Hoshizaki America, Inc.

Modular Flaker

Models
FD-1001MAH(-C)
FD-1001MWH(-C)
FD-1001MRH(-C)
FD-1001MLH(-C)

SERVICE MANUAL

"A Superior Degree of Reliability"

www.hoshizaki.com

ISO
HOSHIZAKI • ISO 9001

Number: 73159
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IMPORTANT

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

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

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

HOSHIZAKI AMERICA, INC.
618 Highway 74 South
Peachtree City, GA 30269

Attn: Hoshizaki Technical Support Department

Phone: 1-800-233-1940 Technical Support
(770) 487-2331
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(770) 487-3360
E-mail: techsupport@hoshizaki.com

Web Site: www.hoshizaki.com

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

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

IMPORTANT

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

CONTENTS

Important Safety Information

Throughout this manual, notices appear to bring your attention to situations which could result in death, serious injury, or damage to the unit.

⚠ WARNING **Indicates a hazardous situation which could result in death or serious injury.**

CAUTION **Indicates a situation which could result in damage to the unit.**

IMPORTANT **Indicates important information about the use and care of the unit.**

⚠ WARNING

This icemaker should be destined only to the use for which it has been expressly conceived. Any other use should be considered improper and therefore dangerous. The manufacturer cannot be held responsible for eventual damage caused by improper, incorrect, and unreasonable use.

To reduce the risk of death, electric shock, serious injury, or fire, follow basic precautions including the following:

- Electrical connection must be hard-wired and must meet national, state, and local electrical code requirements. Failure to meet these code requirements could result in death, electric shock, serious injury, fire, or severe damage to equipment.
- This unit requires an independent power supply. See the nameplate for proper voltage and breaker/fuse size. Failure to use a proper breaker or fuse can result in a tripped breaker, blown fuse, or damage to existing wiring. This could lead to heat generation or fire.
- **THIS UNIT MUST BE GROUNDED.** Failure to properly ground this unit could result in death or serious injury.
- This unit should be disassembled or repaired only by qualified service personnel to reduce the risk of electric shock, injury, or fire.
- Do not make any alterations to the unit. Alterations could result in electric shock, injury, fire, or damage to the unit.

I. Specifications

A. Icemaker

1. FD-1001MAH (air-cooled)

Awaiting Data

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

2. FD-1001MAH-C (air-cooled)

AC SUPPLY VOLTAGE	208-230/60/1 (3 wire with neutral for 115V)			
COMPRESSOR	240 V	4.2 RLA	34 LRA	
GEAR MOTOR	120 V	3 FLA	1/4 HP	
FAN MOTOR	115 V	0.85FLA	1/15 HP	
OTHER	120 V	0.03A		
MAXIMUM FUSE SIZE	15 A			
MAX. HACR BREAKER (USA ONLY)	15 A			
MAX. CIRC. BREAKER (CANADA ONLY)	15 A			
MINIMUM CIRCUIT AMPACITY	15 A			

APPROXIMATE ICE PRODUCTION PER 24 HR. lbs./day (kg/day) Reference without *marks	Ambient Temp.(°F)	WATER TEMP. (°F) 50	70	90
	70	*940 (427)	890 (405)	855 (389)
	80	820 (373)	790 (358)	755 (344)
	90	725 (330)	*695 (317)	670 (304)
	100	640 (292)	615 (280)	*580 (265)

SHAPE OF ICE	Cubelet	
ICE QUALITY	Approx. 80%, Ice (90/70°F, Conductivity 200 µs/cm)	
APPROXIMATE STORAGE CAPACITY	N/A	
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F
ELECTRIC W (kWH/100 lbs.)	1390 (4.8)	1320 (3.4)
POTABLE WATER gal./24HR (gal./100 lbs.)	86 (12)	113 (12)
EXTERIOR DIMENSIONS (WxDxH)	22" x 24" x 25-15/16" (560 x 610 x 658mm)	
EXTERIOR FINISH	Stainless Steel, Galvanized Steel (Rear)	
WEIGHT	Net 176 lbs. (80 kg), Shipping 205 lbs. (93 kg)	
CONNECTIONS - ELECTRIC	Permanent - Connection	
- WATER SUPPLY	Inlet 1/2" FPT	
- DRAIN	Outlet 3/4" FPT	
ICE MAKING SYSTEM	Auger type	
HARVESTING SYSTEM	Direct Driven Auger (1/4 HP Gear Motor)	
ICE MAKING WATER CONTROL	Float Switch	
COOLING WATER CONTROL	N/A	
BIN CONTROL SYSTEM (PRIMARY)	Photoelectric Sensor	
BIN CONTROL SYSTEM (SECONDARY)	Mechanical Bin Control (Proximity Sw.)	
COMPRESSOR	Hermetic, Model RS70-C1E-PFV	
CONDENSER	Air-cooled, Fin and tube type	
EVAPORATOR	Copper Tube on Cylinder	
REFRIGERANT CONTROL	Thermostatic Expansion Valve	
REFRIGERANT CHARGE	R-404A, 1 lb.12oz. (800g)	
DESIGN PRESSURE	High 427 PSIG, Low 230 PSIG	
P.C. BOARD CIRCUIT PROTECTION	High Voltage Cut-off Relay	
COMPRESSOR PROTECTION	Internal Protector	
GEAR MOTOR PROTECTION	Fuse (3A)	
REFRIGERANT CIRCUIT PROTECTION	Auto-reset High Pressure Control Switch	
LOW WATER PROTECTION	Float Switch and Timer	
ACCESSORIES -SUPPLIED	Spare Fuse	
-REQUIRED	Ice Storage Bin	
OPERATING CONDITIONS	VOLTAGE RANGE	187-253 V
	AMBIENT TEMP.	45-100° F
	WATER SUPPLY TEMP.	45-90° F
	WATER SUPPLY PRESSURE	10-113 PSIG

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

3. FD-1001MWH (water-cooled)

Awaiting Data

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

4. FD-1001MWH-C (water-cooled)

Awaiting Data

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

5. FD-1001MRH (remote air-cooled)

Awaiting Data

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

6. FD-1001MRH-C (remote air-cooled)

AC SUPPLY VOLTAGE	208-230/60/1 (3 wire with neutral for 115V)			
COMPRESSOR	240 V	4.2 RLA	34 LRA	
GEAR MOTOR	120 V	3 FLA	1/4 HP	
FAN MOTOR REMOTE	115 V	3A	MAX	
OTHER	120 V	0.03A		
MAXIMUM FUSE SIZE	15 A			
MAX. HACR BREAKER (USA ONLY)	15 A			
MAX. CIRC. BREAKER (CANADA ONLY)	15 A			
MINIMUM CIRCUIT AMPACITY	15 A			

APPROXIMATE ICE PRODUCTION PER 24 HR. lbs./day (kg/day) Reference without *marks	Ambient Temp.(°F)	WATER TEMP. (°F) 50	70	90
	70	*930 (423)	895 (406)	860 (390)
	80	825 (375)	790 (360)	760 (345)
	90	730 (332)	*720 (326)	670 (306)
	100	645 (294)	620 (282)	*580 (263)

SHAPE OF ICE	Cubelet	
ICE QUALITY	Approx. 80%, Ice (90/70°F, Conductivity 200 µs/cm)	
APPROXIMATE STORAGE CAPACITY	N/A	
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F
ELECTRIC W (kWH/100 lbs.)	1449 (4.8)	1401 (3.6)
POTABLE WATER gal./24HR (gal./100 lbs.)	86 (12)	112 (12)
EXTERIOR DIMENSIONS (WxDxH)	22" x 24" x 25-15/16" (560 x 610 x 658mm)	
EXTERIOR FINISH	Stainless Steel, Galvanized Steel (Rear)	
WEIGHT	Net 176 lbs. (80 kg), Shipping 205 lbs. (93 kg)	
CONNECTIONS - ELECTRIC	Permanent - Connection	
- WATER SUPPLY	Inlet 1/2" FPT	
- DRAIN	Outlet 3/4" FPT	
- REFRIGERATION CIRCUIT	Discharge line 1-1/16-12 UNF Fitting (#10 AEROQUIP)	
	Liquid line 5/8-18 UNF Fitting (#6 AEROQUIP)	
ICE MAKING SYSTEM	Auger type	
HARVESTING SYSTEM	Direct Driven Auger (1/4 HP Gear Motor)	
ICE MAKING WATER CONTROL	Float Switch	
COOLING WATER CONTROL	N/A	
BIN CONTROL SYSTEM (PRIMARY)	Photoelectric Sensor	
BIN CONTROL SYSTEM (SECONDARY)	Mechanical Bin Control (Proximity Sw.)	
COMPRESSOR	Hermetic, Model RS70-C1E-PFV	
CONDENSER	Air-cooled Remote Condenser unit URC-5F Recommended	
EVAPORATOR	Copper Tube on Cylinder	
REFRIGERANT CONTROL	Thermostatic Expansion Valve	
	Condensing Pressure Regulator on URC-5F	
REFRIGERANT CHARGE	R-404A, 4 lb.1oz. (1850g)	
	(Ice Maker: 2 lb. 3 oz., Cond. Unit: 1 lb. 14 oz.)	
DESIGN PRESSURE	High 427 PSIG, Low 230 PSIG	
P.C. BOARD CIRCUIT PROTECTION	High Voltage Cut-off Relay	
COMPRESSOR PROTECTION	Internal Protector	
GEAR MOTOR PROTECTION	Fuse (3A)	
REFRIGERANT CIRCUIT PROTECTION	Auto-reset High Pressure Control Switch	
LOW WATER PROTECTION	Float Switch and Timer	
ACCESSORIES -SUPPLIED	Spare Fuse	
-REQUIRED	Ice Storage Bin	
OPERATING CONDITIONS	VOLTAGE RANGE	187-253 V
	AMBIENT TEMP.	45-100° F
	WATER SUPPLY TEMP.	45-90° F
	WATER SUPPLY PRESSURE	10-113 PSIG

7. FD-1001MLH (low side, parallel rack system)

Awaiting Data

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

8. FD-1001MLH-C (low side, parallel rack system)

Awaiting Data

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

B. Condenser Unit

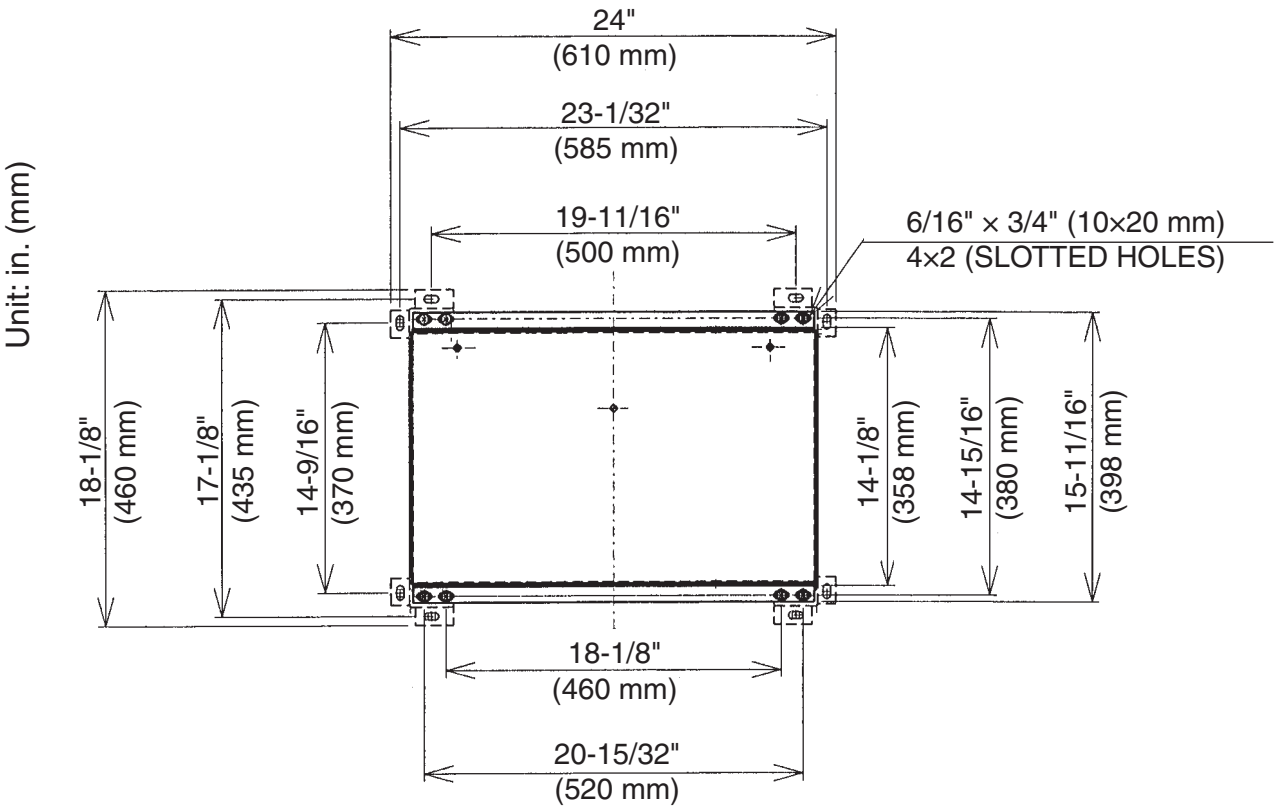
1. URC-5F

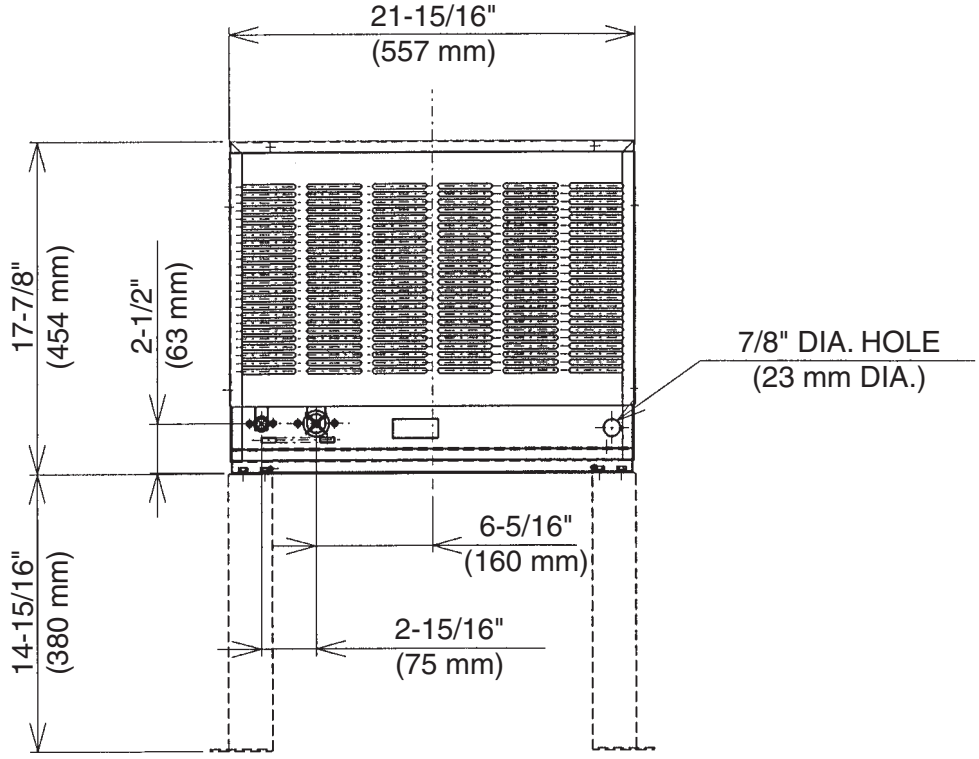
a) Specifications

AC SUPPLY VOLTAGE	115/60/1 (Connection to Icemaker)		
FAN MOTOR	115 V	Total 1.3FLA	65W
EXTERIOR DIMENSIONS (WxDxH)	21-15/16" x 15-11/16" x 17-7/8" (557 x 398 x 454 mm)		
DIMENSIONS INCLUDING LEGS (WxDxH)	24" x 18-1/8" x 32-13/16" (610 x 460 x 834 mm)		
EXTERIOR FINISH	Galvanized Steel		
WEIGHT	Net 61 lbs. (28 kg)	Shipping 68 lbs. (31 kg)	
CONNECTIONS - ELECTRIC	Permanent - Connection		
- REFRIGERANT	Discharge Line 1-1/16"-12 UNF Fitting (#10 AEROQUIP)		
	Liquid Line	5/8"-18 UNF Fitting (#6 AEROQUIP)	
CONDENSER	Air-cooled, Fin and tube type		
FAN MOTOR PROTECTION	Thermal Protection		
REFRIGERANT CONTROL	Condensing Pressure Regulator		
REFRIGERANT CHARGE	R-404A	1 lb. 14 oz.	(850g)
DESIGN PRESSURE	High 467 PSIG		
OPERATING CONDITIONS	VOLTAGE RANGE	104 ~ 127 V	
	AMBIENT TEMP.	-20 ~ 122 °F	
ACCESSORIES -SUPPLIED	Leg		2 pcs
	Hex. Head Bolt w/Washer	8 x 16	8 pcs
	Hex. Nut	8	8 pcs

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

b) Dimensions

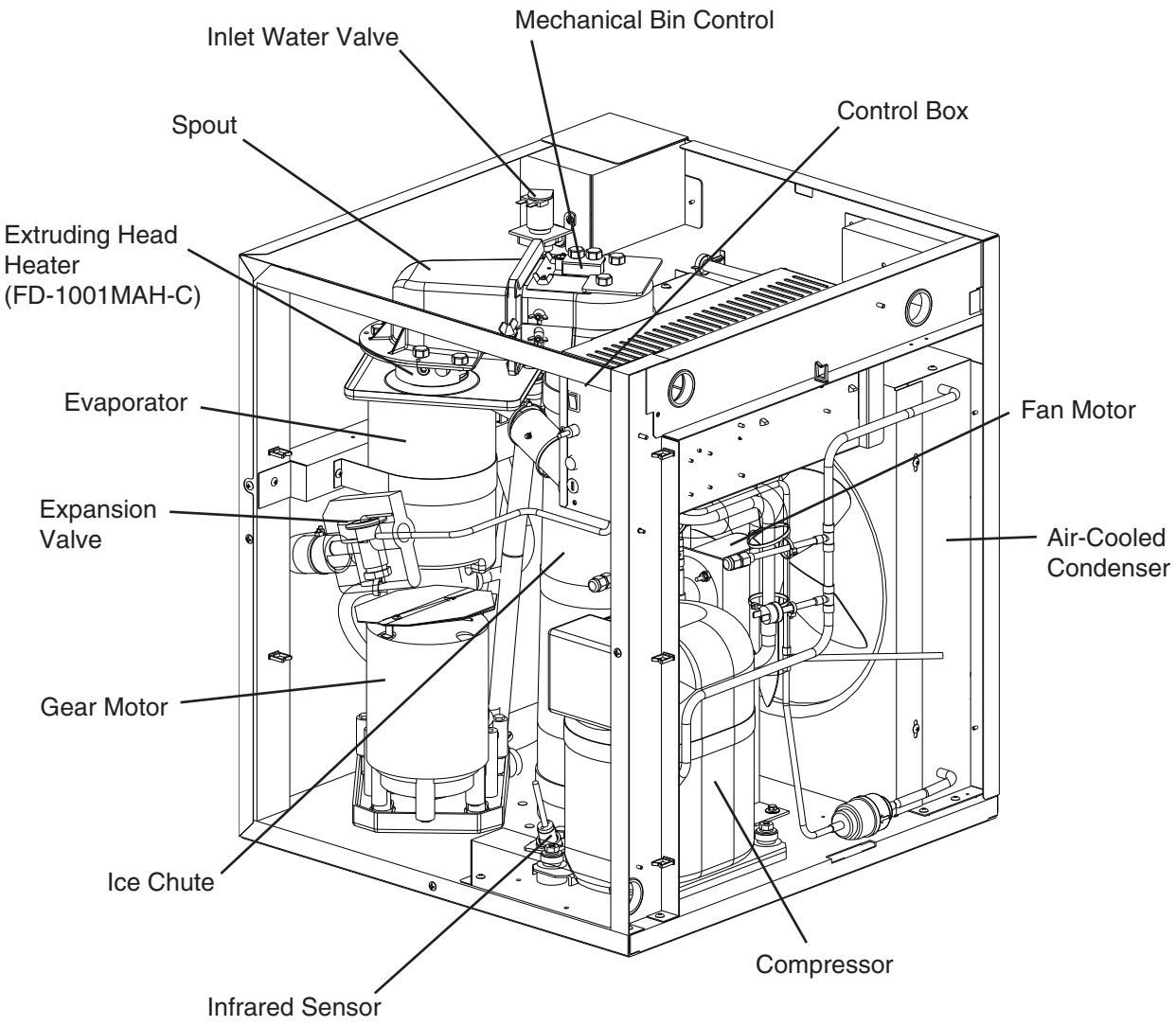




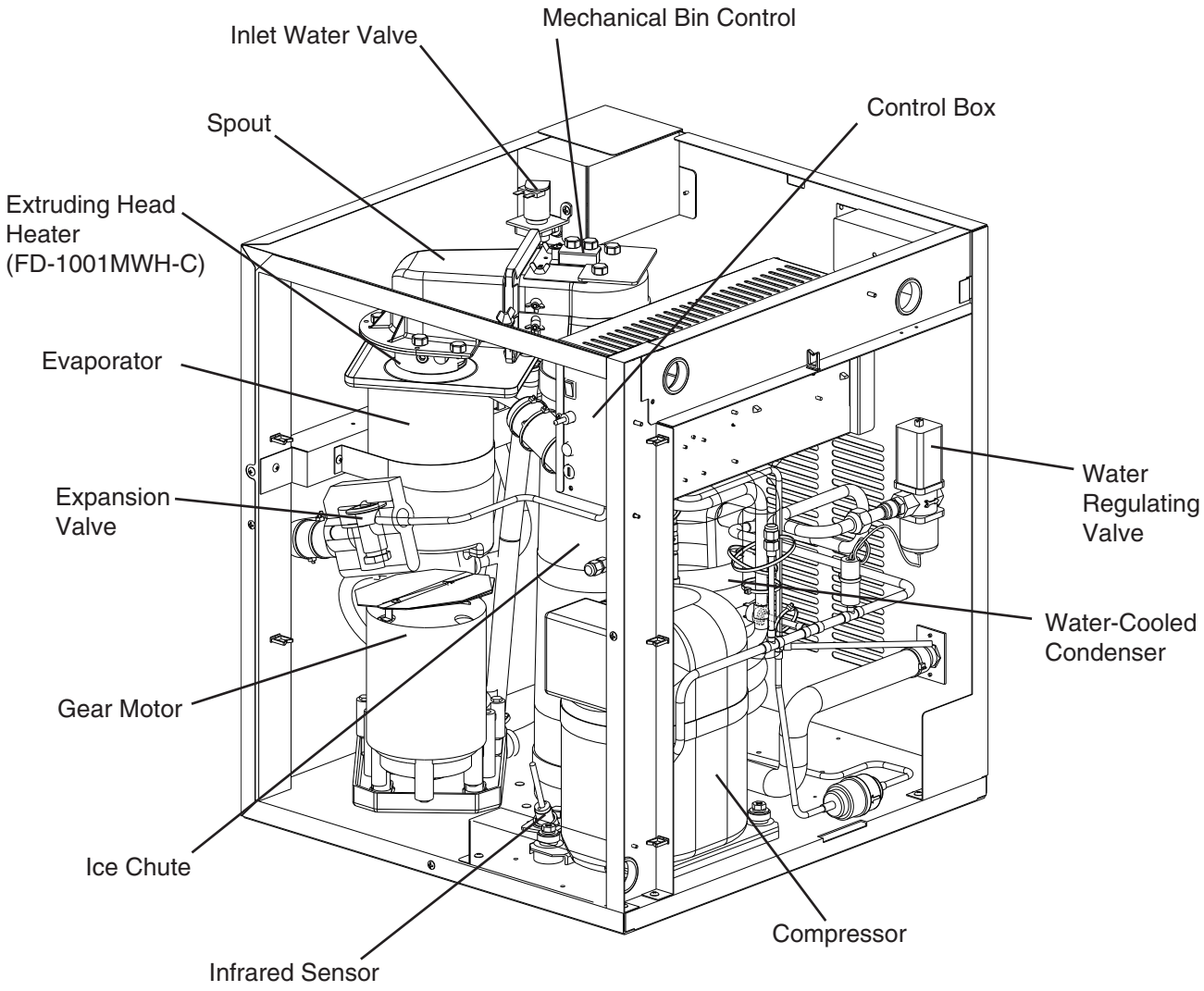
II. General Information

A. Construction

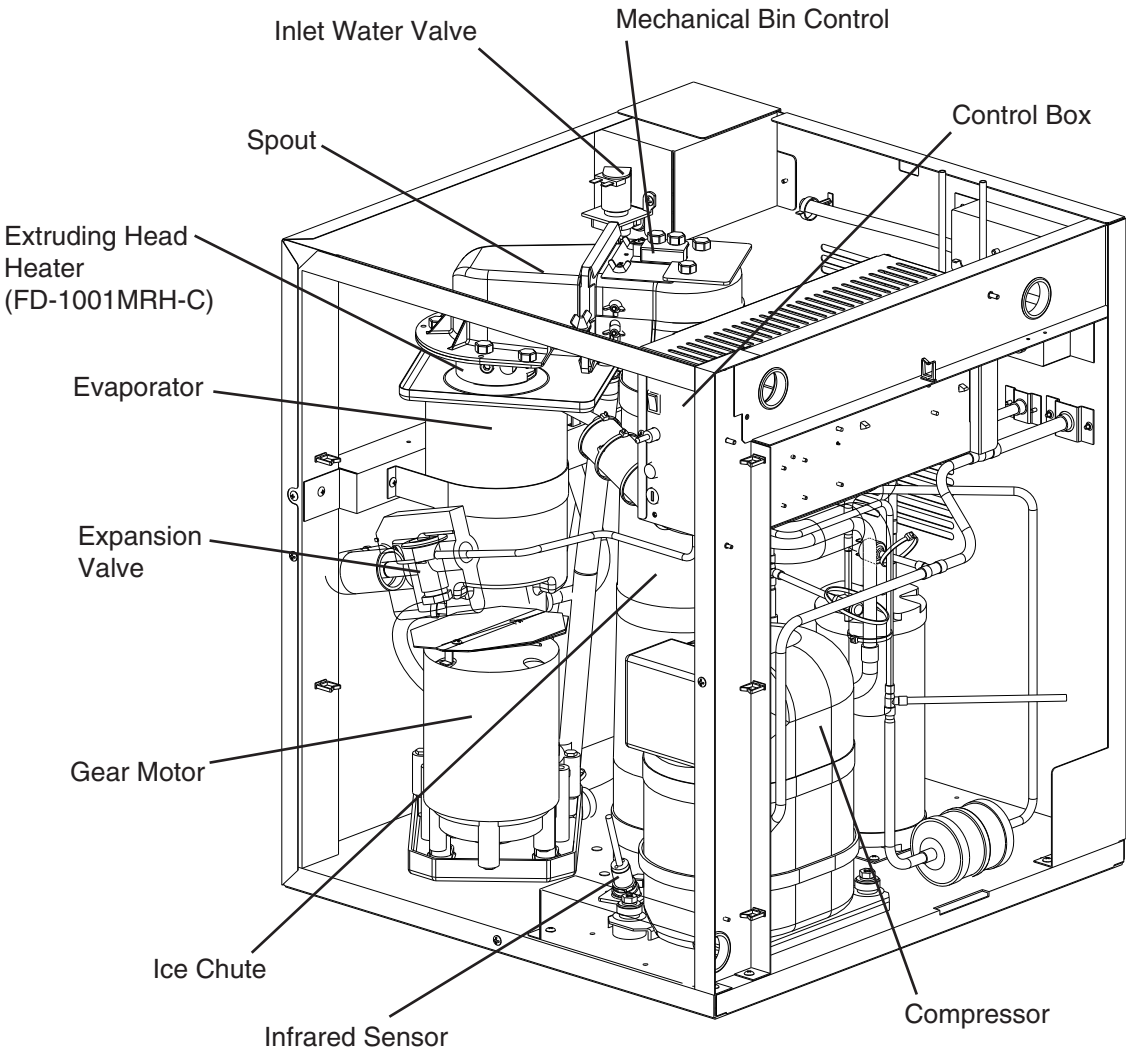
1. FD-1001MAH(-C) (air-cooled)



