HOSHIZAKI

Service Manual

Modular Crescent Cuber

Models
KM-340MAJ, MWJ
KM-515MAJ, MWJ, MRJ
KM-650MAJ, MWJ, MRJ

hoshizakiamerica.com

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⚠ WARNING

Only qualified service technicians should install and service the appliance. To obtain the name and phone number of your local Hoshizaki Certified Service Representative, visit www.hoshizaki.com. No service should be undertaken until the technician has thoroughly read this Service Manual. Failure to service and maintain the appliance in accordance with this manual will adversely affect safety, performance, component life, and warranty coverage. Proper installation is the responsibility of the installer. Product failure or property damage due to improper installation is not covered under warranty.

Hoshizaki provides this manual primarily to assist qualified service technicians in the service of the appliance.

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

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Fax: 1-800-843-1056; (770) 487-3360

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Peachtree City, GA 30269
Attn: Hoshizaki Technical Support Department

Web Site: www.hoshizaki.com

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

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

IMPORTANT
This manual should be read carefully before the appliance is serviced. Read the warnings and guidelines contained in this manual carefully as they provide essential information for the continued safe use, service, and maintenance of the appliance. Retain this manual 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, damage to the appliance, or damage to property.

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

NOTICE **Indicates a situation which could result in damage to the appliance or property.**

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

⚠ WARNING

The appliance should be destined only to the use for which it has been expressly conceived. Any other use should be considered improper and therefore dangerous. The manufacturer cannot be held responsible for injury or damage resulting from improper, incorrect, and unreasonable use. Failure to service and maintain the appliance in accordance with this manual will adversely affect safety, performance, component life, and warranty coverage and may result in costly water damage.

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

- Only qualified service technicians should install and service this appliance.
- The appliance must be installed in accordance with applicable national, state, and local codes and regulations.
- Electrical connection must be hard-wired and must meet national, state, and local electrical code requirements. Failure to meet these code requirements could result in death, electric shock, serious injury, fire, or severe damage to equipment.
- The icemaker requires an independent power supply of proper capacity. See the nameplate for electrical specifications. Failure to use an independent power supply of proper capacity can result in a tripped breaker, blown fuses, damage to existing wiring, or component failure. This could lead to heat generation or fire.
- **THE ICEMAKER MUST BE GROUNDED.** Failure to properly ground the icemaker could result in death or serious injury.
- Move the control switch to the "OFF" position and turn off the power supply before servicing. Lockout/Tagout to prevent the power supply from being turned back on inadvertently.
- To reduce the risk of electric shock, do not touch the control switch with damp hands.
- Do not make any alterations to the unit. Alterations could result in electric shock, injury, fire, or damage to the unit.
- The appliance is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

⚠ WARNING, continued

- Children should be properly supervised around this appliance.
- Do not climb, stand, or hang on the appliance or allow children or animals to do so. Serious injury could occur or the appliance could be damaged.
- Do not use combustible spray or place volatile or flammable substances near the appliance. They might catch fire.
- Keep the area around the appliance clean. Dirt, dust, or insects in the appliance could cause harm to individuals or damage to the appliance.

Additional Warning for Remote Models

- **THE REMOTE CONDENSER UNIT MUST BE GROUNDED.** The power supply and ground connection to the remote condenser unit are supplied from the icemaker. Failure to properly ground the remote condenser unit could result in death or serious injury.
- Move the icemaker control switch to the "OFF" position and turn off the power supply to the icemaker before servicing the remote condenser unit. Lockout/Tagout to prevent the power supply from being turned back on inadvertently.

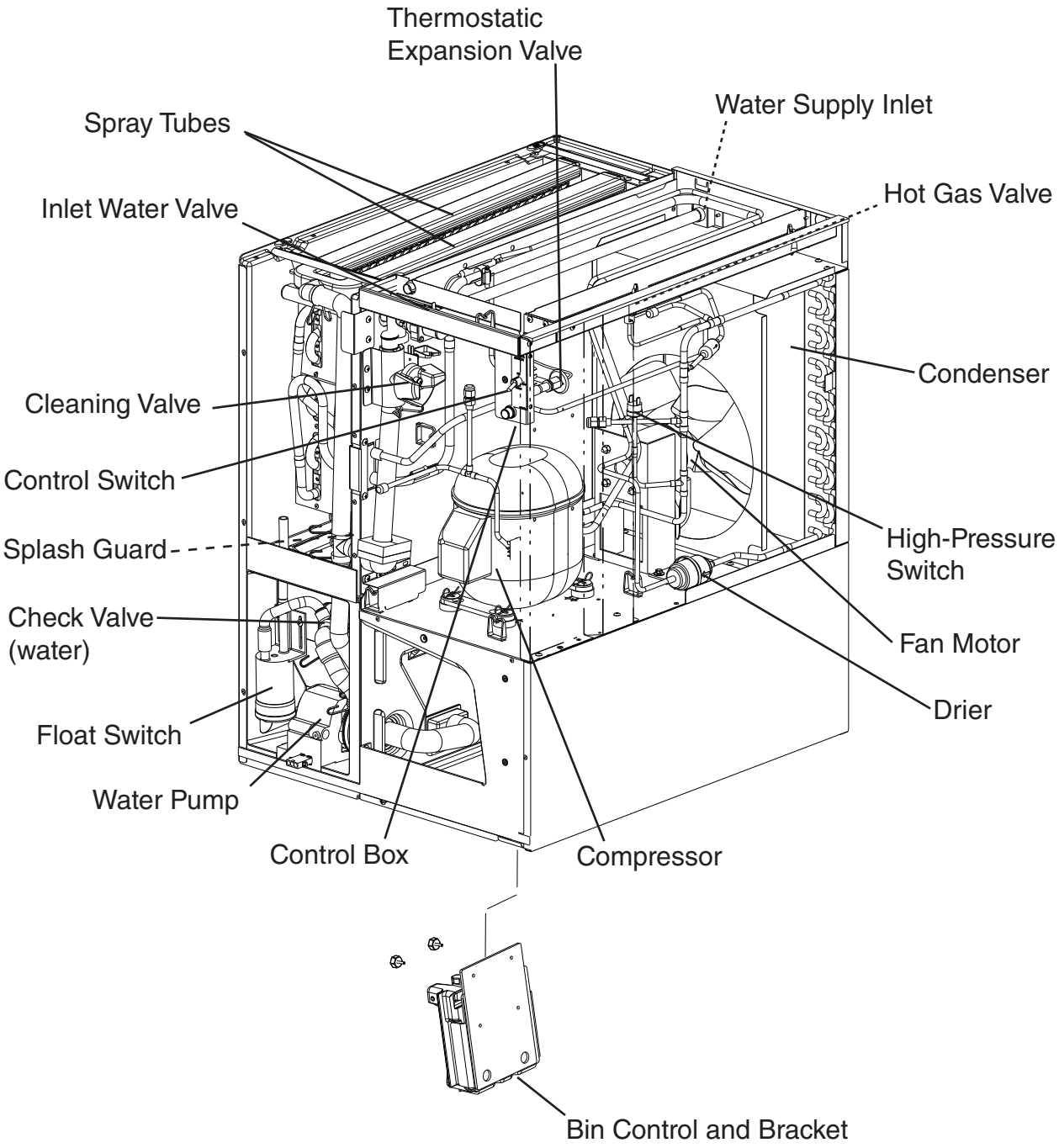
NOTICE

- Follow the instructions in this manual carefully to reduce the risk of costly water damage.
- In areas where water damage is a concern, install in a contained area with a floor drain.
- Install the appliance in a location that stays above freezing. Normal operating ambient temperature must be within 45°F to 100°F (7°C to 38°C).
- Do not leave the icemaker on during extended periods of non-use, extended absences, or in sub-freezing temperatures. To properly prepare the icemaker for these occasions, follow the instructions in "VI. Preparing the Appliance for Periods of Non-Use."
- Do not place objects on top of the appliance.
- The dispenser unit/ice storage bin is for ice use only. Do not store anything else in the dispenser unit/ice storage bin.

I. Construction and Water/Refrigeration Circuit Diagram

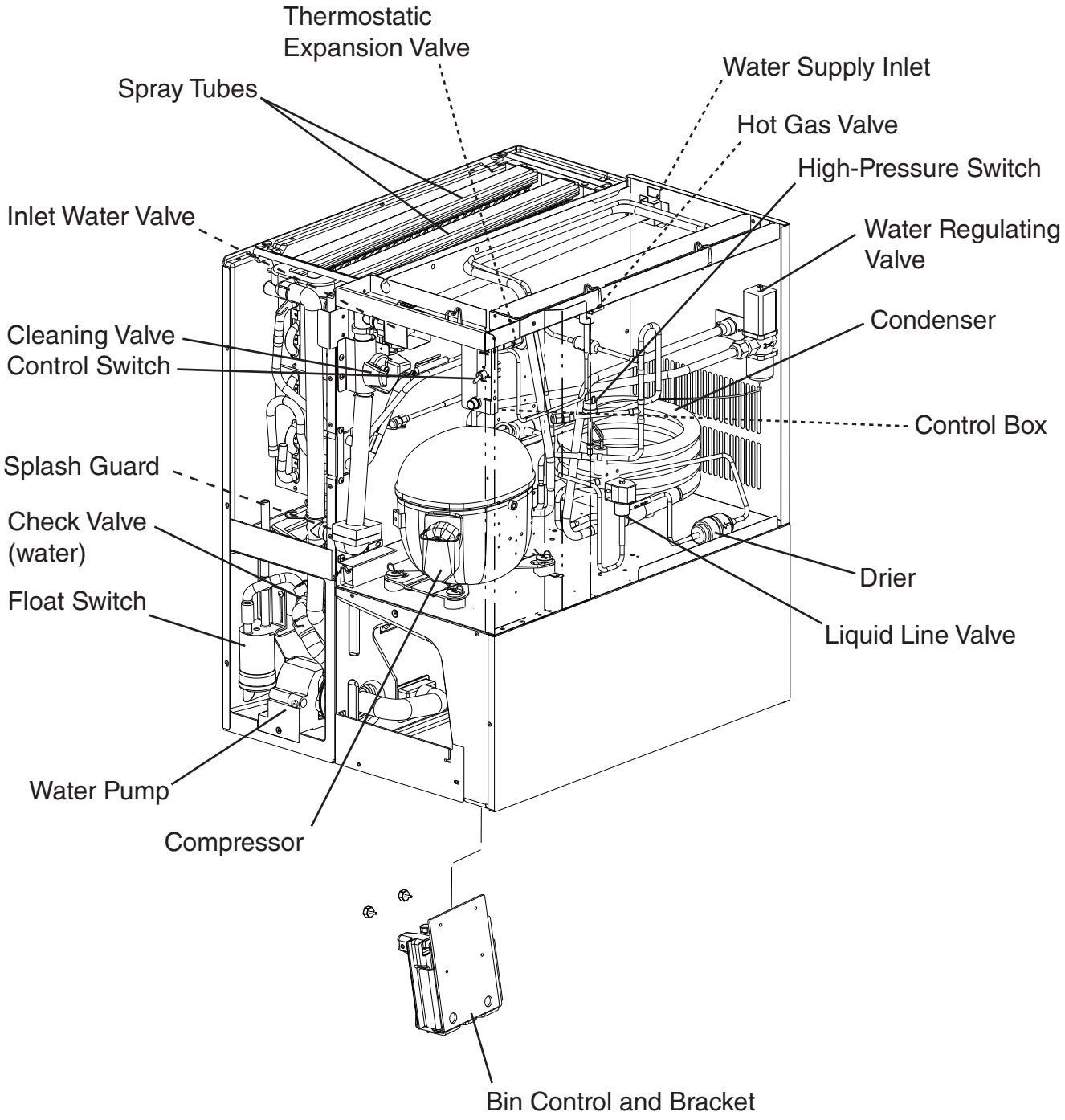
A. Construction

1. Air-Cooled Models (MAJ)



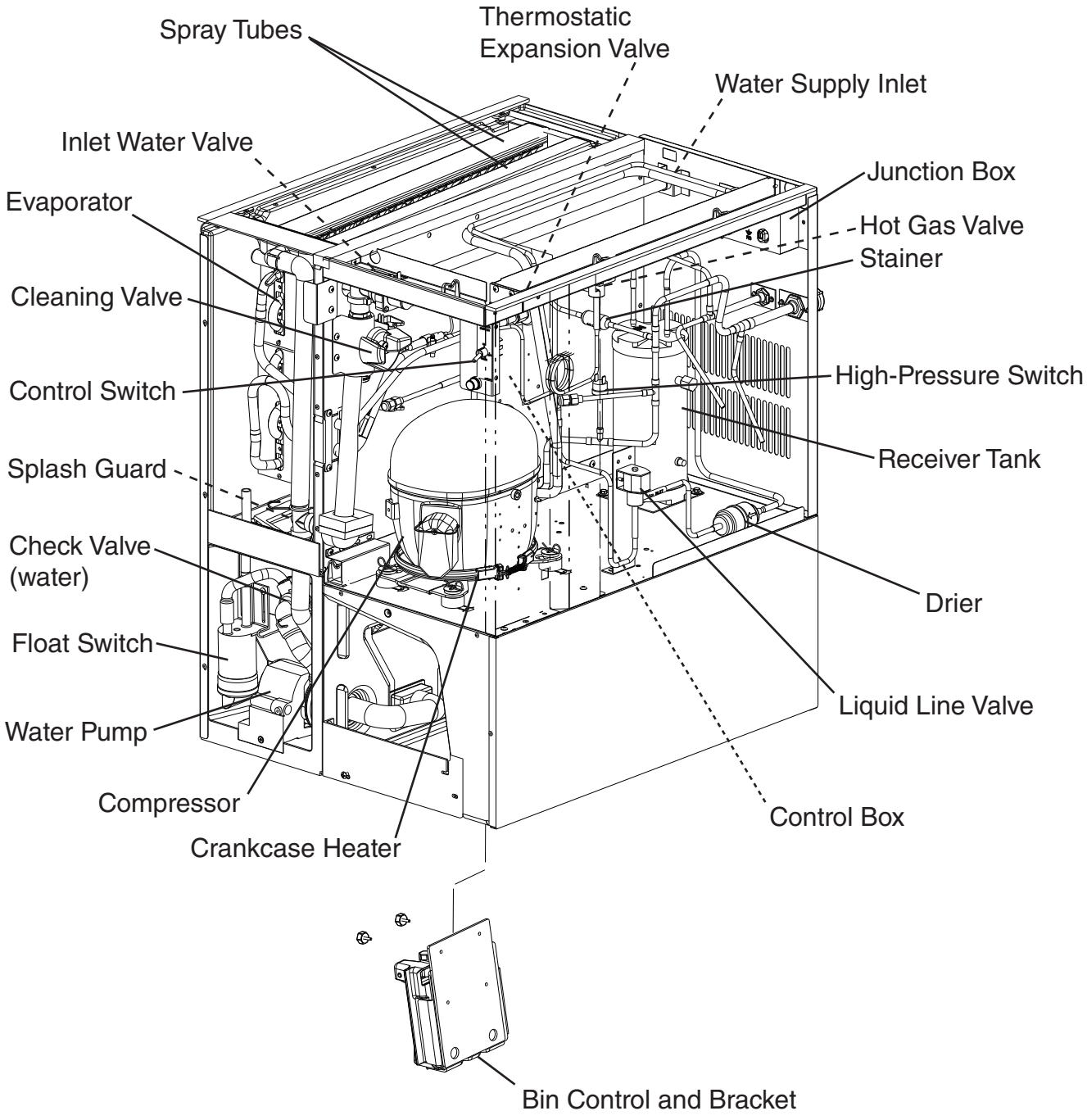
Model Shown: KM-340MAJ

2. Water-Cooled Models (MWJ)



Model Shown: KM-515MWJ

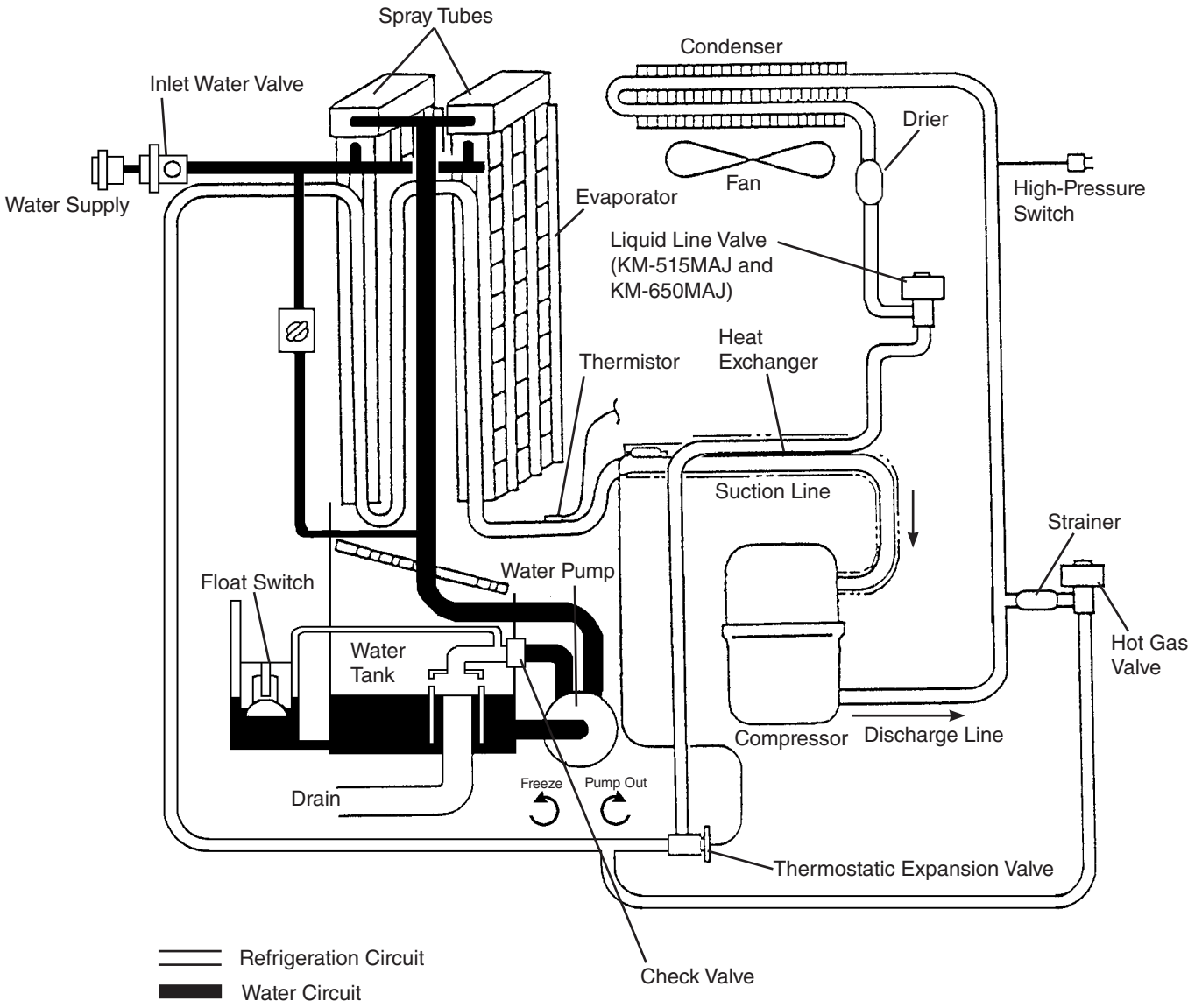
3. Remote Models (MRJ)



