 (three) more times to rinse thoroughly.

Sanitizing Procedure - Following cleaning procedure.

1. Disconnect the power source, and close the water supply line shut-off valve.
2. Dilute approximately 48 fl oz of a 5.25% Sodium Hypochlorite solution with 6 gal of water.
3. Remove the separating panel and cap, located on the right, bottom part of the water tank. And drain the water tank. And then place the cap in position.
4. Pour the sanitizing solution into the water tank.
5. Place the separating panel in position.
6. Turn on the icemaker, and start sanitizing process.
7. Turn off the icemaker in 15 (fifteen) minutes.
8. Remove the separating panel and cap, located on the right, bottom part of the water tank. And drain the water tank.
9. Place the cap and separating panel in position.
10. Rinse 2 (two) times referring to the step No. 14, in "Cleaning Procedure".
11. Clean the storage bin by using clean water.
12. Move the toggle ON-OFF "CONTROL SWITCH", located on the control box, to the ICE position.

13. Place the front panel in position.
14. Open the water supply shut-off valve.
15. Turn on the icemaker, and start automatic icemaking process.

2. MAINTENANCE

IMPORTANT

This icemaker must be maintained individually, referring to the instruction manual and labels provided with the icemaker.

* Stainless Steel Exterior
  To keep the exterior from corrosion, wipe occasionally with a clean and soft cloth. Use a damp cloth containing a neutral cleaner to wipe off oil or dirt built up.
* Storage Bin and Scoop
  - Wash your hands before removing ice. Use a plastic scoop provided (Accessory).
  - The ice storage bin is for ice use only. Do not store anything except ice in the bin.
  - Keep the scoop clean. Clean by using a neutral cleaner at least once a day, and rinse thoroughly.
  - Clean the bin liner at least once a month, by using a neutral cleaner. Rinse thoroughly after cleaning.
* Air Filter (Air-cooled model only)
  A plastic mesh air filter removes dirt or dust in the air, and keeps the condenser from getting clogged. When the filter gets clogged, the icemaker performance will be reduced. Clean the filter at least twice a month. More frequent cleaning will be required depending on the location. When clogged by oil, use a warm solution containing a neutral cleaner. Be careful to prevent damage to the mesh.
* Condenser (Air-cooled model only)
  When the condenser gets clogged by small particles through the air filter, the icemaker performance will be more reduced than the air filter clogged. Clean the condenser once a year, by using a brush or vacuum cleaner.
* Strainer (Optional Extra)
  A plastic mesh strainer removes dirt or particles in the water supply. When the mesh gets clogged, the icemaker will be out of water, similar to a trouble due to water failure. Clean the mesh at least once a month. Remove a cleanout plug, and cleanout dirt by using a tiny brush.

V. TECHNICAL INFORMATION

1. WATER CIRCUIT AND REFRIGERANT CIRCUIT

a. KM-1201DU (Air-cooled)

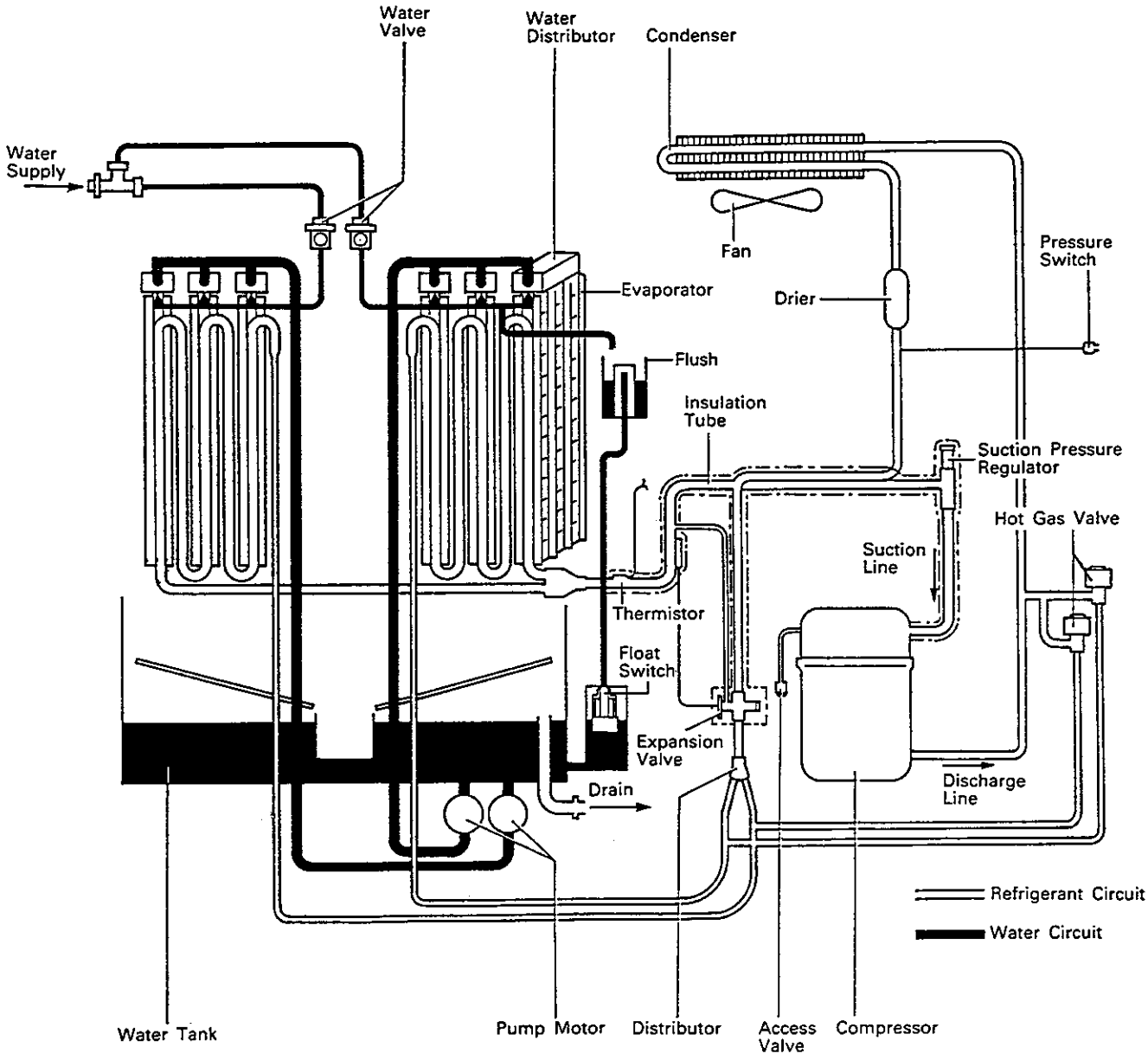


Fig. 25 Water and Refrigerant Circuit – KM-1201DU

b. KM-1201DWU (Water-cooled)

