

Hoshizaki America, Inc.

Modular Crescent Cuber

Models

KM-90 IMAH

KM-90 IMWH

KM-90 IMRH/3



“A Superior Degree
of Reliability”

www.hoshizaki.com

SERVICE MANUAL



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IMPORTANT

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

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

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

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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.

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Important Safety Information

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

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

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

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

⚠ WARNING

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

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

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

I. Specifications

A. Ice maker

1a. KM-901MAH (air-cooled) Auxiliary Code T-0, U-0

AC SUPPLY VOLTAGE	208-230/60/1 (3 wire with netrual for 115V)			
AMPERAGE	11.4 A (5 Min. Freeze AT 104°F / WT 80°F)			
MINIMUM CIRCUIT AMPACITY	20 A			
MAXIMUM FUSE SIZE	20 A			
APPROXIMATE ICE PRODUCTION PER 24 HR. lbs./day (kg/day) Reference without *marks	Ambient Temp.(°F)	WATER TEMP. (°F)		
		50	70	90
	70	*874 (396)	832 (378)	785 (356)
	80	842 (382)	778 (353)	736 (334)
	90	832 (378)	*732 (332)	687 (312)
	100	826 (375)	721 (327)	646 (293)
SHAPE OF ICE	Crescent Cube			
ICE PRODUCTION PER CYCLE	13.6 lbs. (6.2 kg) 720pcs.			
APPROXIMATE STORAGE CAPACITY	N/A			
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F		
ELECTRIC W (kWH/100 lbs.)	1710(5.6)	1600(4.4)		
WATER gal./24HR (gal./100 lbs.)	143(19.6)	240(27.5)		
EXTERIOR DIMENSIONS (WxDxH)	30" x 27-3/8" x 37-7/16" (762 x 695 x 950 mm)			
EXTERIOR FINISH	Stainless Steel, Galvanized Steel (Rear)			
WEIGHT	Net 196 lbs. (89 kg), Shipping 256 lbs. (116 kg)			
CONNECTIONS - ELECTRIC	Permanent - Connection			
- WATER SUPPLY	Inlet	1/2" FPT		
- DRAIN	Outlet	3/4" FPT		
		3/8" OD Tube		
CUBE CONTROL SYSTEM	Float Switch			
HARVESTING CONTROL SYSTEM	Hot Gas and Water, Thermistor and Timer			
ICE MAKING WATER CONTROL	Timer Controlled. Overflow Pipe			
COOLING WATER CONTROL	N/A			
BIN CONTROL SYSTEM	Thermostat			
COMPRESSOR	Hermetic, Model CS12K6E-PFV-237			
CONDENSER	Air-Cooled , Fin and tube type			
EVAPORATOR	Vertical type, Stainless Steel and Copper			
REFRIGERANT CONTROL	Thermostatic Expansion Valve			
REFRIGERANT CHARGE	R404A, 2 lb. 15 oz. (1320g)			
DESIGN PRESSURE	High 467PSIG, Low 230PSIG			
P.C. BOARD CIRCUIT PROTECTION	High Voltage Cut-out (Internal)			
COMPRESSOR PROTECTION	Auto-reset Overload Protector (Internal)			
REFRIGERANT CIRCUIT PROTECTION	Auto-reset High Pressure Control Switch			
LOW WATER PROTECTION	Float Switch			
ACCESSORIES -SUPPLIED	N/A			
-REQUIRED	Ice Storage Bin			
OPERATING CONDITIONS	VOLTAGE RANGE	187 - 253 V		
	AMBIENT TEMP.	45 -100° F		
	WATER SUPPLY TEMP.	45 - 90° F		
	WATER SUPPLY PRESSURE	10 - 113 PSIG		

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

1b. KM-901MAH (air-cooled) Auxiliary Code U-1 and Later

AC SUPPLY VOLTAGE	208-230/60/1 (3 wire with netrual for 115V)			
AMPERAGE	11.4 A (5 Min. Freeze AT 104°F / WT 80°F)			
MINIMUM CIRCUIT AMPACITY	20 A			
MAXIMUM FUSE SIZE	20 A			
APPROXIMATE ICE PRODUCTION PER 24 HR. lbs./day (kg/day) Reference without *marks	Ambient Temp.(°F)	WATER TEMP. (°F)		
		50	70	90
	70	*874 (396)	832 (378)	785 (356)
	80	842 (382)	778 (353)	736 (334)
	90	832 (378)	*732 (332)	687 (312)
	100	826 (375)	721 (327)	646 (293)
SHAPE OF ICE	Crescent Cube			
ICE PRODUCTION PER CYCLE	13.6 lbs. (6.2 kg) 720pcs.			
APPROXIMATE STORAGE CAPACITY	N/A			
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F		
ELECTRIC W (kWH/100 lbs.)	1710(5.6)	1600(4.4)		
WATER gal./24HR (gal./100 lbs.)	143(19.6)	240(27.5)		
EXTERIOR DIMENSIONS (WxDxH)	30" x 27-3/8" x 37-7/16" (762 x 695 x 950 mm)			
EXTERIOR FINISH	Stainless Steel, Galvanized Steel (Rear)			
WEIGHT	Net 196 lbs. (89 kg), Shipping 256 lbs. (116 kg)			
CONNECTIONS - ELECTRIC	Permanent - Connection			
- WATER SUPPLY	Inlet	1/2" FPT		
- DRAIN	Outlet	3/4" FPT		
		3/8" OD Tube		
CUBE CONTROL SYSTEM	Float Switch			
HARVESTING CONTROL SYSTEM	Hot Gas and Water, Thermistor and Timer			
ICE MAKING WATER CONTROL	Timer Controlled. Overflow Pipe			
COOLING WATER CONTROL	N/A			
BIN CONTROL SYSTEM	Mechanical Switch			
COMPRESSOR	Hermetic, Model CS12K6E-PFV-237			
CONDENSER	Air-Cooled , Fin and tube type			
EVAPORATOR	Vertical type, Stainless Steel and Copper			
REFRIGERANT CONTROL	Thermostatic Expansion Valve			
REFRIGERANT CHARGE	R404A, 2 lb. 15 oz. (1320g)			
DESIGN PRESSURE	High 467PSIG, Low 230PSIG			
P.C. BOARD CIRCUIT PROTECTION	High Voltage Cut-out (Internal)			
COMPRESSOR PROTECTION	Auto-reset Overload Protector (Internal)			
REFRIGERANT CIRCUIT PROTECTION	Auto-reset High Pressure Control Switch			
LOW WATER PROTECTION	Float Switch			
ACCESSORIES -SUPPLIED	N/A			
-REQUIRED	Ice Storage Bin			
OPERATING CONDITIONS	VOLTAGE RANGE	187 - 253 V		
	AMBIENT TEMP.	45 -100° F		
	WATER SUPPLY TEMP.	45 - 90° F		
	WATER SUPPLY PRESSURE	10 - 113 PSIG		

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

2a. KM-901MWH (water-cooled) Auxiliary Code T-0, U-0

AC SUPPLY VOLTAGE	208-230/60/1 (3 wire with netrual for 115V)			
AMPERAGE	8.7A (5 Min. Freeze AT 104°F / WT 80°F)			
MINIMUM CIRCUIT AMPACITY	15 A			
MAXIMUM FUSE SIZE	15 A			
APPROXIMATE ICE PRODUCTION PER 24 HR. lbs./day (kg/day) Reference without *marks	Ambient	WATER TEMP. (°F)		
	Temp.(°F)	50	70	90
	70	*912 (414)	889 (403)	849 (385)
	80	895 (406)	860 (390)	815 (370)
	90	889 (403)	*835 (379)	791 (359)
	100	878 (398)	825 (374)	751 (341)
SHAPE OF ICE	Crescent Cube			
ICE PRODUCTION PER CYCLE	13.4 lbs. (6.1 kg) 720pcs.			
APPROXIMATE STORAGE CAPACITY	N/A			
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F		
ELECTRIC W (kWH/100 lbs.)	1570(4.5)	1480(3.9)		
WATER gal./24HR (gal./100 lbs.)	182(21.8)	245(26.9)		
WATER COOLED CONDENSER gal./24HR (gal./100 lbs.)	1162(139)	631(69)		
EXTERIOR DIMENSIONS (WxDxH)	30" x 27-3/8" x 37-7/16" (762 x 695 x 950 mm)			
EXTERIOR FINISH	Stainless Steel, Galvanized Steel (Rear)			
WEIGHT	Net 189 lbs. (86 kg), Shipping 249 lbs. (113 kg)			
CONNECTIONS - ELECTRIC	Permanent - Connection			
- WATER SUPPLY	Inlet	1/2" FPT	Cond. Inlet 1/2" FPT	
- DRAIN	Outlet	3/4" FPT	Cond. Outlet 3/8" FPT	
		3/8" OD Tube		
CUBE CONTROL SYSTEM	Float Switch			
HARVESTING CONTROL SYSTEM	Hot Gas and Water, Thermistor and Timer			
ICE MAKING WATER CONTROL	Timer Controlled. Overflow Pipe			
COOLING WATER CONTROL	Pressure Regulator			
BIN CONTROL SYSTEM	Thermostat			
COMPRESSOR	Hermetic, Model CS12K6E-PFV-237			
CONDENSER	Water-cooled, Tube in tube type			
EVAPORATOR	Vertical type, Stainless Steel and Copper			
REFRIGERANT CONTROL	Thermostatic Expansion Valve			
REFRIGERANT CHARGE	R404A, 1 lb. 15.4 oz. (890g)			
DESIGN PRESSURE	High 427PSIG, Low 230PSIG			
P.C. BOARD CIRCUIT PROTECTION	High Voltage Cut-out (Internal)			
COMPRESSOR PROTECTION	Auto-reset Overload Protector (Internal)			
REFRIGERANT CIRCUIT PROTECTION	Auto-reset High Pressure Control Switch			
LOW WATER PROTECTION	Float Switch			
ACCESSORIES -SUPPLIED	N/A			
-REQUIRED	Ice Storage Bin			
OPERATING CONDITIONS	VOLTAGE RANGE	187 - 253 V		
	AMBIENT TEMP.	45 -100° F		
	WATER SUPPLY TEMP.	45 - 90° F		
	WATER SUPPLY PRESSURE	10 - 113 PSIG		

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

2b. KM-901MWH (water-cooled) Auxiliary Code U-1 and Later

AC SUPPLY VOLTAGE	208-230/60/1 (3 wire with neutral for 115V)			
AMPERAGE	8.7A (5 Min. Freeze AT 104°F / WT 80°F)			
MINIMUM CIRCUIT AMPACITY	15 A			
MAXIMUM FUSE SIZE	15 A			
APPROXIMATE ICE PRODUCTION PER 24 HR. lbs./day (kg/day) Reference without *marks	Ambient Temp.(°F)	WATER TEMP. (°F)		
		50	70	90
	70	*912 (414)	889 (403)	849 (385)
	80	895 (406)	860 (390)	815 (370)
	90	889 (403)	*835 (379)	791 (359)
	100	878 (398)	825 (374)	751 (341)
SHAPE OF ICE	Crescent Cube			
ICE PRODUCTION PER CYCLE	13.4 lbs. (6.1 kg) 720pcs.			
APPROXIMATE STORAGE CAPACITY	N/A			
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F		
ELECTRIC W (kWH/100 lbs.)	1570(4.5)	1480(3.9)		
WATER gal./24HR (gal./100 lbs.)	182(21.8)	245(26.9)		
WATER COOLED CONDENSER gal./24HR (gal./100 lbs.)	1162(139)	631(69)		
EXTERIOR DIMENSIONS (WxDxH)	30" x 27-3/8" x 37-7/16" (762 x 695 x 950 mm)			
EXTERIOR FINISH	Stainless Steel, Galvanized Steel (Rear)			
WEIGHT	Net 189 lbs. (86 kg), Shipping 249 lbs. (113 kg)			
CONNECTIONS - ELECTRIC	Permanent - Connection			
- WATER SUPPLY	Inlet	1/2" FPT	Cond. Inlet 1/2" FPT	
- DRAIN	Outlet	3/4" FPT	Cond. Outlet 3/8" FPT	
		3/8" OD Tube		
CUBE CONTROL SYSTEM	Float Switch			
HARVESTING CONTROL SYSTEM	Hot Gas and Water, Thermistor and Timer			
ICE MAKING WATER CONTROL	Timer Controlled. Overflow Pipe			
COOLING WATER CONTROL	Pressure Regulator			
BIN CONTROL SYSTEM	Mechanical Switch			
COMPRESSOR	Hermetic, Model CS12K6E-PFV-237			
CONDENSER	Water-cooled, Tube in tube type			
EVAPORATOR	Vertical type, Stainless Steel and Copper			
REFRIGERANT CONTROL	Thermostatic Expansion Valve			
REFRIGERANT CHARGE	R404A, 1 lb. 15.4 oz. (890g)			
DESIGN PRESSURE	High 427PSIG, Low 230PSIG			
P.C. BOARD CIRCUIT PROTECTION	High Voltage Cut-out (Internal)			
COMPRESSOR PROTECTION	Auto-reset Overload Protector (Internal)			
REFRIGERANT CIRCUIT PROTECTION	Auto-reset High Pressure Control Switch			
LOW WATER PROTECTION	Float Switch			
ACCESSORIES -SUPPLIED	N/A			
-REQUIRED	Ice Storage Bin			
OPERATING CONDITIONS	VOLTAGE RANGE	187 - 253 V		
	AMBIENT TEMP.	45 -100° F		
	WATER SUPPLY TEMP.	45 - 90° F		
	WATER SUPPLY PRESSURE	10 - 113 PSIG		

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

3a. KM-901MRH (remote air-cooled) Auxiliary Code T-0, U-0

AC SUPPLY VOLTAGE	208-230/60/1 (3 wire with netrual for 115V)			
AMPERAGE	11.6A (5 Min. Freeze AT 104°F / WT 80°F)			
MINIMUM CIRCUIT AMPACITY	20 A			
MAXIMUM FUSE SIZE	20 A			
APPROXIMATE ICE PRODUCTION PER 24 HR. lbs./day (kg/day) Reference without *marks	Ambient	WATER TEMP. (°F)		
	Temp.(°F)	50	70	90
	70	*889 (403)	859 (389)	803 (364)
	80	866 (393)	818 (371)	755 (343)
	90	859 (389)	*785 (356)	724 (328)
	100	843 (382)	771 (350)	668 (303)
SHAPE OF ICE	Crescent Cube			
ICE PRODUCTION PER CYCLE	13.5 lbs. (6.1 kg) 720pcs.			
APPROXIMATE STORAGE CAPACITY	N/A			
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F		
ELECTRIC W (kWH/100 lbs.)	1770(5.4)	1590(4.3)		
WATER gal./24HR (gal./100 lbs.)	152(19.3)	246(27.7)		
EXTERIOR DIMENSIONS (WxDxH)	30" x 27-3/8" x 37-7/16" (762 x 695 x 950 mm)			
EXTERIOR FINISH	Stainless Steel, Galvanized Steel (Rear)			
WEIGHT	Net 189 lbs. (86 kg), Shipping 249 lbs. (113 kg)			
CONNECTIONS - ELECTRIC	Permanent - Connection			
- WATER SUPPLY	Inlet	1/2" FPT		
- DRAIN	Outlet	3/4" FPT		
		3/8" OD Tube		
CUBE CONTROL SYSTEM	Float Switch			
HARVESTING CONTROL SYSTEM	Hot Gas and Water, Thermistor and Timer			
ICE MAKING WATER CONTROL	Timer Controlled. Overflow Pipe			
COOLING WATER CONTROL	N/A			
BIN CONTROL SYSTEM	Thermostat			
COMPRESSOR	Hermetic, Model CS12K6E-PFV-279			
CONDENSER	Air-Cooled Remote, Condenser Unit URC-9F			
EVAPORATOR	Vertical type, Stainless Steel and Copper			
REFRIGERANT CONTROL	Thermostatic Expansion Valve			
	Condensing Pressure Regulator on URC-9F			
REFRIGERANT CHARGE	R404A, 9 lbs. 4 oz. (4200g) (Icemaker 5 lbs. 5 oz. Cond. Unit 3 lbs. 15 oz.)			
DESIGN PRESSURE	High 467PSIG, Low 230PSIG			
P.C. BOARD CIRCUIT PROTECTION	High Voltage Cut-out (Internal)			
COMPRESSOR PROTECTION	Auto-reset Overload Protector (Internal)			
REFRIGERANT CIRCUIT PROTECTION	Auto-reset High Pressure Control Switch			
LOW WATER PROTECTION	Float Switch			
ACCESSORIES -SUPPLIED	N/A			
-REQUIRED	Ice Storage Bin, Remote Condenser Unit			
OPERATING CONDITIONS	VOLTAGE RANGE	187 - 253 V		
	AMBIENT TEMP.	45 -100° F		
	WATER SUPPLY TEMP.	45 - 90° F		
	WATER SUPPLY PRESSURE	10 - 113 PSIG		

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

3b. KM-901MRH (remote air-cooled) Auxiliary Code U-1 and Later

AC SUPPLY VOLTAGE	208-230/60/1 (3 wire with netrual for 115V)			
AMPERAGE	11.6A (5 Min. Freeze AT 104°F / WT 80°F)			
MINIMUM CIRCUIT AMPACITY	20 A			
MAXIMUM FUSE SIZE	20 A			
APPROXIMATE ICE PRODUCTION PER 24 HR. lbs./day (kg/day) Reference without *marks	Ambient Temp.(°F)	WATER TEMP. (°F)		
		50	70	90
	70	*889 (403)	859 (389)	803 (364)
	80	866 (393)	818 (371)	755 (343)
	90	859 (389)	*785 (356)	724 (328)
	100	843 (382)	771 (350)	668 (303)
SHAPE OF ICE	Crescent Cube			
ICE PRODUCTION PER CYCLE	13.5 lbs. (6.1 kg) 720pcs.			
APPROXIMATE STORAGE CAPACITY	N/A			
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F		
ELECTRIC W (kWH/100 lbs.)	1770(5.4)	1590(4.3)		
WATER gal./24HR (gal./100 lbs.)	152(19.3)	246(27.7)		
EXTERIOR DIMENSIONS (WxDxH)	30" x 27-3/8" x 37-7/16" (762 x 695 x 950 mm)			
EXTERIOR FINISH	Stainless Steel, Galvanized Steel (Rear)			
WEIGHT	Net 189 lbs. (86 kg), Shipping 249 lbs. (113 kg)			
CONNECTIONS - ELECTRIC	Permanent - Connection			
- WATER SUPPLY	Inlet	1/2" FPT		
- DRAIN	Outlet	3/4" FPT		
		3/8" OD Tube		
CUBE CONTROL SYSTEM	Float Switch			
HARVESTING CONTROL SYSTEM	Hot Gas and Water, Thermistor and Timer			
ICE MAKING WATER CONTROL	Timer Controlled. Overflow Pipe			
COOLING WATER CONTROL	N/A			
BIN CONTROL SYSTEM	Mechanical Switch			
COMPRESSOR	Hermetic, Model CS12K6E-PFV-279			
CONDENSER	Air-Cooled Remote, Condenser Unit URC-9F			
EVAPORATOR	Vertical type, Stainless Steel and Copper			
REFRIGERANT CONTROL	Thermostatic Expansion Valve			
	Condensing Pressure Regulator on URC-9F			
REFRIGERANT CHARGE	R404A, 9 lbs. 4 oz. (4200g)			
	(Icemaker 5 lbs. 5 oz. Cond. Unit 3 lbs. 15 oz.)			
DESIGN PRESSURE	High 467PSIG, Low 230PSIG			
P.C. BOARD CIRCUIT PROTECTION	High Voltage Cut-out (Internal)			
COMPRESSOR PROTECTION	Auto-reset Overload Protector (Internal)			
REFRIGERANT CIRCUIT PROTECTION	Auto-reset High Pressure Control Switch			
LOW WATER PROTECTION	Float Switch			
ACCESSORIES -SUPPLIED	N/A			
-REQUIRED	Ice Storage Bin, Remote Condenser Unit			
OPERATING CONDITIONS	VOLTAGE RANGE	187 - 253 V		
	AMBIENT TEMP.	45 -100° F		
	WATER SUPPLY TEMP.	45 - 90° F		
	WATER SUPPLY PRESSURE	10 - 113 PSIG		

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

4a. KM-901MRH3 (remote air-cooled) Auxiliary Code T-0, U-0

AC SUPPLY VOLTAGE	208-230/60/3		
AMPERAGE	7.0A (5 Min. Freeze AT 104°F / WT 80°F)		
MINIMUM CIRCUIT AMPACITY	20 A		
MAXIMUM FUSE SIZE	20 A		
APPROXIMATE ICE PRODUCTION PER 24 HR.	Ambient Temp.(°F)	WATER TEMP. (°F)	
lbs./day (kg/day)		50	70
Reference without *marks	70	*899 (408)	874 (397)
	80	880 (399)	842 (382)
	90	874 (397)	*815 (370)
	100	855 (388)	800 (363)
SHAPE OF ICE	Crescent Cube		
ICE PRODUCTION PER CYCLE	14.2 lbs. (6.4 kg) 720pcs.		
APPROXIMATE STORAGE CAPACITY	N/A		
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F	
ELECTRIC W (kWH/100 lbs.)	1830(5.4)	1670(4.5)	
WATER gal./24HR (gal./100 lbs.)	147(18.0)	254(28.2)	
EXTERIOR DIMENSIONS (WxDxH)	30" x 27-3/8" x 37-7/16" (762 x 695 x 950 mm)		
EXTERIOR FINISH	Stainless Steel, Galvanized Steel (Rear)		
WEIGHT	Net 198 lbs. (90 kg), Shipping 258 lbs. (117 kg)		
CONNECTIONS - ELECTRIC	Permanent - Connection		
- WATER SUPPLY	Inlet	1/2" FPT	
- DRAIN	Outlet	3/4" FPT	
		3/8" OD Tube	
CUBE CONTROL SYSTEM	Float Switch		
HARVESTING CONTROL SYSTEM	Hot Gas and Water, Thermistor and Timer		
ICE MAKING WATER CONTROL	Timer Controlled. Overflow Pipe		
COOLING WATER CONTROL	N/A		
BIN CONTROL SYSTEM	Thermostat		
COMPRESSOR	Hermetic, Model CS12K6E-TF5-279		
CONDENSER	Air-Cooled Remote, Condenser Unit URC-9F		
EVAPORATOR	Vertical type, Stainless Steel and Copper		
REFRIGERANT CONTROL	Thermostatic Expansion Valve		
	Condensing Pressure Regulator on URC-9F		
REFRIGERANT CHARGE	R404A, 9 lbs. 4 oz. (4200g)		
	(Icemaker 5 lbs. 5 oz. Cond. Unit 3 lbs. 15 oz.)		
DESIGN PRESSURE	High 467PSIG, Low 230PSIG		
P.C. BOARD CIRCUIT PROTECTION	High Voltage Cut-out (Internal)		
COMPRESSOR PROTECTION	Auto-reset Overload Protector (Internal)		
REFRIGERANT CIRCUIT PROTECTION	Auto-reset High Pressure Control Switch		
LOW WATER PROTECTION	Float Switch		
ACCESSORIES -SUPPLIED	N/A		
-REQUIRED	Ice Storage Bin, Remote Condenser Unit		
OPERATING CONDITIONS	VOLTAGE RANGE	187 - 253 V	
	AMBIENT TEMP.	45 -100° F	
	WATER SUPPLY TEMP.	45 - 90° F	
	WATER SUPPLY PRESSURE	10 - 113 PSIG	