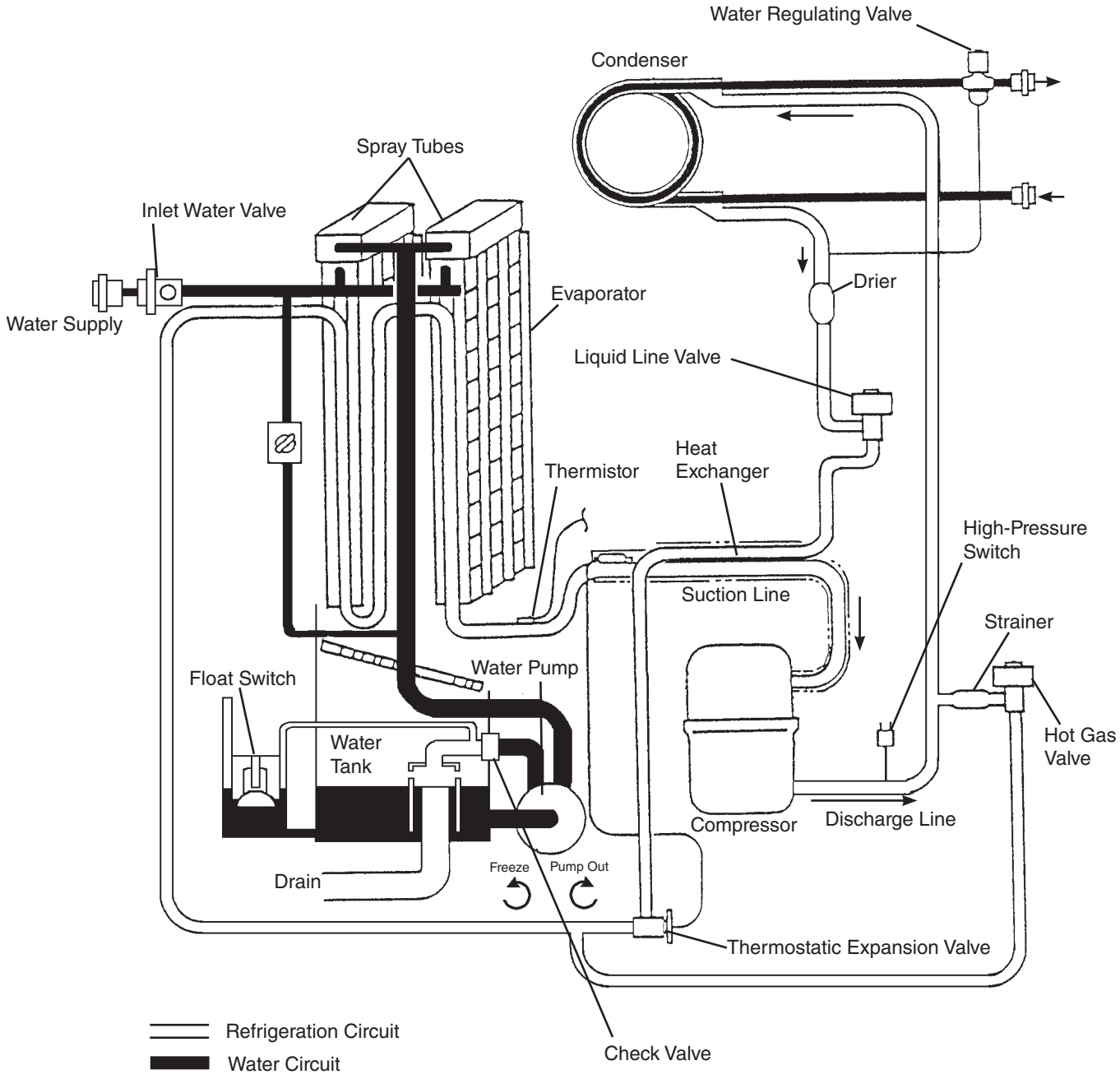
Model Shown: KM-650MRJ

B. Water/Refrigeration Circuit Diagram

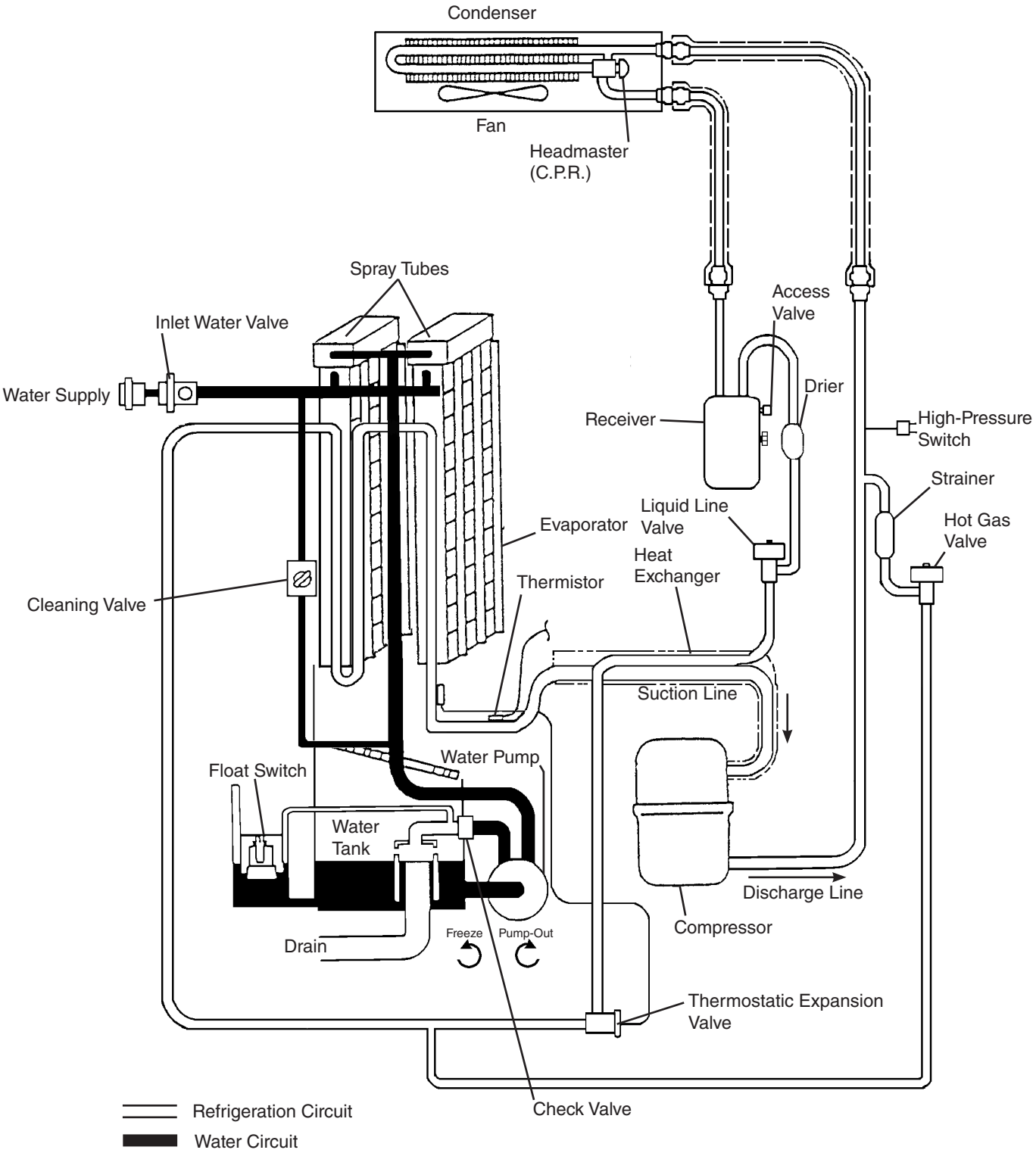
1. Air-Cooled Models (MAJ)



2. Water-Cooled Models (MWJ)



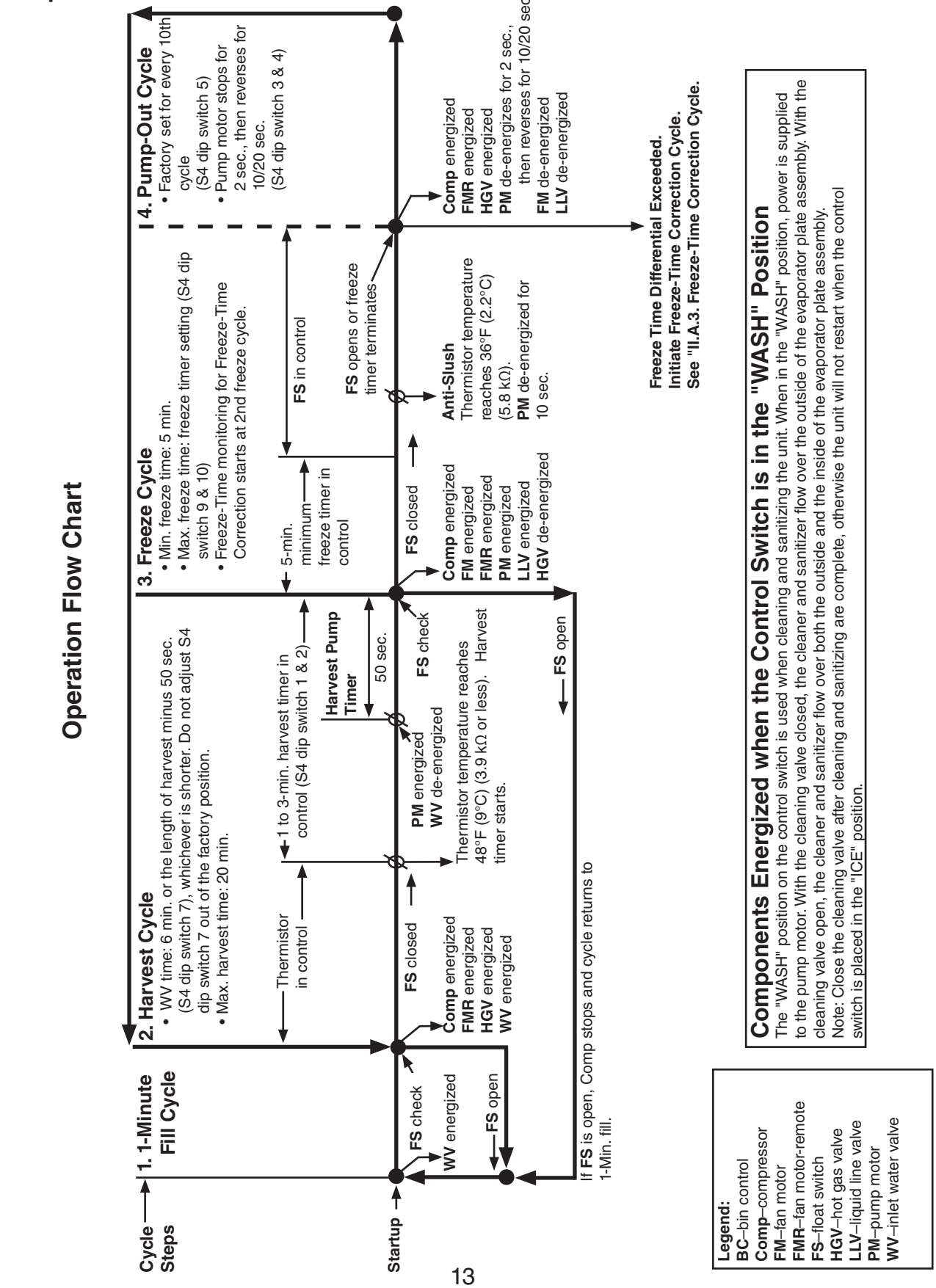
3. Remote Models (MRJ)



II. Sequence of Operation and Service Diagnosis

A. Sequence of Operation Flow Chart

1. Operation Flow Chart

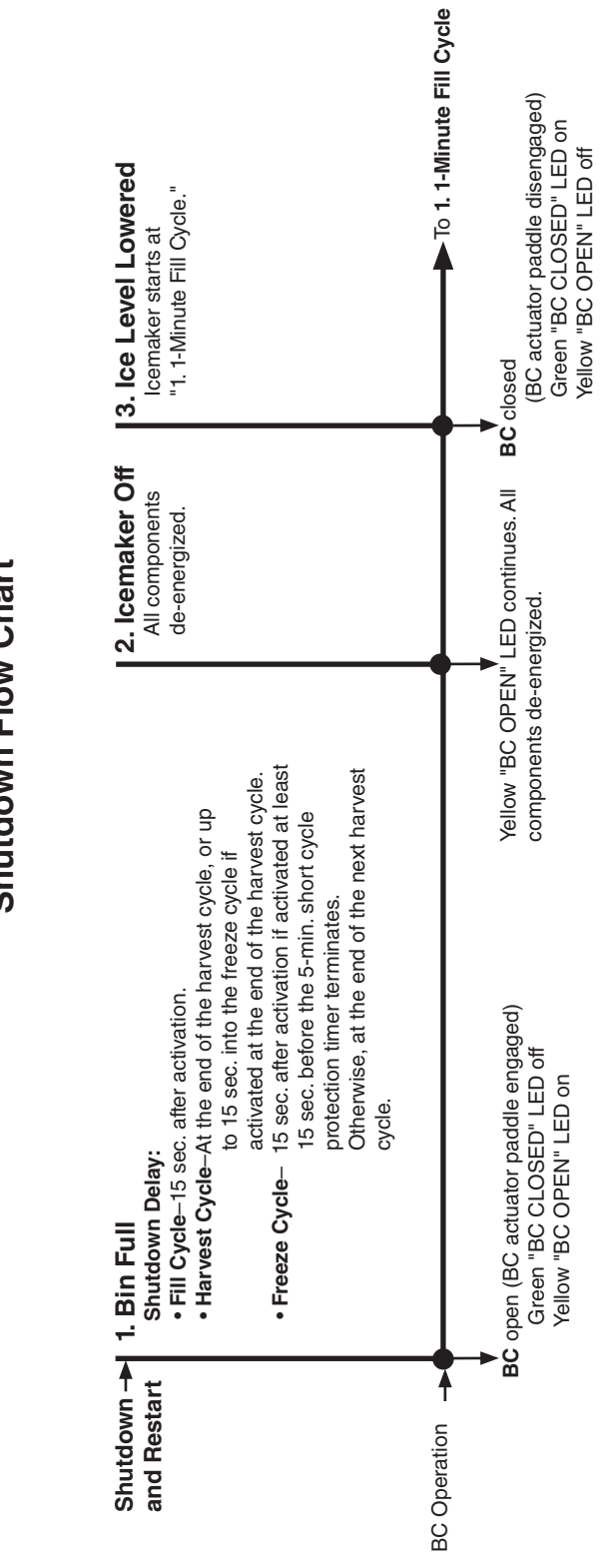


Components Energized when the Control Switch is in the "WASH" Position

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:
BC–bin control
Comp–compressor
FM–fan motor
FMR–fan motor-remote
FS–float switch
HGV–hot gas valve
LLV–liquid line valve
PM–pump motor
WV–inlet water valve