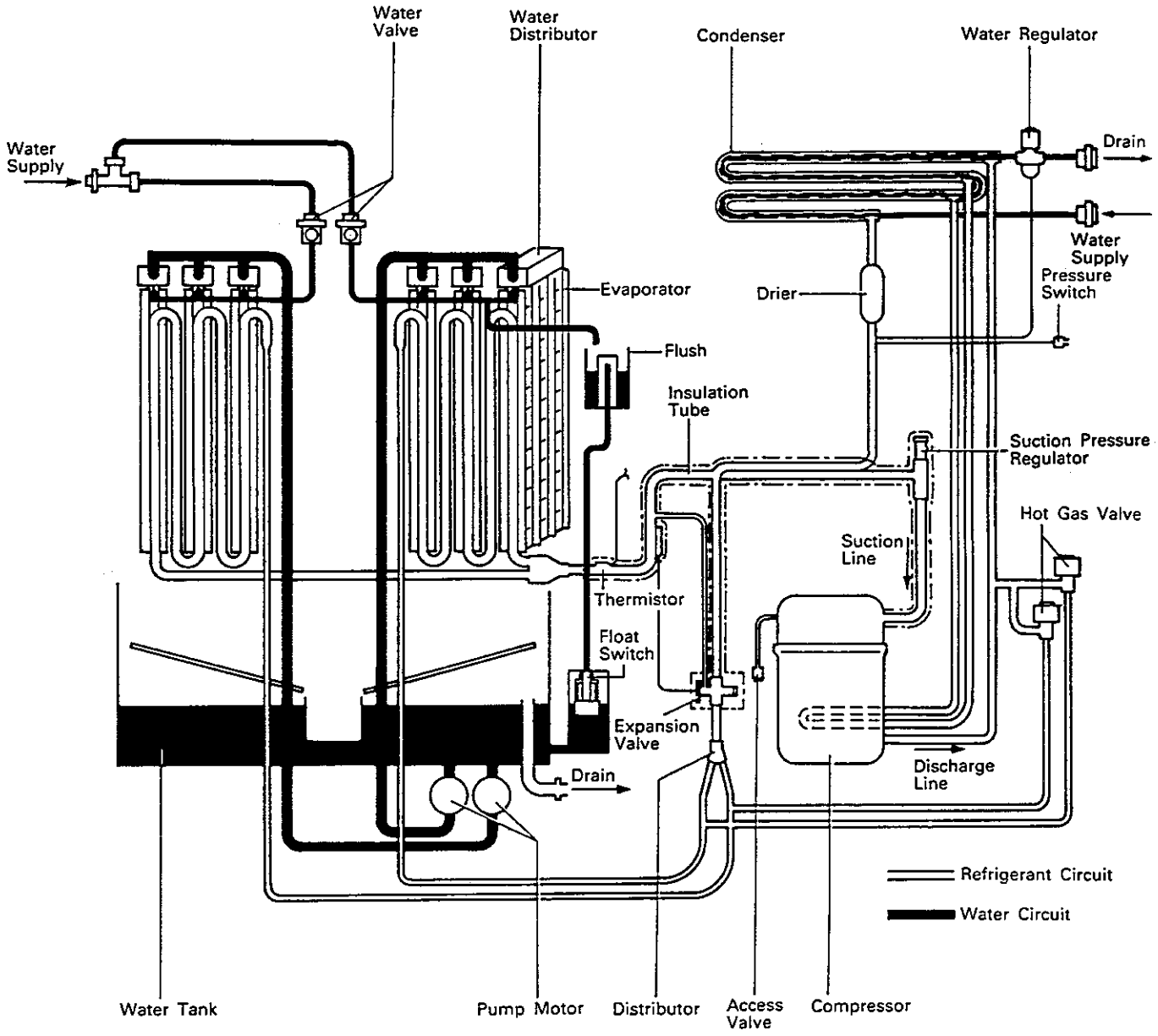


Fig. 26 Water and Refrigerant Circuit – KM-1201DWU

c. KM-1201DSU (Air-cooled Remote)

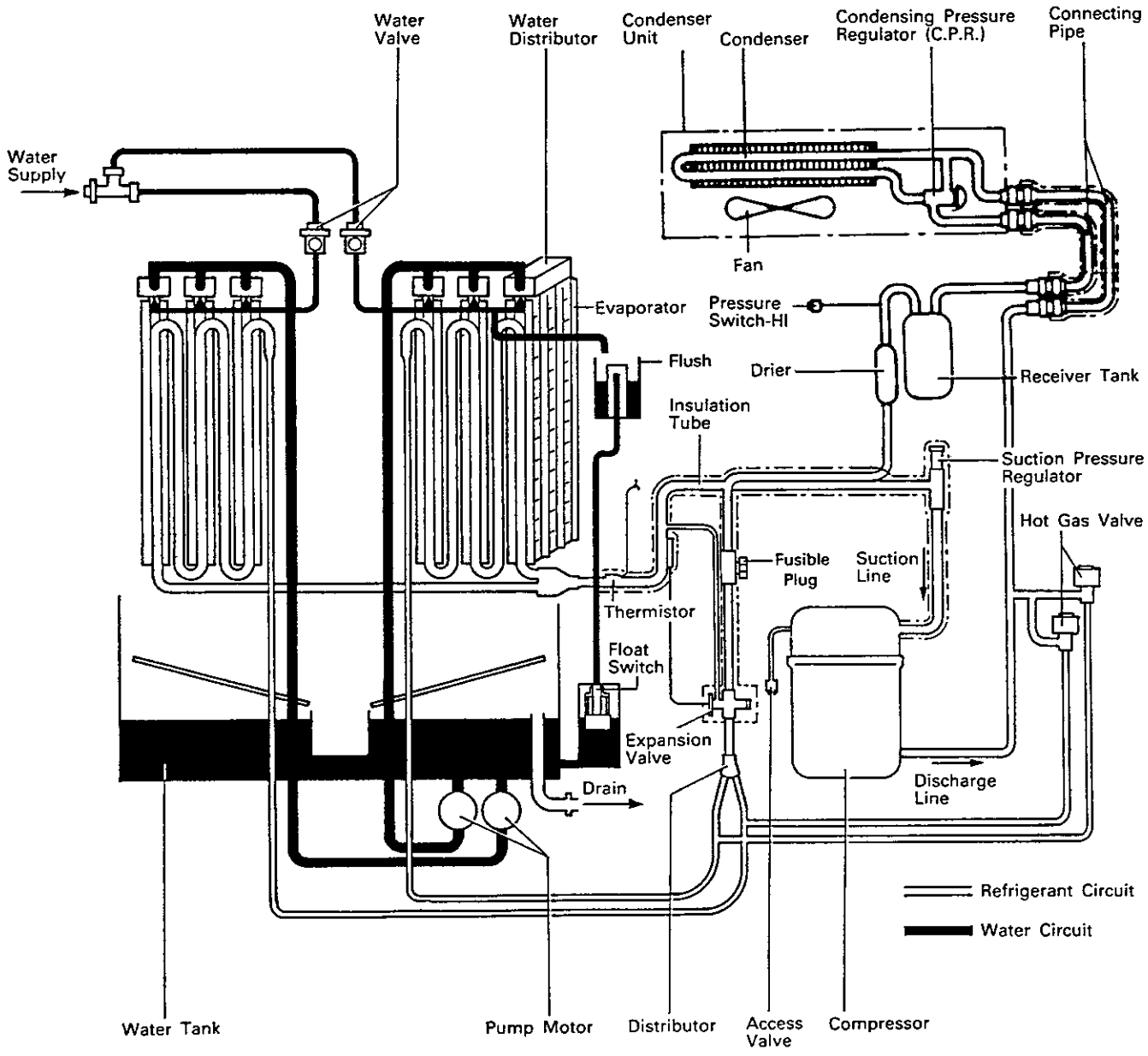


Fig. 27 Water and Refrigerant Circuit – KM-1201DSU

2. WIRING DIAGRAM AND TIMING CHART

a. Wiring Diagram

KM-1201DU (Air-cooled)
KM-1201DWU (Water-cooled)

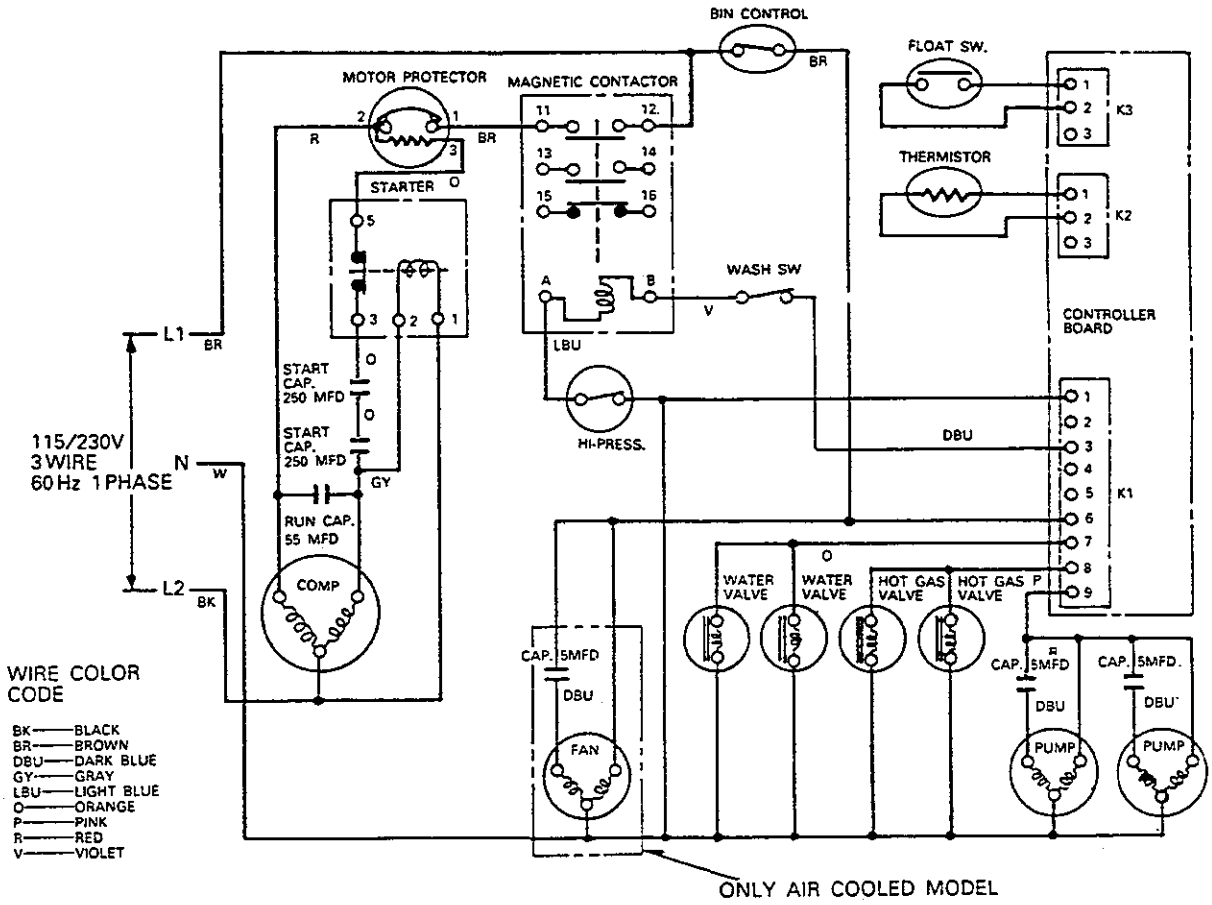


Fig. 28 Wiring Diagram – KM-1201DU, DWU

BIN CONTROL functions to control ice storage level. Factory setting marked Red.

CAUTION

To eliminate static, always touch the metal part of the unit when access to the Controller Board.

