

# Hoshizaki America, Inc.

## Modular Cubelet Serenity Series

Model  
FS-1022MLH-C

Including  
Condensing Unit Model  
SRC-10H



“A Superior Degree  
of Reliability”

[www.hoshizaki.com](http://www.hoshizaki.com)

## SERVICE MANUAL



Number: 73186  
Issued: 6-9-2011

## **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  
Fax: 1-800-843-1056  
(770) 487-3360  
E-mail: techsupport@hoshizaki.com

Web Site: [www.hoshizaki.com](http://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 .....	5
I. Specifications.....	7
A. Icemaker .....	7
B. Condensing Unit.....	8
II. General Information .....	9
A. Construction .....	9
1. Icemaker .....	9
2. Condensing Unit .....	10
3. Icemaking Unit.....	11
B. Sequence of Operation .....	12
1. Sequence Cycles and Shutdown .....	12
a) Fill Cycle .....	12
b) Ice Purge Cycle.....	12
c) Freeze Cycle .....	12
d) Drain Cycle .....	13
e) Shutdown Cycle .....	14
2. Sequence Flow Chart.....	15
C. Control Board.....	16
1. Control Board Layout .....	17
2. LED Lights and Audible Alarm Safeties .....	18
3. Controls and Adjustments.....	19
a) Default Dip Switch Settings.....	19
b) Infrared Sensor Shutdown Delay (S1 dip switch 1, 2, 3).....	19
c) Drain Frequency Control (S1 dip switch 4).....	20
d) Continuous Dispensing Timer (S1 dip switch 5 & 6) .....	20
e) Bin Control Selector (S1 dip switch 7).....	20
f) Mechanical Bin Control Shutdown Delay (S1 dip switch 8) .....	21
g) Factory Use (S1 Dip Switch 9 & 10).....	21
III. Technical Information .....	22
A. Water Circuit and Refrigeration Circuit .....	22
B. Wiring Diagrams.....	23
1. FS-1022MLH-C .....	23
2. SRC-10H .....	24
C. Performance Data .....	25

IV. Service Diagnosis .....	26
A. Ice Production Check .....	26
B. Diagnostic Procedure .....	26
C. Control Board Check .....	30
D. Bin Control Check .....	33
1. Infrared Sensor Check .....	33
2. Mechanical Backup Bin Control Check.....	34
E. Float Switch Check and Cleaning .....	36
1. Float Switch Check .....	36
2. Float Switch Cleaning .....	36
F. Diagnostic Charts .....	38
V. Removal and Replacement of Components .....	41
A. Service for Refrigerant Lines.....	41
1. Refrigerant Recovery .....	42
2. Brazing .....	42
3. Evacuation and Recharge (R-404A).....	42
B. Important Notes for Component Replacement.....	43
1. Upper Bearing Wear Check .....	45
2. Removal and Replacement of Cutter.....	45
3. Removal and Replacement of Extruding Head.....	46
4. Removal and Replacement of Auger .....	46
5. Removal and Replacement of Evaporator .....	47
6. Removal and Replacement of Mechanical Seal and Lower Housing .....	48
7. Removal and Replacement of Gear Motor .....	49
VI. Cleaning and Maintenance.....	51
A. Cleaning and Sanitizing Instructions .....	51
1. Cleaning Solution .....	51
2. Cleaning Procedure .....	51
3. Sanitizing Solution .....	53
4. Sanitizing Procedure - Initial .....	53
5. Sanitizing Procedure - Final.....	54
B. Maintenance.....	55
C. Preparing the Icemaker for Long Storage .....	57

---

## 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 injury or damage resulting from improper, incorrect, and unreasonable use.

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

- This unit should be disassembled or repaired only by qualified service personnel to reduce the risk of electric shock, injury, or fire.
- Move the power switch to the "OFF" position. Unplug the icemaker from the electrical outlet and turn off the power supply to the condensing unit before any servicing is undertaken. Place the disconnect (if applicable) in the off position. Lockout/Tagout to prevent the power supply from being turned back on inadvertently.
- Make sure the icemaker power switch is in the "OFF" position before plugging in or unplugging the icemaker to reduce the risk of electric shock.
- Do not make any alterations to the icemaker or condensing unit. Alterations could result in electric shock, injury, fire, or damage to the units.

#### **For FS**

- The icemaker requires an independent power supply of proper capacity. See the nameplate for electrical specifications. Failure to use a properly sized 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.** This unit is equipped with a 3-prong grounding plug to reduce the risk of potential shock hazards. It must be plugged into a properly grounded, independent wall outlet. If the outlet is a 2-prong outlet, it is your personal responsibility to have a qualified electrician replace it with a properly grounded, independent 3-prong wall outlet. Do not remove the ground prong from the power cord and do not use an adapter plug.
- Do not use an extension cord.
- To reduce the risk of electric shock, make sure the power switch is in the "OFF" position before plugging in or unplugging the unit.

### **For FS - Continued**

- To reduce the risk of electric shock, do not touch the plug or power switch with damp hands.
- Do not use a unit with a damaged power cord. The power cord should not be altered, jerked, bundled, weighed down, pinched, or tangled. Such actions could result in electric shock or fire. To unplug the unit, be sure to pull the plug, not the cord, and do not jerk the cord.
- Do not place fingers or any other objects into the ice discharge opening.

### **For SRC**

- 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.
- The remote condensing unit requires an independent power supply of proper capacity. See the nameplate for electrical specifications. Failure to use a properly sized breaker or fuse can result in a tripped breaker, blown fuses, or damage to existing wiring. This could lead to heat generation or fire.
- **THIS UNIT MUST BE GROUNDED.** Failure to properly ground the remote condensing unit could result in death or serious injury.
- Lockout/Tagout to prevent the power supply from being turned back on inadvertently.

# I. Specifications

## A. Ice maker

### 1. FS-1022MLH-C

AC SUPPLY VOLTAGE	115/60/1		
GEAR MOTOR	120 V	3 FLA	1/4 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. lb./day (kg/day)	Ambient Temp.(°F)	WATER TEMP. (°F)	
Reference without *marks		50	70
	70	*830 (380)	805 (365)
	80	765 (350)	750 (340)
	90	710 (325)	*705 (320)
	100	660 (300)	*600 (275)
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.)	1745 (5.96)	1713 (4.94)	FS-1022MLH-C & SRC-10H
ELECTRIC W (kWH/100 lbs.)	331 (1.13)	345 (1.00)	FS-1022MLH-C ONLY
POTABLE WATER gal./24HR (gal./100 lb.)	84 (12)	100 (12)	
EXTERIOR DIMENSIONS (WxDxH)	22"x16.5"x26" (560x417x657mm)		
EXTERIOR FINISH	Stainless Steel		
WEIGHT	Net 126 lb. (57 kg), Shipping 166 lb. (75 kg)		
CONNECTIONS - ELECTRIC	Cord Connection		
- WATER SUPPLY	Inlet 1/2" FPT		
- DRAIN	Outlet 3/4" FPT		
- REFRIGERATION	Suction line 1-1/16-12 UNF Fitting (#10 PARKER)		
CIRCUIT	Liquid line 5/8-18 UNF Fitting (#6 PARKER)		
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 Switch)		
CONDENSING UNIT	Air-Cooled Remote Condensing unit SRC-10H Required		
EVAPORATOR	Copper Tube on Cylinder		
REFRIGERANT CONTROL	Thermostatic Expansion Valve		
REFRIGERANT CHARGE	Headmaster (C.P.R.) on SRC-10H (210 PSI)		
	R-404A, 8 lb. 6 oz. (3800 g)		
	Ice maker: 4 oz. (113 g)		
	Condensing Unit: 8 lb. 2 oz. (3687 g)		
DESIGN PRESSURE	High 427 PSIG, Low 230 PSIG		
P.C. BOARD CIRCUIT PROTECTION	Fuse (1A)		
GEAR MOTOR PROTECTION	Fuse (3A)		
LOW WATER PROTECTION	Float Switch and Timer		
ACCESSORIES -SUPPLIED	Spare Fuse		
-REQUIRED	Ice Storage Bin		
	Condensing Unit: SRC-10H		
OPERATING CONDITIONS	VOLTAGE RANGE	104-127VAC	
	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.

## B. Condensing Unit

### 1. SRC-10H

AC SUPPLY VOLTAGE	208-230/60/1 (3 Wire w/Neutral for 115VAC)		
COMPRESSOR	208-230V	9.6 RLA	46 LRA
FAN MOTOR	120 V	3 A	MAX
OTHER	120 V	0.5 A	
MAXIMUM FUSE SIZE	20 A		
MAX. HACR BREAKER (USA ONLY)	20 A		
MAX. CIRC. BREAKER (CANADA ONLY)	20 A		
MINIMUM CIRCUIT AMPACITY	20 A		
EXTERIOR DIMENSIONS (WxDxH)	28"x23"x19" (711x280x485mm)		
DIMENSIONS WITH LEGS (WxDxH)	28"x23"x36" (711x280x915mm)		
EXTERIOR FINISH	Galvanized Steel		
WEIGHT (Approximate)	Net 143 lb. (65 kg), Shipping 169 lb. (77 kg)		
CONNECTIONS - ELECTRIC	Permanent - Connection		
- REFRIGERATION	Suction Line 1 1/16"-12 UNF Fitting (#10 PARKER)		
CIRCUIT	Liquid Line 5/8"-18 UNF Fitting (#6 PARKER)		
COMPRESSOR	Hermetic, Model RS80-C2E-CAV		
CONDENSER	Air-Cooled Fin and Tube Type		
FAN MOTOR PROTECTION	Thermal Protector		
REFRIGERATION PROTECTION	Auto-Reset High-Pressure Switch, Manual Low-Pressure Switch		
REFRIGERANT CONTROL	Headmaster (C.P.R.) (210 PSI)		
PUMPDOWN CONTROL	Auto-Reset Low-Pressure Switch		
REFRIGERANT CHARGE	R-404A, 8 lb. 6 oz. (3800 g) Condensing Unit: 8 lb. 2 oz. (3687 g) Icemaker: 4 oz. (113 g)		
DESIGN PRESSURE	High 427 PSIG, Low 230 PSIG		
COMPRESSOR PROTECTION	Internal Protector		
ACCESSORIES -SUPPLIED	Leg		2 pcs.
	Hex Head Bolt w/ Washer 8X16		8 pcs.
	Hex Nut		8 pcs.
OPERATING CONDITIONS	VOLTAGE RANGE		187-253 VAC
	AMBIENT TEMP.		-4-122°F
	HEAT OF REJECTION		10500 BTU/hr

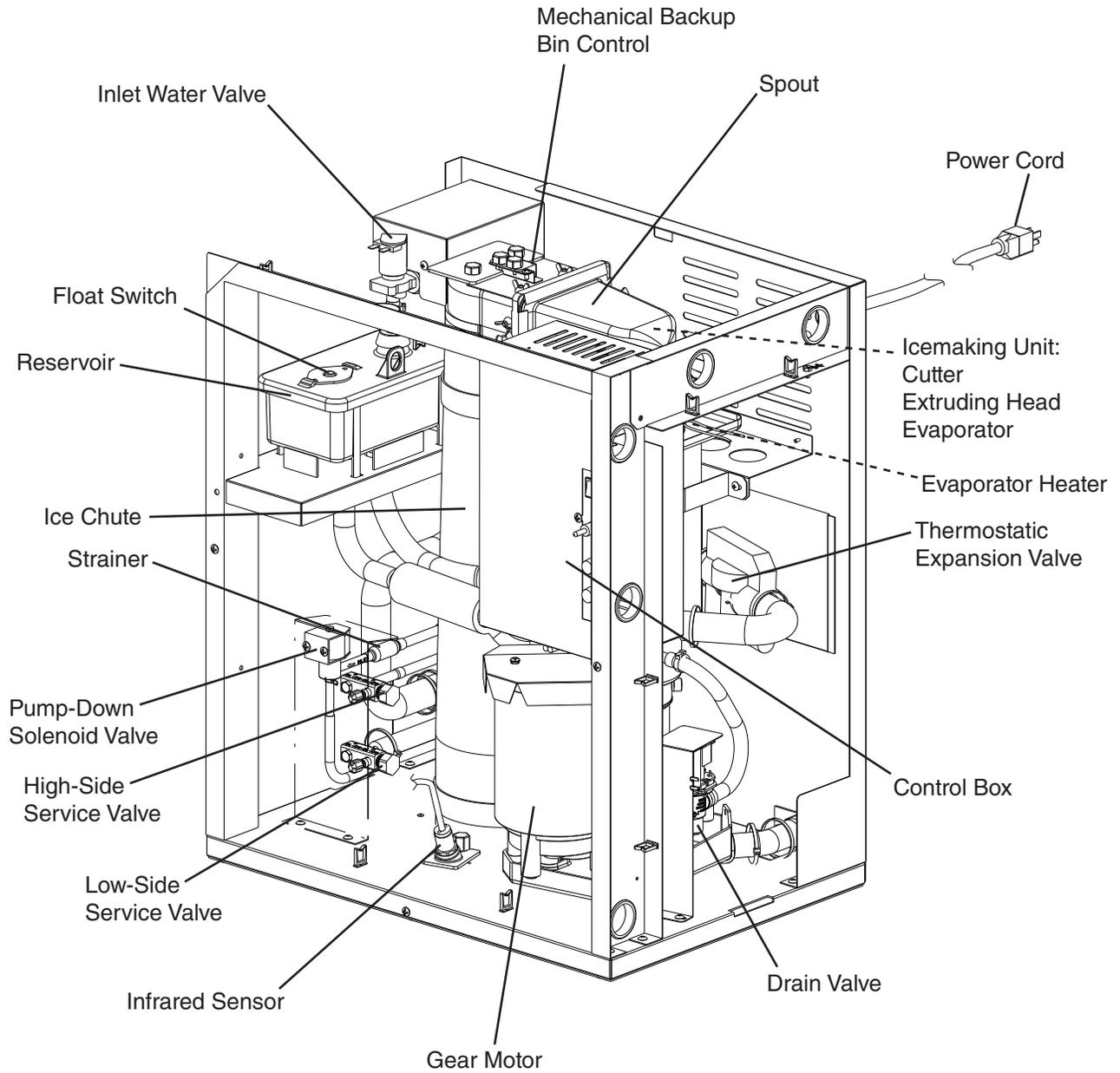
Note: We reserve the right to make changes in specifications and design without prior notice.