2. Shutdown Flow Chart

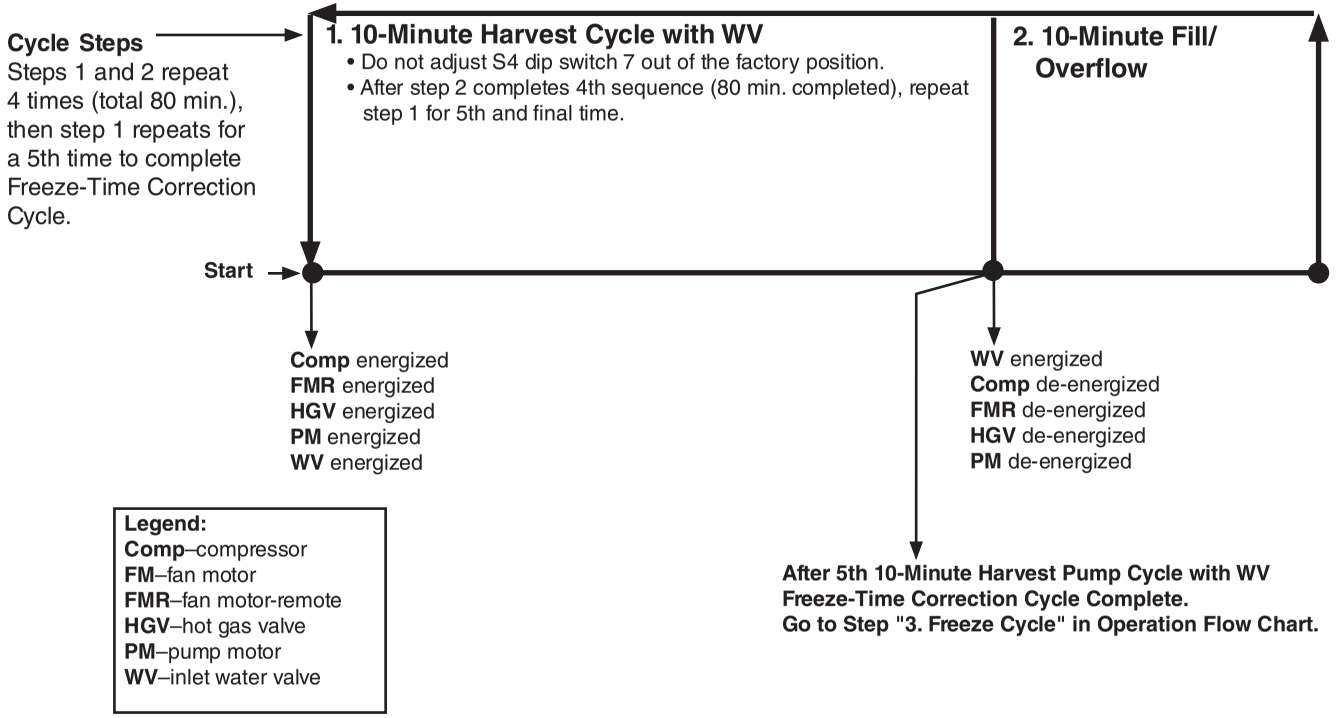


2A7664-02 Freeze-Time Correction Flow Chart

Freeze Time Differential Exceeded. Minimum and Maximum Freeze times have exceeded differential parameters.
Freeze-Time Correction function is enabled when S4 Dip Switch 7 is in the "ON" position. CB monitors freeze time. After 3 freeze cycles, CB compares the minimum and maximum differential of the 3 freeze cycle times. Every freeze cycle time after the third freeze cycle time is added to the minimum/ maximum calculation.
Example: After 8 cycles, if the differential between the shortest cycle (minimum) and the longest cycle (maximum) is equal to or greater than 427 sec. a freeze-time correction cycle is initiated:

Number of Freeze Cycles	Differential Value in Sec.
3	254
4	309
5	349
6	380
7	406
8	427
9	446
10	462

Note: When 1st freeze-time correction cycle is initiated, CB "POWER OK" LED starts blinking. On 2nd freeze-time correction cycle, if CB "POWER OK" LED has been reset, CB "POWER OK" LED starts blinking. If CB "POWER OK" had not been reset after 1st freeze-time correction cycle CB "POWER OK" LED continues to blink.
After 3rd freeze-time correction cycle in 36 hours, CB yellow "EXT HARVEST" LED starts blinking.
Appliance continues to operate and LEDs continue to blink until ALARM RESET button is pressed with power on.



Appliance Cycle Reset and Alarm Reset:
Cycle Reset: Power Supply or Control Switch Turned Off and On again: Appliance turns off, then re-starts at 1.Fill Cycle.
Alarm Reset: CB "ALARM RESET" pressed during or after a freeze-time correction cycle with power supply on:
Appliance continues cycle with no interruption or reset.
CB red "POWER OK" LED blinking:
CB red "POWER OK" LED resets to solid.
CB yellow "EXT HARVEST" LED blinking:
CB yellow "EXT HARVEST: LED turns off.

B. Service Diagnosis

⚠ WARNING

- The appliance should be diagnosed and repaired only by qualified service personnel to reduce the risk of death, electric shock, serious injury, or fire.
- Risk of electric shock. Control switch in "OFF" position does not de-energize all loads Use extreme caution and exercise safe electrical practices.
- Moving parts (e.g., fan blade) can crush and cut. Keep hands clear.
- Before servicing the appliance, move the control switch to the "OFF" position and turn off the power supply.
- **CHOKING HAZARD:** Ensure all components, fasteners, and thumbscrews are securely in place after the appliance is serviced. Make sure that none have fallen into the dispenser unit/ice storage bin.
- Make sure all food zones in the appliance and dispenser unit/ice storage bin are clean after service.

The diagnostic procedure is a sequence check that allows you to diagnose the electrical system and components. Before proceeding, check for correct installation, proper voltage per nameplate, and adequate water supply. Check CB using the steps in "II.D. Control Board Check." Check dip switch settings to assure that S4 dip switches and S5 dip switches 1 through 5 are in the factory default position. S4 dip switch 1, 2, 3, 4, and 5 are cleaning adjustments and the settings are flexible. For factory default settings, see "III.C.1. Default Dip Switch Settings."

Note:
- When checking high voltage (115VAC), always choose a white (W) neutral wire to establish a good neutral connection.
- When checking voltage from the CB K1 connector (10 pin connector), pull CB K1 connector out slightly to allow room for multimeter test leads contact.

1) Turn off the power supply, then access the control box. Move the control switch to the "OFF" position. Clear any ice from BC.

2) Check that the 115VAC 10A fuse is good.

1. Sequence and Component Diagnosis

3) **Power On**: Turn on the power supply, then move the control switch to the "ICE" position. A 5-sec. delay occurs. CB red "POWER OK" LED and CB green "BC CLOSED" LED turn on. If CB yellow "BC OPEN" LED is on (indicating a full bin), check BC. Move ice away from BC actuator paddle. If CB yellow "BC OPEN" LED stays on, see "II.E.1. Bin Control Check."

Note: • CB red "POWER OK" LED remains on unless the 10.5VAC power supply is interrupted (K2 connector).

• Check CB using the steps in "II.D. Control Board Check."

• Confirm CB green "BC CLOSED" LED is on. If CB yellow "BC OPEN" LED is on, remove ice from BC. If no ice is around BC and CB yellow "BC OPEN" LED is on, see "II.E.1. Bin Control Check."

a) **Power On Diagnosis:** If CB red "POWER OK" LED is off, confirm 10A fuse is good. Check for 115VAC at control switch #1 (BK) to neutral (W) then at control switch #2 (P) to neutral (W). If 115VAC is present on #1 (BK) and not on #2 (P), replace control switch. If 115VAC is present on control switch #2 (P), check for 115VAC at HPS (P) to neutral (W) then HPS (BK) to neutral (W). If 115VAC is present at HPS (P) and not at HPS (BK), HPS is open. See HPS Diagnosis below. If 115VAC is present at HPS (BK), check for 10.5VAC at CB K2 #1 red wire to CB K2 #2 red wire. If 10.5VAC is not present, check that the cleaning valve is closed and the interlock switch is closed. Next, check CT continuity. If open, replace CT.

b) **HPS Diagnosis:** Check that the condenser coil is not clogged or restricted. Let refrigeration circuit pressures equalize. If HPS does not reset and pressures are equalized, replace HPS. If pressures are not equalized, reclaim refrigerant and diagnose refrigeration circuit restriction. Check that there are no restrictions in the refrigeration circuit.
Harvest Cycle: HGV, strainer, or check valve.
Freeze Cycle: FM, FMR, TXV, WRV, HM, LLV, strainer, check valve, drier, and damaged line set or fitting.

Confirm that the location meets installation requirements:

• The appliance is not intended for outdoor use. Normal operating ambient temperature should be within 45°F to 100°F (7°C to 38°C).

• Allow 6" (15 cm) clearance at rear, sides, and top for proper air circulation and ease of maintenance and/or service should they be required.

• The appliance should not be located in a corrosive environment.

4) **1-Min. Fill Cycle – LED 4 is on.** WV and X11 relay energize. After 1 min., CB checks for a closed FS. If FS is closed, the harvest cycle begins. If harvest cycle begins (Comp, HGV, FMR energized), continue to step 5a. If FS is open, WV remains energized until FS closes (low water safety protection during initial start up and at the end of each harvest). **Diagnosis:** Check that water enters the water tank. If not, check that the water supply line shut-off valve is open and screens or external filters are clear. Check for 115VAC at CB K1 #6 (O) to neutral (W). If 115VAC is not present, replace CB. If 115VAC is present, and WV does not energize, check for 115VAC at WV. If 115VAC is present, check coil continuity. If open, replace WV. If the water tank fills, but the appliance fails to start harvest (Comp energized), check for open FS. See "II.F. Float Switch Check and Cleaning." If FS is closed and CB fails to start the harvest cycle after 1 min., replace CB.

5a) **Initial Harvest Cycle – LEDs 1, 4, and 2 are on.** WV and X11 relay continue. Comp, FMR, HGV, and X10 relay 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 3.9 kΩ from the thermistor and turns harvest termination over to the harvest timer (S4 dip switch 1 & 2 and S5 dip switch 4). WV and X11 relay are energized during harvest for a maximum of 6 min. or the length of harvest minus HPT setting (S4 dip switch 6), whichever is shorter. See step 5b below.

a) **Comp Diagnosis**: Check that evaporator is warming. If not, confirm that Comp energizes. If not, check for 115VAC at CB K1 #1 or #9 (V) to neutral (W). If 115VAC is not present, check for 115VAC at CB K1 #7 or #10 (BK) to neutral (W). If 115VAC is present at #7 or #10 (BK) and not at #1 or #9 (V), replace CB. If 115VAC is present, check for 115VAC at CR solenoid. If 115VAC is present, confirm contacts are closed. If not, replace CR. If CR contacts are closed, check Comp external overload, Comp start and run capacitors, Comp start relay, and Comp motor winding.

b) **HGV Diagnosis**: If Comp is energized and evaporator is not warming, check that HGV energizes and opens. Check for 115VAC at CB K1 #2 (P) to neutral (W). If 115VAC is not present and LED 2 is on, replace CB. If 115VAC is present, check for 115VAC at HGV coil and check HGV coil continuity. Replace as needed.

c) **LLV Diagnosis**: Confirm that LLV is de-energized and closed (not bypassing). If energized, replace CB. If de-energized and bypassing, replace LLV.

d) **WRV Diagnosis**: Confirm WRV is not leaking by. If WRV is leaking by, confirm HGV is open and LLV is closed. Next, check for proper refrigerant pressures. If refrigerant pressures are correct, adjust or replace WRV. See "IV.C. Water Regulating Valve Adjustment (water-cooled models).".

5b) **Harvest Pump Time (Harvest Assist) – LEDs 1, 3, and 2 are on.** When the thermistor reaches 48°F (9°C), CB reads 3.9 kΩ from the thermistor and turns harvest termination over to the harvest timer (S4 dip switch 1 & 2 and S5 dip switch 4). When WV de-energizes, LED 4 turns off, X11 relay de-energizes and LED 3 turns on. PM energizes. Comp, FMR, HGV, and X10 relay continue.
Diagnosis: Place a thermometer on the suction line next to the thermistor. Has it warmed to 48°F (9°C) or warmer? Confirm thermistor status. See "II.G Thermistor Check." If the thermistor reading is in proper range, dip switch 7 is on, and PM does not energize before harvest terminates, replace CB. If WV continues, check for 115VAC at CB K1 #6 (O). If 115VAC is present, and LED 4 is off, replace CB. If LED 3 is on and PM is not energized, check for 115VAC at CB K1 #5 (DBU). If 115VAC is not present, replace CB. If 115VAC is present and PM is not energized, check for 115VAC at X10 relay terminal #7 (Y) to neutral (W). If 115VAC is not present, check for 115VAC at X10 relay terminal #3 (P) to neutral (W) and X10 relay terminal #5 (Y) to neutral (W). If 115VAC is present on terminal #3 (P) and not on terminal #5 (Y), replace X10 relay. If 115VAC is present on X10 relay terminal #7 (Y) and PM is not energized, check for 115VAC at X10 relay terminal #4 (R) to neutral (W) and terminal #6 (DBU) to neutral (W). If 115VAC is present on terminal #6 (DBU) and not on terminal #4 (R), replace X10 relay. If 115VAC is present on X10 relay terminal #4 (R), check control switch contact continuity between terminals #4 (R) and #5 (W/R). If contacts are open, replace control switch. If contacts are closed and 115VAC is present between control switch terminal #5 (W/R) and neutral (W), check PM capacitor and motor winding continuity.

5c) **Initial Harvest Cycle Termination Diagnosis**: When the thermistor reaches 48°F (9°C), CB reads 3.9 kΩ from the thermistor and turns harvest termination over to the harvest timer (S4 dip switch 1 & 2 and S5 dip switch 4). Check discharge line temperature. For a thermistor check, see "II.G. Thermistor Check." If 1-min. fill cycle starts after harvest timer terminates, check that FS is clean and operating properly, see "II.F. Float Switch Check and Cleaning." If FS is closed, CB proceeds to the next cycle. If not, replace CB.
Note: The minimum total time allowed by CB for a complete harvest cycle is based on S5 dip switch 4. Maximum harvest time allowed is 20 min.

NOTICE! **S4 dip switch 7 must remain on. Otherwise, PM will not energize during the last seconds of harvest.**

6) **Freeze Cycle – LED 1 is on.** Comp, FMR, and PM continue. FM and LLV energize. HGV and X10 relay de-energize. Appliance is held in freeze by a 5-min. short cycle protection timer. After 5-min. short cycle protection timer terminates and FS opens, freeze cycle terminates.
Note: PM power supply switches from CB K1 #5 (DBU) in harvest to K1 #4 (R) in freeze.
Anti-Slush: When anti-slush is enabled (S5 dip switch 5 "ON"), PM de-energizes when thermistor reaches 36°F (2.2°C) (5.8kΩ) for 10 sec. then, energizes for the remainder of the freeze cycle.

a) **Freeze Cycle Diagnosis**: Confirm Comp, FMR, and PM continue. Confirm that FM and LLV energize. Confirm WRV opens. Next, confirm HGV and X10 relay de-energize. During the first 5 min. of freeze, confirm evaporator is cooling. If not, confirm WV de-energized (not leaking by), HGV de-energized (not bypassing), LLV and FM energize, TXV and HM operate correctly, WRV opens, Comp is efficient, and refrigerant charge is correct. See "VIII.A. Specification and Performance Data Sheets."

b) **Comp and FMR Diagnosis**: If Comp and FMR de-energize once freeze begins, check that appliance has not shut off on HPS (CB "POWER OK" LED off). If so, check "3)b) HPS Diagnosis" above. If CB "POWER OK" LED is on, check for 115VAC at CB K1 #1 (V) or #9 (V) to neutral (W). If 115VAC is not present and LED 1 is on, replace CB. If 115VAC is present, check for 115VAC at CR coil. If 115VAC is present, check CR coil and contact continuity. Replace as needed. If CR is okay, check Comp start relay and start and run capacitors. Next, check Comp motor winding continuity. If Comp is energized but evaporator is not cooling, check for an inefficient Comp. See "VIII.A. Specification and Performance Data Sheets." If Comp is energized but FMR is not, check for 115VAC at the FMR junction box. If 115VAC is not present, check icemaker wiring connections. If 115VAC is present, check for voltage at condenser unit. If 115VAC is not present, check field wiring connections. If 115VAC is present, check FMR capacitor, motor winding, and fan blade for binding.

c) **WV and HGV Diagnosis**: If WV is energized, check for 115VAC at CB K1 #6 (O) to neutral (W). If 115VAC is present after PM energizes in harvest cycle, replace CB. If 115VAC is not present, replace WV (bypassing). If HGV did not de-energize at the end of harvest, check for 115VAC at CB K1 #2 (P) to neutral (W). If 115VAC is present and LED 3 is off, replace CB. If 115VAC is not present, replace HGV (bypassing).

d) **PM Diagnosis**: Confirm water is flowing over evaporator from PM and not WV. If PM de-energizes once freeze begins, check for 115VAC at CB K1 #4 (R) to neutral (W). If 115VAC is not present, replace CB. If 115VAC is present and PM is de-energized, check for 115VAC at control switch #5 (W/R) to neutral (W). If 115VAC is present at CB K1 #4 (R) and not at control switch #5 (W/R), check control switch continuity between #5 (W/R) and #4 (R). Replace as needed. If 115VAC is present at control switch #5 (W/R) to neutral (W), check PM capacitor and motor winding continuity.

e) **FM and LLV Diagnosis**: If FM or LLV does not energize, check for 115VAC at CB K1 #3 (BK) to neutral (W). If 115VAC is not present, replace CB. If 115VAC is present:
For FM, check capacitor, motor winding, and blade for binding.
For LLV, check coil voltage and continuity.

f) **Refrigerant Pressures, HM, and TXV Diagnosis**: If evaporator is still not cooling, check refrigerant pressures. See "VIII.A. Specification and Performance Data Sheets."
Next, check HM operation. If refrigeration pressures are above HM setpoint and HM is bypassing, replace HM. Check TXV for proper operation. Remove TXV bulb and hold it in your hand, refrigerant low-side pressure should rise, place TXV bulb in ice water, refrigerant low-side pressure should drop. A 10 to 15 pound pressure swing between warm and cold conditions indicate a good TXV. If a 10 to 15 pound swing is not present, replace TXV.

g) **WRV Diagnosis**: WRV is factory set and generally no adjustment is required. If WRV fails to open in freeze, check for proper refrigerant pressures. See "VIII.A. Specification and Performance Data Sheets." If refrigerant pressures are correct and WRV does not open, adjust or replace as needed. See "IV.C. Water Regulating Valve Adjustment (water-cooled models)."

h) **Freeze Termination Diagnosis:** After 5 min. in freeze, disconnect CB K5 FS connector. 15 sec. later appliance should switch out of the freeze cycle (15 second delay after FS opens before terminating the freeze cycle). If appliance remains in freeze longer than 15 sec. after FS removed, replace CB. If appliance switches with FS removed but would previously not switch out of freeze with FS connected (long freeze - 3 beep alarm), see "II.F. Float Switch Check and Cleaning."