KM-1201DSU (Air-cooled Remote)

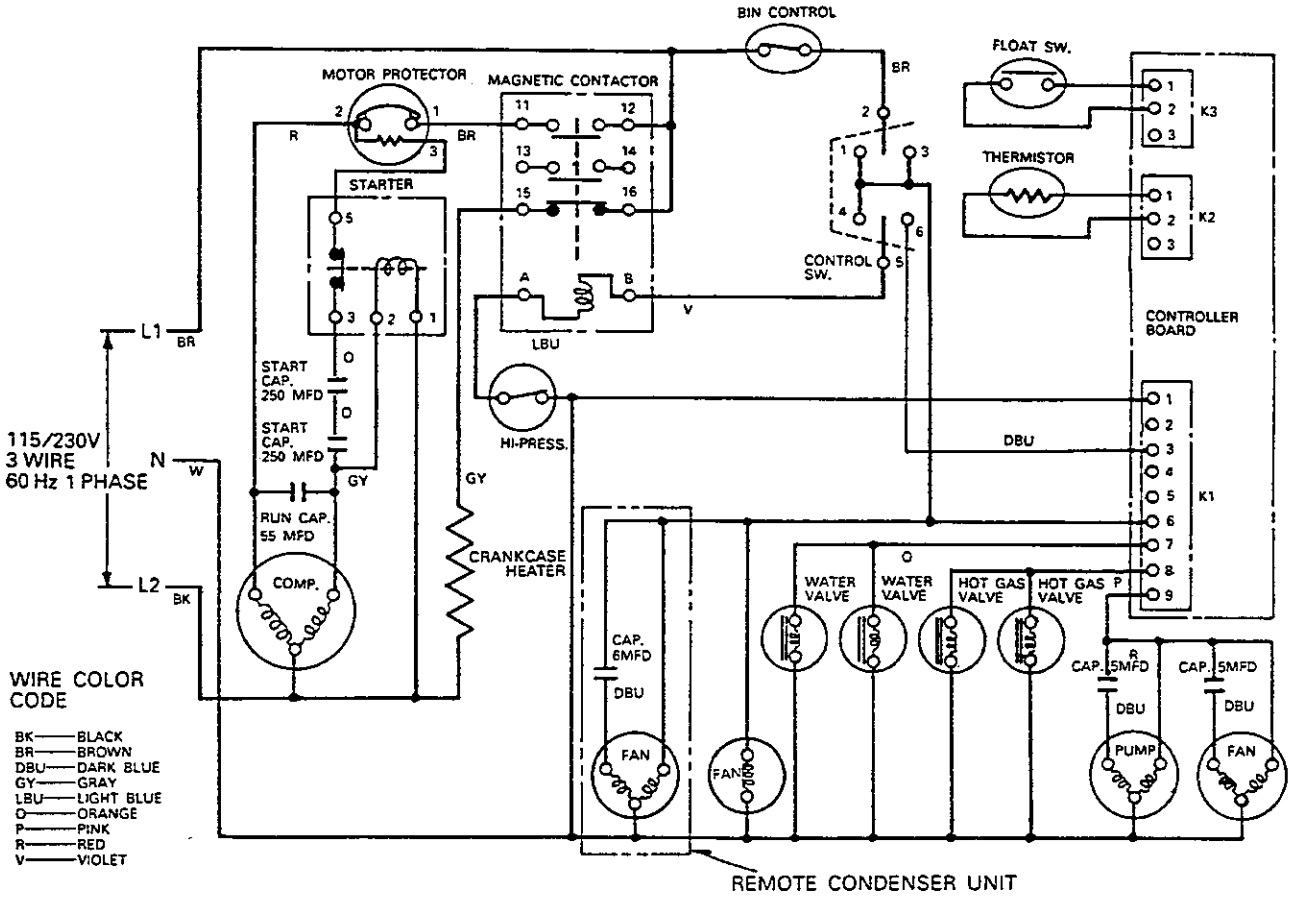


Fig. 29 Wiring Diagram – KM-1201DSU

BIN CONTROL functions to control ice storage level. Factory setting marked Red.

NOTE

Turn off only the control switch when the icemaker is not used for a longer period.
The primary of magnetic switch is still energized even if the control switch moved to the OFF position.

CAUTION

To eliminate static, always touch the metal part of the unit when access to the Controller Board.