## II. General Information

### A. Construction

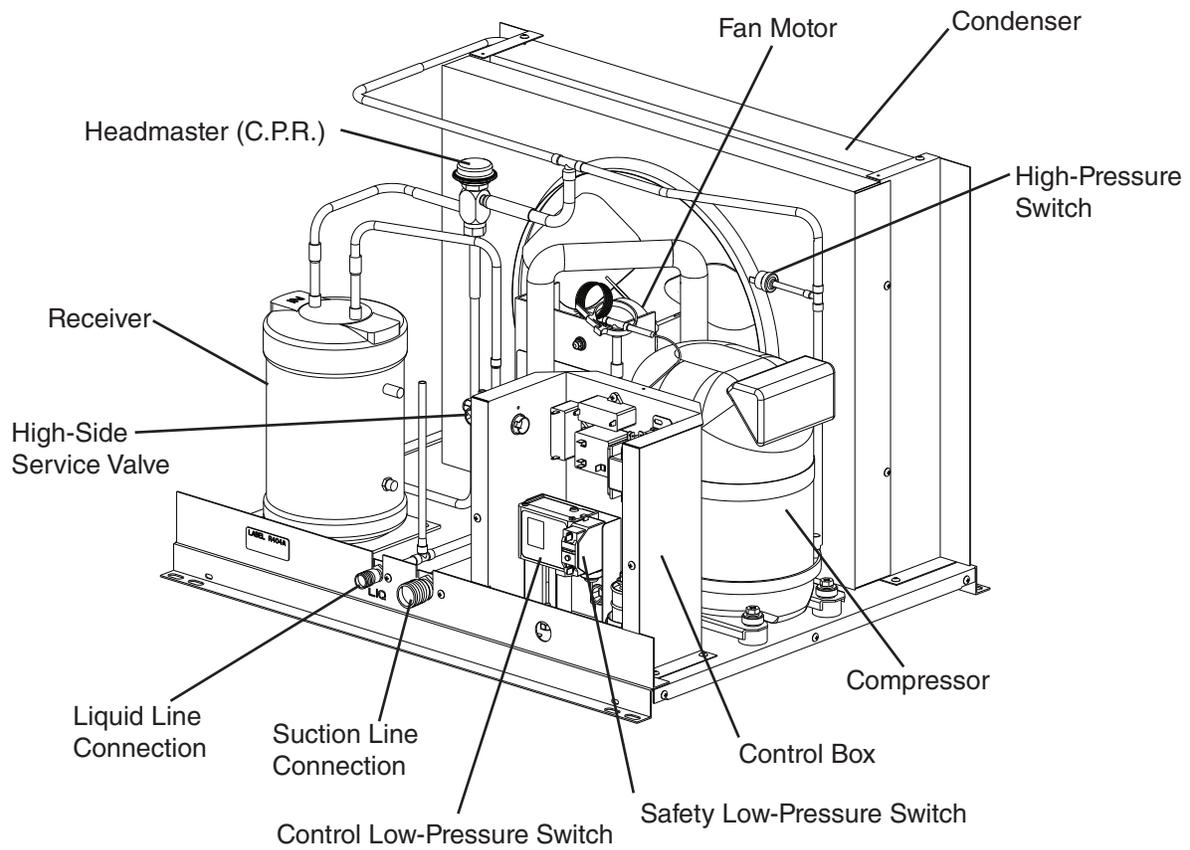
#### 1. Icemaker

##### a) FS-1022MLH-C

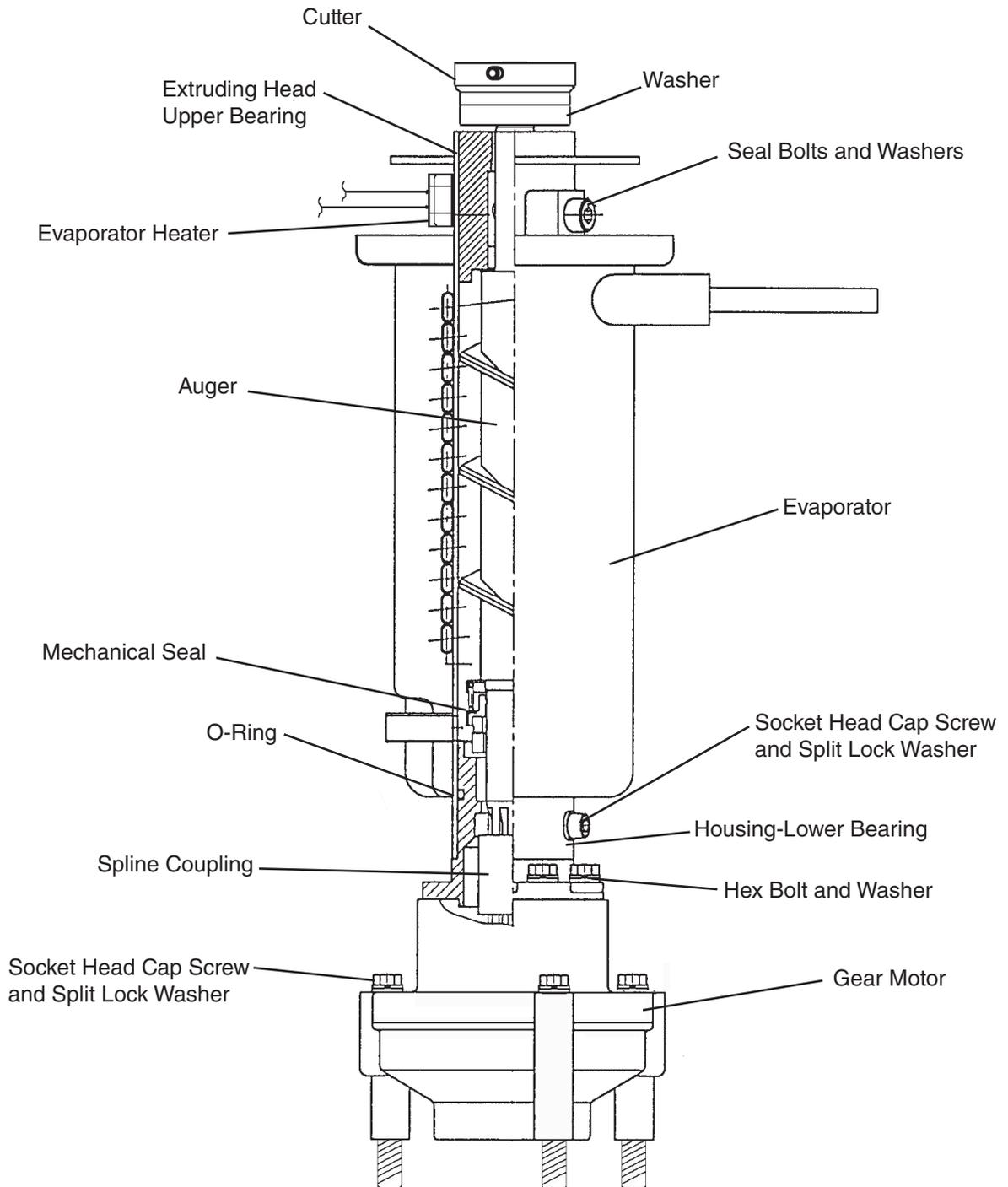


## 2. Condensing Unit

### a) SRC-10H



### 3. Icemaking Unit



## B. Sequence of Operation

The steps in the sequence are as outlined below. This unit utilizes a control board to switch the icemaker 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, control board "POWER OK" LED and infrared sensor green LED come on. The "POWER OK" LED remains on constantly. If the infrared sensor yellow LED is on or flashing, move ice away from the infrared sensor lens.

This system utilizes a pump-down solenoid valve in the icemaker and a control low-pressure switch in the condensing unit to control the operation of the Comp and FMR. This eliminates the need for an electrical connection between the 2 units. When calling for ice, the control board (X1 on control board) energizes the pump-down solenoid. The low-side refrigerant pressure rises to 29 PSIG, the control low-pressure switch (located in the condensing unit) closes, energizing the Comp and FMR. When the ice level satisfies the infrared sensor bin control (bin full), the unit goes into the shutdown cycle. The control board de-energizes the pump-down solenoid valve (X1 on CB). The low-side refrigerant pressure drops (unit pumping down). When the low-side pressure drops to 9 PSIG, the control low-pressure switch opens, de-energizing Comp and FMR. Control Low-Pressure Switch Settings: Cut-Out: 9 PSIG. Differential: 20 PSIG. Cut-In: 29 PSIG.

### 1. Sequence Cycles and Shutdown

#### a) *Fill Cycle*

**"WTRIN" LED is on.** WV energizes and fill cycle begins. 90-second low water safety timer starts. When UF/S closes, WV de-energizes, and 90-second low water safety timer resets. 30-second GM delay timer starts. If 90-second low water safety timer terminates before UF/S closes, 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, and EH 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 CB 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 EH continue. CR (X1 on CB) and PDS energize. When CLPS (in SRC) closes, MC energizes, allowing Comp and FMR to energize. CCH de-energizes. 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 IS activates allowing CB to de-energize X1 on CB and PDS. The unit goes into pump-down, CLPS opens, MC de-energizes, de-energizing Comp and FMR. CCH energizes.

#### **d) Drain Cycle**

- (1) 1-in-1 Drain Cycle:** DV energizes for 2 seconds once every hour when the 1-in-1 drain cycle is activated (S1 dip switch 4 in the off position (factory default position)). 1-hour drain cycle timer terminates, 2-second DT starts. DV energizes for 2 seconds. 2-second DT terminates, 1-hour DT resets. All components and icemaking continue. 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 for ten minutes once every 12 hours when the 1-in-12 drain cycle is activated (S1 dip switch 4 in the "ON" position (optional)). 12-hour drain cycle timer terminates, CR (X1 on CB) and PDS de-energize, GMR (X2 on CB), GM, GMPR, and EH continue. Unit is in pump-down mode. Once the low-side pressure drops to 9 PSIG, CLPS opens, de-energizing MC, Comp, and FMR. 5-minute ice purge timer begins. When the 5-minute ice purge timer terminates, GMR (X2 on CB), GM, GMPR, and EH 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 PDS de-energize. Unit is in pump-down mode. Once the low-side pressure drops to 9 PSIG, CLPS opens, de-energizing MC, Comp, and FMR. 5-minute ice purge timer begins. When the 5-minute ice purge timer terminates, GMR (X2 on CB), GM, and GMPR de-energize. DV energizes to drain the evaporator and reservoir. To avoid the 5-minute shutdown delay, turn off the icemaker power supply, then move the control switch to the "DRAIN" position. 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.3.b) Infrared Sensor Shutdown Delay (S1 dip switch 1, 2, 3)." Once IS shutdown delay timer terminates, CR (X1 on CB) and PDS de-energize and the 5-minute ice purge timer begins. Unit is in pump-down mode. Once the low-side pressure drops to 9 PSIG, CLPS opens, de-energizing MC, Comp, and FMR. When the 5-minute ice purge timer terminates, GMR (X2 on CB), GM, and GMPR de-energize.

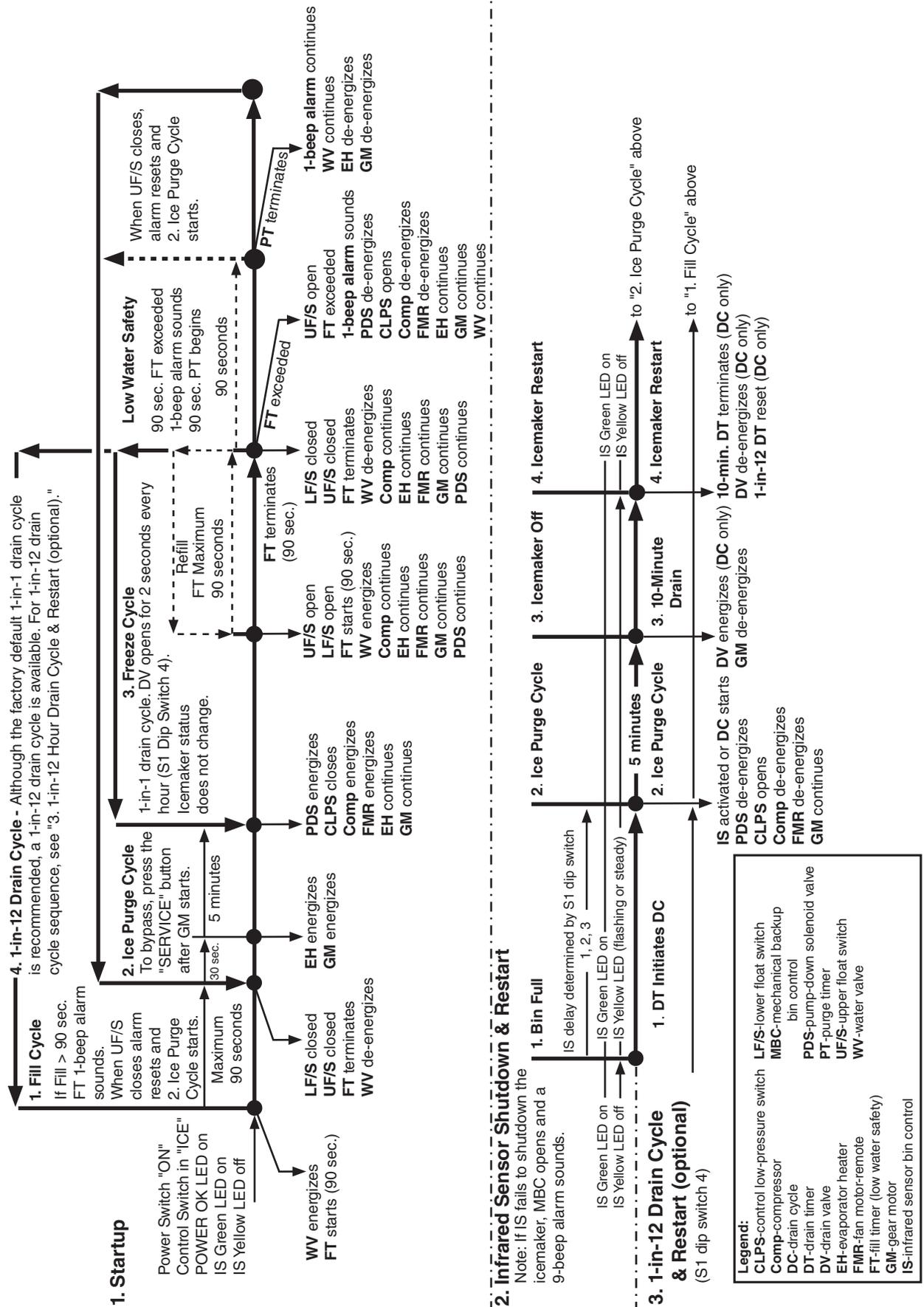
Note: If IS fails to shut down the icemaker, MBC opens, CB shuts down the icemaker, and a 9-beep alarm sounds.

