Ice-O-Matic®

Certified Technicians Manual

GC Series

Electro-Mechanical
Operation and Troubleshooting

Mile High Equipment Company © Ice-O-Matic 03/02

9081182-01

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General Information

How To Use this Manual

Ice-O-Matic provides this manual as an aid to the service technician in installation, operation, and maintenance of GC cube ice machines. If used properly this manual can also help the service technician troubleshoot and diagnose most of the problems that may occur with the machine.

The first two sections of this manual provide general information and maintenance information. The remainder of the manual beginning with section C provides troubleshooting and service information. Section C contains flow charts called troubleshooting trees. Page C-1 provides instructions on using the troubleshooting trees. Each troubleshooting tree is named to describe a particular problem with the operation of the machine. When following the trouble-shooting trees the service technician will be led through questions and checks and end up at a probable solution. When using the troubleshooting trees it is important that the service technician understand the operation and adjustments of the components being checked and the component suspected of being defective. A detailed description of the operation and adjustments of each component as well as other service information is laid out in the service information pages that follow section C.

Each section, after section C, focuses on a particular system in the ice machine, e.g. water distribution system, refrigeration system, etc. Each section formatted out the same way. The first 1 or 2 pages of each section lists each component in that system in alphabetical order and contains a brief description of each component. After the component description page(s) some sections may contain diagnoses or operation information for that particular system. The pages that follow contain detailed service information for each component in the system. The components are again in alphabetical order and each component is on a separate page. Each service information page includes problem, possible cause and remedy charts that in most cases apply only to the component on the respective page.

We believe that most aspects of the GC cuber are covered in this manual, however, should you encounter any conditions not addressed herein, please contact your local Ice-O-Matic distributor for assistance. You may also call or write the Ice-O-Matic Service Department:

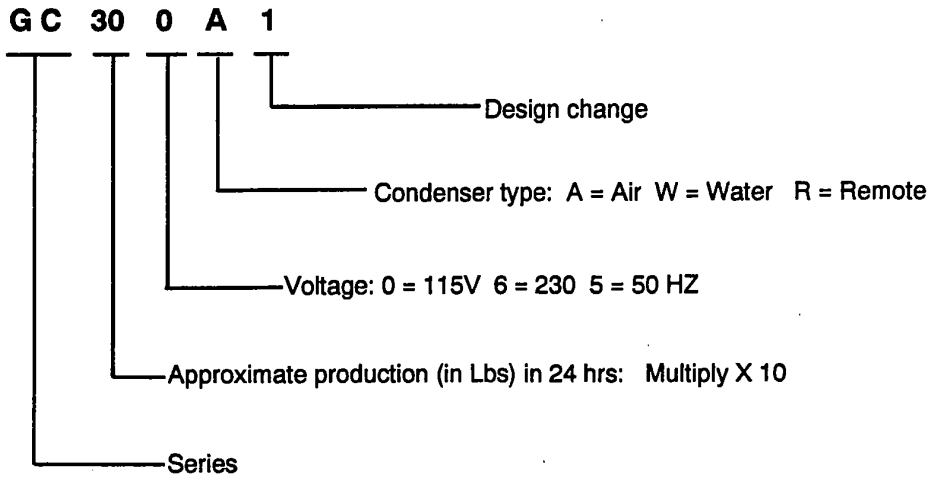
Ice-O-Matic
P.O. Box 39487
Denver, CO 80239-0487
Attn: Service Department

Phone: 1-800-423-3367
(303) 371-3737
Fax: (303) 371-4153

Any service communication must include:

- Model Number
- Serial Number
- A detailed explanation of the problem

How To Read Model Numbers



Serial Number Date Code

First letter in the serial number indicates the month and decade of manufacture.
First digit in the serial number indicates the year of manufacture.

Example: A 5 was manufactured January 1985. M 5 will be manufactured in January 1995.

1980-1989	MONTH	1990-1999
A	JANUARY	M
B	FEBRUARY	N
C	MARCH	P
D	APRIL	Q
E	MAY	R
F	JUNE	S
G	JULY	T
H	AUGUST	U
I	SEPTEMBER	V
J	OCTOBER	W
K	NOVEMBER	Y
L	DECEMBER	Z

Note: O and X have been eliminated.