b. Timing Chart

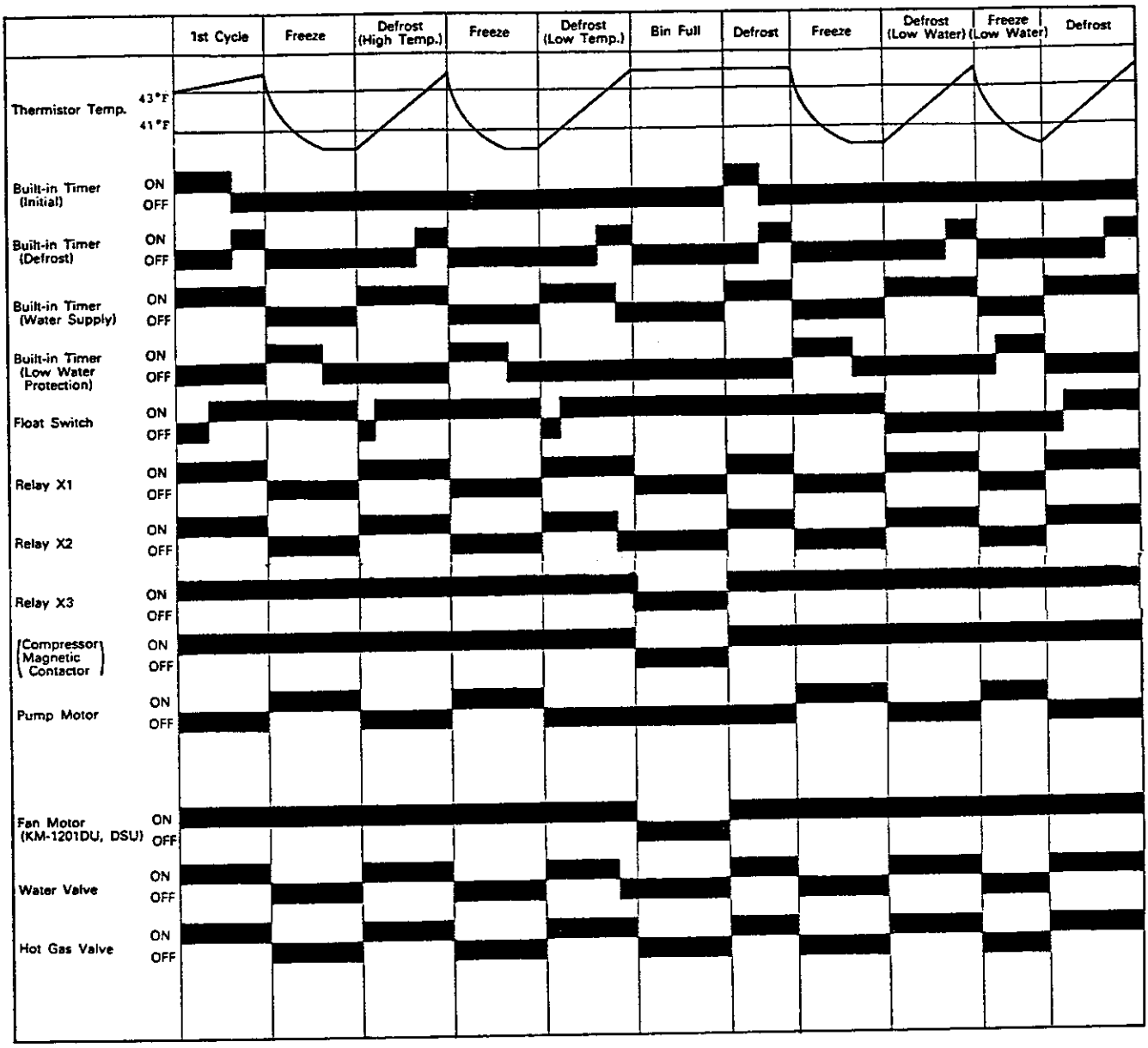


Fig. 30 Timing Chart

3. SEQUENCE

1st Cycle

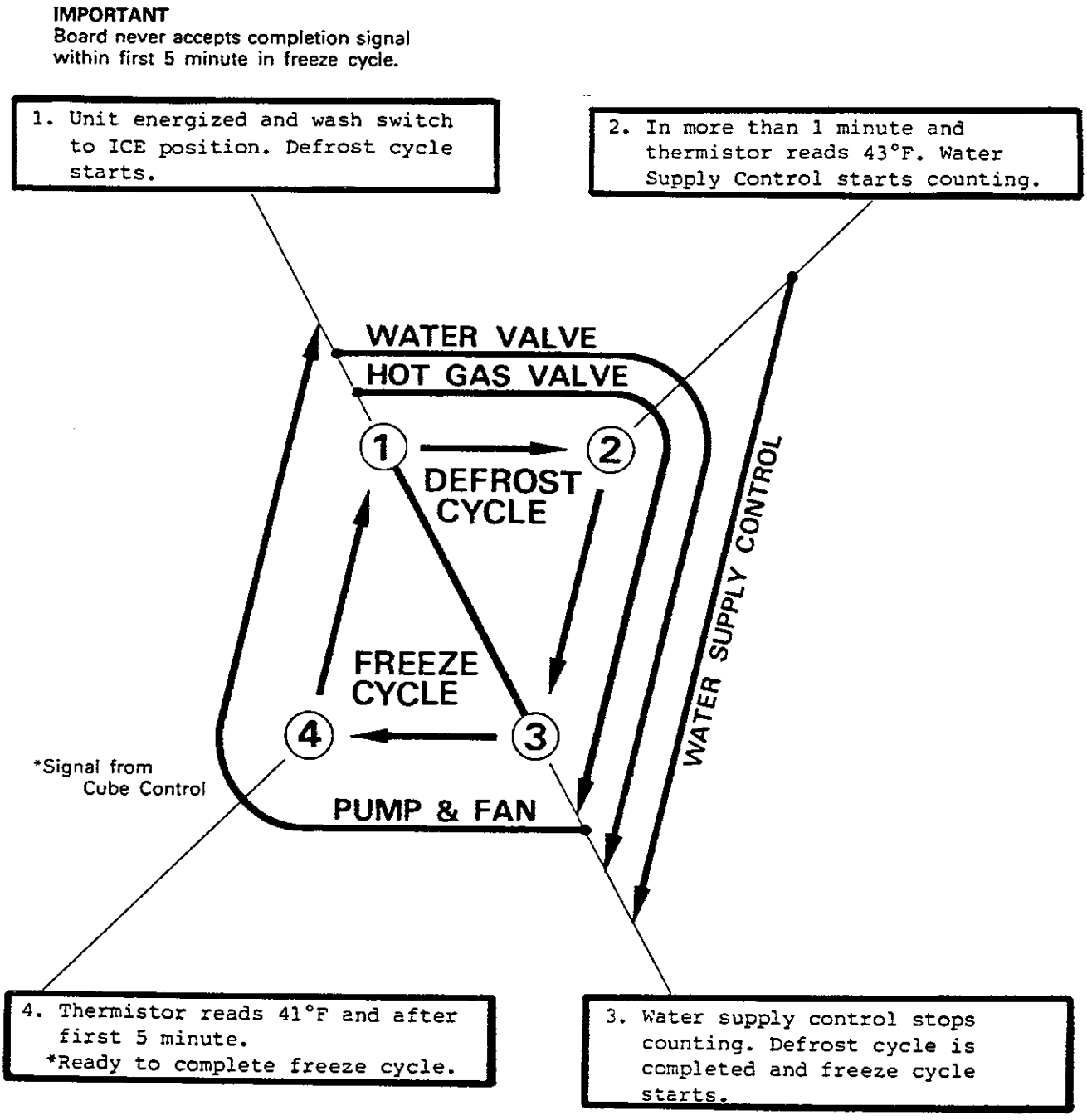


Fig. 31 Sequence–1st Cycle

2nd Cycle and after

IMPORTANT
Board never accepts completion signal within first 5 minute in freeze cycle.

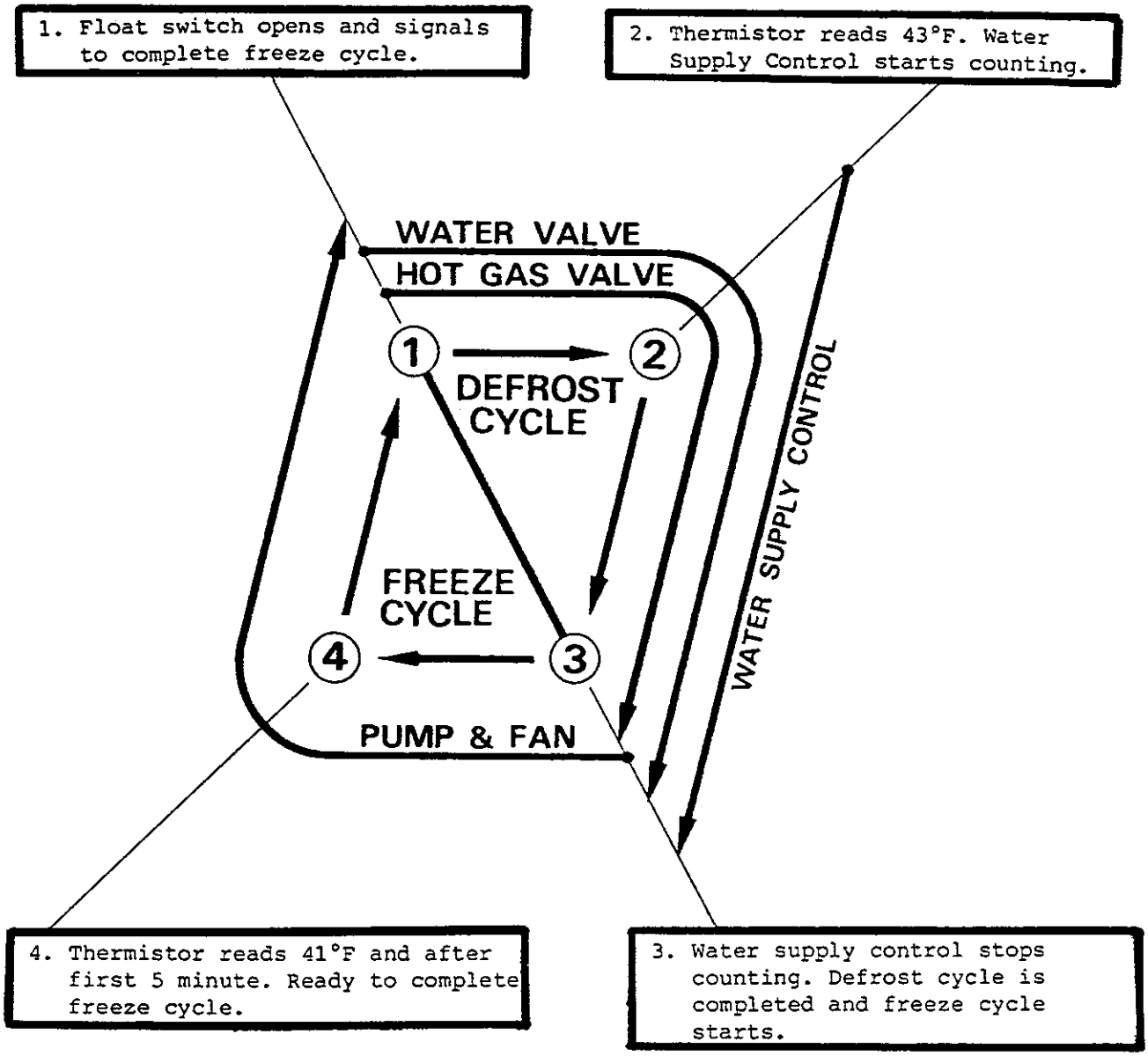


Fig. 32 Sequence–2nd Cycle and after

4. PERFORMANCE DATA

KM-1201DU (Air-cooled)
KM-1201DSU (Air-cooled Remote)

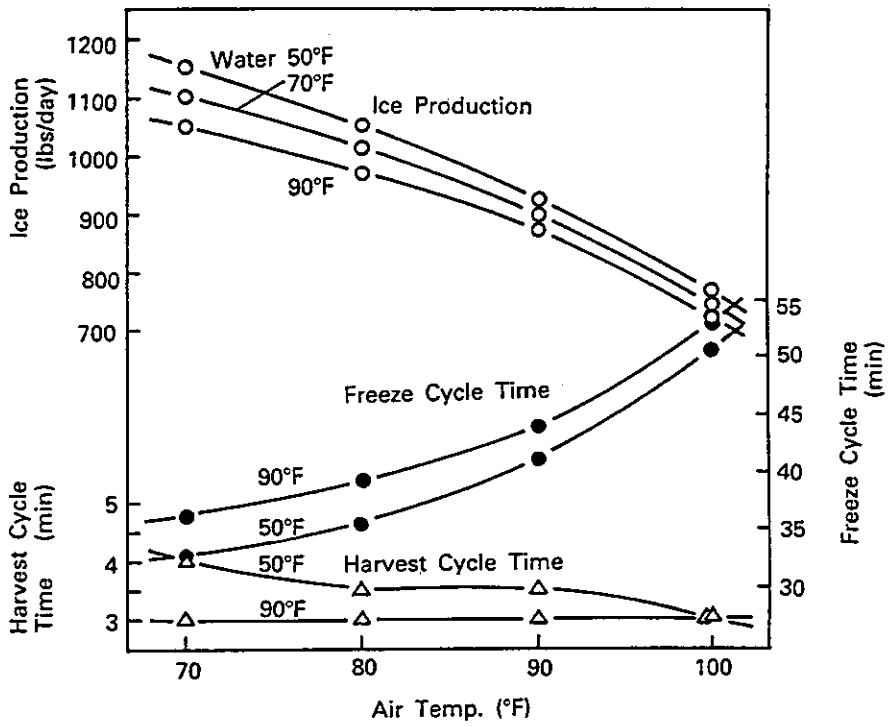
Table 1

Air (°F) \ Water (°F)	ICE PRODUCTION CAPACITY (lbs/day) (kg/day)			FREEZE CYCLE TIME (min)			HARVEST CYCLE TIME (min)			HEAD PRESSURE (PSI) (kg/cm²)			SUCTION PRESSURE (PSI) (kg/cm²)			ELECTRICAL CONSUMPTION (W)			WATER CONSUMPTION (gal/day) (m³/day)		
	50	70	90	50	70	90	50	70	90	50	70	90	50	70	90	50	70	90	50	70	90
70	1150 522	1100 499	1050 476	32	34	36.5	4	3.5	3	213 15.0	216 15.2	220 15.5	44 3.1	47 3.3	52 3.7	2460	2480	2510	423 1.60	354 1.34	288 1.09
80	1050 476	1010 458	970 440	36	37.5	39.5	3.5	3	3	240 16.9	249 17.5	256 18.0	46 3.2	47 3.3	52 3.7	2510	2530	2560	337 1.26	282 1.06	268 1.01
90	930 422	905 411	880 400	41	42.5	44	3.5	3	3	267 18.8	277 19.5	292 20.5	46 3.2	48 3.4	54 3.8	2560	2580	2610	243 0.92	238 0.90	222 0.84
100	770 349	750 340	730 331	50.5	52	53.5	3	3	3	299 21.0	309 21.7	320 22.5	46 3.2	48 3.4	54 3.8	2620	2640	2670	201 0.76	188 0.71	185 0.70