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

4b. KM-901MRH (remote air-cooled) Auxiliary Code U-1 and Later

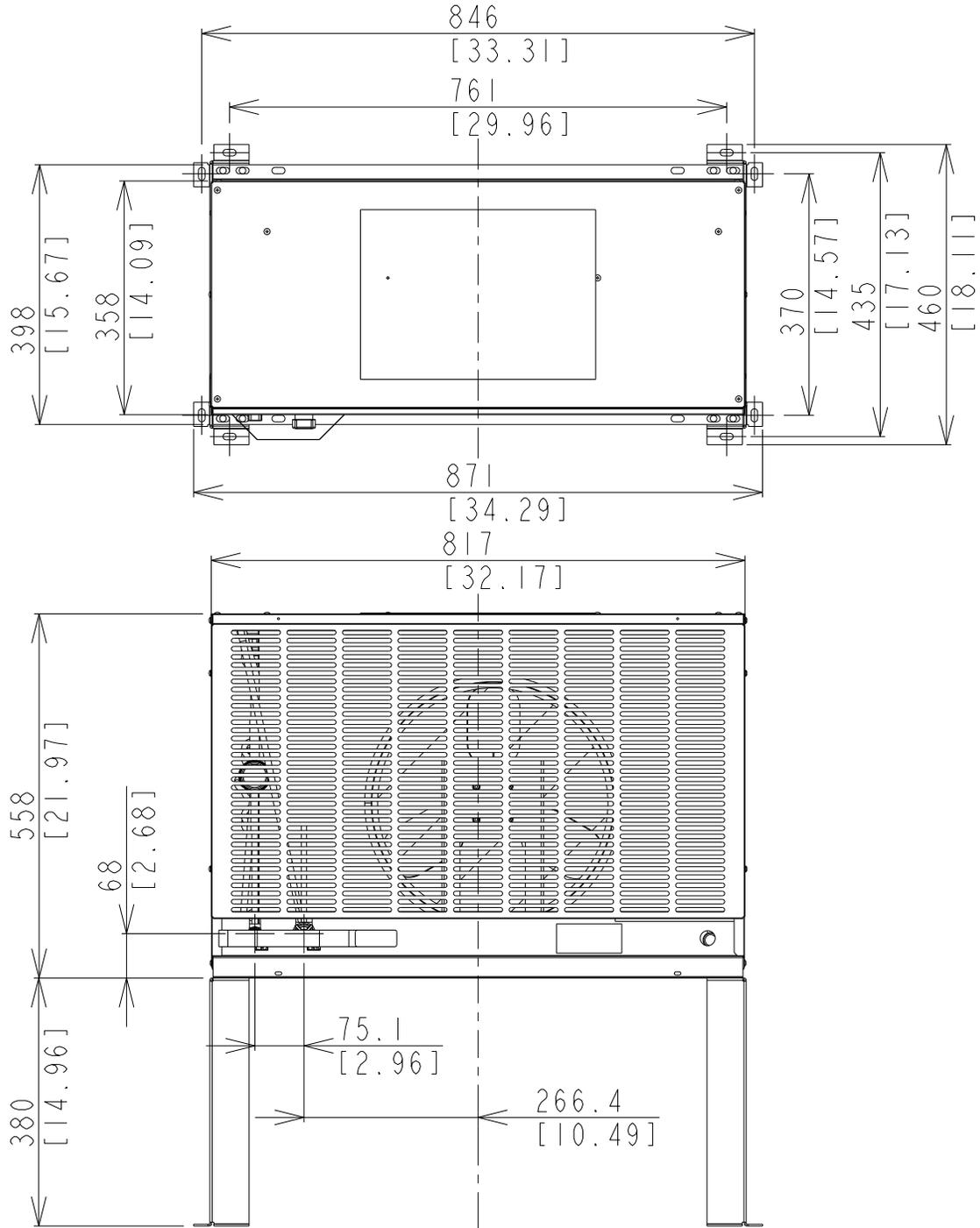
AC SUPPLY VOLTAGE	208-230/60/3		
AMPERAGE	7.0A (5 Min. Freeze AT 104°F / WT 80°F)		
MINIMUM CIRCUIT AMPACITY	20 A		
MAXIMUM FUSE SIZE	20 A		
APPROXIMATE ICE PRODUCTION PER 24 HR.	Ambient Temp.(°F)	WATER TEMP. (°F)	
lbs./day (kg/day)		50	70
Reference without *marks	70	*899 (408)	874 (397)
	80	880 (399)	842 (382)
	90	874 (397)	*815 (370)
	100	855 (388)	800 (363)
SHAPE OF ICE	Crescent Cube		
ICE PRODUCTION PER CYCLE	14.2 lbs. (6.4 kg) 720pcs.		
APPROXIMATE STORAGE CAPACITY	N/A		
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F	
ELECTRIC W (kWH/100 lbs.)	1830(5.4)	1670(4.5)	
WATER gal./24HR (gal./100 lbs.)	147(18.0)	254(28.2)	
EXTERIOR DIMENSIONS (WxDxH)	30" x 27-3/8" x 37-7/16" (762 x 695 x 950 mm)		
EXTERIOR FINISH	Stainless Steel, Galvanized Steel (Rear)		
WEIGHT	Net 198 lbs. (90 kg), Shipping 258 lbs. (117 kg)		
CONNECTIONS - ELECTRIC	Permanent - Connection		
- WATER SUPPLY	Inlet	1/2" FPT	
- DRAIN	Outlet	3/4" FPT	
		3/8" OD Tube	
CUBE CONTROL SYSTEM	Float Switch		
HARVESTING CONTROL SYSTEM	Hot Gas and Water, Thermistor and Timer		
ICE MAKING WATER CONTROL	Timer Controlled. Overflow Pipe		
COOLING WATER CONTROL	N/A		
BIN CONTROL SYSTEM	Mechanical Switch		
COMPRESSOR	Hermetic, Model CS12K6E-TF5-279		
CONDENSER	Air-Cooled Remote, Condenser Unit URC-9F		
EVAPORATOR	Vertical type, Stainless Steel and Copper		
REFRIGERANT CONTROL	Thermostatic Expansion Valve		
	Condensing Pressure Regulator on URC-9F		
REFRIGERANT CHARGE	R404A, 9 lbs. 4 oz. (4200g)		
	(Icemaker 5 lbs. 5 oz. Cond. Unit 3 lbs. 15 oz.)		
DESIGN PRESSURE	High 467PSIG, Low 230PSIG		
P.C. BOARD CIRCUIT PROTECTION	High Voltage Cut-out (Internal)		
COMPRESSOR PROTECTION	Auto-reset Overload Protector (Internal)		
REFRIGERANT CIRCUIT PROTECTION	Auto-reset High Pressure Control Switch		
LOW WATER PROTECTION	Float Switch		
ACCESSORIES -SUPPLIED	N/A		
-REQUIRED	Ice Storage Bin, Remote Condenser Unit		
OPERATING CONDITIONS	VOLTAGE RANGE	187 - 253 V	
	AMBIENT TEMP.	45 -100° F	
	WATER SUPPLY TEMP.	45 - 90° F	
	WATER SUPPLY PRESSURE	10 - 113 PSIG	

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

B. Condenser Unit

1. URC-9F

Unit: mm [in.]



Specifications

MODEL: URC-9F

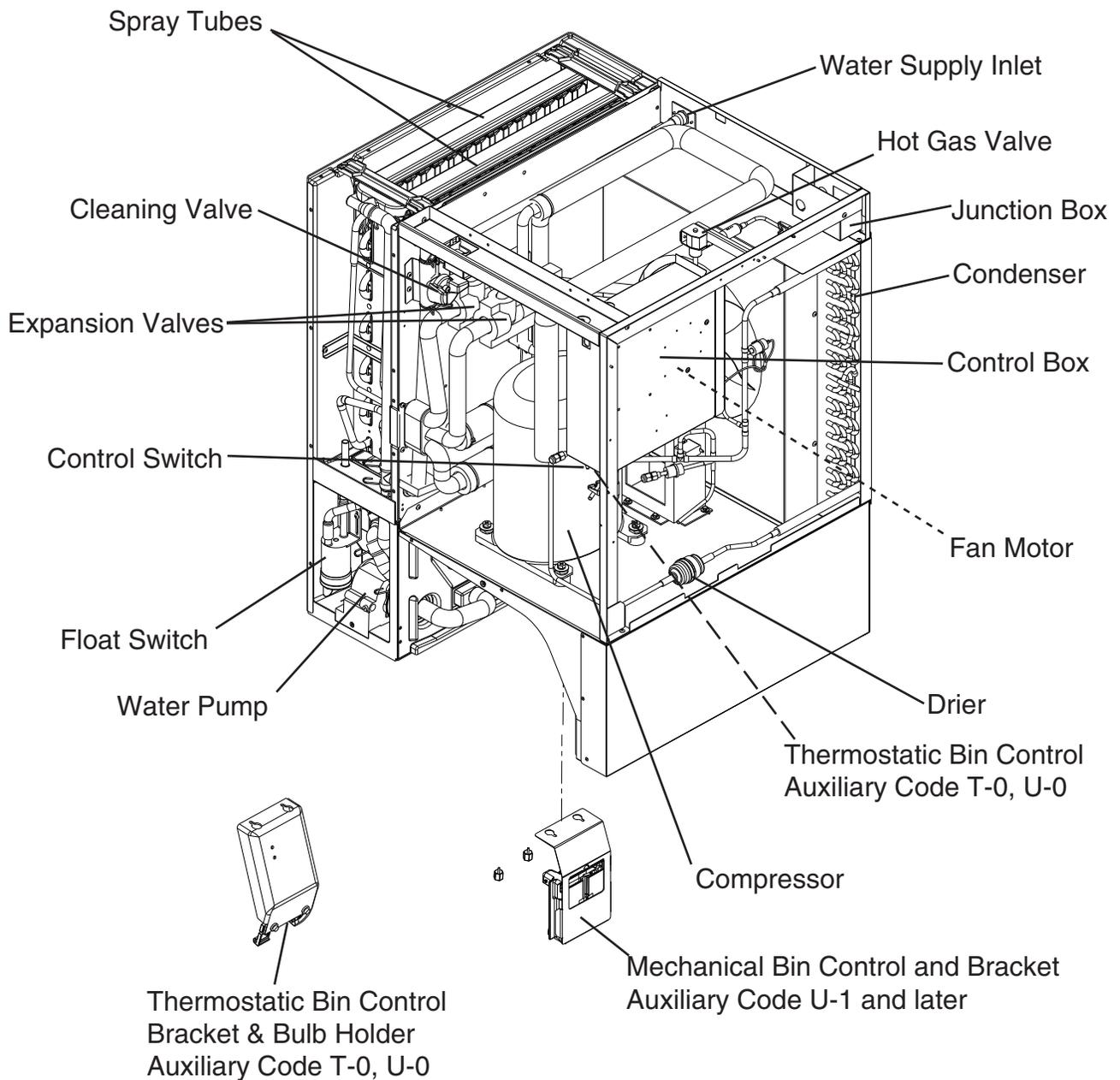
AC SUPPLY VOLTAGE	115/60/1 (Connection to Icemaker)		
FAN MOTOR	115 V	Total 1.3FLA	65W
EXTERIOR DIMENSIONS (WxDxH)	32-3/16" x 15-11/16" x 21-15/16" (817 x 398 x 558 mm)		
DIMENSIONS INCLUDING LEGS (WxDxH)	34-5/16" x 18-1/8" x 36-15/16" (871 x 460 x 938 mm)		
EXTERIOR FINISH	Galvanized Steel		
WEIGHT	Net 81 lbs. (37 kg)	Shipping 92 lbs. (42 kg)	
CONNECTIONS - ELECTRIC	Permanent - Connection		
- REFRIGERANT	Discharge Line 1-1/16"-12 UNF Fitting (#10 AEROQUIP)		
	Liquid Line	5/8"-18 UNF Fitting (#6 AEROQUIP)	
CONDENSER	Air-cooled, Fin and tube type		
FAN MOTOR PROTECTION	Thermal Protection		
REFRIGERANT CONTROL	Condensing Pressure Regulator		
REFRIGERANT CHARGE	R-404A	3 lbs. 14.8 oz. (1780g)	
DESIGN PRESSURE	High 467 PSIG		
OPERATING CONDITIONS	VOLTAGE RANGE	104 ~ 127 V	
	AMBIENT TEMP.	-20 ~ 122 °F	
ACCESSORIES -SUPPLIED	Leg		2 pcs
	Hex. Head Bolt w/Washer	8 x 16	8 pcs
	Hex. Nut	8	8 pcs

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

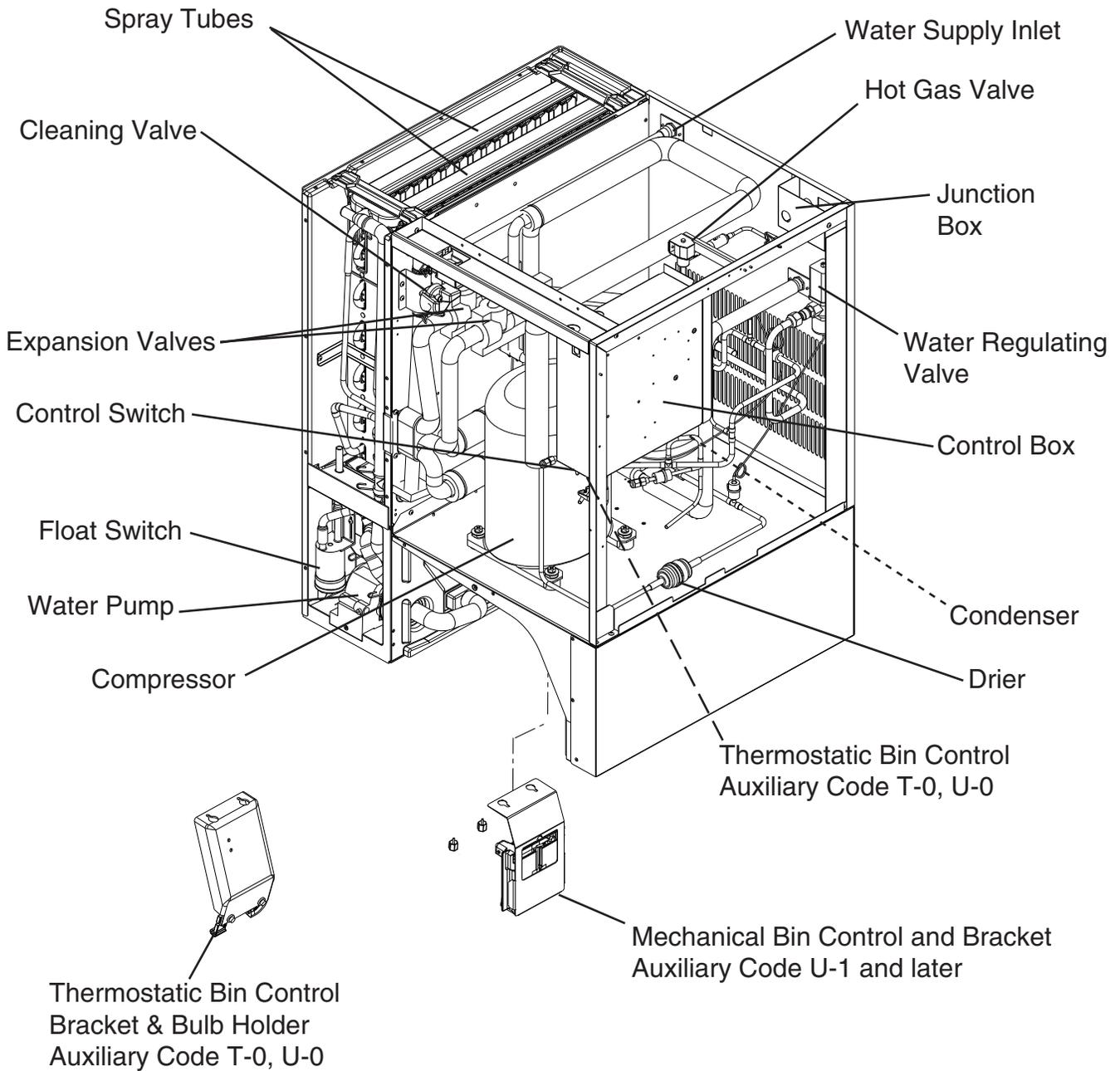
II. General Information

A. Construction

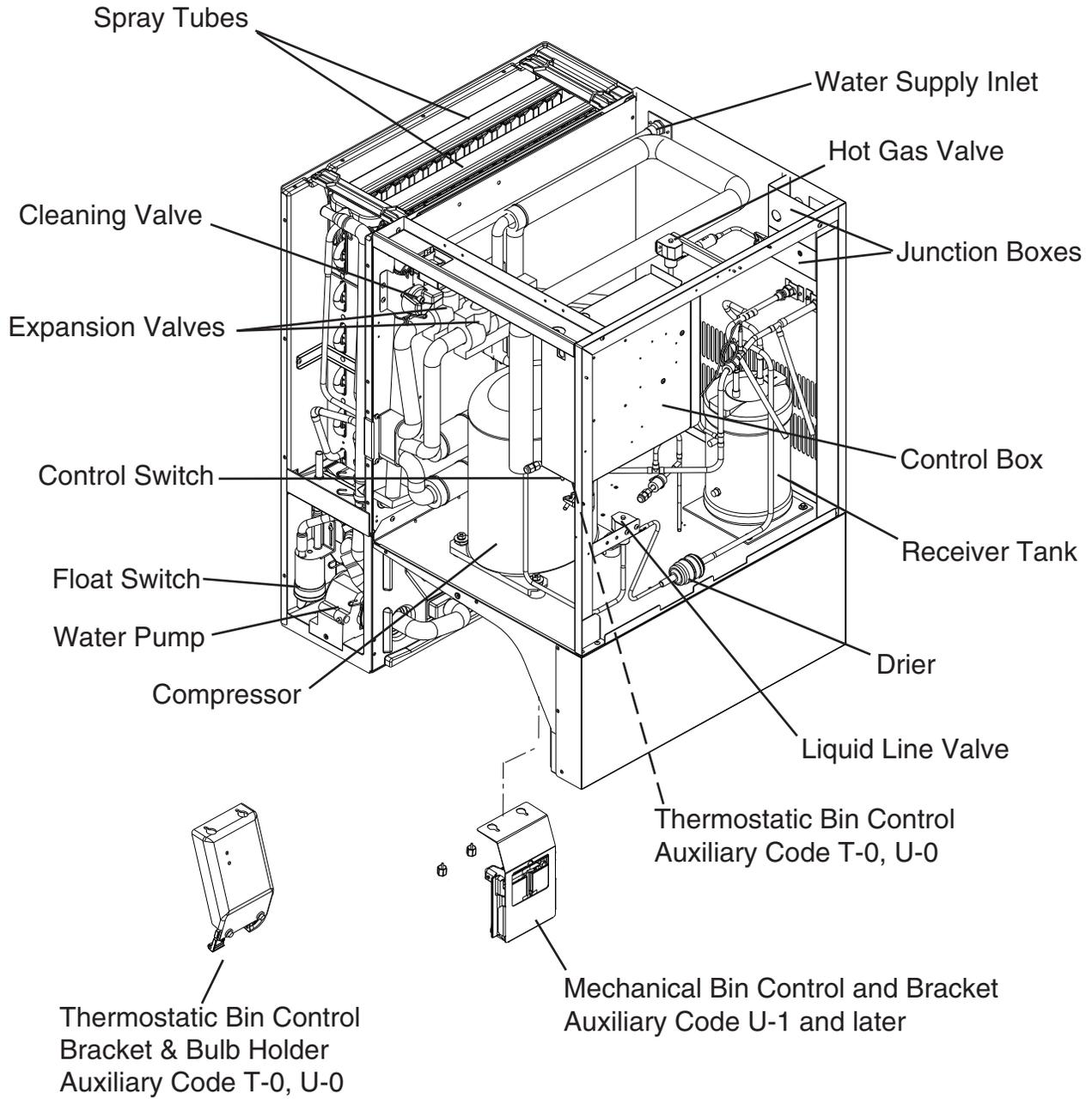
1. KM-901MAH (air-cooled)



2. KM-901MWH (water-cooled)



3. KM-901MRH/3 (remote air-cooled)



B. Sequence of Operation

1. Sequence Cycles and Shutdown

a) "E" Control Board: Auxiliary Code T-0, U-0

The steps in the sequence are as outlined below. When power is supplied, CB red "POWER OK" LED comes on. There is a 5-second delay before startup. Note that the order of the component LEDs from the outer edge of CB is 1, 4, 3, 2.

(1) 1-Minute Fill Cycle

LED 4 is on. WV energizes and the 1-minute fill cycle begins. After 1 minute, CB checks for a closed F/S. If F/S is closed, the harvest cycle begins. If not, WV remains energized through additional 1-minute fill cycles until water fills the tank and closes F/S. This serves as a low water safety to protect PM.

(2) Initial Harvest Cycle

LEDs 1, 4, and 2 are on. WV remains energized, Comp, FMR, HGV energize. CB monitors the warming of the evaporator via the thermistor located on the suction line. When the thermistor reaches 48°F (9°C), CB reads a 3.9 kΩ signal from the thermistor and turns harvest termination over to the harvest timer (S4 dip switch 1 & 2). The harvest timer has settings of 60, 90, 120, and 180 seconds. For details, see "II.C.3.b) Harvest Timer (S4 dip switch 1 & 2)." WV is energized during harvest for a maximum of 6 minutes or the length of harvest, whichever is shorter. LED 4 goes off when WV de-energizes. When the harvest timer expires, the harvest cycle is complete. CB checks the position of F/S and proceeds to the next cycle if it is closed or calls for a 1-minute fill cycle if it is open. The minimum total time allowed by CB for a complete harvest cycle is 2 minutes.

(3) Freeze Cycle

LED 1 is on. Comp and FMR remain energized, PM, FM, and LLV energize, HGV and WV de-energize. For the first 5 minutes, CB will not accept a signal from F/S. This minimum 5-minute freeze time is short cycle protection for Comp. At the end of 5 minutes, F/S assumes control. As ice builds on the evaporator, the water level in the tank lowers. The freeze cycle continues until F/S opens and terminates the cycle.

(4) Pump-Out Cycle

LEDs 1, 3, and 2 are on. LED 4 is on when S4 dip switch 3 & 4 are set to 3 off and 4 on. Comp and FMR remain energized. HGV energizes. WV energizes if S4 dip switch 3 off and 4 on. LLV and FM de-energize. PM stops for 2 seconds then reverses, taking water from the bottom of the tank and forcing pressure against the check valve seat allowing water to go through the check valve and down the drain. At the same time, water flows through the small tube to power flush F/S. When the pump-out timer expires, the pump-out is complete.

The first pump-out occurs after the 1st freeze cycle, then every 10th cycle thereafter. The pump-out frequency is factory set, and generally no adjustment is required. However, where water quality is bad and the icemaker needs a pump-out more often, the pump-out frequency can be adjusted. The pump-out frequency control (S4 dip switch 5 & 6) can be set to have a pump-out occur every cycle, or every 2, 5, or 10 cycles. For details, see "II.C.3.d) Pump-Out Frequency Control (S4 dip switch 5 & 6)."

(5) *Harvest Cycle*

Same as the initial harvest cycle. See "II.B.1.a)(2) Initial Harvest Cycle."

Note: Unit continues to cycle until TBC is satisfied or power is turned off. The unit always restarts at the 1-minute fill cycle.

(6) *Shutdown*

When ice contacts the thermostatic bulb (TBC switch open), TBC shuts down the unit within 10 seconds. TBC is factory set, and generally no adjustment is required. However, adjustment may be needed in some conditions, particularly at higher altitude locations. **CAUTION! Do not adjust S4 dip switch 7 out of the factory default position on this model. This dip switch must be left in the factory default position or this unit will not operate correctly.**

Legend: **CB**—control board; **Comp**—compressor; **FM**—fan motor;

FMR—fan motor-remote; **F/S**—float switch; **HGV**—hot gas valve; **LLV**—liquid line valve; **PM**—pump motor; **TBC**—thermostatic bin control; **WV**—inlet water valve

b) "G" Control Board: Auxiliary Code U-1 and Later

The steps in the sequence are as outlined below. When power is supplied, CB red "POWER OK" LED and green "BC CLOSED" LED come on. There is a 5-second delay before startup. Note that the order of the component LEDs from the outer edge of CB is 1, 4, 3, 2.

(1) *1-Minute Fill Cycle*

LED 4 is on. WV energizes and the 1-minute fill cycle begins. After 1 minute, CB checks for a closed F/S. If F/S is closed, the harvest cycle begins. If not, WV remains energized through additional 1-minute fill cycles until water fills the tank and closes F/S. This serves as a low water safety to protect PM.

(2) *Initial Harvest Cycle*

LEDs 1, 4, and 2 are on. WV remains energized, Comp, FMR, HGV energize. CB monitors the warming of the evaporator via the thermistor located on the suction line. When the thermistor reaches 48°F (9°C), CB reads a 3.9 kΩ signal from the thermistor and turns harvest termination over to the harvest timer (S4 dip switch 1 & 2). The harvest timer has settings of 60, 90, 120, and 180 seconds. For details, see "II.C.3.b) Harvest Timer (S4 dip switch 1 & 2)." WV is energized during harvest for a maximum of 6 minutes or the length of harvest minus 0 or 50 seconds (harvest pump timer (S4 dip switch 7)), whichever is shorter. **CAUTION! Do not adjust S4 dip switch 7 out of the factory default position on this model. This dip switch must be left in the factory default position or this unit will not operate correctly.** For details, see "II.C.3.e) Bin Control Selector/Harvest Pump Timer (S4 dip switch 7)." LED 4 goes off when WV de-energizes. LED 3 comes on and PM energizes and runs for the last 0 or 50 seconds of harvest depending on S4 dip switch 7 setting. When the harvest timer expires, the harvest cycle is complete. CB checks the position of F/S and proceeds to the freeze cycle if it is closed or calls for a 1-minute fill cycle if it is open. The minimum total time allowed by CB for a complete harvest cycle is 2 minutes.

(3) *Freeze Cycle*

LED 1 is on. Comp and FMR remain energized, PM, FM, and LLV energize. HGV and WV de-energize. For the first 5 minutes, CB will not accept a signal from F/S. This minimum 5-minute freeze time is short cycle protection for Comp. At the end of 5 minutes, F/S assumes control. As ice builds on the evaporator, the water level in the tank lowers. The freeze cycle continues until F/S opens and terminates the cycle. There is a 15 second delay before CB acknowledges an open F/S.

(4) *Pump-Out Cycle*

LEDs 1, 3, and 2 are on. LED 4 is on when S4 dip switch 3 & 4 are set to 3 off and 4 on. Comp and FMR remain energized, HGV energizes, WV energizes if S4 dip switch 3 off and 4 on. LLV and FM de-energize. PM stops for 2 seconds then reverses, taking water from the bottom of the tank and forcing pressure against the check valve seat allowing water to go through the check valve and down the drain. At the same time, water flows through the small tube to power flush F/S. When the pump-out timer expires, the pump-out is complete.