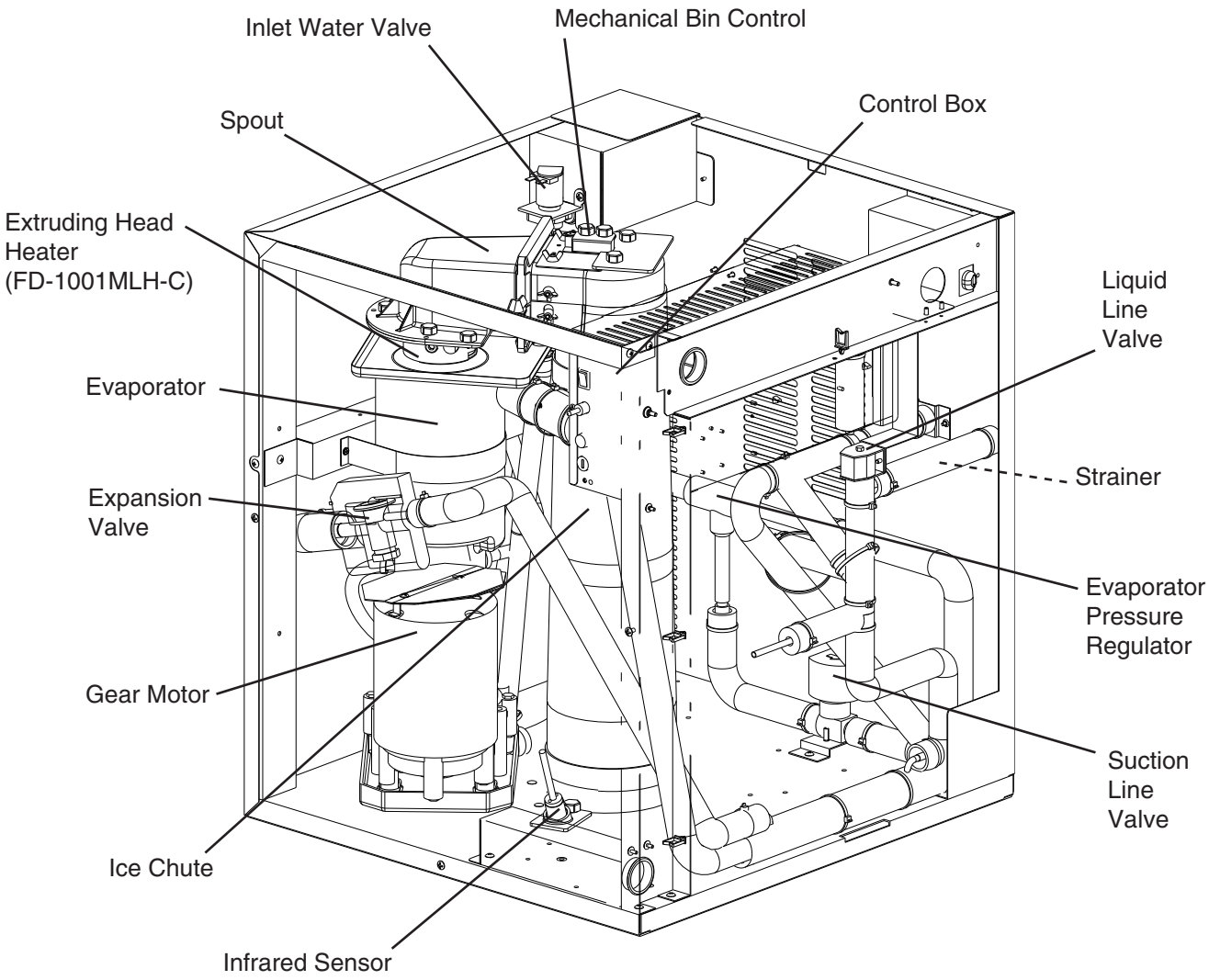
2. FD-1001MWH(-C) (water-cooled)



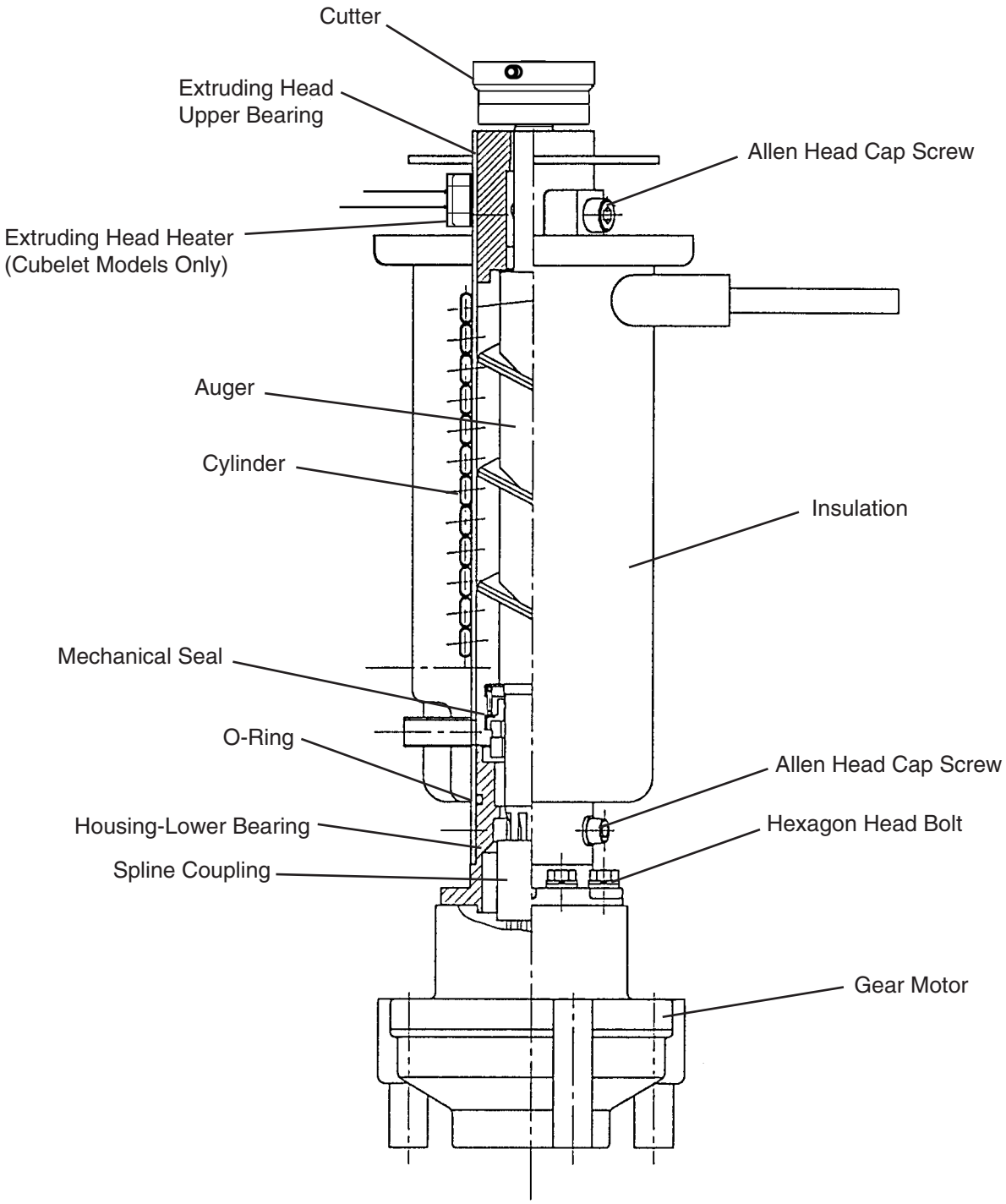
3. FD-1001MRH(-C) (remote air-cooled)



4. FD-1001MLH(-C) (low side, parallel rack system)



5. Ice Making Unit



B. Sequence of Operation

The steps in the sequence are as outlined below. This unit utilizes a control board to switch the components on and off as needed. When power is supplied, the power switch is in the "ON" position, and the control switch is in the "ICE" position, CB "POWER OK" LED comes on.

1. Sequence Cycles and Shutdown

a) Fill Cycle

"WTRIN" LED is on. WV energizes and fill cycle begins. UF/S closes and WV de-energizes. 30-second GM delay timer starts. If UF/S remains open during fill cycle longer than 90 seconds, WV remains energized, and a 1-beep alarm sounds.

b) Ice Purge Cycle

"GM" LED is on. 30-second GM delay timer terminates. GMR (X2 on CB), GM, GMPR, FM/FMR energize. 5-minute ice purge timer starts; GM runs for 5 minutes to clear any ice from the evaporator. To bypass, press the "SERVICE" button on the control board after GM starts. **WARNING! Risk of electric shock. Care should be taken not to touch live terminals.**

Note: UF/S must be closed before GMR will energize.

c) Freeze Cycle

"COMP" and "GM" LEDs are on. 5-minute ice purge timer terminates. GMR (X2 on CB), GM, GMPR, and FM/FMR remain energized, CR (X1 on CB) and Comp energize (LLV and SLV energize on MLH models). As water in the evaporator cools, ice starts forming within 4 to 6 minutes. This time frame depends on the inlet water and ambient temperature conditions. UF/S and LF/S operate WV as needed to continue the ice making process. This continues until BC shuts down the icemaker or power is turned off to the unit.

d) Drain Cycle

(1) 1-in-1 Drain Cycle: DV energizes once every hour when the 1-in-1 drain cycle is activated (S1 dip switch 4 is in the "OFF" position (factory default position)). GMR (X2 on CB), GM, GMPR, FM/FMR, CR (X1 on CB), and Comp continue. DV energizes for 2 seconds every hour. This setting is recommended for optimum icemaker performance. The 1-in-1 drain cycle allows any sediment to drain from the evaporator without interrupting the icemaking process.

(2) 1-in-12 Drain Cycle (optional): DV energizes once every 12 hours when the 1-in-12 drain cycle is activated (S1 dip switch 4 is in the on position (optional)). 12 hour drain cycle timer terminates, CR (X1 on CB) and Comp de-energize (LLV and SLV de-energize on MLH model), GMR (X2 on CB), GM, GMPR, and FM/FMR continue. The 5-minute ice purge timer begins. When the 5-minute ice purge timer terminates, GMR (X2 on CB), GM, GMPR, and FM/FMR de-energize. 10-minute DT begins, DV energizes. After 10-minute DT terminates, 12 hour drain cycle timer starts.

(3) Manual Drain: Manual drain is used when servicing evaporator components and cleaning and sanitizing the unit. When the unit is making ice and the control switch is moved to the "DRAIN" position, there is a 3-second delay, then CR (X1 on CB) and Comp (LLV and SLV on MLH models) de-energize and the 5-minute ice purge timer begins. When the 5-minute ice purge timer terminates, GMR (X2 on CB), GM, GMPR, and FM/FMR de-energize. DV energizes to drain the evaporator and reservoir. To avoid the 5-minute shutdown delay, turn off the power supply, then move the control switch to the "DRAIN" position. Turn on the power supply. DV energizes to drain the evaporator and reservoir. DV de-energizes when the control switch is moved to the "ICE" position.

e) Shutdown Cycle

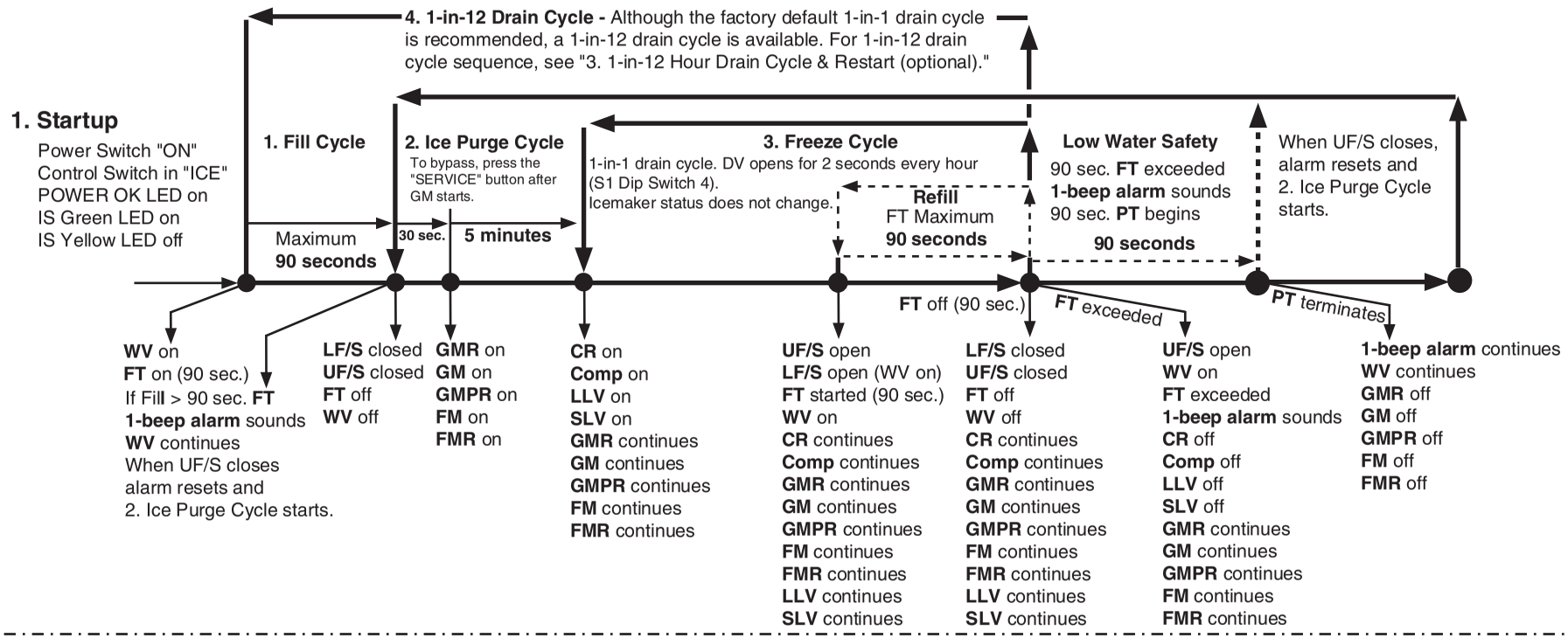
(1) Infrared Sensor: When power is supplied to the icemaker, the green LED on IS turns on. The green LED remains on constantly. As ice fills the storage bin to the level of activating IS, IS yellow LED turns on (flashing or steady). The yellow LED flashes when ice is at the outer limit of its range and turns steady as ice nears. After the yellow LED turns on (flashing or steady), IS shutdown delay timer (S1 dip switch 1, 2, & 3) begins. For a typical dispenser unit application, a 100-second shutdown delay is recommended. When used with a standard Hoshizaki storage bin, any shutdown delay setting is acceptable. See "II.C.4.b) Infrared Sensor Shutdown Delay (S1 dip switch 1, 2, & 3)." Once IS shutdown delay timer terminates, CR (X1 on CB) and Comp (LLV and SLV on MLH models) de-energize and the 5-minute ice purge timer begins. When the 5-minute ice purge timer terminates, GMR (X2 on CB), GM, GMPR, and FM/FMR de-energize. See "II.D. Bin Control."

Note: If IS fails to shutdown the icemaker, MBC opens, CB shuts down the icemaker and a 9-beep alarm sounds.

(2) Mechanical Bin Control: CB shuts down the entire unit within 10 seconds when MBC opens (actuator paddle engaged), and sounds a 9-beep alarm. For further details, see "II.C.4.f) Mechanical Bin Control Shutdown Delay (S1 dip switch 8)" and "II.D. Bin Control."

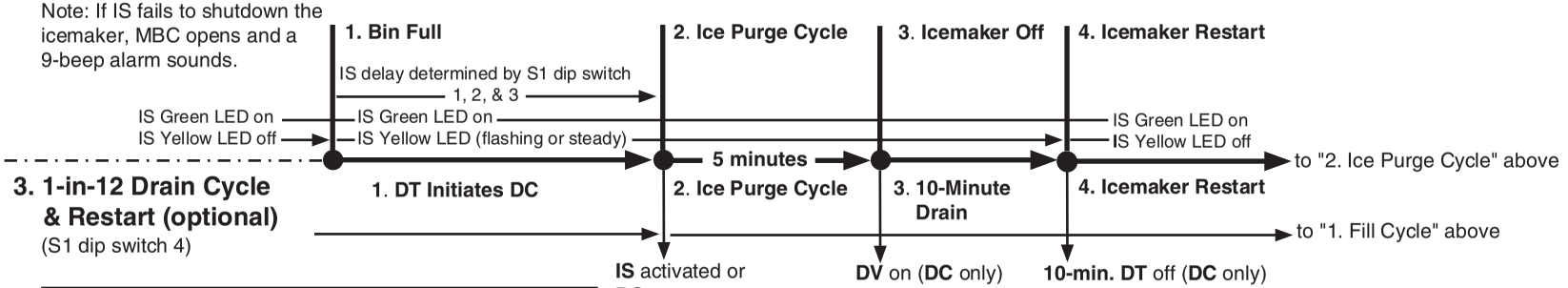
Legend: **BC**–bin control; **CB**–control board; **Comp**–compressor; **CR**–compressor relay; **DT**–drain timer; **DV**–drain valve; **FM**–fan motor; **FMR**–fan motor-remote; **GM**–gear motor; **GMPR**–gear motor protect relay; **GMR**–gear motor relay; **IS**–infrared sensor; **LF/S**–lower float switch; **LLV**–liquid line valve (MLH model); **MBC**–mechanical bin control; **SLV**–suction line valve (MLH model); **UF/S**–upper float switch; **WV**–inlet water valve

FD Sequence Flow Chart



2. Infrared Sensor Shutdown & Restart

Note: If IS fails to shutdown the icemaker, MBC opens and a 9-beep alarm sounds.



3. 1-in-12 Drain Cycle & Restart (optional)

(S1 dip switch 4)

IS activated or
DC starts
CR off
Comp off
LLV off
SLV off
GMR continues
GM continues
GMPR continues
FM continues
FMR continues

DV on (**DC** only)
GMR off
GM off
GMPR off
FM off
FMR off

10-min. DT off (**DC** only)
DV off (**DC** only)
1-in-12 DT reset (**DC** only)

Legend:

Comp-compressor
CR-compressor relay
DC-drain cycle
DT-drain timer
DV-drain valve
FM-fan motor
FMR-fan motor-remote
FT-fill timer (low water safety)
GM-gear motor
GMPR-gear motor protect relay
GMR-gear motor relay (X2 CB)
IS-infrared sensor bin control
LF/S-lower float switch
LLV-liquid line valve (MLH only)
MBC-mechanical bin control
PT-purge timer
SLV-suction line valve (MLH only)
UF/S-upper float switch
WV-water valve

C. Control Board

- A Hoshizaki exclusive control board is employed in FD-1001MAH(-C), FD-1001MWH(-C), FD-1001MRH(-C), and FD-1001MLH(-C) Modular Flakers.
- All models are pre-tested and factory set.

CAUTION

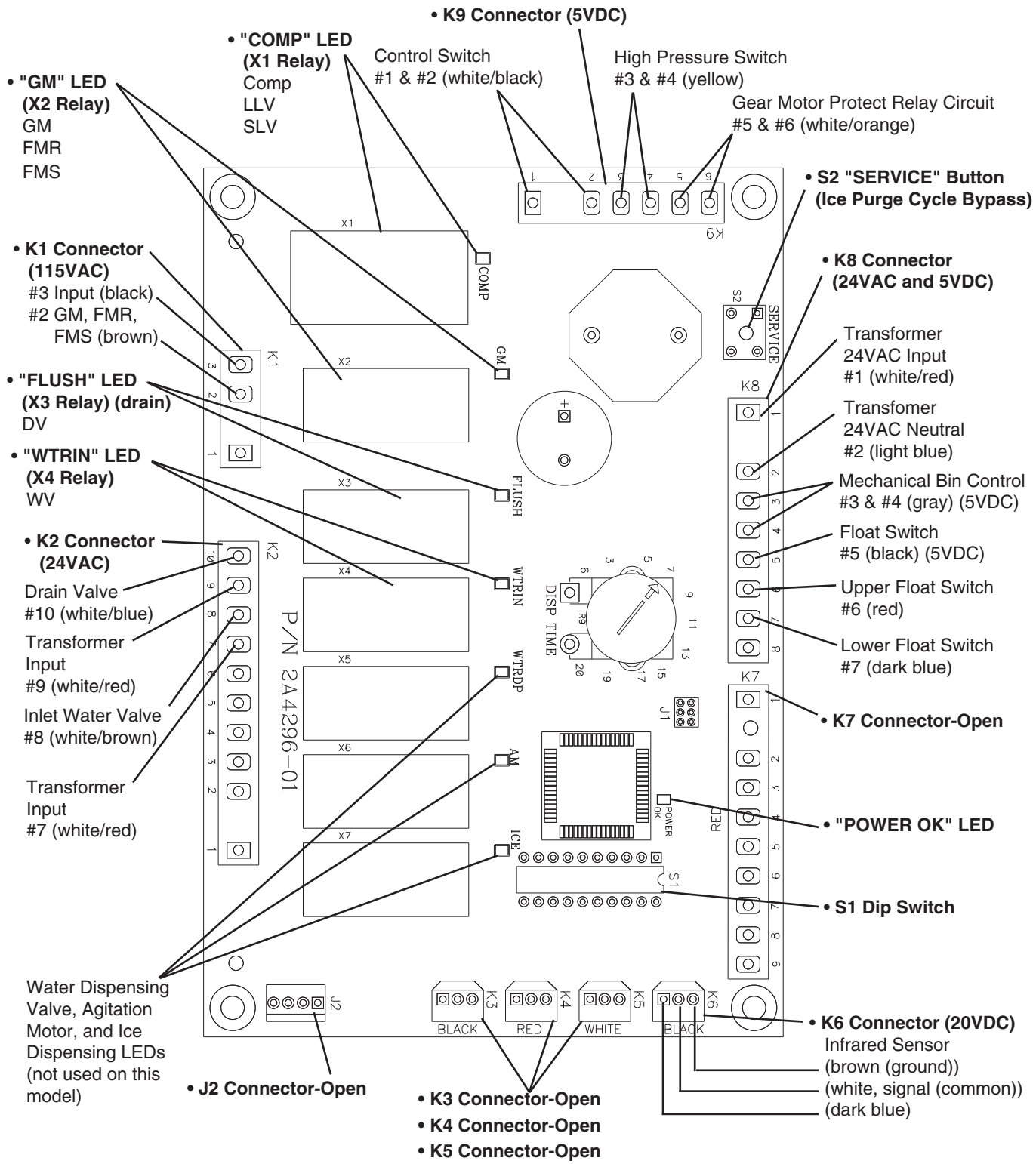
1. The control board is fragile; handle very carefully.
2. The control board contains integrated circuits, which are susceptible to failure due to static discharge. It is especially important to touch the metal part of the icemaker before handling or replacing the control board.
3. Do not touch the electronic devices on the control board or the back of the control board to prevent damage to the control board.
4. Do not change wiring and connections. Never misconnect terminals.
5. Do not short out power supply to test for voltage.
6. Always replace the whole control board if it goes bad.

The control board provides the following safeguards:

- High and low voltage protection.
- Provides component protection during low water supply.
- Purges remaining ice in the evaporator.
- Provides short cycle protection for the compressor.

1. Control Board Layout

"F-A" Control Board



"F-A" Control Board	
Part Number	2A4296-01

2. Features

a) Low Water Safety

When the inlet water valve opens during fill and refill, a 90-second low water safety timer starts. Once the upper float switch closes the 90-second low water safety timer terminates. If the upper float switch remains open longer than 90 seconds, a 1-beep alarm sounds. The water valve and 1-beep alarm continue until the upper float switch closes.

b) Ice Purge Cycle Bypass

To speed up the diagnostic process, the 5-minute ice purge cycle may be bypassed by pressing the "SERVICE" button on the control board after the gear motor starts. **WARNING! Risk of electric shock. Care should be taken not to touch live terminals.**

c) Freeze Timer

A 30-minute freeze timer starts once the upper float switch closes. Should the upper float switch fail to close again before the 30-minute timer terminates, the control board shuts down the icemaker and sounds a 5-beep alarm every 5 seconds. Also, when the lower float switch is open and the upper float switch is closed, the control board sounds a 5-beep alarm every 5 seconds. Both alarms require a manual reset. For further details, see "II.C.3.d) Feeze Timer (5-beep alarm)."

d) Drain Frequency

(1) 1-in-1 Drain Cycle: The 1-hour drain timer terminates, then the drain valve energizes for 2 seconds. This occurs once every hour when the 1-in-1 drain cycle is activated (S1 dip switch 4 in the "OFF" position (factory default)). This setting is recommended for optimum icemaker performance. The 1-in-1 drain cycle allows for maximum drainage of any sediment from the evaporator without interrupting the icemaking process.

(2) 1-in-12 Drain Cycle (optional): The 12-hour drain timer terminates, then the icemaker cycles down and the drain valve energizes for 10 minutes. This occurs once every 12 hours when the 1-in-12 drain cycle is activated (S1 dip switch 4 in the "ON" position (optional)). For further details, see "II.B.1.d) Drain Cycle."

e) Bin Control Shutdown Delay

(1) Infrared Sensor: The ice level at shutoff may need to be adjusted depending on the dispenser agitation or dispense method. For a typical dispenser unit application, a 100-second shutdown delay is recommended. Increasing the shutdown delay setting allows for a higher level of ice in the bin before the icemaker shuts down. When used with a standard Hoshizaki storage bin, any shutdown delay setting is acceptable. For further details, see "II.C.4.b) Infrared Sensor Shutdown Delay (S1 dip switch 1, 2, and 3)."

(2) Mechanical Bin Control: The control board shuts down the entire unit within 10 seconds when the mechanical bin control proximity switch opens (actuator paddle engaged). For further details, see "II.C.4.f) Mechanical Bin Control Shutdown Delay (S1 dip switch 8)."

f) High Voltage and Low Voltage Cut-outs

The maximum and minimum allowable supply voltages of this icemaker are limited by the high voltage (147Vac±5% or more) and low voltage (92Vac±5% or less) cut-outs.

When high voltage (147Vac±5% or more) is present, the icemaker automatically stops and the control board signals with a 7-beep alarm every 3 seconds.

When low voltage (92Vac±5% or less) is present, the icemaker automatically stops and the control board signals with a 6-beep alarm every 3 seconds.

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

g) LED Lights and Alarm Safeties Chart

The "POWER OK" LED indicates proper control voltage and will remain on unless a control voltage problem occurs. For further details, see "II.B. Sequence of Operation."

Sequence Step	LED	Energized Components	Min.	Max.
Fill Cycle	WTRIN	WV	-	-
Ice Purge Cycle	GM	GM, FM/FMR	5 min.	5 min.
Freeze Cycle (with refill)	GM, WTRIN* (refill), COMP	GM, Comp, FM/FMR, LLV, SLV, WV* (refill)	-	*On until UF/S closes. Alarm sounds after 90 sec.
Drain Cycle	FLUSH (Drain)	DV	2 sec.	10 min.

The built-in alarm safeties shut down the unit.

No. of Beeps (every 5 sec.)	Type of Alarm	Reset Options
1	Low Water Safety UF/S open > 90 seconds after WV energized.	Automatic reset once water supply is restored and UF/S closes.
2	Control Switch In "DRAIN" position longer than 15 minutes.	Automatic reset once the control switch is moved to the "ICE" position.
3	High Pressure Switch First and second activation in 1 hour.	Automatic reset once pressure drops below the high pressure threshold and the high pressure switch closes.
4	High Pressure Switch Third activation in 1 hour.	Call for service. To avoid possible catastrophic failure, it is recommended to leave the icemaker off until this alarm is resolved. Manual reset. Turn power off and on again.
5	Freeze Timer WV off > 30 minutes since last WV activation.	Manual reset. Turn power off and on again.
6	Low Voltage (92Vac ±5% or less)	"POWER OK" LED turns off if voltage protection operates. The control voltage safeties automatically reset when voltage is corrected.
7	High Voltage (147Vac ±5% or more)	
8	Gear Motor GMPR contacts fail to close.	Manual reset. Turn power off and on again.
9	Infrared Sensor (S1 dip switch 7) MBC actuator paddle engaged.	Manual reset. Turn power off and on again.

Legend: **Comp**–compressor; **DV**–drain valve; **FM**–fan motor; **FMR**–fan motor-remote; **GM**–gear motor; **GMPR**–gear motor protect relay; **LLV**-liquid line valve (MLH model only); MBC–mechanical bin control; **SLV**–suction line valve (MLH model only); **UF/S**–float switch; **WV**–inlet water valve

3. Alarm Safeties

a) Low Water Safety (1-beep alarm)

(1) Fill Cycle: If upper float switch remains open 90 seconds after the inlet water valve has energized, the control board sounds a 1-beep alarm every 5 seconds. The alarm resets and the icemaker automatically starts running again once water is restored or the float switch is cleaned or replaced.

(2) Freeze Cycle/Refill: If upper float switch remains open 90 seconds after the inlet water valve energizes, the compressor de-energizes and the control board sounds a 1-beep alarm every 5 seconds. The gear motor continues for another 90 seconds to clear the ice from the evaporator. The inlet water valve and 1-beep alarm continue until the upper float switch closes. The alarm resets and the icemaker automatically starts running again when the upper float switch closes.

b) Control Switch in the "DRAIN" Position (2-beep alarm)

When the control switch is left in the "DRAIN" position longer than 15 minutes, the control board sounds a 2-beep alarm every 5 seconds. When the control switch is moved to the "ICE" position, the alarm resets and the icemaker starts running again.

c) High Pressure Switch (3 & 4-beep alarms)

(1) 3-beep alarm: For the first and second high pressure switch activation in 1 hour, the icemaker shuts down and the control board sounds a 3-beep alarm every 5 seconds. When the high pressure switch closes, the alarm resets and the icemaker automatically starts running again.

(2) 4-beep alarm: For the third high pressure switch activation in 1 hour, the icemaker shuts down and the control board sounds a 4-beep alarm every 5 seconds. This alarm is to prevent catastrophic failure to the compressor and requires a manual reset. Before resetting, contact your local Hoshizaki Service Representative. Turn the power off and then on again to reset the alarm. If the high pressure switch has reset, the icemaker starts running again.

d) Freeze Timer (5-beep alarm)

The control board starts a 30-minute freeze timer once the upper float switch closes. As the water level drops in the reservoir, the upper float switch opens. Should the upper float switch fail to close again before the 30-minute freeze timer terminates, the control board sounds a 5-beep alarm every 5 seconds. This alarm requires a manual reset. Turn the power off and then on again to reset the alarm. The icemaker starts running. Also, when the lower float switch is open and the upper float switch is closed, the control board sounds a 5-beep alarm every 5 seconds. This alarm requires a manual reset. Turn the power off and then on again to reset the alarm. For further details, see "IV.E. Float Switch Check."

e) Low Voltage (6-beep alarm)

The minimum allowable power supply voltage of this icemaker is limited by the low voltage cut-out. When low voltage (92Vac ±5% or less) is present, the "POWER OK" LED turns off and the control board shuts down the unit and sounds a 6-beep alarm every 5 seconds. When the proper supply voltage resumes, the icemaker automatically starts running again.

f) High Voltage (7-beep alarm)

The maximum allowable supply voltage for this icemaker is limited by the high voltage cut-out. When high voltage (147.5Vac ±5% or more) is present, the "POWER OK" LED turns off and the control board shuts down the unit and sounds a 7-beep alarm every 5 seconds. When the proper supply voltage resumes, the unit automatically starts running again.

g) Gear Motor (8-beep alarm)

Gear motor operation is confirmed through the gear motor protect relay (control board K1 connector). If the white/orange (W/O) wires on the control board K9 connector (gear motor protect circuit) do not have continuity (gear motor protect relay de-energized), the compressor relay does not energize. If the icemaker is running, and the gear motor protect relay de-energizes, the control board shuts down the compressor and gear motor and sounds an 8-beep alarm every 5 seconds. This alarm requires a manual reset. Turn the power off and then on again to reset the alarm. The icemaker starts running. The compressor starts running again when the gear motor protect relay energizes. For further details, see "IV.B. Diagnostic Procedure."

h) Bin Control (9-beep alarm)

This alarm provides protection to prevent the icemaker from overfilling the ice storage bin. If the infrared sensor is signifying the ice storage bin is empty (yellow LED off), and the mechanical bin control is signifying the ice storage bin is full (proximity switch open), the control board shuts down the unit and sounds a 9-beep alarm every 5 seconds. This alarm requires a manual reset. Turn the power off and then on again to reset the alarm. For further details, see "IV.D. Bin Control Check."