General Information

Electrical & Mechanical Specifications

Note: 50 cycle models, manufactured before 4/95, used R-22 refrigerant. Refer to the serial plate on back of the machine for electrical and mechanical specifications on these machines.

22" (56 cm) Wide Models

Model Number	Ice Prod. 24 hrs @ 90°F (32°C) Air 70°F (21°C) Water	Condensing Unit	Voltage Characteristics	No.Of Wires (Incl. Grd.)	Minimum Circuit Ampacity	Max. Fuse Size	Refrigerant Type/ Charge
GC-300-A	248 lb (113 kg)	Air	115/60/1	3	17.5	20	32oz/908g
GC-300-W	312 lb (142 kg)	Water	115/60/1	3	14.3	20	18oz/511g
GC-305-A	245 lb (111 kg)	Air	230/50/1	3	12	15	32oz/908g
GC-305-W	315 lb (143 kg)	Water	230/50/1	3	9.2	15	18oz/511g
GC-550-A	458 lb (208 kg)	Air	115/60/1	3	20.5	30	36oz/1021g
GC-550-W	517 lb (235 kg)	Water	115/60/1	3	15.5	30	20oz/567g
GC-555-A	373 lb (169 kg)	Air	230/50/1	3	12.3	15	36oz/1021g
GC-555-W	367 lb (167kg)	Water	230/50/1	3	9.7	15	20oz/567g

30" (76 cm) Wide Models

Model Number	Ice Prod. 24 hrs @ 90°F (32°C) Air 70°F (21°C) Water	Condensing Unit	Voltage Characteristics	No.Of Wires (incl. gnd)	Minimum Circuit Ampacity	Max. Fuse Size	R404a Refrigerant Charge
GC-655-A	544 Lbs (247 Kgs)	Air	230/50/1	3	8.6	25	150oz (1418g)
GC-655-W	671 Lbs (305 Kgs)	Water	230/50/1	3	6.5	25	26oz (737g)
GC-655-R	573 Lbs (272 Kgs)	Remote	230/50/1	3	8.9	25	160oz (4536g)
GC-756-A	586 Lbs (288 Kgs)	Air	208-230/60/1	3	10.5	15	40oz (1134g)
GC-756-W	668 Lbs (303 Kgs)	Water	208-230/60/1	3	7.7	15	30oz (851g)
GC-756-R	620 Lbs (281 Kgs)	Remote	208-230/60/1	3	11.7	15	160oz (4536g)
GC1206-A	907Lbs.(411 Kgs)	Air	208-230/60/1	3	14.3	20	60 oz (1701g)
GC1206-R	1113Lbs.(31.5Kgs)	Remote	208-230/60/1	3	21.9	30	240oz (6804g)

Installation Guidelines

For proper operation of the ICE-O-MATIC ice machine the following installation guidelines must be followed. Failure to do so may result in loss of production capacity, premature part failures, and may void all warranty.

For a step by step Installation and Start-up procedure please refer to the Installation, Start-up Manual shipped with the machine.

Ambient Operating Temperatures

The ambient temperature must be between 50° F (10° C) and 100° F (38° C).

Incoming Water Supply

The water temperature to the machine must be between 40° F (4.5° C) and 100° F (38° C).
The water pressure must be between 20 psi (1.4 bar) and 110 psi (7.5 bar).

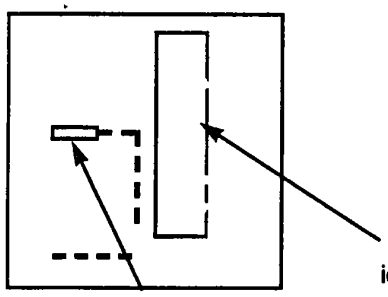
See Plumbing Diagram for line sizing, page A-5.

Clearance Requirements

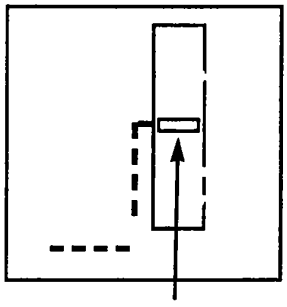
There should be at least 6 inches of clearance at rear and left side. If the machine is installed between 6" and 8" from the rear and/or left side, a baffle will need to be installed to prevent discharge air from being recirculated through condenser. The baffle is available through your local Ice-O-Matic distributor.