**(2) Mechanical Backup Bin Control:** CB shuts down the entire unit within 10 seconds when MBC opens (actuator paddle engaged), and sounds a 9-beep alarm.

Legend: **CB**—control board; **CCH**—crankcase heater; **CLPS**—control low-pressure switch; **Comp**—compressor; **CR**—compressor relay (pump-down solenoid); **DT**—drain timer; **DV**—drain valve; **EH**—evaporator heater; **FMR**—fan motor-remote; **F/S**—float switch; **GM**—gear motor; **GMPR**—gear motor protect relay; **GMR**—gear motor relay; **IS**—infrared sensor; **LF/S**—lower float switch; **MBC**—mechanical backup bin control; **MC**—magnetic contactor; **PDS**—pump-down solenoid valve; **UF/S**—upper float switch; **WV**—inlet water valve

## 2. Sequence Flow Chart

### "F-A" Control Board Sequence Flow Chart FS-1022MLH-C/SRC-10H



## C. Control Board

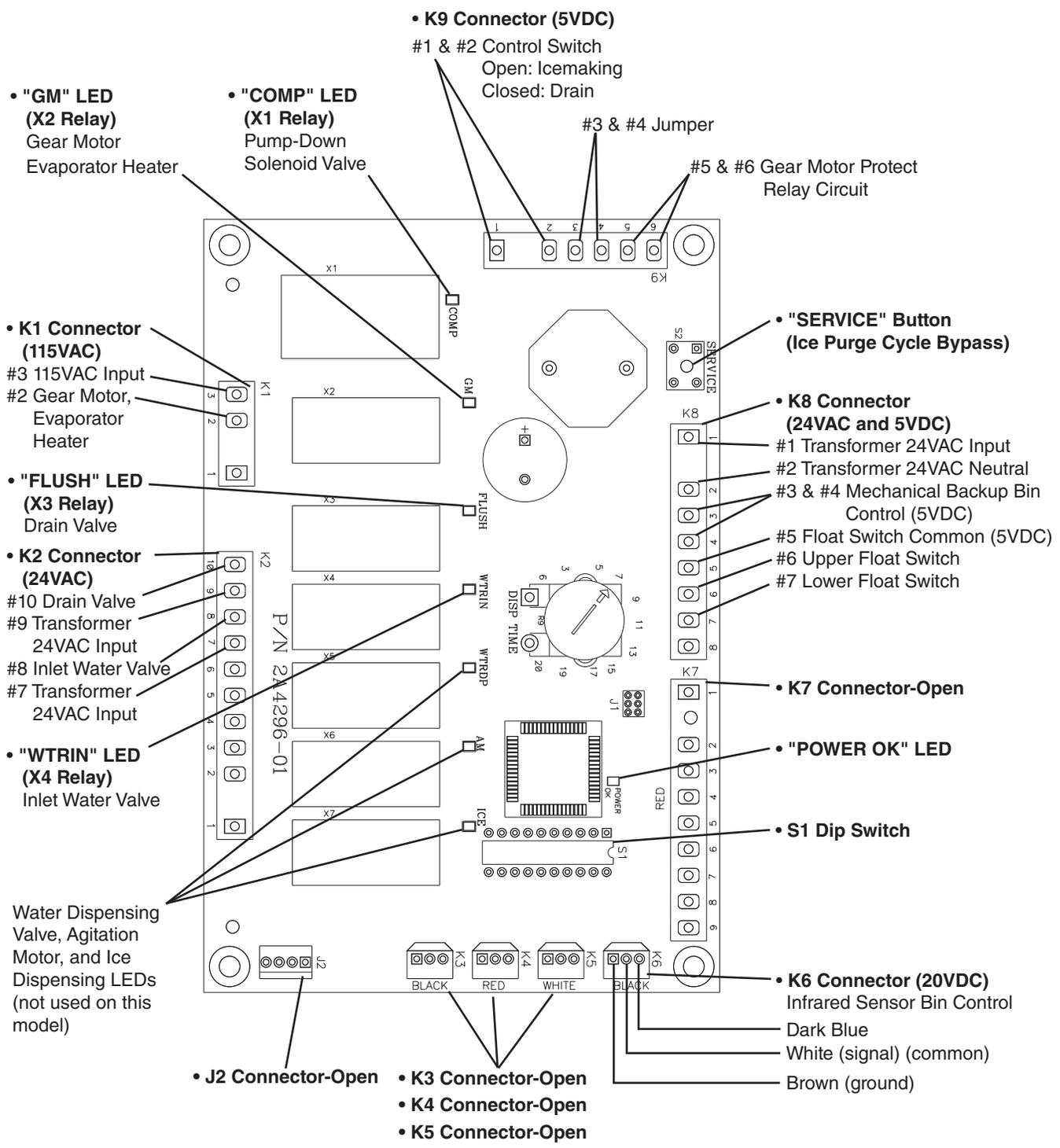
- A Hoshizaki exclusive control board is employed in Hoshizaki Modular Flakers.
- All models are pre-tested and factory set.

### 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.
4. Do not change wiring and connections. Do not misconnect terminals.
5. Do not short out power supply to test for voltage.
6. Always replace the whole control board assembly if it goes bad.

# 1. Control Board Layout

## "F-A" Control Board



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

## 2. LED Lights and Audible Alarm Safeties

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, EH	5 min.	5 min.
Freeze Cycle (with refill)	GM, COMP, WTRIN* (refill),	GM, EH, PDS, Comp, FMR, WV* (refill)	-	*On until UF/S closes. Alarm sounds after 90 sec.
1-in-1 Drain Cycle (S1 dip switch 4 off)	FLUSH (Drain) GM, COMP (only if IS not satisfied)	DV Comp, GM, EH, PDS, FMR (only if IS not satisfied)	2 sec.	2 sec.
1-in-12 Drain Cycle (S1 dip switch 4 on)	FLUSH (Drain)	DV	10 min.	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: N/A on this model.	See "III.B.2. SRC-10H" for high-pressure switch operation.
4	High-Pressure Switch: N/A on this model.	
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.
7	High Voltage (147VAC±5% or more)	The control voltage safeties automatically reset when voltage is corrected.
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: **DV**—drain valve; **EH**—evaporator heater; **FMR**—fan motor-remote; **GM**—gear motor; **IS**—infrared sensor bin control; **MBC**—mechanical backup bin control; **PDS**—pump-down solenoid valve; **WV**—inlet water valve

### 3. Controls and Adjustments

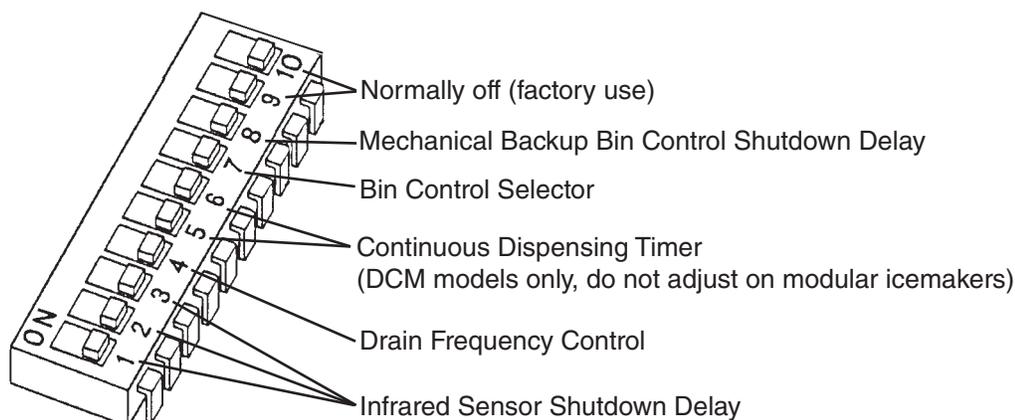
#### CAUTION

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:

S1 Dip Switch No.	1	2	3	4	5	6	7	8	9	10
FS-1022MLH-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
<b>ON</b>	<b>OFF</b>	<b>OFF</b>	<b>100 Seconds (1.6 minutes) (Factory Default)</b>
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	Bin Control Application	Gear Motor Delay
No. 7		
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.

<b>S1 Dip Switch Setting</b>	<b>Mechanical Backup Bin Control Shutdown Delay</b>
<b>No. 8</b>	
OFF	0.25 Seconds
ON	6.7 Seconds

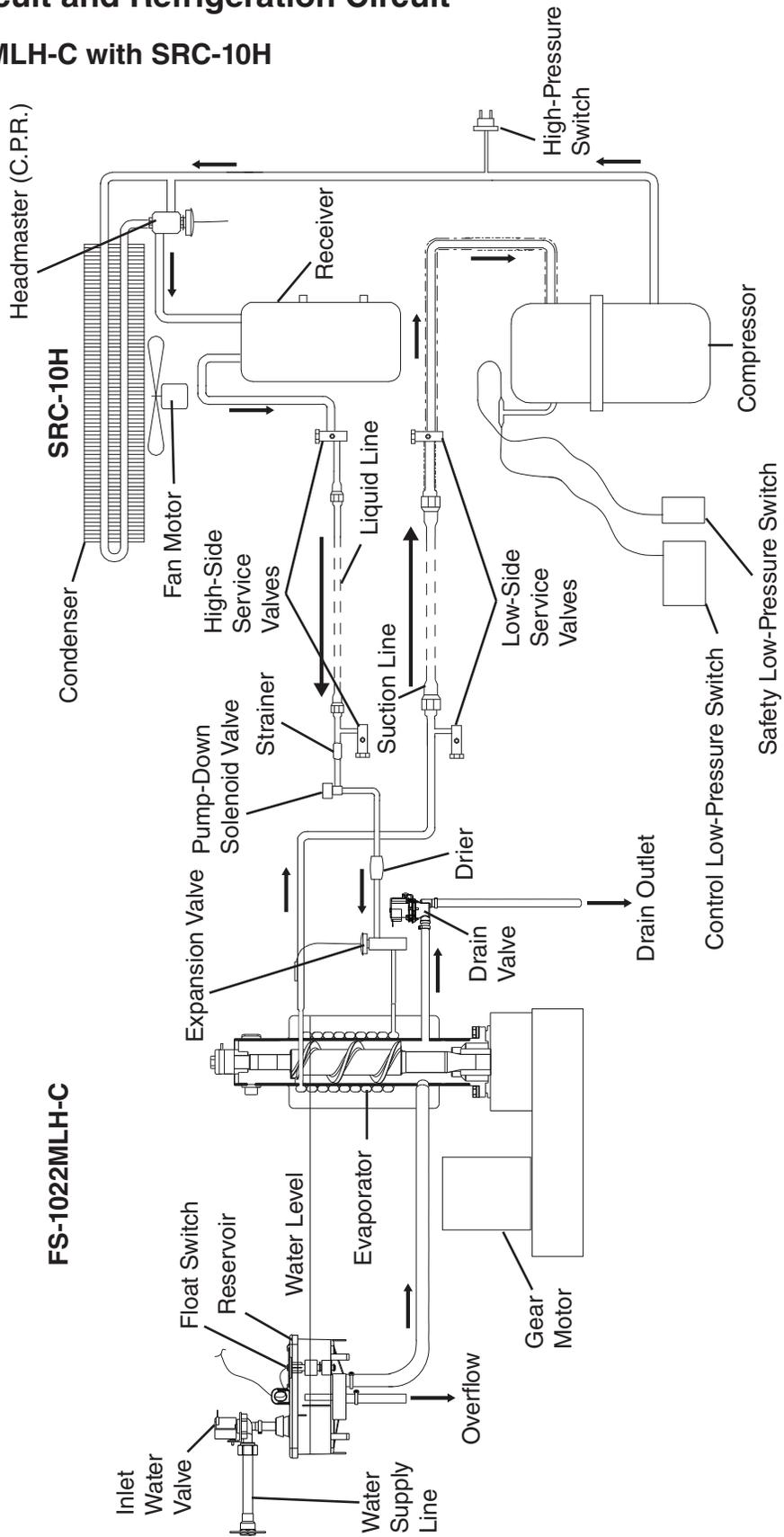
**g) Factory Use (S1 Dip Switch 9 & 10)**

Factory set for optimum performance. Do not adjust.