4. Controls and Adjustments

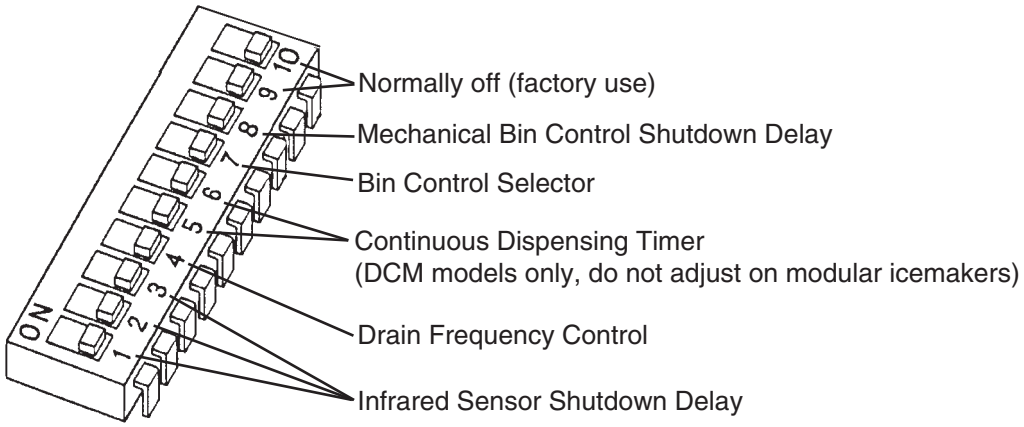
CAUTION

Dip switches are factory set. Failure to maintain factory settings may adversely affect performance and warranty coverage. For more information, contact Hoshizaki Technical Support at 1-800-233-1940.

a) Default Dip Switch Settings

The S1 dip switch settings are factory-set to the following positions:

Dip Switch No.	1	2	3	4	5	6	7	8	9	10
FD-1001M_H(-C)	ON	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF



b) Infrared Sensor Shutdown Delay (S1 dip switch 1, 2, & 3)

Infrared sensor shutdown delay is the delay between the infrared sensor detecting ice (yellow LED flashing or steady) and the start of the shutdown sequence. For dispenser unit applications, the ice level at shutoff may need to be adjusted depending on the dispenser agitation or dispense method. Increasing the shutdown delay setting allows for a higher level of ice in the bin before the icemaker shuts down. For a typical dispenser unit application, a 100-second shutdown delay is recommended. When used with a standard Hoshizaki storage bin, any shutdown delay setting is acceptable.

⚠ WARNING

Increasing the shutdown delay allows a higher level of ice in the dispensing unit/storage bin before shutdown. This could lead to icemaker movement or ice overflow.

S1 Dip Switch Setting			Infrared Sensor Shutdown Delay
No. 1	No. 2	No. 3	
OFF	OFF	OFF	0 Seconds
ON	**OFF**	**OFF**	**100 Seconds (1.6 minutes) (Factory Default)**
OFF	ON	OFF	1100 Seconds (18.3 minutes)
OFF	OFF	ON	1650 Seconds (27.5 minutes)
ON	ON	OFF	2200 Seconds (36.7 minutes)
OFF	ON	ON	0 Seconds
ON	ON	ON	0 Seconds

c) Drain Frequency Control (S1 dip switch 4)

This unit is factory set for optimum performance with the 1-in-1 drain cycle (S1 dip switch 4 in the "OFF" position). This setting allows for removal of sediment from the evaporator without interrupting the icemaking process. An optional 1-in-12 drain cycle is available.

S1 Dip Switch Setting	Drain Timer Interval	Drain Valve Open
No. 4		
OFF (1-in-1)	1 Hour	2 Seconds
ON (1-in-12)	11 Hours 45 Minutes	10 Minutes

d) Continuous Dispensing Timer (S1 dip switch 5 & 6)

DCM models only. The dispense mode switch on DCMs must be in the "CONTINUOUS" position for this setting to apply. The factory setting allows ice to be dispensed continuously as long as the dispense solenoid is activated.

S1 Dip Switch Setting		Dispense Time
No. 5	No. 6	
OFF	OFF	No Limit
ON	OFF	20 Seconds
OFF	ON	60 Seconds
ON	ON	No Limit

e) Bin Control Selector (S1 dip switch 7)

This unit is factory set for infrared sensor bin control operation. No adjustment is required. When used on a standard ice storage bin, the mechanical bin control may be used instead of the infrared sensor by moving S1 dip switch 7 to the off position. In the factory default position (S1 dip switch 7 in the on position), the gear motor delay after the upper float switch closes is 30 seconds. When the mechanical bin control is used (S1 dip switch 7 in the off position), the gear motor delay after the upper float switch closes is 5 seconds. **WARNING! Do not place S1 dip switch 7 in the off position on dispenser unit applications.**

S1 Dip Switch Setting No. 7	Bin Control Application	Gear Motor Delay
OFF	Mechanical Bin Control (Standard Ice Storage Bins Only)	5 seconds
ON	Infrared Sensor with Mechanical Bin Control Backup	30 seconds

f) Mechanical Bin Control Shutdown Delay (S1 dip switch 8)

Factory set for normal operation. No adjustment is required. The shutdown delay is the time between the mechanical bin control proximity switch opening and the control board shutting off the icemaker.

S1 Dip Switch Setting No. 8	Bin Control #1 Shutdown Delay
OFF	0.25 Seconds
ON	6.7 Seconds

g) Factory Use (S1 Dip Switch 9 & 10)

Factory set for optimum performance. Do not adjust.

D. Bin Control

An infrared sensor is used to control the level of ice in the dispenser unit/ice storage bin (S1 dip switch 7 in the "ON" position). The infrared sensor is the primary bin control device. 20VDC powers the infrared sensor from the control board K6 connector. A green power LED and a yellow ice detection LED are located on the infrared sensor. See Fig. 1. The paddle-actuated mechanical bin control is used as a backup bin control and safety device. See Fig. 2. For further details, see "IV.D. Bin Control Check."

The paddle-actuated mechanical bin control may be used as a stand-alone bin control when the unit is placed on a standard Hoshizaki ice storage bin (S1 dip switch 7 in the off position). **WARNING! Do not place S1 dip switch 7 in the off position on dispenser unit applications.**

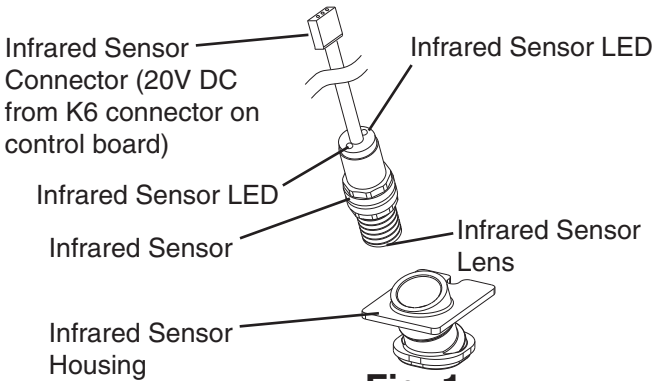


Fig. 1

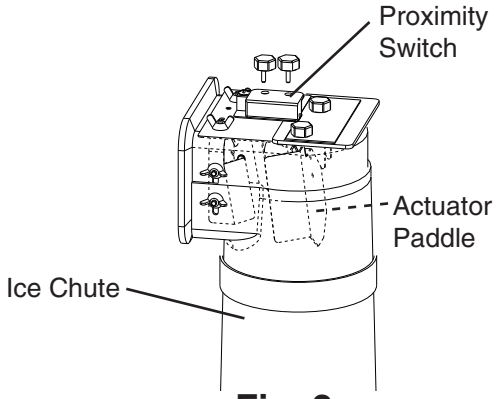


Fig. 2

E. Float Switch

A dual float switch is used to determine that there is sufficient water in the reservoir during fill and refill. The control board monitors the upper float switch to de-energize the inlet water valve when the upper float switch closes during fill and refill. The control board monitors the lower float switch to energize the inlet water valve when the lower float switch opens during the freeze cycle (refill). See Fig. 3. The control board monitors the time between the lower float switch opening and the upper float switch closing (90-second low water safety). The control board also monitors the time between the upper float switch closing and the lower float switch opening (30-minute freeze timer). No adjustment is required. For a float switch check procedure, see "IV.E.1. Float Switch Check."

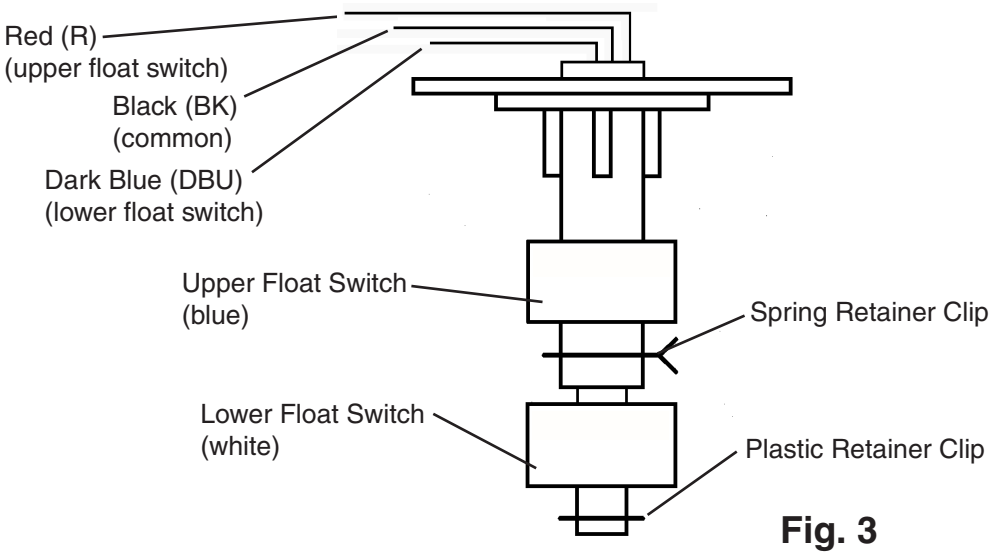
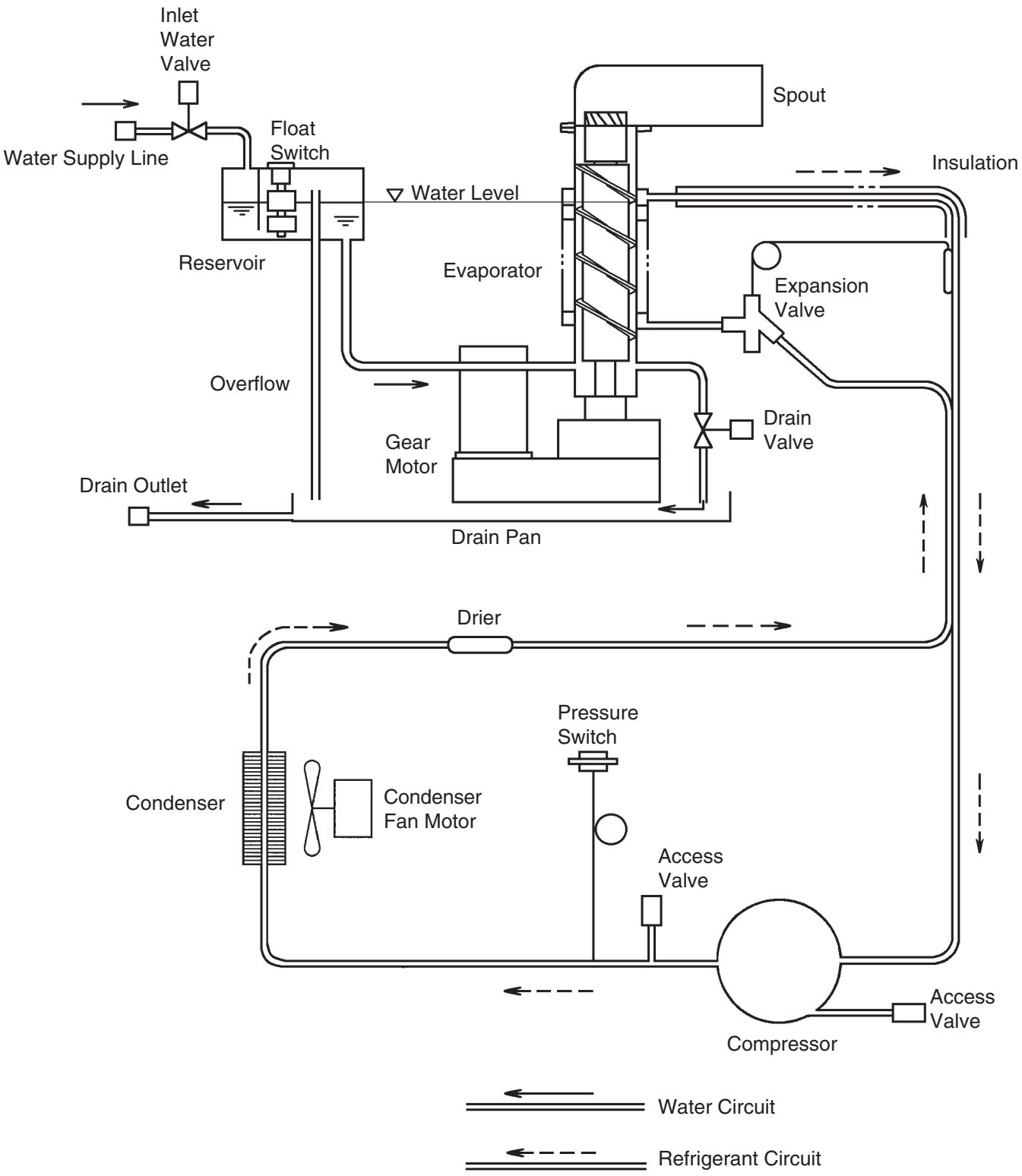


Fig. 3

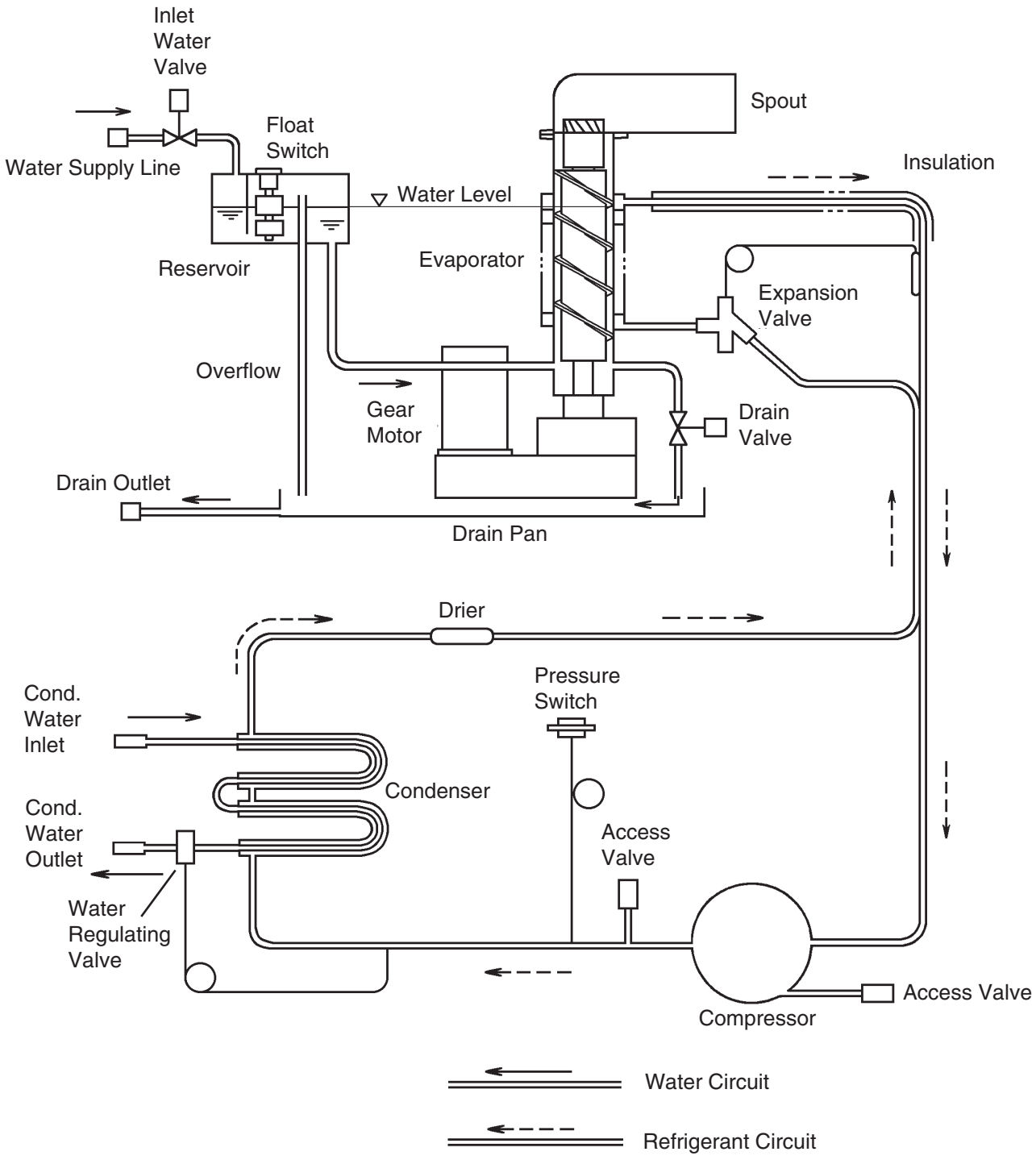
III. Technical Information

A. Water Circuit and Refrigeration Circuit

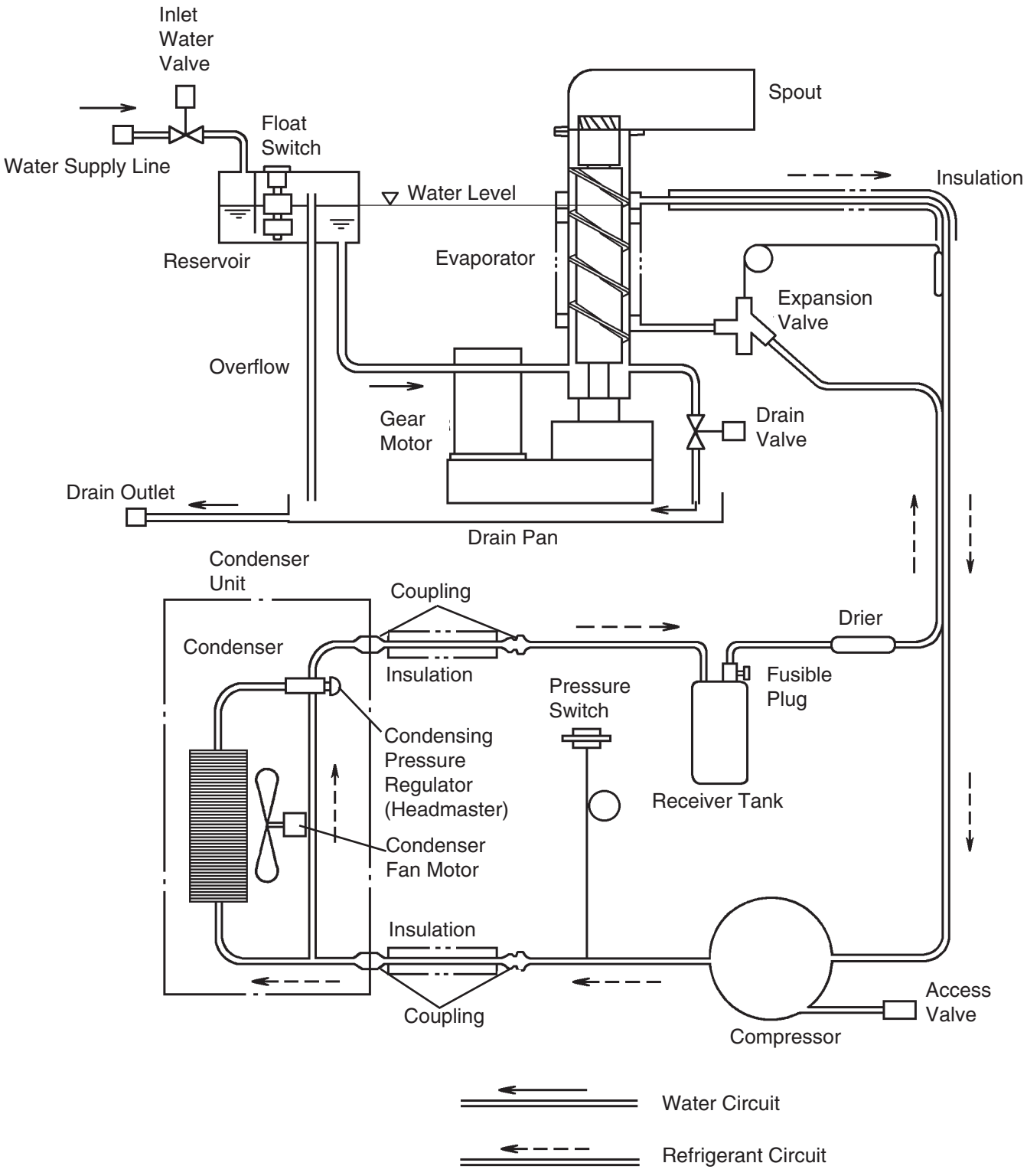
1. FD-1001MAH(-C) (air-cooled)



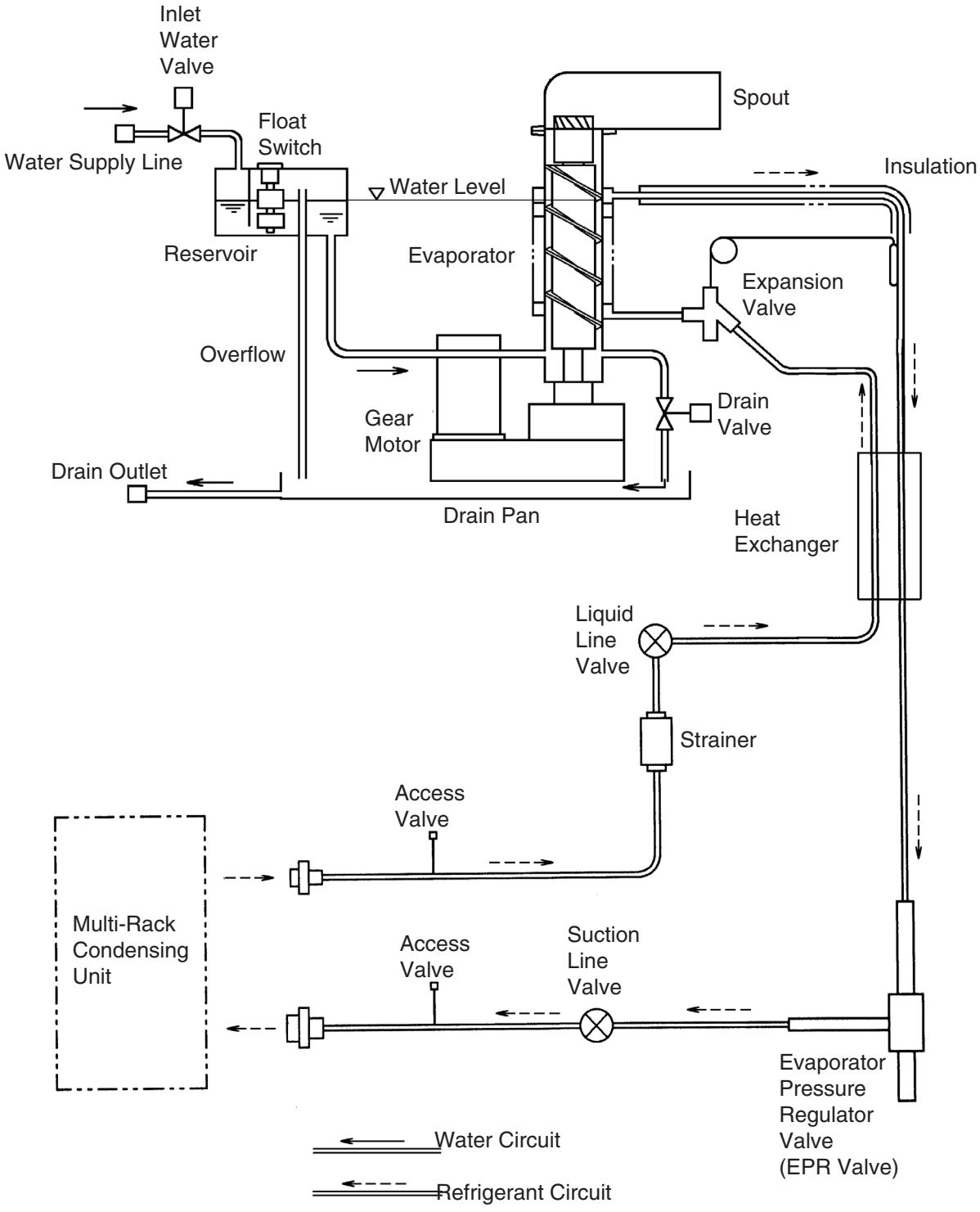
2. FD-1001MWH(-C) (water-cooled)



3. FD-1001MRH(-C) (remote air-cooled)



4. FD-1001MLH(-C) (low side, parallel rack system)

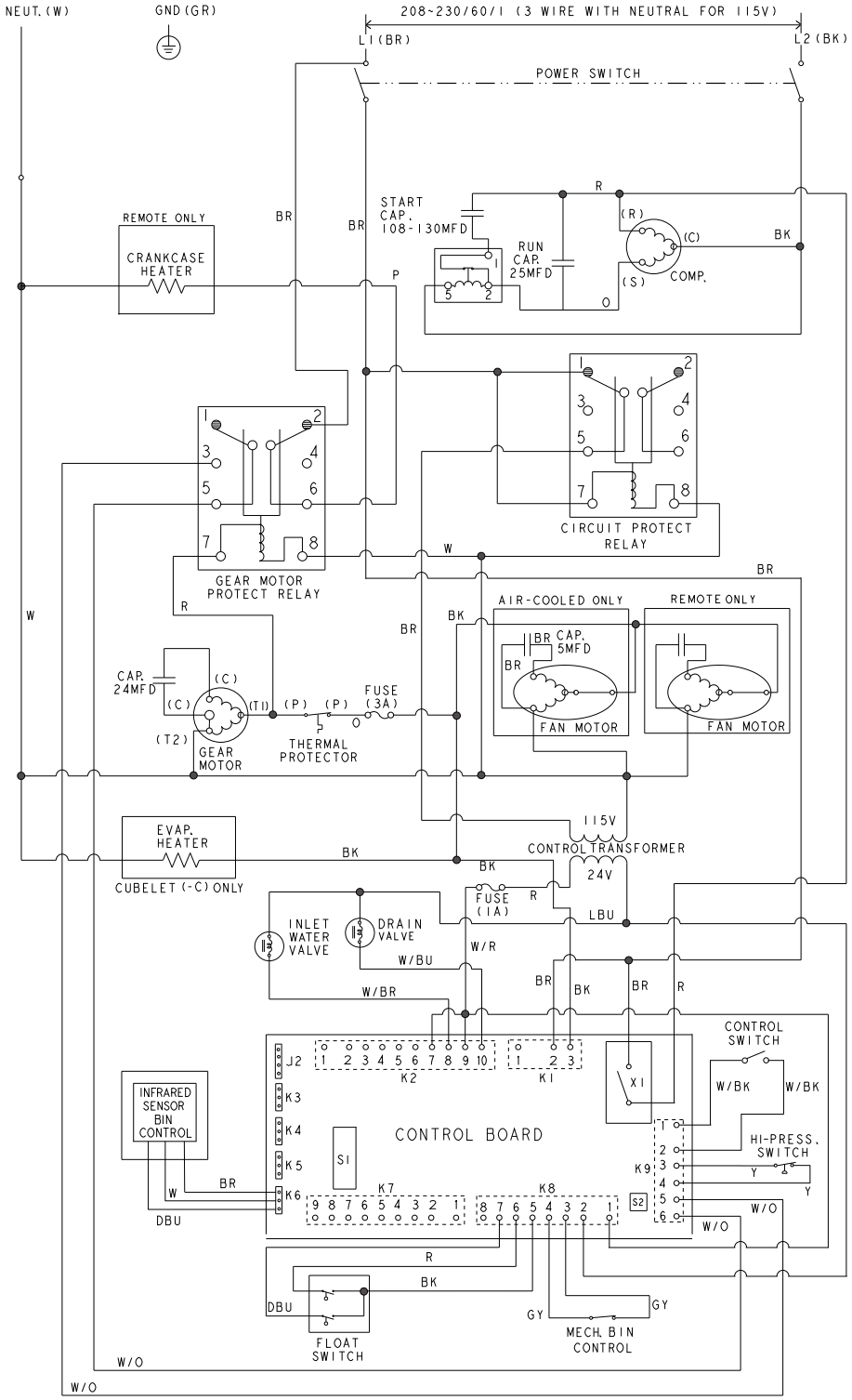


B. Wiring Diagrams

1. FD-1001MAH(-C), FD-1001MWH(-C), FD-1001MRH(-C)

CONTROL BOARD	
S1	SERVICE BUTTON
S2	DIP SWITCH
X1	COMPRESSOR RELAY

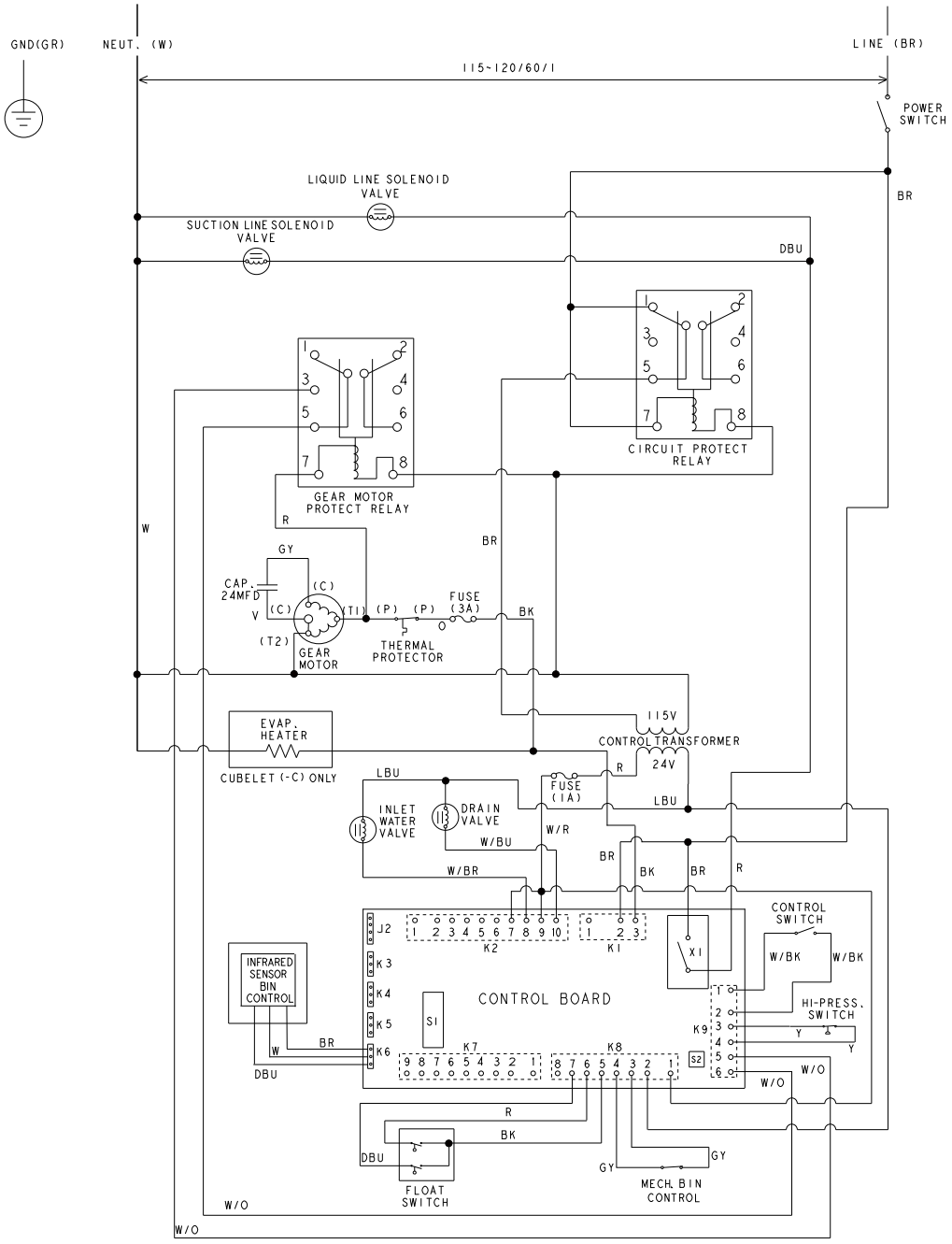
WIRE COLOR CODE	
R	RED
BK	BLACK
BR	BROWN
O	ORANGE
Y	YELLOW
GR	GREEN
GY	GRAY
P	PINK
V	VIOLET
W	WHITE
LBU	LIGHT BLUE
DBY	DARK BLUE
W/BU	WHITE / BLUE
W/R	WHITE / RED
W/BK	WHITE / BLACK
W/BR	WHITE / BROWN
W/0	WHITE / ORANGE