Note: Normal freeze cycle will last 20 to 40 min. depending on model and conditions. Cycle times and pressures should follow performance data provided in this manual. See "VIII.A. Specification and Performance Data Sheets."

i) **Short Freeze Cycle Diagnosis**: Confirm water tank fills and overflows during 1 min. fill and harvest cycles. If not, check water supply filters, shut-off valve, WV screen. If water tank empties before 5 min. timer terminates and freeze cycle is short, check that CV is not leaking by (water flowing down the potable drain). If CV is leaking by, remove and clean CV, replace rubber seat and spring if necessary. If water tank is full, see "II.F. Float Switch Check and Cleaning." for erratic operating FS.

7) **Pump-Out Cycle – LEDs 1, 3, and 2 are on (10/20 second pump-out).** Timing of the first pump-out is determined by S4 dip switch 5. See the table below.

Control Board Settings		
S4 Dip Switch Setting No. 5	**Pump-Out Frequency**	**Control Board**
OFF	Every 10 cycles	After 11th freeze cycle
ON	Every cycle	After 2nd freeze cycle

Comp and FMR continue, HGV and X12 relay energize.
Note: If S4 dip switch 3 & 4 are set to 3 off and 4 on, LED 4 turns on and WV and X11 relay energize, energizing X10 relay. ***NOTICE!*** **S4 dip switch 3 & 4 must not be set to 3 off and 4 on. Otherwise, PM will rotate in freeze cycle direction instead of pump-out direction.**

FM and LLV de-energize. PM stops for 2 sec., then reverses for 10/20 sec. depending on pump-out timer (S4 dip switch 3 & 4) setting. When the pump-out timer terminates, pump-out is complete. The pump-out frequency control (S4 dip switch 5) is factory set, and generally no adjustment is required. However, the pump-out frequency control can be set to have a pump-out occur every 10 cycles or every cycle. For details, see "III.C.4. Pump-Out Frequency Control (S4 dip switch 5)."

Pump-Out Diagnosis: In the freeze cycle before pump-out (see table above), after 5 min. of freeze disconnect CB black K5 connector (FS connector). Check that PM stops and re-starts. Next, check that PM rotation is correct (water flowing down the drain through CV). If PM does not stop and re-start, check that CB LEDs 1, 3, and 2 are on. If not, replace CB. If LEDs 1, 3, and 2 are on and PM does not energize, check for 115VAC at CB K1 #5 (DBU) to neutral (W). If 115VAC is not present, replace CB. If 115VAC is present, check that X10 relay is de-energized. If not, check X11 relay status. If X11 relay is energized, replace CB. If X11 relay is de-energized and X10 relay is energized, replace X11 relay (contacts sticking). If X10 relay is de-energized, check for 115VAC at terminal #6 (DBU) to neutral (W) and terminal #2 (DBU) to neutral (W). If 115VAC is present on terminal #6 (DBU) and not on terminal #2 (DBU), replace X10 relay. If 115VAC is present on X10 terminal #2 (DBU) and PM is not energized check for 115VAC at X12 terminal #6 (DBU) to neutral (W) and X12 terminal #4 (DBU) to neutral (W). If 115VAC is present on X12 terminal #6 (DBU) and not on X12 terminal #4 (DBU), check for 115VAC at X12 terminal #7 (P) to X12 terminal #8 (W). If 115VAC is not present, check CB K1 pin #2 (P) wiring for loose connection. If 115VAC is present and X12 is not energized, check coil continuity. Replace as needed. If X12 is energized and X12 terminal #4 (DBU) does not have 115VAC, replace X12 relay (contacts sticking). If X12 terminal #4 (DBU) has 115VAC, PM should be energized and rotating in pump-out rotation. If not, check PM motor windings and impellar for binding. If energized and rotating correctly, make sure the drain line is not clogged and that CV is clean and operating properly.

Confirm FM and LLV de-energize. If FM or LLV are energized with LEDs 1, 3, and 2 on, replace CB.

8) **Normal Harvest Cycle** – Same as the initial harvest cycle. Return to step 5a) above.
Note: Appliance continues to cycle until BC is satisfied or power is switched off.
The appliance always restarts at the 1-min. fill cycle.

2. Shutdown Diagnosis

1) See "II.E.1. Bin Control Check."

3. Freeze-Time Correction Cycle Diagnosis

1) See "II.C. Freeze-Time Correction Cycle."

Legend: **BC**–bin control; **CB**–control board; **Comp**–compressor; **CV**–check valve; **FM**–fan motor; **FMR**–fan motor remote; **FS**–float switch; **HGV**–hot gas valve; **HM**–headmaster (C.P.R.); **HPS**–high-pressure switch; **LLV**–liquid line valve; **PM**–pump motor; **TXV**–thermostatic expansion valve; **WRV**–water regulating Valve; **WV**–inlet water valve

C. Freeze-Time Correction Cycle (90 min.)

Freeze-Time Correction function is enabled when S4 Dip Switch 7 is in the "ON" position and initiates when the minimum and maximum freeze times have exceeded differential parameters. Freeze-time correction timer and count starts at the beginning of the 2nd freeze cycle after startup from power off condition. Freeze-time correction timer and count continues and retains its freeze-time correction timer and count during a BC off cycle and resumes its freeze-time correction timer and count on the 2nd freeze cycle after BC restart. If freeze-time differential is exceeded (see table below), freeze-time correction cycle starts and CB red "POWER OK" LED blinks. When freeze-time correction cycle occurs 3 or more times within a 36 hour period, CB yellow "EXT HARVEST" LED blinks with CB red "POWER OK" LED. Appliance starts in freeze cycle after a freeze-time correction cycle. To reset CB LEDs, press ALARM RESET button on CB with power on. CB resets LEDs and appliance continues cycle without interruption.

1) **Freeze Time Differential Initiation:** CB starts monitoring freeze times on the second freeze time. After 3 freeze cycles (4th total), CB begins to compare minimum and maximum freeze time cycles. Every freeze cycle time after the first freeze cycle time is added to the freeze time list. Minimum and maximum freeze time differential comparisons begin on the third cycle and are monitored up to 10 cycles. On the 11th cycle the first freeze cycle time is dropped to maintain the 10 maximum number of cycles.

   Example: After 8 cycles (excluding first cycle), if the differential between the shortest cycle (minimum) and the longets cycle (maximum) is equal to or greater than 427 sec. a freeze-time correction cycle is initiated:

Number of Freeze Cycles	Differential Value in Sec.
3	254
4	309
5	349
6	380
7	406
8	427
9	446
10	462

2) **Freeze-Time Correction Sequence**:
First occurrence within 36 hr., minimum and maximum freeze times have exceeded differential parameters. CB "POWER OK" LED starts blinking. Freeze-Time Correction Cycle starts.
Second occurrence within 36 hr., minimum and maximum freeze times have exceeded differential parameters. If not reset, CB "POWER OK" LED continues blinking. If reset from first occurrence, CB "POWER OK" LED starts blinking. Freeze-Time Correction Cycle starts.
Third occurrence within 36 hr. minimum and maximum freeze times have exceeded differential parameters. CB yellow "EXT HARVEST" LED starts blinking. Also, If not reset, CB "POWER OK" LED continues blinking. If reset, CB "POWER OK" LED starts blinking.Freeze-Time Correction Cycle starts.
Total freeze-time correction cycle last for 90 min. At the end of 80 min., the final step initiates and final Harvest Pump Time (Harvest Assist) with WV (10-min.) starts. Once the final Harvest Pump Time (Harvest Assist) with WV (10-min.) terminates (90 min. complete), normal freeze cycle begins.

2a) **10-Min. Harvest Pump Time (Harvest Assist) with WV**: CB "POWER OK" LED blinking. CB LEDs 1, 4, 3, and 2 are on and Comp, FMR, HGV, PM, and WV energize. 10-min. timer starts. Once 10-min. timer terminates, CB LEDs 1, 3, and 2 turn off and Comp, FMR, HGV, and PM de-energize. WV continues.

2b) **10-Min. Fill:** CB LED 4 on and WV energized. 10-min. timer starts.

2c) **Final 10-Min. Harvest Pump Time (Harvest Assist) with WV**: CB "POWER OK" LED blinking. Once 10-min. timer terminates, CB LEDs 1, 4, 3, and 2 are on and Comp, FMR, HGV, and PM energizes. WV continues. 10-min. timer starts. Once 10-min. timer terminates, normal freeze cycle begins. CB LED 1 on and Comp, FMR, and PM continue. HGV and WV de-energize.

Note: After 3rd Freeze-Time Correction Cycle in 36 hours, CB signals with blinking CB yellow "EXT HARVEST" LED. Appliance continues normal operation.
CB "POWER OK" LED and CB yellow "EXT HARVEST" LED continue blinking in normal operation sequence.

3) **Appliance Cycle Reset and CB Alarm Reset:**
Cycle Reset: Power supply or control switch turned off and on again: Appliance turns off, then re-starts at 1.Fill Cycle.
Alarm Reset: CB "ALARM RESET" pressed during or after a freeze-time correction cycle with power supply on: Appliance continues cycle with no interruption or reset.
CB red "POWER OK" LED blinking: CB red "POWER OK" LED resets to solid.
CB yellow "EXT HARVEST" LED blinking: CB yellow "EXT HARVEST: LED turns off.

Legend: **BC**–bin control; **CB**–control board; **Comp**–compressor; **CR**–compressor relay; **CT**–control transformer; **CV**–check valve; **FM**–fan motor; **FMR**–fan motor remote; **FS**–float switch; **HGV**–hot gas valve; **HM**–headmaster (C.P.R.); **HPS**–high-pressure switch; **LLV**–liquid line valve; **PM**–pump motor; **TXV**–thermostatic expansion valve; **WRV**–water regulating valve; **WV**–inlet water valve

D. Control Board Check

Before replacing CB 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 CB is in alarm (beeping), press the "ALARM RESET" button on CB while CB is beeping. **WARNING! Risk of electric shock. Care should be taken not to touch live terminals.** Once reset, the icemaker starts at the 1-minute fill cycle. For audible alarm information, see "III.B. 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 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 "III.C.1. Default Dip Switch Settings."

2) Move the control switch to the "ICE" position. If the red CB "POWER OK" LED is on, control voltage is good, continue to step 3. If CB "POWER OK" LED is off, check CT secondary circuit. CT output is 10.5VAC at 115VAC primary input. If the secondary circuit has proper voltage and the red LED is off, replace CB.

   If the secondary circuit does not have proper voltage, check CT primary circuit. Check for 115VAC at CB K1 connector pin #10 (BR) to neutral (W) for 115VAC. Always choose a white (W) neutral wire to establish a good neutral connection when checking voltages. For additional checks, see "II.G.1. No Ice Production."

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.

   Following the test, the icemaker begins operation at the 1-minute fill cycle. If the LEDs do not light as described above, replace CB.

4) To verify voltage output from CB to the components, slide the CB K1 connector out far enough to allow multimeter lead contact. With the icemaker in the cycle to be tested, check output voltage from the corresponding pin on CB K1 connector to a neutral (W wire). If output voltage is not found and the appropriate LED is on, replace CB.

Legend: **CB**–control board; **CT**–control transformer

E. Bin Control Check

1. Bin Control Check

This appliance uses a lever-actuated proximity switch to control the ice level in the storage bin. No adjustment is required.

To check BC, 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 base cover and clear any ice away from BC.
5) Disconnect BC connector from CB K4 connector.
6) Check for continuity across the wires of BC connector. When the actuator paddle is not engaged, BC switch is closed. If open, check that the actuator paddle is not sticking. Clean if necessary. See "II.E.2. Bin Control Cleaning." If BC switch still reads open, replace BC.
7) Press and hold the actuator paddle; check for continuity across the wires of BC connector. When the actuator paddle is engaged, BC switch is open. If closed, check that the actuator paddle is not restricted. Clean if necessary. See "II.E.2. Bin Control Cleaning." If BC switch still reads closed, replace BC.

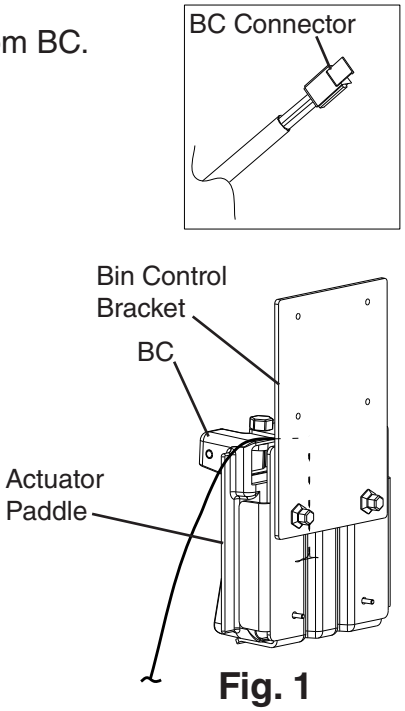


Fig. 1

8) Reconnect BC connector to CB K4 connector, then move the control switch to the "ICE" position. Turn on the power supply.
9) Check that CB green "BC CLOSED" LED is on.
10) Allow the icemaker to cycle on. Press and hold the actuator paddle. CB yellow "BC OPEN" LED should turn on and the icemaker should shut down according to the chart below. If it does not, replace CB.

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

Legend: **BC**–bin control; **CB**–control board

2. Bin Control Cleaning

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

⚠ WARNING

CHOKING HAZARD: Ensure all components, fasteners, and thumbscrews are securely in place after the icemaker is serviced. Make sure that none have fallen into the dispense unit/ice storage bin.

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 and clear any ice away from BC.
4) Disconnect BC connector from CB K4 connector, then remove BC from the icemaker.
5) Remove the actuator paddle from the switch mount. See Fig. 2.
6) Wipe down BC with a mixture of 1 part of Hoshizaki "Scale Away" and 25 parts of warm water. Rinse the parts thoroughly with clean water.
7) Reassemble BC 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 BC connector to CB K4 connector, then move the control switch to the "ICE" position.
9) Replace the control box cover and base cover in their correct positions.
10) Turn on the power supply to start the automatic icemaking process.
11) Replace the front panel in its correct position.

Legend: **BC**–bin control

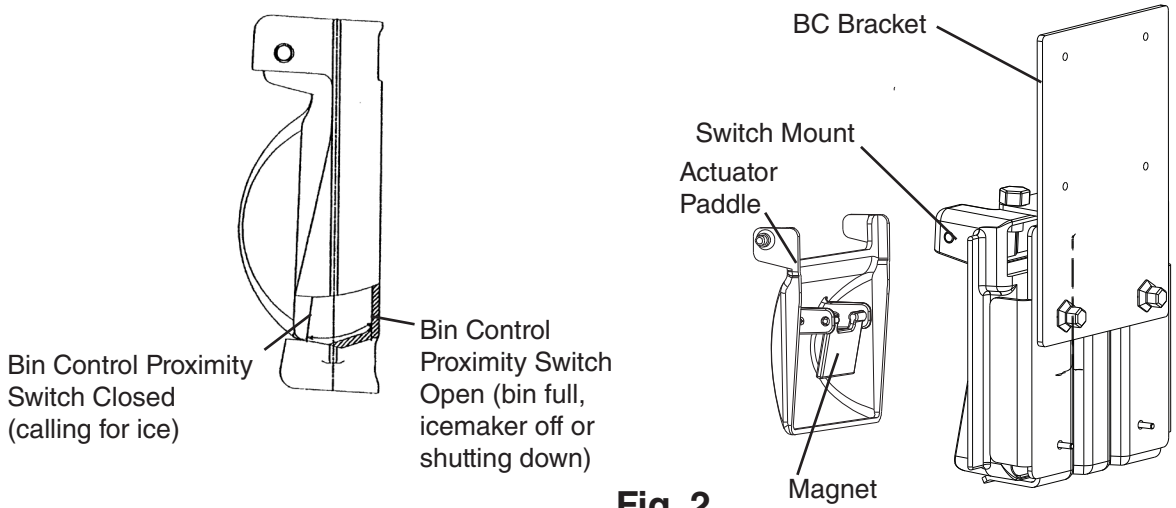


Fig. 2

F. Float Switch Check and Cleaning

FS is used to determine that there is sufficient water in the water tank after the 1-min. fill cycle and after each harvest cycle. FS 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.

1. Float Switch Check

To check FS, 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) Drain the water tank. Remove the base cover, then disconnect one end of the pump tubing to drain the water tank. See Fig. 3. After the water tank has drained, reconnect the pump tubing.

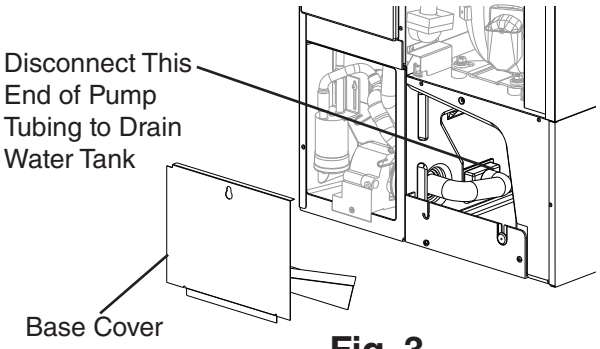


Fig. 3

4) Remove the control box cover.
5) Disconnect FS connector from CB K5 connector.
6) Check for continuity across FS leads. With the water tank empty, FS should be open. If open, continue to step 7. If closed, follow the steps in "II.E.2. Float Switch Cleaning." After cleaning FS, check it again. Replace if necessary.
7) Reconnect FS connector to CB K5 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 min., the 1-min. fill cycle should end and the initial harvest cycle should begin. If the initial harvest cycle begins, FS 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. Move the control switch to the "OFF" position.
11) Remove the control box cover.
12) Disconnect FS connector from CB K5 connector.
13) Check for continuity across FS leads. With the water tank full, FS should be closed. If FS is closed and the icemaker will not switch from the 1-min. fill cycle to the initial harvest cycle, replace CB. If FS is open, confirm that the water tank is full. If the water tank is not full, check the water supply, water filters, and inlet water valve. If the water tank is full, follow the steps in "II.F.2. Float Switch Cleaning." After cleaning FS, check it again. Replace if necessary.