The first pump-out occurs after the 11th freeze cycle, then every 10th cycle thereafter. The pump-out frequency control is factory set, and generally no adjustment is required. However, where water quality is bad and the icemaker needs a pump-out more often, the pump-out frequency can be adjusted. The pump-out frequency control (S4 dip switch 5 & 6) can be set to have a pump-out occur every cycle, or every 2, 5, or 10 cycles. Timing of the first pump-out is dependent on S4 dip switch 5 & 6 settings. See the table below. For details, see "II.C.3.d) Pump-Out Frequency Control (S4 dip switch 5 & 6)."

"G" Control Board Settings			
S4 Dip Switch Setting		Pump-Out Frequency	1st Pump-Out
No. 5	No. 6		
OFF	OFF	Every cycle	After 2nd freeze cycle
ON	OFF	Every 2 cycles	After 3rd freeze cycle
OFF	ON	Every 5 cycles	After 6th freeze cycle
ON	ON	Every 10 cycles	After 11th freeze cycle

(5) *Harvest Cycle*

Same as the initial harvest cycle. See "II.B.1.b)(2) Initial Harvest Cycle."

Note: Unit continues to cycle until MBC is satisfied or power is turned off. The unit always restarts at the 1-minute fill cycle.

(6) *Shutdown*

When MBC is activated (MBC open), the yellow "BC OPEN" LED comes on. The unit then shuts down as outlined in the table below.

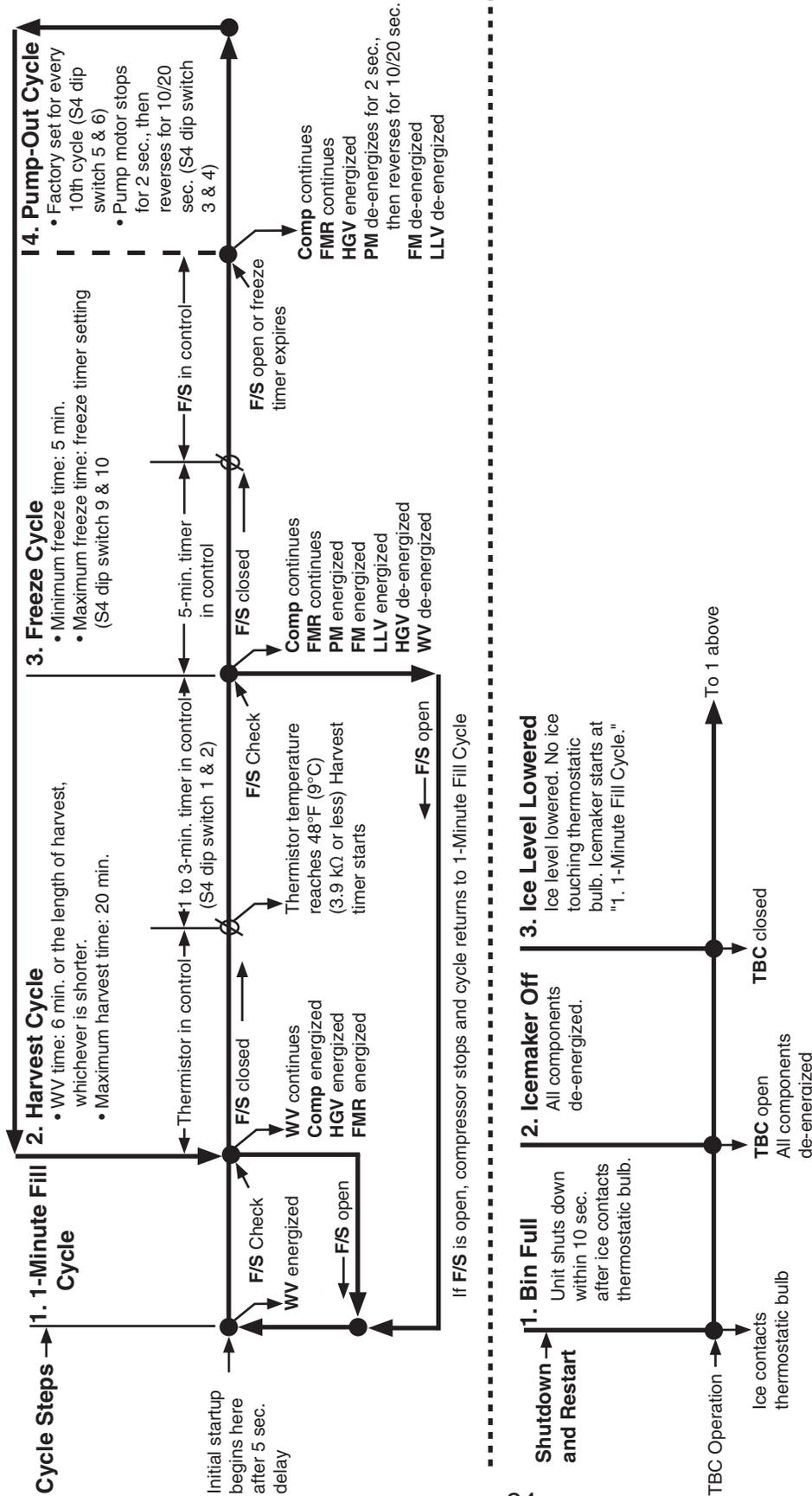
Cycle at Mechanical Bin Control Activation	Shutdown
Fill Cycle	15 seconds after activation.
Harvest Cycle	At the end of the harvest cycle, or up to 15 seconds into the freeze cycle if activated at the end of the harvest cycle.
Freeze Cycle	15 seconds after activation if activated at least 15 seconds before the 5-minute short cycle protection timer expires. Otherwise, at the end of the next harvest cycle.

Legend: **CB**—control board; **Comp**—compressor; **FM**—fan motor;
FMR—fan motor-remote; **F/S**—float switch; **HGV**—hot gas valve; **LLV**—liquid line valve; **MBC**—mechanical bin control; **PM**—pump motor; **WV**—inlet water valve

2. Sequence Flow Chart

a) "E" Control Board: Auxiliary Code T-0, U-0

"E" Control Board Sequence Flow Chart KM-901MAH, KM-901MWH, KM-901MRH/3



Components Energized when the Control Switch is in the "WASH" Position

The "WASH" position on the control switch is used when cleaning and sanitizing the unit. When in the "WASH" position, power is supplied to the pump motor. With the cleaning valve closed, the cleaner and sanitizer flow over the outside of the evaporator plate assembly. With the cleaning valve open, the cleaner and sanitizer flow over both the outside and the inside of the evaporator plate assembly.

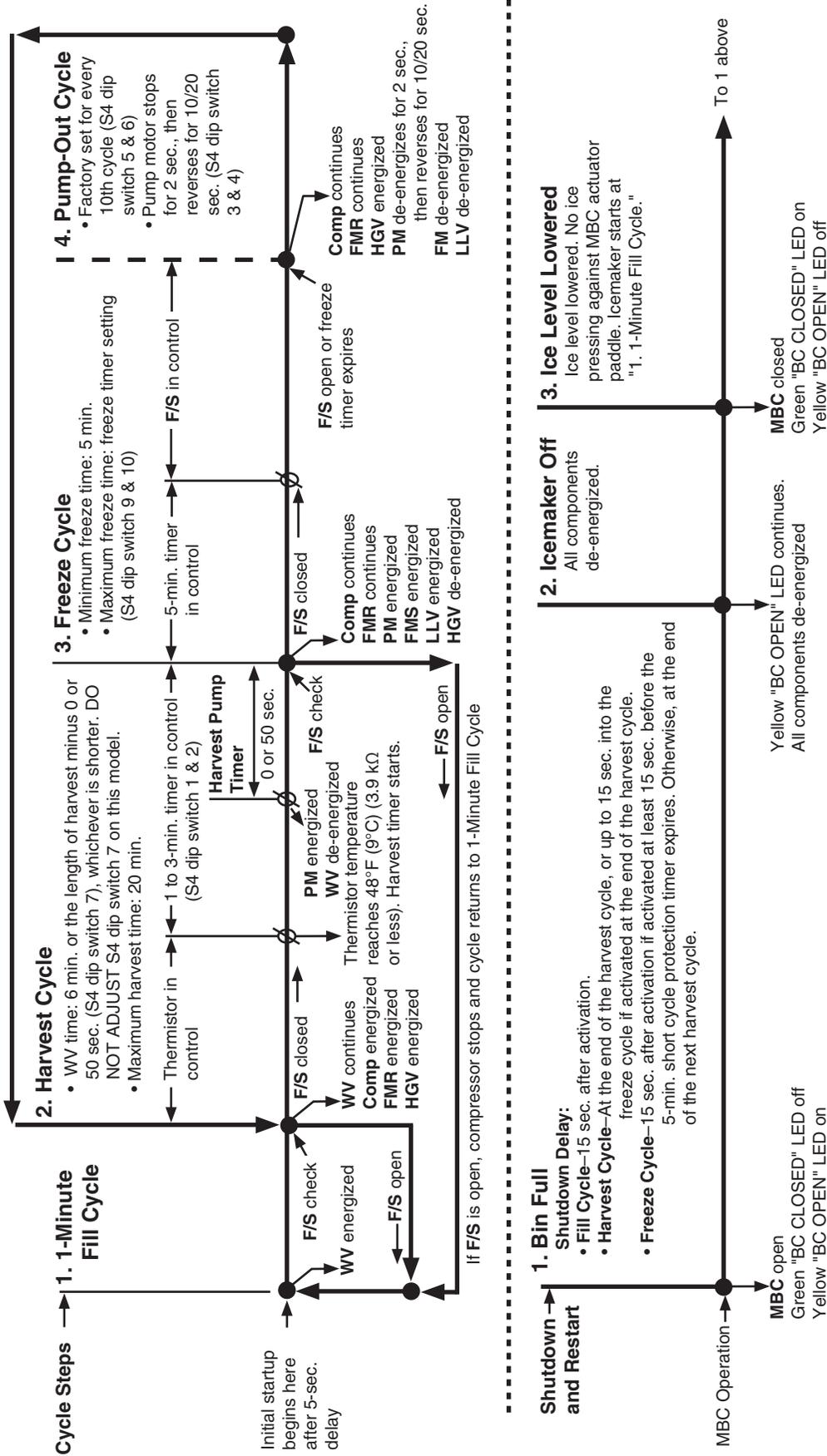
Note: Close the cleaning valve after cleaning and sanitizing are complete, otherwise the unit will not restart when the control switch is placed in the "ICE" position.

Legend:

- Comp—compressor
- FM—fan motor
- FMR—fan motor-remote
- F/S—float switch
- HGV—hot gas valve
- LLV—liquid line valve
- TBC—thermostatic bin control
- PM—pump motor
- WV—inlet water valve

b) "G" Control Board: Auxiliary Code U-1 and Later

**"G" Control Board Sequence Flow Chart
KM-901MAH, KM-901MWH, KM-901MRH/3**



Components Energized when the Control Switch is in the "WASH" Position

The "WASH" position on the control switch is used when cleaning and sanitizing the unit. When in the "WASH" position, power is supplied to the pump motor. With the cleaning valve closed, the cleaner and sanitizer flow over the outside of the evaporator plate assembly. With the cleaning valve open, the cleaner and sanitizer flow over both the outside and the inside of the evaporator plate assembly.

Note: Close the cleaning valve after cleaning and sanitizing are complete, otherwise the unit will not restart when the control switch is placed in the "ICE" position.

Legend:

- Comp—compressor
- FM—fan motor
- FMR—fan motor-remote
- F/S—float switch
- HGV—hot gas valve
- LLV—liquid line valve
- MBC—mechanical bin control
- PM—pump motor
- WV—inlet water valve

C. Control Board

- A Hoshizaki exclusive solid-state control board is employed in KM-901MAH, KM-901MWH, and KM-901MRH/3 Modular Crescent Cubers.
- All models are pretested and factory set.

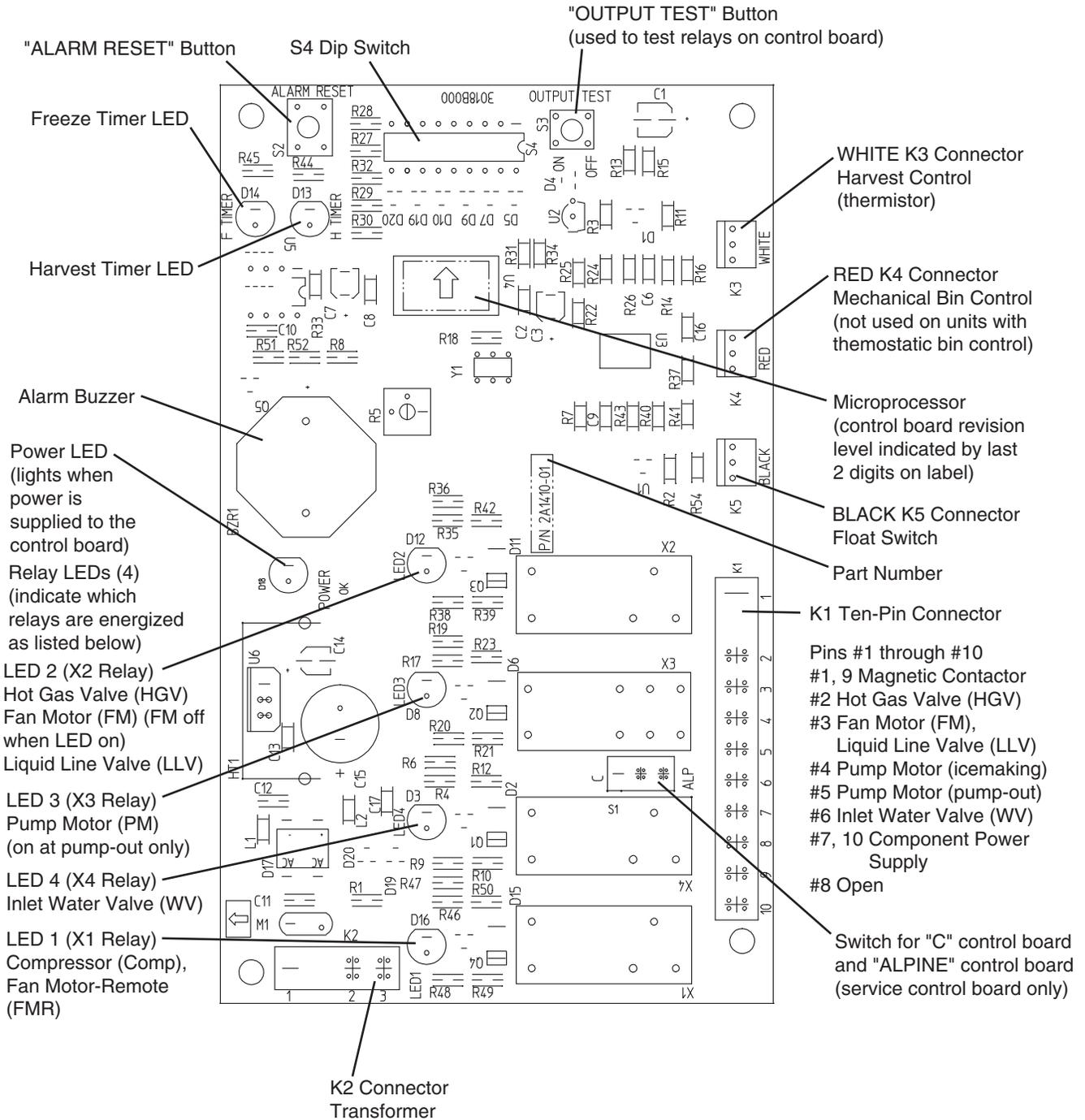
CAUTION

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 unit 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 K3, K4, and K5, because the same connector is used for the thermistor, mechanical bin control, and float switch. K4 is not used on "E" control board models.
5. Always replace the whole control board assembly if it goes bad.
6. Do not short out power supply to test for voltage.

1. Control Board Layout

a) "E" Control Board: Auxiliary Code T-0, U-0

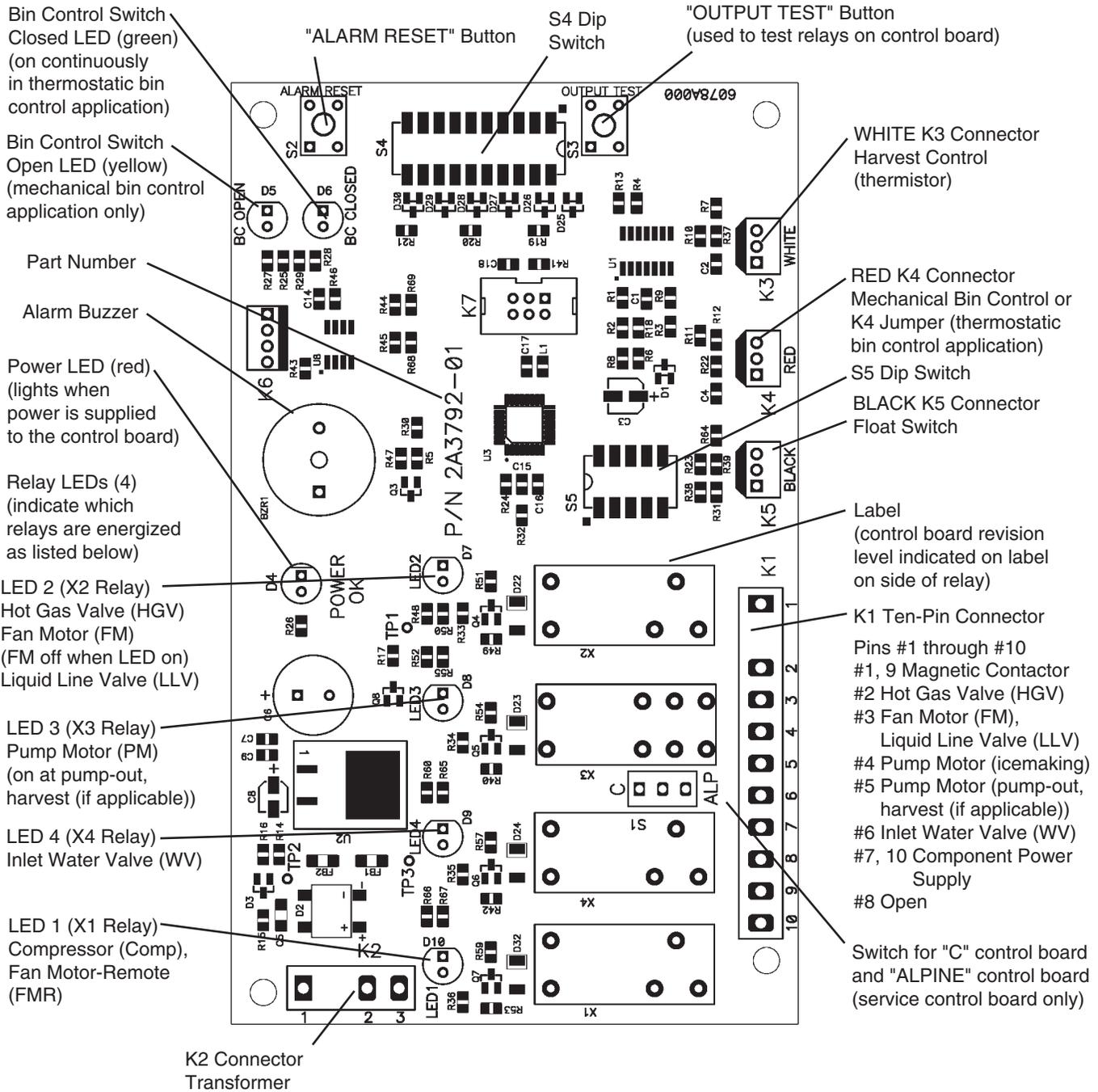
"E" Control Board



"E" Control Board	
Part Number	2A1410-01 (factory); 2A1410-02 (service)

b) "G" Control Board: Auxiliary Code U-1 and Later

"G" Control Board



"G" Control Board	
Part Number	2A3792-01

2. Features

a) **Maximum Water Supply Period - 6 minutes**

"E" control board: The inlet water valve is open during harvest for 6 minutes or the length of harvest, whichever is shorter.

"G" control board: The inlet water valve is open during harvest for 6 minutes or the length of harvest minus 0 or 50 seconds (harvest pump timer (S4 dip switch 7)), whichever is shorter. For details, see "II.C.3.e) Bin Control Selector/Harvest Pump Timer (S4 dip switch 7)."

b) **Harvest Backup Timer and Freeze Timer**

The harvest backup timer shuts down the icemaker if, for two cycles in a row, the harvest cycle takes more than 20 minutes to complete. The control board signals this problem using 2 beeps every 3 seconds.

The freeze timer shuts down the icemaker if, for two cycles in a row, the freeze cycle takes longer than the time specified to complete. The control board signals this problem using 3 beeps every 3 seconds. The freeze timer is factory set using S4 dip switch 9 & 10. For details, see "II.C.3.g) Freeze Timer (S4 dip switch 9 & 10)."

The "ALARM RESET" button on the control board must be pressed with power on to reset either of these safeties.

c) **High Temperature Safety**

The temperature of the suction line in the refrigeration circuit is limited by the high temperature safety. This protects the unit from excessively high temperatures. If the evaporator temperature reaches $127^{\circ}\text{F}\pm 7^{\circ}\text{F}$ ($53^{\circ}\text{C}\pm 4^{\circ}\text{C}$), the control board reads a .8 k Ω signal from the thermistor and shuts down the icemaker.

The control board will signal this problem using 1 beep every 3 seconds. The "ALARM RESET" button on the control board must be pressed with power on to reset the safety.

d) **Low Water Safety**

The control board checks the position of the float switch at the end of the initial 1-minute fill cycle and at the end of each harvest cycle. If the float switch is in the up position (electrical circuit closed), the control board changes to the next cycle. If the float switch is in the down position (electrical circuit open), the control board changes to additional 1-minute fill cycles until water enters the tank and closes the float switch. When the float switch closes, the control board changes to the next cycle. The unit will not start without adequate water in the tank. This serves as a low water safety to protect the water pump. For water-cooled model, if the condenser water supply is shut off, the unit is protected by the high-pressure switch.

e) **High Voltage and Low Voltage Cut-outs**

The maximum and minimum allowable supply voltages of this icemaker are limited by the high voltage and low voltage cut-outs. If miswiring (especially on single phase 3 wire models) causes excessive voltage ($147\text{Vac}\pm 5\%$ or more), the high voltage cut-out shuts down the circuit in 3 seconds and the icemaker automatically stops. The control board will signal this problem using 7 beeps every 3 seconds.

The icemaker also automatically stops in cases of insufficient voltage ($92\text{Vac}\pm 5\%$ or less). The control board will signal this problem using 6 beeps every 3 seconds. When the proper supply voltage is resumed, the icemaker automatically starts running again.

f) LED Lights and Audible Alarm Safeties

(1) "E" Control Board: Auxiliary Code T-0, U-0

At startup, a 5-second delay occurs while the control board conducts an internal timer check. A beep occurs when power is turned off. The red LED indicates proper control voltage and remains on unless a control voltage problem occurs. The green LEDs 1 through 4 energize and sequence from initial startup as listed in the table below. Note that the order of the LEDs from the outer edge of the control board is 1, 4, 3, 2. For details, see "II.B. Sequence of Operation."

Sequence Step	LED	Energized Components	Time LEDs are On		
			Min.	Max.	Avg.
1-Minute Fill Cycle	4	WV			1 minute
Harvest Cycle	1, 4, 2	Comp, FMR, WV, HGV	2 minutes	20 minutes	3 to 5 minutes
Freeze Cycle	1	Comp, FM/FMR, PM, LLV	5 minutes	freeze timer setting	30 to 35 minutes
Pump-Out Cycle	1, 4*, 3, 2	Comp, FMR, WV*, PM, HGV	10 seconds	20 seconds	*pump-out timer setting

The built-in safeties shut down the unit and have alarms as listed below.

No. of Beeps (every 3 sec.)	Type of Alarm	Notes
1	High Evaporator Temp. (temperature > 127°F) (53°C)	Check for harvest problem (stuck HGV or relay), hot water entering unit, stuck HM, or shorted thermistor.
2	Harvest Backup Timer (harvest > 20 min. for two cycles in a row)	Orange "H TIMER" LED on. Check for open thermistor, HGV not opening, TXV or LLV leaking by, low charge, inefficient Comp, or WRV leaking by.
3	Freeze Timer (freeze > freeze timer setting for two cycles in a row)	Yellow "F TIMER" LED on. Check for F/S stuck closed (up), WV leaking by, HGV leaking by, PM not pumping, TXV not feeding properly, LLV not opening, low charge, HM not bypassing, or inefficient Comp.
To reset the above safeties, press the "ALARM RESET" button with the power supply on.		
6	Low Voltage (92Vac±5% or less)	Red LED turns off if voltage protection operates. The control voltage safeties automatically reset when voltage is corrected.
7	High Voltage (147Vac±5% or more)	

Legend: **Comp**—compressor; **FM**—fan motor; **FMR**—fan motor-remote; **F/S**—float switch; **HGV**—hot gas valve; **HM**—headmaster (C.P.R.); **LLV**—liquid line valve; **PM**—pump motor; **TXV**—thermostatic expansion valve; **WRV**—water regulating valve; **WV**—inlet water valve

(2) "G" Control Board: Auxiliary Code U-1 and Later

At startup, a 5-second delay occurs while the control board conducts an internal timer check. A beep occurs when the control switch is moved to the "ICE" position. The red LED indicates proper control voltage and remains on unless a control voltage problem occurs. The green LEDs 1 through 4 energize and sequence from initial startup as listed in the table below. Note that the order of the LEDs from the outer edge of the control board is 1, 4, 3, 2. For details, see "II.B. Sequence of Operation."