2. FD-1001MLH(-C)

CONTROL BOARD	
S1	SERVICE BUTTON
S2	DIP SWITCH
X1	COMPRESSOR RELAY

WIRE COLOR CODE	
R	RED
BK	BLACK
BR	BROWN
O	ORANGE
Y	YELLOW
GR	GREEN
GY	GRAY
P	PINK
V	VIOLET
W	WHITE
LBU	LIGHT BLUE
DBY	DARK BLUE
W/BU	WHITE / BLUE
W/R	WHITE / RED
W/BK	WHITE / BLACK
W/BR	WHITE / BROWN
W/0	WHITE / ORANGE



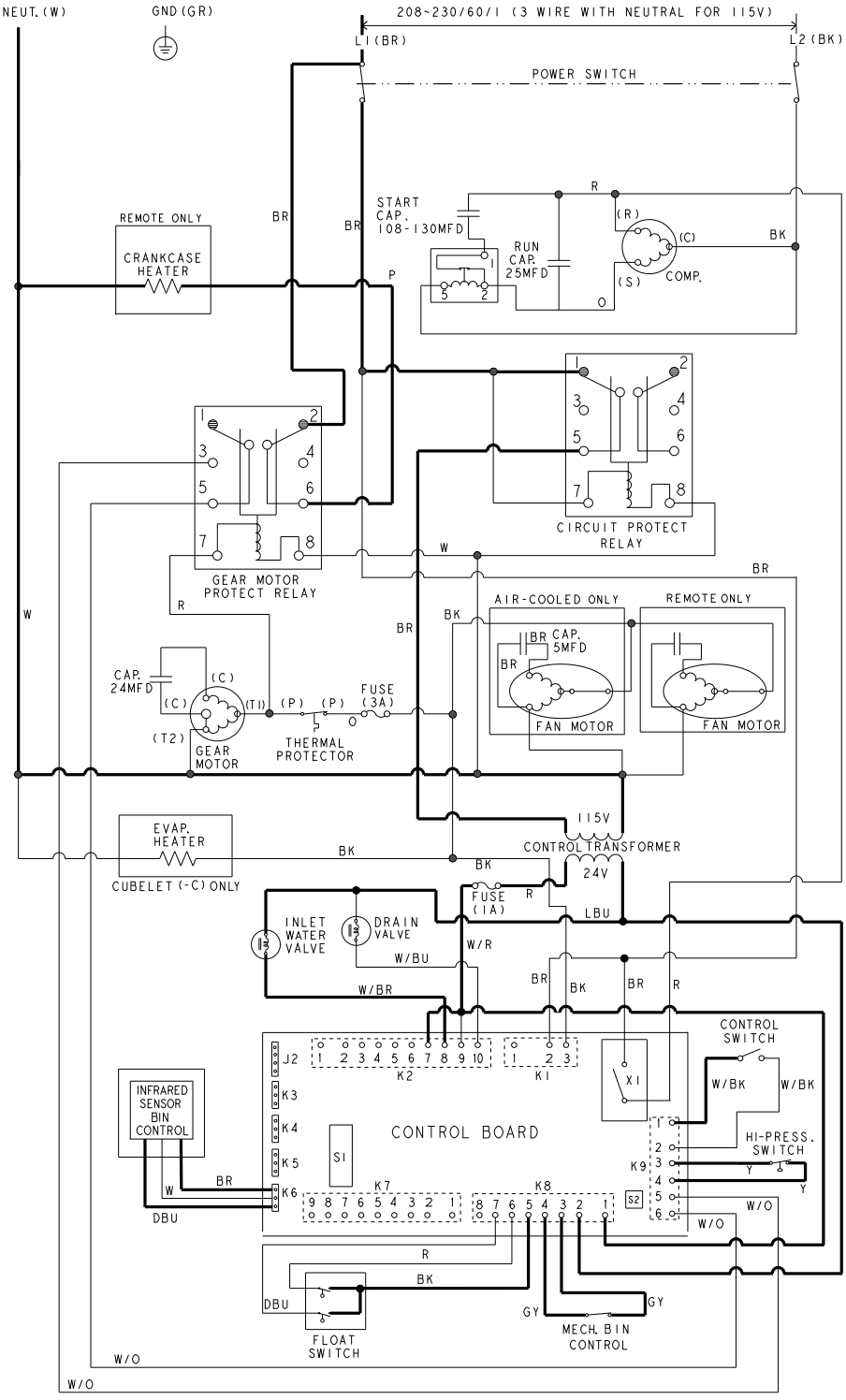
3. Sequence Wiring Diagram

a) Fill Cycle.

Power supply is turned on. Inlet water valve energizes and reservoir fills.

CONTROL BOARD	
S1	SERVICE BUTTON
S2	DIP SWITCH
X1	COMPRESSOR RELAY

WIRE COLOR CODE	
R	RED
BK	BLACK
BR	BROWN
O	ORANGE
Y	YELLOW
GR	GREEN
GY	GRAY
P	PINK
V	VIOLET
W	WHITE
LBU	LIGHT BLUE
DBY	DARK BLUE
W/BU	WHITE / BLUE
W/R	WHITE / RED
W/BK	WHITE / BLACK
W/BR	WHITE / BROWN
W/0	WHITE / ORANGE



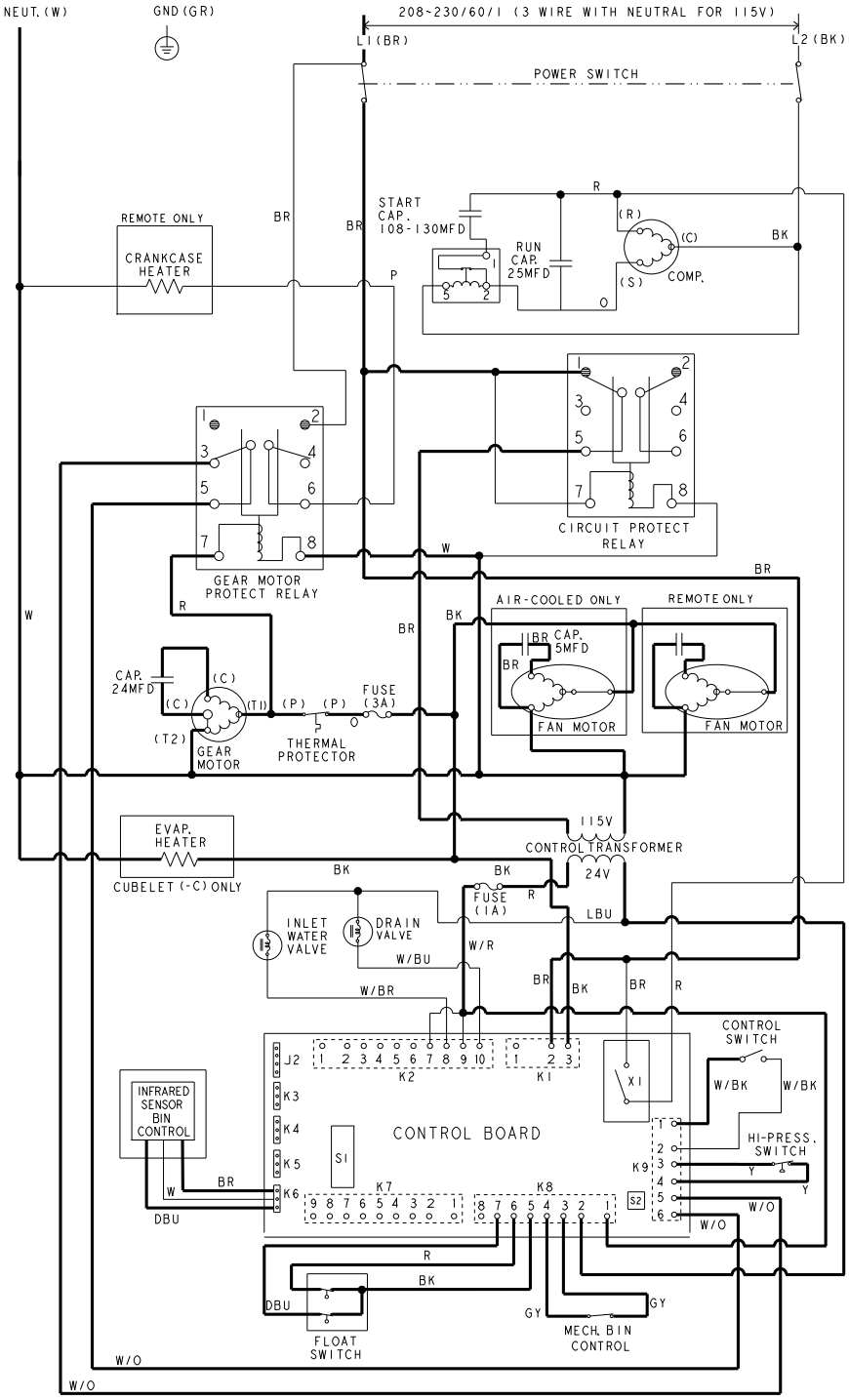
b) Ice Purge Cycle

Upper float switch closes, 30-second gear motor delay timer starts. After 30-second gear motor delay timer terminates, 5-minute ice purge timer starts, gear motor, fan motor/ fan motor-remote energize.

Note: The 30-second gear motor delay is active when S1 dip switch 7 is in the on position. Otherwise, gear motor has a 5-second delay when upper float switch closes.

CONTROL BOARD	
S1	SERVICE BUTTON
S2	DIP SWITCH
X1	COMPRESSOR RELAY

WIRE COLOR CODE	
R	RED
BK	BLACK
BR	BROWN
O	ORANGE
Y	YELLOW
GR	GREEN
GY	GRAY
P	PINK
V	VIOLET
W	WHITE
LBU	LIGHT BLUE
DBY	DARK BLUE
W/BU	WHITE / BLUE
W/R	WHITE / RED
W/BK	WHITE / BLACK
W/BR	WHITE / BROWN
W/0	WHITE / ORANGE



c) Freeze Cycle

5-minute ice purge timer terminates, compressor energizes (liquid line valve, and suction line valve on MLH models).

CONTROL BOARD	
S1	SERVICE BUTTON
S2	DIP SWITCH
X1	COMPRESSOR RELAY

WIRE COLOR CODE	
R	RED
BK	BLACK
BR	BROWN
O	ORANGE
Y	YELLOW
GR	GREEN
GY	GRAY
P	PINK
V	VIOLET
W	WHITE
LBU	LIGHT BLUE
DBY	DARK BLUE
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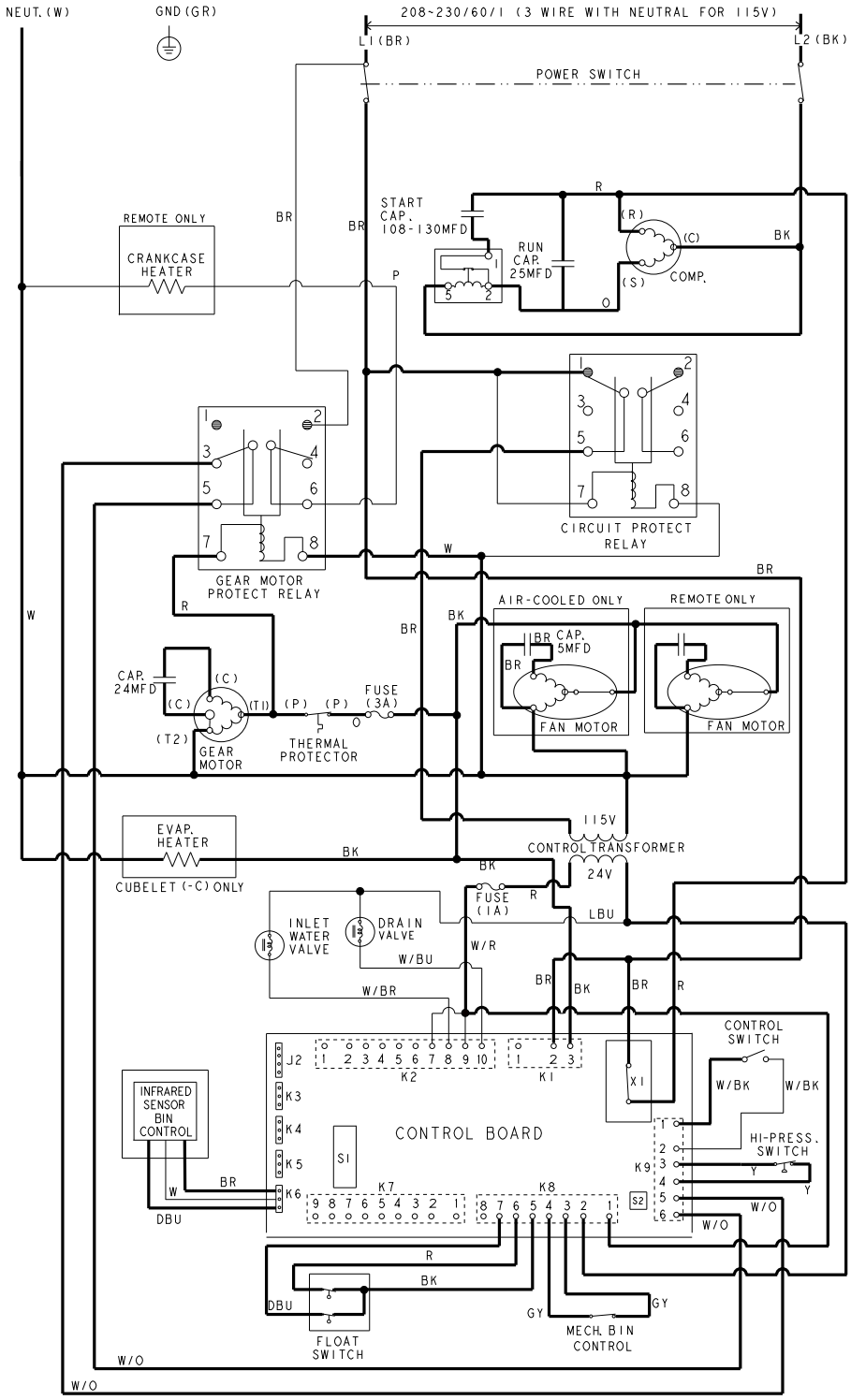
W/R	WHITE / RED
W/BK	WHITE / BLACK
W/BR	WHITE / BROWN
W/0	WHITE / ORANGE

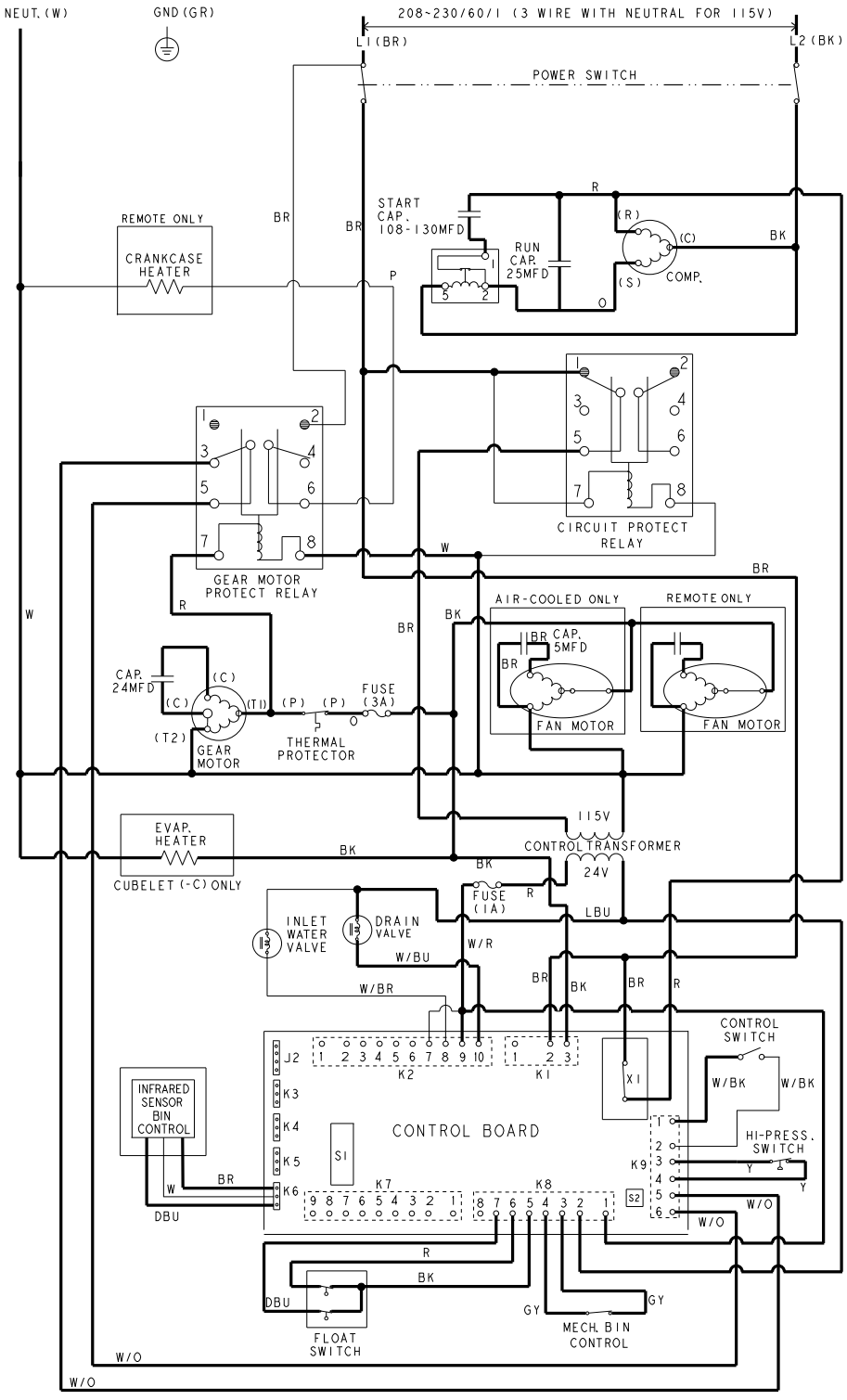


d) 1-in-1 Drain Cycle

Compressor, (liquid line valve, suction line valve on MLH models), fan motor/fan motor-remote, and gear motor continue. Drain valve energizes for 2 seconds every hour.

CONTROL BOARD	
S1	SERVICE BUTTON
S2	DIP SWITCH
X1	COMPRESSOR RELAY

WIRE COLOR CODE	
R	RED
BK	BLACK
BR	BROWN
O	ORANGE
Y	YELLOW
GR	GREEN
GY	GRAY
P	PINK
V	VIOLET
W	WHITE
LBU	LIGHT BLUE
DBY	DARK BLUE
W/BU	WHITE / BLUE
W/R	WHITE / RED
W/BK	WHITE / BLACK
W/BR	WHITE / BROWN
W/0	WHITE / ORANGE

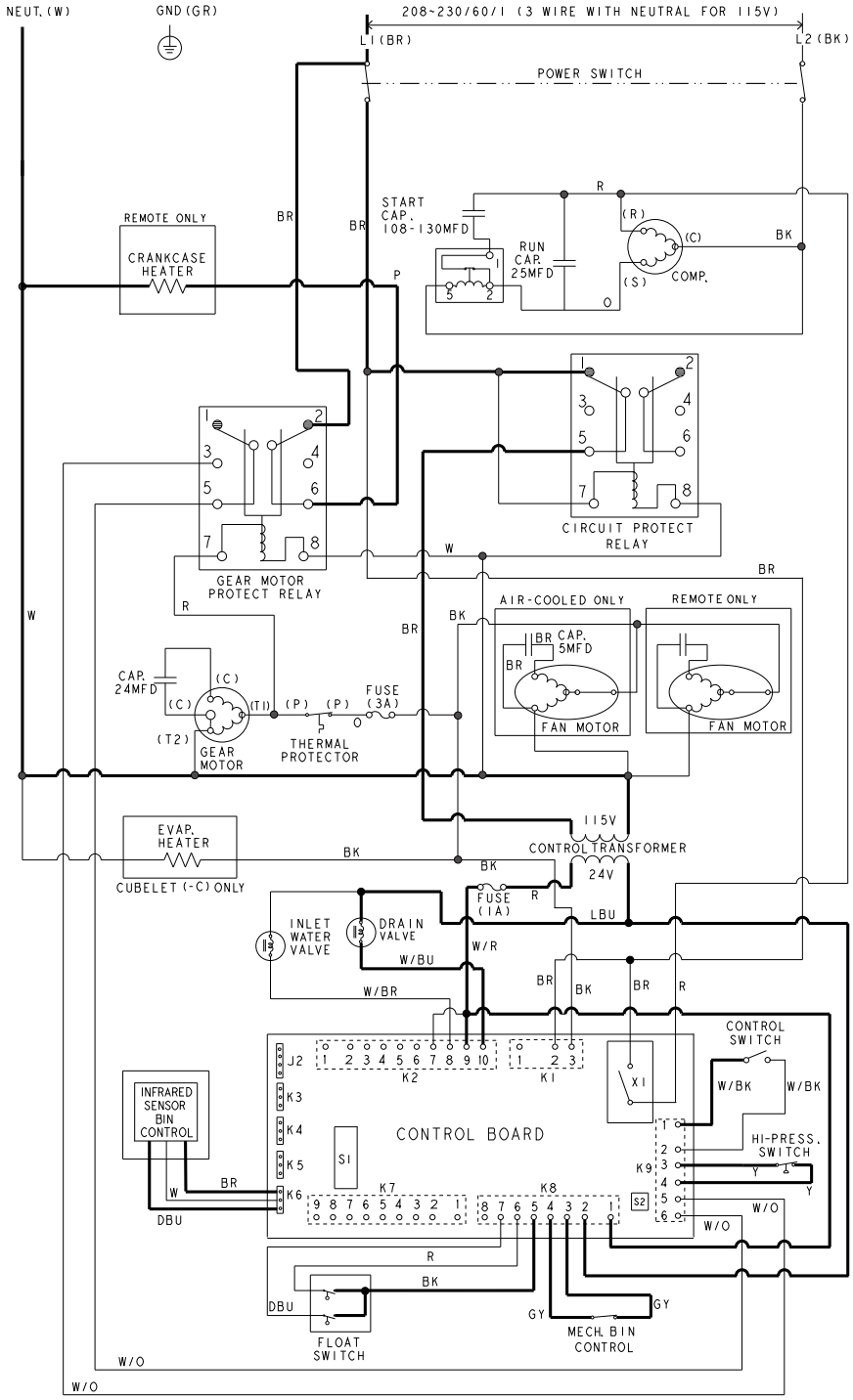


e) 1-in-12 Drain Cycle

1-in-12 drain cycle initiates (S1 dip switch 4). Compressor and fan motor/fan motor-remote de-energize. 5-minute ice purge timer starts and gear motor continues. 5-minute ice purge timer terminates, gear motor de-energizes. Drain valve opens for 10 minutes.

CONTROL BOARD	
S1	SERVICE BUTTON
S2	DIP SWITCH
X1	COMPRESSOR RELAY

WIRE COLOR CODE	
R	RED
BK	BLACK
BR	BROWN
O	ORANGE
Y	YELLOW
GR	GREEN
GY	GRAY
P	PINK
V	VIOLET
W	WHITE
LBU	LIGHT BLUE
DBY	DARK BLUE
W/BU	WHITE / BLUE
W/R	WHITE / RED
W/BK	WHITE / BLACK
W/BR	WHITE / BROWN
W/0	WHITE / ORANGE

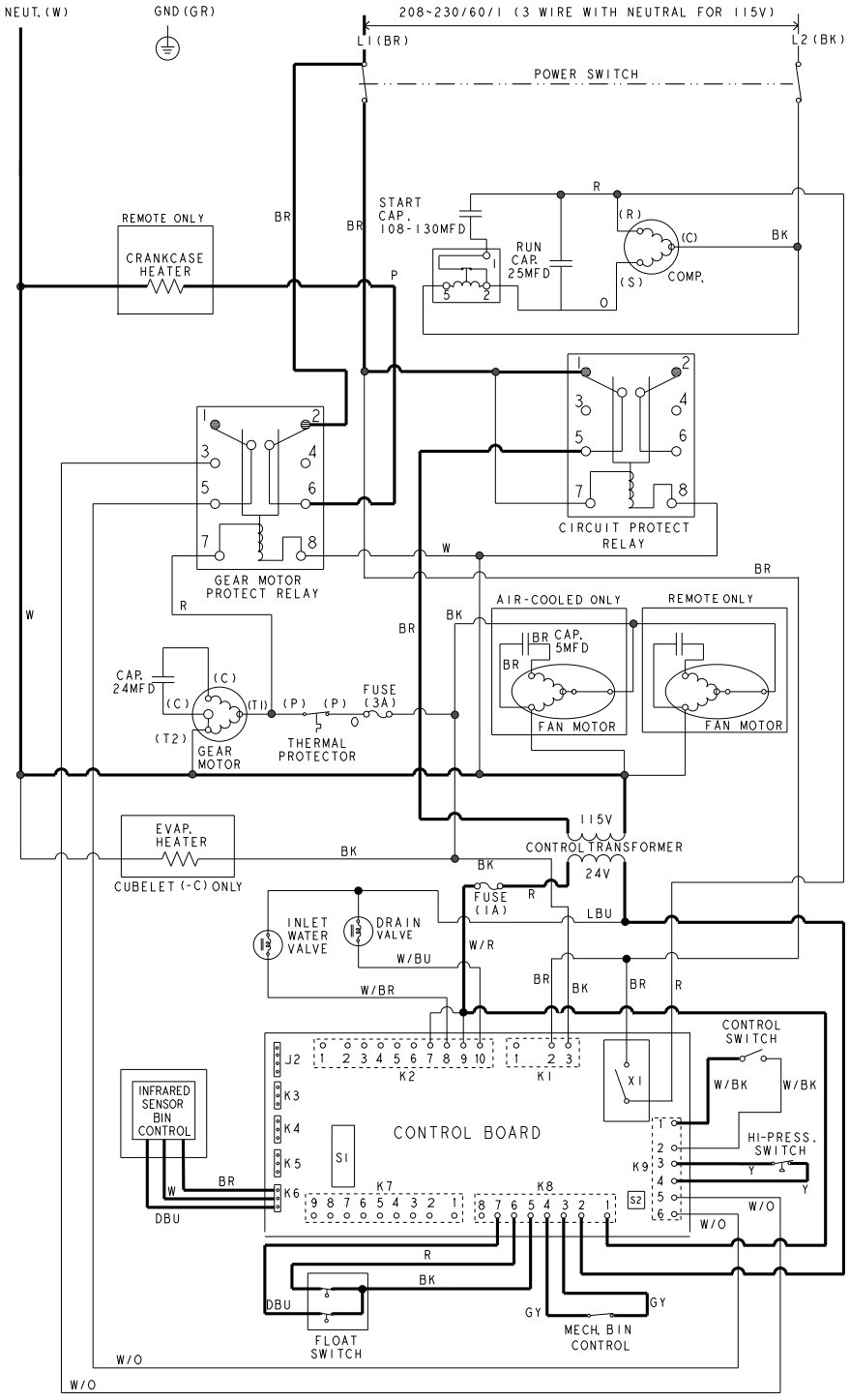


f) Infrared Sensor Shutdown

Ice fills storage bin to level of activating infrared sensor, infrared sensor yellow LED turns on (flashing or steady). Infrared sensor shutdown sequence begins. For further information, see "II.B.1.e) Shutdown Cycle."