KM-1201DWU (Water-cooled)

Table 2

Air (°F) \ Water (°F)	ICE PRODUCTION CAPACITY (lbs/day) (kg/day)			FREEZE CYCLE TIME (min)			HARVEST CYCLE TIME (min)			HEAD PRESSURE (PSI) (kg/cm²)			SUCTION PRESSURE (PSI) (kg/cm²)			ELECTRICAL CONSUMPTION (W)			WATER CONSUMPTION (gal/day) (m³/day)		
	50	70	90	50	70	90	50	70	90	50	70	90	50	70	90	50	70	90	50	70	90
70	1150 522	1030 467	930 422	32	37	41.5	4	3	3	240 16.9	249 17.5	289 20.3	41 2.9	43 3.0	44 3.1	2350	2390	2470	1090 4.12	1361 5.15	1683 6.37
80	1115 506	1005 456	900 408	33.5	38	43	3.5	3	3	240 16.9	249 17.5	294 20.7	41 2.9	44 3.1	46 3.2	2360	2390	2490	1017 3.85	1361 5.15	1691 6.40
90	1080 490	975 442	870 395	35	39.5	44.5	3.5	3	3	240 16.9	250 17.6	299 21.0	43 3.0	46 3.2	47 3.3	2360	2390	2490	1017 3.85	1376 5.21	1707 6.46
100	1045 475	930 422	830 376	36.5	41.5	47	3	3	3	240 16.9	252 17.7	300 21.1	46 3.2	48 3.4	48 3.4	2360	2400	2500	1017 3.85	1448 5.48	1717 6.50



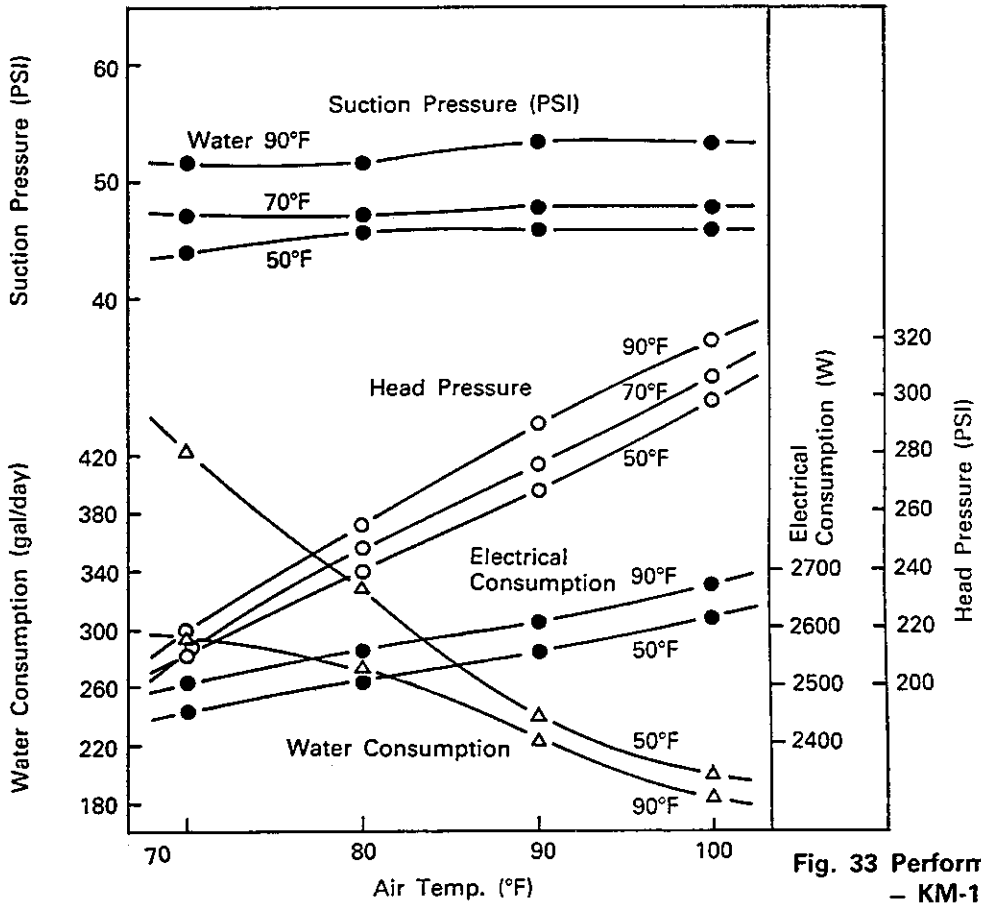
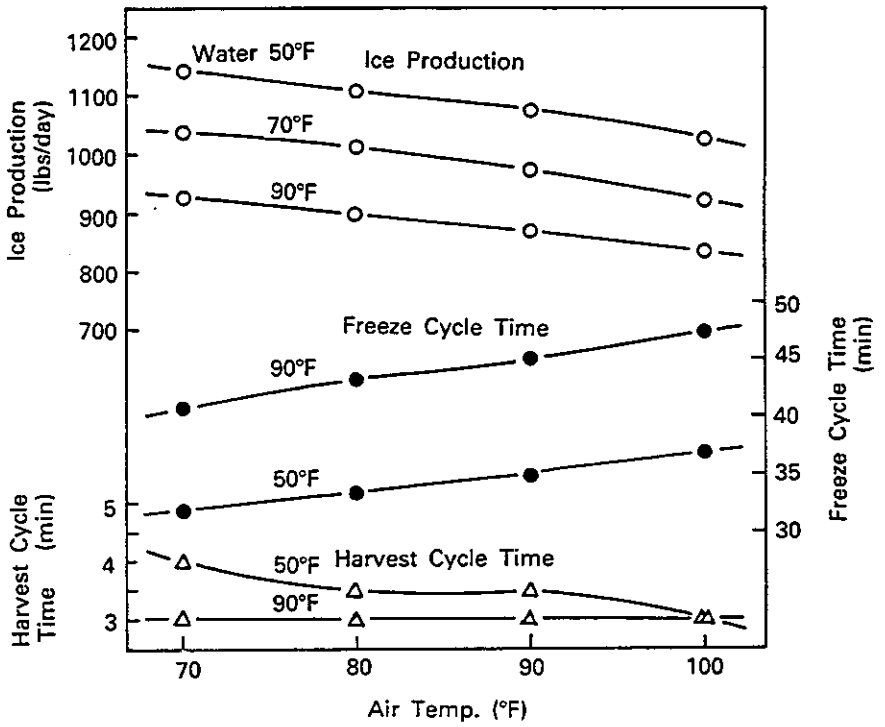


Fig. 33 Performance Data – KM-1201DU, DSU

KM-1201DWU (Water-cooled)