Sequence Step	LED	Energized Components	Time LEDs are On		
			Min.	Max.	Avg.
1-Minute Fill Cycle	4	WV			1 minute
Harvest Cycle	1, 4, 2	Comp, FMR, WV, HGV	2 minutes	20 minutes	3 to 5 minutes
Harvest Pump Timer	1, 3, 2	Comp, FMR, PM, HGV	0 seconds	50 seconds	harvest pump timer setting
Freeze Cycle	1	Comp, FM/FMR, PM, LLV	5 minutes	freeze timer setting	30 to 35 minutes
Pump-Out Cycle	1, 4*, 3, 2	Comp, FMR, WV*, PM, HGV	10 seconds	20 seconds	*pump-out timer setting

The built-in safeties shut down the unit and have alarms as listed below.

No. of Beeps (every 3 sec.)	Type of Alarm	Notes
1	High Evaporator Temp. (temperature > 127°F (53°C))	Check for harvest problem (stuck HGV or relay), hot water entering unit, stuck HM, or shorted thermistor.
2	Harvest Backup Timer (harvest > 20 min. for two cycles in a row)	Check for open thermistor, HGV not opening, TXV or LLV leaking by, low charge, inefficient Comp, or WRV leaking by.
3	Freeze Timer (freeze > freeze timer setting for two cycles in a row)	Check for F/S stuck closed (up), WV leaking by, HGV leaking by, PM not pumping, TXV not feeding properly, LLV not opening, low charge, HM not bypassing, or inefficient Comp.
To reset the above safeties, press the "ALARM RESET" button with the power supply on.		
6	Low Voltage (92Vac±5% or less)	Red LED turns off if voltage protection operates. The control voltage safeties automatically reset when voltage is corrected.
7	High Voltage (147Vac±5% or more)	

Legend: **Comp**—compressor; **FM**—fan motor; **FMR**—fan motor-remote; **F/S**—float switch; **HGV**—hot gas valve; **HM**—headmaster (C.P.R.); **LLV**—liquid line valve; **PM**—pump motor; **TXV**—thermostatic expansion valve; **WRV**—water regulating valve; **WV**—inlet water valve

3. Controls and Adjustments

CAUTION

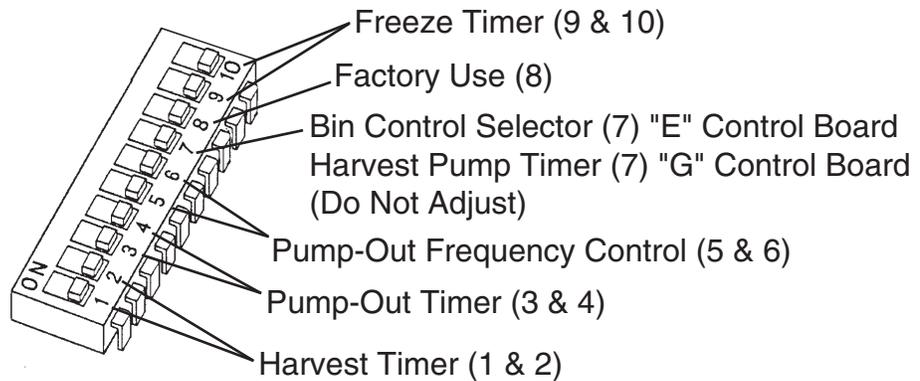
Dip switches are factory set. Failure to maintain factory settings may adversely affect performance and warranty coverage. For more information, contact Hoshizaki Technical Support at 1-800-233-1940.

a) Default Dip Switch Settings

The dip switches are factory set to the following positions:

S4 Dip Switch										
S4 Dip Switch No.	1	2	3	4	5	6	7	8	9	10
KM-901MAH	ON	OFF	ON	OFF	ON	ON	OFF	OFF	OFF	ON
KM-901MWH	ON	OFF	ON	OFF	ON	ON	OFF	OFF	OFF	ON
KM-901MRH/3	ON	OFF	ON	OFF	ON	ON	OFF	OFF	OFF	ON

S5 Dip Switch ("G" Control Board: Auxiliary Code U-1 and Later)					
S5 Dip Switch No.	1	2	3	4	5
KM-901MAH	OFF	OFF	OFF	OFF	OFF
KM-901MWH	OFF	OFF	OFF	OFF	OFF
KM-901MRH/3	OFF	OFF	OFF	OFF	OFF



b) Harvest Timer (S4 dip switch 1 & 2)

The harvest timer when the thermistor reads 48°F (9°C) at the evaporator outlet and the control board reads the thermistor's 3.9 kΩ signal. The harvest timer is factory set, and generally no adjustment is required. However, a setting longer than the factory setting may be advised in cases where the flush provided at harvest needs to be prolonged for extra cleaning. Before changing this setting, contact Hoshizaki Technical Support at 1-800-233-1940 for recommendations. Keep in mind that setting the harvest timer to a longer setting decreases 24-hour production.

Note that the pump-out timer (S1 dip switch 3 & 4) acts in place of the harvest timer during cycles with a pump-out. For details, see "II.C.3.c) Pump-Out Timer (S1 dip switch 3 & 4)."

S4 Dip Switch Setting		Time (seconds)
No. 1	No. 2	
OFF	OFF	60
ON	OFF	90
OFF	ON	120
ON	ON	180

c) Pump-Out Timer (S4 dip switch 3 & 4)

When a pump-out is called for, the pump motor de-energizes after the preceding freeze cycle. The pump motor energizes 2 seconds later in the reverse direction, taking water from the bottom of the tank and forcing pressure against the check valve seat allowing water to go through the check valve and down the drain. At the same time, water flows through the small tube to power flush the float switch. The pump motor drains the water tank for the time determined by the pump-out timer. The pump-out timer also acts in place of the harvest timer during cycles with a pump-out. The pump-out timer is factory set, and generally no adjustment is required. However, where water quality is bad and the icemaker needs a longer pump-out time, the pump-out timer can be adjusted. The pump-out timer control can be set to pump-out for 10 or 20 seconds.

S4 Dip Switch Setting		Time (seconds)		Inlet Water Valve
No. 3	No. 4	T1	T2	
OFF	OFF	10	150	Closed
ON	OFF	10	180	Closed
OFF	ON	10	120	Open
ON	ON	20	180	Closed

T1: Time to drain the water tank

T2: Harvest timer at pump-out

d) Pump-Out Frequency Control (S4 dip switch 5 & 6)

The pump-out frequency control is factory set to drain the water tank every 10 cycles, and generally no adjustment is required. However, where water quality is bad and the icemaker needs a pump-out more often, the pump-out frequency can be adjusted. The pump-out frequency control can be set to have a pump-out occur every cycle, or every 2, 5, or 10 cycles.

Timing of the first pump-out is dependent on the control board. "E" control board first pump-out is after the first freeze cycle. "G" control board first pump-out is dependent on S4 dip switch 5 & 6. See the table below.

"E" & "G" Control Board Settings			1st Pump-Out	
S4 Dip Switch Setting		Pump-Out Frequency	"E" Control Board	"G" Control Board
No. 5	No. 6			
OFF	OFF	Every cycle	After 1st freeze cycle	After 2nd freeze cycle
ON	OFF	Every 2 cycles		After 3rd freeze cycle
OFF	ON	Every 5 cycles		After 6th freeze cycle
ON	ON	Every 10 cycles		After 11th freeze cycle

e) Bin Control Selector/Harvest Pump Timer (S4 dip switch 7)

Depending on the control board, S4 dip switch 7 is either a bin control selector or harvest pump timer.

CAUTION

Do not adjust. This dip switch must be left in the factory default position or this unit will not operate correctly.

(1) Bin Control Selector, "E" Control Board: Auxiliary Code T-0, U-0

Factory set for proper operation. Do not adjust. When set to the on position on a unit with a thermostatic bin control, a 5-beep alarm sounds (open circuit) and the unit does not operate.

"E" Control Board	
S4 Dip Switch Setting	Bin Control
No. 7	
ON	Mechanical
OFF	Thermostatic

(2) Harvest Pump Timer, "G" Control Board: Auxiliary Code U-1 and Later

Factory set for proper operation. Do not adjust. Depending on the harvest pump timer setting, the pump motor energizes and runs the last 0 or 50 seconds of harvest. The water valve is energized during harvest for a maximum of 6 minutes or the length of harvest minus 0 or 50 seconds (determined by the harvest pump timer setting), whichever is shorter. **CAUTION! Do not adjust S4 dip switch 7 out of the factory default position on this model. This dip switch must be left in the factory default position or this unit will not operate correctly.**

"G" Control Board	
S4 Dip Switch Setting	Pump Motor Time (seconds)
No. 7	
ON	50
OFF	0

f) Factory Use (S4 dip switch 8)

Factory set for proper operation. Do not adjust. This must be left in the factory default position.

g) Freeze Timer (S4 dip switch 9 & 10)

CAUTION

Adjust to proper specification, or the unit may not operate correctly.

The freeze timer setting determines the maximum allowed freeze time to prevent possible freeze-up issues. Upon termination of the freeze timer, the control board initiates the harvest cycle. After 2 consecutive freeze timer terminations, the control board shuts down the icemaker. In this case, see "IV.F.3. Low Ice Production" for possible solutions. The freeze timer is factory set, and generally no adjustment is required. Before changing this setting, contact Hoshizaki Technical Support at 1-800-233-1940 for recommendations.

S4 Dip Switch Setting		Time (minutes)
No. 9	No. 10	
OFF	OFF	60
OFF	ON	50
ON	OFF	70
ON	ON	60

h) Float Switch Control (S5 dip switch 1): "G" Control Board

CAUTION

Do not adjust. This must be left in the factory default position or the unit will not operate correctly.

Factory set. S5 dip switch 1 allows for single or double float switch applications. The KM-901MAH, KM-901MWH, and KM-901MRH/3 use a single float switch.

i) Refill Counter (S5 dip switch 2 through 5): "G" Control Board

CAUTION

Do not adjust. These must be left in the factory default position or the unit will not operate correctly.

Factory set. S5 dip switch 2 through 5 allows for refills during the freeze cycle. The KM-901MAH, KM901MWH, and KM-901MRH/3 do not refill.

D. Bin Control

1. Thermostatic Bin Control: Auxiliary Code T-0, U-0

CAUTION

When the ambient temperature is below 45°F (7°C), the thermostatic bin control switch opens and shuts down the icemaker even if the ice storage bin is empty. When the thermostat is set in the prohibited range, the icemaker operates continuously even if the ice storage bin is filled with ice. Setting in the prohibited range may result in severe damage to the icemaker.

The thermostatic bin control switch is a temperature controlled switch used to control the level of ice in the bin. It is in line with the power supply to the control switch. The thermostatic bin control switch shuts down the unit within 10 seconds when ice contacts the thermostatic bulb, regardless of the cycle at activation. The thermostatic bin control is factory set, and generally no adjustment is required. However, adjustment may be needed in some conditions, particularly at higher altitude locations. For further details, see "IV.C.1. Thermostatic Bin Control Check."

2. Mechanical Bin Control: Auxiliary Code U-1 and Later

The mechanical bin control is a lever-actuated bin control switch used to control the level of ice in the bin. The mechanical bin control connects to the control board RED K4 connector. When the actuator paddle is not engaged (mechanical bin control switch closed; control board green "BC CLOSED" LED on), the unit produces ice. When the actuator paddle is engaged (mechanical bin control switch open; control board yellow "BC OPEN" LED on), the unit shuts down as outlined in the table below.

Cycle at Mechanical Bin Control Activation	Shutdown
Fill Cycle	15 seconds after activation.
Harvest Cycle	At the end of the harvest cycle, or up to 15 seconds into the freeze cycle if activated at the end of the harvest cycle.
Freeze Cycle	15 seconds after activation if activated at least 15 seconds before the 5-minute short cycle protection timer expires. Otherwise, at the end of the next harvest cycle.

E. Float Switch

The float switch is used to determine that there is sufficient water in the tank after the 1-minute fill cycle and after each harvest cycle. The float switch is also used to determine that the appropriate volume of water has been converted into ice before switching out of the freeze cycle. No adjustment is required.

F. Thermistor

The thermistor is used as a harvest control sensor. The thermistor's resistance varies depending on the suction line temperature. The control board monitors the resistance to start the harvest timer. No adjustment is required.

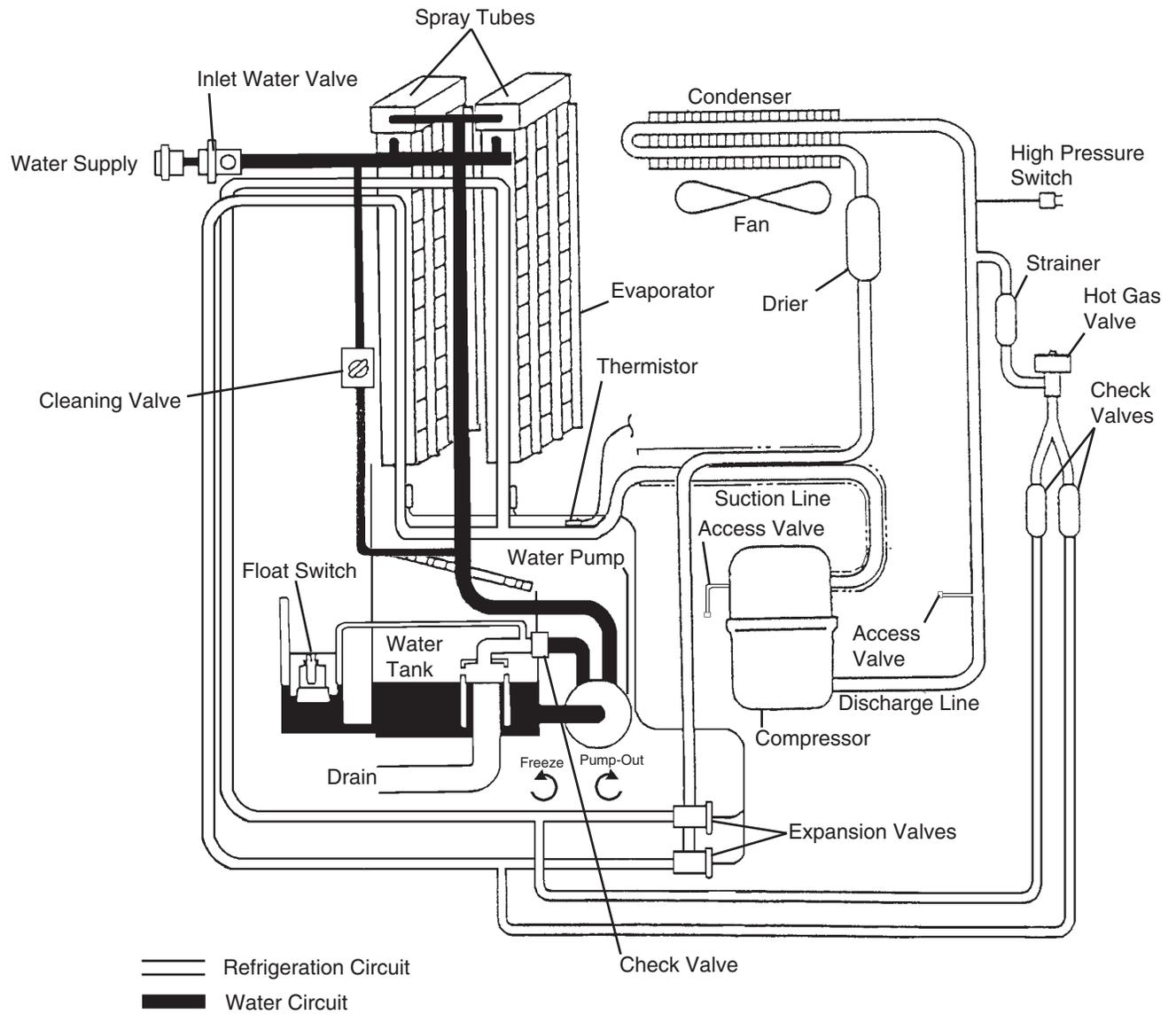
G. Control Switch

The control switch has three positions: "OFF" for power off, "ICE" for icemaking, and "WASH" to activate the water pump when cleaning and sanitizing.

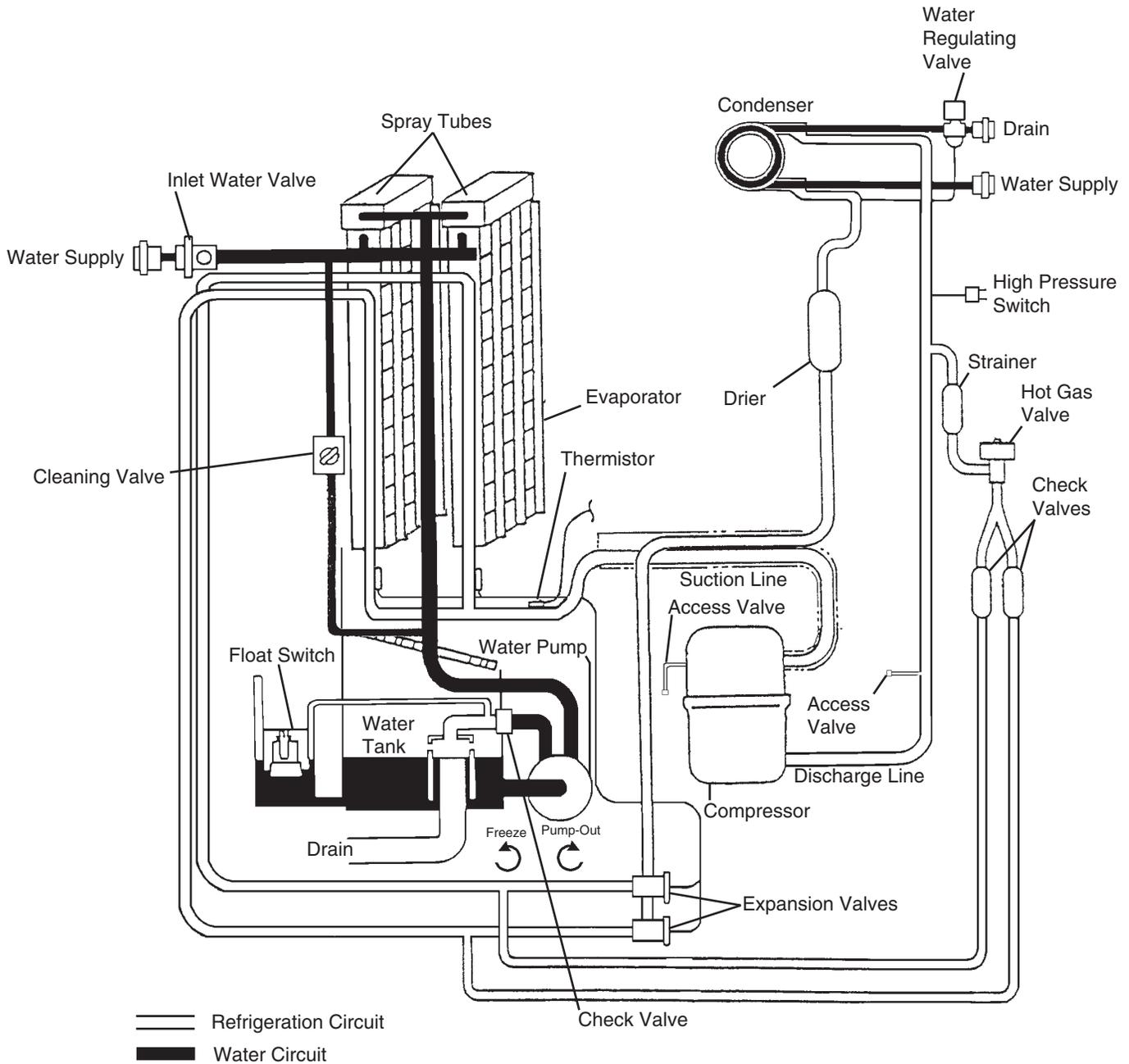
III. Technical Information

A. Water Circuit and Refrigeration Circuit

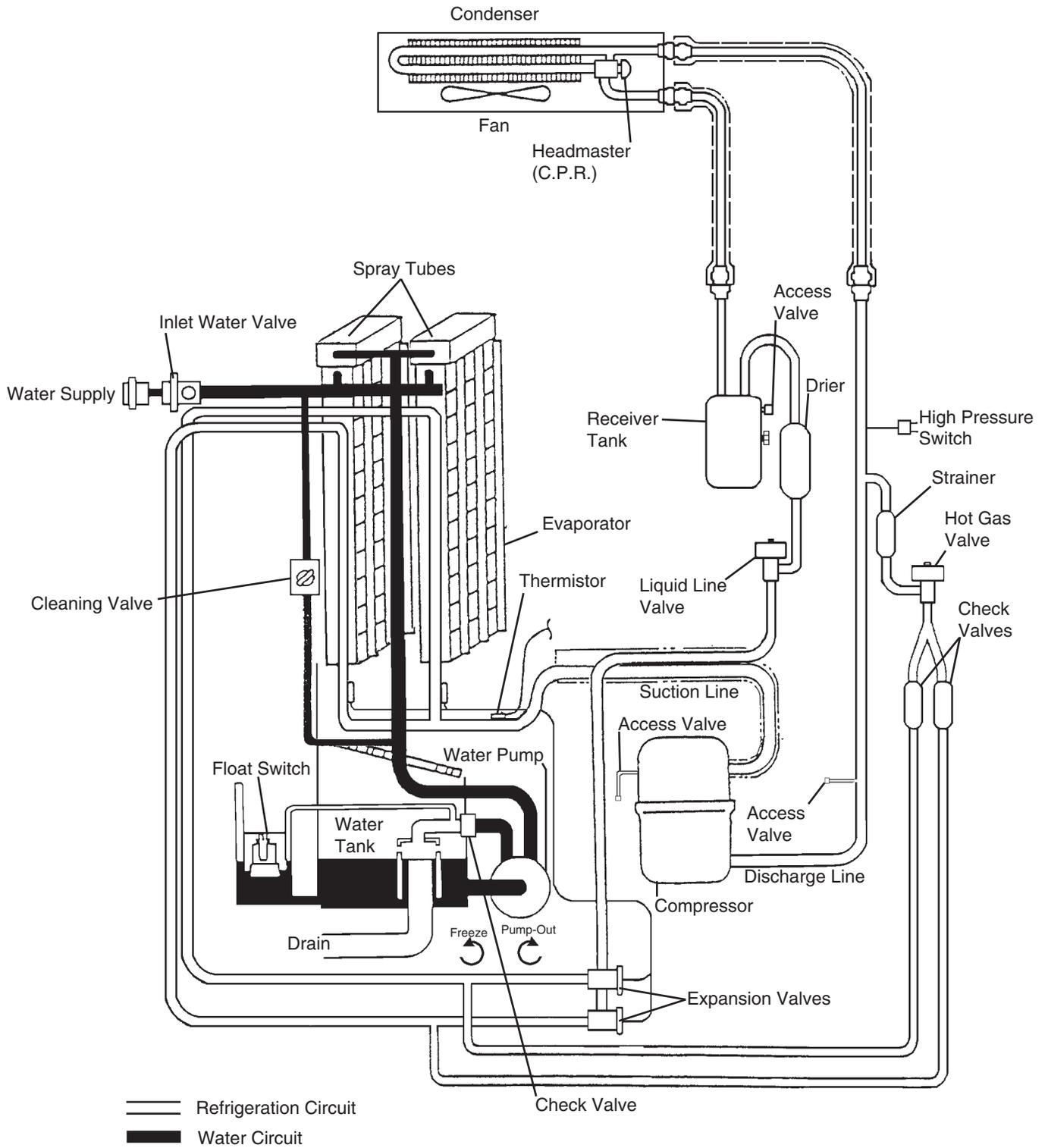
1. KM-901MAH (air-cooled)