CONTROL BOARD	
S1	SERVICE BUTTON
S2	DIP SWITCH
X1	COMPRESSOR RELAY

WIRE COLOR CODE	
R	RED
BK	BLACK
BR	BROWN
O	ORANGE
Y	YELLOW
GR	GREEN
GY	GRAY
P	PINK
V	VIOLET
W	WHITE
LBU	LIGHT BLUE
DBY	DARK BLUE
W/BU	WHITE / BLUE
W/R	WHITE / RED
W/BK	WHITE / BLACK
W/BR	WHITE / BROWN
W/0	WHITE / ORANGE



g) Mechanical Bin Control Shutdown

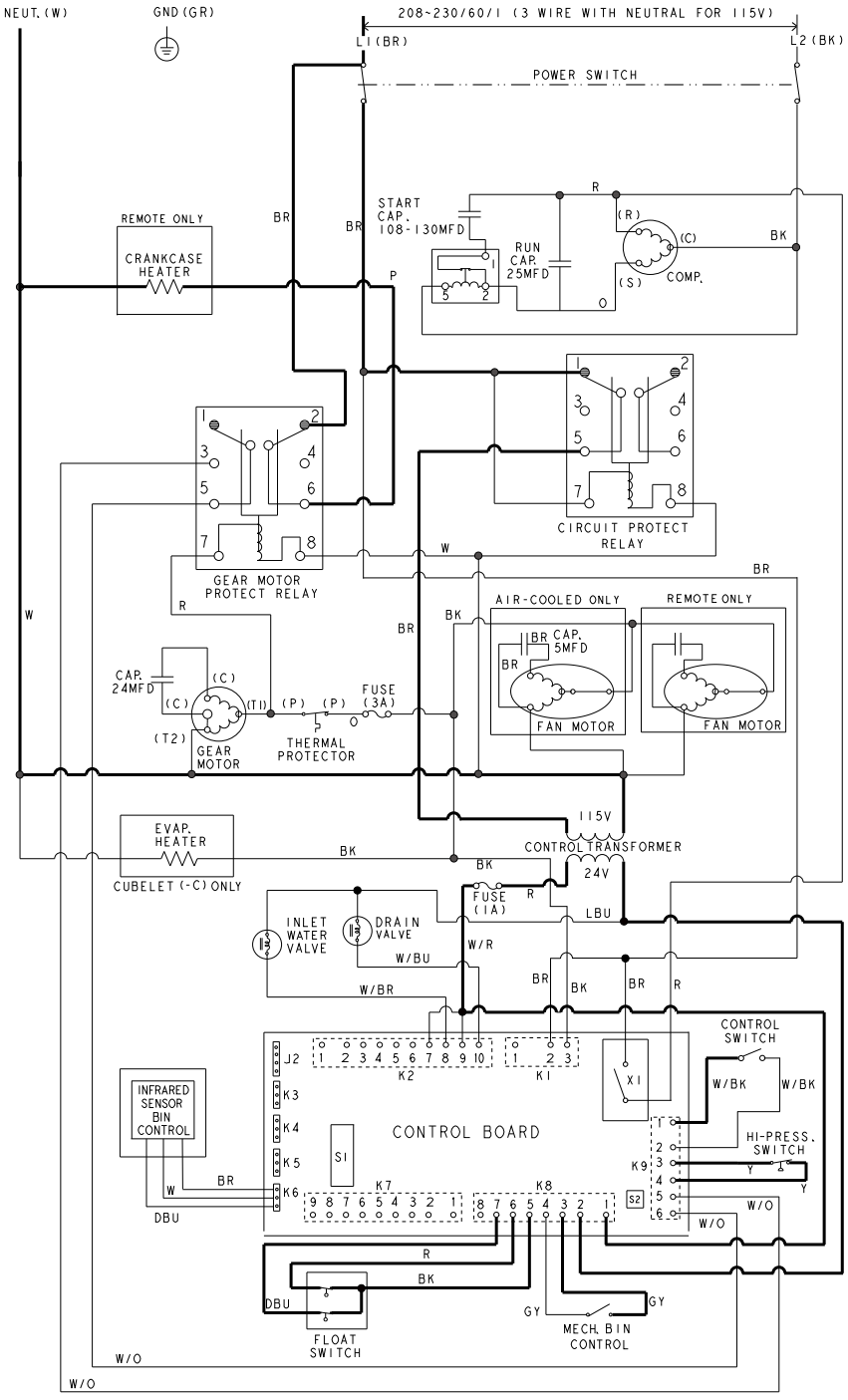
Ice fills the chute to the point of engaging the mechanical bin control.

Dip Switch 7 "ON": The icemaker shuts down within 10 seconds of the mechanical bin control opening and a 9-beep alarm sounds.

Dip Switch 7 "OFF": Hoshizaki ice storage bin applications only. The icemaker shuts down within 10 seconds of the mechanical bin control opening.

CONTROL BOARD	
S1	SERVICE BUTTON
S2	DIP SWITCH
X1	COMPRESSOR RELAY

WIRE COLOR CODE	
R	RED
BK	BLACK
BR	BROWN
O	ORANGE
Y	YELLOW
GR	GREEN
GY	GRAY
P	PINK
V	VIOLET
W	WHITE
LBU	LIGHT BLUE
DBY	DARK BLUE
W/BU	WHITE / BLUE
W/R	WHITE / RED
W/BK	WHITE / BLACK
W/BR	WHITE / BROWN
W/0	WHITE / ORANGE

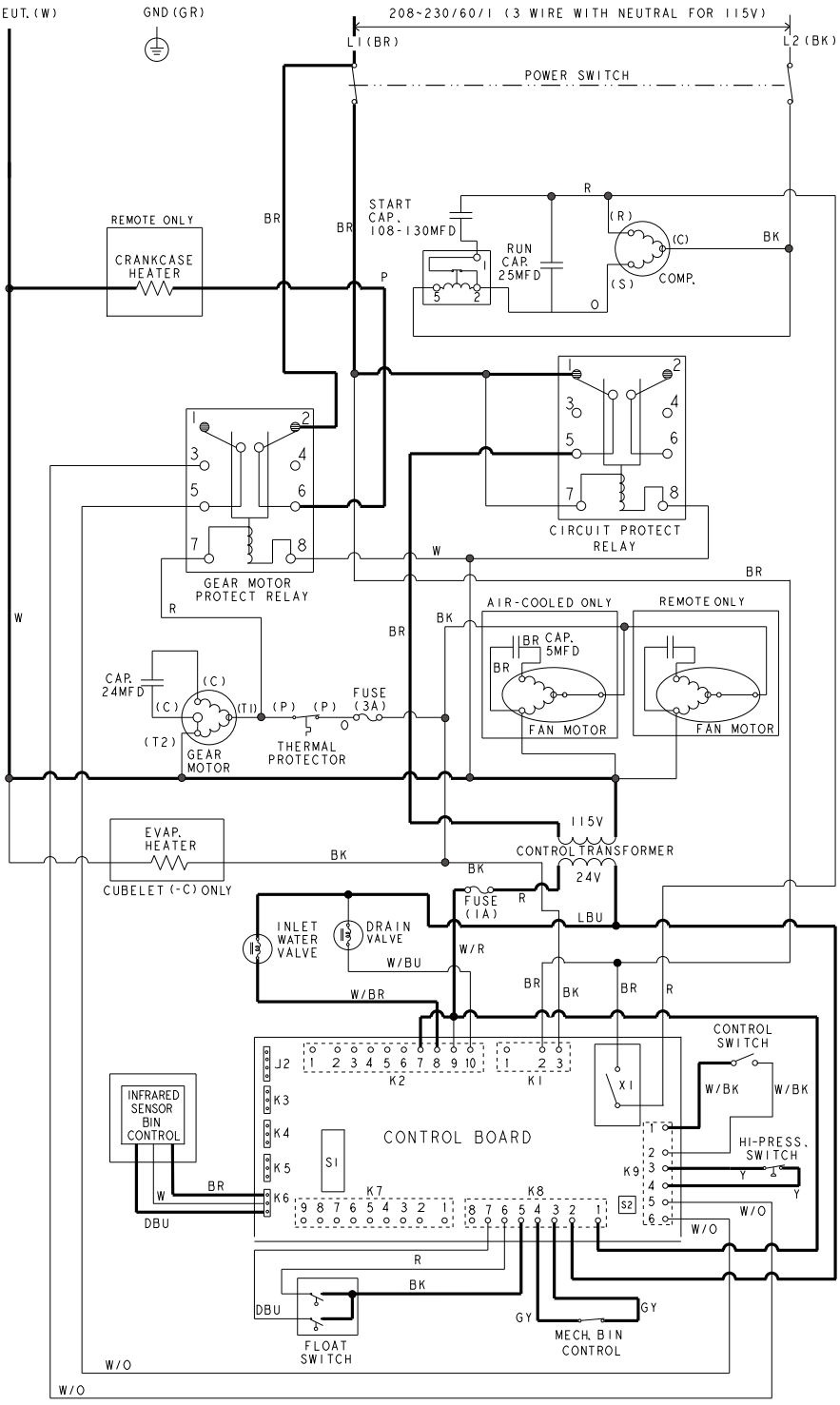


h) Low Water Safety

During fill or refill, should the upper float switch fail to close within 90 seconds after the water valve energizes, a 1-beep alarm sounds. The water valve remains open until the upper float switch closes. If this occurs during refill, the icemaker cycles down.

CONTROL BOARD	
S1	SERVICE BUTTON
S2	DIP SWITCH CONTROL
X1	COMPRESSOR RELAY

WIRE COLOR CODE	
R	RED
BK	BLACK
BR	BROWN
O	ORANGE
Y	YELLOW
GR	GREEN
GY	GRAY
P	PINK
V	VIOLET
W	WHITE
LBU	LIGHT BLUE
DBY	DARK BLUE
W/BU	WHITE / BLUE
W/R	WHITE / RED
W/BK	WHITE / BLACK
W/BR	WHITE / BROWN
W/0	WHITE / ORANGE

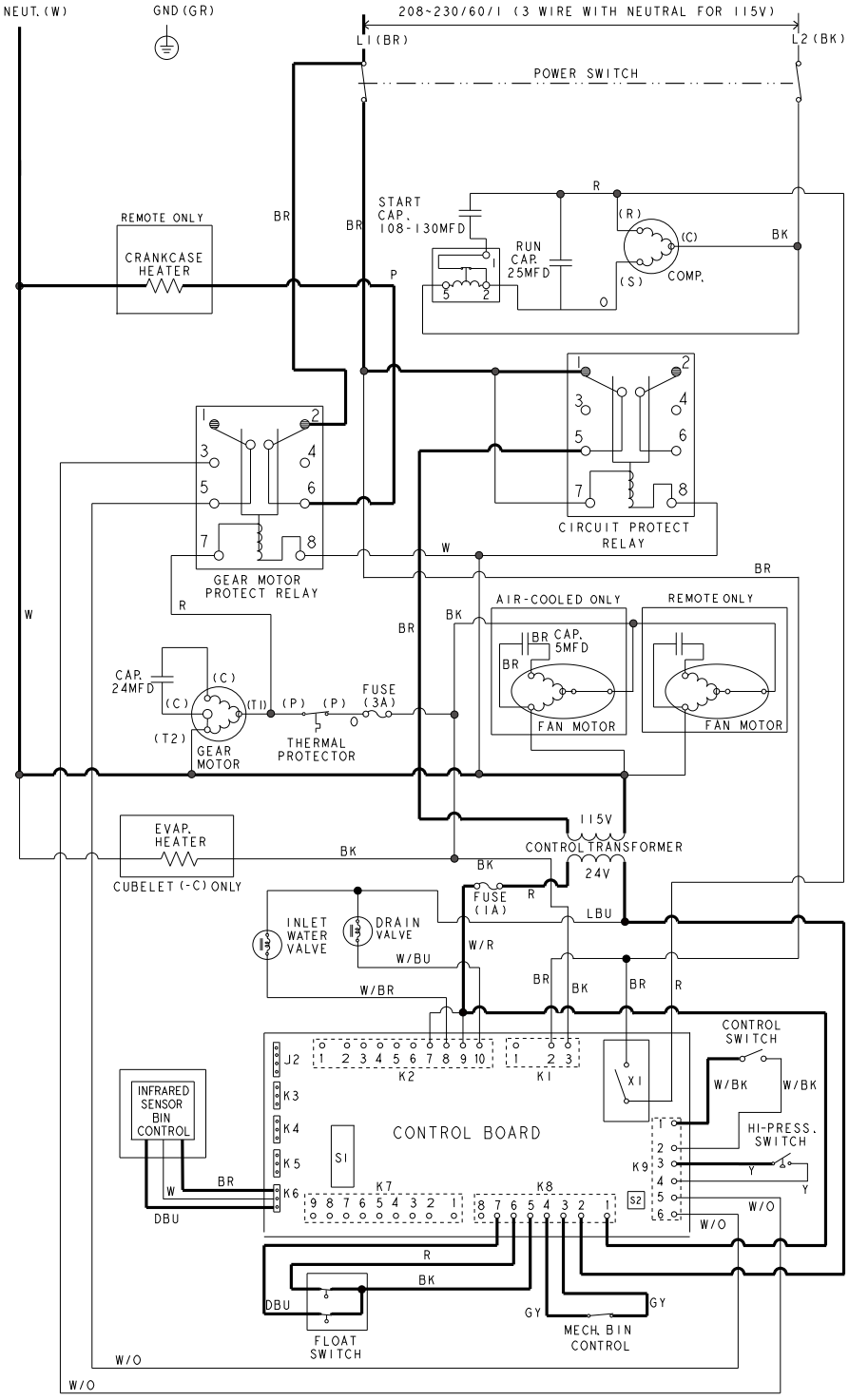


i) High Pressure Switch

If pressure on the refrigeration circuit high-side exceeds Hoshizaki specifications, a high pressure switch activates. The control board then shuts down the unit until the high-side pressure returns to an acceptable level. See "II.C.3.c) High Pressure Switch (3 & 4-beep alarms)."

CONTROL BOARD	
S1	SERVICE BUTTON
S2	DIP SWITCH CONTROL
X1	COMPRESSOR RELAY

WIRE COLOR CODE	
R	RED
BK	BLACK
BR	BROWN
O	ORANGE
Y	YELLOW
GR	GREEN
GY	GRAY
P	PINK
V	VIOLET
W	WHITE
LBU	LIGHT BLUE
DBY	DARK BLUE
W/BU	WHITE / BLUE
W/R	WHITE / RED
W/BK	WHITE / BLACK
W/BR	WHITE / BROWN
W/0	WHITE / ORANGE



C. Performance Data

1. FD-1001MAH (air-cooled)

Awaiting Data

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

2. FD-1001MAH-C (air-cooled)

APPROXIMATE ICE PRODUCTION PER 24 HR. lbs./day (kg/day)	Ambient Temp. (°F)	Water Temp. (°F) 50		70		90	
	70	*940	*(427)	890	(405)	855	(389)
	80	820	(373)	790	(358)	755	(344)
	90	725	(330)	*695	*(317)	670	(304)
	100	640	(292)	615	(280)	*580	*(265)
APPROXIMATE ELECTRIC CONSUMPTION watts	70	*1404	--	1402	--	1400	--
	80	1398	--	1395	--	1393	--
	90	1391	--	*1389	--	1372	--
	100	1354	--	1337	--	*1319	--
APPROXIMATE WATER CONSUMPTION PER 24 HR. gal./day (l/day)	70	*113	*(427)	107	(405)	103	(389)
	80	99	(373)	95	(358)	91	(344)
	90	87	(330)	*84	*(317)	80	(304)
	100	77	(292)	74	(280)	*70	*(265)
EVAPORATOR OUTLET TEMP. °F (°C)	70	*17	*(-9)	17	(-9)	17	(-9)
	80	17	(-9)	14	(-10)	14	(-10)
	90	14	(-10)	*14	*(-10)	12	(-11)
	100	12	(-11)	12	(-11)	*12	*(-11)
HEAD PRESSURE PSIG (kg/cm²G)	70	*304	*(21.4)	304	(21.4)	304	(21.4)
	80	287	(20.1)	287	(20.1)	287	(20.1)
	90	269	(18.9)	*269	*(18.9)	269	(18.9)
	100	204	(14.3)	204	(14.3)	*204	*(14.3)
SUCTION PRESSURE PSIG (kg/cm²G)	70	*39	*(2.7)	39	(2.7)	39	(2.7)
	80	37	(2.6)	37	(2.6)	37	(2.6)
	90	36	(2.5)	*36	*(2.5)	36	(2.5)
	100	31	(2.2)	31	(2.2)	*31	*(2.2)
TOTAL HEAT OF REJECTION	8800 BTU/h (AT 90°F /WT 70°F)						

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

3. FD-1001MWH (water-cooled)

Awaiting Data

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

4. FD-1001MWH-C (water-cooled)

Awaiting Data

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

5. FD-1001MRH (remote air-cooled)

Awaiting Data

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

6. FD-1001MRH-C (remote air-cooled)

APPROXIMATE ICE PRODUCTION	Ambient Temp. (°F)	Water Temp. (°F) 50		70		90	
PER 24 HR.	70	*930	*(423)	895	(406)	860	(390)
	80	825	(375)	790	(360)	760	(345)
	90	730	(332)	*720	*(326)	670	(306)
lbs./day (kg/day)	100	645	(294)	620	(282)	*580	*(263)
APPROXIMATE ELECTRIC	70	*1401	--	1408	--	1415	--
CONSUMPTION	80	1422	--	1428	--	1435	--
	90	1442	--	*1449	--	1444	--
watts	100	1440	--	1435	--	*1430	--
APPROXIMATE WATER	70	*112	*(423)	108	(406)	103	(390)
CONSUMPTION PER 24 HR.	80	99	(375)	95	(360)	91	(345)
	90	88	(332)	*86	*(326)	81	(306)
gal./day (l/day)	100	78	(294)	75	(282)	*70	*(263)
EVAPORATOR OUTLET TEMP.	70	*5	*(-15)	5	(-15)	5	(-15)
	80	5	(-15)	9	(-13)	9	(-13)
	90	9	(-13)	*9	*(-13)	12	(-11)
°F (°C)	100	12	(-11)	12	(-11)	*12	*(-11)
HEAD PRESSURE	70	*205	*(14.4)	205	(14.4)	205	(14.4)
	80	234	(16.5)	234	(16.5)	234	(16.5)
	90	264	(18.6)	*264	*(18.6)	264	(18.6)
PSIG (kg/cm²G)	100	301	(21.1)	301	(21.1)	301	*(21.1)
SUCTION PRESSURE	70	*33	*(2.3)	33	(2.3)	33	(2.3)
	80	35	(2.4)	35	(2.4)	35	(2.4)
	90	36	(2.6)	*36	*(2.6)	36	(2.6)
PSIG (kg/cm²G)	100	39	(2.7)	39	(2.7)	*39	*(2.7)
CONDENSER VOLUME	74.5 cu in						
HEAT OF REJECTION FROM CONDENSER	8900 BTU/h (AT 90°F /WT 70°F)						
HEAT OF REJECTION FROM COMPRESSOR	1400 BTU/h (AT 90°F /WT 70°F)						

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

7. FD-1001MLH (low side, parallel rack system)

Awaiting Data

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

8. FD-1001MLH-C (low side, parallel rack system)

Awaiting Data

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

IV. Service Diagnosis

⚠ WARNING

1. This unit should be diagnosed and repaired only by qualified service personnel to reduce the risk of death, electric shock, serious injury, or fire.
2. Risk of electric shock. Use extreme caution and exercise safe electrical practices.
3. Moving parts (e.g., fan blade) can crush and cut. Keep hands clear.
4. **CHOKING HAZARD:** Ensure all components, fasteners, and thumbscrews are securely in place after the unit is serviced. Make sure that none have fallen into the dispenser unit/storage bin.
5. Make sure all food zones in the icemaker and dispenser unit/storage bin are clean after the unit is serviced. For cleaning procedures, see "VI. Cleaning and Maintenance."

A. Ice Production Check

To check production, prepare a bucket or pan to catch the ice and a set of scales to weigh the ice. After the icemaker has operated for 10 to 20 minutes, catch the ice production for 10 minutes. Weigh the ice to establish the batch weight. Multiply the batch weight by 144 for the total production in 24 hours.

B. Diagnostic Procedure

This diagnostic procedure is a sequence check that allows you to diagnose the electrical system and components. Before proceeding, check for correct installation, adequate water supply (minimum of 10 PSIG, maximum of 113 PSIG) and proper voltage per unit nameplate. Check that the 24VAC 1A fuse and the 115VAC 3A GM fuse are good. When checking for high-voltage (115VAC), always choose a white (W) neutral wire to establish a good neutral connection. When checking for low-voltage (secondary) (24VAC), always choose a light blue (LBU) neutral wire to establish a good neutral connection. If the icemaker is in alarm, see "II.C.3. Alarm Safeties."

Note: FM/FMR and EHH (-C model only) energize when "GM" LED turns on. On MLH model, CB X1 Comp relay energizes LLV and SLV.

1) Turn off the power supply.

2) Remove the front panel, then move the power switch to the "OFF" position.

3) Remove the control box cover and access CB.

4) Check the S1 dip switch settings, see "II.C.4.a) Default Dip Switch Settings" to assure that they are in the correct positions. For proper operation of IS, confirm that S1 dip switch 7 is in the "ON" position.

⚠ WARNING

1. Risk of electric shock. Use extreme caution and exercise safe electrical practices.
2. Moving parts (e.g., fan blade) can crush and cut. Keep hands clear.

5) Turn on the power supply, then move the power switch to the "ON" position. Make sure the control switch is in the "ICE" position. CB "POWER OK" LED and IS green LED turn on. **Diagnosis "POWER OK" LED**: Check that CB "POWER OK" LED is on. If not, check for proper supply voltage (115VAC) input to the control transformer. If 115VAC is not present, check the power switch and breaker. Next, check that the circuit protect relay is de-energized (closed between terminals #1 and #5). If the circuit protect relay is energized (208/230VAC), confirm proper power supply. The circuit protect relay helps protect 115VAC components from exposure to 208/230VAC. Next, check for proper outpout voltage (24VAC) from the control transformer. If "POWER OK" LED is off, check 24VAC at CB K8 connector pin #1 white/red (W/R) to pin #2 light blue (LBU). If 24VAC is not present, replace the control transformer. If 24VAC is present and "POWER OK" LED is off, CB is bad and must be replaced.
Diagnosis IS: If "POWER OK" LED is on and IS green LED is off, check 20VDC at CB K6 connector brown (BR) wire to dark blue (DBU) wire. If 20VDC is not present, confirm dip switch 7 is in the "ON" position. If dip switch 7 is in the "ON" position and 20VDC is not present, CB is bad and must be replaced. If IS yellow LED is on or flashing, move ice away from IS lens. If no ice is present, clean the lens with a warm, clean damp cloth. If cleaning the lens does not work, replace IS. **Diagnosis MBC**: Confirm S1 dip switch 7 is in the "OFF" position. Check that the actuator paddle is properly positioned. Check for continuity across MBC proximity switch. When MBC proximity switch is closed 5VDC is present at CB K8 connector pin #3 or #4 gray (GY) to CB white K5 connector pin closest to red K4 connector (5VDC gnd). See Fig. 6. If 5VDC is not present, the control board is bad and must be replaced.

CB monitors the following switches with 5VDC: High-Pressure Switch, Gear Motor Protect Relay (relay terminals 3 & 5), and Mechanical Bin Control. When 5VDC is present across any of these switches, the switch is open.

6) **Fill Cycle** – "**WTRIN" LED is on**. WV energizes. The 90-second low water safety timer begins. LF/S closes. Nothing occurs at this time. The reservoir continues to fill until UF/S closes, terminating the 90-second low water safety timer, starting the 30-minute freeze timer, and de-energizing WV. **Diagnosis:** Check that "WTRIN" LED turns on. If not, make sure IS yellow LED is off. If not, move ice away from IS. If IS yellow LED does not turn off, clean the lens with a warm, clean damp cloth. If cleaning the lens does not work, replace IS. When "WTRIN" LED turns on, check that WV fills the reservoir. If not, check 24VAC to WV from CB K2 connector pin #8 white/brown (W/BR) wire to a light blue (LBU) neutral wire. Check for continuity through WV solenoid. If open, replace WV. Check for water supply line shut-off valve closed, clogged water filters, and clogged WV screen. Check that DV is not leaking by. Check that WV shuts off when UF/S closes. If not, check UF/S, LF/S, CB, and WV. See "IV.E.1. Float Switch Check."
Note: Low Water Safety–If UF/S remains open 90 seconds after WV energizes, a 1-beep alarm sounds. This alarm resets automatically once UF/S closes.

7) **Ice Purge Cycle** – **"GM" LED is on**. 30-second GM delay timer and 30-minute freeze timer start. WV de-energizes and "WTRIN" LED turns off. Once the 30-second GM delay timer terminates, the 5-minute ice purge timer starts. GMR (X2 on CB), GM, GMPR, FM/FMR, and EHH (-C model only) energize. **Diagnosis**: If "GM" LED is off, check that WV de-energizes and UF/S closes. If "GM" LED is on and GM is off, confirm 115VAC at CB K1 connector pin #3 black (BK) to white (W) neutral. Check for 115VAC at CB K1 connector pin #2 brown (BR) to a white (W) neutral. If no voltage is present, CB is bad and must be replaced. If 115VAC is present, check GM fuse, thermal protector, and GM windings. If FM/FMR is on but GM is off, check GM capacitor, GM windings, and GM coupling between auger and GM. If FM/FMR does not start, check FM/FMR capacitor, FM/FMR windings, and FM/FMR bearings.

8) **Freeze Cycle** – **"COMP" LED is on**. "GM" LED remains on. Comp, LLV (MLH model), and SLV (MLH model) energize. GMR (X2 on CB), GM, GMPR, and FM/FMR continue. Ice production begins 4 to 6 minutes after Comp, LLV (MLH model), and SLV (MLH model) energize depending on ambient and water conditions. **Diagnosis**: Check that "COMP" LED is on and that Comp, or LLV (MLH model) and SLV (MLH model), energize. If "COMP" LED is off, check DC voltage across GMPR terminals 3 and 5 white/orange (W/O) wires. If 5VDC is present, GMPR contacts are open. Check GMPR solenoid voltage and solenoid continuity. Replace GMPR if necessary. If "COMP" LED remains off, CB is bad and must be replaced. If "COMP" LED is on and Comp is off, check for 115VAC at CB X1 Comp relay, Comp, LLV (MLH model), and SLV (MLH model). Check Comp internal overload (motor protector), start relay, and capacitors.

9) **Refill Cycle/Low Water Safety Cycle** – As ice is produced, the water level in the reservoir drops. UF/S opens. Nothing occurs at this time. When LF/S opens, WV energizes, 90-second low water safety timer (fill timer) starts. Comp, GMR, GM, GMPR, and FM/FMR continue. When UF/S closes, WV de-energizes, 90-second low water safety timer (fill timer) terminates and 30-minute freeze timer resets.
If UF/S remains open 90 seconds after WV energizes (fill timer exceeded), a 90-second shutdown cycle starts. Comp de-energizes and CB signals a 1-beep alarm every 5 seconds. 90-second purge timer starts. GMR, GM, GMPR, and FM/FMR continue to clear ice from the evaporator. 90-second purge timer terminates, GMR, GM, GMPR, and FM/FMR de-energize. WV and 1-beep alarm continue until UF/S closes.
Diagnosis – Check that "WTRIN" LED is on. If not, check LF/S. See "IV.E. Float Switch Check and Cleaning." If LF/S is open and "WTRIN" LED is off, CB is bad and must be replaced. If "WTRIN" LED is on, check that the reservoir fills. If not, check the water supply line, clogged water filters, WV solenoid, clogged WV screen. If WV is energized and refill exceeds 90-second low water safety timer (fill timer), check DV leaking by, UF/S open. See "IV.E. Float Switch Check and Cleaning."
Note: Each time UF/S closes, 30-minute freeze timer starts. The 30-minute freeze timer resets when UF/S closes again. If UF/S does not close again within 30 minutes, CB shuts down the unit and sounds a 5-beep alarm every 5 seconds. See "II. C.3.d) Freeze Timer (5-beep alarm)."

10) **Shutdown** – See "IV.D. Bin Control Check."

Legend: **CB**–control board; **Comp**–compressor; **DV**–drain valve; **EHH**–extruding head heater (-C model only); **FM**–fan motor; **FMR**–fan motor-remote; **GM**–gear motor; **GMPR**–gear motor protect relay; **GMR**–gear motor relay; **IS**–infrared sensor; **LF/S**–lower float switch; **LLV**–liquid line valve (MLH model only); **MBC**–mechanical bin control; **SLV**–suction line valve (MLH model only); **UF/S**–upper float switch; **WV**–inlet water valve

C. Control Board Check

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

1) Check the S1 dip switch settings to assure that they are in the factory default position. S1 dip switch 7 is determined by bin control application:

   Bin Control Application:
   Infrared Sensor Bin Control: S1 dip switch 7 in the "OFF" position.
   Mechanical Bin Control: S1 dip switch 7 in the "ON" position.
   For factory default settings, see "II.C.4.a) Default Dip Switch Settings."