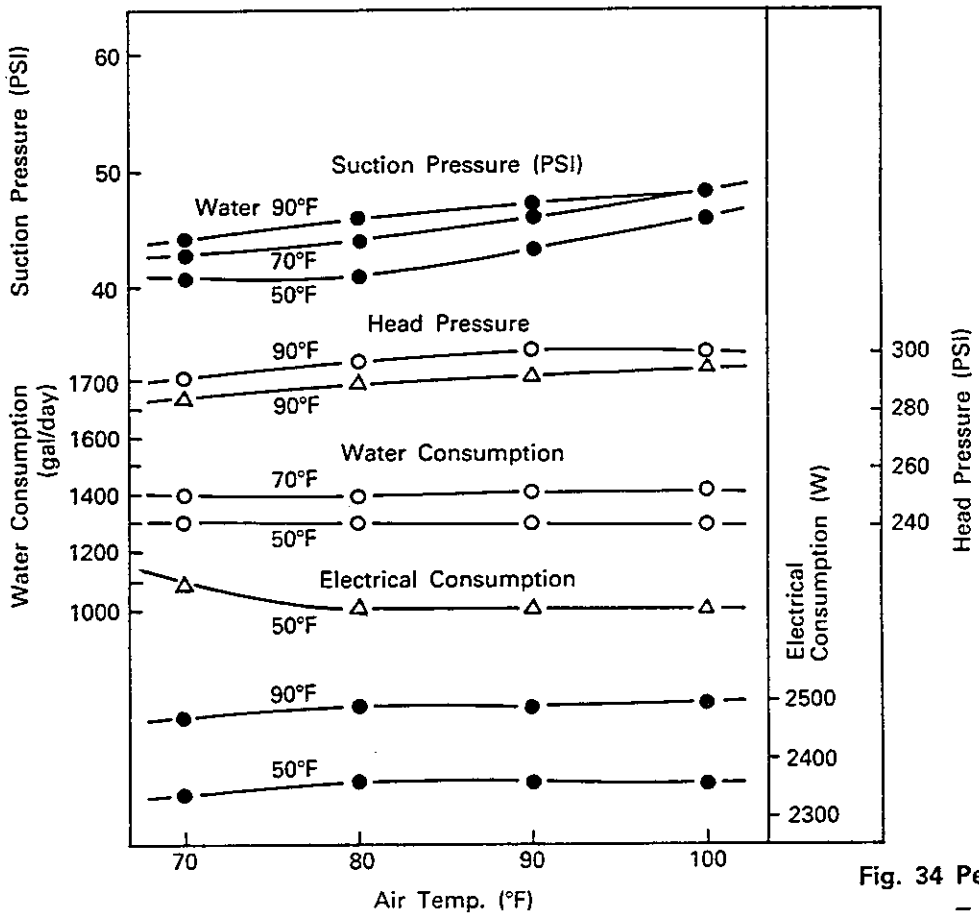


Fig. 34 Performance Data – KM-1201DWU

VI. SERVICE DIAGNOSIS

1. NO ICE PRODUCTION

PROBLEM	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. Fuse (Inside Fused Disconnect, if any)	1. Blownout	1. Check for short-circuit and replace
	c. Bin Control Thermostat	1. Tripped with bin filled with ice	1. Remove ice
		2. Ambient temperature too cool	2. Get warmer
		3. Set too warm	3. Adjust to colder
		4. Bulb out of position	4. Place in position
		5. Bad contacts or leaks from bulb	5. Check for continuity, and replace
2. Compressor will not start, or operates intermittently.	a. Wash Switch	1. WASH position	1. Move to ICE position
		2. Bad contacts	2. Check for continuity and replace
	b. High Pressure Control	1. Bad contacts	1. Check for continuity, with icemaker OFF
		2. Dirty air filter or condenser	2. Clean
		3. Ambient or condenser water temperature too warm	3. Get cooler
		4. Refrigerant overcharged	4. Recharge
		5. Water pressure too low or off	5. Check and get recommended pressure
		6. Fan not operating	6. See chart 1.-6.
		7. Refrigerant line or components plugged	7. Clean and replace drier
	c. Water Regulator	1. Set too high	1. Adjust to lower
	d. Overload	1. Bad contacts	1. Check for continuity, with icemaker OFF
		2. Voltage too low	2. Get higher
		3. Refrigerant overcharged	3. Recharge
	e. Starter	1. Bad contacts	1. Check for continuity, with icemaker OFF
	f. Start Capacitor or Run Capacitor	1. Defective	1. Check for short-circuited, and replace

PROBLEM	POSSIBLE CAUSE		REMEDY
2. Compressor will not start, or operates intermittently.	g. Magnetic Contactor	1. Coil winding opened	1. Replace
		2. Bad contacts or defective coil	2. Check for continuity
	h. Compressor	1. Wiring to compressor	1. Check for loose connection, miswiring or open, and replace
	i. Voltage	1. Too low	1. Get higher
3. No water is supplied.	a. Water Supply Line	1. Water pressure too low or OFF	1. Check and get recommended pressure
	b. Water Solenoid Valve	1. Dirty mesh filter or orifice	1. Clean
		2. Coil winding opened	2. Replace
		3. Wiring to water valve	3. Check for loose connection, miswiring or open, and replace
		4. Check Controller Board	4. See "Checking Controller Board".
4. 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
		2. Check Controller Board	2. See "Checking Controller Board".
5. No water comes from water distributors, or water pump will not start.	a. Water Tank	1. Water level too low	1. See chart 1.-3.
	b. Pump Motor	1. Coil winding opened	1. Replace
		2. Bearing worn out	2. Replace
		3. Wiring to pump motor	3. Check for loose connection, miswiring or open, and replace
		4. Defective Capacitor	4. Replace
		5. Check Controller Board	5. See "Checking Controller Board".
	c. Pump Assembly	1. Defective impeller	1. Replace
		2. Mechanical Seal worn out	2. Check for water leaks, and replace
	d. Water System	1. Water leaks	1. Check connections for water leaks, and replace
6. Fan motor will not start, or is not operating.	a. Fan Motor	1. Wiring to fan motor	1. Check for loose connection, miswiring or open, and replace
		2. Coil winding opened	2. Replace

PROBLEM	POSSIBLE CAUSE		REMEDY
6. Fan motor will not start, or is not operating.	a. Fan Motor	3. Bearing worn out	3. Replace
		4. Defective capacitor	4. Replace
		5. Check Controller Board	5. See "Checking Controller Board".
	b. Fan Blade	1. Bound	1. Check and replace
7. Ice formed on evaporator will not fall into bin.	a. Cube Control Float Switch	1. Float does not move freely	1. Check and replace
		2. Bad contacts	2. Check for continuity and replace
	b. Thermistor	1. Loose attachment	1. Reinstall
		2. Defective	2. Replace
	c. Hot Gas Solenoid Valve	1. Coil winding opened	1. Replace
		2. Plunger does not move	2. Replace
		3. Wiring to hot gas valve	3. Check for loose connection, miswiring or open, and replace
	d. Controller Board	1. Misconnected, or float switch connected to thermistor	1. Place in position
		2. Check Controller Board	2. See "Checking Controller Board".
8. The icemaker skips freezing cycle, or freezing cycle time is too short.	a. Thermistor	1. Connector disconnected	1. Place in position
		2. Leads opened	2. Replace
	b. Cube Control Float Switch	1. Connector disconnected	1. Place in position
		2. Water level too low	2. See chart 1.-3.
		3. Float does not move freely	3. Check and replace
		4. Wiring opened	4. Check for continuity and replace
		5. Defective switch	5. Replace
		6. Check Controller Board	6. See "Checking Controller Board".
9. All components runs, but no ice is produced.	a. Refrigerant	1. Under-charged	1. Check for leaks and recharge
		2. Air or moisture trapped	2. Clean and replace drier, and recharge
	b. Compressor	1. Defective valve	1. Replace
	c. Hot Gas Solenoid Valve	1. Continues to open in freezing cycle	1. Check and replace

2. LOW ICE PRODUCTION

PROBLEM	POSSIBLE CAUSE		REMEDY
1. Freezing cycle time is too long.	a. See Chart 1. And check Dirty filter or condenser, Ambient or water temperature, Water pressure, Water regulator, Thermistor, Refrigerant charge or Water solenoid valve.		
2. Harvest cycle time is too long.	a. Water Tank	1. Water level too low	1. See chart 1.-5.
	b. Hot Gas Solenoid Valve	1. See chart 1.-7.	
		2. Defective low pressure switch	2. Check and replace
	c. Ambient and Water temperature	1. Too cool	1. Get warmer

3. ABNORMAL ICE

PROBLEM	POSSIBLE CAUSE		REMEDY
1. Small cube	a. Water Tank	1. Water level too low	1. See chart 1.-5.
	b. Cube Control Float Switch	1. Upper position	1. Move to lower position
	c. Ice Cube Guide	1. Out of position. Circulated water falls into bin	1. Place in position
2. Cloudy cube	a. Water System	1. Dirty	1. Clean
	b. Water Distributor and Water Supply Guide	1. Plugged	1. Clean
	c. Water Quality	1. High hardness or contains impurities	1. Move water supply control to longer, or install a water softener
	d. Circulated Water	1. Too little	1. See chart 1.-5.

4. OTHERS

PROBLEM	POSSIBLE CAUSE		REMEDY
1. Icemaker will not stop when bin is filled with ice.	a. Bin Control Thermostat	1. Set too cold	1. Adjust to warmer
		2. Defective	2. Replace
2. Abnormal noise	a. Pump Motor	1. Bearings worn out	1. Replace
	b. Fan Motor	1. Bearings worn out	1. Replace
	c. Compressor	1. Bearings worn out, or cylinder valve broken	1. Replace
3. Ice in storage bin often melts.	a. Bin Drain	1. Plugged	1. Clean

VII. REMOVAL AND REPLACEMENT OF COMPONENTS

1. SERVICE FOR REFRIGERANT LINE

DANGER

1. Refrigerant R-502 itself is not flammable, explosive and poisonous. However, when exposed to an open flame, R-502 creates PHOSGENE gas, HARZARDOUS IN LARGE AMOUNTS.
2. Always purge the system through a hose vented to the outside, because it is very dangerous for the room to be filled with R-502, as this easily displaces the Oxygen supply.
3. DO NOT use any silver alloy or copper alloy which contains Arsenic, when attempting brazing.

a. Refrigerant Discharge

A refrigerant access valve is provided with the icemaker unit. Install a proper fitting on the high-side line, if necessary, to check for gauge pressure.

b. Evacuation and Recharge

1. Attach charging hoses, service manifold and vacuum pump to the system.
2. Turn on the vacuum pump.
3. Allow the vacuum pump to pull down to a 29.9"Hg (760 mmHg) vacuum. Evacuating time depends on pump capacity.
4. Close a low-side valve on the service manifold.
5. Disconnect the vacuum pump, and attach a refrigerant service cylinder. Remember to loosen the connection, and purge the air from the hose. See NAMEPLATE for required refrigerant charge.
6. Open the low-side valve. DO NOT invert the service cylinder. A LIQUID CHARGE WILL CAUSE DAMAGE TO COMPRESSOR.
7. Turn on the icemaker when charging speed gets slow. Turn off the icemaker when a low-side pressure shows approximately 0 PSI (10 kg/cm^2). DO NOT run the icemaker at vacuum pressures. Close the low-side valve when the service cylinder gets empty.
8. Repeat the above Step #4 through #7, if necessary, until a required amount of refrigerant enters the system.
9. Disconnect the hoses and service manifold.
10. Cap the access valve to prevent possible leak.