2. KM-901MWH (water-cooled)



3. KM-901MRH/3 (remote air-cooled)

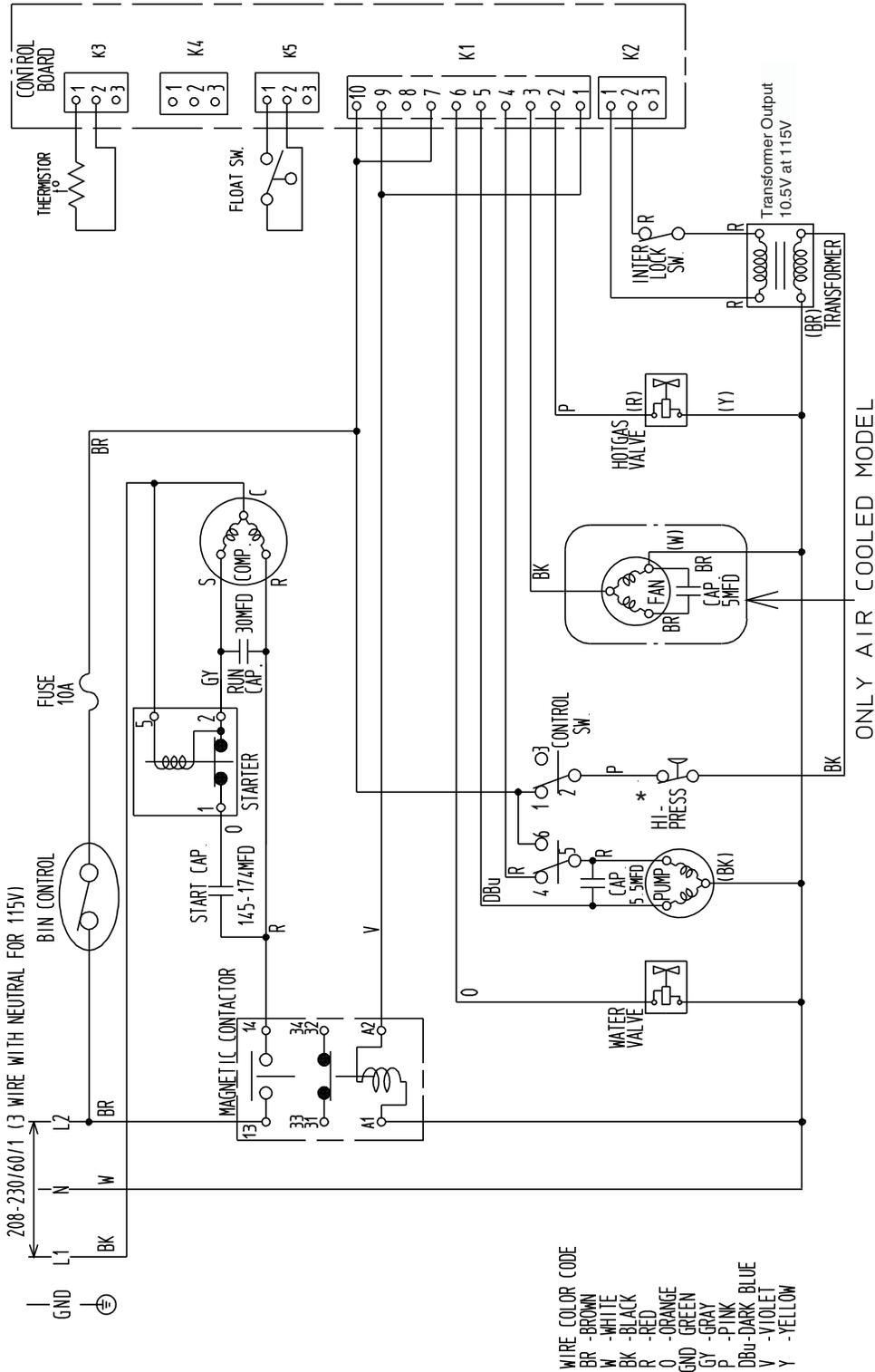


B. Wiring Diagrams

1. Thermostatic Bin Control: Auxiliary Code T-0, U-0

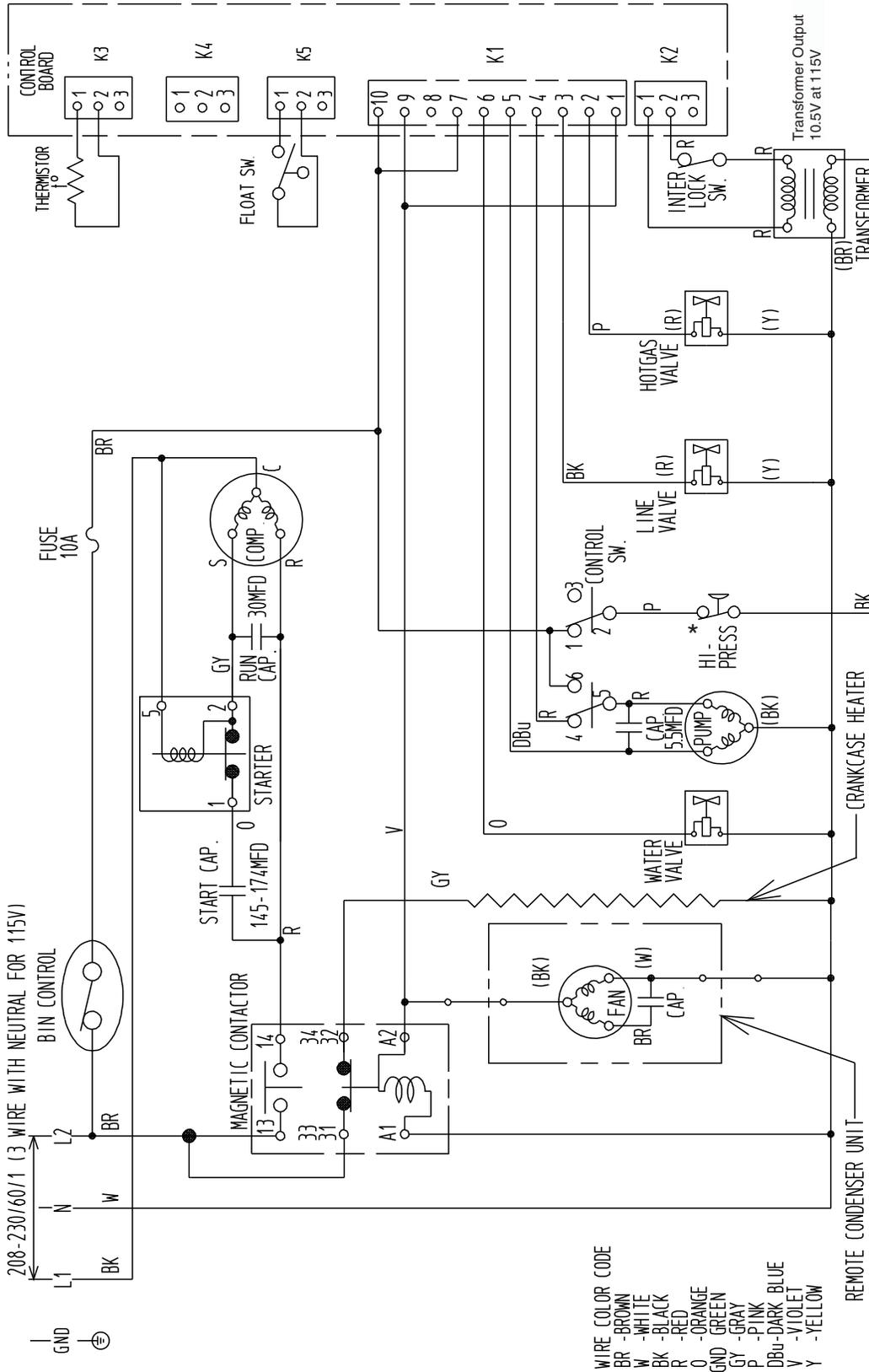
a) KM-901MAH (air-cooled) and KM-901MWH (water-cooled)

Thermostatic Bin Control: Auxiliary Code T-0, U-0



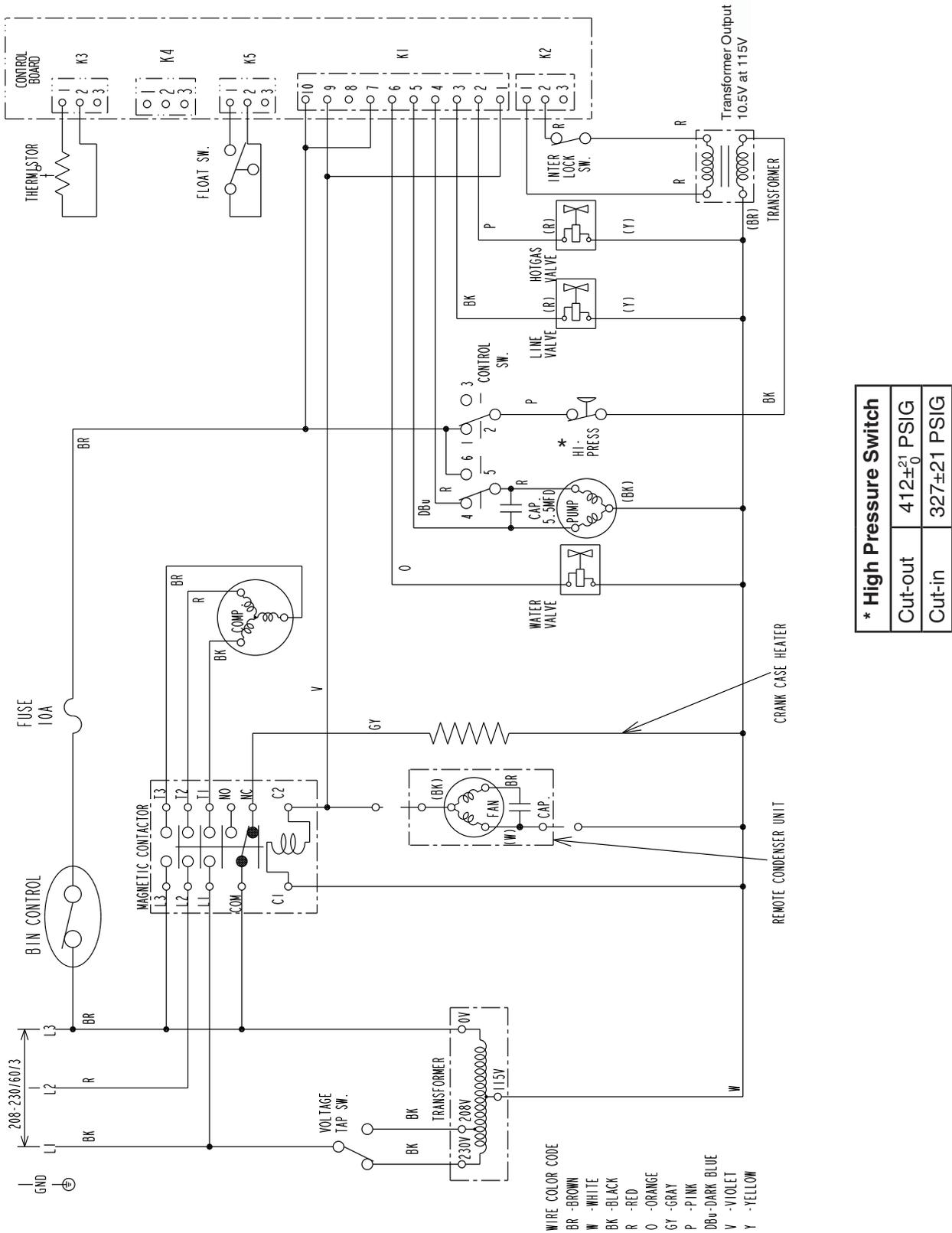
b) KM-901MRH (remote air-cooled)

Thermostatic Bin Control: Auxiliary Code T-0, U-0



c) KM-901MRH3 (remote air-cooled)

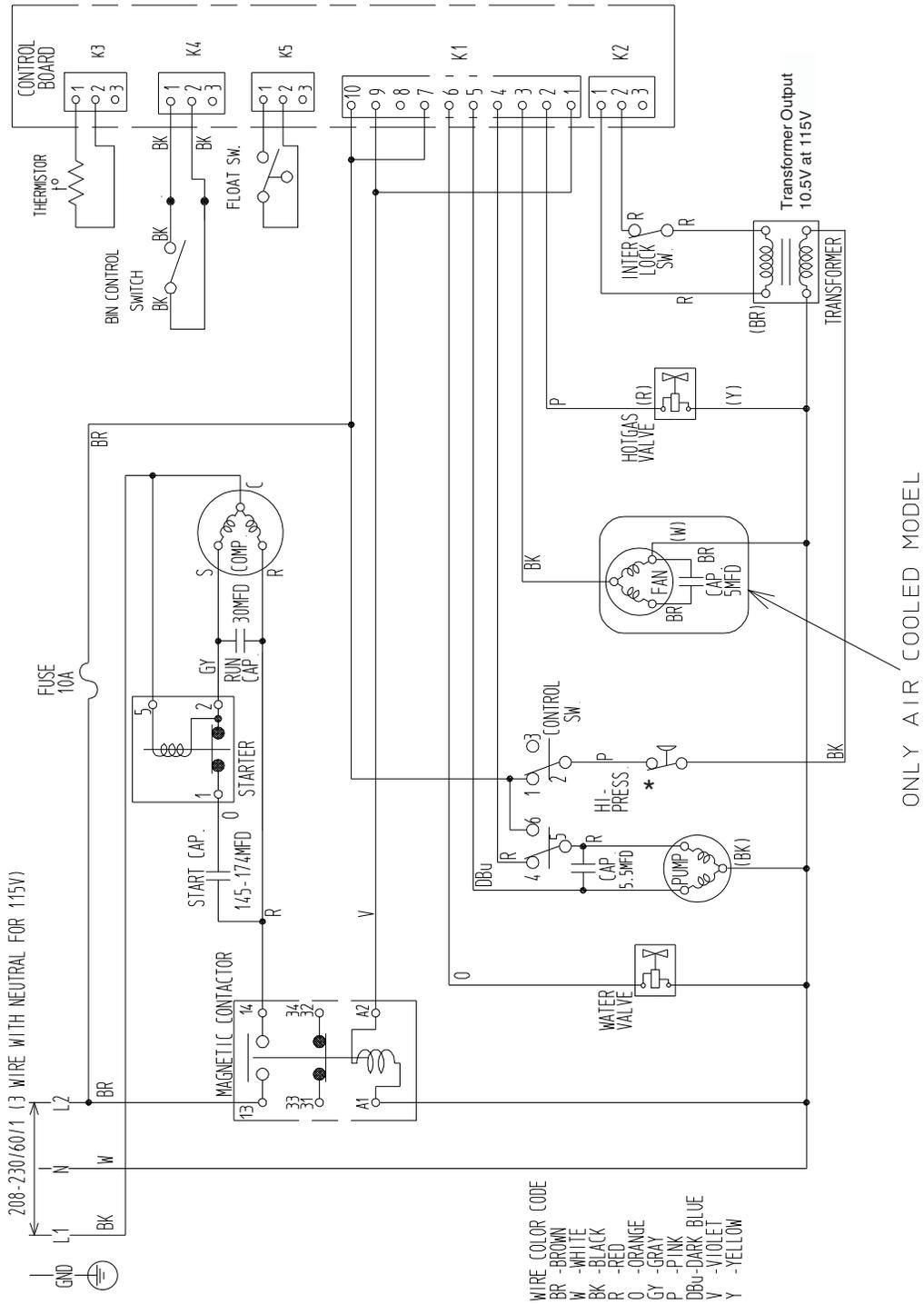
Thermostatic Bin Control: Auxiliary Code T-0, U-0



2. Mechanical Bin Control: Auxiliary Code U-1 and Later

a) KM-901MAH (air-cooled) and KM-901MWH (water-cooled)

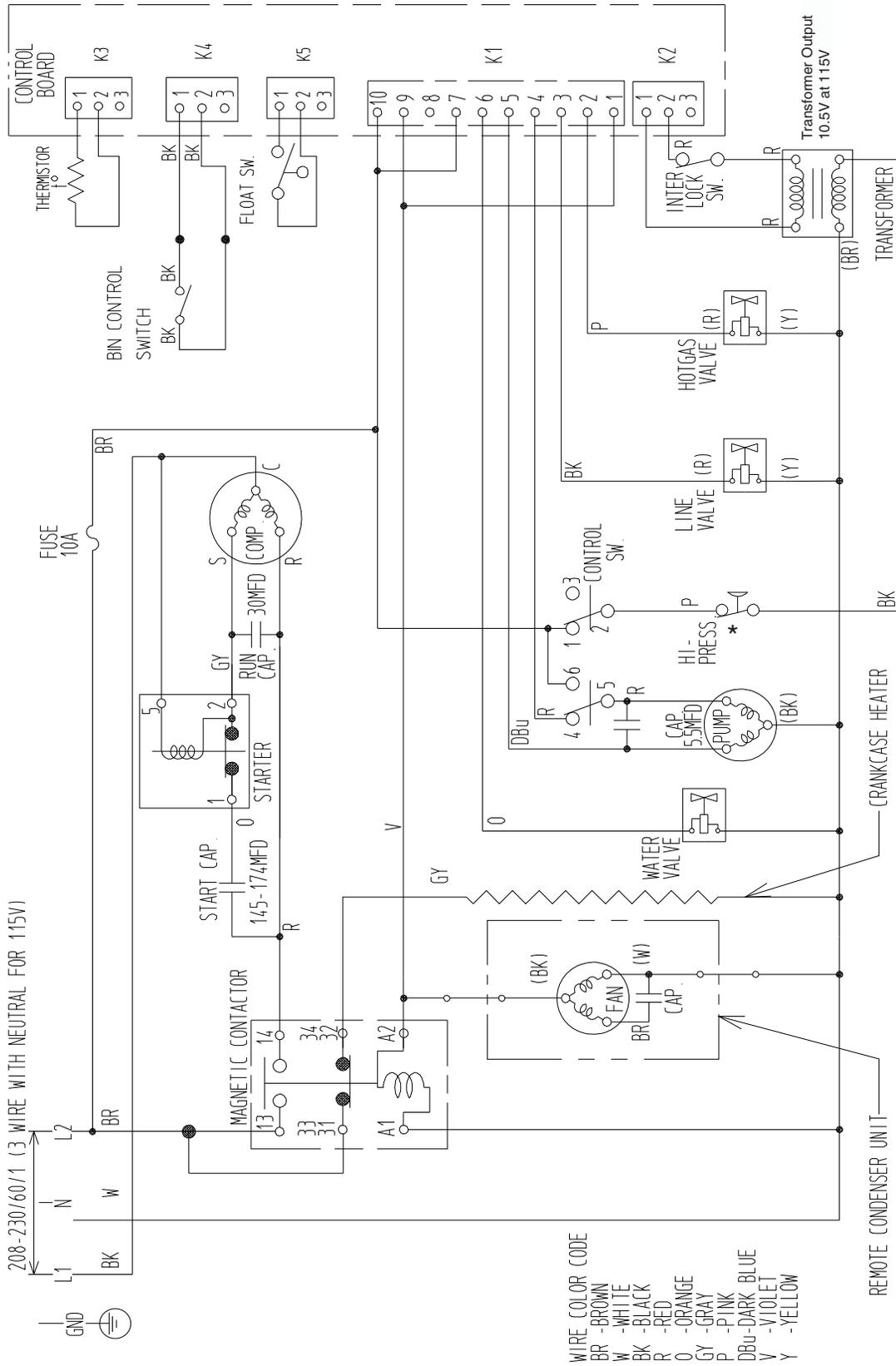
Mechanical Bin Control: Auxiliary Code U-1 and Later



* High Pressure Switch	
Air-Cooled Model	Water-Cooled Model
Cut-out	384±2 ¹ PSIG
Cut-in	284±21 PSIG

b) KM-901MRH (remote air-cooled)

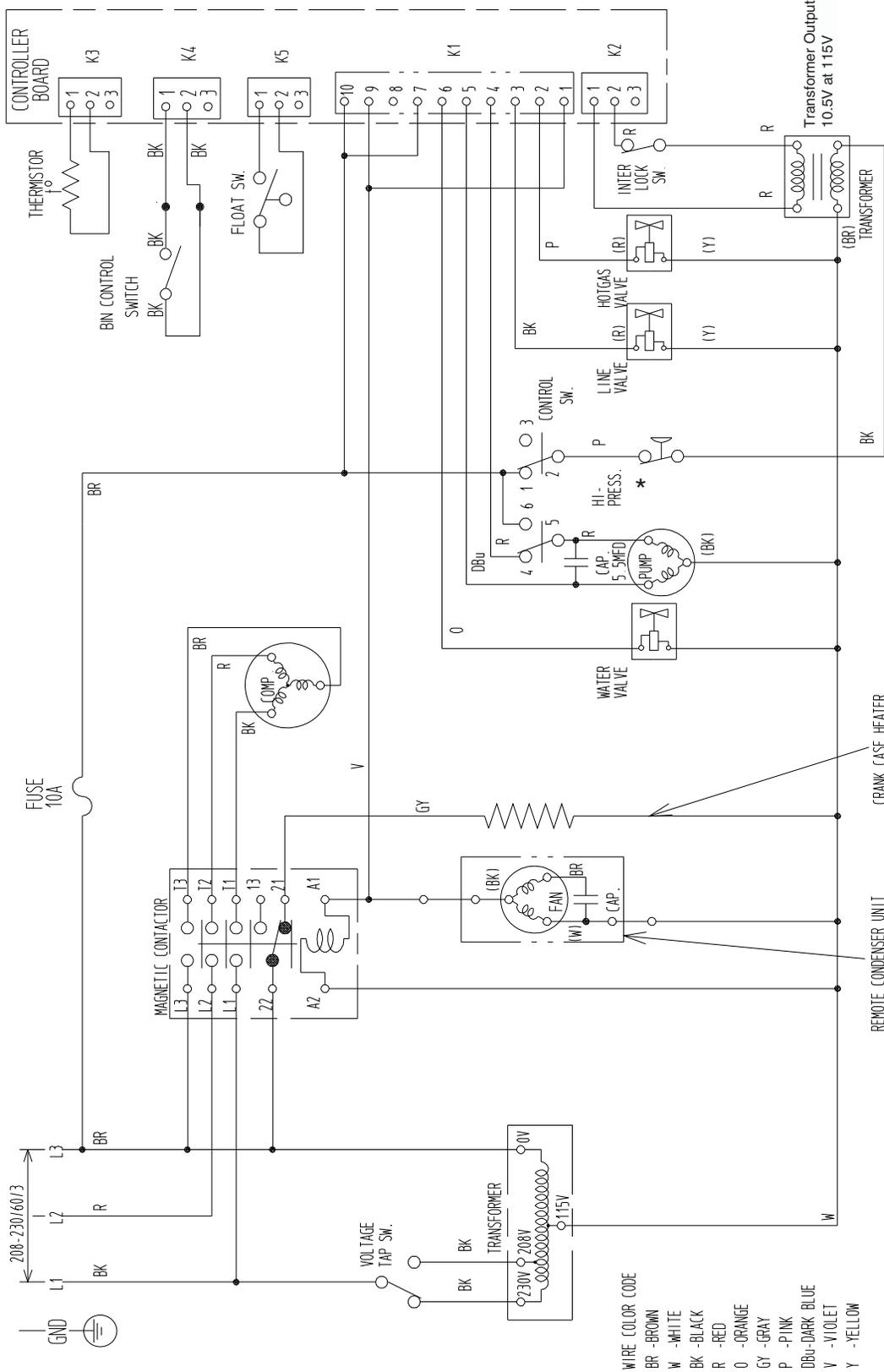
Mechanical Bin Control: Auxiliary Code U-1 and Later



* High Pressure Switch	
Cut-out	412±21 PSIG
Cut-in	327±21 PSIG

c) KM-901MRH3 (remote air-cooled)

Mechanical Bin Control: Auxiliary Code U-1 and Later



* High Pressure Switch	
Cut-out	412±21 PSIG
Cut-in	327±21 PSIG

C. Performance Data

1. KM-901MAH (air-cooled)

APPROXIMATE ICE PRODUCTION PER 24 HR.	AMBIENT TEMP. (°F/°C)	WATER TEMP. (°F/°C)					
		50/10		70/21		90/32	
	70/21	874	<u>396</u>	832	<u>378</u>	785	<u>356</u>
	80/27	842	<u>382</u>	778	<u>353</u>	736	<u>334</u>
	90/32	832	<u>378</u>	732	<u>332</u>	687	<u>312</u>
lbs./day <u>kg./day</u>	100/38	826	<u>375</u>	721	<u>327</u>	646	<u>293</u>
APPROXIMATE ELECTRIC CONSUMPTION	70/21	1600		1632		1658	
	80/27	1625		1675		1691	
	90/32	1632		1710		1731	
watts	100/38	1631		1715		1750	
APPROXIMATE WATER CONSUMPTION PER 24 HR.	70/21	240	<u>0.91</u>	212	<u>0.80</u>	187	<u>0.71</u>
	80/27	219	<u>0.83</u>	175	<u>0.66</u>	158	<u>0.60</u>
	90/32	212	<u>0.80</u>	143	<u>0.54</u>	123	<u>0.46</u>
gal./day <u>m³/day</u>	100/38	175	<u>0.66</u>	139	<u>0.52</u>	103	<u>0.39</u>
FREEZING CYCLE TIME	70/21	19		20		22	
	80/27	20		22		24	
	90/32	20		24		26	
min.	100/38	21		24		27	
HARVEST CYCLE TIME	70/21	4.3		3.9		3.6	
	80/27	4.0		3.3		3.1	
	90/32	3.9		2.8		2.6	
min.	100/38	3.3		2.7		2.4	
HEAD PRESSURE	70/21	219	<u>15.4</u>	238	<u>16.7</u>	261	<u>18.3</u>
	80/27	234	<u>16.4</u>	263	<u>18.5</u>	284	<u>20.0</u>
	90/32	238	<u>16.7</u>	284	<u>20.0</u>	306	<u>21.5</u>
PSIG <u>kg/cm²G</u>	100/38	242	<u>17.0</u>	289	<u>20.3</u>	327	<u>23.0</u>
SUCTION PRESSURE	70/21	35	<u>2.5</u>	37	<u>2.6</u>	41	<u>2.9</u>
	80/27	36	<u>2.6</u>	39	<u>2.7</u>	44	<u>3.1</u>
	90/32	37	<u>2.6</u>	41	<u>2.9</u>	46	<u>3.2</u>
PSIG <u>kg/cm²G</u>	100/38	38	<u>2.7</u>	42	<u>3.0</u>	50	<u>3.5</u>

TOTAL HEAT OF REJECTION FROM CONDENSER

15,400 BTU/h [AT 90°F (32°C) / WT 70°F (21°C)]

Note:

1. Pressure data is recorded at 5 minutes into freeze cycle. The data not in bold should be used for reference only.
2. We reserve the right to make changes in specifications and design without prior notice.