2) Move the power switch to the "ON" position and move the control switch to the "ICE" position. The "POWER OK" LED turns on. **Diagnosis "POWER OK" LED**: Check that the "POWER OK" LED is on. If not, check for proper supply voltage (115VAC) input to the control transformer (power switch, breaker, fuse, and circuit protect relay). Next, check for proper low-voltage (24VAC) output from the control transformer and that the 1A fuse is good. Check for 24VAC from K8 connector pin #1 white/red (W/R) to K8 connector pin #2 light blue (LBU). If 24VAC is present and the "POWER OK" LED is off, the control board is bad and must be replaced.

3) "WTRIN" LED is on: When the lower or upper float switch is open, the inlet water valve energizes and water fills the reservoir. **Diagnosis:** If "WTRIN" LED is off, upper float switch is closed (reservoir full), "GM" LED is on, and the gear motor energizes, skip to step 8. If "WTRIN" and "GM" LED are off, confirm that the control switch is in the "ICE" position (open). Check that the yellow LED on the infrared sensor is not steady or flashing (see step 4 below). Next, check the continuity of the lower and upper float switches (open or closed). For further details, see 5.f. below. If the lower or upper float switch is open and the "WTRIN" LED is off, the control board is bad and must be replaced. If the "WTRIN" LED is on and the lower or upper float switch is open, water should be filling the reservoir. If not, skip to step 6.

4) Infrared Sensor (K6 connector): Check that the infrared sensor green LED is on. If not, check for 20VDC from the black K6 connector dark blue wire (DBU) to the K6 connector brown (BR) wire. See Fig. 4. If 20VDC is not present, the control board is bad and must be replaced. Next, confirm that the yellow LED is not flashing or steady. If IS yellow LED is on or flashing, move ice away from IS lens. If no ice is present, clean the lens with a warm, clean damp cloth. If cleaning the lens does not work, replace IS.

Infrared Sensor (20VDC)
Closed
20VDC DBU to BR
20VDC DBU to W
0VDC W to BR

Infrared Sensor (20VDC)
Open (yellow LED flashing or steady)
20VDC DBU to BR
0VDC DBU to W
20VDC W to BR

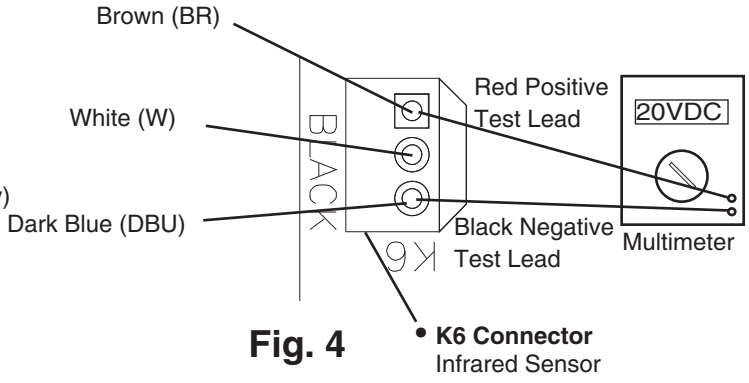


Fig. 4

5) 5VDC control board switch output checks: Control Switch, High Pressure Switch, Gear Motor Protect Relay (terminals 3 & 5), Mechanical Bin Control Proximity Switch, and Float Switch.
When checking 5VDC control voltage, always place the red positive test lead from the multimeter to the white K5 connector pin closest to the red K4 connector. See Fig. 5. Then place the black negative test lead from the multimeter to the corresponding pin to complete the 5VDC check. If the icemaker is in alarm (beeping), see "II.C.2.g) LED Lights and Alarm Safeties Chart."

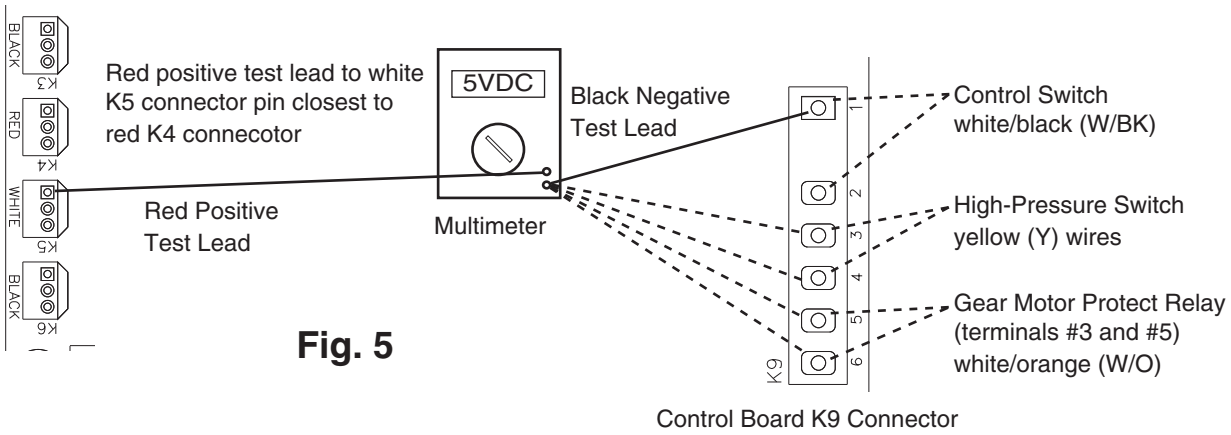


Fig. 5

a. Control Switch (K9 connector pins #1 and #2 white/black (W/BK) wires): 5VDC is present from the white K5 connector pin closest to red K4 connector to the K9 connector pin #1 white/black (W/BK) wire at all times. If 5VDC is not present, the control board is bad and must be replaced. When the control switch is in the "ICE" position, the control switch contacts are open. 0VDC is present from the white K5 connector pin closest to red K4 connector to the K9 connector pin #2 white/black (W/BK) wire. When in the "ICE" position, 5VDC is present from the K9 connector pin #1 white/black (W/BK) wire to pin #2 white/black (W/BK) wire. When the control switch is in the "DRAIN" position, the control switch contacts are closed. 5VDC is present from the white K5 connector pin closest to red K4 connector to the K9 connector pins #1 or #2 white/black (W/BK) wires. If 5VDC is not present the control board is bad and must be replaced. 0VDC is present from the K9 connector pin #1 white/black (W/BK) wire to pin #2 white/black (W/BK) wire.

b. High Pressure Switch (K9 connector pins #3 and #4 yellow (Y) wires): When the high pressure switch is closed, 5VDC is present from the white K5 connector pin closest to red K4 connector to the K9 connector pins #3 and #4 yellow (Y) wires. If 5VDC is not present, the control board is bad and must be replaced. If 5VDC is present to K9 connector pin #3 yellow (Y) wire and not to K9 connector pin #4 yellow (Y) wire, the high pressure switch is open and the control board sounds a 3-beep alarm. Check continuity across the high pressure switch (K9 connector pins #3 and #4 yellow (Y) wires). When the high-pressure switch is closed, 0VDC is present from the K9 connector pin #3 yellow (Y) wire to K9 connector pin #4 yellow (Y) wire. When the high-pressure switch is open, 5VDC is present from the K9 connector pin #3 yellow (Y) wire to K9 connector pin #4 yellow (Y) wire. If the high pressure switch is open and the control board is not in alarm, the control board is bad and must be replaced.

c. Gear Motor Protect Relay (K9 connector pins #5 and #6 white/orange (WO) wires): When the gear motor protect relay contacts terminals 3 and 4 are open (gear motor protect relay de-energized), 5VDC is present from the white K5 connector pin closest to red K4 connector to the K9 connector pin #5 white/orange (W/O) wire. If 5VDC is not present, the control board is bad and must be replaced. When the gear motor protect relay contacts terminals 3 and 4 are closed (gear motor protect relay energized), 5VDC is present from the white K5 connector pin closest to red K4 connector to the K9 connector pins #5 and #6 white/orange (W/O) wires. Also check from the K9 connector pin #5 white/orange (W/O) wire to K9 connector pin #6 white/orange (W/O) wire. If 0VDC is present, the gear motor protect relay contacts (terminals 3 & 5) are closed. If 5VDC is present, the gear motor protect relay contacts (terminals 3 & 5) are open and the control board may be in an 8-beep alarm. See "II.C.3.g) Gear Motor (8-beep alarm)."

d. Mechanical Bin Control (K8 connector pins #3 and #4 gray (GY) wires): When the mechanical bin control proximity switch is closed (calling for ice), 5VDC is present from the white K5 connector pin closest to red K4 connector to the K8 connector pin #3 and #4 gray (GY) wires. If 5VDC is not present, the control board is bad and must be replaced. If 5VDC is present to pin #3 gray (GY) wire and not to pin #4 gray (GY) wire, the mechanical bin control proximity switch is open. See "IV.D.2. Mechanical Bin Control Check."

e. Float Switch (K8 connector pins #5 black (BK) wire, #6 red (R) wire (upper), and #7 dark blue (DBU) wire (lower)): 5VDC is present from the white K5 connector pin closest to red K4 connector to the K8 connector pin #5 (black (BK) wire). If 5VDC is not present, the control board is bad and must be replaced. For further float switch diagnostics, see "IV.E. Float Switch Check and Cleaning."

6) "WTRIN" LED is on, and the inlet water valve is off: Check that the water supply is on and that no water restrictions exist. Next, check for 24VAC from the K2 connector pin #7 white/red (W/R) wire to a light blue (LBU) wire. If 24VAC is present, check for 24VAC from the K2 connector pin #8 white/brown wire to a light blue (LBU) wire. If 24VAC is not present, the control board is bad and must be replaced. If 24VAC is present, check for 24VAC directly across the inlet water valve solenoid. If 24VAC is present, turn off the power supply and check continuity across the inlet water valve solenoid. If open, replace the inlet water valve.

7) "GM" LED is on and the gear motor and condenser fan are off: Check for 115VAC from the K1 connector pin #2 brown (BR) wire to a white (W) neutral wire. If 115VAC is not present, see "IV.B. Diagnostic Procedure" step 5. If 115VAC is present, check for 115VAC from the control board K1 connector pin #3 black (BK) wire to a white (W) neutral wire. If 115VAC is not present, the control board is bad and must be replaced.

8) "GM" and "COMP" LED are on and the compressor is off: (Note: To bypass the Ice Purge Cycle, press the "SERVICE" button after the "GM" LED turns on). Check for 115VAC from the control board X1 relay brown (BR) wire to a white neutral wire. If 115VAC is not present, see "IV.B. Diagnostic Procedure" step 5. If 115VAC is present, check X1 relay red (R) wire to a white neutral wire. If 115VAC is not present, the control board is bad and must be replaced.

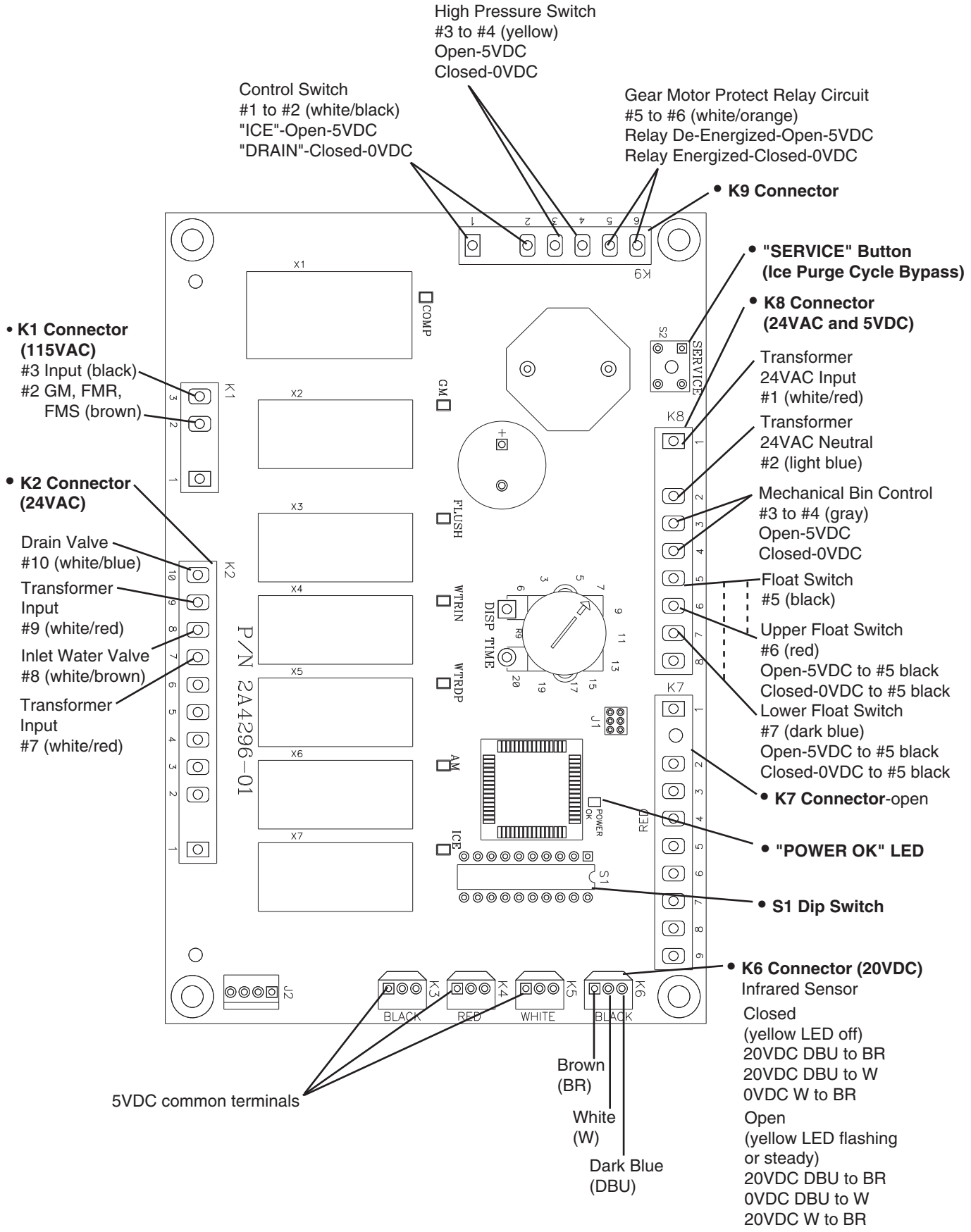

High Pressure Switch
#3 to #4 (yellow)
Open-5VDC
Closed-0VDC
Control Switch
#1 to #2 (white/black)
"ICE"-Open-5VDC
"DRAIN"-Closed-0VDC
Gear Motor Protect Relay Circuit
#5 to #6 (white/orange)
Relay De-Energized-Open-5VDC
Relay Energized-Closed-0VDC
• K9 Connector
• "SERVICE" Button
(Ice Purge Cycle Bypass)
• K8 Connector
(24VAC and 5VDC)
• K1 Connector
(115VAC)
#3 Input (black)
#2 GM, FMR,
FMS (brown)
• K2 Connector
(24VAC)
Drain Valve
#10 (white/blue)
Transformer
Input
#9 (white/red)
Inlet Water Valve
#8 (white/brown)
Transformer
Input
#7 (white/red)
Transformer
24VAC Input
#1 (white/red)
Transformer
24VAC Neutral
#2 (light blue)
Mechanical Bin Control
#3 to #4 (gray)
Open-5VDC
Closed-0VDC
Float Switch
#5 (black)
Upper Float Switch
#6 (red)
Open-5VDC to #5 black
Closed-0VDC to #5 black
Lower Float Switch
#7 (dark blue)
Open-5VDC to #5 black
Closed-0VDC to #5 black
• K7 Connector-open
• "POWER OK" LED
• S1 Dip Switch
• K6 Connector (20VDC)
Infrared Sensor
Closed
(yellow LED off)
20VDC DBU to BR
20VDC DBU to W
0VDC W to BR
Open
(yellow LED flashing
or steady)
20VDC DBU to BR
0VDC DBU to W
20VDC W to BR
5VDC common terminals
Brown
(BR)
White
(W)
Dark Blue
(DBU)
P/N 2A4296-01
BLACK
RED
WHITE
BLACK

Fig. 6

D. Bin Control Check

1. Infrared Sensor Check

IMPORTANT

Make sure S1 dip switch 7 is in the "ON" position. This allows the control board to monitor the infrared sensor along with the mechanical bin control.

1) Turn off the power supply.

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

3) Confirm that S1 dip switch 1, 2, & 3 are in the proper position for your application. See "II.C.4.b) Infrared Sensor Shutdown Delay (S1 dip switch 1, 2, & 3)."

4) Confirm that the infrared sensor is connected to the K6 connector on the control board. Wipe down the infrared sensor lens with a clean, warm, damp cloth.

5) Move the control switch to the "ICE" position, then move the power switch to the "ON" position.

6) Turn on the power supply to start the automatic icemaking process. Check that the infrared sensor green LED is on. This green LED confirms 20VDC power from the K6 connector on the control board to the infrared sensor and remains on constantly. **Diagnosis:** If the green LED is not on, check DC voltage at K6 connector dark blue (DBU) to brown (BR). If 20VDC is not present the control board is bad and must be replaced. If 20VDC is present and the green LED is off, the infrared sensor is bad and must be replaced.

7) Make sure the "GM" LED on the control board is on. There is a delay of at least 30 seconds before the "GM" LED turns on after power-up. After the "GM" LED turns on, press the "SERVICE" button on the control board to bypass the 5-minute ice purge cycle. See "II.C.1. Control Board Layout." **WARNING! Risk of electric shock. Care should be taken not to touch live terminals.** The "COMP" LED turns on.

8) "GM" and "COMP" LEDs are on. Use an object to cover the infrared sensor lens at the bottom of the icemaker. If the bottom of the icemaker is not accessible in your application, remove the thumbscrew securing the infrared sensor housing, remove the housing from the base, then cover the infrared sensor lens. See Fig. 7. The yellow LED on the infrared sensor turns on (flashing or steady). The yellow LED flashes when ice is at the outer limit of its range and turns steady as ice nears. After the yellow LED turns on (flashing or steady), the infrared sensor shutdown delay timer starts . See "Infrared Sensor Shutdown Delay (S1 dip switch 1, 2, and 3)." The compressor should de-energize immediately after the shutdown delay timer expires. Five minutes later, the gear motor and fan motor should de-energize. **Diagnosis:** If the yellow LED is not on after covering the lens, the infrared sensor is bad and must be replaced. If the unit remains on after the infrared sensor shutdown delay timer expires and the 5-minute ice purge timer expires, the control board is bad and must be replaced. If the infrared sensor fails to shut down the icemaker and the level of ice activates the mechanical bin control, the icemaker shuts down within 10 seconds of the mechanical bin control opening and a 9-beep alarm sounds. To reset, turn the power off, and then on again.

9) Remove the object covering the infrared sensor. If you removed the infrared sensor housing from the base, replace it in its correct position, and secure it with the thumbscrew.

10) Move the power switch to the "OFF" position. Turn off the power supply, then proceed to "IV.D.2. Mechanical Bin Control Check."

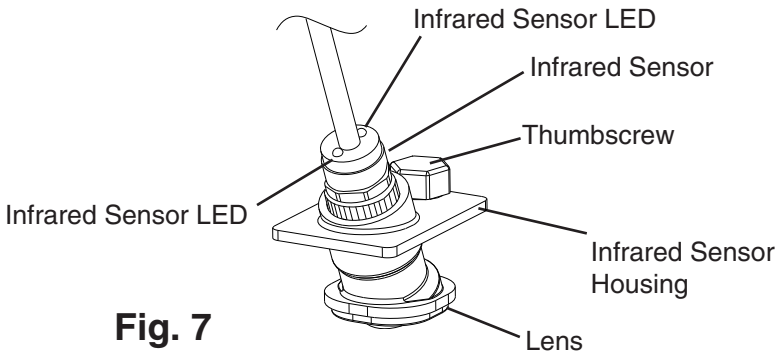


Fig. 7

2. Mechanical Bin Control Check

When the actuator paddle is not engaged the mechanical bin control is closed and the icemaker produces ice.

a) Backup Bin Control: S1 dip switch 7 placed in the "ON" position, the mechanical bin control is used as a backup bin control safety. When ice fills the chute and engages the actuator paddle, the mechanical bin control opens and the control board shuts down the icemaker within 10 seconds and sounds a 9-beep alarm.

b) Stand-Alone Bin Control: S1 dip switch 7 placed in the "OFF" position, the mechanical bin control is used as a stand-alone bin control. The stand-alone application should only be used in Hoshizaki standard ice storage bin applications. When ice fills the chute and engages the actuator paddle, the mechanical bin control opens and the control board shuts down the icemaker within 10 seconds. **WARNING! Do not place S1 dip switch 7 in the "OFF" position on dispenser unit applications.** See "II.C.4.a) Default Dip Switch Settings."

1) Make sure the power supply is off.

2) Remove the strap connecting the spout to the chute assembly. See Fig. 8. Pull up the chute assembly slightly so that you can access the actuator paddle located in the top of the chute.

3) Move the power switch to the "ON" position.

4) Turn on the power supply to start the automatic icemaking process.

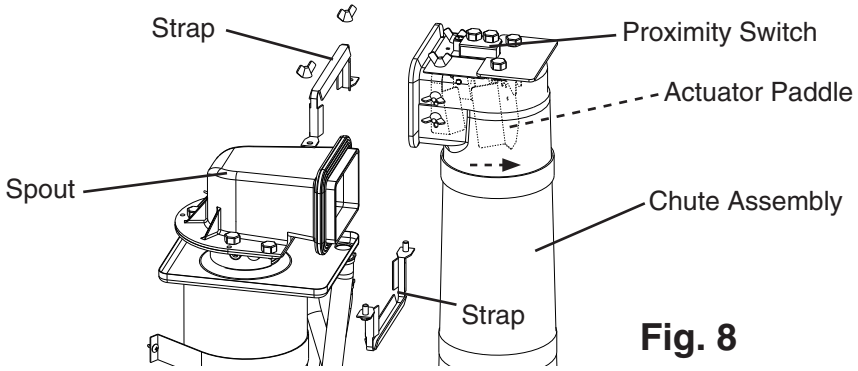


Fig. 8

5) Make sure the "GM" LED is on. There is a delay of at least 30 seconds before the "GM" LED turns on after power-up. After the "GM" LED turns on, press the "SERVICE" button on the control board to bypass the 5-minute compressor delay. **WARNING! Risk of electric shock. Care should be taken not to touch live terminals.** The "COMP" LED turns on.

6) Press the actuator paddle located in the top of the chute.
S1 dip switch 7 in the "ON" position: The compressor and gear motor should de-energize within 10 seconds and the control board should sound a 9-beep alarm.
S1 dip switch 7 in the "OFF" position: The compressor and gear motor should de-energize within 10 seconds. **Diagnosis:** If the mechanical bin control fails to open or the icemaker fails to shut down, check that the actuator paddle is moving freely. Confirm that the actuator paddle is engaged. Check for continuity across the mechanical bin control wires. If the mechanical bin control is found open and the icemaker continues to run, the control board is bad and must be replaced. If the mechanical bin control is found closed with the actuator paddle engaged, the mechanical bin control proximity switch is bad and must be replaced.

7) Move the power switch to the "OFF" position and turn off the power supply.

8) Replace the chute assembly and strap in their correct positions.

9) Move the power switch to the "ON" position.

10) Replace the control box cover, top panel, and front panel in their correct positions.

11) Turn on the power supply to start the automatic icemaking process.

E. Float Switch Check and Cleaning

1. Float Switch Check

1) Remove the front panel and move the power switch to the "OFF" position. Move the control switch to the "DRAIN" position.
2) Move the power switch to the "ON" position.
3) Allow the water to drain from the reservoir, then move the power switch to the "OFF" position and the control switch to the "ICE" position.
4) Remove the molex plug from the control box and check continuity across the float switch wires. Black (BK) to red (R) for the upper float and black (BK) to dark blue (DBU) for the lower float. See Fig. 9. With the water reservoir empty, the float switches are open. If open, continue to step 5. If closed, follow the steps in "IV.E.2. Float Switch Cleaning." After cleaning the float switches, check them again. Replace if necessary.
5) Replace the molex plug on the control box.
6) Move the power switch to the "ON" position and let the water reservoir fill.
7) Once the reservoir is full and the gear motor starts, move the power switch to the "OFF" position.
8) Remove the molex plug from the control box and check continuity across the float switch wires. Black (BK) to red (R) for the upper float and black (BK) to blue (DBU) for the lower float. They should be closed. Clean or replace if necessary.

2. Float Switch Cleaning

Depending on local water conditions, scale may build up on the float switch. Scale on the switch can cause the floats to stick. In this case, the float switch should be cleaned and checked.

1) Turn off the power supply.
2) Remove the float switch assembly from the reservoir cover. See Fig. 10.
3) Wipe down the float switch assembly with a mixture of 1 part recommended cleaner Hoshizaki "Scale Away" or "LIME-A-WAY" (Economics Laboratory, Inc.) and 25 parts warm water. Rinse the assembly thoroughly with clean water.
4) While not necessary, the floats can be removed from the shaft during cleaning. If you remove them, note that the blue float is on top. The floats must be installed with the magnets inside them towards the top of the switch. Installing the floats upside down will affect the timing of the float switch operation. See Fig. 9.
5) Rinse the float switch assembly thoroughly with clean water and replace in its original position.

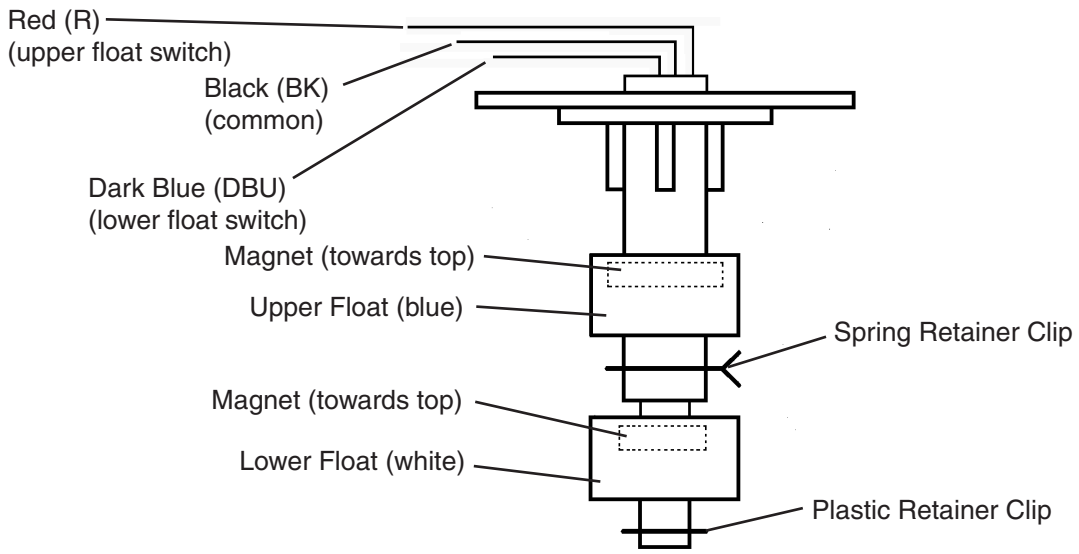

Red (R)
(upper float switch)
Black (BK)
(common)
Dark Blue (DBU)
(lower float switch)
Magnet (towards top)
Upper Float (blue)
Spring Retainer Clip
Magnet (towards top)
Lower Float (white)
Plastic Retainer Clip

Fig. 9

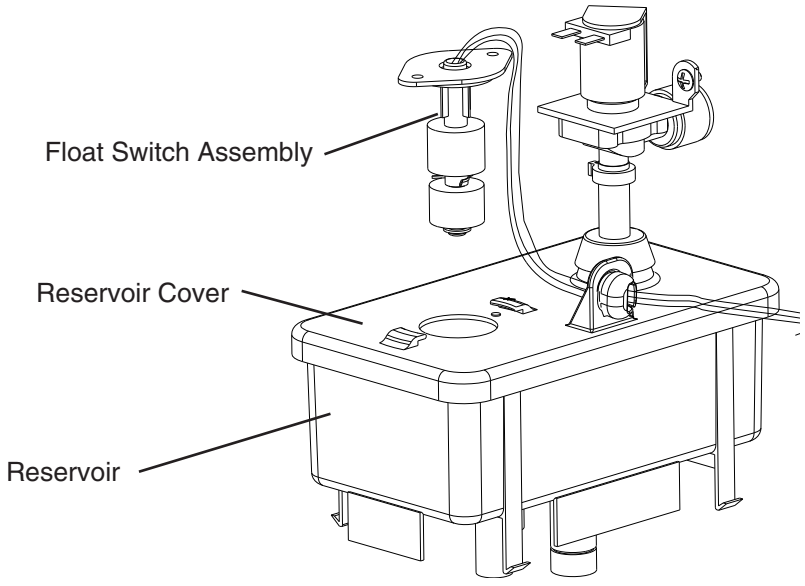

Float Switch Assembly
Reservoir Cover
Reservoir

Fig. 10

F. Diagnostic Charts

1. No Ice Production

Problem	Possible Cause		Remedy
[1] The icemaker will not start.	a) Power Supply	1. Off, blown fuse, or tripped breaker.	1. Turn on, replace, or reset.
		2. Loose connection.	2. Tighten.
		3. Bad contacts.	3. Check for continuity and replace.
		4. Not within specifications.	4. Refer to nameplate and correct.
	b) Water Supply	1. Water supply off or pressure too low.	1. Check and get recommended pressure.
	c) Power Switch (Control Box)	1. "OFF" position.	1. Move to "ON" position.
		2. Bad contacts.	2. Check for continuity and replace.
	d) Circuit Protect Relay	1. Power supply not within specifications.	1. Refer to nameplate and correct or re-wire.
		2. Bad Contacts.	2. Check for continuity and replace.
	e) Transformer	1. Coil winding opened.	1. Replace.
	f) Fuse (Control Box)	1. Blown.	1. Check for short circuit and replace.
	g) Infrared Sensor	1. No power or defective.	1. See "IV.D. Bin Control Check."
	h) Mechanical Bin Control (Backup Bin Control Safety)	1. Tripped with bin filled with ice. (9-beep alarm)	1. Remove ice.
		2. Mechanical bin control stuck open.	2. See "IV.D. Bin Control Check."
		3. Actuator paddle does not move freely.	3. Clean shaft and its corresponding holes or replace damaged components.
	i) High Pressure Switch	1. Bad Contacts.	1. Check for continuity and replace.
		2. Dirty air filter or condenser.	2. Clean.
		3. Ambient or condenser water temperature too warm.	3. Reduce temperature.
		4. Refrigerant overcharged.	4. Recharge.
		5. Fan not operating (except water-cooled model).	5. See chart "3.[2.]a) Fan Motor"
		6. Refrigerant line or component restricted.	6. Remove the restriction or component and replace the drier.