2. BRAZING

All solder-connections on the refrigerant circuit components are clear-paint coated. Sandpaper the solder-connections, before unsoldering the components. Use a good abrasive cloth to remove paint.

3. REMOVAL AND REPLACEMENT OF COMPRESSOR

IMPORTANT

1. DO NOT unsolder or braze pipe connections on the compressor, with the Suction Pressure Regulator exceeding 210°F. Always protect the regulator using a damp cloth, to prevent damage to the regulator against overheat.
2. Always install a new drier any time the sealed refrigeration system is opened. Do not replace the drier until after all other repairs or replacements have been made.

1. Disconnect the power source.
2. Remove the exterior panels.
3. Purge refrigerant from the system.
4. Remove the terminal cover on the compressor, and then disconnect solderless compressor wiring.

5. Remove the discharge pipe and suction pipe by using brazing equipment.
6. Remove the hold-down bolts, washers and grommets.
7. Slide the compressor out and remove.
8. Unpack a new compressor package.
9. Attach the grommets of the old compressor to the new one.
10. Sandpaper the suction pipe and discharge pipe on the compressor.
11. Place the compressor in position, and secure it by using the hold-down bolts and washers.
12. Remove plugs from the suction pipe and discharge pipe. Check that Nitrogen gas flows from the pipes when plugs removed. This means that the new compressor is brand-new.
13. Braze or solder the ACCESS, SUCTION and DISCHARGE LINES, with Nitrogen gas flowing at pressures 3–4 PSI (0.2–0.3 kg/cm^2). DO NOT change this order.
14. Replace the drier.
15. Check for leaks using Nitrogen gas 140 PSI (10 kg/cm^2) and soap bubbles.
16. Evacuate the system and charge refrigerant. See NAMEPLATE for required refrigerant charge.
17. Connect the compressor wiring, and place the terminal cover in position.
18. Connect the power source.

4. REMOVAL AND REPLACEMENT OF DRIER

IMPORTANT

Always install a new drier, any time the sealed refrigeration system is opened.
Do not replace the drier until after all other repairs or replacements have been made.

1. Disconnect the power source.
2. Remove the exterior panels.
3. Purge refrigerant from the system.
4. Disconnect the drier by using brazing equipment.
5. Braze or solder a new drier, with the ARROW on the drier, in the direction of refrigerant flow. And with Nitrogen gas flowing at pressures 3–4 PSI (0.2–0.3 kg/cm^2).
6. Check for leaks by using Nitrogen gas at 140 PSI (10 kg/cm^2) and soap bubbles.
7. Evacuate the system and charge refrigerant. See NAMEPLATE for required refrigerant charge.
8. Connect the power source.
9. Place the exterior panels in position.

5. REMOVAL AND REPLACEMENT OF EXPANSION VALVE

IMPORTANT

Always install a new drier, any time the sealed refrigeration system is opened.
Do not replace the drier until after all other repairs or replacements have been made.

1. Disconnect the power source.
2. Remove the front panel.
3. Purge refrigerant from the system.
4. Remove the expansion valve bulb.
5. Disconnect flare-connections and remove the expansion valve.
6. Install a new expansion valve in reverse order.
7. Replace the drier.
8. Check for leaks using Nitrogen gas (140 PSI) and soap bubbles.
9. Evacuate the system and charge refrigerant.
   See NAMEPLATE for required refrigerant charge.
10. Attach the bulb to the suction line in position.
    Be sure to secure it using a wire, and tape insulation.
11. Place the panel in position.
12. Connect the power source.

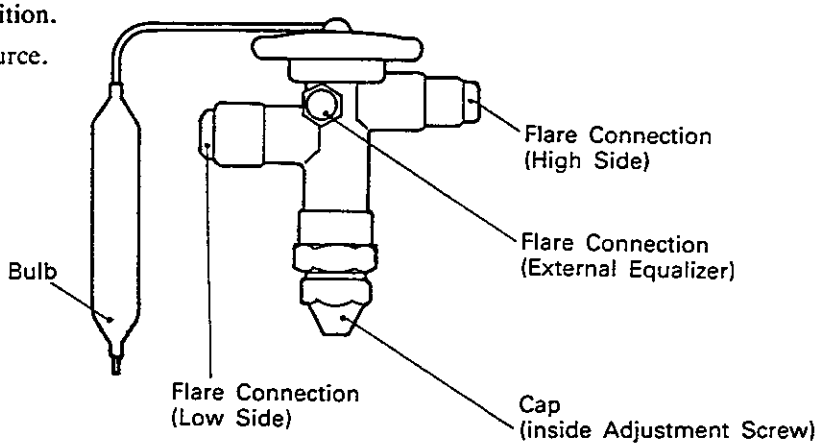


Fig. 35 Expansion Valve

6. REMOVAL AND REPLACEMENT OF HOT GAS VALVE

IMPORTANT

Always install a new drier, any time the sealed refrigeration system is opened.
Do not replace the drier until after all other repairs or replacements have been made.

1. Disconnect the power source.
2. Remove the exterior panels.
3. Purge refrigerant from the system.
4. Disconnect the hot gas valve leads, and remove screw and solenoid.
5. Unsolder the solder-connections using brazing equipment.
6. Install a new valve. Always protect the valve body using a damp cloth to prevent damage to valve against overheat. DO NOT braze with the valve body exceeding 250°F. Use Nitrogen gas at the pressure of 3–4 PSI when brazing the valve.

7. Replace the drier.
8. Check for leaks using Nitrogen gas (140 PSI) and soap bubbles.
9. Evacuate the system and charge refrigerant.
   See NAMEPLATE for required refrigerant charge.
10. Attach the solenoid to the valve body, and secure it with screw.
11. Connect the leads.
12. Place the panels in position.
13. Connect the power source.

NOTE: Always use same diameter and length of copper pipe when replacing hot gas lines. This may otherwise cause much reduction of performance.

7. REMOVAL AND REPLACEMENT OF WATER REGULATOR (for Water-cooled Model only)

IMPORTANT

Always install a new drier, any time the sealed refrigeration system is opened.
Do not replace the drier until after all other repairs or replacements have been made.

1. Close the water supply line shut-off valve.
2. Disconnect the power source.
3. Remove the exterior panels.
4. Purge refrigerant from the system.
5. Locate the capillary tube solder-connection on the high-side line. And cut off the copper pipe near the capillary tube solder-connection, by using a pipe cutter.
6. Cut off the capillary tubes for the water regulator and the high-pressure control switch respectively next to solder-connection, by using a file and pliers.
   Be very careful not to damage the capillary the tube ends.
7. Disconnect the flare-connections on the water regulator.
8. Remove screws and regulator from the mounting bracket.
9. Install a new water regulator, with the ARROW on the valve body, in the direction of the water flow. And insert the both capillary tubes into the copper pipe.
10. Reduce the diameter of the copper tube end, and braze or solder copper pipe and the capillary tubes together.
11. Replace the drier.
12. Check for leaks using Nitrogen gas 140 PSI (10 kg/cm^2) and soap bubbles.
13. Evacuate the system and charge refrigerant. See NAMEPLATE for required refrigerant charge.
14. Connect the flare-connections.
15. Open the water supply line shut-off valve.
16. Connect the power source.
17. Check for water leaks.
18. Place the exterior panels in position.

Adjustment

The water regulator is factory adjusted. No adjustment is required under normal use. Adjust a water regulator, if necessary, using following procedures.

(1) Attach a pressure gauge to the high-side line of the system. Or prepare a thermometer to check for the condenser drain temperature.

(2) Rotate the adjustment screw by using a wrench, so that the pressure gauge shows 250 PSI (17.5 kg/cm^2), or the thermometer reads 110–115°F (43–46°C), in 5 (five) minute after a freeze cycle or icemaking process starts. When the pressure exceeds 250 PSI (17.5 kg/cm^2), or the condenser drain temperature exceeds 110°F (43°C), rotate the adjustment screw CCW (Counterclockwise).

(3) Check that the pressure or the condenser drain temperature holds a stable setting.