2. KM-901MWH (water-cooled)

APPROXIMATE ICE PRODUCTION PER 24 HR.	AMBIENT TEMP. (°F/°C)	WATER TEMP. (°F/°C)					
		50/10		70/21		90/32	
	70/21	912	<u>414</u>	889	<u>403</u>	849	<u>385</u>
	80/27	895	<u>406</u>	860	<u>390</u>	815	<u>370</u>
	90/32	889	<u>403</u>	835	<u>379</u>	791	<u>359</u>
lbs./day <u>kg./day</u>	100/38	878	<u>398</u>	825	<u>374</u>	751	<u>341</u>
APPROXIMATE ELECTRIC CONSUMPTION	70/21	1480		1506		1527	
	80/27	1500		1541		1553	
	90/32	1506		1570		1586	
watts	100/38	1505		1574		1600	
APPROXIMATE WATER CONSUMPTION PER 24 HR.	70/21	876	<u>3.32</u>	1013	<u>3.84</u>	1530	<u>5.79</u>
	80/27	981	<u>3.71</u>	1194	<u>4.52</u>	1893	<u>7.17</u>
	90/32	1013	<u>3.84</u>	1344	<u>5.09</u>	1977	<u>7.48</u>
gal./day <u>m³/day</u>	100/38	1360	<u>5.15</u>	1493	<u>5.65</u>	2559	<u>9.69</u>
FREEZING CYCLE TIME	70/21	18		19		20	
	80/27	19		19		21	
	90/32	19		20		21	
min.	100/38	19		20		22	
HARVEST CYCLE TIME	70/21	4.1		3.8		3.6	
	80/27	3.9		3.4		3.3	
	90/32	3.8		3.1		2.9	
min.	100/38	3.4		3.0		2.7	
HEAD PRESSURE	70/21	227	<u>16.0</u>	230	<u>16.1</u>	240	<u>16.9</u>
	80/27	229	<u>16.1</u>	233	<u>16.4</u>	247	<u>17.4</u>
	90/32	230	<u>16.1</u>	236	<u>16.6</u>	249	<u>17.5</u>
PSIG <u>kg/cm²G</u>	100/38	234	<u>16.4</u>	239	<u>16.8</u>	260	<u>18.3</u>
SUCTION PRESSURE	70/21	33	<u>2.3</u>	34	<u>2.4</u>	38	<u>2.6</u>
	80/27	34	<u>2.4</u>	36	<u>2.5</u>	40	<u>2.8</u>
	90/32	34	<u>2.4</u>	37	<u>2.6</u>	41	<u>2.9</u>
PSIG <u>kg/cm²G</u>	100/38	36	<u>2.5</u>	38	<u>2.7</u>	45	<u>3.2</u>

TOTAL HEAT OF REJECTION FROM CONDENSER	13,500 BTU/h [AT 90°F (32°C) / WT 70°F (21°C)]
TOTAL HEAT OF REJECTION FROM COMPRESSOR	2,100 BTU/h [AT 90°F (32°C) / WT 70°F (21°C)]
WATER FLOW FOR CONDENSER	100 gal./h [AT 100°F (38°C) / WT 90°F (32°C)]
PRESSURE DROP OF COOLING WATER LINE	less than 10 PSIG

Note:

1. Pressure data is recorded at 5 minutes into freeze cycle. The data not in bold should be used for reference only.
2. We reserve the right to make changes in specifications and design without prior notice.

3. KM-901MRH (remote air-cooled)

APPROXIMATE ICE PRODUCTION PER 24 HR.	AMBIENT TEMP. (°F/°C)	WATER TEMP. (°F/°C)					
		50/10		70/21		90/32	
	70/21	889	<u>403</u>	859	<u>389</u>	803	<u>364</u>
	80/27	866	<u>393</u>	818	<u>371</u>	755	<u>343</u>
	90/32	859	<u>389</u>	785	<u>356</u>	724	<u>328</u>
lbs./day <u>kg./day</u>	100/38	843	<u>382</u>	771	<u>350</u>	668	<u>303</u>
APPROXIMATE ELECTRIC CONSUMPTION	70/21	1590		1643		1664	
	80/27	1630		1712		1705	
	90/32	1643		1770		1775	
watts	100/38	1630		1771		1780	
APPROXIMATE WATER CONSUMPTION PER 24 HR.	70/21	246	<u>0.93</u>	219	<u>0.83</u>	194	<u>0.74</u>
	80/27	225	<u>0.85</u>	182	<u>0.69</u>	165	<u>0.63</u>
	90/32	219	<u>0.83</u>	152	<u>0.57</u>	131	<u>0.50</u>
gal./day <u>m³/day</u>	100/38	182	<u>0.69</u>	147	<u>0.56</u>	112	<u>0.42</u>
FREEZING CYCLE TIME	70/21	18		20		21	
	80/27	19		21		23	
	90/32	20		22		24	
min.	100/38	20		23		26	
HARVEST CYCLE TIME	70/21	4.3		3.9		3.6	
	80/27	4.0		3.4		3.2	
	90/32	3.9		2.9		2.7	
min.	100/38	3.4		2.8		2.4	
HEAD PRESSURE	70/21	208	<u>14.6</u>	229	<u>16.1</u>	252	<u>17.7</u>
	80/27	224	<u>15.7</u>	256	<u>18.0</u>	277	<u>19.5</u>
	90/32	229	<u>16.1</u>	279	<u>19.6</u>	301	<u>21.2</u>
PSIG <u>kg/cm²G</u>	100/38	232	<u>16.3</u>	284	<u>20.0</u>	322	<u>22.6</u>
SUCTION PRESSURE	70/21	35	<u>2.5</u>	37	<u>2.6</u>	41	<u>2.9</u>
	80/27	37	<u>2.6</u>	40	<u>2.8</u>	45	<u>3.1</u>
	90/32	37	<u>2.6</u>	43	<u>3.0</u>	47	<u>3.3</u>
PSIG <u>kg/cm²G</u>	100/38	38	<u>2.7</u>	44	<u>3.1</u>	51	<u>3.6</u>

TOTAL HEAT OF REJECTION FROM CONDENSER	14,000 BTU/h [AT 90°F (32°C) / WT 70°F (21°C)]
TOTAL HEAT OF REJECTION FROM COMPRESSOR	2,200 BTU/h [AT 90°F (32°C) / WT 70°F (21°C)]
CONDENSER VOLUME	121 CU. IN (URC-9F)

Note:

1. Pressure data is recorded at 5 minutes into freeze cycle. The data not in bold should be used for reference only.
2. We reserve the right to make changes in specifications and design without prior notice.

4. KM-901MRH3 (remote air-cooled)

APPROXIMATE ICE PRODUCTION PER 24 HR.	AMBIENT TEMP. (°F/°C)	WATER TEMP. (°F/°C)					
		50/10		70/21		90/32	
	70/21	899	<u>408</u>	874	<u>397</u>	817	<u>371</u>
	80/27	880	<u>399</u>	842	<u>382</u>	772	<u>350</u>
	90/32	874	<u>397</u>	815	<u>370</u>	749	<u>340</u>
lbs./day <u>kg./day</u>	100/38	855	<u>388</u>	800	<u>363</u>	689	<u>313</u>
APPROXIMATE ELECTRIC CONSUMPTION	70/21	1670		1717		1755	
	80/27	1706		1779		1803	
	90/32	1717		1830		1861	
watts	100/38	1716		1837		1890	
APPROXIMATE WATER CONSUMPTION PER 24 HR.	70/21	254	<u>0.96</u>	222	<u>0.84</u>	203	<u>0.77</u>
	80/27	230	<u>0.87</u>	181	<u>0.69</u>	174	<u>0.66</u>
	90/32	222	<u>0.84</u>	147	<u>0.56</u>	134	<u>0.51</u>
gal./day <u>m³/day</u>	100/38	185	<u>0.70</u>	144	<u>0.54</u>	123	<u>0.46</u>
FREEZING CYCLE TIME	70/21	19		20		21	
	80/27	20		21		23	
	90/32	20		22		24	
min.	100/38	20		23		26	
HARVEST CYCLE TIME	70/21	4.4		3.9		3.6	
	80/27	4.0		3.3		3.2	
	90/32	3.9		2.8		2.6	
min.	100/38	3.4		2.7		2.4	
HEAD PRESSURE	70/21	206	<u>14.5</u>	225	<u>15.8</u>	248	<u>17.5</u>
	80/27	220	<u>15.5</u>	249	<u>17.5</u>	272	<u>19.1</u>
	90/32	225	<u>15.8</u>	270	<u>19.0</u>	293	<u>20.6</u>
PSIG <u>kg/cm²G</u>	100/38	229	<u>16.1</u>	275	<u>19.4</u>	315	<u>22.1</u>
SUCTION PRESSURE	70/21	36	<u>2.5</u>	38	<u>2.7</u>	41	<u>2.9</u>
	80/27	37	<u>2.6</u>	40	<u>2.8</u>	44	<u>3.1</u>
	90/32	38	<u>2.7</u>	42	<u>3.0</u>	46	<u>3.2</u>
PSIG <u>kg/cm²G</u>	100/38	39	<u>2.7</u>	43	<u>3.0</u>	49	<u>3.4</u>

TOTAL HEAT OF REJECTION FROM CONDENSER	14,100 BTU/h [AT 90°F (32°C) / WT 70°F (21°C)]
TOTAL HEAT OF REJECTION FROM COMPRESSOR	2,200 BTU/h [AT 90°F (32°C) / WT 70°F (21°C)]
CONDENSER VOLUME	121 CU. IN (URC-9F)

Note:

1. Pressure data is recorded at 5 minutes into freeze cycle. The data not in bold should be used for reference only.
2. 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 storage bin.
5. Make sure all food zones in the icemaker and storage bin are clean after the unit is serviced. For cleaning procedures, see "VI. Cleaning and Maintenance."

A. Diagnostic Procedure

The diagnostic procedure is basically a sequence check which can be used at unit startup or for system diagnosis. This procedure allows you to diagnose electrical system and component failures. Before conducting the diagnostic procedure, check for correct installation, proper voltage per unit nameplate, and adequate water supply. Check CB using the steps in "IV.B. Control Board Check." Check the dip switch settings to assure that S4 dip switch 3, 4, 7, 8, 9, & 10 and S5 dip switch 1 through 5 ("G" CB) are in the factory default position. S4 dip switch 1, 2, 5, & 6 are cleaning adjustments and the settings are flexible. For factory default settings, see "II.C.3.a) Default Dip Switch Settings." As you go through the procedure, check to assure the components energize and de-energize correctly. If not, those components and controls are suspect.

- 1) Turn off the power supply, then access the control box. Clear any ice from TBC or MBC.
- 2) Turn on the power supply, then move the control switch to the "ICE" position. A 5-second delay occurs. The red "POWER OK" LED on CB comes on. On "G" CB, the green "BC CLOSED" LED also comes on. If the yellow "BC OPEN" LED is on (indicating a full bin), check MBC. See "IV.C.2.a) Mechanical Bin Control Check."

WARNING

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

3) **1-Minute Fill Cycle – LED 4 is on.** WV energizes. After 1 minute, CB checks for a closed F/S. If F/S is closed, the harvest cycle begins. If closed, continue to step 4. If open, WV remains energized through additional 1-minute fill cycles until water fills the tank and closes F/S (low water safety). **Diagnosis:** If WV does not open, check the supply voltage at WV terminals, check continuity on the coil, confirm the screen or external filter is not plugged (no water flow). If unit fails to start harvest, check for open F/S or bad 1-minute timer in CB. See "IV.D. Float Switch Check and Cleaning" and "IV. B. Control Board Check."

4) **Initial Harvest Cycle – LEDs 1, 4, and 2 are on.** WV remains energized, Comp, FMR, HGV energize. CB monitors the warming of the evaporator via the thermistor located on the suction line. When the thermistor reaches 48°F (9°C), CB reads a 3.9 kΩ signal from the thermistor and turns harvest termination over to the harvest timer (S4 dip switch 1 & 2). The harvest timer has settings of 60, 90, 120, and 180 seconds. For details, see "II.C.3.b) Harvest Timer (S4 dip switch 1 & 2)." When the harvest timer expires, the harvest cycle is complete. CB checks the position of F/S and proceeds to the next cycle if it is closed or calls for a 1-minute fill cycle if it is open. The minimum total time allowed by CB for a complete harvest cycle is 2 minutes.

"E" CB: WV is energized during harvest for a maximum of 6 minutes or the length of harvest, whichever is shorter.

"G" CB: WV is energized during harvest for a maximum of 6 minutes or the length of harvest minus 0 or 50 seconds (harvest pump timer (S4 dip switch 7)), whichever is shorter. LED 4 goes off when WV de-energizes. LED 3 comes on and PM energizes and runs for the last 0 or 50 seconds of harvest depending on S4 dip switch 7 setting. **CAUTION! Do not adjust S4 dip switch 7 out of the factory default position on this model. This dip switch must be left in the factory default position or this unit will not operate correctly.** For details, see "II.C.3.e) Bin Control Selector/Harvest Pump Timer (S4 Dip Switch 7)."

Diagnosis: Check if Comp is running, HGV and WV still energized. Average harvest cycle at factory setting is 2 to 3 minutes. How long does initial harvest last? 1.5 minutes after initial harvest begins, touch Comp discharge line. Is it hot? If not, check refrigerant pressures and Comp operation. If it is hot, touch the inlet line to the evaporator. Is it hot? If it is hot and the freeze cycle is not starting, check the harvest timer adjustment (S4 dip switch 1 & 2), the thermistor for open circuit, the discharge line temperature, Comp efficiency, and if HGV is fully open. For a thermistor check, see "IV.E. Thermistor Check." If 1-minute fill cycle starts after harvest, check that F/S is clean and operating properly, see "IV.D. Float Switch Check and Cleaning." Make sure PM does not come on last 50 seconds of harvest. For details, see "II.C.3.e) Bin Control Selector/Harvest Pump Timer (S4 Dip Switch 7)."

5) **Freeze Cycle – LED 1 is on.** Comp and FMR remain energized, PM, LLV, and FM energize. WV and HGV de-energize. The unit is held in freeze by a 5-minute short cycle protection timer (CB will not accept a signal from F/S). After the 5-minute short cycle protection timer expires, CB turns freeze termination over to F/S. **Diagnosis:** During the first 5 minutes of freeze, confirm that the evaporator temperature drops. After 5 minutes in freeze, disconnect black F/S connector from CB BLACK K5 connector. If the evaporator is not cold, check to see if HGV is still open or if TXV is not opening properly, if WV is continuing to fill the reservoir, if there are improper unit pressures, an inoperative Comp, or an inoperative HM. The unit should switch out of the freeze cycle ("G" CB - 15 second delay after F/S opens before terminating the freeze cycle). If the unit switches out of freeze with F/S removed, but would previously not switch out of freeze with F/S connected (long freeze - 3 beep alarm), F/S may be sticking. To check and clean F/S, see "IV.D. Float Switch Check and Cleaning." If the unit remains in freeze (longer than 15 seconds on "G" CB) after disconnecting the black F/S connector, replace CB. See "V.P. Removal and Replacement of Control Board."

Note: Normal freeze cycle will last 20 to 40 minutes depending on model and conditions. Cycle times and pressures should follow performance data provided in this manual. See "III.C. Performance Data."

6) **Pump-Out Cycle – (10/20 second pump-out) – LEDs 1, 3, and 2 are on.** LED 4 is on when S4 dip switch 3 & 4 are set to 3 off and 4 on. Comp and FMR remain energized, HGV energizes. WV energizes if S4 dip switch 3 off and 4 on. LLV and FM de-energize. PM stops for 2 seconds, then reverses for 10/20 seconds depending on pump-out timer S4 dip switch 3 & 4 setting. When the pump-out timer expires, the pump-out is complete. The pump-out frequency control is factory set for every 10th cycle, and generally no adjustment is required. However, where water quality is bad and the icemaker needs a pump-out more often, the pump-out frequency can be adjusted. The pump-out frequency control (S4 dip switch 5 & 6) can be set to have a pump-out occur every cycle, or every 2, 5, or 10 cycles. For details, see "II.C.3.d) Pump-Out Frequency Control (S4 dip switch 5 & 6)."

Timing of the first pump-out is dependent on CB. "E" CB first pump-out is after the first freeze cycle. "G" CB first pump-out is determined by S4 dip switch 5 & 6. See the table below.

"E" & "G" Control Board Settings		1st Pump-Out		
S4 Dip Switch Setting		Pump-Out Frequency	"E" Control Board	"G" Control Board
No. 5	No. 6			
OFF	OFF	Every cycle	After 1st freeze cycle	After 2nd freeze cycle
ON	OFF	Every 2 cycles		After 3rd freeze cycle
OFF	ON	Every 5 cycles		After 6th freeze cycle
ON	ON	Every 10 cycles		After 11th freeze cycle

Diagnosis: If PM does not reverse, check to see if S4 and S5 dip switch settings are in the factory default position. Check PM circuit and capacitor, check #5 pin (DBu wire) on CB K1 ten-pin connector for voltage. If water does not pump out, check and clean the check valve assembly and tubing.

7) **Normal Harvest Cycle** – same as the initial harvest cycle – See "IV.A.4) Initial Harvest Cycle."

8) **Shutdown**

a) **Thermostatic Bin Control: Auxiliary Code T-0, U-0**

When the unit is running hold ice in contact with the thermostatic bulb, TBC switch opens within 10 seconds, shutting down the unit. TBC is factory set, and generally no adjustment is required. However, adjustment may be needed in some conditions, particularly at higher altitude locations. **CAUTION! Do not adjust S4 dip switch 7 out of the factory default position on this model. This dip switch must be left in the factory default position or this unit will not operate correctly. Diagnosis:** See "IV.C.1. Thermostatic Bin Control Check."

b) **Mechanical Bin Control: Auxiliary Code U-1 and Later**

See "IV.C.2.a) Mechanical Bin Control Check."

Legend: **CB**–control board; **Comp**–compressor; **FM**–fan motor; **FMR**–fan motor-remote; **F/S**–float switch; **HGV**–hot gas valve; **HM**–headmaster (C.P.R.); **LLV**–liquid line valve; **MBC**–mechanical bin control; **PM**–pump motor; **TBC**–thermostatic bin control; **TXV**–thermostatic expansion valve; **WV**–inlet water valve

B. 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.

Alarm Reset: If the control board is in alarm (beeping), press the "ALARM RESET" button on the control board with power on. Once reset, the unit starts at the 1-minute fill cycle. For audible alarm information, see "II.C.2.f) LED Lights and Audible Alarm Safeties."

- 1) Check the dip switch settings to assure that S4 dip switch 3, 4, 7, 8, 9, & 10 and S5 dip switch 1 through 5 ("G" control board) are in the factory default position. S4 dip switch 1, 2, 5, & 6 are cleaning adjustments and the settings are flexible. For factory default settings, see "II.C.3.a) Default Dip Switch Settings."
- 2) Move the control switch to the "ICE" position. If the red "POWER OK" LED is on, the control voltage is good. If the "POWER OK" LED is off, check the control transformer secondary circuit. The control transformer secondary circuit includes the cleaning valve interlock switch. Make sure the interlock switch is closed; otherwise, no control voltage is supplied to the K2 connector. Transformer output is 10.5V at 115V primary input. If the secondary circuit has proper voltage and the red LED is off, the control board is bad and should be replaced. See "V.P. Removal and Replacement of Control Board."

If the secondary circuit does not have proper voltage, check the control transformer primary circuit. Check for 115V at the control board K1 ten-pin connector. Check the #10 pin (BR wire) to a white neutral wire for 115V. Always choose a white neutral wire to establish a good neutral connection when checking voltages. For additional checks, see "IV.F.1.[1] The icemaker will not start."

- 3) The "OUTPUT TEST" button provides a relay sequence test. Make sure the control switch is in the "ICE" position, then press the "OUTPUT TEST" button. For the correct lighting sequence, see the table below. Note that the order of the LEDs from the outer edge of the control board is 1, 4, 3, 2. Components (e.g., compressor) cycle during the test.

Control Board	Correct LED Lighting Sequence
"E"	2, 3, 4, 1
"G"	1, 4, 3, 2

Following the test, the icemaker resumes operation. If the LEDs do not light as described above, the control board is bad and should be replaced. See "V.P. Removal and Replacement of Control Board."

- 4) To verify voltage output from the control board to the components, slide the control board K1 ten-pin connector out far enough to allow multimeter lead contact. With the unit in the cycle to be tested, check output voltage from the corresponding pin on the control board K1 ten-pin connector to ground. If output voltage is not found and the appropriate LED is on, the control board is bad and should be replaced. See "V.P. Removal and Replacement of Control Board."

C. Bin Control Check

1. Thermostatic Bin Control Check: Auxiliary Code T-0, U-0

To check the thermostatic bin control, follow the steps below.

CAUTION

When the ambient temperature is below 45°F (7°C), the thermostatic bin control switch opens and shuts down the icemaker even if the ice storage bin is empty. When the thermostat is set in the prohibited range, the icemaker operates continuously even if the ice storage bin is filled with ice. Setting in the prohibited range may result in severe damage to the icemaker.

The thermostatic bin control is factory set, and generally no adjustment is required. However, adjustment may be needed in some conditions, particularly at higher altitude locations.

- 1) Turn off the power supply.
- 2) Remove the front panel, then remove the control box cover.
- 3) Disconnect the thermostatic bin control wires from the thermostatic bin control switch.
- 4) Clear any ice away from the thermostatic bulb, then hold your hand around the thermostatic bulb to warm it up.
- 5) Check for continuity across the thermostatic bin control switch. If closed, continue to step 6. If open, adjust or replace the thermostatic bin control.
- 6) With the multimeter test leads still in place, hold ice on the thermostatic bulb to lower the temperature. Within 10 seconds, the thermostatic bin control switch should open (no continuity). If it remains closed, adjust or replace the thermostatic bin control.

2. Mechanical Bin Control Check and Cleaning: Auxiliary Code U-1 and Later

a) *Mechanical Bin Control Check*

To check the mechanical bin control switch, follow the steps below.

- 1) Turn off the power supply.
- 2) Remove the front panel, then move the control switch to the "OFF" position.
- 3) Remove the control box cover, then clear any ice away from the mechanical bin control.
- 4) Disconnect the red connector from the control board RED K4 connector.
- 5) Check for continuity across the wires of the red connector. See Fig. 1. When the actuator paddle is not engaged, the mechanical bin control switch is closed. If open, check that the white harness connector is secured to the mechanical bin control switch connector and that the actuator paddle is not sticking. Clean if necessary. See "IV. C.2.b) Mechanical Bin Control Cleaning." See Fig. 1. If the mechanical bin control switch still reads open, replace the mechanical bin control.
- 6) Press the actuator paddle, check for continuity across the wires of the red connector. When the actuator paddle is engaged, the mechanical bin control switch is open. If closed, check that the actuator paddle is not restricted. Clean if necessary. See "IV. C.2.b) Mechanical Bin Control Cleaning." If the mechanical bin control switch still reads closed, replace the mechanical bin control.
- 7) Reconnect the red connector, then move the control switch to the "ICE" position. Turn on the power supply.
- 8) Check that the green "BC CLOSED" LED on the control board is on.
- 9) Allow the unit to cycle on. Following the chart below, press and hold the actuator paddle. The yellow "BC OPEN" LED should be on and the unit should shut down according to the chart below. If it does not, replace the control board. See "V.P. Removal and Replacement of Control Board."

Cycle at Mechanical Bin Control Activation	Shutdown
Fill Cycle	15 seconds after activation.
Harvest Cycle	At the end of the harvest cycle, or up to 15 seconds into the freeze cycle if activated at the end of the harvest cycle.
Freeze Cycle	15 seconds after activation if activated at least 15 seconds before the 5-minute short cycle protection timer expires. Otherwise, at the end of the next harvest cycle.

b) Mechanical Bin Control Cleaning

Scale may build up on the mechanical bin control. Scale can cause the actuator paddle and magnet to stick. In this case, the mechanical bin control should be cleaned.

⚠ WARNING

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 storage bin.

- 1) Turn off the power supply.
- 2) Remove the front panel and base cover, then move the control switch to the "OFF" position.
- 3) Clear any ice away from the mechanical bin control.
- 4) Disconnect the mechanical bin control switch connector, then remove the mechanical bin control assembly from the unit.
- 5) Remove the actuator paddle from the switch mount. See Fig. 1.
- 6) Wipe down the mechanical bin control assembly with a mixture of 1 part of recommended cleaner Hoshizaki "Scale Away" or "LIME-A-WAY" (Economics Laboratory, Inc.) and 25 parts of warm water. Rinse the parts thoroughly with clean water.
- 7) Reassemble the mechanical bin control assembly and replace it in its correct position.
Note: If the magnet was removed for cleaning, be sure to replace it in its correct position.
- 8) Reconnect the mechanical bin control switch connector.
- 9) Move the control switch to the "ICE" position.
- 10) Replace the base cover and front panel in their correct positions.
- 11) Turn on the power supply to start the automatic icemaking process.