### III. Technical Information

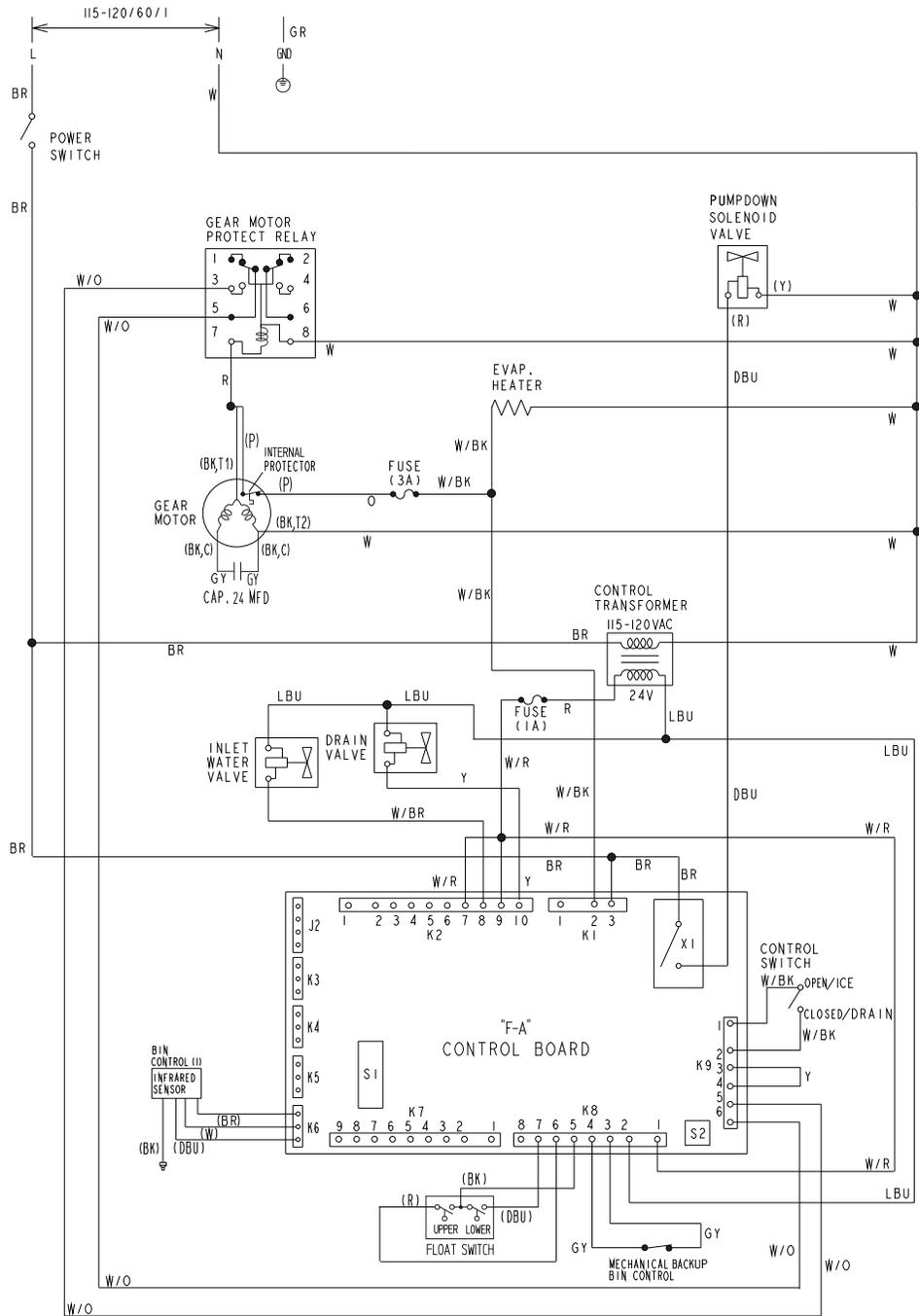
#### A. Water Circuit and Refrigeration Circuit

##### 1. FS-1022MLH-C with SRC-10H



# B. Wiring Diagrams

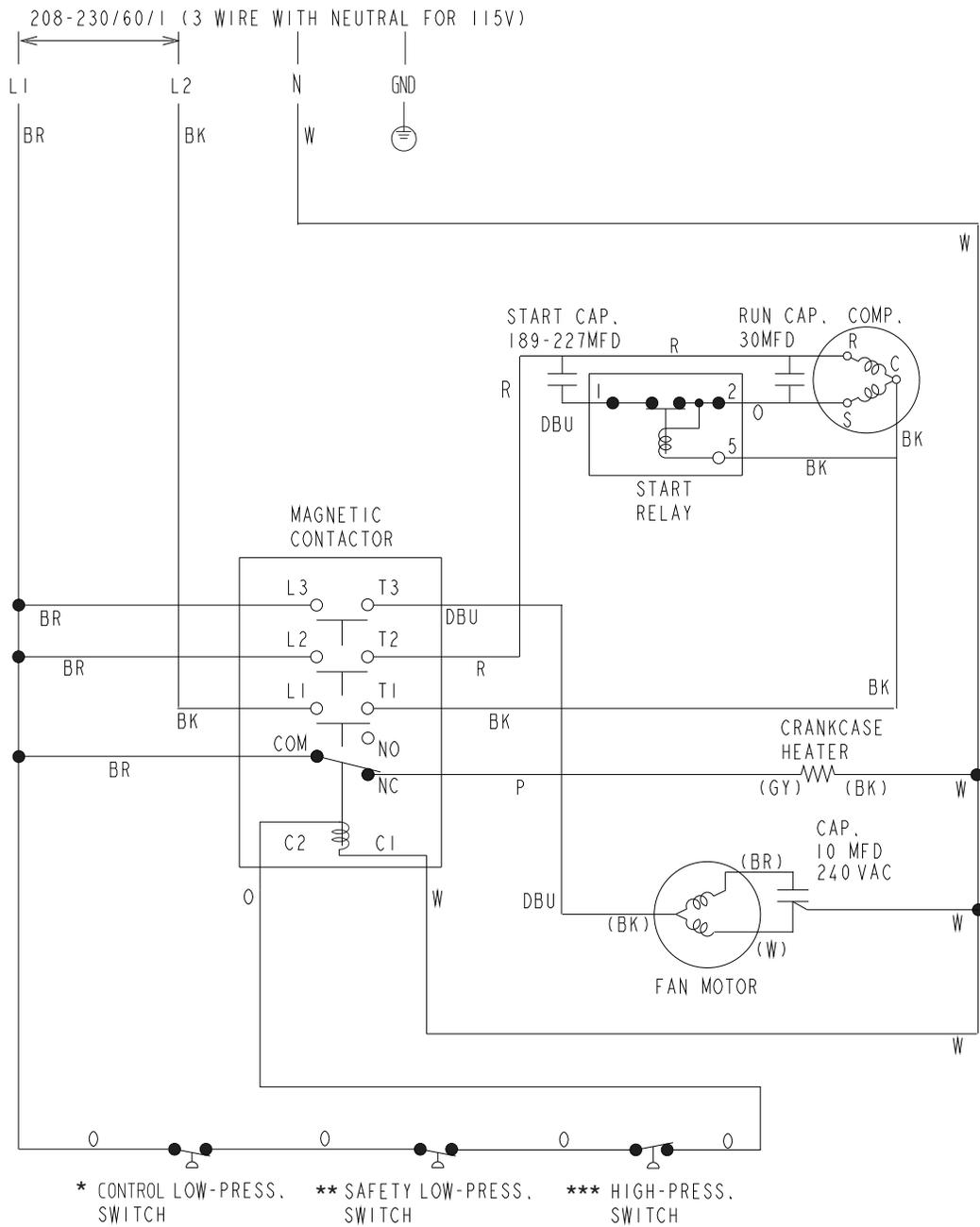
## 1. FS-1022MLH-C



SI DIP SWITCH SETTING	1	2	3	4	5	6	7	8	9	10
FS-1022MLH-C	ON	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF

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

## 2. SRC-10H



### WIRE COLOR CODE

BK	BLACK	O	ORANGE
BR	BROWN	P	PINK
DBU	DARK BLUE	R	RED
GY	GRAY	W	WHITE

* Control Low-Pressure Switch	
Cut-in	$29 \pm_{0.5}^0$ PSIG
Differential	$20 \pm_{0.5}^{10}$ PSIG
Cut-out	9 PSIG

** Safety Low-Pressure Switch (Manual Reset)	
Cut-out	$3 \pm 2.5$ PSIG
Differential	6 PSIG

*** High-Pressure Switch	
Cut-out	$384 \pm_{0}^{22}$ PSIG
Cut-in	$284 \pm 22$ PSIG

## C. Performance Data

### 1. FS-1022MLH-C with SRC-10H

APPROXIMATE ICE PRODUCTION PER 24 HR.	Ambient Temp. (F)	Water Temp. (F)					
		50		70		90	
lbs./DAY ( l/day)	70	*832	<u>378</u>	803	<u>365</u>	784	<u>356</u>
	80	765	<u>347</u>	747	<u>340</u>	729	<u>331</u>
	90	712	<u>324</u>	*703	<u>320</u>	679	<u>309</u>
	100	663	<u>301</u>	647	<u>294</u>	*600	<u>273</u>
APPROXIMATE ELECTRIC CONSUMPTION	70	1713	--	1717	--	1722	--
	80	1727	--	1731	--	1736	--
	90	1740	--	1745	--	1760	--
	100	1775	--	1789	--	1804	--
APPROXIMATE WATER CONSUMPTION PER 24 HR.	70	*100	<u>377</u>	96	<u>364</u>	94	<u>356</u>
	80	92	<u>347</u>	90	<u>339</u>	88	<u>331</u>
	90	85	<u>323</u>	*84	<u>319</u>	81	<u>308</u>
	100	80	<u>301</u>	78	<u>293</u>	*72	<u>272</u>
EVAPORATOR OUTLET TEMP. F ( C)	70	*14	<u>-10</u>	14	<u>-10</u>	14	<u>-10</u>
	80	14	<u>-10</u>	16	<u>-9</u>	16	<u>-9</u>
	90	16	<u>-9</u>	*16	<u>-9</u>	18	<u>-8</u>
	100	18	<u>-8</u>	18	<u>-8</u>	*18	<u>-8</u>
HEAD PRESSURE	70	*224	<u>15.7</u>	224	<u>15.7</u>	224	<u>15.7</u>
	80	233	<u>16.4</u>	233	<u>16.4</u>	233	<u>16.4</u>
	90	242	<u>17.0</u>	*242	<u>17.0</u>	242	<u>17.0</u>
	100	279	<u>19.6</u>	279	<u>19.6</u>	*279	<u>19.6</u>
SUCTION PRESSURE PSIG (kg/sq.cmG)	70	*29	<u>2.0</u>	29	<u>2.0</u>	29	<u>2.0</u>
	80	30	<u>2.1</u>	30	<u>2.1</u>	30	<u>2.1</u>
	90	31	<u>2.2</u>	*31	<u>2.2</u>	31	<u>2.2</u>
	100	33	<u>2.3</u>	33	<u>2.3</u>	*33	<u>2.3</u>
HEAT OF REJECTION		1130 BTU/hr AT 90 F/WT 70 F					

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.2. LED Lights and Audible Alarm Safeties."

Note: EH energizes when "GM" LED turns on. CB X1 Comp relay energizes PDS.

Pressure rises in the refrigeration system and closes CLPS. MC is energized when CLPS closes, energizing Comp and FMR.

- 1) Remove the front panel, then move the power switch to the "OFF" position.
- 2) Unplug the icemaker from the electrical outlet.
- 3) Remove the control box cover and access CB.
- 4) Check the S1 dip switch settings, see "II.C.3.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.
- 5) **Startup – "POWER OK" LED is on.** Plug the icemaker into the electrical outlet, then move the power switch to the "ON" position. Move the control switch to the "ICE" position. CB "POWER OK" LED and IS green LED should be on. **Diagnosis "POWER OK" LED:** CB "POWER OK" LED is off. Check for proper supply voltage (115VAC) input to the control transformer. If 115VAC is not present, check the power switch and breaker. Next, check for proper 24VAC output voltage from the control transformer. Check CB

K8 connector pin #1 white/red (W/R) to pin #2 light blue (LBU). If 24VAC is not present and 1A 24VAC fuse is good, replace the control transformer. If 24VAC is present and "POWER OK" LED is off, CB is bad and must be replaced.

**IS Diagnosis:** Check that IS green LED is on. 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 S1 dip switch 7 is in the "ON" position. If S1 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 yellow LED is still on or flashing after cleaning the lens, replace IS. **MBC Diagnosis:** Move S1 dip switch 7 to the "OFF" position. Check that the actuator paddle is properly positioned. Check for continuity across MBC proximity switch. When MBC proximity switch is closed 0VDC is read across CB K8 connector pin #3 gray (GY) and #4 gray (GY). 5VDC is present between CB K8 connector pin #3 gray (GY) or #4 gray (GY) to CB white K5 connector pin closest to red K4 connector (5VDC gnd). If 5VDC is not present, CB is bad and must be replaced.

CB monitors the following switches with 5VDC: Control Switch, Gear Motor Protect Relay (relay terminals 3 & 5), Float Switch, 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. The closing of the UF/S de-energizes WV, terminates the 90-second low water safety timer, and starts the 30-minute freeze timer. **Diagnosis:** Check that WV energizes and water fills the reservoir. If not, check for water supply line shut-off valve closed, clogged water filters, and clogged WV screen. Next, 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. If WV is energized and refill exceeds 90-second low water safety timer (fill timer) with no water in the reservoir, check for DV leaking. If reservoir is full and overflowing check for open UF/S. Check that WV shuts off when UF/S closes. If not, check UF/S continuity, red (R) wire to black (BK) wire. Clean or replace if necessary. See "IV.E. Float Switch Check and Cleaning."  
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.** WV de-energizes and "WTRIN" LED turns off. 30-second GM delay timer and 30-minute freeze timer start. The 30-second GM delay timer terminates, GMR (X2 on CB), GM, GMPR, and EH energize. 5-minute ice purge timer starts. **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 brown (BR) to white (W) neutral. Check for 115VAC at CB K1 connector pin #2 white/black (W/BK) to a white (W) neutral. If no voltage is present, CB is bad and must be replaced. If 115VAC is present, check GM fuse, GM internal protector, GM windings and capacitor, and GM coupling between auger and GM.