Problem	Possible Cause		Remedy
[1] The icemaker will not start (continued).	i) High Pressure Switch (continued)	7. Condenser water pressure too low or off (water-cooled model).	7. Check and get recommended pressure.
		8. Water regulating valve set too high (water-cooled model).	8. Adjust it lower.
	j) Control Switch	1. "DRAIN" position.	1. Move to "ICE" position.
		2. Bad contacts.	2. Check for continuity and replace.
	k) Inlet Water Valve	1. Coil winding opened.	1. Replace.
	l) Control Board	1. Defective.	1. See "IV.B. Diagnostic Procedure."
[2] Fill cycle will not terminate.	a) Float Switch	1. Bad contacts.	1. Check for continuity and replace.
		2. Float does not move freely.	2. Clean or replace.
	b) Drain Water Valve	1. Valve seat clogged and water leaking.	1. Clean or replace.
	c) Hoses	1. Disconnected.	1. Connect.
	d) Control Board	1. Defective.	1. See "IV.B. Diagnostic Procedure."
[3] Ice purge cycle will not start.	a) Control Board	1. Defective.	1. See "IV.B. Diagnostic Procedure."
	b) Gear Motor Fuse	1. Blown.	1. Check gear motor amperage, bearing wear (see "V.D.1. Upper Bearing Wear Check"), supply voltage.
	c) Gear Motor Thermal Protector	1. Open.	1. Check gear motor bearings, voltage supply.
	d) Gear Motor Protect Relay	1. Open windings.	1. Replace.
		2. Open or stuck contacts.	2. Replace.
	e) Gear Motor	1. Open windings.	1. Replace.
		2. Auger coupling broke.	2. Replace.
		3. Locked bearings.	3. Replace.
[4] Freeze cycle will not start (compressor).	a) Control Board	1. Defective.	1. See "IV.B. Diagnostic Procedure."
	b) Starter (start relay)	1. Bad contacts.	1. Check for continuity and replace.
		2. Coil winding opened.	2. Replace.
		3. Loose connections.	3. Tighten.
	c) Start Capacitor or Run Capacitor	1. Defective, weak.	1. Replace.

Problem	Possible Cause		Remedy
[4] Freeze cycle will not start (compressor) (continued).	d) Compressor	1. Wiring to compressor.	1. Check for loose or open connection, repair or replace.
		2. Loose connections.	2. Tighten.
		3. Motor winding opened or grounded.	3. Replace.
		4. Compressor locked and motor protector tripped.	4. Replace.
	e) Power Supply	1. Not within specifications.	1. Refer to nameplate and correct.
[5] Freeze cycle starts, but no ice is produced.	a) Refrigerant Line	1. Gas leaks.	1. Check for leaks with a leak detector. Repair leaks. Replace drier and charge with refrigerant. See "V.A. Service for Refrigerant Lines."
		2. Refrigerant line or component restricted.	2. Remove the restriction or component and replace the drier.
	b) Expansion Valve (TXV) (not adjustable)	1. Defective.	1. Replace.
	c) Compressor	1. Defective.	1. See "2.[1]g) Compressor".
	d) Headmaster (C.P.R.) (remote air-cooled model)	1. Not operating properly and liquid line temperature too warm.	1. Replace.
	e) Water Supply Line (water-cooled model)	1. Condenser water pressure too low or off and high pressure control opens and closes frequently.	1. Check and get recommended pressure.
	f) Water Regulating Valve (water-cooled model)	1. Set too high.	1. Adjust or replace. See "V.H. Adjustment of Water Regulating Valve."

2. Low Ice Production

Problem	Possible Cause		Remedy
[1] Low ice production.	a) Evaporator	1. Dirty.	1. Clean. See "VI.A. Cleaning and Sanitizing Instructions."
	b) Bin Control	1. Erratic, sticking, defective.	1. See "IV.D. Bin Control Check."
	c) Losing Water	1. Drain valve leaking.	1. Clean or replace.
		2. Mechanical seal leaking.	2. Replace.
		3. O-ring leaking.	3. Replace.
	d) Expansion Valve (TXV) (not adjustable)	1. Low-side pressure too low.	1. Replace.
		2. Low-side pressure too high.	2. See if expansion valve bulb is mounted properly, and replace the valve if necessary.
	e) Refrigerant Line	1. Gas leaks.	1. Check for leaks with a leak detector. Repair leaks. Replace drier and charge with refrigerant. See "V.A. Service for Refrigerant Lines."
		2. Refrigerant lines or components restricted	2. Remove the restriction or component and replace the drier.
		3. Overcharged.	3. Recharge.
	f) High-Side Pressure Too High	1. Dirty air filter or condenser.	1. Clean.
		2. Ambient or condenser water temperature too warm.	2. Reduce temperature.
		3. Fan motor slow rpm.	3. See "3.[2]a) Fan Motor".
		4. Fan motor capacitor.	4. Check and Replace.
		5. Condenser water pressure too low or off (water-cooled model).	5. Check and get recommended pressure.
		6. Water regulating valve restricted (water-cooled model).	6. Clean.
	g) Compressor	1. Inefficient compressor.	1. Replace compressor.
		2. Faulty thermal protector (overload).	2. Replace compressor.
		3. Faulty capacitor/ starter.	3. Replace components.

3. Other

Problem	Possible Cause		Remedy
[1] Icemaker will not stop when bin is filled with ice.	a) Bin Control	1. Erratic or defective.	1. See "IV.D. Bin Control Check."
[2] Abnormal noise	a) Fan Motor (except water-cooled model)	1. Bearing worn out.	1. Replace.
		2. Fan blade deformed.	2. Replace fan blade.
		3. Fan blade does not move freely.	3. Replace.
	b) Compressor	1. Bearings worn out, or cylinder valve broken.	1. Replace.
		2. Mounting pad out of position.	2. Reinstall.
	c) Refrigerant Lines	1. Rub or touch lines or other surfaces.	1. Reposition.
	d) Auger	1. Bearings or auger worn out.	1. Replace bearings or auger. See "V.D.1. Upper Bearing Wear Check."
	e) Gear Motor	1. Bearing or gear worn out / damaged.	1. Replace.
	f) Evaporator	1. Scale on inside wall of evaporator freezing cylinder.	1. Use "SCALE AWAY" solution to clean periodically. If the water is found hard by testing, install a softener.
		2. Low refrigerant pressures.	2. Check charge, check for possible leak, repair, re-charge.
		3. Expansion valve bad.	3. Replace.
		4. Evaporator bad.	4. Replace.
[3] Overflow from reservoir (water does not stop).	a) Water Supply	1. Water pressure too high.	1. Install a pressure reducing valve.
	b) Inlet Water Valve	1. Diaphragm does not close.	1. Clean or replace.
	c) Float Switch	1. Bad contacts.	1. Check for continuity and replace.
[4] Gear motor protector operates frequently or fuse blows frequently.	a) Power Supply	1. Not within specifications.	1. Refer to nameplate and correct.
	b) Evaporator Assembly	1. Gear motor bearings or auger bearings worn out.	1. Replace bearings or auger. See "V.D.1. Upper Bearing Wear Check."
	c) Bin Control	1. Defective.	1. See "IV.D. Bin Control Check."
		2. Actuator does not move freely.	2. Clean shaft and its corresponding holes or replace bin control.
	d) Control Board	1. Erratic operation of gear motor relay.	1. See "IV.B. Diagnostic Procedure."

V. Removal and Replacement of Components

⚠ WARNING

1. This unit should be diagnosed and repaired only by qualified service personnel to reduce the risk of death, electric shock, serious injury, or fire.
2. Move the power switch to the "OFF" position and turn off the power supply before servicing. Lockout/Tagout to prevent the power from being turned back on inadvertently.
3. **CHOKING HAZARD:** Ensure all components, fasteners, and thumbscrews are securely in place after the equipment is serviced. Make sure that none have fallen into the dispenser unit/storage bin.
4. Make sure all food zones in the icemaker and dispenser unit/storage are clean after the unit is serviced. For cleaning procedures, see "VI. Cleaning and Maintenance."

A. Service for Refrigerant Lines

⚠ WARNING

1. Repairs requiring the refrigeration circuit to be opened must be performed by properly trained and EPA-certified service personnel.
2. Always recover the refrigerant and store it in an approved container. Do not discharge the refrigerant into the atmosphere.
3. Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.

CAUTION

1. Do not leave the system open for longer than 15 minutes when replacing or servicing parts. The Polyol Ester (POE) oils used in R-404A units can absorb moisture quickly. Therefore it is important to prevent moisture from entering the system when replacing or servicing parts.
2. Always install a new drier every time the sealed refrigeration system is opened.
3. Do not replace the drier until after all other repair or replacement has been made. Install the new drier with the arrow on the drier in the direction of the refrigerant flow.
4. When brazing, protect the drier by using a wet cloth to prevent the drier from overheating. Do not allow the drier to exceed 250°F (121°C).

1. Refrigerant Recovery (except MLH model)

The icemaker unit is provided with refrigerant access valves. Using proper refrigerant practices, recover the refrigerant from the access valves and store it in an approved container. Do not discharge the refrigerant into the atmosphere.

2. Brazing

⚠ WARNING

1. R-404A itself is not flammable at atmospheric pressure and temperatures up to 176°F (80°C).
2. R-404A itself is not explosive or poisonous. However, when exposed to high temperatures (open flames), R-404A can be decomposed to form hydrofluoric acid and carbonyl fluoride both of which are hazardous.
3. Do not use silver alloy or copper alloy containing arsenic.
4. Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.

1) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.

CAUTION

1. Always install a new drier every time the sealed refrigeration system is opened.
2. Do not replace the drier until after all other repair or replacement has been made. Install the new drier with the arrow on the drier in the direction of the refrigerant flow.
3. When brazing, protect the drier by using a wet cloth to prevent the drier from overheating. Do not allow the drier to exceed 250°F (121°C).

2) Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.

3. Evacuation and Recharge (R-404A) (except MLH model)

1) Attach a vacuum pump to the system. Be sure to connect charging hoses to both high and low-side access valves.

IMPORTANT

The vacuum level and vacuum pump may be the same as those for current refrigerants. However, the rubber hose and gauge manifold to be used for evacuation and refrigerant charge should be exclusively for POE oils.

2) Turn on the vacuum pump. Never allow the oil in the vacuum pump to flow backwards.

3) Allow the vacuum pump to pull down to a 29.9" Hg vacuum. Evacuating period depends on pump capacity.

4) Close the low-side valve and high-side valve on the gauge manifold.

5) Disconnect the gauge manifold hose from the vacuum pump and attach it to a refrigerant service cylinder. Remember to loosen the connection and purge the air from the hose. For air-cooled and water-cooled models, see the nameplate for the required refrigerant charge. For remote air-cooled models, see the rating label inside the icemaker. Hoshizaki recommends only virgin refrigerant or reclaimed refrigerant which meets ARI Standard 700 (latest edition) be used.

6) A liquid charge is recommended for charging an R-404A system. Invert the service cylinder and place it on scales. Open the high-side valve on the gauge manifold.

7) Allow the system to charge with liquid until the proper charge weight is met.

8) If necessary, add any remaining charge to the system through the low-side. Use a throttling valve or liquid dispensing device to add the remaining liquid charge through the low-side access port with the unit running.

9) Close the gauge manifold valves and disconnect the gauge manifold hoses.

10) Cap the access valves to prevent a possible leak.

4. Refrigerant Recovery, Evacuation, and Recharge - MLH Model (low side, parallel rack system)

a) Refrigerant Recovery

Using proper refrigerant practices, close the liquid and suction line service valves at the rack system. Then, follow the steps below to recover the refrigerant from the line set and icemaker and store it in an approved container. Do not discharge the refrigerant into the atmosphere.

1) Turn off the icemaker power supply.

2) Close the liquid and suction line service valves at the rack system.

3) Connect gauge manifold hoses to the line set liquid and suction access valves.

4) Place magnets on top of the liquid and suction line solenoids.

5) Recover the refrigerant from the line set and icemaker. Note the charge amount removed. Do not discharge the refrigerant into the atmosphere.

b) Brazing

See "V.A.2. Brazing."

c) Evacuation and Recharge (R-404A)

1) Attach a vacuum pump to the system. Be sure to connect charging hoses to both liquid and suction access valves.

IMPORTANT

The vacuum level and vacuum pump may be the same as those for current refrigerants. However, the rubber hose and gauge manifold to be used for evacuation and refrigerant charge should be exclusively for POE oils.

2) Turn on the vacuum pump. Never allow the oil in the vacuum pump to flow backwards.

3) Allow the vacuum pump to pull down to a 29.9" Hg vacuum. Evacuating period depends on pump capacity.

4) Close the low-side valve and high-side valve on the gauge manifold.

5) Disconnect the gauge manifold hose from the vacuum pump and attach it to a refrigerant service cylinder. Remember to loosen the connection and purge the air from the hose. Hoshizaki recommends only virgin refrigerant or reclaimed refrigerant which meets ARI Standard 700 (latest edition) be used.

6) A liquid charge is recommended for charging an R-404A system. Invert the service cylinder and place it on scales. Open the high-side valve on the gauge manifold.

7) Allow the system to charge with liquid until a charge weight equal to the charge weight removed earlier in step "4.a)5)" is met.

8) Remove the magnets from the liquid and suction line valves.

9) Close the gauge manifold valves.

10) Open the rack system liquid and suction line service valves.

11) Turn on the power supply.

12) Allow the system to run, then confirm the EPR (evaporator pressure regulator) setting.
EPR Setting: 32 PSIG for evaporator temperature no less than 5°F (-15°C).

13) Disconnect the gauge manifold hoses.

14) Cap the access valves to prevent a possible leak.

B. Removal and Replacement of Compressor

CAUTION

1. Always install a new drier every time the sealed refrigeration system is opened.
2. Do not replace the drier until after all other repair or replacement has been made. Install the new drier with the arrow on the drier in the direction of the refrigerant flow.
3. When brazing, protect the drier by using a wet cloth to prevent the drier from overheating. Do not allow the drier to exceed 250°F (121°C).

Note: When replacing a compressor with a defective winding, be sure to install the new start capacitor and start relay supplied with the replacement compressor. Due to the ability of the POE oil in the compressor to absorb moisture quickly, the compressor must not be opened more than 15 minutes for replacement or service. Do not mix lubricants of different compressors even if both are charged with R-404A, except when they use the same lubricant.

1) Turn off the power supply.

2) Remove the panels.

3) Recover the refrigerant and store it in an approved container.

4) Remove the terminal cover on the compressor, and disconnect the compressor wiring. On remote air-cooled models, disconnect the crankcase heater.

5) Remove the drier and the discharge, suction, and process pipes.

6) Remove the hold-down bolts, washers, and rubber grommets.

7) Remove the compressor. Unpack the new compressor package.

8) Attach the rubber grommets of the prior compressor to the new compressor.

9) Place the compressor in position and secure it using the bolts and washers.

10) Place the new drier in position.

11) Remove plugs from the suction, discharge, and process pipes.

12) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.

13) Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.

14) Evacuate the system, and charge it with refrigerant. For air-cooled and water-cooled models, see the nameplate for the required refrigerant charge. For remote air-cooled models, see the rating label inside the icemaker.

15) Connect the terminals, and replace the terminal cover in its correct position. On remote air-cooled models, connect the crankcase heater.

16) Replace the panels in their correct positions.

17) Turn on the power supply.

C. Removal and Replacement of Expansion Valve

Moisture in the refrigeration circuit may exceed drier capacity and freeze up at the expansion valve.

CAUTION

1. Always install a new drier every time the sealed refrigeration system is opened.
2. Do not replace the drier until after all other repair or replacement has been made. Install the new drier with the arrow on the drier in the direction of the refrigerant flow.
3. When brazing, protect the valve body and drier by using wet cloths to prevent the valve body and drier from overheating. Do not allow the valve body or drier to exceed 250°F (121°C).

1) Turn off the power supply.

2) Remove the panels.

3) Recover the refrigerant and store it in an approved container.

4) Remove the insulation and the expansion valve bulb on the suction line.

5) Remove the expansion valve cover and disconnect the expansion valve. Place the new expansion valve in position.

6) Remove the drier, then place the new drier in position.

7) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.

8) Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.

9) Evacuate the system, and charge it with refrigerant. For air-cooled and water-cooled models, see the nameplate for the required refrigerant charge. For remote air-cooled model, see the rating label inside the icemaker.

10) Attach the expansion valve bulb to the suction line in the same location as the previous bulb. The bulb should be between the 10 and 2 o'clock position on the tube. Be sure to secure the bulb with the clamp and holder and to insulate it.

11) Place the expansion valve cover in position.

12) Replace the panels in their correct positions.

13) Turn on the power supply.

D. Removal and Replacement of Evaporator Assembly Components

CAUTION

On flaker models, make sure the cutter pin is in place after service. On cubelet models, make sure the extruding head heater is installed after service.

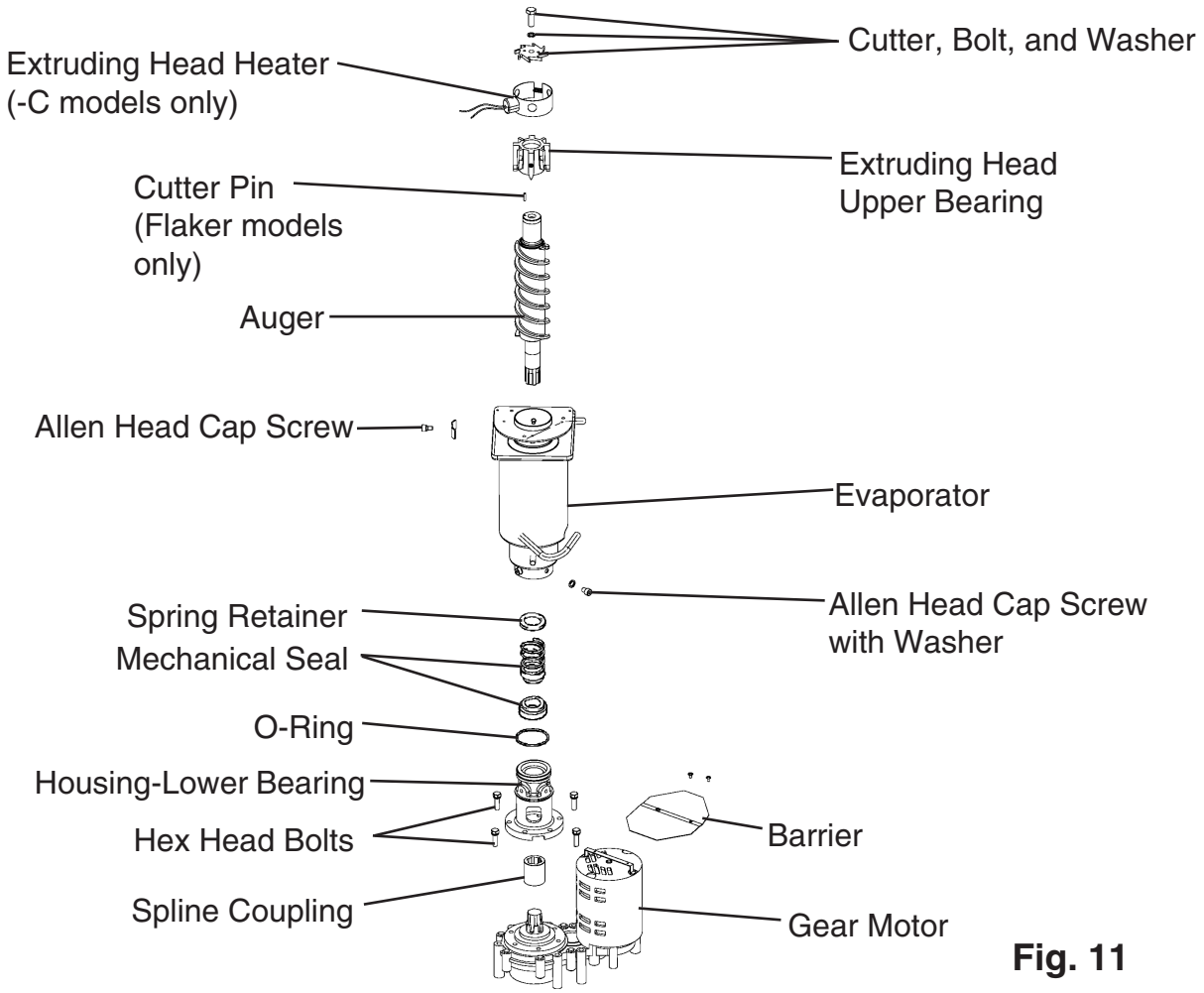


Fig. 11

1. Upper Bearing Wear Check

To ensure that the bearing inside the extruding head does not exceed the wear tolerance of .02", follow the instructions below.

1) Turn off the power supply.
2) Remove the panels.
3) Remove the strap connecting the spout to the chute assembly, then remove the spout.
4) Remove the bolt from the auger and lift off the cutter.
5) Replace the bolt in the auger. Grasp the bolt at the top of the auger and move the auger towards you and then try to insert a .02" round stock or pin gauge in between the back side of the auger shaft and the bearing surface. Check several locations around the auger shaft. If the gauge goes between the shaft and the bearing at any point or if the bearing is scratched or cracked, both the top bearing in the extruding head and the lower bearing in the housing should be replaced. Instructions for removing the extruding head and housing are located later in this procedure.

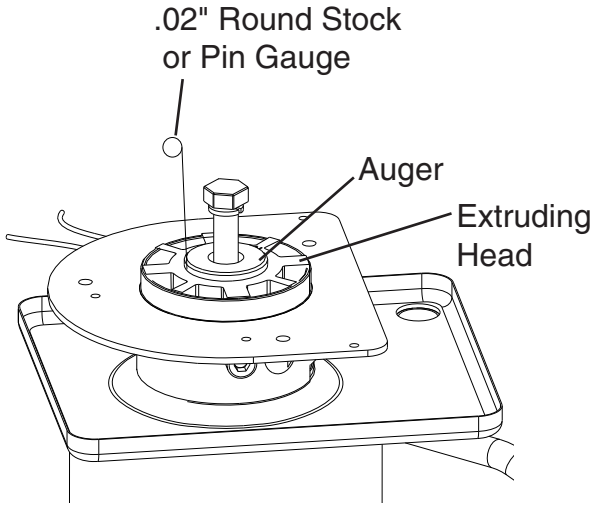


Fig. 12

Note: Replacing the bearing requires a bearing press adaptor. If one is not available, replace the whole extruding head and housing.

6) Remove the bolt. Replace the cutter and then the cutter bolt.
7) Replace the spout.
8) Replace the panels in their correct positions.
9) Turn on the power supply.

2. Removal and Replacement of Cutter

1) Turn off the power supply.
2) Remove the panels.
3) Remove the strap connecting the spout to the chute assembly, then remove the spout.
4) Remove the bolt and lift off the cutter.
5) Install the new cutter and replace the bolt.
6) Replace the spout.
7) Replace the panels in their correct positions.
8) Turn on the power supply.

3. Removal and Replacement of Extruding Head

1) Drain the water from the evaporator.
   a) Move the power switch to the "OFF" position.
   b) Move the control switch to the "DRAIN" position.
   c) Move the power switch to the "ON" position and allow the water to drain from the evaporator.
   d) Move the power switch to the "OFF" position, then turn off the power supply.
2) Remove the panels.
3) Remove the strap connecting the spout to the chute assembly, then remove the spout.
4) Remove the bolt and lift off the cutter.
5) Remove the allen head cap screws and lift off the extruding head.
6) Place the new extruding head in place and tighten down the allen head cap screws.
7) Replace the cutter, cutter bolt, and spout.
8) Replace the panels in their correct positions.
9) Move the drain switch to the "ICE" position. Then, turn on the power supply.

4. Removal and Replacement of Auger

1) Drain the water from the evaporator.
   a) Move the power switch to the "OFF" position.
   b) Move the control switch to the "DRAIN" position.
   c) Move the power switch to the "ON" position and allow the water to drain from the evaporator.
   d) Move the power switch to the "OFF" position.
2) Turn off the power supply.
3) Remove the panels.
4) Remove the strap connecting the spout to the chute assembly, then remove the spout.
5) Remove the allen head cap screws securing the extruding head. Using the cutter, lift out the auger assembly.
6) Remove the cutter bolt, cutter pin (flaker only), cutter, and extruding head from the auger and place on the new auger. (On flaker models, a new cutter pin is supplied with the new auger.)
7) Install the new auger.
8) Replace the removed parts in the reverse order of which they were removed.
9) Replace the panels in their correct positions.
10) Move the drain switch to the "ICE" position. Then, turn on the power supply.

5. Removal and Replacement of Evaporator

CAUTION

1. Always install a new drier every time the sealed refrigeration system is opened.
2. Do not replace the drier until after all other repair or replacement has been made. Install the new drier with the arrow on the drier in the direction of the refrigerant flow.
3. When brazing, protect the drier by using a wet cloth to prevent the drier from overheating. Do not allow the drier to exceed 250°F (121°C).

1) Drain the water from the evaporator.
   a) Move the power switch to the "OFF" position.
   b) Move the control switch to the "DRAIN" position.
   c) Move the power switch to the "ON" position and allow the water to drain from the evaporator.
   d) Move the power switch to the "OFF" position, then turn off the power supply.
2) Remove the panels.
3) Recover the refrigerant and store it in an approved container.
4) Remove the strap connecting the spout to the chute assembly, then remove the spout.
5) Disconnect the water hoses.
6) Remove the allen head cap screws securing the extruding head. Using the cutter, lift out the auger assembly.
7) Remove the insulation and the expansion valve bulb on the suction line.
8) Disconnect the inlet and outlet tubing.
9) Remove the allen head cap screws securing the evaporator to the lower housing.
10) Lift off the evaporator.
11) Inspect the mechanical seal and O-ring prior to installing the new evaporator. The mechanical seal consists of two parts. One moves along with the auger, and the other is fixed on the lower housing. If the contact surfaces of these two parts are worn, cracked, or scratched, the mechanical seal may cause water leaks and should be replaced. Instructions for removing the mechanical seal and lower housing are located later in this procedure.
12) Make sure the lower mechanical seal is in place, then place the evaporator in position. Secure the evaporator to the lower housing using the allen head cap screws.
13) Remove the drier, then place the new drier in position.
14) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.
15) Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.

16) Evacuate the system, and charge it with refrigerant. For air-cooled and water-cooled models, see the nameplate for the required refrigerant charge. For remote air-cooled models, see the rating label inside the icemaker.

17) Replace the removed parts in the reverse order of which they were removed.

18) Replace the panels in their correct positions.

19) Move the drain switch to the "ICE" position. Then, turn on the power supply.

6. Removal and Replacement of Mechanical Seal and Lower Housing

6a. Mechanical Seal

1) Drain the water from the evaporator.
   a) Move the power switch to the "OFF" position.
   b) Move the control switch to the "DRAIN" position.
   c) Move the power switch to the "ON" position and allow the water to drain from the evaporator.
   d) Move the power switch to the "OFF" position.
2) Turn off the power supply.
3) Remove the panels.
4) Remove the strap connecting the spout to the chute assembly, then remove the spout.
5) Remove the allen head cap screws securing the extruding head. Using the cutter, lift out the auger assembly.
6) The mechanical seal consists of two parts. One moves along with the auger, and the other is fixed on the lower housing. If the contact surfaces of these two parts are worn, cracked, or scratched, the mechanical seal may cause water leaks and should be replaced.
7) Remove the allen head cap screws securing the evaporator to the lower bearing housing.
8) Raise the evaporator up to access the lower housing.
9) Remove the O-ring and mechanical seal from the housing. If only replacing the mechanical seal, proceed to step 12.

⚠ WARNING

To help prevent water leaks, be careful not to damage the surfaces of the O-ring or mechanical seal.

6b. Lower Housing

10) Remove the bolts securing the housing to the gear motor and remove the housing from the gear motor. If inspection of the upper bearing inside the extruding head (see "V.D.1. Upper Bearing Wear Check") indicates that it is out of tolerance, replace both it and the bearing inside the lower housing.
    Note: Replacing the bearing requires a bearing press adaptor. If one is not available, replace the whole extruding head and housing.

11) Mount the lower housing on the gear motor.

12) Install the O-ring and lower part of the mechanical seal on the lower housing.

13) Lower the evaporator down and secure it to the lower housing.

14) Install the auger assembly with the upper part of the mechanical seal attached.

15) Replace the removed parts in the reverse order of which they were removed.

16) Replace the panels in their correct positions.

17) Move the drain switch to the "ICE" position. Then, turn on the power supply.

7. Removal and Replacement of Gear Motor

1) Drain the water from the evaporator.
   a) Move the power switch to the "OFF" position.
   b) Move the control switch to the "DRAIN" position.
   c) Move the power switch to the "ON" position and allow the water to drain from the evaporator.
   d) Move the power switch to the "OFF" position.

2) Turn off the power supply.

3) Remove the panels.

4) Remove the strap connecting the spout to the chute assembly, then remove the spout.

5) Remove the bolts securing the lower housing to the gear motor. Lift the evaporator up slightly.

6) Remove the bolts securing the gear motor.

7) Disconnect the gear motor wiring, then remove the gear motor.

8) Remove the gear motor bracket and spline coupling from the old gear motor and place on the new gear motor.

9) Install the new gear motor and re-connect the electrical wires.