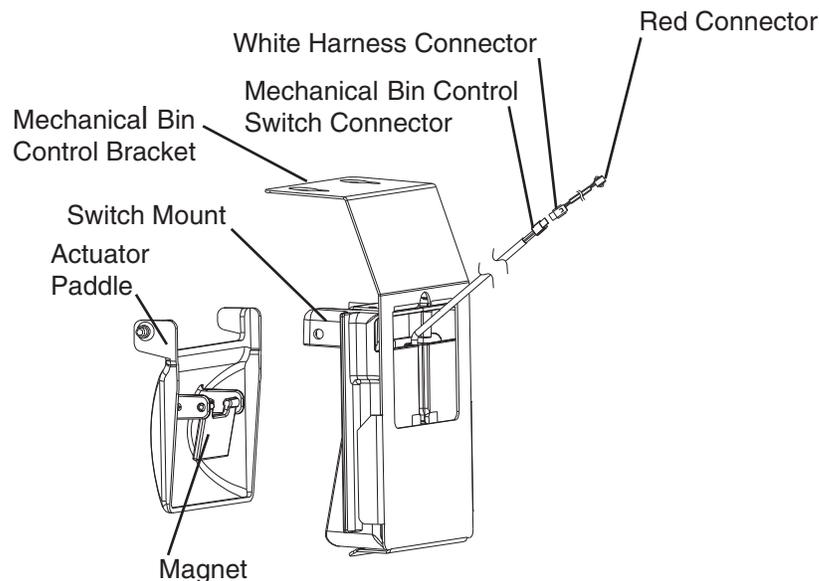


Fig. 1

D. Float Switch Check and Cleaning

1. Float Switch Check

To check the float switch, follow the steps below.

- 1) Turn off the power supply.
- 2) Remove the front panel and move the control switch to the "OFF" position.
- 3) Remove the base cover, then disconnect one end of the pump tubing to drain the water tank. See Fig. 2. After the water tank has drained, reconnect the pump tubing.
- 4) Remove the control box cover.
- 5) Disconnect the black float switch connector from the control board BLACK K5 connector.
- 6) Check for continuity across the float switch leads. With the water tank empty, the float switch should be open. If open, continue to step 7. If closed, follow the steps in "IV. D.2. Float Switch Cleaning." After cleaning the float switch, check it again. Replace if necessary.
- 7) Reconnect the black float switch connector, then replace the control box cover in its correct position.
- 8) Move the control switch to the "ICE" position. Replace the front panel in its correct position, then turn on the power supply. After 1 minute, the 1-minute fill cycle should end and the initial harvest cycle should begin. If the initial harvest cycle begins, the float switch is good and the check is complete. If the initial harvest cycle does not begin, continue to step 9.
- 9) Turn off the power supply.
- 10) Remove the front panel.
- 11) Move the control switch to the "OFF" position.
- 12) Remove the control box cover.
- 13) Disconnect the black float switch connector from the control board BLACK K5 connector.
- 14) Check for continuity across the float switch leads. With the water tank full, the float switch should be closed. If the float switch is closed and the icemaker will not switch from the 1-minute fill cycle to the initial harvest cycle, replace the control board. See "V.P. Removal and Replacement of Control Board."

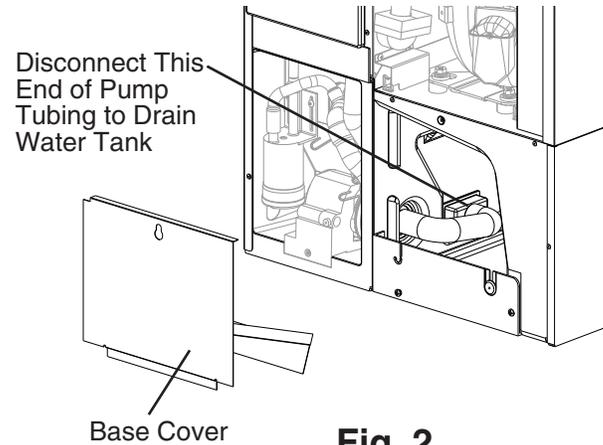


Fig. 2

If the float switch is open, confirm that the water tank is full. If the tank is not full, check the water supply, water filters, and inlet water valve. If the tank is full, follow the steps in "IV.D.2. Float Switch Cleaning." After cleaning the float switch, check it again. Replace if necessary.

2. Float Switch Cleaning

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

- 1) Turn off the power supply.
- 2) Remove the front panel, then move the control switch to the "OFF" position.
- 3) Remove the base cover, then disconnect one end of the pump tubing to drain the water tank. See Fig. 2. After the water tank has drained, reconnect the pump tubing.
- 4) Disconnect the vent tube and the flush tube from the top of the float switch, then remove the float switch assembly and remove the float switch assembly and remove the rubber boot from the bottom of the float switch assembly. See Fig. 3.
- 5) Remove the retainer rod from the bottom of the float switch housing, then remove the float. Be careful not to bend the retainer rod excessively when removing it.
- 6) Wipe down the float switch housing, shaft, float, and retainer rod with a mixture of 1 part of recommended cleaner Hoshizaki "Scale Away" or "LIME-A-WAY" (Economics Laboratory, Inc.) and 25 parts of warm water. Clean the inside of the rubber boot and hose with cleaning solution. Rinse the parts thoroughly with clean water.
- 7) Reassemble the float switch assembly and replace it and the rubber boot in their correct positions. Reconnect the vent tube and the flush tube.
- 8) Move the control switch to the "ICE" position.
- 9) Replace the front panel in its correct position.

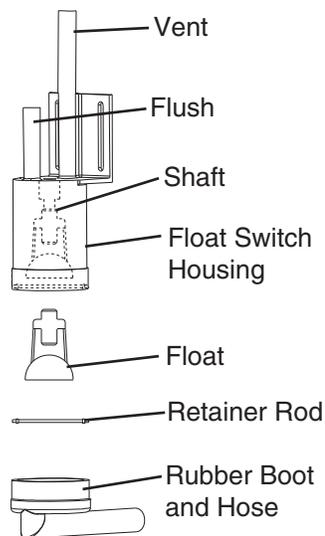


Fig. 3

E. Thermistor Check

To check thermistor resistance, follow the steps below.

- 1) Turn off the power supply.
- 2) Remove the front panel, then move the control switch to the "OFF" position.
- 3) Remove the control box cover.
- 4) Remove the thermistor. See "V.L. Removal and Replacement of Thermistor."
- 5) Immerse the thermistor sensor portion in a glass containing ice and water for 2 or 3 minutes.
- 6) Remove the white thermistor connector from the control board WHITE K3 connector and check the resistance between thermistor leads. Normal reading is within 4.7 to 6.2 k Ω . If outside the normal reading, replace the thermistor. If inside the normal reading, continue to the next step.
- 7) Replace the thermistor in its correct position. See "V.L. Removal and Replacement of Thermistor."
- 8) Reconnect the white thermistor connector to the control board WHITE K3 connector.
- 9) Replace the control box cover in its correct position, then turn on the power supply.
- 10) Move the control switch to the "ICE" position.
- 11) Once the harvest cycle starts, begin timing the harvest cycle.
- 12) The harvest timer should expire and terminate the harvest cycle within 2 to 3 minutes. If the harvest timer does not expire and terminate the harvest cycle, the harvest timer is bad and the control board should be replaced. See "V.P. Removal and Replacement of Control Board."

F. Diagnostic Charts

1. No Ice Production

Problem	Possible Cause	Remedy	
[1] The icemaker will not start.	a) Power Supply	1. Off, blown fuse, or tripped breaker.	1. Turn on, replace, or reset.
		2. Loose connection.	2. Tighten.
		3. Bad contacts.	3. Check for continuity and replace.
		4. Not within specifications.	4. Refer to nameplate and correct.
	b) Transformer (115V primary) (3 phase only)	1. Voltage tap switch does not match incoming voltage.	1. Verify incoming voltage, move switch to proper setting.
		2. Coil winding open or shorted.	2. Replace.
	c) Water Supply	1. Water supply off or pressure too low.	1. Check and get recommended pressure.
	d) Thermostatic Bin Control	1. Tripped with bin filled with ice.	1. Remove ice.
		2. Ambient temperature too cool.	2. Increase ambient temperature.
		3. Set too warm.	3. See "IV.C.1. Thermostatic Bin Control Check."
		4. Bulb out of position.	4. Place in position.
		5. Bad contacts.	5. Check for continuity and replace.
	e) Fuse (Control Box)	1. Blown.	1. Check for short circuit and replace.
	f) Control Switch	1. "OFF" or "WASH" position.	1. Move to "ICE" position.
		2. Bad contacts.	2. Check for continuity and replace.
	g) High Pressure Control	1. Bad contacts.	1. Check for continuity and replace.
		2. Dirty air filter or condenser.	2. Clean.
		3. Ambient or condenser water temperature too warm.	3. Reduce temperature.
		4. Refrigerant overcharged.	4. Recover, evacuate, and recharge.
		5. Fan not operating (except water-cooled model).	5. See chart 1.[7].
		6. Refrigerant lines or components restricted.	6. Recover, repair, replace drier, evacuate and recharge.
		7. Condenser water pressure too low or off (water-cooled model).	7. Check and get recommended pressure.

Problem	Possible Cause		Remedy
[1] The icemaker will not start. (continued)	h) Transformer	1. Coil winding open or shorted.	1. Replace.
	i) Wiring to Control Board	1. Loose connections or open.	1. Check for continuity and replace.
	j) Interlock Switch (Cleaning Valve)	1. Open position.	1. Move to closed position.
		2. Bad contacts.	2. Check for continuity and replace.
	k) Mechanical Bin Control	1. Movement restricted.	1. Check and free.
		2. Defective	2. See "IV.C.2. Mechanical Bin Control Check and Cleaning."
	l) Thermistor	1. Leads shorted or open and high temperature or harvest backup timer safety operates (1 beep or 2 beep alarm).	1. See "IV.E. Thermistor Check."
	m) Hot Gas Valve	1. Continues to open in freeze cycle and freeze timer safety operates (3 beep alarm).	1. Check for hot gas valve stuck open and replace.
	n) Inlet Water Valve	1. Mesh filter or orifice gets clogged and water supply cycle does not finish.	1. Clean.
		2. Coil winding open.	2. Replace.
3. Wiring to inlet water valve.		3. Check for loose connection or open, and replace.	
o) Float Switch	1. Bad contacts.	1. Check for continuity and replace.	
	2. Defective switch.	2. Clean or replace. See "IV. D. Float Switch Check and Cleaning."	
p) Control Board	1. Defective or in alarm.	1. See "IV.B. Control Board Check."	
[2] Fill cycle will not terminate.	a) Water Supply	1. Water supply off or pressure too low.	1. Check and get recommended pressure.
	b) Float Switch	1. Connector disconnected.	1. Reconnect.
		2. Float does not move freely or switch defective switch.	2. Clean or replace. See "IV. D. Float Switch Check and Cleaning."
c) Control Board	1. Defective.	1. See "IV.B. Control Board Check."	

Problem	Possible Cause		Remedy	
[3] Compressor will not start or stops operating.	a) Magnetic Contactor	1. Bad contacts.	1. Check for continuity and replace.	
		2. Coil winding open.	2. Replace.	
	b) Start Capacitor or Run Capacitor	1. Defective.	1. Replace.	
		c) Internal Overload Protector Open (check 1 through 3 to the right and d through f below)	1. Loose terminal.	1. Tighten or replace.
			2. Voltage.	2. Check and correct.
	d) Starter	3. Dirty condenser.	3. Clean.	
		1. Bad contacts.	1. Check and replace.	
			2. Coil winding open.	2. Replace.
	e) Compressor	1. Power supply not within specifications.	1. Refer to nameplate and correct.	
		2. Wiring to compressor.	2. Check for loose connection or open, and replace.	
		3. Defective.	3. Replace.	
		4. Protector tripped.	4. Reduce temperature.	
	f) Control Board	1. No power to contactor.	1. See "IV.B. Control Board Check."	
[4] Water continues to be supplied in freeze cycle.	a) Water Pressure	1. Too high.	1. Reduce.	
	b) Inlet Water Valve	1. Diaphragm does not close.	1. Check for water leaks with icemaker off.	
	c) Control Board	1. Defective.	1. See "IV.B. Control Board Check."	
[5] Pump motor will not start.	a) Pump Motor	1. Motor winding open.	1. Replace.	
		2. Bearing worn out.	2. Replace.	
		3. Wiring to pump motor.	3. Check for loose connection or open, and replace.	
		4. Defective capacitor.	4. Replace.	
		5. Defective or bound impeller.	5. Replace and clean.	
		6. Mechanical seal worn out.	6. Check and replace.	
	b) Control Board	1. Defective.	1. See "IV.B. Control Board Check."	
c) Control Switch	1. Bad contacts.	1. Replace.		
[6] Freeze cycle time is too short.	a) Pump-Out Check Valve	1. Leaking by.	1. Clean or replace.	
	b) Float Switch	1. Dirty or erratic operation.	1. Clean or replace. See "IV. D. Float Switch Check and Cleaning."	
	c) Control Board	1. Defective.	1. See "IV.B. Control Board Check."	
	d) Water System	1. Water leaks.	1. Check connections for water leaks and repair.	

Problem	Possible Cause	Remedy	
[7] Fan motor will not start, or is not operating (except water-cooled model).	a) Fan Motor	1. Motor winding open.	1. Replace.
		2. Bearing worn out.	2. Replace.
		3. Wiring to fan motor.	3. Check for loose connection or open, and replace.
		4. Defective capacitor.	4. Replace.
		5. Fan blade bound.	5. Check and replace.
	b) Control Board	1. Defective.	1. See "IV.B. Control Board Check."
[8] All components run, but no ice is produced.	a) Refrigerant	1. Low charge.	1. Check for leaks. Recover, repair, evacuate, and recharge.
		2. Air or moisture trapped.	2. Recover, replace drier, evacuate, and recharge.
	b) Compressor	1. Defective.	1. Replace.
	c) Hot Gas Valve	1. Continues to open in freeze cycle.	1. Check and replace.
	d) Liquid Line Valve (if applicable)	1. Continues to close in freeze cycle.	1. Check and replace.
	e) Inlet Water Valve	1. Inlet water valve is wide open during freeze.	1. Check for water leaks with icemaker off.
	f) Expansion Valve	1. Bulb loose.	1. Secure bulb.
		2. Operating erratically.	2. Check and replace.
	g) Headmaster (C.P.R.) (remote condenser unit)	1. Not operating properly and liquid line temperature too warm.	1. Replace headmaster.
	h) Water Supply Line (water-cooled model)	1. Condenser water pressure too low or off and high pressure control opens and closes frequently.	1. Check and get recommended pressure.
i) Water Regulating Valve (water-cooled model)	1. Set too high.	1. Adjust or replace. See "V.J. Adjustment of Water Regulating Valve."	

2. Evaporator is Frozen Up

Problem	Possible Cause	Remedy	
[1] Freeze cycle time is too long.	a) Inlet Water Valve	1. Diaphragm does not close.	1. Check for water leaks with icemaker off.
	b) Float Switch	1. Float does not move freely or defective switch.	1. Clean or replace. See "IV. D. Float Switch Check and Cleaning."
	c) Evaporator	1. Scaled up.	1. Clean.
		2. Damaged.	2. Replace.
	d) Spray Tubes	1. Dirty.	1. Clean.
		2. Out of position.	2. Place in position.
	e) Pump Motor	1. RPM too slow.	1. See chart 1.[5].

Problem	Possible Cause	Remedy	
[1] Freeze cycle time is too long. (continued)	f) Thermistor	1. Disconnected, loose, or defective.	1. Connect, secure, check. See "V.L. Removal and Replacement of Thermistor."
	g) Refrigerant	1. Low charge.	1. Check for leaks. Recover, repair, evacuate, and recharge.
	h) Expansion Valve	1. Bulb loose.	1. Secure bulb.
		2. Operating erratically.	2. Check and replace.
i) Control Board	1. Defective.	1. See "IV.B. Control Board Check."	
[2] All ice formed on evaporator does not fall into bin in harvest cycle.	a) Evaporator	1. Scaled up.	1. Clean.
		2. Damaged.	2. Replace.
	b) Ambient and/or Water Temperature	1. Too cool.	1. Increase temperature.
	c) Water Supply Line	1. Water pressure too low.	1. Check and get recommended pressure.
	d) Water System	1. Water supply line too small; requires 3/8" OD line dedicated per machine.	1. Increase water line size.
		2. Water filter clogged or flow rate too small.	2. Replace filter or install a higher flow rate filter.
	e) Inlet Water Valve	1. Dirty mesh filter or orifice.	1. Clean.
		2. Diaphragm does not close.	2. Check for water leaks with icemaker off.
	f) Spray Tubes	1. Dirty.	1. Clean.
		2. Out of position.	2. Place in position.
	g) Thermistor	1. Disconnected, loose, or defective.	1. Connect, secure, check. See "V.L. Removal and Replacement of Thermistor."
	h) Hot Gas Valve	1. Coil winding open.	1. Replace.
		2. Plunger does not move.	2. Replace.
		3. Wiring to hot gas valve.	3. Check for loose connection or open, and replace.
	i) Expansion Valve	1. Bulb loose.	1. Secure bulb.
		2. Operating erratically.	2. Check and replace.
	j) Liquid Line Valve (if applicable)	1. Continues to open in harvest cycle.	1. Check operation in harvest cycle and replace.
k) Control Board	1. Harvest timer is set too short.	1. Adjust longer, referring to "II.C.3.b) Harvest Timer (S4 dip switch 1 & 2)."	
	2. Defective.	2. See "IV.B. Control Board Check."	

Problem	Possible Cause	Remedy	
[2] All ice formed on evaporator does not fall into bin in harvest cycle. (continued)	l) Refrigerant	1. Low charge.	1. Check for leaks. Recover, repair, evacuate, and recharge.
	m) Water Regulating Valve (water-cooled model)	1. Leaking by in harvest.	1. Check and replace.
[3] Other.	a) Ice Cube Guide	1. Out of position.	1. Place in position.
	b) Thermostatic Bin Control	1. Bulb out of position.	1. Place in position.
		2. Bad contacts.	2. Check for continuity and replace. See "IV.C.1. Thermostatic Bin Control Check."
	c) Mechanical Bin Control	1. Movement restricted.	1. Check and free.
		2. Defective.	2. See "IV.C.2. Mechanical Bin Control Check and Cleaning."

3. Low Ice Production

Problem	Possible Cause	Remedy	
[1] Freeze cycle time is long.	a) Inlet Water Valve	1. Diaphragm does not close.	1. Check for water leaks with icemaker off.
	b) Float Switch	1. Float switch does not move freely or switch defective.	1. Clean or replace. See "IV. D. Float Switch Check and Cleaning."
	c) Evaporator	1. Scaled up.	1. Clean.
		2. Damaged.	2. Replace.
	d) Spray Tubes	1. Dirty.	1. Clean.
		2. Out of position.	2. Place in position.
	e) Pump Motor	1. RPM too slow.	1. See chart 1.[5].
	f) Condenser (except water-cooled model)	1. Air filter or condenser clogged.	1. Clean.
	g) Refrigerant Charge	1. Low charge.	1. Check for leaks. Recover, repair, evacuate, and recharge.
	h) Hot Gas Valve	1. Open.	1. Check and replace.
	i) Expansion Valve	1. Bulb loose.	1. Secure bulb.
		2. Operating erratically.	2. Check and replace.
	j) Compressor	1. Erratic or off.	1. See chart 1.[3].
	k) Condenser Water (water-cooled model)	1. Water regulating valve set too high.	1. Adjust or replace. See "V.J. Adjustment of Water Regulating Valve."
2. Condenser water pressure too low.		2. Check and get recommended pressure.	
3. Water temperature out of specification.		3. Correct to specification.	
l) Liquid Line Valve	1. Erratic, sticking.	1. Check and replace.	
m) Headmaster (C.P.R.) (remote condenser unit)	1. Bypassing.	1. Replace.	

Problem	Possible Cause		Remedy
[1] Freeze cycle time is long. (continued)	n) Control Board	1. Float switch connection loose (K5).	1. Check and reconnect.
		2. Defective.	2. See "IV.B. Control Board Check."
[2] Harvest cycle time is long.	a) Water Supply	1. Water temperature too cold.	1. Increase temperature.
	b) Thermistor	1. Disconnected, loose, or defective.	1. Connect, secure, check. See "V.L. Removal and Replacement of Thermistor" and "IV.E. Thermistor Check."
	c) Control Board	1. Not reading thermistor.	1. Check and replace. See "IV.E. Thermistor Check."
		2. Sending voltage to liquid line valve (if applicable) in harvest.	2. Check and replace. See "IV.B. Control Board Check."
	d) Inlet Water Valve	1. Clogged.	1. Clean or replace.
	e) Evaporator	1. Scaled up.	1. Clean.
		2. Damaged.	2. Replace.
	f) Hot Gas Valve	1. Does not open, or opens partially.	1. Check and replace.
	g) Expansion Valve	1. Wide open in harvest.	1. Check and replace.
		2. Bulb loose.	2. Secure bulb.
h) Water Regulating Valve (water-cooled model)	1. Open during harvest.	1. Adjust or replace. See "V.J. Adjustment of Water Regulating Valve."	
i) Liquid Line Valve (if applicable)	1. Open during harvest cycle.	1. Check and replace.	

4. Abnormal Ice

Problem	Possible Cause		Remedy
[1] Small cubes.	a) Pump-Out Check Valve	1. Dirty or worn and leaking by.	1. Clean or replace.
	b) Ice Cube Guide	1. Out of position. Circulated water falls into bin.	1. Place in position.
	c) Water System	1. Water supply line too small; requires 3/8" OD line dedicated per machine.	1. Increase water line size.
		2. Water filter clogged or flow rate too small.	2. Replace filter or install a higher flow rate filter.
	d) Inlet Water Valve	1. Dirty mesh filter or orifice.	1. Clean.
	e) Pump Motor	1. RPM too slow.	1. See chart 1.[5].
f) Control Board	1. Defective.	1. See "IV.B. Control Board Check."	

Problem	Possible Cause	Remedy	
[2] Cloudy or irregular cubes.	a) Evaporator	1. Frozen up.	1. See chart 2.
		2. Scaled up.	2. Clean
		3. Damaged.	3. Replace.
	b) Water System	1. Water supply line too small; requires 3/8" OD line dedicated per machine.	1. Increase water line size.
		2. Water filter clogged or flow rate too small.	2. Replace filter or install a higher flow rate filter.
		3. High hardness or contains impurities.	3. Install a water softener or filter.
	c) Spray Guide	1. Dirty.	1. Clean.

5. Other

Problem	Possible Cause	Remedy	
[1] Icemaker will not stop when bin is filled with ice.	a) Thermostatic Bin Control	1. Set too cold.	1. See "IV.C.1. Thermostatic Bin Control Check."
		2. Defective.	2. Replace.
	b) Mechanical Bin Control	1. Movement restricted.	1. Check and free.
		2. Loose connection.	2. Check and reconnect.
		3. Defective	3. See "IV.C.2. Mechanical Bin Control Check and Cleaning."
	c) Control Board ("G" control board with mechanical bin control)	1. Defective.	1. See "IV.B. Control Board Check."
[2] Abnormal noise.	a) Pump Motor	1. Bearings worn out.	1. Replace.
	b) Fan Motor (except water-cooled model)	1. Bearings worn out.	1. Replace.
		2. Fan blade deformed.	2. Replace.
		3. Fan blade does not move freely.	3. Replace.
	c) Compressor	1. Bearings worn out or cylinder valve broken.	1. Replace.
		2. Mounting pad out of position.	2. Reinstall.
	d) Refrigerant Lines	1. Rub or touch other lines or surfaces.	1. Reposition.
	[3] Ice in storage bin often melts.	a) Drain Line(s)	1. Plugged.
b) Icemaker and Bin		1. Drains not run separately.	1. Separate the drain lines.
c) Ice Cube Guide		1. Out of position. Circulated water falls into bin.	1. Place in position.

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 control switch to the "OFF" position and turn off the power supply before servicing.
3. **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 storage bin.
4. Make sure all food zones in the icemaker and storage bin are clean after the unit is serviced. For cleaning procedures, see "VI. Cleaning and Maintenance."

A. Service for Refrigerant Lines

⚠ WARNING

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

CAUTION

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

1. Refrigerant Recovery

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

2. Brazing

⚠ WARNING

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

- 1) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.
Note: Because the pipes in the evaporator case are specially coated to resist corrosion, it is important to make connections outside the evaporator case when possible. If it is necessary to braze inside the evaporator case, use sandpaper to remove the coating from the brazing connections before unbrazing the components.

⚠ 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 the charging hoses to both high and low-side access valves.