8) **Freeze Cycle – "GM" and "COMP" LEDs are on.** "GM" LED, GMR (X2 on CB), GM, GMPR, and EH continue. "COMP" LED turns on and PDS energizes. Once the refrigeration circuit low-side pressure rises to 29 PSIG, CLPS closes, energizing MC, which energizes Comp and FMR. Ice production begins 4 to 6 minutes after Comp and FMR energize depending on ambient and water conditions.

**FS Diagnosis:** Check that "COMP" LED is on and that PDS energizes. 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 PDS is not energized, confirm 115VAC at CB X1 relay brown (BR) to white (W) neutral and CB X1 relay dark blue (DBU) to white (W) neutral. If 115VAC is present on CB X1 brown (BR) and not on CB X1 dark blue (DBU) CB is bad and must be replaced. Next, check for 115VAC from PDS dark blue (DBU) to white (W) neutral. If 115VAC is present and PDS is closed, check for continuity through PDS solenoid. If open or if PDS is sticking closed, replace PDS.

**SRC Diagnosis:** Confirm that CLPS closes. Once CLPS closes, MC energizes, energizing Comp and FMR. If not, check CLPS, SLPS (manual reset), and HPS (automatic reset).

**CLPS:** When PDS is energized, CLPS closes when refrigeration circuit low-side pressure rises to 29 PSIG. If CLPS is open, check that refrigeration circuit low-side pressure has reached 29 PSIG. If refrigeration circuit low-side pressure is too low, confirm proper TXV operation, check for refrigerant restrictions (drier, PDS), and correct refrigerant charge. Recover, evacuate, and recharge if necessary.

**SLPS:** If SLPS is open, manually reset SLPS. Confirm proper TXV operation, check for refrigerant restriction (drier, PDS), and correct refrigerant charge. Recover, evacuate, and recharge if necessary.

**HPS:** HPS automatically resets when refrigeration circuit high-side pressure is within an acceptable range. If HPS does not reset (open), allow pressures to equalize and HPS to reset. If refrigeration circuit high-side pressure does not drop, recover, evacuate, and recharge if necessary. Before restarting unit, check for dirty or clogged condenser. Once unit is restarted, check for proper FMR operation and fan blade for binding. Check for refrigeration circuit refrigerant restriction (receiver, service valves, PDS, and drier). Also check for proper HM operation. If refrigerant pressures have returned to an acceptable range and HPS does not close, replace HPS.

**MC:** If MC energizes and Comp does not energize, check 208-230VAC at MC T1 black (BK) to MC T2 red (R). If 208-230VAC is not present, check incoming power supply and MC contact continuity. If 208-230VAC is present and Comp does not start, check Comp start relay, start capacitor, run capacitor, and Comp motor windings. If FMR does not energize, check 115VAC at MC T3 dark blue (DBU) to white (W) neutral. If 115VAC is present and FM does not energize, check FM capacitor and motor windings.

9) **Refill Cycle/Low Water Safety Cycle – "GM", "COMP", and "WTRIN" LEDs are on.**

As ice is produced, the water level in the reservoir drops. UF/S opens. Nothing happens at this time. When LF/S opens, WV energizes, 90-second low water safety timer (fill timer) starts. GMR (X2 on CB), GM, GMPR, EH, PDS, MC, Comp, and FMR continue. When LF/S closes, nothing happens at this time. When UF/S closes, WV de-energizes, 90-second low water safety timer (fill timer) terminates, and 30-minute freeze timer starts.

If UF/S remains open 90 seconds after WV energizes (LF/S opens) (fill timer exceeded), a 90-second shutdown cycle starts. CB X1 relay de-energizes, de-energizing PDS. Refrigeration circuit low-side pressure drops to 9 PSIG, opening CLPS. CLPS opens de-energizing MC, Comp, and FMR. CB signals a 1-beep alarm every 5 seconds. 90-second purge timer starts. GMR (X2 on CB), GM, GMPR, and EH continue. 90-second purge timer terminates, GMR (X2 on CB), GM, GMPR, and EH de-energizes. WV and 1-beep alarm continue until UF/S closes.

**Diagnosis** – Check that "WTRIN" LED is on. If not, check that LF/S is open. 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 for water supply line shut-off valve closed, clogged water filters, and clogged WV screen. Next, 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. If WV is energized and refill exceeds 90-second low water safety timer (fill timer) with no water in the reservoir, check for DV leaking. If reservoir is full and overflowing check that UF/S closes. If not, check UF/S continuity, red (R) wire to black (BK) wire. Clean or replace if necessary. 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.2. LED Lights and Audible Alarm Safeties."

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

Legend: **CB**–control board; **CLPS**–control low-pressure switch; **Comp**–compressor; **DV**–drain valve; **EH**–evaporator heater; **FMR**–fan motor-remote; **GM**–gear motor; **GMPR**–gear motor protect relay; **GMR**–gear motor relay; **HM**–headmaster; **HPS**–high-pressure switch; **IS**–infrared sensor; **LF/S**–lower float switch; **MC**–magnetic contactor; **MBC**–mechanical backup bin control; **PDS**–pump-down solenoid valve; **SLPS**–safety low-pressure switch; **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. Before proceeding, check for 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.2. LED Lights and Audible Alarm Safeties."

Note: EH energizes when "GM" LED turns on. CB X1 Comp relay energizes PDS. Refrigeration circuit low-side pressure rises to 29 PSIG, closing the CLPS contacts. MC is energized when CLPS closes, energizing Comp and FMR.

- 1) Check the S1 dip switch settings to assure that they are in the factory default position. For factory default settings, see "II.C.3.a) Default Dip Switch Settings." S1 dip switch 7 determines bin control application:

Bin Control Application:

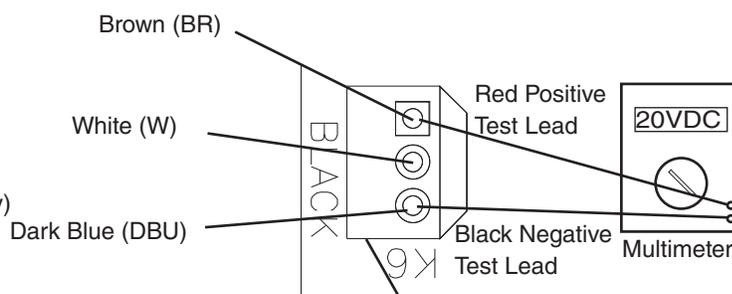
**Infrared Sensor Bin Control with Mechanical Backup Bin Control:** S1 dip switch 7 in the "ON" position.

**Mechanical Bin Control (Standard Ice Storage Bin):** S1 dip switch 7 in the "OFF" position.

- 2) **Startup – "POWER OK" LED on:** Move the control switch to the "ICE" position, then move the power switch to the "ON" 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 CT (main breaker or fuse and power switch). Next, check for proper low-voltage (24VAC) output from CT 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, CB is bad and must be replaced.
- 3) **IS Power Supply:** CB supplies 20VDC to IS. **Diagnosis:** Check that IS green LED is on. If green LED is not on, check for 20VDC between CB connector K6 dark blue (DBU) and connector K6 brown (BR). See Fig. 1. If 20VDC is not present, CB is bad and must be replaced.

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

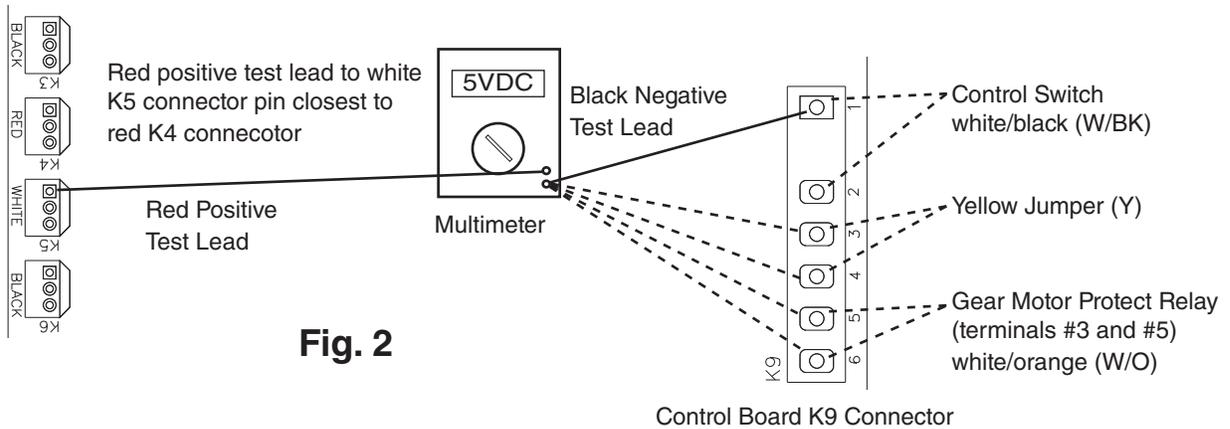
Infrared Sensor (20VDC)  
Open (yellow LED flashing or steady)  
20VDC DBU to BR  
0VDC DBU to W  
20VDC W to BR



**Fig. 1**

• **K6 Connector**  
Infrared Sensor

- 4) **5VDC Output Checks:** Control Switch (open contacts for icemaking, closed contacts for drain), GMPR (terminals 3 & 5), MBC, and F/S. 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. 2. Then place the black negative test lead from the multimeter to the corresponding pin to complete the 5VDC check.



- 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, CB 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 CB 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. Gear Motor Protect Relay (GMPR)—K9 connector pins #5 and #6 white/orange (WO) wires: When GMPR terminals 3 and 4 are open (GMPR 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, CB is bad and must be replaced. When GMPR terminals 3 and 4 are closed (GMPR 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, GMPR terminals 3 & 5 are closed. If 5VDC is present, GMPR terminals 3 & 5 are open and CB may be in an 8-beep alarm. See "II.C.2. LED Lights and Audible Alarm Safeties."

- c. Mechanical Backup Bin Control (MBC) –K8 connector pins #3 and #4 gray (GY) wires: When MBC 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. **Diagnosis:** If 5VDC is not present to either pin, CB is bad and must be replaced. If 5VDC is present to pin #3 gray (GY) wire and not to pin #4 gray (GY) wire, MBC is open. See "IV.D.2. Mechanical Backup Bin Control Check."
- d. Float Switch (LF/S and UF/S) –K8 connector pin #5 black (BK) wire (common), #6 red (R) wire (upper), and #7 dark blue (DBU) wire (lower): 5VDC is always present from the white K5 connector pin closest to red K4 connector to the K8 connector pin #5 black (BK) wire (common). 5VDC is present to the K8 connector pin #6 red (R) wire (upper) and pin #7 dark blue (DBU) wire (lower) when the F/S is open. **Diagnosis:** If 5VDC is not present at K8 connector pin #5 black (BK) wire, CB is bad and must be replaced. For further F/S diagnostics, see "IV.E. Float Switch Check and Cleaning."
- 5) **Fill "WTRIN" LED is on:** The "WTRIN" LED only turns on when the reservoir water level is low enough to open the LF/S. The "WTRIN" LED turns off once the UF/S closes. 24VAC is present at CB K2 connector pin #8 to any light blue (LBU) wire when LF/S is open. **Diagnosis:** If the LF/S is open and the "WTRIN" LED is off, confirm LF/S status, open or closed. If LF/S is open and "WTRIN" LED is off, CB is bad and should be replaced. If "WTRIN" LED is on and 24VAC is not present from CB connector K2 connector pin #8 to any light blue (LBU) wire, confirm 24VAC from K2 connector pin #9 to any light blue (LBU) wire. If 24VAC is present on K2 connector pin #9 and not on K2 connector pin #8, CB is bad and must be replaced.
- 6) **Ice Purge Cycle "GM" LED is on:** "GM" LED is on, GM and EH energize. **Diagnosis:** If "GM" LED is on and GM and EH are off, check for 115VAC from the K1 connector pin #2 white/black (BK) wire to a white (W) neutral wire. If 115VAC is not present, check for 115VAC from CB K1 connector pin #3 brown (BR) wire to a white (W) neutral wire. If 115VAC is present on pin #3 and not on pin #2, CB is bad and should be replaced.
- 7) **Freeze Cycle "GM" and "COMP" LED are on:** To bypass the Ice Purge Cycle, press the "SERVICE" button on CB after the "GM" LED turns on. **WARNING! Risk of electric shock. Care should be taken not to touch live terminals.** When "COMP" LED is on 115VAC is present at CB X1 relay dark blue (DBU) wire and PDS energizes. **Diagnosis:** Check for 115VAC from CB X1 relay dark blue (DBU) wire to a white neutral wire. If 115VAC is not present, check X1 relay brown (BR) wire to a white neutral wire. If 115VAC is present on X1 relay brown (BR) wire and not on X1 relay dark blue (DBU) wire, CB is bad and must be replaced.
- 8) **Refill "WTRIN" LED is on:** See "5) Fill "WTRIN" LED is on:" above.