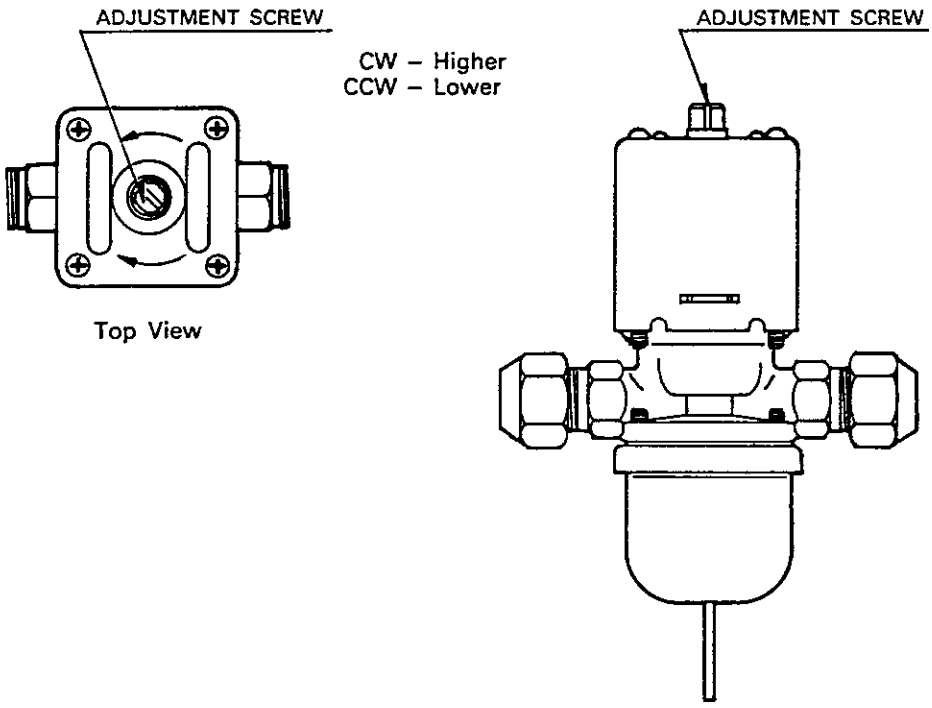


Fig. 36 Water Regulator

8. REMOVAL AND REPLACEMENT OF SUCTION PRESSURE REGULATOR

IMPORTANT

Always install a new drier, any time the sealed refrigeration system is opened.
Do not replace the drier until after all other repairs or replacements have been made.

1. Disconnect the power source.
2. Remove the exterior panels.
3. Purge refrigerant from the system.
4. Unsolder the solder-connections using brazing equipment.
5. Install a new regulator. Always protect the regulator using a damp cloth to prevent damage to regulator against overheat. DO NOT braze with the regulator body exceeding 210°F. Use Nitrogen gas at the pressure of 3–4 PSI, when brazing the regulator.
6. Replace the drier.
7. Check for leaks using Nitrogen gas (140 PSI) and soap bubbles.
8. Be sure to replace foam insulation.
9. Evacuate the system and charge refrigerant. See NAMEPLATE for required refrigerant charge.
10. Place the panels in position.
11. Connect the power source.

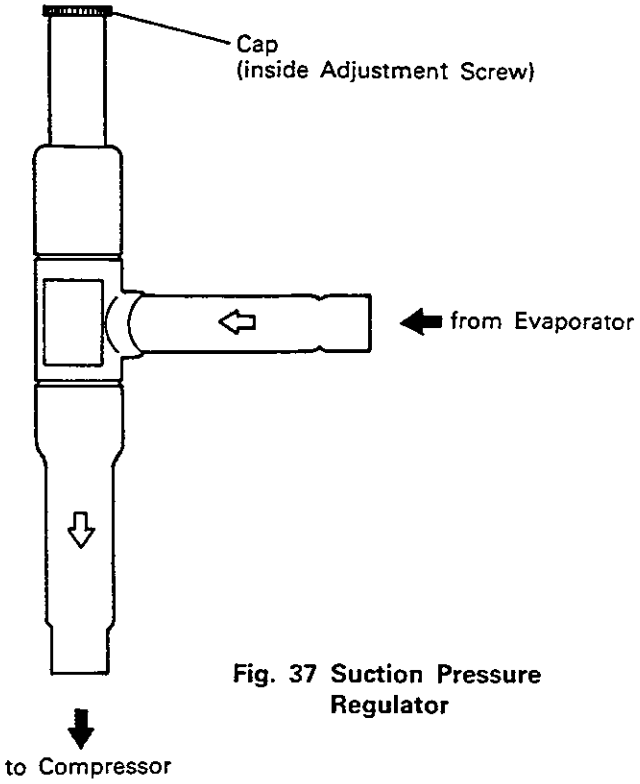


Fig. 37 Suction Pressure Regulator

Adjustment

The suction pressure regulator is factory adjusted. No adjustment is required under normal use. Adjust a suction pressure regulator, if necessary, using following procedures.

(1) Always try to adjust a suction pressure regulator at ambient temperatures above 90°F (32°C), in order to obtain accurate setting.

(2) Attach a pressure gauge to the refrigerant access valve, provided on the compressor process tube.

(3) Remove a cap from the suction pressure regulator. And rotate adjustment screw, so that the pressure gauge shows 85 PSI (6 kg/cm^2). When the pressure exceeds 85 PSI (6 kg/cm^2), rotate the adjustment screw CCW.

(4) Be sure to replace the cap, or moisture enters the regulator resulting in failure.

9. REMOVAL AND REPLACEMENT OF CONDENSING PRESSURE REGULATOR
(Air-cooled Remote model only)

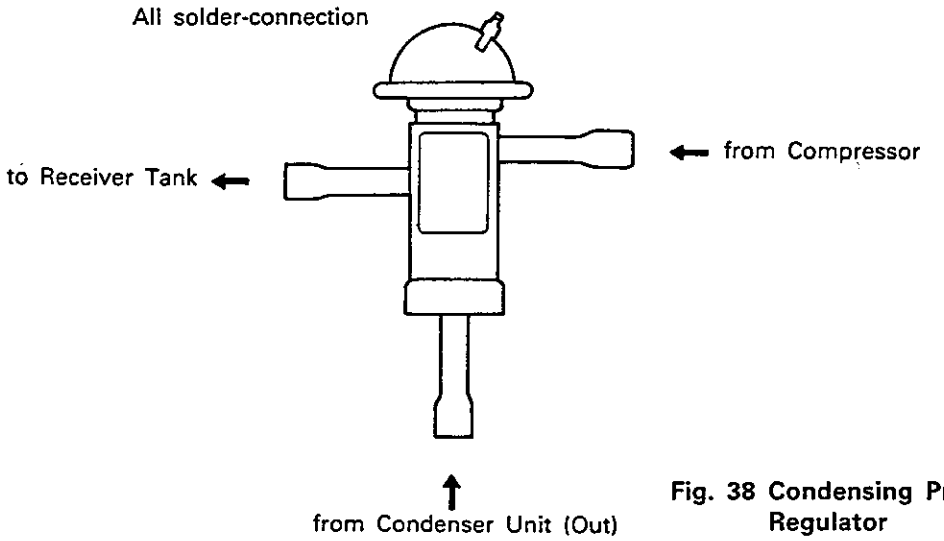


Fig. 38 Condensing Pressure Regulator

IMPORTANT

Always install a new drier, any time the sealed refrigeration system is opened.
Do not replace the drier until after all other repairs or replacements have been made.

1. Disconnect the power source.
2. Remove the exterior panels.
3. Purge refrigerant from the system.
4. Remove the exterior panel on the remote condenser unit. And locate the regulator.
5. Unsolder the solder-connections using brazing equipment.
6. Install a new regulator. Always protect the regulator using a damp cloth to prevent damage to regulator against overheat. DO NOT braze with the regulator body exceeding 250°F. Use Nitrogen gas at the pressure of 3–4 PSI. when brazing the regulator.
7. Replace the drier.
8. Check for leaks using Nitrogen gas (140 PSI) and soap bubbles.
9. Evacuate the system and charge refrigerant. See NAMEPLATE for required refrigerant charge.
10. Place the panels in position.
11. Connect the power source.

10. REMOVAL AND REPLACEMENT OF FAN MOTOR

1. Disconnect the power source.
2. Remove the exterior panels.
3. Remove the wire connectors from the fan motor leads.
4. Remove the fan motor bracket and fan motor.
5. Install a new fan motor in reverse order.
6. Place the panels in position.
7. Connect the power source.

11. REMOVAL AND REPLACEMENT OF WATER VALVE

1. Close the water supply line shut-off valve.
2. Disconnect the power source.
3. Remove the front panel, separating panel and water valve cover.
4. Disconnect the receptacle (leads) from the water valve.
5. Remove the valve outlet tubing disconnecting the clamp.
6. Remove the fitting (nut) and water valve.
7. Remove the bracket from the unit.
8. Install a new valve in reverse order.
9. Open the shut-off valve.
10. Connect the power source.
11. Check for leaks.
12. Place the panels in position.

12. REMOVAL AND REPLACEMENT OF PUMP MOTOR

1. Disconnect the power source.
2. Remove the front panel.
3. Remove the cover for capacitor.
4. Remove the wire connectors from the pump motor leads.
5. Remove the mounting bracket for capacitor, and then remove screws securing the mounting bracket for pump motor.
6. Disconnect the pump suction and discharge tubings.
7. Disassemble the pump motor, and check motor or parts.
8. Install a new motor or parts in reverse order.
9. Connect the power source, and check for leaks.
10. Place the panels in position.

13. REMOVAL AND REPLACEMENT OF WATER DISTRIBUTOR

1. Disconnect the power source, and close the water supply line shut-off valve.
2. Remove the front panel and separating panel.
3. Remove the rubber hose from the water distributors by removing clamps.
4. Loosen the fasteners (Plungers) on the water distributors by pulling the heads.
5. Remove the water distributors.
6. Install new water distributors in reverse order.
7. Place the panels in position.
8. Open the shut-off valve, and connect the power source.