Legend: **CB**–control board; **FS**–float switch

2. Float Switch Cleaning

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

1) Turn off the power supply.
2) Remove the front panel, then move the control switch to the "OFF" position.
3) Drain the water tank. Remove the base cover, then disconnect one end of the pump tubing to drain the water tank. See Fig. 3. After the water tank has drained, reconnect the pump tubing.
4) Disconnect the vent tube and the flush tube from the top of FS, then remove FS assembly and remove the rubber boot from the bottom of FS assembly. See Fig. 4.
5) Remove the retainer rod from the bottom of FS housing, then remove the float. Be careful not to bend the retainer rod excessively when removing it.
6) Wipe down FS housing, shaft, float, and retainer rod with a mixture of 1 part Hoshizaki "Scale Away" and 25 parts warm water. Clean the inside of the rubber boot and hose with cleaning solution. Rinse the parts thoroughly with clean water.
7) Reassemble FS 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 base cover (if applicable) and front panel in their correct positions.
10) Turn on the power supply to start the automatic icemaking process.

Legend: **CB**–control board; **FS**–float switch

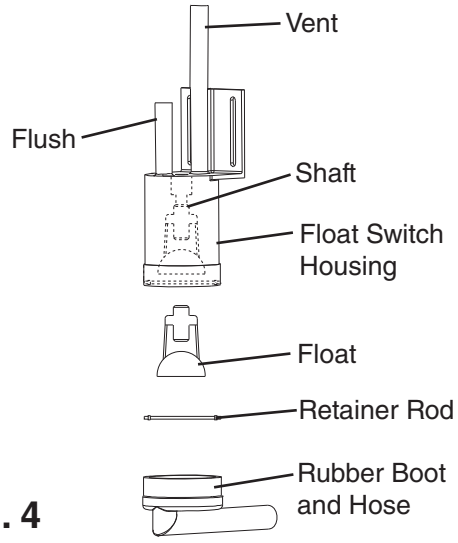


Fig. 4

G. Thermistor Check

To check thermistor resistance, follow the steps below.

1) Turn off the power supply.
2) Remove the front panel. Move the control switch to the "OFF" position.
3) Remove the control box cover.
4) Remove the thermistor from the refrigerant tubing.
5) Immerse the thermistor sensor portion in a glass containing ice and water for 2 or 3 min.
6) Disconnect the thermistor connector from CB K3 connector and check the resistance between thermistor leads. Normal range is 4.7 to 6.2 kΩ. If outside the normal range, replace the thermistor. See "IV.B. Component Service Information." If within the normal range, continue to the next step.
7) Replace the thermistor in its correct position. See "IV.B. Component Service Information."
8) Reconnect the thermistor connector to CB K3 connector.
9) Replace the control box cover in its correct position.
10) Move the control switch to the "ICE" position.
11) Replace the front panel in its correct position.
12) Turn on the power supply.
13) Once the harvest cycle starts (Comp energizes), begin timing the harvest cycle.
14) The harvest timer and harvest cycle should terminate within 2 to 5 min. If the harvest cycle does not terminate within 2 to 5 min., replace CB.

Legend: **CB**–control board; **Comp**–compressor

H. Control Switch

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

I. Diagnostic Tables

1. No Ice Production

No Ice Production - Possible Cause	
1. Power Supply	a) Off, blown fuse, or tripped breaker.
	b) Not within specifications.
2. Fuse (Control Box)	a) Blown.
3. Thermostatic Bin Control See "II.E. Bin Control Check"	a) Tripped with bin filled with ice.
	b) Ambient temperature too cool.
	c) Set too warm.
	d) Bulb out of position.
	e) Open contacts, defective.
4. Control Switch	a) In "OFF" or "WASH" position.
	b) Bad contacts.
5. High-Pressure Switch	a) Dirty condenser.
	b) Fan motor not operating.
	c) Refrigerant overcharged.
	d) Bad contacts.
	e) Refrigerant lines or components plugged.
6. Control Transformer (115VAC/10.5VAC)	a) Coil winding open or shorted.
7. Control Board See "II.D. Control Board Check"	a) In alarm.
	b) CB yellow "BC OPEN" LED on (bin full).
	c) Defective.
8. Bin Control See "II.E. Bin Control Check"	a) Tripped with bin filled with ice.
	b) Actuator does not move freely.
	c) Defective.
9. Water Supply	a) Water supply off or improper water pressure.
	b) External water filters clogged.
10. Inlet Water Valve	a) Screen or orifice clogged.
	b) Coil winding open.
	c) Water valve open in freeze cycle.
11. Float Switch See "II.F. Float Switch Check and Cleaning"	a) Float does not move freely.
	b) Defective.
12. Compressor	a) Compressor relay/magnetic contactor contacts bad or coil winding open.
	b) Start capacitor or run capacitor defective (single phase).
	c) Internal protector open.
	d) Start relay contacts bad or coil winding open (single phase).
	e) Compressor defective.
13. Hot Gas Valve	a) Closed in harvest cycle.
	b) Open in freeze cycle.
14. Thermistor See "II.G. Thermistor Check"	a) Loose, disconnected, or defective.

No Ice Production - Possible Cause	
15. Pump Motor	a) Motor winding open.
	b) Bearing worn out or locked rotor.
	c) Defective capacitor.
	d) Mechanical seal worn out.
16. Thermostatic Expansion Valve	a) Bulb loose.
	b) Operating erratically.
17. Liquid Line Valve	a) Closed in freeze cycle.
	b) Open in harvest cycle.
18. Fan Motor	a) Motor winding open.
	b) Bearing worn out or locked rotor.
	c) Defective capacitor.
19. Water System	a) Water leaks causing short freeze time.

2. Freeze-Up

Defrost and clean the icemaker prior to diagnosing freeze-up. Fill out a freeze-up checklist. See "II.J. Freeze Up Check List," the Hoshizaki America Technician's Pocket Guide, or contact your local distributor for a copy of the freeze-up checklist.

Freeze-Up - Possible Cause	
Harvest Cycle	
1. Evaporator	a) Scaled up.
	b) Damaged.
2. Cube Guides	a) Out of position.
	b) Damaged.
3. Spray Tubes and/or Spray Guides	a) Dirty.
	b) Out of position.
4. Water Supply	a) Low water pressure.
	b) External water filters clogged.
	c) Insufficient water line size. Minimum 1/4" Nominal ID (6 mm Nominal OD in the EU) copper water tubing or equivalent.
5. Inlet Water Valve	a) Screen or orifice clogged.
	b) Defective.
6. Float Switch See "II.F. Float Switch Check and Cleaning"	a) Dirty, sticking.
	b) Defective.
7. Refrigerant Charge	a) Low.
8. Control Board See "III.C. Settings and Adjustments" and "II.D. Control Board Check"	a) Harvest timer (S4 dip switch 1 & 2) set too short.
	b) Harvest pump timer (S4 dip switch 7) not in factory default position.
	c) Defective.
9. Bin Control See "II.E. Bin Control Check"	a) Actuator does not move freely.

Freeze-Up - Possible Cause	
10. Thermistor See "II.G. Thermistor Check"	a) Loose, disconnected, or defective.
11. Thermostatic Expansion Valve	a) Defective.
12. Hot Gas Valve	a) Closed or restricted.
13. Liquid Line Valve	a) Open.
Freeze Cycle	
1. Evaporator	a) Scaled up.
	b) Damaged.
2. Spray Tubes and/or Spray Guides	a) Dirty.
	b) Out of position.
3. Refrigerant Charge	a) Low.
4. Control Board See "II.D. Control Board Check"	a) Freeze timer (S4 dip switch 9 & 10) set incorrectly.
	b) Defective.
5. Inlet Water Valve	a) Leaking by.
6. Float Switch See "II.F. Float Switch Check and Cleaning"	a) Float does not move freely.
	b) Defective.
7. Pump Motor	a) RPM too slow.
	b) Impeller damaged.
8. Thermostatic Expansion Valve	a) Bulb loose or defective.
9. Liquid Line Valve	a) Restricted.
10. Headmaster (C.P.R.) (remote models)	a) Not bypassing.

3. Low Ice Production

Low Ice Production - Possible Cause	
Long Harvest Cycle	
1. Evaporator	a) Scaled up.
2. Spray Tubes and/or Spray Guides	a) Dirty.
	b) Out of position.
3. Refrigerant Charge	a) Low.
4. Water Supply	a) Low water pressure.
	b) External water filters clogged.
	c) Insufficient water line size. Minimum 1/4" Nominal ID (6 mm Nominal OD in the EU) water tubing or equivalent.
	d) Too cold.
5. Control Board See "II.D. Control Board Check"	a) Thermistor connection loose (K3).
	b) Defective.
6. Thermistor See "II.G. Thermistor Check"	a) Loose, disconnected, or defective.
7. Hot Gas Valve	a) Erratic or closed.
8. Inlet Water Valve	a) Screen or orifice clogged.

Low Ice Production - Possible Cause	
9. Compressor	a) Inefficient or off.
10. Liquid Line Valve	a) Erratic or open.
11. Thermostatic Expansion Valve	a) Defective.
Long Freeze Cycle	
1. Evaporator	a) Scaled up, dirty.
2. Float Switch See "II.F. Float Switch Check and Cleaning"	a) Scaled up, dirty.
	b) Float sticking.
	c) Defective switch.
3. Inlet Water Valve	a) Leaking by.
4. Hot Gas Valve	a) Erratic or open.
5. Condenser	a) Clogged.
6. Control Board See "II.D. Control Board Check"	a) Float switch connection loose (K5).
	b) Defective.
7. Refrigerant Charge	a) Low.
8. Thermostatic Expansion Valve	a) Bulb loose.
	b) Defective.
9. Compressor	a) Inefficient or off.
10. Pump Motor	a) RPM too slow.
11. Liquid Line Valve	a) Erratic or restricted.
12. Headmaster (C.P.R.) (remote models)	a) Not bypassing.
13. Splash Guard	a) Out of place.
	b) Missing or damaged.
Freeze-Time Correction Cycle Initiated	
1. Evaporator	a) Scaled up, dirty.
2. Float Switch See "II.F. Float Switch Check and Cleaning"	a) Scaled up, dirty.
	b) Float sticking.
	c) Defective switch.
3. Refrigerant Charge	a) Low.
4. Splash Guard	a) Out of place.
	b) Missing or damaged.
5. Distribution/Spray Tubes	a) Scaled up, dirty.
6. Cube Guides	a) Out of position.
	b) Damaged.
7. See "2. Freeze Up" Above	

J. Freeze-Up Check List

Freeze-Up Check List
Please Complete When Diagnosing a Freeze-Up, Refrigerant Leak, or Low Charge
Technical Support Fax #: 770-487-3360
Make Copies And Use As Needed

Model #_____ **Serial #**_____ **Install Date**_____ **Freeze-Up Date**_____

List model and manufacture of bin or dispenser_____.

Date appliance was last cleaned:_____.

Freeze-Up Defrost

YES NO

[ ] [ ] 1) After defrosting, was the appliance leak checked?
[ ] [ ] 2) Were any leaks found?
If so where?_____.
[ ] [ ] 3) Was any refrigerant added to the unit?
If so, how much?_____.

Set Up

[ ] [ ] 4) Is the appliance stand alone?
[ ] [ ] 5) Is water line independent?
[ ] [ ] 6) Is water line correct size? If not_____".
1/4" Nominal ID Copper Water Tubing or Equivalent.
7) What is water pressure?_____.
Water Temperature_____.
[ ] [ ] 8) Does appliance have any water filtration?
If yes please list the following:
Filter brand_____.
Model_____.
Filter pressure gauge reading during the fill cycle_____.
Date filter was last replaced?_____.
GPM or LPM flow rate of filter system?_____.
9) Ambient temperature at appliance?
_____.
At remote condenser (if applicable)?_____.

Appliance Status

[ ] [ ] 10) Is the appliance and/or float switch dirty?
11) List the S4 (1-10) and S5 (1-5) DIP switch settings.
S4: 1___2___3___4___5___6___7___8___9___10____
S5: 1_____2_____3_____4_____5_____
[ ] [ ] 12) Is DIP switch number 7 ON (harvest pump time (harvest assist) all models and freeze-time correction models with control board 2A7664-02?
[ ] [ ] 13) Is the cube guide positioned correctly?
[ ] [ ] 14) Are the evaporator separators positioned properly?
[ ] [ ] 15) Is the thermistor properly mounted, tight, and insulated?
[ ] [ ] 16) Is the TXV bulb properly mounted, tight, and insulated?
[ ] [ ] 17) Are splash guards in place?

Appliance Sequence of Operation

Fill

YES NO

[ ] [ ] 18) Does the water tank fill and overflow? 60-90 sec. Note: Larger models may take up to 120 seconds to overflow when empty.
[ ] [ ] 19) If NO in step 17, is water flow 5GPM for larger?

Harvest

[ ] [ ] 20) Is the hot gas valve opening?
[ ] [ ] 21) Is harvest pump time (harvest assist) utilized (S4dip switch 7)?
[ ] [ ] 22) Is hot gas valve opening in harvest?
[ ] [ ] 23) Does water valve close completely when deenergized?
24) What was length of harvest?_____.

Freeze

[ ] [ ] 25) Is pump motor energized in freeze cycle except during 10-sec. anti-slush. If activated (S5 dip switch 5 on)?
26) Water-cooled condenser outlet temperature 5-min. into freeze? _____°F.
27) What was length of freeze?_____.
[ ] [ ] 28) Is the cube size consistent from inlet to outlet of evaporator?
[ ] [ ] 29) Is ice still dropping when next freeze cycle starts?
30) What is the ice drop weight?_____.
31) What is head pressure?
Freeze_____Harvest_____.
(Freeze pressure should be taken 5 minutes into the freeze cycle).
32) What is suction pressure?
Freeze_____Harvest_____.
(Freeze pressure should be taken 5 minutes into the freeze cycle).
[ ] [ ] 33) When activating bin control, did appliance shutdown within 15 seconds in the first 5 minutes of freeze cycle?

Freeze-Time Correction Status - Control Board 2A7664-02

[ ] [ ] 34) Has Freeze-Time Correction been activated? ("POWER OK" LED blinking)
[ ] [ ] 35) Has more than 1 Freeze-Tiem Correction been activated? ("POWER OK" LED and "EXT HARVEST" LED blinking)

Note: Make copies of this form and use it when diagnosing a freeze up condition. Submit a completed copy of the checklist along with the freeze-up labor claim form.

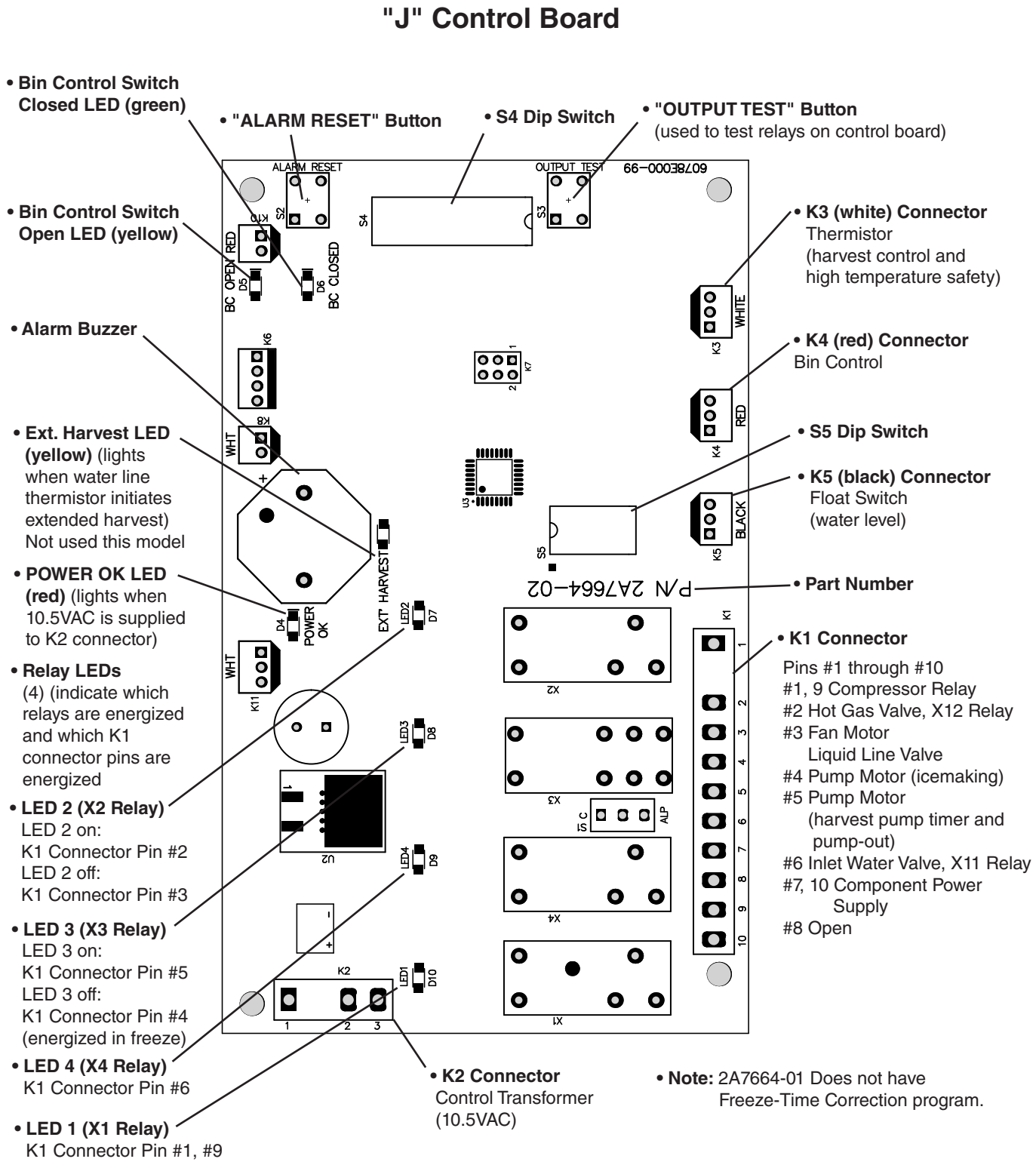
III. Controls and Adjustments

- A Hoshizaki exclusive control board is employed in KM series appliances.
- All models are pretested and factory adjusted.
- For a control board check procedure, see "II.C. Control Board Check."