Legend: **CB**–control board; **EH**–evaporator heater; **F/S**–float switch; **GM**–gear motor; **GMPR**–gear motor protect relay; **IS**–infrared sensor; **LF/S**–lower float switch; **MBC**–mechanical backup bin control; **PDS**–pump-down solenoid valve; **UF/S**–upper float switch; **WV**–inlet water valve

## D. Bin Control Check

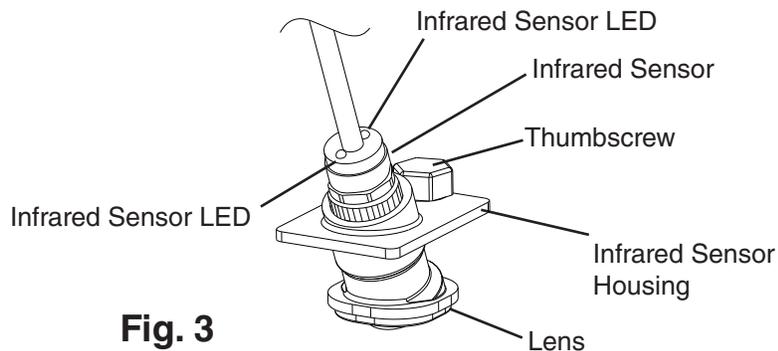
### 1. Infrared Sensor Check

#### 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 backup bin control.

- 1) Remove the front panel.
- 2) Move the power switch to the "OFF" position, then unplug the unit from the electrical outlet.
- 3) Remove the control box cover and access CB. Confirm that S1 dip switch 1, 2, 3 are in the proper position for your application. See "II.C.3.b) Infrared Sensor Shutdown Delay (S1 dip switch 1, 2, 3)."
- 4) Confirm that IS is connected to the K6 connector on CB. Wipe down the IS lens with a clean, warm, damp cloth. If the bottom of the icemaker is not accessible in your application, remove the thumbscrew securing the IS housing, then remove the housing from the base. See Fig. 3.
- 5) Make sure the control switch is in the "ICE" position, then plug the icemaker into the electrical outlet.
- 6) Move the power switch to the "ON" position to start the automatic icemaking process. Check that the IS green LED is on. The green LED confirms 20VDC power from CB to IS and remains on constantly. **Diagnosis:** If the green LED is not on, confirm 20VDC at K6 connector dark blue (DBU) to brown (BR). If 20VDC is present and the green LED is off, IS is bad and must be replaced. If not, see step "3) IS Power Supply," under "IV.C. Control Board Check."
- 7) Make sure the "GM" LED on CB 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 CB to bypass the 5-minute ice purge cycle. **WARNING! Risk of electric shock. Care should be taken not to touch live terminals.**
- 8) "GM" and "COMP" LEDs are on. Use an object to cover IS lens. The yellow LED on IS 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 starts. See "II.C.3.b) Infrared Sensor Shutdown Delay (S1 dip switch 1, 2, 3)." Comp and FMR should de-energize immediately after the shutdown delay timer terminates. Five minutes later, GM should de-energize. **Diagnosis:** If the yellow LED is not on after covering the lens, IS is bad and must be replaced. If the unit remains on after IS shutdown delay timer terminates and the 5-minute ice purge timer terminates, CB is bad and must be replaced. If IS fails to shut down the icemaker and the level of ice activates MBC, the icemaker shuts down within 10 seconds of MBC opening and a 9-beep alarm sounds. To reset, move the power switch to the "OFF" position, and then back to the "ON" position.

- 9) Remove the object covering IS. If you removed IS 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. Unplug the icemaker from the electrical outlet, then proceed to "IV.D.2. Mechanical Backup Bin Control Check."



**Fig. 3**

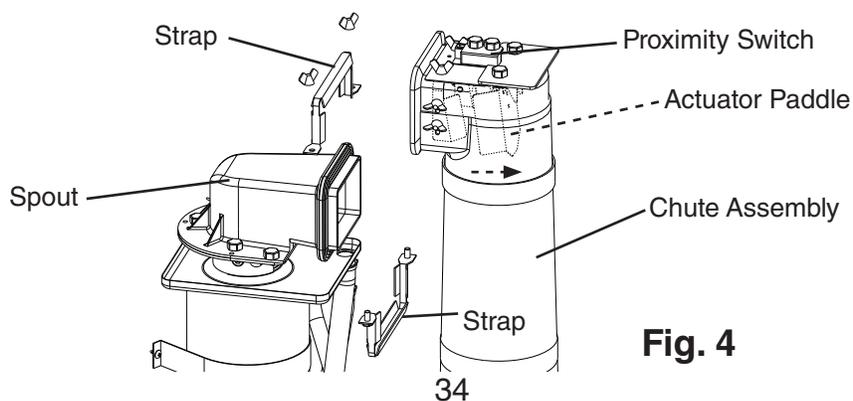
## 2. Mechanical Backup Bin Control Check

When the actuator paddle is not engaged MBC is closed and the icemaker produces ice.

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

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

- 1) Remove the front panel.
- 2) Move the power switch to the "OFF" position, then unplug the unit from the electrical outlet.
- 3) Remove the strap connecting the spout to the chute assembly. See Fig. 4. Pull up the chute assembly slightly so that you can access the actuator paddle located in the top of the chute.
- 4) Plug the unit into the electrical outlet.
- 5) Move the power switch to the "ON" position to start the automatic icemaking process.



**Fig. 4**

- 6) 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 located on CB to bypass the 5-minute ice purge cycle. **WARNING! Risk of electric shock. Care should be taken not to touch live terminals.** The "COMP" LED turns on.
- 7) Press the actuator paddle located in the top of the chute.  
**S1 dip switch 7 in the "ON" position:** Comp and GM de-energizes within 10 seconds and CB sounds a 9-beep alarm. **S1 dip switch 7 in the "OFF" position:** Comp and GM de-energize within 10 seconds. **Diagnosis:** If MBC does not open or the icemaker continues to make ice, check that the actuator paddle is moving freely. Confirm that the actuator paddle is engaged. Check for continuity across MBC wires. If MBC contacts are found open and the icemaker continues to make ice, CB is bad and must be replaced. If MBC is closed with the actuator paddle engaged, MBC is bad and must be replaced.
- 8) Move the power switch to the "OFF" position, then unplug the unit from the electrical outlet.
- 9) Replace the chute assembly and strap in their correct positions.
- 10) Replace the control box cover and top panel in their correct positions.
- 11) Plug the unit into the electrical outlet.
- 12) Move the power switch to the "ON" position to start the automatic icemaking process.
- 13) Replace the front panel in its correct position.

Legend: **CB**—control board; **Comp**—compressor; **GM**—gear motor; **IS**—infrared sensor;  
**MBC**—mechanical backup bin control

## **E. Float Switch Check and Cleaning**

### **1. Float Switch Check**

- 1) Remove the front panel, then move the power switch to the "OFF" position.
- 2) Move the control switch to the "DRAIN" position.
- 3) Move the power switch to the "ON" position.
- 4) Allow the water to drain from the evaporator, then move the power switch to the "OFF" position and the control switch to the "ICE" position.
- 5) Unplug the unit from the electrical outlet.
- 6) Remove the control box cover.
- 7) Remove CB K8 connector and check F/S continuity. Both the UF/S and LF/S should be open. Check continuity between CB K8 connector pin #5 black (BK) (common) wire and K8 connector pin #6 red (R) (UF/S) wire. Next, check continuity between CB K8 connector pin #5 black (BK) (common) wire and K8 connector pin #7 dark blue (DBU) (LF/S) wire. If both are open, continue to step 5. If either are closed, follow the steps in "IV.E.2. Float Switch Cleaning." After cleaning F/S, check UF/S and LF/S again. Replace if necessary.
- 8) Replace CB K8 connector in its correct position.
- 9) Plug the unit into the electrical outlet, then move the power switch to the "ON" position and let the water reservoir fill.
- 10) Once the reservoir is full and GM starts, move the power switch to the "OFF" position.
- 11) Unplug the unit from the electrical outlet.
- 12) Remove CB K8 connector and check F/S continuity. Both the UF/S and LF/S should be closed. Check continuity between CB K8 connector pin #5 black (BK) (common) wire and K8 connector pin #6 red (R) (UF/S) wire. Next, check continuity between CB K8 connector pin #5 black (BK) (common) wire and K8 connector pin #7 dark blue (DBU) (LF/S) wire. If either are open, follow the steps in "IV.E.2. Float Switch Cleaning." After cleaning F/S, check UF/S and LF/S again. Replace if necessary.
- 13) Replace CB K8 connector in its correct position. Replace the control box cover in its correct position.
- 14) Plug the unit into the electrical outlet, then move the power switch to the "ON" position to start the automatic icemaking process.
- 15) Replace the front panel in its correct position.

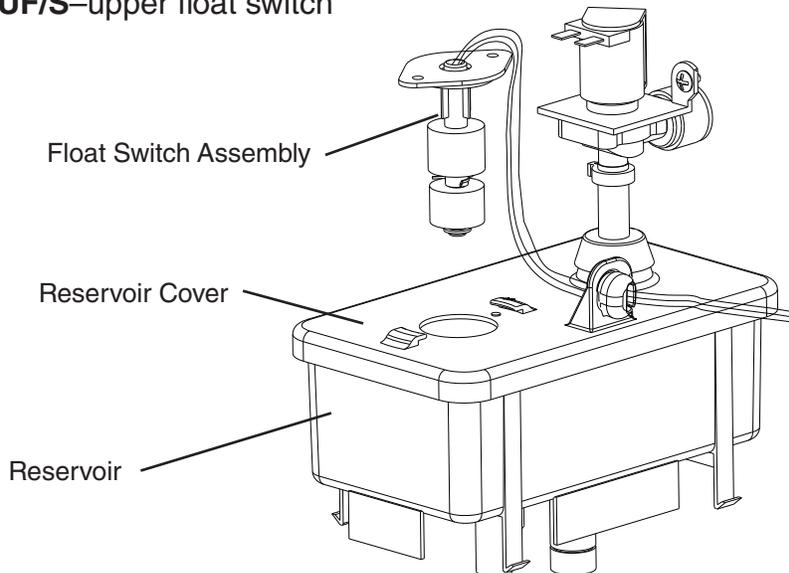
### **2. Float Switch Cleaning**

Depending on local water conditions, scale may build up on F/S. Scale on F/S can cause inconsistent operation of UF/S and LF/S. In this case, both UF/S and LF/S should be cleaned and checked.

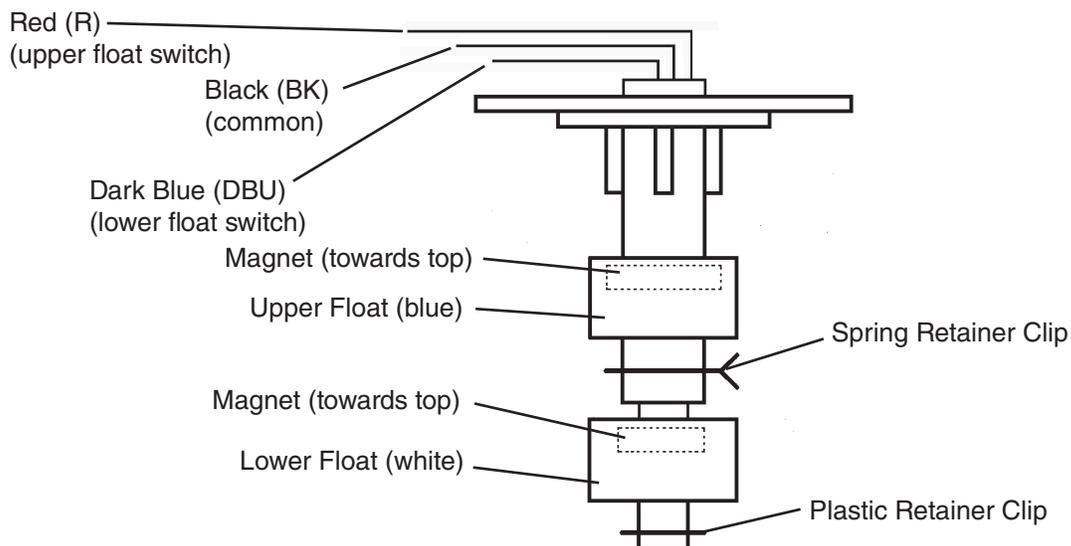
- 1) Remove the front panel, then move the power switch to the "OFF" position.
- 2) Unplug the unit from the electrical outlet.
- 2) Remove F/S assembly from the reservoir cover. See Fig. 5.

- 3) Wipe down F/S assembly with a mixture of 1 part Hoshizaki "Scale Away" 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 (UF/S) and the white float is on bottom (LF/S). The floats must be installed with the magnets inside them towards the top of the switch. See Fig. 6. Installing the floats upside down will affect the timing of F/S operation.
- 5) Rinse the float switch assembly thoroughly with clean water and replace in its correct position.
- 6) Plug the unit into the electrical outlet, then move the power switch to the "ON" position to start the automatic icemaking process.
- 7) Replace the front panel in its correct position.

Legend: **CB**—control board; **F/S**—float switch; **GM**—gear motor; **LF/S**—lower float switch; **UF/S**—upper float switch



**Fig. 5**



**Fig. 6**

## F. Diagnostic Charts

Before consulting the diagnostic charts, check for correct installation, proper voltage per unit nameplate, and adequate water supply. Check CB using the steps in "IV.C. Control Board Check." Check that the S1 dip switch settings are in the factory default position. For factory default settings, see "II.C.3.a) Default Dip Switch Settings."

### 1. No Ice Production

<b>No Ice Production - Possible Cause</b>	
<b>Startup</b>	
1a. Power Supply-FS	a) Unplugged, off, blown fuse, or tripped breaker. b) Not within specifications.
1b. Power Supply-SRC	a) Off, tripped breaker. b) Not within specifications.
2. Water Supply	a) Water supply off or improper water pressure. b) External water filters clogged.
3. Power Switch	a) "OFF" position.
4. Control Transformer (115V/24V)	a) Coil winding open or shorted.
5. Fuse (Control Box)	a) Blown.
6. Control Board See "IV.C. Control Board Check"	a) In alarm. b) BC OPEN, yellow LED on (bin full). c) Defective.
7. Control Switch	a) In "DRAIN" position. b) Bad contacts.
8. Infrared Sensor Bin Control	a) No power, lens dirty, or defective. b) Control board dip switch 7 off.
9. Mechanical Backup Bin Control	a) Tripped with bin filled with ice (9-beep alarm). b) Proximity switch stuck open. c) Actuator paddle does not move freely.
<b>Fill Cycle</b>	
1. Control Board	a) No power to inlet water valve. b) No power to float switch or not reading float switch condition.
2. Inlet Water Valve	a) Screen or orifice clogged. b) Coil winding open.
3. Float Switch See "IV.E. Float Switch Check and Cleaning"	a) Float does not move freely. b) Defective.
<b>Ice Purge Cycle</b>	
1. Control Board	a) No power to gear motor. b) No power to gear motor protect relay circuit.
2. Gear Motor	a) Blown fuse. b) Internal protector open. c) Gear motor winding open. d) Mechanical failure.