10) Replace the removed parts in the reverse order of which they were removed.

11) Replace the panels in their correct positions.

12) Move the drain switch to the "ICE" position. Then, turn on the power supply.

E. Removal and Replacement of Air-Cooled Condenser

CAUTION

1. Always install a new drier every time the sealed refrigeration system is opened.
2. Do not replace the drier until after all other repair or replacement has been made. Install the new drier with the arrow on the drier in the direction of the refrigerant flow.
3. When brazing, protect the drier by using a wet cloth to prevent the drier from overheating. Do not allow the drier to exceed 250°F (121°C).

1) Turn off the power supply.
2) Remove the panels.
3) Recover the refrigerant and store it in an approved container.
4) Disconnect the condenser inlet and outlet piping.
5) Remove the corner barrier from the condenser.
6) Remove the screws securing the condenser assembly, then remove the assembly.
7) Install the new condenser, then attach the corner barrier.
8) Remove the drier, then place the new drier in position.
9) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.
10) Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.
11) Evacuate the system, and charge it with refrigerant. See the nameplate for the required refrigerant charge.
12) Replace the panels in their correct positions.
13) Turn on the power supply.

F. Removal and Replacement of Water-Cooled Condenser

CAUTION

1. Always install a new drier every time the sealed refrigeration system is opened.
2. Do not replace the drier until after all other repair or replacement has been made. Install the new drier with the arrow on the drier in the direction of the refrigerant flow.
3. When brazing, protect the drier by using a wet cloth to prevent the drier from overheating. Do not allow the drier to exceed 250°F (121°C).

1) Turn off the power supply.
2) Remove the panels.
3) Close the condenser water supply line shut-off valve. If connected to a closed loop water supply, also close the condenser return outlet shut-off valve.
4) Open the condenser water supply line drain valve. If connected to a closed loop water supply, also open the condenser return outlet drain valve.
5) Attach a compressed air or carbon dioxide supply to the condenser water supply line drain valve.
6) Open the water regulating valve by using a screwdriver to pry up on the spring retainer underneath the spring. While holding the valve open, blow out the condenser using the compressed air or carbon dioxide supply until water stops coming out.
7) Recover the refrigerant and store it in an approved container.
8) Disconnect the condenser water inlet and outlet piping and the refrigeration inlet and outlet piping at the condenser.
9) Remove the old condenser and install the new condenser.
10) Remove the drier, then place the new drier in position.
11) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.
12) Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.
13) Evacuate the system, and charge it with refrigerant. See the nameplate for the required refrigerant charge.
14) Close the drain valve(s). Open the condenser water supply line shut-off valve. If connected to a closed loop water supply, also open the condenser return outlet shut-off valve.
15) Check for water leaks.
16) Replace the panels in their correct positions.
17) Turn on the power supply.

G. Removal and Replacement of Water Regulating Valve -

Water-Cooled Model

CAUTION

1. Always install a new drier every time the sealed refrigeration system is opened.
2. Do not replace the drier until after all other repair or replacement has been made. Install the new drier with the arrow on the drier in the direction of the refrigerant flow.
3. When brazing, protect WRV and drier by using wet cloths to prevent the WRV and drier from overheating. Do not allow the WRV or drier to exceed 250°F (121°C).

1) Turn off the power supply.
2) Remove the panels.
3) Close the condenser water supply line shut-off valve. If connected to a closed loop water supply, also close the condenser return outlet shut-off valve.
4) Open the condenser water supply line drain valve. If connected to a closed loop water supply, also open the condenser return outlet drain valve.
5) Attach a compressed air or carbon dioxide supply to the condenser water supply line drain valve.
6) Open the water regulating valve by using a screwdriver to pry up on the spring retainer underneath the spring. While holding the valve open, blow out the condenser using the compressed air or carbon dioxide supply until water stops coming out.
7) Recover the refrigerant and store it in an approved container.
8) Disconnect the capillary tube at the condenser outlet.
9) Disconnect the flare-connections of the valve.
10) Remove the screws and the valve from the bracket.
11) Install the new valve.
12) Remove the drier, then place the new drier in position.
13) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.
14) Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.
15) Evacuate the system, and charge it with refrigerant. See the nameplate for the required refrigerant charge.
16) Connect the flare-connections.
17) Close the condenser water supply line drain valve. If connected to a closed loop water supply, also close the condenser return outlet drain valve.

18) Open the condenser water supply line shut-off valve. If connected to a closed loop water supply, also open the condenser return outlet shut-off valve.

19) Check for water leaks.

20) Replace the panels in their correct positions.

21) Turn on the power supply.

H. Adjustment of Water Regulating Valve - Water-Cooled Model

The water regulating valve (also called "water regulator") is factory-adjusted. No adjustment is required under normal use. Adjust the water regulator, if necessary, using the following procedure.

1) Prepare a thermometer to check the condenser outlet temperature. Attach a pressure gauge to the high-side line of the system.

2) Five minutes after a freeze cycle starts, confirm that the thermometer reads 104°F to 115°F (40°C to 46°C). If it does not, rotate the adjustment screw by using a flat blade screwdriver until the temperature is in the proper range. See Fig. 13. Next, check that the reference pressure is in the range indicated in the Head Pressure table in the Performance Data section. If it is not in the proper range, verify the refrigerant charge.

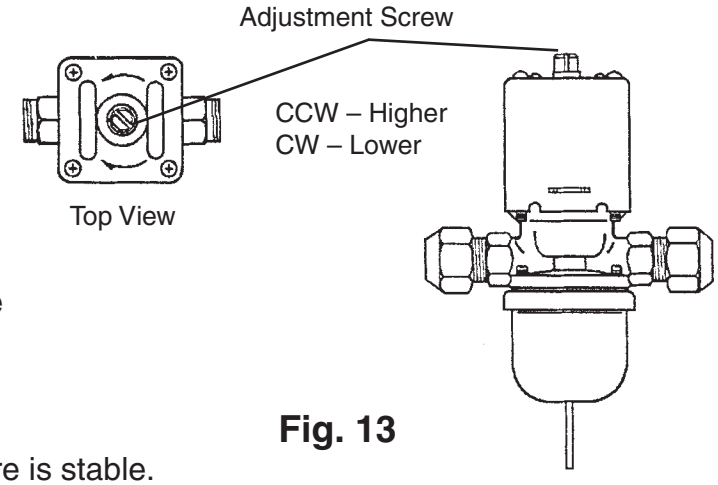


Fig. 13

3) Check that the condenser drain temperature is stable.

I. Removal and Replacement of Fan Motor (air-cooled and remote air-cooled models)

Note: When replacing a fan motor with defective winding, it is recommended that a new capacitor be installed.

1) Turn off the power supply.

2) Remove the panels.

3) Remove the junction box cover from the remote condenser unit (remote air-cooled model).

4) Disconnect the fan motor wires and the capacitor wires.

5) Remove the fan motor bracket (air-cooled model), fan motor, and capacitor.

6) Install the new fan motor onto the fan motor bracket (air-cooled model). Install the fan motor assembly and connect the fan motor wires. Make sure the wires are properly routed in the wire saddles and do not interfere with the fan blade. Install the capacitor and connect the capacitor wires.

7) Replace the panels in their correct positions.

8) Replace the junction box cover in its correct position (remote air-cooled model).

9) Turn on the power supply.

J. Removal and Replacement of Headmaster (Condensing Pressure Regulator - C.P.R.) - Remote Air-Cooled Model

CAUTION

1. Always install a new drier every time the sealed refrigeration system is opened.
2. Do not replace the drier until after all other repair or replacement has been made. Install the new drier with the arrow on the drier in the direction of the refrigerant flow.
3. When brazing, protect the C.P.R. and drier by using wet cloths to prevent the C.P.R. and drier from overheating. Do not allow the C.P.R. or drier to exceed 250°F (121°C).

1) Turn off the power supply.
2) Remove the panels from the remote condenser unit.
3) Recover the refrigerant and store it in an approved container.
4) Before heating, break off the stub on the dome to release the dome charge.
5) Disconnect the headmaster.
6) Place the new headmaster in position.
7) Remove the drier, then place the new drier in position.
8) Braze all fittings with nitrogen gas flowing at a pressure of 3 to 4 PSIG.
9) Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.
10) Evacuate the system and charge it with refrigerant. See the rating label inside the icemaker, for the required refrigerant charge.
11) Replace the panels in their correct positions.
12) Turn on the power supply.

K. Removal and Replacement of Liquid Line Valve or Suction Line Valve

- MLH Model (low side, parallel rack system)

CAUTION

1. Always replace the strainer when replacing the liquid line valve.
2. Always install a new drier every time the sealed refrigeration system is opened.
3. Do not replace the drier until after all other repair or replacement has been made. Install the new drier with the arrow on the drier in the direction of the refrigerant flow.
4. When brazing, protect the valve body and drier by using wet cloths to prevent the valve body and drier from overheating. Do not allow the valve body or drier to exceed 250°F (121°C).

1) Turn off the power supply.
2) Remove the panels.
3) Isolate the icemaker from the rack system. See "V.A.4. Refrigerant Recovery, Evacuation, and Recharge - MLH Model (low side, parallel rack system)" or the rack system manufacturer's instructions.
4) Recover the refrigerant from the icemaker and store it in an approved container.
5) Remove the screw and the solenoid.
6) Disconnect the valve and strainer.
7) Place the new valve and strainer in position.
8) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.
9) Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.
10) Evacuate and recharge the system. See "V.A.4. Refrigerant Recovery, Evacuation, and Recharge - MLH Model (low side, parallel rack system)" or the rack system manufacturer's instructions.
11) Cut the leads of the solenoid allowing enough lead length to reconnect using closed end connectors.
12) Connect the new solenoid leads.
13) Attach the solenoid to the valve body and secure it with the screw.
14) Replace the panels in their correct positions.
15) Turn on the power supply.

L. Removal and Replacement of Evaporator Pressure Regulator (E.P.R.)

MLH Model (low side, parallel rack system)

CAUTION

1. Always install a new drier every time the sealed refrigeration system is opened.
2. Do not replace the drier until after all other repair or replacement has been made. Install the new drier with the arrow on the drier in the direction of the refrigerant flow.
3. When brazing, protect the E.P.R. and drier by using wet cloths to prevent the E.P.R. and drier from overheating. Do not allow the E.P.R. or drier to exceed 250°F (121°C).

1) Turn off the power supply.
2) Remove the panels.
3) Isolate the icemaker from the rack system. See "V.A.4. Refrigerant Recovery, Evacuation, and Recharge - MLH Model (low side, parallel rack system)" or the rack system manufacturer's instructions.
4) Recover the refrigerant and store it in an approved container.
5) Remove the E.P.R. valve.
6) Place the new E.P.R. valve in position.
7) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.
8) Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.
9) Evacuate and recharge the system. See "V.A.4. Refrigerant Recovery, Evacuation, and Recharge - MLH Model (low side, parallel rack system)" or the rack system manufacturer's instructions.
10) Replace the panels in their correct positions.
11) Turn on the power supply.

M. Removal and Replacement of Water Valves

1. Inlet Water Valve

1) Turn off the power supply.
2) Remove the panels.
3) Close the water supply line shut-off valve
4) Open the water supply line drain valve.
5) Disconnect the terminals from the inlet water valve.

6) Loosen the fitting nut on the inlet water valve, and remove the inlet water valve. Do not lose the packing inside the fitting nut.
7) Remove the water supply hose from the inlet water valve.
8) Install the new inlet water valve.
9) Replace the removed parts in the reverse order of which they were removed.
10) Close the water supply line drain valve.
11) Open the water supply line shut-off valve.
12) Check for water leaks.
13) Replace the panels in their correct positions.
14) Turn on the power supply.

2. Drain Valve

1) Turn off the power supply.
2) Remove the panels and close the water supply line shut-off valve.
3) Remove the clamp and disconnect the drain water valve.
   Note: Water may still remain inside the evaporator. Be sure to drain the water into the drain pan.
4) Disconnect the terminals from the drain water valve.
5) Remove the drain water valve from the bracket.
6) Remove the drain pipe from the drain water valve.
7) Connect the drain pipe to the new drain water valve, and place the new drain water valve in position.
8) Connect the hose to the drain water valve and secure it with the clamp.
9) Pour water into the reservoir, and check for water leaks.
10) Open the water supply line shut-off valve.
11) Turn on the power supply.
12) Move the control switch to the "ICE" position.
13) Check for water leaks.
14) Turn off the power supply, then move the control switch to the "DRAIN" position.
15) Turn on the power supply. Make sure water is draining.
16) Turn off the power supply, then move the control switch to the "ICE" position.
17) Turn on the power supply.
18) Replace the panels in their correct positions.

N. Removal and Replacement of Control Board

1) Turn off the power supply.
2) Remove the front panel and the control box cover.
3) Disconnect the control board connectors from the control board.
4) Remove the control board.
5) Adjust the dip switches on the new control board to the factory default settings. See "II. C.4.a) Default Dip Switch Settings."
6) Install the new control board taking care not to damage it.
7) Connect the control board connectors to the new control board.
8) Replace the control box cover and front panel in their correct positions.
9) Turn on the power supply.

VI. Cleaning and Maintenance

⚠ WARNING

CHOKING HAZARD: Ensure all components, fasteners, and thumbscrews are securely in place after any cleaning or maintenance is done to the unit. Make sure that none have fallen into the dispenser unit/storage bin.

A. Cleaning and Sanitizing Instructions

Hoshizaki recommends cleaning and sanitizing this icemaker at least twice a year. More frequent cleaning and sanitizing, however, may be required in some existing water conditions.

⚠ WARNING

1. To prevent injury to individuals and damage to the icemaker, do not use ammonia type cleaners.
2. Carefully follow any instructions provided with the bottles of cleaning and sanitizing solution.
3. Always wear liquid-proof gloves and goggles to prevent the cleaning and sanitizing solutions from coming into contact with skin or eyes.
4. After cleaning and sanitizing, do not use ice made from the cleaning and sanitizing solutions. Be careful not to leave any solution on the parts or in the dispenser unit/storage bin.

1. Cleaning Solution

IMPORTANT

For safety and maximum effectiveness, use the solution immediately after dilution.

Dilute 9.6 fl. oz. (0.29 l) of recommended cleaner, Hoshizaki "Scale Away" or "LIME-A-WAY" (Economics Laboratory, Inc.), with 1.6 gal. (6.0 l) of warm water.

2. Cleaning Procedure

1) Turn off the power supply, then remove the front panel. Make sure the power switch is in the "ON" position, then move the control switch to the "DRAIN" position. Replace the front panel in its correct position.
2) Close the water supply line shut-off valve.
3) Turn on the power supply and allow the water system to drain for 5 minutes.
4) Turn off the power supply, then remove the front and top panels. Move the power switch to the "OFF" position.
5) Remove all of the ice from the dispenser unit/storage bin.

6) Remove the strap connecting the spout to the chute assembly, then remove the spout.

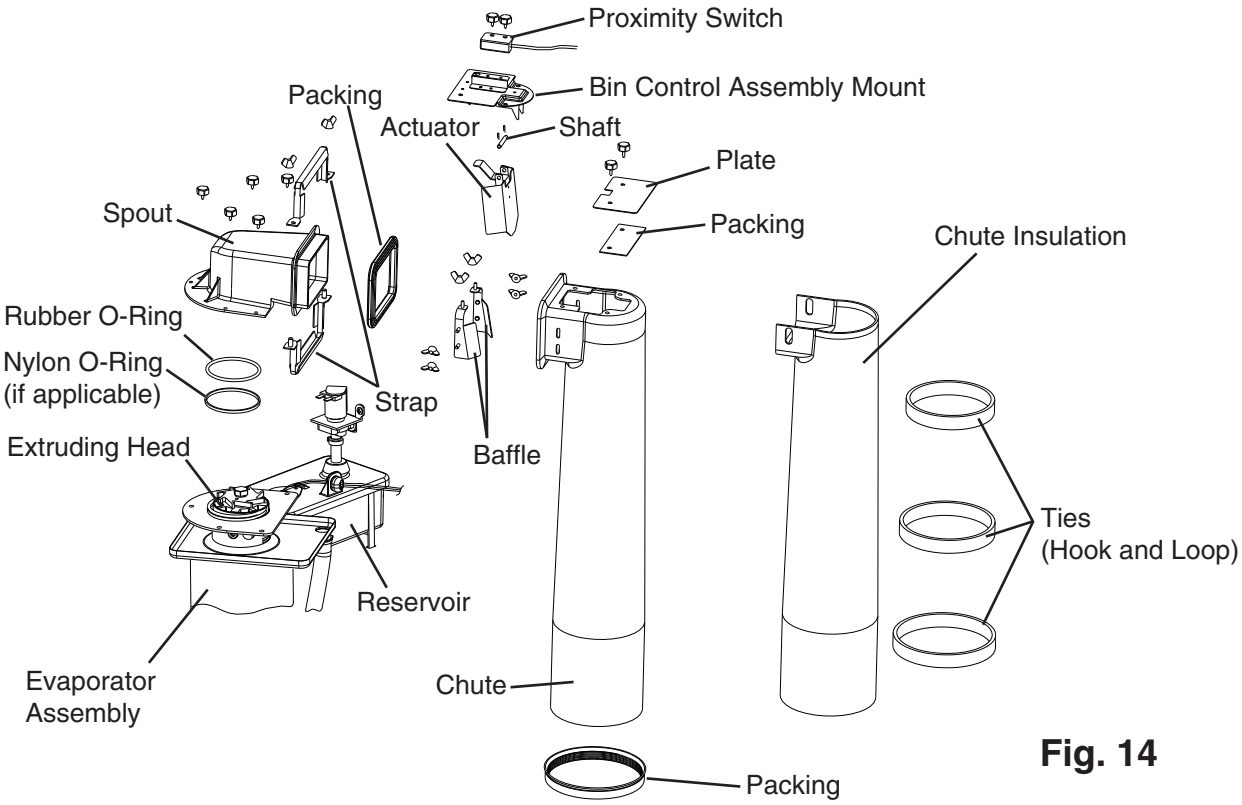


Fig. 14

7) Pour the cleaning solution over the extruding head until the evaporator assembly and the reservoir are full and the solution starts to overflow into the drain pan.
   Note: If there is excess scale on the extruding head, fill the evaporator assembly and reservoir as described above, then use a clamp on the reservoir hose between the reservoir and evaporator assembly to block flow. Pour additional cleaning fluid over the extruding head until the evaporator assembly is completely full.

8) Replace the spout and strap in their correct positions.

9) Allow the icemaker to sit for about 10 minutes before operation. If you placed a clamp on the reservoir hose in step 7, remove it before operation.

10) In bad or severe water conditions, clean the float switch assembly as described below. See Fig. 15. Otherwise, continue to step 12.
    a. Remove the float switch assembly from the reservoir cover.
    b. Wipe down the float switch assembly with the cleaning solution.
    c. Rinse the float switch assembly thoroughly with clean water.
    d. Replace the float switch assembly in its correct position.

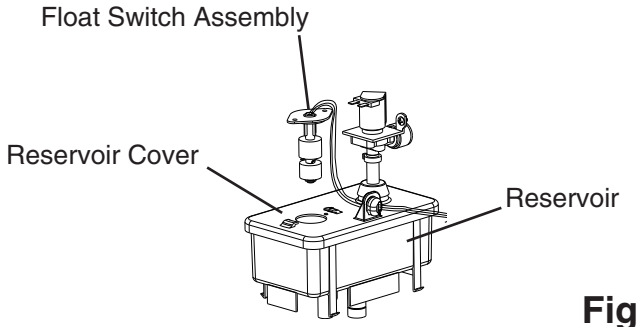


Fig. 15

11) Wipe down the infrared sensor's lens (located on the bottom of the icemaker) with the cleaning solution. See Fig. 16. Next, rinse the cleaning solution off of the infrared sensor's lens with a clean, damp cloth.

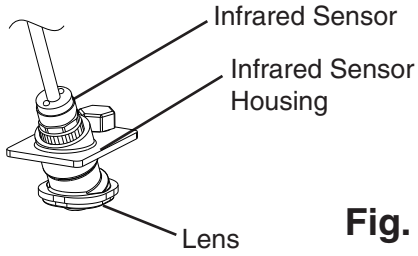


Fig. 16

12) Move the control switch to the "ICE" position, then move the power switch to the "ON" position. Replace the panels in their correct positions. Turn on the power supply and make ice using the solution until the icemaker stops making ice.

13) Turn off the power supply, then remove the front panel. Move the control switch to the "DRAIN" position, then replace the front panel in its correct position.

14) Turn on the power supply and allow the solution to drain for 5 minutes.

15) Turn off the power supply, then remove the front panel. Move the control switch to the "ICE" position, then replace the front panel in its correct position.

16) Open the water supply line shut-off valve, then turn on the power supply to supply water to the reservoir.

17) After the gear motor starts, turn off the power supply. Remove the front panel, then move the control switch to the "DRAIN" position. Replace the front panel in its correct position.

18) Turn on the power supply and allow the water system to drain for 5 minutes.
Note: If you do not sanitize the unit, go to step 14 in "VI.A.5. Sanitizing Procedure - Final."

19) Turn off the power supply, then close the water supply line shut-off valve.

3. Sanitizing Solution

IMPORTANT

For safety and maximum effectiveness, use the solution immediately after dilution.

Dilute 2.5 fl. oz. (74 ml or 5 tbs) of a 5.25% sodium hypochlorite solution (chlorine bleach) with 5 gal. (19 l) of warm water.

4. Sanitizing Procedure - Initial

1) Make sure the power supply is off and the water supply line shut-off valve is closed. Remove the panels, then move the power switch to the "OFF" position.

2) Remove the strap connecting the spout to the chute assembly, then remove the spout. Remove the rubber O-ring and nylon O-ring (if applicable) at the top of the cylinder and also remove the packing between the spout and the chute.

3) Pour the sanitizing solution over the extruding head until the evaporator assembly and the reservoir are full and the solution starts to overflow into the drain pan.

4) Remove the proximity switch from the chute assembly, then remove the chute assembly from the icemaker.

5) Remove the packing at the bottom of the ice chute. Remove the 3 ties and the chute insulation.

6) Remove the 2 baffles.

7) Remove the plate and the packing from the top of the ice chute, then remove the backup bin control assembly by sliding it slightly towards the chute opening and lifting it off.

8) Disassemble the backup bin control assembly by removing the 2 snap pins, shaft, and actuator.

9) Soak the spout, O-ring, packings, chute, baffles, plate, and backup bin control assembly in the sanitizing solution for 10 minutes then wipe them down.

10) Rinse the parts thoroughly with clean water.

CAUTION

If the solution is left on these parts, they will rust.

11) Replace all parts in their correct positions.

IMPORTANT

When installing the baffles, make sure that the bent surface (the one without the studs) faces the actuator so that the bent surface can guide the ice to the center of the actuator.

12) Move the control switch to the "ICE" position, then move the power switch to the "ON" position. Replace the panels in their correct positions, then turn on the power supply. Make ice using the solution until the icemaker stops making ice.

13) Turn off the power supply, then remove the front panel. Move the control switch to the "DRAIN" position, then replace the front panel in its correct position.

14) Turn on the power supply and allow the solution to drain for 5 minutes.

15) Turn off the power supply.

5. Sanitizing Procedure - Final

1) Mix a new batch of the sanitizing solution.

2) Make sure the power supply is off and the water supply line shut-off valve is closed. Remove the front and top panels, then move the power switch to the "OFF" position.

3) Remove the strap connecting the spout to the chute assembly, then remove the spout.

4) Pour the sanitizing solution over the extruding head until the evaporator assembly and the reservoir are full and the solution starts to overflow into the drain pan.

5) Replace the spout and strap in their correct positions.

6) Allow the icemaker to sit for about 10 minutes before operation.

7) Move the control switch to the "ICE" position, then move the power switch to the "ON"

position. Replace the panels in their correct positions, then turn on the power supply. Make ice using the solution until the icemaker stops making ice.

8) Turn off the power supply, then remove the front panel. Move the control switch to the "DRAIN" position, then replace the front panel in its correct position.

9) Turn on the power supply and allow the solution to drain for 5 minutes.

10) Turn off the power supply, then remove the front panel. Move the control switch to the "ICE" position, then replace the front panel in its correct position.

11) Open the water supply line shut-off valve, then turn on the power supply to supply water to the reservoir.

12) After the gear motor starts, turn off the power supply. Remove the front panel, then move the control switch to the "DRAIN" position. Replace the front panel in its correct position.

13) Turn on the power supply and allow the water system to drain for 5 minutes.

14) Turn off the power supply, then remove the front panel. Move the control switch to the "ICE" position, then replace the front panel in its correct position.

15) Turn on the power supply to start the automatic icemaking process. Allow the icemaker to run for about 30 minutes, then turn off the power supply.

16) Pour warm water into the dispenser unit/storage bin and melt any remaining ice. Clean the dispenser unit/storage bin liner using a neutral cleaner. Rinse thoroughly after cleaning.

17) Turn on the power supply to start the automatic icemaking process.

B. Maintenance

This icemaker must be maintained individually, referring to the instruction manual and labels provided with the icemaker. The schedule below is a guideline. More frequent maintenance, however, may be required depending on water quality, the icemaker's environment, and local sanitation regulations.

Consult with your local distributor about inspection and maintenance service. To obtain the name and phone number of your local distributor, visit www.hoshizaki.com or call Hoshizaki Technical Support at 1-800-233-1940 in the USA.

⚠ WARNING

1. Only qualified service technicians should attempt to service or maintain this icemaker.
2. Disconnect power before performing maintenance.

Maintenance Schedule		
Frequency	**Area**	**Task**
Every 2 Weeks	Air Filter(s)	Inspect. Wash with warm water and neutral cleaner if dirty.
Monthly	External Water Filters	Check for proper pressure and change if necessary.
	Icemaker and Dispenser Unit/ Storage Bin Exterior	Wipe down with clean, soft cloth. Use a damp cloth containing a neutral cleaner to wipe off oil or dirt build up. Clean any chlorine staining (rust colored spots) using a non-abrasive cleaner like Zud or Bon Ami.
	Infrared Sensor Lens; Underside of Icemaker and Top Kits; Bin Door and Snout (if applicable)	Wipe down with clean cloth and warm water.
Every 6 Months	Icemaker and Dispenser Unit/ Storage Bin	Clean and sanitize per the cleaning and sanitizing instructions provided in this manual.
	Evaporator Condensate Drain Pan and Gear Motor Drain Pan	Wipe down with clean cloth and warm water. Slowly pour one cup of sanitizing solution (prepare as outlined in the sanitizing instructions in this manual) into the evaporator condensate drain pan. Be careful not to overflow the pan. This solution will flow down to the gear motor drain pan and out the drain line to sanitize these areas. Repeat with a cup of clean water to rinse.
	Icemaker and Dispenser Unit/ Storage Bin Drains	Check to make sure they are clear.
Yearly	Inlet Water Valve and Drain Valve	Close the water supply line shut-off valve and drain the water system. Clean the inlet water valve screen and clean and inspect the drain valve.
	Water Hoses	Inspect the water hoses and clean/replace if necessary.
	Condenser (air-cooled and remote air-cooled)	Inspect. Clean if necessary by using a brush or vacuum cleaner.
	Icemaker	Inspect for oil spots, loose components, fasteners, and wires.
	Upper Bearing (extruding head)	Check for wear using .02" round stock or pin gauge. Replace both upper bearing and lower bearing if wear exceeds factory recommendations. See the Service Manual for details.
After 3 Years, then Yearly	Upper Bearing (extruding head); Lower Bearing and O-Ring (lower housing); Mechanical Seal; Evaporator Cylinder; Auger	Inspect. Replace both upper bearing and lower bearing if wear exceeds factory recommendations. Replace the mechanical seal if the seal's contact surfaces are worn, cracked, or scratched.

C. Preparing the Icemaker for Long Storage

CAUTION

When storing the icemaker for an extended time or in sub-freezing temperatures, follow the instructions below to prevent damage.

When the icemaker is not used for two or three days under normal conditions, it is sufficient to only move the power switch to the "OFF" position. When storing the icemaker for extended time or in sub-freezing temperatures, follow the instructions below.

1. Remove the water from the icemaker water supply line:

1) Turn off the power supply, then remove the front panel.
2) Move the power switch to the "OFF" position.
3) Close the icemaker water supply line shut-off valve, then open the icemaker water supply line drain valve.
4) Allow the line to drain by gravity.
5) Attach a compressed air or carbon dioxide supply to the icemaker water supply line drain valve.
6) Move the control switch to the "ICE" position, then move the power switch to the "ON" position. Replace the front panel in its correct position, then turn on the power supply.
7) Blow the icemaker water line out using the compressed air or carbon dioxide supply.
8) Close the icemaker water supply line drain valve.

2. Drain the evaporator:

1) Turn off the power supply, then remove the front panel.
2) Move the control switch to the "DRAIN" position, then replace the front panel in its correct position.
3) Turn on the power supply and allow the water system to drain for 5 minutes.
4) Turn off the power supply, then remove the front panel. Move the power switch to the "OFF" position.
5) Remove the evaporator drain line hose from the evaporator and attach a compressed air or carbon dioxide supply to the hose.
6) Turn on the power supply, then move the power switch to the "ON" position. Blow out the evaporator drain line using the compressed air or carbon dioxide supply until water stops coming out.
7) Move the power switch to the "OFF" position, then turn off the power supply. Reconnect the evaporator drain line hose.
8) Replace the front panel in its correct position.
9) Remove all ice from the dispenser unit/storage bin. Clean the dispenser unit/storage bin liner using a neutral cleaner. Rinse thoroughly after cleaning.

3. On water-cooled model only, first remove the water from the water-cooled condenser:

1) Make sure the power supply is off, then remove the front and right side panels.
2) Close the condenser water supply line shut-off valve. If connected to a closed loop system, also close the condenser return line shut-off valve.
3) Open the condenser water supply line drain valve. If connected to a closed loop system, also open the condenser return line drain valve.
4) Attach a compressed air or carbon dioxide supply to the condenser water supply line drain valve.
5) Open the water regulating valve by using a screwdriver to pry up on the spring retainer underneath the spring. While holding the valve open, blow out the condenser using the compressed air or carbon dioxide supply until water stops coming out.
6) Close the drain valve(s).
7) Replace the right side panel and front panel in their correct positions.