NOTICE
• Fragile, handle very carefully. • The control board contains integrated circuits, which are susceptible to failure due to static discharge. It is especially important to touch the metal part of the icemaker when handling or replacing the control board. • Do not touch the electronic devices on the control board or the back of the control board. • Do not change wiring and connections. Do not misconnect K3 WHITE, K4 RED, and K5 BLACK, because the same connector is used for the thermistor, bin control, and float switch. • Do not short out power supply to test for voltage. • Always replace the whole control board assembly if it goes bad.

A. Control Board Layout

1. "J" Control Board



"J" Control Board	
Part Number	2A7664-02

B. LED Lights and Audible Alarm Safeties

Beep occurs and red CB "POWER OK" LED turns on when control switch is moved to "ICE" position.

Sequence

Green LEDs 1 through 4 turn on and sequence from initial startup as listed in the table below. Order of green LEDs from the outer edge of control board is 1, 4, 3, 2.

Sequence Step	LED	Energized Components	Time LEDs are On	
			Min.	Max.
1-Minute Fill Cycle	4	WV		
Harvest Cycle	1, 4, 2	Comp, FM*, FMR, HGV, WV	1 minute	20 minutes
Harvest Pump Time (harvest assist)	1, 3, 2	Comp, FM*, FMR, HGV, PM	0 seconds	50 seconds
Freeze Cycle	1	Comp, FM/FMR, PM, LLV	5 minutes	freeze timer setting
Anti-Slush Control	1, 3	Comp, FM/FMR, LLV	If S5 dip switch 5 on, PM off 10 sec. when thermistor at 36°F (2.2°C)	
Pump-Out Cycle	1, 4†, 3, 2	Comp, FM*, FMR, HGV, PM, WV †, DV	10 seconds	20 seconds
*FM energized if on K1 Conector Pin #9; †pump-out timer setting				

Alarms

Type	Alarm	Notes
1 Beep	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 Beep	Harvest Backup Timer (harvest > 20 min. for two cycles in a row)	Check thermistor (open), HGV not opening, TXV or LLV leaking by, low charge, inefficient Comp, or WRV leaking by.
3 Beep	Freeze Timer (freeze > freeze timer setting for two cycles in a row)	Check FS stuck closed (up), WV leaking by, HGV leaking by, PM not pumping, TXV defective, LLV not opening, low charge, HM not bypassing, or inefficient Comp.
LED Blink	Freeze-Time Correction (2A7664-02) (maximum freeze time differential exceeded)	CB red "POWER OK" LED blinks. 3rd freeze-time correction cycle in 36 hours starts CB yellow "EXT HARVEST" LED blinking. Fill out freeze-up checklist.
To reset above safeties, press "ALARM RESET" button with power supply on.		
6	Low Voltage (92Vac±5% or less)	Red LED turns off if voltage protection operates. 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; **FS**–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

C. Settings and Adjustments

NOTICE
Dip switches are factory set. Failure to maintain factory settings may adversely affect performance and warranty coverage. For more information, contact your Hoshizaki Service Center.

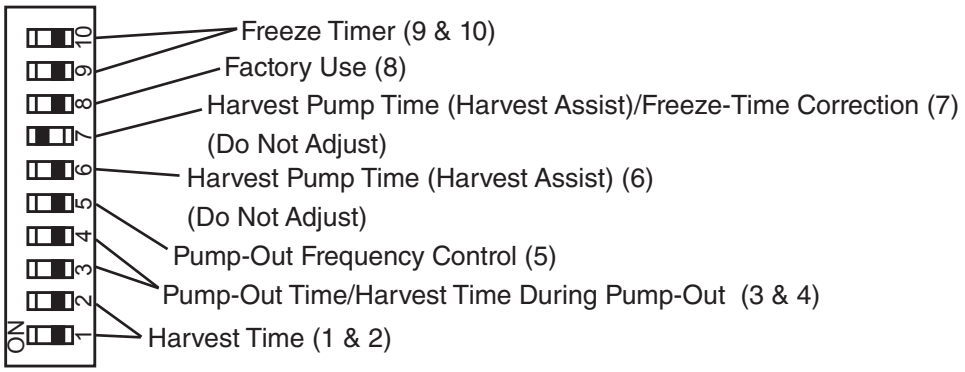
1. Default Dip Switch Settings

The dip switches are factory-adjusted to the following positionsfor both the 2A7664-01and 2A7664-02 control boards:

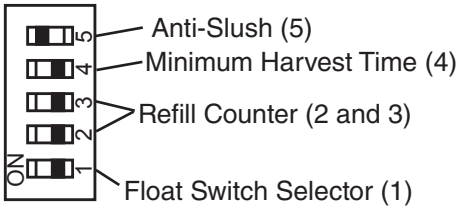
S4 Dip Switch No.	1	2	3	4	5	6	7	8	9	10
KM-340MAJ, KM-340MWJ	OFF	OFF	ON	OFF	ON	OFF	ON	OFF	OFF	OFF
KM-515MAJ, KM-515MWJ, KM-515MRJ	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
KM-650MAJ, KM-650MWJ, KM-650MRJ	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF

S5 Dip Switch (Do Not Adjust) "J" Control Board					
Dip Switch No.	1	2	3	4	5
All Models	OFF	OFF	OFF	OFF	ON

S4 Dip Switch
"J" Control Board



S5 Dip Switch (Do Not Adjust)
"J" Control Board



2. Harvest Time (S4 dip switch 1 & 2)

The harvest timer starts counting when the thermistor reaches 48°F (9°C) at the evaporator outlet and the control board reads 3.9 kΩ from the thermistor. 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 drain provided at harvest needs to be prolonged for extra cleaning. Note that the pump-out timer (S4 dip switch 3 & 4) acts in place of the harvest timer during cycles with a pump out. For details, see "III.C.3. Pump-Out Timer (S4 dip switch 3 & 4)."

Note: On models with a pump-out every cycle, the harvest timer is only relevant during the initial harvest cycle since a pump out occurs every cycle thereafter.

S4 Dip Switch Setting		Time (sec.)	
No. 1	**No. 2**	**S5-4 OFF**	**S5-4 ON**
OFF	OFF	60	30
ON	OFF	90	45
OFF	ON	120	60
ON	ON	180	75

3. Pump-Out Time/Harvest Time During Pump-Out (S4 dip switch 3 & 4)

NOTICE
Do not adjust 3 off and 4 on. Pump motor does not run in pump-out rotation in this setting.

When a pump-out is called for, the pump motor stops for 2 sec., then energizes in the reverse direction, taking water from the bottom of the water 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 time can be set to pump-out for 10 or 20 sec. During pump-out cycles minimum harvest time is based on times given in the table below.

S4 Dip Switch Setting		Time (sec.)			Inlet Water Valve	
		T1	T2			
No. 3	**No. 4**		**S5-4 OFF**	**S5-4 ON**	**S5-4 OFF**	**S5-4 ON**
OFF	OFF	10	150	100	Closed	Closed
ON	OFF	10	180	130	Closed	Closed
OFF	ON	10	120	70	Open	Closed
ON	ON	20	180	180	Closed	Closed

T1: Time to drain the water tank

T2: Harvest timer at pump out

4. Pump-Out Frequency Control (S4 dip switch 5)

The pump-out frequency control is factory set to drain the water tank every 10 cycles. 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 10 cycles.

The first pump-out is dependent on S4 dip switch 5. See the table below.

S4 Dip Switch Setting No. 5	Pump-Out Frequency	1st Pump-Out
OFF	Every 10 cycles	After 11th freeze cycle
ON	Every cycle	After 2nd freeze cycle

5. Harvest Pump Time (Harvest Assist) (S4 dip switch 6)

NOTICE
Factory set for proper operation. Do not adjust. Adjustment outside of the factory default setting may result in damage to the appliance.

Harvest pump time (harvest assist) is only active when S4 dip switch 7 is in the "ON" position. In the factory default position, the harvest pump time (harvest assist) starts with 50 sec. left to go in harvest cycle (S4 dip switche 6) and after the thermistor reaches 48°F (9°C) at the evaporator outlet and the control board reads 3.9 kΩ from the thermistor. The harvest pump time (harvest assist) is factory set, and no adjustment is required.

S4 Dip Switch Setting	Harvest Pump Time (Harvest Assist)	
No. 6	S5-4 OFF	S5-4 ON
OFF	50 sec.	25 sec.
ON	25 sec.	15 sec.

6. Harvest Pump Time (Harvest Assist)/Freeze-Time Correction (S4 dip switch 7)

NOTICE
Factory set for proper operation. Do not adjust. Adjustment outside of the factory default setting may result in damage to the appliance.

a) Harvest Pump Time (Harvest Assist)

Depending on S4 dip switch 7 setting, the pump motor either stays off or is energized during the last seconds of the harvest cycle. When the pump motor is energized (S4 dip switch 7 on), water circulates over the evaporator. The harvest water valve is open during harvest for a maximum of 6 minutes or the length of harvest minus the harvest pump time value(S4 dip switch 6), whichever is shorter.

When S4 dip switch 7 is in the on position and harvest begins, X11 and X10 relays energize. A latching circuit is created through the X11 and X10 relays. For further details, see "VIII.B. Wiring Diagrams." In the factory default position, 50 sec. before harvest termination, LED 4 turns off, inlet water valve and X11 relay de-energize. X10 relay remains energized through the latching circuit. Next, LED 3 turns on and control board K1 connector pin #5 (DBU wire) energizes, energizing the pump motor for the last seconds of harvest. Harvest pump time adjusted by S4 dip switch 1 & 2 and S5 dip switch 4 settings. Contact Technical Support before adjusted these settings.

b) Freeze-Time Correction

When S4 dip switch 7 is in the on position, freeze-time correction enabled.
See "II.C. Freeze-Time Correction Cycle (90 min.)."

S4 Dip Switch Setting No. 7	Harvest Pump Time (sec.) (Harvest Assist)	Freeze-Time Correction
OFF	0	Disabled
ON	50	Enabled

7. Factory Use (S4 dip switch 8)

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

8. Freeze Timer (S4 dip switch 9 & 10)

NOTICE
Adjust to proper specification, or the icemaker 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 or pump-out cycle. After 2 consecutive freeze timer terminations, the control board shuts down the icemaker. In this case, see "II.G.3. Low Ice Production" for possible solutions. The freeze timer is factory set and no adjustment is required. Before changing this setting, contact Hoshizaki Technical Support at 1-800-233-1940 for recommendations.

S4 Dip Switch Setting		Time (min.)
No. 9	No. 10	
OFF	OFF	60
OFF	ON	50
ON	OFF	70
ON	ON	75

9. Float Switch Selector (S5 dip switch 1)

This dip switch setting allows use of this control board in single and dual float switch models. This model uses a single float switch style.

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

S5 Dip Switch Setting	Top or Bottom Float Switch Control
No. 1	
OFF	Bottom Float Switch Enabled
ON	Top Float Switch Enabled

10. Refill Counter (S5 dip switch 2 and 3)

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

S5 Dip Switch Setting		Refill Counter
No. 2	No. 3	
OFF	OFF	0
OFF	ON	1 refill
ON	OFF	9 refills
ON	ON	10 refills

11. Minimum Harvest Time (S5 dip switch 4)

NOTICE
Factory set for proper operation. Do not adjust. Adjustment outside the factory default setting may result in damage to the appliance.

S5 Dip Switch Setting No. 4	Minimum Harvest Timer
OFF	120 sec.
ON	70 sec.

12. Anti-Slush (S5 dip switch 5)

This dip switch setting provides anti-slush control during the freeze cycle. When the evaporator temperature reaches 36°F (2.2°C) the control board reads a 5.8kΩ signal from the thermistor and de-energizes the water pump for 10 sec. to melt the ice slush and prevent the ice slush from blocking the water supply tubing, causing irregular freeze patterns.

NOTICE
Factory set for proper operation. Do not adjust. Adjustment outside the factory default setting may result in damage to the appliance.

S5 Dip Switch Setting No. 5	Anti-Slush
OFF	Disabled
ON	Enabled

IV. Refrigeration Circuit and Component Service Information

⚠ WARNING

- This appliance should be diagnosed and repaired only by qualified service personnel to reduce the risk of death, electric shock, serious injury, or fire.
- Move the control switch to the "OFF" position and turn off the power supply. Place the disconnect in the "OFF" position. Lockout/Tagout to prevent the power supply from being turned back on inadvertently.
- **CHOKING HAZARD:** Ensure all components, fasteners, and thumbscrews are securely in place after the icemaker is serviced. Make sure that none have fallen into the dispenser unit/ice storage bin.
- Make sure all food zones in the icemaker and dispenser unit/ice storage bin are clean after service.

A. Refrigeration Circuit Service Information

⚠ WARNING

- Repairs requiring the refrigeration circuit to be opened must be performed by properly trained and EPA-certified service personnel.
- 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.

NOTICE

- Always recover the refrigerant and store it in an approved container. Do not discharge the refrigerant into the atmosphere.
- Do not leave the system open for longer than 15 min. when replacing or servicing parts. The Polyol Ester (POE) oils used in R-404A applications can absorb moisture quickly. Therefore it is important to prevent moisture from entering the system when replacing or servicing parts.
- Always install a new drier every time the sealed refrigeration system is opened. Do not replace the drier until after all other repair or replacement has been made. Install the new drier with the arrow on the drier in the direction of the refrigerant flow.
- 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 is provided with refrigerant access valves. Using proper refrigerant practices, recover the refrigerant. Store the refrigerant in an approved container. Do not discharge the refrigerant into the atmosphere.

2. Brazing

⚠ WARNING

- R-404A itself is not flammable at atmospheric pressure and temperatures up to 176°F (80°C).
- 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.
- Do not use silver alloy or copper alloy containing arsenic.

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.

NOTICE

- Always install a new drier every time the sealed refrigeration system is opened.
- Do not replace the drier until after all other repair or replacement has been made. Install the new drier with the arrow on the drier in the direction of the refrigerant flow.
- 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 refrigerant 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 the required refrigerant charge, 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 required when charging an R-404A system (to prevent fractionation). Place the service cylinder on the scales; if the service cylinder is not equipped with a dip tube, invert the service cylinder, then place it on the scales. Open the high-side valve on the gauge manifold.

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

8) If necessary, add any remaining charge to the system through the low-side. ***NOTICE!*** **To prevent compressor damage, use a throttling valve or liquid dispensing device to add the remaining liquid charge through the low-side refrigerant access valve with the icemaker running.**

9) Close the high and low-side gauge manifold valves, then disconnect the gauge manifold hoses.

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

B. Component Service Information

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

Component	Notes
Compressor	1 phase: Install a new start capacitor, run capacitor, and start relay. 3 phase: Install a new magnetic contactor.
Thermostatic Expansion Valves	• Attach the thermostatic 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 positions on the tube. • Secure the bulb with the clamp and holder, then insulate it.
Hot Gas Valves Liquid Line Valves	• Replace the strainer if applicable. • Use copper tube of the same diameter and length when replacing valve lines.
Fan Motors	Install a new capacitor.
Pump Motor	Install a new capacitor.
Thermistor	• Attach the new thermistor to the suction line in the same location as the previous thermistor. • The thermistor should be at the 12 o'clock position on the tube. • Smoothly fill the recessed area of the thermistor holder with high thermal conductive type sealant. Hoshizaki America part number 4A0683-01 (Silicone Heat Sink Compound 10-8108 manufactured by GC Electronics), KE-4560 RTV (manufactured by ShinEtsu Silicones), or equivalent are recommended. • Secure the thermistor with the holder, then insulate it. • Be very careful to prevent damage to the leads.

C. Water Regulating Valve Adjustment (water-cooled model)

The water regulating valve is factory set, and generally no adjustment is required. However, when necessary, adjust the water regulator using the following procedure.

1) Prepare a thermometer to check the condenser drain temperature. Attach a pressure gauge to the high-side line of the system.
2) 5 min. 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. 5. Next, check that the reference pressure is in the range indicated in the Head Pressure table in the Performance Data section. If it is not in the proper range, verify the refrigerant charge.

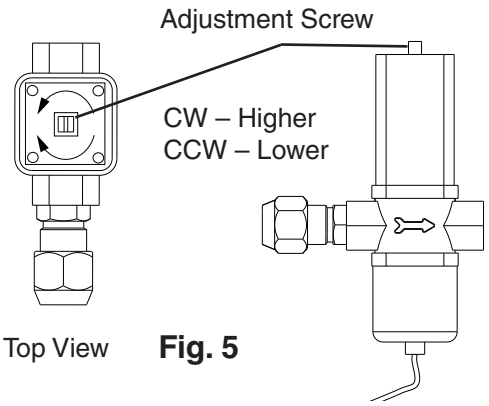


Fig. 5

3) Check that the condenser drain temperature is stable.

V. Maintenance

The maintenance schedule below is a guideline. More frequent maintenance may be required depending on water quality, the appliance's environment, and local sanitation regulations

⚠ WARNING

- Only qualified service technicians should service the appliance.
- To reduce the risk of electric shock, do not touch the control switch or service switch with damp hands
- Before servicing: Move the control switch to the "OFF" position and turn off the power supply. Place the disconnect in the "OFF" position.
  Lockout/Tagout to prevent the power supply from being turned back on inadvertently.
- **CHOKING HAZARD:** Ensure all components, fasteners, and thumbscrews are securely in place after any maintenance is done to the icemaker. Make sure that none have fallen into the dispenser unit/ice storage bin.