<b>No Ice Production - Possible Cause</b>	
<b>Ice Purge Cycle Continued</b>	
3. Gear Motor Protect Relay	a) Open windings. b) Contacts stuck open.
<b>Freeze Cycle</b>	
1. Gear Motor Protect Relay	a) Open.
2. Control Board	a) No power to pump-down solenoid valve. b) X1 relay defective.
3. Pump-Down Solenoid Valve	a) Open coil. b) Sticking.
4. Magnetic Contactor	a) Open coil. b) Contacts sticking.
5. Control Low-Pressure Switch	a) Refrigerant pressure too low. b) Out of adjustment or defective.
6. Safety Low-Pressure Switch (manual reset)	a) Refrigerant pressure too low. b) Defective.
7. High-Pressure Switch	a) Dirty condenser. b) Ambient temperature too warm. c) Fan motor not operating. d) Refrigerant overcharged. e) Bad contacts. f) Refrigerant lines or components restricted.
8. Condensing Unit Fan Motor	a) Magnetic contactor contacts bad or coil winding open. b) Motor winding open. c) Bearing worn out or locked rotor. d) Capacitor defective.
9. Compressor	a) Magnetic contactor contacts bad or coil winding open. b) Motor winding open. c) Start capacitor or run capacitor defective. d) Start relay contacts bad or coil winding open.
10. Evaporator	a) Dirty. b) Damaged or defective.
11. Expansion Valve (TXV)	a) Bulb loose. b) Operating erratically.
12. Refrigerant Charge	a) Low.
13. Drain Valve	a) Dirty, leaking by. b) Defective coil. c) Defective control board.
14. Water System	a) Water leaks.
<b>Refill</b>	
1. Float Switch	a) Dirty/sticking. b) Defective.
2. Inlet Water Valve	a) Clogged or defective.
3. Water Supply	a) Off.

<b>No Ice Production - Possible Cause</b>	
4. Control Board	a) No power to float switch or not reading float switch condition.
	b) No power to inlet water valve.
<b>Shutdown</b>	
1. Infrared Sensor Bin Control	a) Dirty lens.
	b) Defective.
	c) Control board (no power to IS).
2. Mechanical Backup Bin Control	a) Tripped with bin filled with ice (9-beep alarm).
	b) Proximity switch stuck closed.
	c) Actuator paddle does not move freely.
	d) Control board dip switch failure.
3. Pump-Down Solenoid Valve	a) Defective (stuck open).
4. Control Low-Pressure Switch	a) Defective (stuck closed).
5. Magnetic Contactor	a) Contacts stuck closed.
6. Control Board	a) No power to IS.
	b) X1 relay defective.
	c) In alarm.

---

## 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 unplug the icemaker from the electrical outlet and turn off the power supply to the condensing unit 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."
5. When replacing evaporator assembly and water circuit components, make sure there are no water leaks after the repair is complete.

## 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

The icemaker unit is provided with refrigerant service valves. Using proper refrigerant practices, recover the refrigerant from the service 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)

- 1) Attach a vacuum pump to the system. Be sure to connect charging hoses to both high and low-side service 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. Open the gauge manifold valves, then open the high and low-side service valves. 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. See the rating label inside the icemaker for the required refrigerant charge. Hoshizaki recommends only virgin refrigerant or reclaimed refrigerant which meets ARI Standard 700 (latest edition) be used.
- 6) A liquid charge is required for charging an R-404A system (to prevent fractionation). Place the service cylinder on the scales: if the service cylinder is not equipped with a dip tube, invert the service cylinder, then place it on the 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.  
**CAUTION! To prevent compressor damage, use a throttling valve or liquid dispensing device to add the remaining liquid charge through the low-side service valve with the unit running.**
- 9) Close the high and low-side service valves. Close the high and low-side gauge manifold valves, then disconnect the gauge manifold hoses.
- 10) Cap the service valves to prevent a possible leak.

## B. Important Notes for Component Replacement

### CAUTION

When replacing a component listed below, see the notes to help ensure proper operation.

Component	Notes
Compressor	<ul style="list-style-type: none"> <li>• Install a new drier, start capacitor, run capacitor, and start relay.</li> </ul>
Expansion Valve	<ul style="list-style-type: none"> <li>• Install a new drier.</li> <li>• Attach the expansion valve bulb to the suction line in the same location as the previous bulb.</li> <li>• The bulb should be between the 10 and 2 o'clock positions on the tube.</li> <li>• Secure the bulb with the clamp and holder, then insulate it.</li> </ul>
Pump-Down Solenoid Valve	<ul style="list-style-type: none"> <li>• Install a new strainer and drier.</li> <li>• Use copper tube of the same diameter and length when replacing valve lines.</li> </ul>
Fan Motor	<ul style="list-style-type: none"> <li>• Install a new fan motor capacitor.</li> </ul>
<b>Evaporator Assembly Components. See Fig. 7.</b>	
Upper and Lower Bearings	<ul style="list-style-type: none"> <li>• Inspect the upper bearing for wear. See "V.B.1. Upper Bearing Wear Check." Replace if necessary.</li> <li>• When replacing the upper bearing it is advised to also change the lower bearing at the same time.</li> </ul>
Evaporator	<ul style="list-style-type: none"> <li>• Install a new drier.</li> <li>• Inspect the mechanical seal and O-ring prior to installing the new evaporator. If worn, cracked, or scratched, the mechanical seal should also be replaced.</li> </ul>
Gear Motor	<ul style="list-style-type: none"> <li>• Install a new gear motor capacitor.</li> </ul>

# Evaporator Assembly

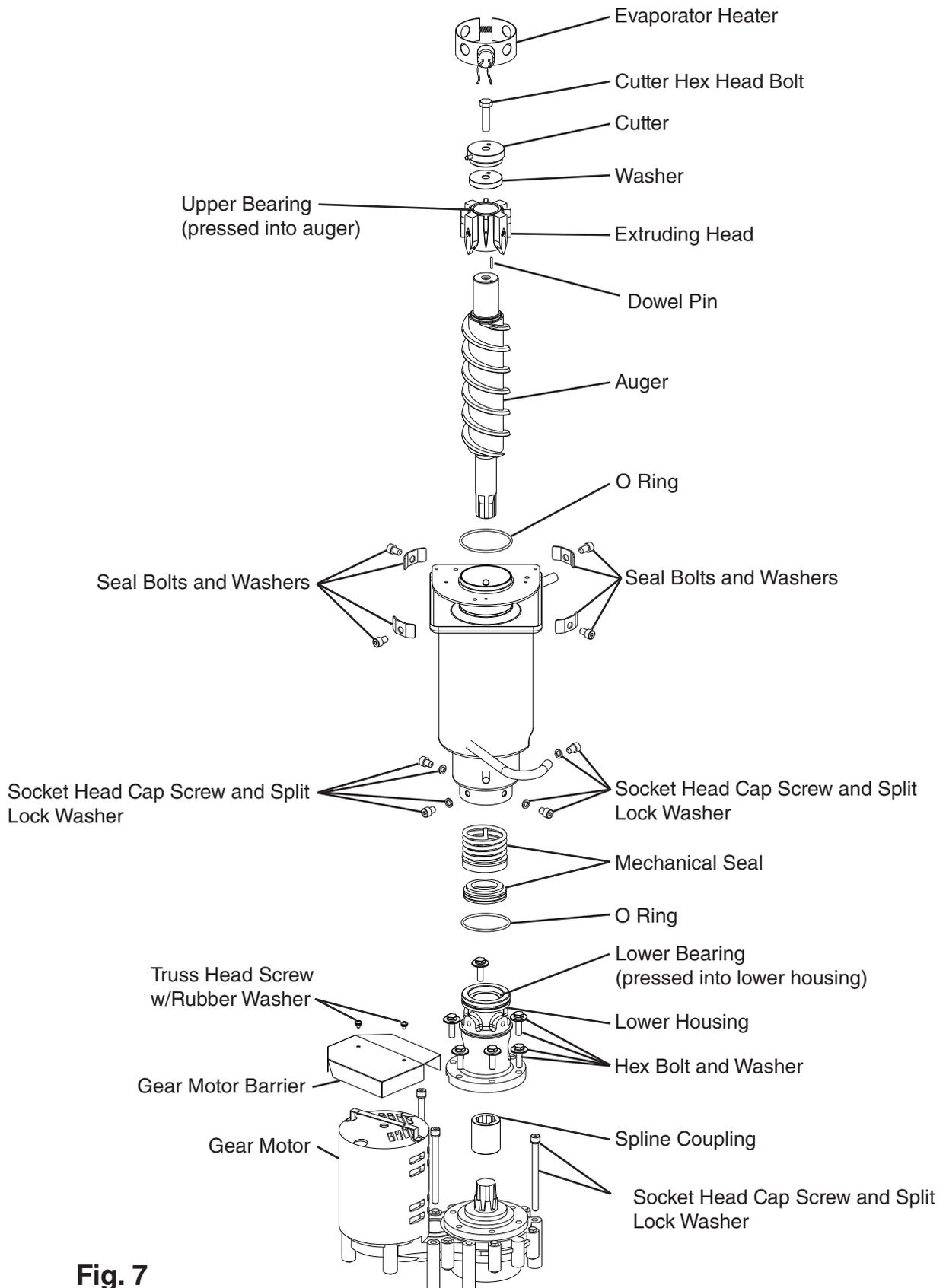


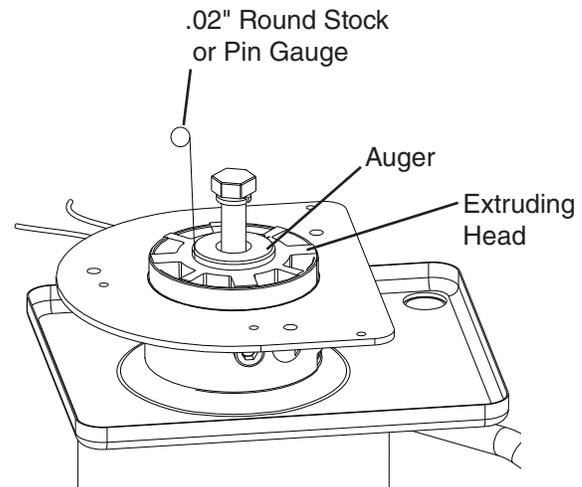
Fig. 7

## 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) Remove the front panel. Move the power switch to the "OFF" position, then unplug the unit from the electrical outlet.
- 2) Remove the top and side 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 and washer.

- 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 lower housing should be replaced. Instructions for removing the extruding head and lower housing are located later in this procedure.



**Fig. 8**

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

- 6) Remove the bolt. Replace the washer, cutter, and cutter bolt.
- 7) Replace the spout.
- 8) Replace the top and side panels in their correct positions.
- 9) Plug the unit into the electrical outlet, then move the power switch to the "ON" position to start the automatic icemaking process.
- 10) Replace the front panel in its correct position.

## 2. Removal and Replacement of Cutter

- 1) Remove the front panel. Move the power switch to the "OFF" position, then unplug the unit from the electrical outlet.
- 2) Remove the top and side 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. Replace the bolt.
- 6) Replace the spout.
- 7) Replace the top and side panels in their correct positions.

- 8) Plug the unit into the electrical outlet, then move the power switch to the "ON" position to start the automatic icemaking process.
- 9) Replace the front panel in its correct position.

### **3. Removal and Replacement of Extruding Head**

- 1) Remove the front panel, then move the power switch to the "OFF" position.
- 2) Move the control switch to the "DRAIN" position.
- 3) Move the power switch to the "ON" position.
- 4) Allow the water to drain from the evaporator.
- 5) Move the power switch to the "OFF" position, then unplug the unit from the electrical outlet.
- 6) Remove the top and side panels.
- 7) Remove the strap connecting the spout to the chute assembly, then remove the spout.
- 8) Remove the cutter bolt and lift off the cutter and washer.
- 9) Remove the seal bolts and lift off the extruding head.
- 10) Place the new extruding head in place and tighten down the seal bolts.
- 11) Replace the washer, cutter, cutter bolt, and spout.
- 12) Replace the top and side panels in their correct positions.
- 13) Move the control switch to the "ICE" position.
- 14) Plug the unit into the electrical outlet, then move the power switch to the "ON" position to start the automatic icemaking process.
- 15) Replace the front panel in its correct position.

### **4. Removal and Replacement of Auger**

- 1) Remove the front panel, then move the power switch to the "OFF" position.
- 2) Move the control switch to the "DRAIN" position.
- 3) Move the power switch to the "ON" position.
- 4) Allow the water to drain from the evaporator.
- 5) Move the power switch to the "OFF" position, then unplug the unit from the electrical outlet.
- 6) Remove the top and side panels.
- 7) Remove the strap connecting the spout to the chute assembly, then remove the spout.
- 8) Remove the extruding head seal bolts. Using the cutter, lift out the auger assembly.
- 9) Remove the cutter bolt, cutter, washer, and dowel pin. Remove the extruding head from the auger and place on the new auger.
- 10) Install the new auger.
- 11) Replace the removed parts in the reverse order of which they were removed.
- 12) Replace the top and side panels in their correct positions.

- 13) Move the control switch to the "ICE" position.
- 14) Plug the unit into the electrical outlet, then move the power switch to the "ON" position to start the automatic icemaking process.
- 15) Replace the front panel in its correct position.

## 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) Remove the front panel, then move the power switch to the "OFF" position.
- 2) Move the control switch to the "DRAIN" position.
- 3) Move the power switch to the "ON" position.
- 4) Allow the water to drain from the evaporator.
- 5) Move the power switch to the "OFF" position, then unplug the unit from the electrical outlet.
- 6) Remove the top and side panels.
- 7) Recover the refrigerant and store it in an approved container.
- 8) Remove the strap connecting the spout to the chute assembly, then remove the spout.
- 9) Disconnect the water hoses.
- 10) Remove the extruding head seal bolts. Using the cutter, lift out the auger assembly.
- 11) Remove the insulation and the expansion valve bulb on the suction line.
- 12) Disconnect the inlet and outlet tubing.
- 13) Remove the socket head cap screws and split lock washers securing the evaporator to the lower housing.
- 14) Lift off the evaporator.
- 15) 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.
- 16) Make sure the lower mechanical seal is in place, then place the evaporator in position. Secure the evaporator to the lower housing using the socket head cap screws and split lock washers.