⚠ IMPORTANT

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

- 2) Turn on the vacuum pump. Open the gauge manifold 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. For air-cooled and water-cooled models, see the nameplate for the required refrigerant charge. For remote air-cooled models, see the rating label inside the icemaker. Hoshizaki recommends only virgin refrigerant or reclaimed refrigerant which meets ARI Standard 700 (latest edition) be used.
- 6) A liquid charge is recommended for charging an R-404A system. Invert the service cylinder and place it on scales. Open the high-side valve on the gauge manifold.
- 7) Allow the system to charge with liquid until the proper charge weight is met.
- 8) If necessary, add any remaining charge to the system through the low-side. Use a throttling valve or liquid dispensing device to add the remaining liquid charge through the low-side access valve with the unit running.
- 9) Close the gauge manifold valves and disconnect the gauge manifold hoses.
- 10) Cap the access valves to prevent a possible leak.

B. Removal and Replacement of Compressor

CAUTION

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

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

- 1) Turn off the power supply.
- 2) Remove the panels.
- 3) Recover the refrigerant and store it in an approved container.
- 4) Remove the terminal cover on the compressor and disconnect the compressor wiring. On remote air-cooled models, disconnect the crankcase heater.
- 5) Remove the discharge, suction, and process pipes.
- 6) Remove the hold-down bolts, washers, and rubber grommets.
- 7) Remove the compressor. Unpack the new compressor package.

- 8) Attach the rubber grommets of the prior compressor to the new compressor.
- 9) Place the compressor in position and secure it using the bolts and washers.
- 10) Remove the drier, then place the new drier in position.
- 11) Remove the plugs from the suction, discharge, and process pipes.
- 12) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.
- 13) Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.
- 14) Evacuate the system and charge it with refrigerant. For air-cooled and water-cooled models, see the nameplate for the required refrigerant charge. For remote air-cooled models, see the rating label inside the icemaker.
- 15) Connect the terminals and replace the terminal cover in its correct position. On remote air-cooled models, connect the crankcase heater.
- 16) Replace the panels in their correct positions.
- 17) Turn on the power supply.

C. Removal and Replacement of Expansion Valve

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

CAUTION

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

- 1) Turn off the power supply.
- 2) Remove the panels.
- 3) Recover the refrigerant and store it in an approved container.
- 4) Remove the insulation and the expansion valve bulb on the suction line.
- 5) Remove the expansion valve cover and disconnect the expansion valve. Place the new expansion valve in position.
- 6) Remove the drier, then place the new drier in position.
- 7) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.

- 8) Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.
- 9) Evacuate the system, and charge it with refrigerant. For air-cooled and water-cooled models, see the nameplate for the required refrigerant charge. For remote air-cooled models, see the rating label inside the icemaker.
- 10) Attach the expansion valve bulb to the suction line in the same location as the previous bulb. The bulb should be between the 10 and 2 o'clock position on the tube. Be sure to secure the bulb with the clamp and holder and to insulate it.
- 11) Place the expansion valve cover in position.
- 12) Replace the panels in their correct positions.
- 13) Turn on the power supply.

D. Removal and Replacement of Hot Gas Valve or Liquid Line Valve

CAUTION

1. Always use a copper tube of the same diameter and length when replacing the valve lines; otherwise, performance may be affected.
2. Always replace the strainer when replacing the hot gas valve.
3. Always install a new drier every time the sealed refrigeration system is opened.
4. 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.
5. When brazing, protect the valve body and drier by using wet cloths to prevent the valve body and drier from overheating. Do not allow the valve body or drier to exceed 250°F (121°C).

- 1) Turn off the power supply.
- 2) Remove the panels.
- 3) Recover the refrigerant and store it in an approved container.
- 4) Remove the bolt and the solenoid.
- 5) Disconnect the valve. If replacing the hot gas valve, also remove the strainer.
- 6) Place the new valve and strainer (if applicable) in position.
- 7) Remove the drier, then place the new drier in position.
- 8) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.
- 9) Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.

- 10) Evacuate the system, and charge it with refrigerant. For air-cooled and water-cooled models, see the nameplate for the required refrigerant charge. For remote air-cooled models, see the rating label inside the icemaker.
- 11) Replace the solenoid in its correct position.
- 12) Replace the panels in their correct positions.
- 13) Turn on the power supply.

E. 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) Turn off the power supply.
- 2) Remove the panels and the front and top insulation.
- 3) Recover the refrigerant and store it in an approved container.
- 4) Remove the spray tubes. Remove the insulation at the notch where the refrigeration tubing passes through the molded chassis.
- 5) Disconnect the evaporator tubing.
Note: The pipes in the evaporator case are specially coated to resist corrosion. Use sandpaper to remove the coating from the brazing connections before unbrazing.
- 6) Remove the pop rivets securing the evaporator, then lift out the evaporator.
- 7) Install the new evaporator.
- 8) Remove the drier, then place the new drier in position.
- 9) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.
- 10) Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.
- 11) Evacuate the system, and charge it with refrigerant. For air-cooled and water-cooled models, see the nameplate for the required refrigerant charge. For remote air-cooled models, see the rating label inside the icemaker.
- 12) Replace the removed parts in the reverse order of which they were removed.
- 13) Replace the top insulation and the panels in their correct positions.
- 14) Turn on the power supply.

F. Removal and Replacement of Air-Cooled Condenser

CAUTION

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

- 1) Turn off the power supply.
- 2) Remove the panels.
- 3) Recover the refrigerant and store it in an approved container.
- 4) Disconnect the fan motor wiring harness. Remove the bolts securing the fan motor assembly to the floor of the machine, then remove the assembly.
- 5) Disconnect the condenser inlet and outlet piping.
- 6) Remove the screws securing the condenser assembly, then remove the assembly.
- 7) Remove the shroud from the old condenser and attach it to the new condenser.
- 8) Install the new condenser.
- 9) Remove the drier, then place the new drier in position.
- 10) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.
- 11) 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.
- 12) Evacuate the system, and charge it with refrigerant. See the nameplate for the required refrigerant charge.
- 13) Replace the removed parts in the reverse order of which they were removed.
- 14) Replace the panels in their correct positions.
- 15) Turn on the power supply.

G. Removal and Replacement of Water-Cooled Condenser

CAUTION

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

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

H. Removal and Replacement of Remote Air-Cooled Condenser

CAUTION

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

- 1) Turn off the power supply.
- 2) Remove the icemaker panels.
- 3) Recover the refrigerant and store it in an approved container.
- 4) Remove the condenser unit panels.
- 5) Disconnect the condenser inlet and outlet piping.
- 6) Remove the screws securing the condenser to the base of the unit, then remove the condenser.
- 7) Remove the shroud from the condenser and attach to the new condenser.
- 8) Install the new condenser.
- 9) Remove the drier (located in the icemaker), then place the new drier in position.
- 10) Braze all fittings while purging with nitrogen gas flowing at a pressure of 3 to 4 PSIG.
- 11) 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.
- 12) Evacuate the system, and charge it with refrigerant. See the rating label inside the icemaker for the required refrigerant charge.
- 13) Replace the panels in their correct positions.
- 14) Turn on the power supply.

I. Removal and Replacement of Water Regulating Valve (water-cooled model)

CAUTION

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

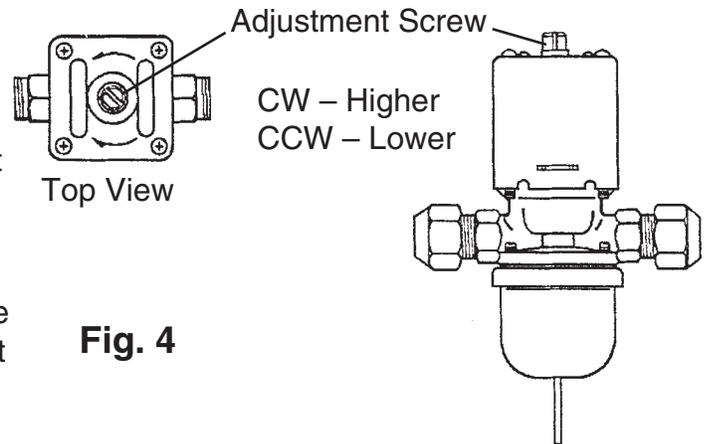
- 1) Turn off the power supply.
- 2) Remove the panels.
- 3) Close the condenser water supply line shut-off valve. If connected to a closed loop water supply, also close the condenser return outlet shut-off valve.
- 4) Open the condenser water supply line drain valve. If connected to a closed loop water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

- 18) Check for water leaks.
- 19) Replace the panels in their correct positions.
- 20) Turn on the power supply.

J. Adjustment of Water Regulating Valve (water-cooled model)

The water regulating valve (also called "water regulator") is factory set, and generally no adjustment is required. However, when necessary, adjust the water regulator using the following procedures.

- 1) Prepare a thermometer to check the condenser drain temperature. Attach a pressure gauge to the high-side line of the system.
- 2) Five minutes after a freeze cycle starts, confirm that the thermometer reads 104°F to 115°F (40°C to 46°C). If it does not, rotate the adjustment screw by using a flat blade screwdriver until the temperature is in the proper range. See Fig. 4. Next, check that the reference pressure is in the range indicated in the Head Pressure table in the Performance Data section. If it is not in the proper range, verify the refrigerant charge.
- 3) Check that the condenser drain temperature is stable.



K. Removal and Replacement of Headmaster (Condensing Pressure Regulator - C.P.R.) (remote air-cooled model)

CAUTION

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

- 1) Turn off the power supply.
- 2) Remove the panels from the remote condenser unit.
- 3) Recover the refrigerant and store it in an approved container.
- 4) Before heating, break off the stub on the dome to release the dome charge.
- 5) Disconnect the headmaster.
- 6) Place the new headmaster in position.
- 7) Remove the drier, then place the new drier in position.

- 8) Braze all fittings with nitrogen gas flowing at a pressure of 3 to 4 PSIG.
- 9) Use an electronic leak detector or soap bubbles to check for leaks. Add a trace of refrigerant to the system (if using an electronic leak detector), and then raise the pressure using nitrogen gas (140 PSIG). DO NOT use R-404A as a mixture with pressurized air for leak testing.
- 10) Evacuate the system and charge it with refrigerant. See the rating label inside the icemaker, for the required refrigerant charge.
- 11) Replace the panels in their correct positions.
- 12) Turn on the power supply.

L. Removal and Replacement of Thermistor

This section covers removal and replacement of the thermistor. For a thermistor check procedure, see "IV.E. Thermistor Check."

CAUTION

1. The thermistor is fragile; handle very carefully.
2. Always use the recommended sealant (high thermal conductive type), Model KE4560RTV manufactured by SHINETSU SILICONE, Part Code 60Y000-11, or Part Code 4A0683-01 or equivalent.
3. Always use the recommended foam insulation (non-absorbent type) or equivalent.
4. Do not shorten or cut the thermistor leads.

- 1) Turn off the power supply.
- 2) Remove the panels.
- 3) Remove the control box cover.
- 4) Disconnect the white thermistor connector from the control board WHITE K3 connector.
- 5) Remove the plastic cable ties, foam insulation, thermistor holder, and thermistor. See Fig. 5.
- 6) Scrape away the old sealant on the thermistor holder and the suction pipe.
- 7) Wipe off moisture or condensation on the suction pipe.
- 8) Smoothly apply recommended sealant (KE4560RTV, Part Code 60Y000-11 or 4A0683-01) to the thermistor holder concave.
- 9) Attach the new thermistor to the suction pipe in the same position as the previous thermistor. Be very careful to prevent damage to the leads. Secure it using the thermistor holder and recommended foam insulation.

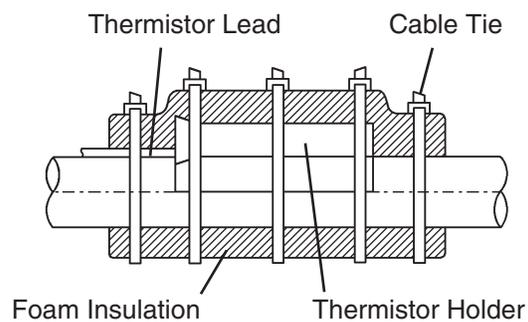


Fig. 5

- 10) Secure the insulation using plastic cable ties.
- 11) Connect the white thermistor connector through the bushing of the control box to the control board WHITE K3 connector.
Note: Do not cut the leads of the thermistor.
- 12) Replace the control box cover and the panels in their correct positions.
- 13) Turn on the power supply.

M. Removal and Replacement of Fan Motor (air-cooled and remote

air-cooled models)

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

- 1) Turn off the power supply.
- 2) Remove the panels.
- 3) Remote air-cooled model: remove the junction box cover from the remote condenser unit.
- 4) Disconnect the fan motor wires.
- 5) Remove the fan motor bracket and fan motor.
- 6) Install the new fan motor, connect the fan motor wires, and replace the removed parts in the reverse order of which they were removed.
- 7) Replace the panels in their correct positions.
- 8) Remote air-cooled model: replace the junction box cover in its correct position.
- 9) Turn on the power supply.

N. Removal and Replacement of Inlet Water Valve

- 1) Turn off the power supply.
- 2) Close the icemaker water supply line shut-off valve. Open the icemaker water supply line drain valve.
- 3) Remove the front panel.
- 4) Disconnect the valve outlet tubing by releasing the clamp.
- 5) Loosen the fitting nut. Be careful not to lose the washer.
- 6) Disconnect the terminals from the inlet water valve.
- 7) Remove the bracket and valve from the unit.
- 8) Install the new valve. Replace the removed parts in the reverse order of which they were removed. Make sure the washer is in place in the fitting nut.
- 9) Close the icemaker water supply line drain valve. Open the icemaker water supply line shut-off valve.
- 10) Turn on the power supply.
- 11) Check for leaks.

- 12) Replace the front panel in its correct position.
- 13) Turn on the power supply.

O. Removal and Replacement of Pump Motor

- 1) Turn off the power supply.
- 2) Remove the front panel.
- 3) Remove the base cover, then disconnect one end of the pump tubing to drain the water tank. See Fig. 6. After the water tank has drained, reconnect the pump tubing.
- 5) Disconnect the pump suction and discharge hoses.
- 6) Remove the closed end connectors from the pump motor leads.
- 7) Remove the screw attaching the pump motor assembly to the base, then remove the pump motor assembly.
- 8) Remove the screw attaching the pump motor to the pump motor bracket.
- 9) Remove the screws attaching the pump housing to the pump motor. Remove the housing and check the impeller.
- 10) If the impeller is defective, install a new impeller.
- 11) Install the new motor or new parts, and replace the removed parts in the reverse order of which they were removed. Be sure to reattach the green ground wire.
- 12) Turn on the power supply and check for leaks.
- 13) Replace the base cover in its correct position.
- 14) Replace the front panel in its correct position.

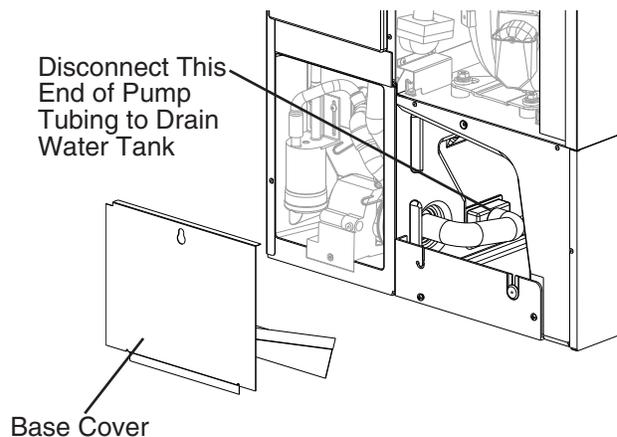


Fig. 6

P. Removal and Replacement of Control Board

When replacing a control board follow the precautions below.

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 unit 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 K3, K4, and K5, because the same connector is used for the thermistor, mechanical bin control, and float switch. K4 is not used on "E" control board models.
5. Always replace the whole control board assembly if it goes bad.
6. Do not short out power supply to test for voltage.

- 1) Turn off the power supply.
- 2) Remove the front panel and the control box cover.
- 3) Disconnect the control board connectors from the control board.
- 4) Remove the control board.
- 5) Adjust the dip switches on the new control board to the factory default settings. See "II. C.3.a) Default Dip Switch Settings." **CAUTION! Do not adjust S4 dip switch 7 out of the factory default position on this model. This dip switch must be left in the factory default position or this unit will not operate correctly.**
- 6) Install the new control board taking care not to damage it.
- 7) Connect the control board connectors to the new control board.
- 8) Replace the control box cover and front panel in their correct positions.
- 9) Turn on the power supply.

VI. Cleaning and Maintenance

⚠ WARNING

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

A. Cleaning and Sanitizing Instructions

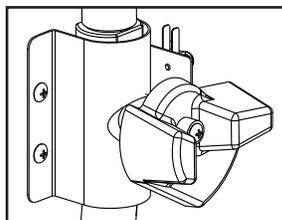
Hoshizaki recommends cleaning and sanitizing this unit at least once a year. More frequent cleaning and sanitizing, however, may be required in some existing water conditions.

⚠ 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. To prevent damage to the water pump seal, do not operate the icemaker with the control switch in the "WASH" position when the water tank is empty.

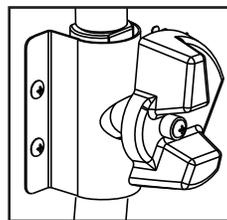
IMPORTANT

1. The cleaning valve is opened during cleaning and sanitizing to allow solution flow to the inside of the evaporator. It should be closed for all icemaking operation. The compressor will not operate unless this valve is completely closed.
2. To close the cleaning valve, the valve handle should be at a right angle to the valve body. To open the cleaning valve, the valve handle should be parallel to the valve body.



CLOSED

Normal Icemaking Operation



OPEN

Cleaning and Sanitizing Operation
(allows solution flow to the inside
of the evaporator)

1. Cleaning Procedure

- 1) Dilute 16 fl. oz. (473 ml) of the recommended cleaner Hoshizaki "Scale Away" or "LIME-A-WAY" (Economics Laboratory, Inc.) with 3 gal. (11 l) of warm water.
- 2) Remove all ice from the evaporator and the storage bin.
Note: To remove cubes on the evaporator, turn off the power supply and turn it back on after 3 minutes. The harvest cycle starts and the cubes will be removed from the evaporator.

- 3) Turn off the power supply.
- 4) Remove the front panel, then remove the insulation panel by lifting up the panel slightly and pulling it towards you.
- 5) Remove the base cover, then disconnect one end of the pump tubing to drain the water tank. See Fig. 7. After the water tank has drained, reconnect the pump tubing.

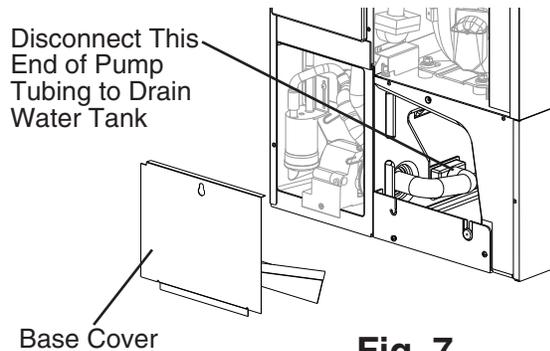


Fig. 7

- 6) In bad or severe water conditions, clean the float switch assembly as described below. Otherwise, continue to step 7.
 - a. Disconnect the vent tube and the flush tube from the top of the float switch, then remove the float switch assembly. Remove the rubber boot from the bottom of the assembly.
 - b. Remove the retainer rod from the bottom of the float switch housing, then remove the float. Be careful not to bend the retainer rod excessively when removing it.
 - c. Wipe down the float switch assembly's housing, shaft, float, and retainer rod with cleaning solution. Clean the inside of the rubber boot and hose with cleaning solution. Rinse the parts thoroughly with clean water.
 - d. Reassemble the float switch assembly and replace it and the rubber boot in their correct positions. Reconnect the vent tube and the flush tube.
- 7) Pour the cleaning solution into the water tank.
- 8) Fully open the cleaning valve on the left side wall of the machine compartment.
- 9) Move the control switch on the control box to the "WASH" position.
- 10) Replace the insulation panel and the front panel in their correct positions.
- 11) Turn on the power supply to start the washing process.
- 12) Turn off the power supply after 30 minutes.
- 13) Remove the front panel.
- 14) Disconnect one end of the pump tubing to drain the water tank. After the water tank has drained, reconnect the pump tubing.
- 15) Move the control switch to the "ICE" position.
- 16) Close the cleaning valve.
Note: The icemaker will not operate unless the cleaning valve is completely closed.
- 17) Replace the front panel in its correct position.
- 18) Turn on the power supply to fill the water tank with water.

- 19) Turn off the power supply after 3 minutes.
- 20) Remove the front panel and fully open the cleaning valve.
- 21) Move the control switch to the "WASH" position.
- 22) Replace the front panel in its correct position.
- 23) Turn on the power supply to rinse off the cleaning solution.
- 24) Turn off the power supply after 5 minutes.
- 25) Remove the front panel.
- 26) Disconnect one end of the pump tubing to drain the water tank. After the water tank has drained, reconnect the pump tubing.
- 27) Repeat steps 15 through 26 three more times to rinse thoroughly.
Note: If you do not sanitize the icemaker, go to step 10 in "2. Sanitizing Procedure."

2. Sanitizing Procedure - Following Cleaning Procedure

- 1) Dilute a 5.25% sodium hypochlorite solution (chlorine bleach) with warm water. (Add 1.5 fl. oz. (44 ml) of sanitizer to 3 gal. (11 l) of water.)
- 2) Remove the insulation panel.
- 3) Pour the sanitizing solution into the water tank.
- 4) Replace the insulation panel and the front panel in their correct positions.
Note: Make sure that the control switch is in the "WASH" position and the cleaning valve is open.
- 5) Turn on the power supply to start the sanitizing process.
- 6) Turn off the power supply after 15 minutes.
- 7) Remove the front panel.
- 8) Disconnect one end of the pump tubing to drain the water tank. After the water tank has drained, reconnect the pump tubing.
- 9) Repeat steps 15 through 26 in "1. Cleaning Procedure" two times to rinse thoroughly.
- 10) Close the cleaning valve.
- 11) Move the control switch to the "ICE" position.
- 12) Replace the front panel and the base cover in their correct positions.
- 13) Clean the storage bin liner using a neutral cleaner. Rinse thoroughly after cleaning.
- 14) Turn on the power supply to start the automatic icemaking process.

B. Maintenance

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

⚠ WARNING

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

1. Stainless Steel Exterior

To prevent corrosion, wipe the exterior occasionally with a clean, soft cloth. Use a damp cloth containing a neutral cleaner to wipe off oil or dirt buildup.

2. Storage Bin and Scoop

- Wash your hands before removing ice. Use the plastic scoop provided (bin accessory).
- The storage bin is for ice use only. Do not store anything else in the storage bin.
- Clean the scoop and the storage bin liner using a neutral cleaner. Rinse thoroughly after cleaning.

3. Air Filters (air-cooled model)

Plastic mesh air filters remove dirt and dust from the air, and keep the condenser from getting clogged. As the filters get clogged, the icemaker's performance will be reduced. Check the filters at least twice a month. When they are clogged, use warm water and a neutral cleaner to wash the filters.

4. Condenser (air-cooled and remote air-cooled models)

Check the condenser once a year, and clean the coil if required by using a brush or vacuum cleaner. More frequent cleaning may be required depending on location.

C. Preparing the Icemaker for Long Storage

CAUTION

1. When storing the icemaker for an extended time or in sub-freezing temperatures, follow the instructions below to prevent damage.
2. To prevent damage to the water pump seal, do not operate the icemaker with the control switch in the "WASH" position when the water tank is empty.

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

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

- 1) Turn off the power supply, then remove the front panel.
- 2) Move the control switch on the control box 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.
- 7) Replace the front panel in its correct position, then turn on the power supply.
- 8) Blow the icemaker water supply line out using the compressed air or carbon dioxide supply.
- 9) Close the icemaker water supply line drain valve.

2. Drain the water tank:

- 1) Turn off the power supply, then remove the front panel.
- 2) Move the control switch to the "OFF" position.
- 3) Remove the base cover, then disconnect one end of the pump tubing to drain the water tank. See Fig. 8. After the water tank has drained, reconnect the pump tubing.
- 4) Replace the base cover and the front panel in their correct positions.
- 5) Remove all ice from the storage bin. Clean the storage bin liner using a neutral cleaner. Rinse thoroughly after cleaning.

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

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

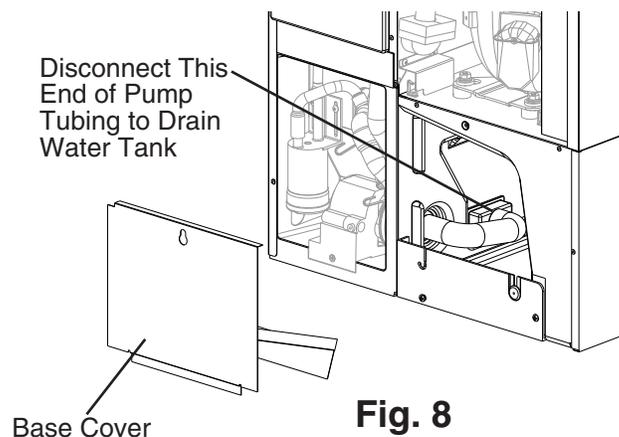


Fig. 8