Maintenance Schedule		
Frequency	**Area**	**Task**
Daily	Scoop	Clean the ice scoop using a neutral cleaner. Rinse thoroughly after cleaning.
Bi-Weekly	Air Filters	Inspect. Wash with warm water and neutral cleaner if dirty.
Monthly	External Water Filters	Check for proper pressure and change if necessary.
	Icemaker Exterior	Wipe down with a clean, soft cloth. Use a damp cloth containing a neutral cleaner to wipe off oil or dirt build up. Clean any chlorine staining (rust colored spots) using a non-abrasive cleanser.
	Underside of Icemaker and Top Kits; Bin Door and Snout	Wipe down with a clean cloth and warm water.
Yearly	Icemaker and Dispenser Unit/Ice Storage Bin Liner	Clean and sanitize per the cleaning and sanitizing instructions provided in the instruction manual or maintenance label on the icemaker.
	Water Supply Inlet	Close the icemaker water supply line shut-off valve and drain the water system. Clean the water supply inlet screen.
	Condenser	Inspect. Clean if necessary by using a brush or vacuum cleaner. More frequent cleaning may be required depending on location.
	Water Hoses	Inspect the water hoses and clean/replace if necessary.

VI. Preparing the Appliance for Periods of Non-Use

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

When the appliance 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 appliance for an extended time or in sub-freezing temperatures, follow the instructions below.

1. Remove the water from the icemaker water line:

1) Turn off the power supply, then remove the front panel.

2) Close the icemaker water supply line shut-off valve and open the icemaker water supply line drain valve.

3) Allow the line to drain by gravity.

4) Attach a compressed air or carbon dioxide supply to the icemaker water supply line drain valve.

5) Make sure at least 3 min. have elapsed since you turned off the power supply. Make sure the control switch is in the "ICE" position. Replace the front panel in its correct position, then turn on the power supply.

6) Blow the icemaker water supply line out using the compressed air or carbon dioxide supply.

7) Close the icemaker water supply line drain valve.

2. Remove the water from the water tank:

1) Turn off the power supply, then remove the front panel.

2) Move the control switch to the "OFF" position.

3) Drain the water tank. 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.

4) Replace the base cover (if applicable) and front panel in their correct positions.

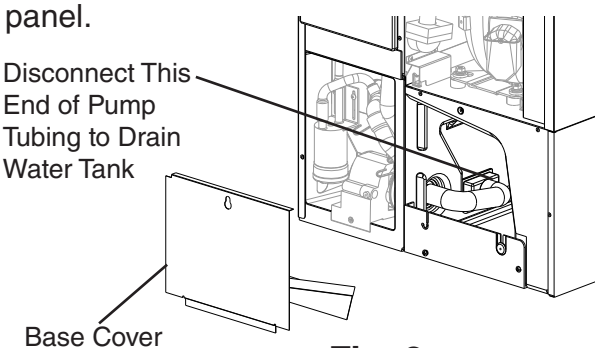


Fig. 6

5) Remove all ice from the dispensing unit/ice 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.

VII. Disposal

The appliance contains refrigerant and must be disposed of in accordance with applicable national, state, and local codes and regulations. Refrigerant must be recovered by properly certified service personnel.

VIII. Technical Information

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

A. Specification and Performance Data Sheets

Pressure data is recorded at 5 min. into freezing cycle. The data not in bold should be used for reference only.

1. KM-340MAJ

Specification Sheet

AC SUPPLY VOLTAGE	115/60/1	
AMPERAGE	9.2 A	
MINIMUM CIRCUIT AMPACITY	15 A	
MAXIMUM FUSE SIZE	15 A	
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F
ELECTRIC W (kWH/100 lbs.)	740 (5.65)	700 (4.18)
WATER gal./24HR (gal./100 lbs.)	54 (17.1)	105 (26.0)
ICE PRODUCTION PER CYCLE	10.7 lbs. (4.9 kg) 480pcs.	
BIN CONTROL SYSTEM	Mechanical Switch	
REFRIGERANT CHARGE	R404A, 1 lb. 4.8 oz. (590g)	

Performance Data Sheet

APPROXIMATE ICE PRODUCTION PER 24 HR.	AMBIENT TEMP. (ºF/ºC)	WATER TEMP. (ºF/ºC) 50/10		70/21		90/32	
	70/21	**404**	183	378	171	348	158
	80/27	384	174	344	156	317	144
APPROXIMATE ELECTRIC CONSUMPTION watts	70/21	**700**		712		723	
	80/27	709		727		736	
	90/32	712		**740**		750	
	100/38	713		742		760	
APPROXIMATE WATER CONSUMPTION PER 24 HR. gal./day m^3/day	70/21	**105**	0.40	90	0.34	82	0.31
	80/27	94	0.35	70	0.27	68	0.26
	90/32	90	0.34	**54**	0.20	49	0.19
	100/38	73	0.27	53	0.20	44	0.17
FREEZING CYCLE TIME min.	70/21	**34**		37		41	
	80/27	36		41		45	
	90/32	37		**44**		48	
	100/38	38		45		52	
HARVEST CYCLE TIME min.	70/21	**4.1**		3.9		3.8	
	80/27	3.9		3.5		3.6	
	90/32	3.9		**3.3**		3.3	
	100/38	3.6		3.3		3.3	
HEAD PRESSURE PSIG kg/cm^2G	70/21	**220**	15.5	241	16.9	259	18.2
	80/27	236	16.6	268	18.8	280	19.7
	90/32	241	16.9	**290**	20.4	306	21.5
	100/38	241	16.9	294	20.6	320	22.5
SUCTION PRESSURE PSIG kg/cm^2G	70/21	**62**	4.4	64	4.5	66	4.6
	80/27	64	4.5	67	4.7	68	4.8
	90/32	64	4.5	**69**	4.9	71	5.0
	100/38	64	4.5	69	4.9	72	5.1

TOTAL HEAT OF REJECTION FROM CONDENSER	7,500 BTU/h [AT 90ºF (32ºC) / WT 70ºF (21ºC)]
TOTAL HEAT OF REJECTION FROM COMPRESSOR	900 BTU/h [AT 90ºF (32ºC) / WT 70ºF (21ºC)]

2. KM-340MWJ

Specification Sheet

AC SUPPLY VOLTAGE	115/60/1	
AMPERAGE	7.5 A	
MINIMUM CIRCUIT AMPACITY	15 A	
MAXIMUM FUSE SIZE	15 A	
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F
ELECTRIC W (kWH/100 lbs.)	690 (4.84)	680 (4.06)
WATER gal./24HR (gal./100 lbs.)	62 (18.1)	87 (21.6)
WATER COOLED CONDENSER (gal./24HR (gal./100 lbs.)	294 (86)	140 (35)
ICE PRODUCTION PER CYCLE	10.5 lbs. (4.8 kg) 480pcs.	
BIN CONTROL SYSTEM	Mechanical	
REFRIGERANT CHARGE	R404A, 1 lb. 0.9 oz. (480g)	

Performance Data Sheet

APPROXIMATE ICE PRODUCTION PER 24 HR.	AMBIENT TEMP. (ºF/ºC)	WATER TEMP. (ºF/ºC) 50/10		70/21		90/32	
	70/21	**402**	182	385	175	368	167
	80/27	389	176	363	164	349	158
	90/32	385	175	**344**	156	329	149
lbs./day kg./day	100/38	384	174	340	154	315	143
APPROXIMATE ELECTRIC CONSUMPTION	70/21	**680**		683		688	
	80/27	682		687		692	
	90/32	683		**690**		695	
watts	100/38	684		691		700	
APPROXIMATE WATER CONSUMPTION PER 24 HR.	70/21	**227**	0.86	265	1.00	453	1.72
	80/27	256	0.97	315	1.19	579	2.19
	90/32	265	1.00	**356**	1.35	593	2.24
gal./day m^3/day	100/38	380	1.44	412	1.56	810	3.07
FREEZING CYCLE TIME	70/21	**34**		36		37	
	80/27	36		38		39	
	90/32	36		**40**		41	
min.	100/38	36		40		42	
HARVEST CYCLE TIME	70/21	**3.7**		3.6		3.6	
	80/27	3.6		3.4		3.5	
	90/32	3.6		**3.3**		3.3	
min.	100/38	3.5		3.3		3.3	
HEAD PRESSURE	70/21	**290**	20.4	289	20.3	298	20.9
	80/27	290	20.4	289	20.3	302	21.2
	90/32	289	20.3	**288**	20.2	299	21.1
PSIG kg/cm^2G	100/38	294	20.7	291	20.4	310	21.8
SUCTION PRESSURE	70/21	**68**	4.8	69	4.8	70	4.9
	80/27	68	4.8	69	4.9	70	5.0
	90/32	69	4.8	**70**	4.9	71	5.0
PSIG kg/cm^2G	100/38	69	4.8	70	4.9	72	5.1

TOTAL HEAT OF REJECTION FROM CONDENSER	7,500 BTU/h [AT 90ºF (32ºC) / WT 70ºF (21ºC)]
TOTAL HEAT OF REJECTION FROM COMPRESSOR	900 BTU/h [AT 90ºF (32ºC) / WT 70ºF (21ºC)]
WATER FLOW FOR CONDENSER	32 gal./h [AT 100ºF (38ºC) / WT 90ºF (32ºC)]
PRESSURE DROP OF COOLING WATER LINE	less than 10 PSIG

3. KM-515MAJ

Specification Sheet

AC SUPPLY VOLTAGE	115/60/1	
AMPERAGE	10.8 A	
MINIMUM CIRCUIT AMPACITY	20 A	
MAXIMUM FUSE SIZE	20 A	
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F
ELECTRIC W (kWH/100 lbs.)	990 (5.30)	900 (4.20)
WATER gal./24HR (gal./100 lbs.)	72 (16.0)	161 (31.2)
ICE PRODUCTION PER CYCLE	10.4 lbs. (4.7 kg) 480pcs.	
BIN CONTROL SYSTEM	Mechanical Switch	
REFRIGERANT CHARGE	R404A, 1 lb. 7.6 oz. (670g)	

Performance Data Sheet

APPROXIMATE ICE PRODUCTION PER 24 HR.	AMBIENT TEMP. (ºF/ºC)	WATER TEMP. (ºF/ºC) 50/10		70/21		90/32	
	70/21	**517**	235	497	226	468	212
	80/27	502	228	472	214	440	200
	90/32	497	226	**450**	204	419	190
lbs./day kg./day	100/38	490	222	443	201	390	177
APPROXIMATE ELECTRIC CONSUMPTION	70/21	**900**		926		943	
	80/27	920		961		966	
	90/32	926		**990**		1000	
watts	100/38	923		992		1010	
APPROXIMATE WATER CONSUMPTION PER 24 HR.	70/21	**161**	0.61	135	0.51	123	0.47
	80/27	141	0.54	101	0.38	102	0.38
	90/32	135	0.51	**72**	0.27	67	0.25
gal./day m^3/day	100/38	106	0.40	71	0.27	62	0.24
FREEZING CYCLE TIME	70/21	**31**		31		31	
	80/27	31		31		32	
	90/32	31		**31**		32	
min.	100/38	31		31		33	
HARVEST CYCLE TIME	70/21	**3.4**		3.0		2.9	
	80/27	3.1		2.5		2.6	
	90/32	3.0		**2.1**		2.1	
min.	100/38	2.6		2.1		2.1	
HEAD PRESSURE	70/21	**233**	16.4	252	17.7	275	19.3
	80/27	248	17.4	277	19.5	298	20.9
	90/32	252	17.7	**298**	21.0	320	22.5
PSIG kg/cm^2G	100/38	255	18.0	303	21.3	340	23.9
SUCTION PRESSURE	70/21	**55**	3.9	56	3.9	58	4.1
	80/27	56	3.9	57	4.0	60	4.2
	90/32	56	3.9	**58**	4.1	61	4.3
PSIG kg/cm^2G	100/38	57	4.0	59	4.1	63	4.4

TOTAL HEAT OF REJECTION FROM CONDENSER	7,000 BTU/h [AT 90ºF (32ºC) / WT 70ºF (21ºC)]
TOTAL HEAT OF REJECTION FROM COMPRESSOR	1,100 BTU/h [AT 90ºF (32ºC) / WT 70ºF (21ºC)]

4. KM-515MWJ

Specification Sheet

AC SUPPLY VOLTAGE	115/60/1	
AMPERAGE	9.1 A	
MINIMUM CIRCUIT AMPACITY	20 A	
MAXIMUM FUSE SIZE	20 A	
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F
ELECTRIC W (kWH/100 lbs.)	860 (4.53)	850 (4.13)
WATER gal./24HR (gal./100 lbs.)	71 (15.6)	121 (24.4)
WATER COOLED CONDENSER gal./24HR (gal./100 lbs.)	367 (80)	189 (38)
ICE PRODUCTION PER CYCLE	10.7 lbs. (4.9 kg) 480pcs.	
BIN CONTROL SYSTEM	Mechanical Switch	
REFRIGERANT CHARGE	R404A, 0 lb. 15.2 oz. (430g)	

Performance Data Sheet

APPROXIMATE ICE PRODUCTION PER 24 HR.	AMBIENT TEMP. (ºF/ºC)	WATER TEMP. (ºF/ºC) 50/10		70/21		90/32	
	70/21	**495**	225	484	219	470	213
	80/27	487	221	469	213	456	207
	90/32	484	219	**457**	207	443	201
lbs./day kg./day	100/38	482	218	454	206	431	196
APPROXIMATE ELECTRIC CONSUMPTION	70/21	**850**		853		854	
	80/27	852		857		856	
	90/32	853		**860**		860	
watts	100/38	852		860		860	
APPROXIMATE WATER CONSUMPTION PER 24 HR.	70/21	**309**	1.17	347	1.31	737	2.79
	80/27	338	1.28	396	1.50	974	3.69
	90/32	347	1.31	**438**	1.66	944	3.57
gal./day m^3/day	100/38	548	2.07	556	2.11	1409	5.34
FREEZING CYCLE TIME	70/21	**29**		30		31	
	80/27	30		31		32	
	90/32	30		**32**		33	
min.	100/38	30		32		34	
HARVEST CYCLE TIME	70/21	**2.9**		2.7		2.6	
	80/27	2.7		2.4		2.4	
	90/32	2.7		**2.2**		2.1	
min.	100/38	2.4		2.2		2.1	
HEAD PRESSURE	70/21	**280**	19.7	281	19.8	286	20.1
	80/27	281	19.8	283	19.9	289	20.3
	90/32	281	19.8	**285**	20.0	290	20.4
PSIG kg/cm^2G	100/38	283	19.9	286	20.1	295	20.7
SUCTION PRESSURE	70/21	**65**	4.6	66	4.6	67	4.7
	80/27	65	4.6	66	4.7	67	4.7
	90/32	66	4.6	**67**	4.7	68	4.8
PSIG kg/cm^2G	100/38	66	4.6	67	4.7	69	4.9

TOTAL HEAT OF REJECTION FROM CONDENSER	8,100 BTU/h [AT 90ºF (32ºC) / WT 70ºF (21ºC)]
TOTAL HEAT OF REJECTION FROM COMPRESSOR	1,200 BTU/h [AT 90ºF (32ºC) / WT 70ºF (21ºC)]
WATER FLOW FOR CONDENSER	56 gal./h [AT 100ºF (38ºC) / WT 90ºF (32ºC)]
PRESSURE DROP OF COOLING WATER LINE	less than 10 PSIG

5. KM-515MRJ with URC-5F

Specification Sheet

AC SUPPLY VOLTAGE	115/60/1	
AMPERAGE	12.8 A	
MINIMUM CIRCUIT AMPACITY	20 A	
MAXIMUM FUSE SIZE	20 A	
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F
ELECTRIC W (kWH/100 lbs.)	960 (5.10)	900 (4.28)
WATER gal./24HR (gal./100 lbs.)	93 (20.5)	196 (39.0)
ICE PRODUCTION PER CYCLE	10.7 lbs. (4.8 kg) 480pcs.	
BIN CONTROL SYSTEM	Mechanical Switch	
REFRIGERANT CHARGE	TOTAL R404A, 4 lb. 4.8 oz. (1950g)	
	ICEMAKER, 2 lb. 6.8 oz. (1100g)	
	CONDENSER, 1 lb. 14 oz. (850g)	

Performance Data Sheet

APPROXIMATE ICE PRODUCTION PER 24 HR.	AMBIENT TEMP. (ºF/ºC)	WATER TEMP. (ºF/ºC) 50/10		70/21		90/32	
	70/21	**504**	228	489	222	453	205
	80/27	493	223	470	213	424	192
	90/32	489	222	**454**	206	411	187
lbs./day kg./day	100/38	476	216	444	201	372	169
APPROXIMATE ELECTRIC CONSUMPTION	70/21	**900**		918		947	
	80/27	913		941		973	
	90/32	918		**960**		991	
watts	100/38	925		967		1020	
APPROXIMATE WATER CONSUMPTION PER 24 HR.	70/21	**196**	0.74	166	0.63	143	0.54
	80/27	173	0.66	126	0.48	114	0.43
	90/32	166	0.63	**93**	0.35	76	0.29
gal./day m^3/day	100/38	128	0.49	89	0.34	60	0.23
FREEZING CYCLE TIME	70/21	**27**		28		30	
	80/27	28		30		32	
	90/32	28		**32**		34	
min.	100/38	29		32		35	
HARVEST CYCLE TIME	70/21	**4.2**		3.7		3.4	
	80/27	3.9		3.1		2.9	
	90/32	3.7		**2.5**		2.3	
min.	100/38	3.1		2.5		2.1	
HEAD PRESSURE	70/21	**205**	14.4	220	15.5	243	17.1
	80/27	217	15.2	240	16.9	264	18.5
	90/32	220	15.5	**257**	18.1	280	19.7
PSIG kg/cm^2G	100/38	225	15.8	262	18.5	302	21.2
SUCTION PRESSURE	70/21	**56**	3.9	57	4.0	58	4.1
	80/27	57	4.0	58	4.1	59	4.1
	90/32	57	4.0	**59**	4.1	60	4.2
PSIG kg/cm^2G	100/38	57	4.0	59	4.2	61	4.3

TOTAL HEAT OF REJECTION FROM CONDENSER	7,600 BTU/h [AT 90ºF (32ºC) / WT 70ºF (21ºC)]
TOTAL HEAT OF REJECTION FROM COMPRESSOR	1,100 BTU/h [AT 90ºF (32ºC) / WT 70ºF (21ºC)]