- 17) Remove the drier, then place the new drier in position.
- 18) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.
- 19) 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.
- 20) Evacuate the system, and charge it with refrigerant. See the rating label inside the icemaker for the required refrigerant charge. Hoshizaki recommends only virgin refrigerant or reclaimed refrigerant which meets ARI Standard 700 (latest edition) be used.
- 21) Replace the removed parts in the reverse order of which they were removed.
- 22) Replace the top and side panels in their correct positions.
- 23) Move the control switch to the "ICE" position.
- 24) Plug the unit into the electrical outlet, then move the power switch to the "ON" position to start the automatic icemaking process.
- 25) Replace the front panel in its correct position.

## **6. Removal and Replacement of Mechanical Seal and Lower Housing**

### **6a. Mechanical Seal**

- 1) Remove the front panel, then move the power switch to the "OFF" position.
- 2) Move the control switch to the "DRAIN" position.
- 3) Move the power switch to the "ON" position.
- 4) Allow the water to drain from the evaporator.
- 5) Move the power switch to the "OFF" position, then unplug the unit from the electrical outlet.
- 6) Remove the top and side panels.
- 7) Remove the strap connecting the spout to the chute assembly, then remove the spout.
- 8) Remove the extruding head seal bolts. Using the cutter, lift out the auger assembly.
- 9) 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.
- 10) Remove the socket head cap screws and split lock washers securing the evaporator to the lower housing.
- 11) Raise the evaporator up to access the lower housing.

- 12) Remove the O-ring and mechanical seal from the housing. If only replacing the mechanical seal, proceed to step 15.

**⚠ WARNING**

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

### **6b. Lower Housing**

- 13) Remove the hex bolts w/washers securing the lower housing to the gear motor and remove the lower housing from the gear motor. If inspection of the upper bearing inside the extruding head (see "V.B.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 lower housing.
- 14) Mount the lower housing on the gear motor.
- 15) Install the O-ring and lower part of the mechanical seal on the lower housing.
- 16) Make sure the lower mechanical seal is in place, then place the evaporator in position. Secure the evaporator to the lower housing using the socket head cap screws and split lock washers.
- 17) Install the auger assembly with the upper part of the mechanical seal attached.
- 18) Replace the removed parts in the reverse order of which they were removed.
- 19) Replace the top and side panels in their correct positions.
- 20) Move the control switch to the "ICE" position.
- 21) Plug the unit into the electrical outlet, then move the power switch to the "ON" position to start the automatic icemaking process.
- 22) Replace the front panel in its correct position.

### **7. Removal and Replacement of Gear Motor**

- 1) Remove the front panel, then move the power switch to the "OFF" position.
- 2) Move the control switch to the "DRAIN" position.
- 3) Move the power switch to the "ON" position.
- 4) Allow the water to drain from the evaporator.
- 5) Move the power switch to the "OFF" position, then unplug the unit from the electrical outlet.
- 6) Remove the top and side panels.
- 7) Remove the strap connecting the spout to the chute assembly, then remove the spout.
- 8) Remove the hex head bolts and washers securing the lower housing to the gear motor. Lift the evaporator up slightly.
- 9) Remove the socket head cap screws with split lock washers securing the gear motor.
- 10) Disconnect the gear motor wiring, then remove the gear motor.

- 11) Remove the gear motor bracket and spline coupling from the old gear motor and place on the new gear motor.
- 12) Install the new gear motor and reconnect the electrical wires.
- 13) Replace the removed parts in the reverse order of which they were removed.
- 14) Replace the top and side panels in their correct positions.
- 15) Move the control switch to the "ICE" position.
- 16) Plug the unit into the electrical outlet, then move the power switch to the "ON" position to start the automatic icemaking process.
- 17) Replace the front panel in its correct position.

---

## VI. Cleaning and Maintenance

This icemaker must be cleaned and maintained in accordance with the instruction manual and labels provided with the icemaker. Consult with your local distributor about cleaning and maintenance service. To obtain the name and phone number of your local distributor, visit [www.hoshizaki.com](http://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 this icemaker.
2. **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.
3. The dispenser unit/storage bin is for ice use only. Do not store anything else in 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

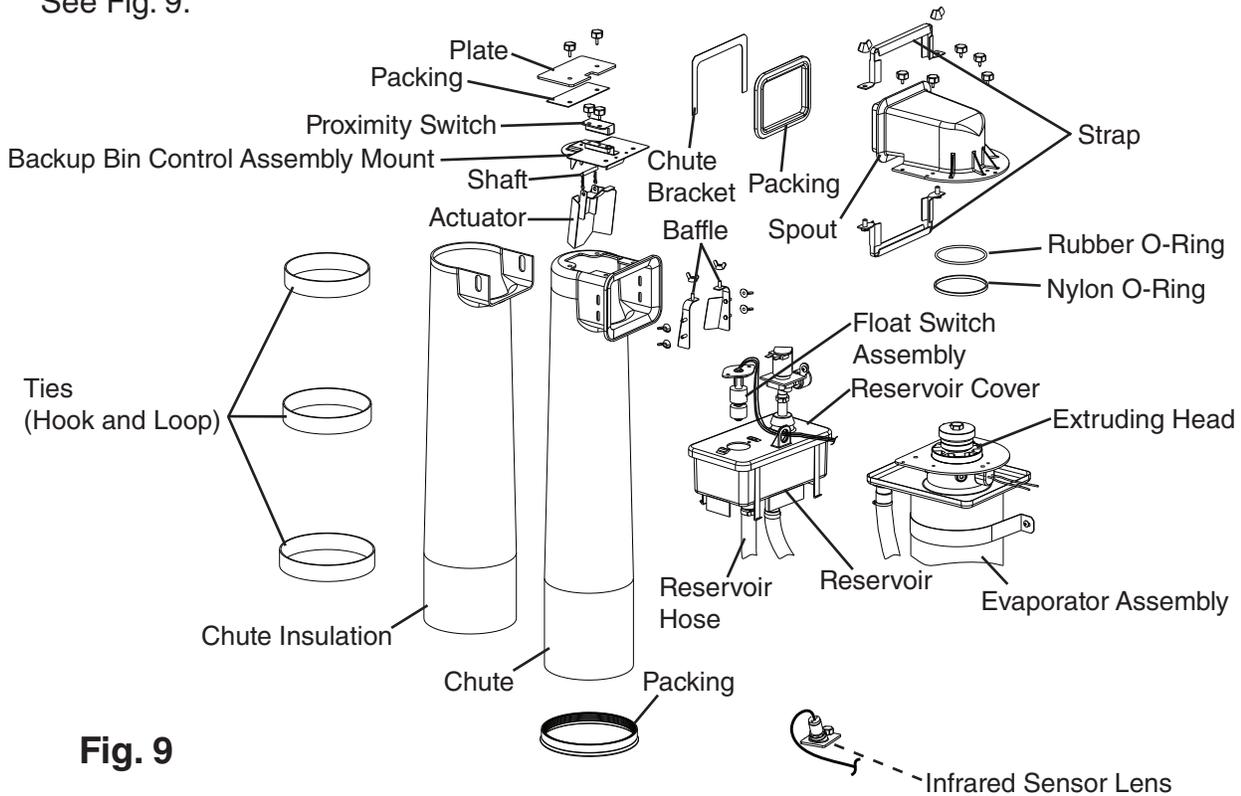
For safety and maximum effectiveness, use the solution immediately after dilution.

Dilute 9.6 fl. oz. (0.29 l) of Hoshizaki "Scale Away" with 1.6 gal. (6.0 l) of warm water.

### 2. Cleaning Procedure

- 1) Remove the front panel, then move the power switch to the "OFF" position. Move the control switch to the "DRAIN" position, then move the power switch back to the "ON" position. Replace the front panel in its correct position.
- 2) Close the water supply line shut-off valve.
- 3) Allow the water system to drain for 5 minutes.
- 4) Remove the front panel. Move the power switch to the "OFF" position, then unplug the unit from the electrical outlet. Remove the top panel.

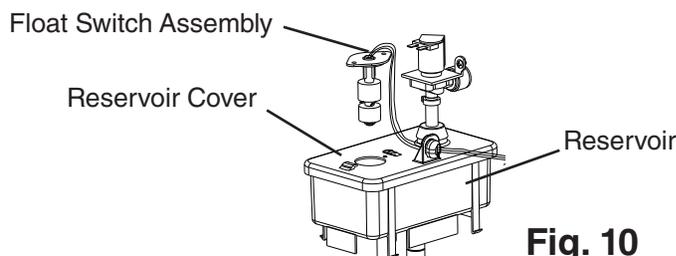
- 5) Remove all of the ice from the dispenser unit/storage bin.
- 6) Remove the strap connecting the spout to the chute assembly, then remove the spout. See Fig. 9.



**Fig. 9**

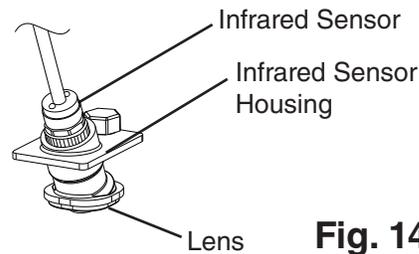
- 7) Pour the cleaning solution over the extruding head until the evaporator assembly and the reservoir are full and the solution starts to overflow into the drain pan.
 

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 solution 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. Otherwise, continue to step 11.
  - 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. 10**

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



**Fig. 14**

- 12) Replace the top panel in its correct position. Move the control switch to the "ICE" position, then plug the unit back in. Move the power switch to the "ON" position, then replace the front panel in its correct position. Make ice using the solution until the icemaker stops making ice.
- 13) Remove the front panel, then move the power switch to the "OFF" position. Move the control switch to the "DRAIN" position, then move the power switch back to the "ON" position. Replace the front panel in its correct position.
- 14) Allow the water system to drain for 5 minutes.
- 15) 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 to supply water to the reservoir.
- 17) After the gear motor starts, remove the front panel. Move the power switch to the "OFF" position. Move the control switch to the "DRAIN" position, then move the power switch back to the "ON" position. Replace the front panel in its correct position.
- 18) Allow the water system to drain for 5 minutes.  
Note: If you do not sanitize the unit, go to step 14 in "III.A.5. Sanitizing Procedure - Final."
- 19) Remove the front panel. Move the power switch to the "OFF" position, then unplug the unit from the electrical outlet. 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 switch is in the "OFF" position, the unit is unplugged from the electrical outlet, and the water supply line shut-off valve is closed. Remove the panels.
- 2) Remove the strap connecting the spout to the chute assembly, then remove the spout. Remove the rubber O-ring and nylon O-ring at the top of the cylinder and also remove the packing and chute bracket between the spout and 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) Replace all panels except the front panel in their correct positions. Move the control switch to the "ICE" position, then plug the unit back in. Move the power switch to the "ON" position, then replace the front panel in its correct position. Make ice using the solution until the icemaker stops making ice.
- 13) Remove the front panel, then move the power switch to the "OFF" position. Move the control switch to the "DRAIN" position, then move the power switch back to the "ON" position. Replace the front panel in its correct position.
- 14) Allow the water system to drain for 5 minutes.
- 15) Remove the front panel. Move the power switch to the "OFF" position, then unplug the unit from the electrical outlet.

### **5. Sanitizing Procedure - Final**

- 1) Mix a new batch of the sanitizing solution.
- 2) Make sure the power switch is in the "OFF" position, the unit is unplugged from the electrical outlet, and the water supply line shut-off valve is closed. Remove the top panel.
- 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) Replace the top panel in its correct position. Move the control switch to the "ICE" position, then plug the unit back in. Move the power switch to the "ON" position, then replace the front panel in its correct position. Make ice using the solution until the icemaker stops making ice.
- 8) Remove the front panel, then move the power switch to the "OFF" position. Move the control switch to the "DRAIN" position, then move the power switch back to the "ON" position. Replace the front panel in its correct position.
- 9) Allow the water system to drain for 5 minutes.
- 10) 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 to supply water to the reservoir.
- 12) After the gear motor starts, remove the front panel. Move the power switch to the "OFF" position. Move the control switch to the "DRAIN" position, then move the power switch back to the "ON" position. Replace the front panel in its correct position.
- 13) Allow the water system to drain for 5 minutes.
- 14) Remove the front panel. Move the control switch to the "ICE" position, then replace the front panel in its correct position.
- 15) Allow the icemaker to run for about 30 minutes, then remove the front panel. Move the power switch to the "OFF" position, then unplug the unit from the electrical outlet.
- 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) Plug the unit back in. Make sure the control switch is in the "ICE" position, then move the power switch to the "ON" position 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](http://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 this icemaker.
2. Move the power switch to the "OFF" position and unplug the unit from the electrical outlet before servicing.

Maintenance Schedule		
Frequency	Area	Task
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	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) 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.
- 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) Move the power switch to the "OFF" position. Move the control switch to the "DRAIN" position, then move the power switch back to the "ON" position. Replace the front panel in its correct position.
- 2) Allow the water system to drain for 5 minutes.
- 3) Remove the front panel, then move the power switch to the "OFF" position.
- 4) Remove the evaporator drain line hose from the evaporator and attach a compressed air or carbon dioxide supply to the hose.
- 5) 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.
- 6) Move the power switch to the "OFF" position, then reconnect the evaporator drain line hose.
- 7) Move the control switch to the "ICE" position. Replace the front panel in its correct position, then unplug the unit from the electrical outlet.
- 8) Remove all ice from the dispenser unit/storage bin. Clean the dispenser unit/storage bin liner using a neutral cleaner. Rinse thoroughly after cleaning.