6. KM-650MAJ

Specification Sheet

AC SUPPLY VOLTAGE	115/60/1	
AMPERAGE	14.8 A	
MINIMUM CIRCUIT AMPACITY	20 A	
MAXIMUM FUSE SIZE	20 A	
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F
ELECTRIC W (kWH/100 lbs.)	1270 (5.41)	1200 (4.57)
WATER gal./24HR (gal./100 lbs.)	80 (14.2)	197 (31.2)
ICE PRODUCTION PER CYCLE	10.8 lbs. (4.9 kg) 480pcs.	
BIN CONTROL SYSTEM	Mechanical Switch	
REFRIGERANT CHARGE	R404A, 1 lb. 5 oz. (595g)	

Performance Data

APPROXIMATE ICE PRODUCTION PER 24 HR.	AMBIENT TEMP. (ºF/ºC)	WATER TEMP. (ºF/ºC) 50/10		70/21		90/32	
	70/21	**630**	286	610	277	572	260
	80/27	615	279	584	265	540	245
	90/32	610	277	**562**	255	520	236
lbs./day kg./day	100/38	599	272	552	250	481	218
APPROXIMATE ELECTRIC CONSUMPTION	70/21	**1200**		1221		1247	
	80/27	1216		1248		1273	
	90/32	1221		**1270**		1296	
watts	100/38	1225		1276		1320	
APPROXIMATE WATER CONSUMPTION PER 24 HR.	70/21	**197**	0.74	162	0.61	147	0.56
	80/27	170	0.65	117	0.44	119	0.45
	90/32	162	0.61	**80**	0.30	74	0.28
gal./day m^3/day	100/38	124	0.47	78	0.30	68	0.26
FREEZING CYCLE TIME	70/21	**21**		22		23	
	80/27	22		24		25	
	90/32	22		**25**		26	
min.	100/38	22		25		27	
HARVEST CYCLE TIME	70/21	**3.5**		3.1		2.9	
	80/27	3.2		2.5		2.6	
	90/32	3.1		**2.0**		2.0	
min.	100/38	2.6		2.0		2.0	
HEAD PRESSURE	70/21	**255**	17.9	274	19.2	303	21.3
	80/27	269	18.9	298	21.0	329	23.2
	90/32	274	19.2	**319**	22.4	350	24.6
PSIG kg/cm^2G	100/38	281	19.7	326	22.9	378	26.6
SUCTION PRESSURE	70/21	**57**	4.0	58	4.1	60	4.3
	80/27	58	4.1	59	4.2	62	4.4
	90/32	58	4.1	**60**	4.2	63	4.4
PSIG kg/cm^2G	100/38	59	4.1	61	4.3	66	4.6

TOTAL HEAT OF REJECTION FROM CONDENSER	10,400 BTU/h [AT 90ºF (32ºC) / WT 70ºF (21ºC)]
TOTAL HEAT OF REJECTION FROM COMPRESSOR	1,700 BTU/h [AT 90ºF (32ºC) / WT 70ºF (21ºC)]

7. KM-650MWJ

Specification Sheet

AC SUPPLY VOLTAGE	115/60/1	
AMPERAGE	12.6 A	
MINIMUM CIRCUIT AMPACITY	20 A	
MAXIMUM FUSE SIZE	20 A	
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F
ELECTRIC W (kWH/100 lbs.)	1160 (4.40)	1150 (4.25)
WATER gal./24HR (gal./100 lbs.)	96 (15.1)	203 (31.4)
WATER COOLED CONDENSER gal./24HR (gal./100 lbs.)	921 (145)	455 (70)
ICE PRODUCTION PER CYCLE	10.7 lbs. (4.8 kg) 480pcs.	
BIN CONTROL SYSTEM	Mechanical Switch	
REFRIGERANT CHARGE	R404A, 0 lb. 15.2 oz. (430g)	

Performance Data Sheet

APPROXIMATE ICE PRODUCTION PER 24 HR.	AMBIENT TEMP. (ºF/ºC)	WATER TEMP. (ºF/ºC) 50/10		70/21		90/32	
	70/21	**647**	293	643	292	610	277
	80/27	644	292	639	290	590	268
	90/32	643	292	**635**	288	592	269
lbs./day kg./day	100/38	627	285	625	283	553	251
APPROXIMATE ELECTRIC CONSUMPTION	70/21	**1150**		1153		1169	
	80/27	1152		1157		1180	
	90/32	1153		**1160**		1181	
watts	100/38	1160		1165		1200	
APPROXIMATE WATER CONSUMPTION PER 24 HR.	70/21	**658**	2.49	763	2.89	1326	5.02
	80/27	738	2.79	901	3.41	1698	6.43
	90/32	763	2.89	**1017**	3.85	1726	6.53
gal./day m^3/day	100/38	1100	4.16	1183	4.48	2378	9.00
FREEZING CYCLE TIME	70/21	**20**		21		22	
	80/27	21		22		24	
	90/32	21		**22**		24	
min.	100/38	22		22		26	
HARVEST CYCLE TIME	70/21	**3.4**		3.0		2.9	
	80/27	3.1		2.5		2.6	
	90/32	3.0		**2.0**		2.0	
min.	100/38	2.6		2.0		2.0	
HEAD PRESSURE	70/21	**235**	16.5	237	16.7	245	17.2
	80/27	237	16.6	240	16.9	250	17.6
	90/32	237	16.7	**243**	17.1	252	17.7
PSIG kg/cm^2G	100/38	240	16.9	245	17.2	260	18.3
SUCTION PRESSURE	70/21	**55**	3.9	56	3.9	57	4.0
	80/27	55	3.9	56	4.0	58	4.1
	90/32	56	3.9	**57**	4.0	59	4.1
PSIG kg/cm´G	100/38	56	3.9	57	4.0	60	4.2

TOTAL HEAT OF REJECTION FROM CONDENSER	11,100 BTU/h [AT 90ºF (32ºC) / WT 70ºF (21ºC)]
TOTAL HEAT OF REJECTION FROM COMPRESSOR	1,500 BTU/h [AT 90ºF (32ºC) / WT 70ºF (21ºC)]
WATER FLOW FOR CONDENSER	96 gal./h [AT 100ºF (38ºC) / WT 90ºF (32ºC)]
PRESSURE DROP OF COOLING WATER LINE	less than 10 PSIG

8. KM-650MRJ with URC-5F

Specification Sheet

AC SUPPLY VOLTAGE	115/60/1	
AMPERAGE	16.1 A	
MINIMUM CIRCUIT AMPACITY	20 A	
MAXIMUM FUSE SIZE	20 A	
ELECTRIC & WATER CONSUMPTION	90/70°F	70/50°F
ELECTRIC W (kWH/100 lbs.)	1230 (5.25)	1150 (4.36)
WATER gal./24HR (gal./100 lbs.)	85 (15.0)	191 (30.3)
ICE PRODUCTION PER CYCLE	11.3 lbs. (5.1 kg) 480pcs.	
BIN CONTROL SYSTEM	Mechanical Switch	
REFRIGERANT CHARGE	TOTAL R404A, 4 lb. 4.8 oz. (1950g)	
	ICEMAKER, 2 lb. 6.8 oz. (1100g)	
	CONDENSER, 1 lb. 14 oz. (850g)	

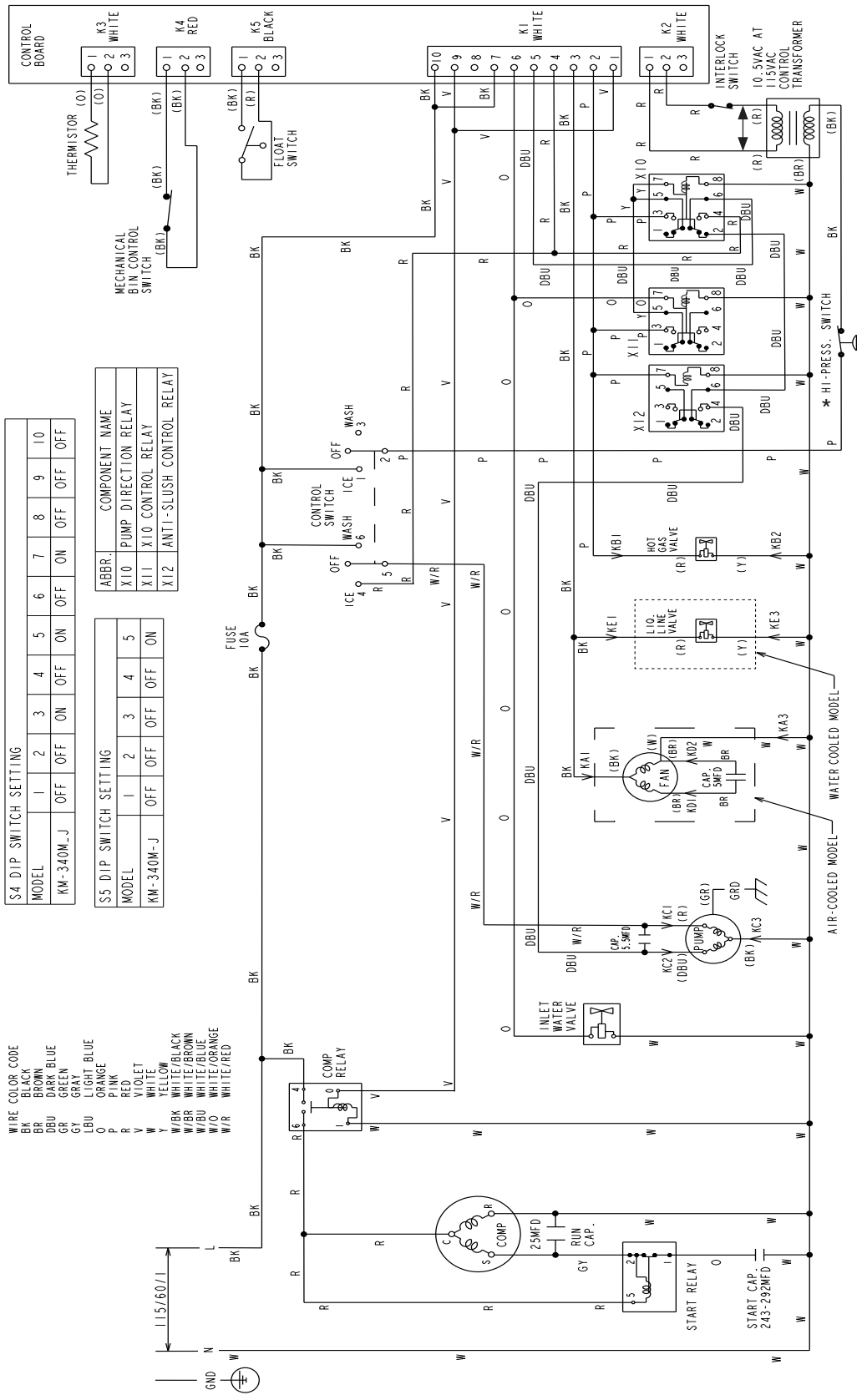
Performance Data Sheet

APPROXIMATE ICE PRODUCTION PER 24 HR.	AMBIENT TEMP. (ºF/ºC)	WATER TEMP. (ºF/ºC) 50/10		70/21		90/32	
	70/21	**632**	287	612	278	574	260
	80/27	617	280	586	266	541	246
	90/32	612	278	**564**	256	521	236
lbs./day kg./day	100/38	601	272	554	251	482	219
APPROXIMATE ELECTRIC CONSUMPTION	70/21	**1150**		1173		1197	
	80/27	1168		1204		1223	
	90/32	1173		**1230**		1251	
watts	100/38	1175		1235		1270	
APPROXIMATE WATER CONSUMPTION PER 24 HR.	70/21	**191**	0.72	160	0.61	145	0.55
	80/27	168	0.63	119	0.45	119	0.45
	90/32	160	0.61	**85**	0.32	78	0.30
gal./day m^3/day	100/38	125	0.47	83	0.31	72	0.27
FREEZING CYCLE TIME	70/21	**22**		23		25	
	80/27	23		24		26	
	90/32	23		**25**		27	
min.	100/38	23		26		29	
HARVEST CYCLE TIME	70/21	**3.6**		3.1		3.0	
	80/27	3.2		2.5		2.6	
	90/32	3.1		**2.0**		2.0	
min.	100/38	2.6		2.0		2.0	
HEAD PRESSURE	70/21	**230**	16.2	234	16.5	266	18.7
	80/27	233	16.4	240	16.8	286	20.1
	90/32	234	16.5	**244**	17.2	285	20.0
PSIG kg/cm^2G	100/38	249	17.5	254	17.8	322	22.6
SUCTION PRESSURE	70/21	**50**	3.5	50	3.5	52	3.7
	80/27	50	3.5	51	3.6	53	3.7
	90/32	50	3.5	**51**	3.6	53	3.7
PSIG kg/cm^2G	100/38	51	3.6	51	3.6	55	3.9

TOTAL HEAT OF REJECTION FROM CONDENSER	10,200 BTU/h [AT 90ºF (32ºC) / WT 70ºF (21ºC)]
TOTAL HEAT OF REJECTION FROM COMPRESSOR	1,500 BTU/h [AT 90ºF (32ºC) / WT 70ºF (21ºC)]

B. Wiring Diagrams

1. KM-340M_J



WIRE COLOR CODE

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

S4 DIP SWITCH SETTING

MODEL	1	2	3	4	5	6	7	8	9	10
KM-340M_J	OFF	OFF	ON	OFF	ON	OFF	ON	OFF	OFF	OFF

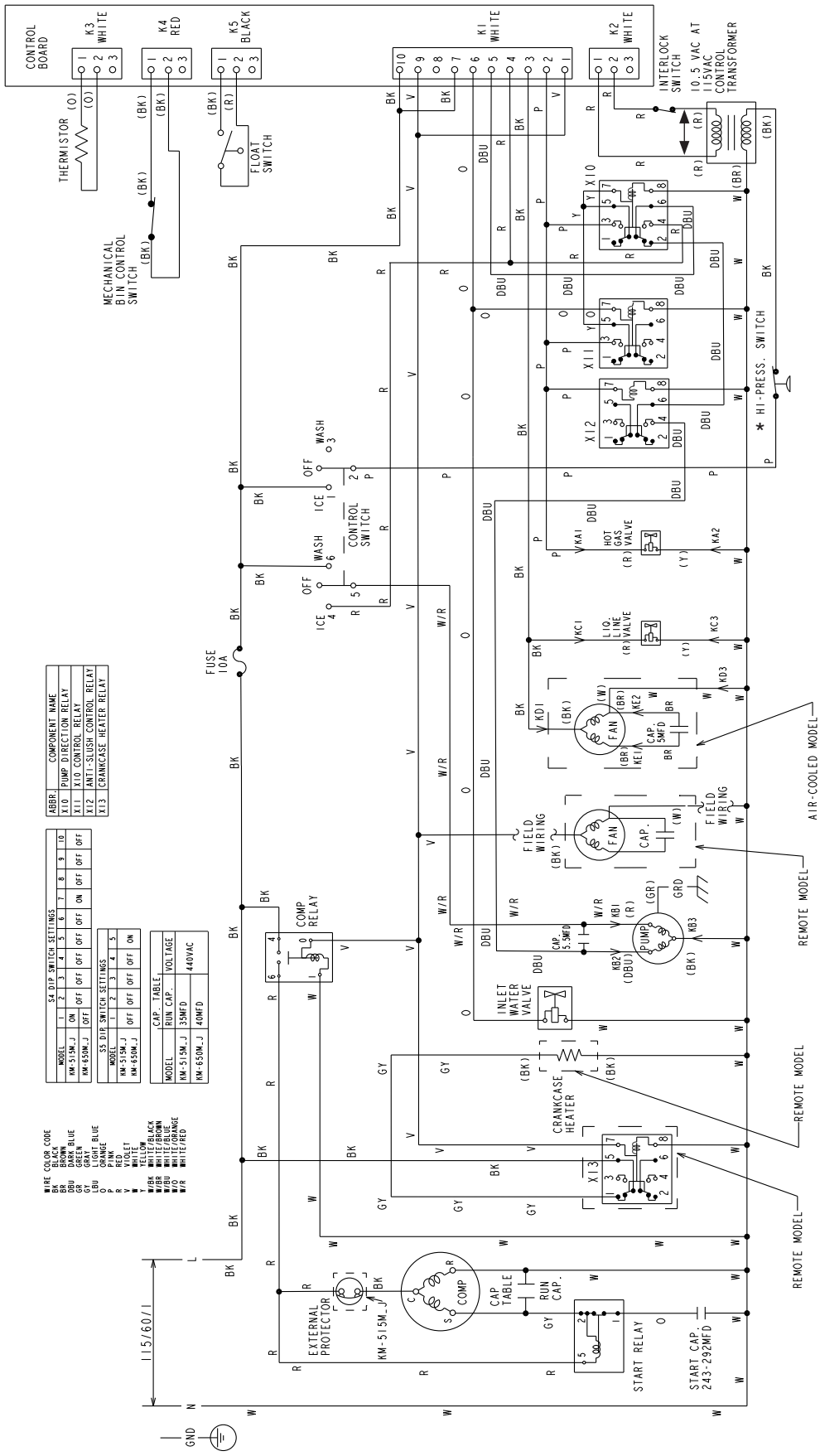
S5 DIP SWITCH SETTING

MODEL	1	2	3	4	5
KM-340M-J	OFF	OFF	OFF	OFF	ON

ABBR.	COMPONENT NAME
X10	PUMP DIRECTION RELAY
X11	X10 CONTROL RELAY
X12	ANTI-SLUSH CONTROL RELAY

* High-Pressure Switch		
	Air-Cooled Model	Water-Cooled Model
Cut-out	412±$^{22}_{0}$ PSIG	384±$^{22}_{0}$ PSIG
Cut-in	327±22 PSIG	284±22 PSIG

2. KM-515M_J and KM-650M_J



* High-Pressure Switch		
	Water-Cooled Model	Air and Remote Models
Cut-out	384±$^{22}_{0}$ PSIG	412±$^{22}_{0}$ PSIG
Cut-in	284±22 PSIG	327±22 PSIG