Start-Up Procedure

Once machine is placed on top of the bin, the bin control bulb must be moved into place for proper operation. This is done by turning the hold down clamp until the bulb is released. The hold down clamp can be reached either through the drop area of the machine or through the bin. See diagram below. Note: 22" (56cm) wide models manufactured before 1/96 use 2 bin controls, a primary and a secondary. The primary bin control is mounted to the bottom of the machine and is housed in a brass tube. It is important that the tube be moved into place by reaching in through the drop area and pushing down on the tube until it stops. The secondary control is mounted to the right sidewall. Both bin controls must be adjusted properly.



Bin control bulb location
for shipping



Bin control bulb location
during operation

Before starting the machine, it is recommended that the sump be filled completely with water. This is done by turning the selector switch to WASH, then push and hold the FILL switch until the sump fills completely with water. Once the sump is full, turn the selector switch to the ICE position and check at least one complete cycle.

Adjustments

Level machine.
Check thermostatic bin controls for proper operation, adjust if necessary.
Check the purge timer setting. See page G17 for adjustment procedure and to determine proper setting.

General Information

Remote Installation Guidelines

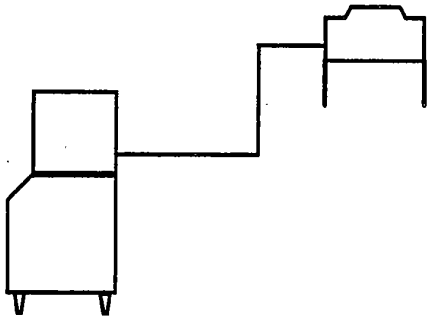
For proper operation of the ICE-O-MATIC ice machine the following installation guidelines must be followed. Failure to do so may result in loss of production capacity, premature part failures, and may void all warranties.

Remote Condensers

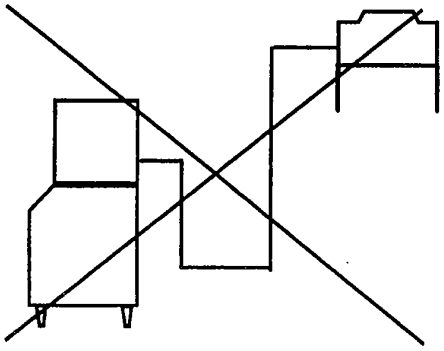
- Ambient operating temperatures: -20 F (-28 C) to 110 F (43 C)
- Maximum refrigerant line length: 40 ft. (12.2 m)
- Maximum vertical rise: 12 ft. (3.6 m)
- Minimum condenser height: Condensers must not be installed more than 6' (1.8 m).below the refrigerant line quick connects at rear of ice machine. No part of the refrigerant lines, between the machine and the condenser, should fall below this point.

WHEN INSTALLING CONDENSER ABOVE ICE MACHINE

DO Slope refrigerant lines downward toward compressor.

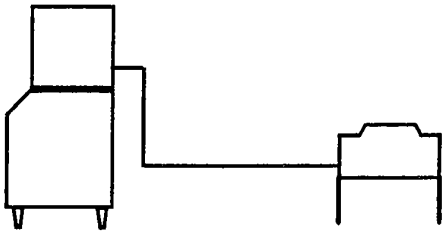


DO NOT Install any part of the refrigerant lines below the quick connect fittings at rear of machine.

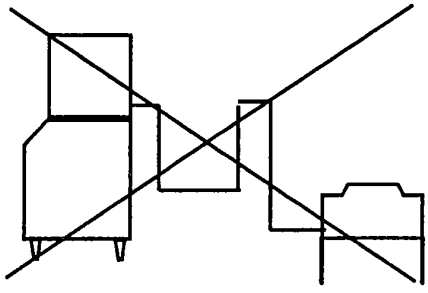


WHEN INSTALLING CONDENSER BELOW ICE MACHINE

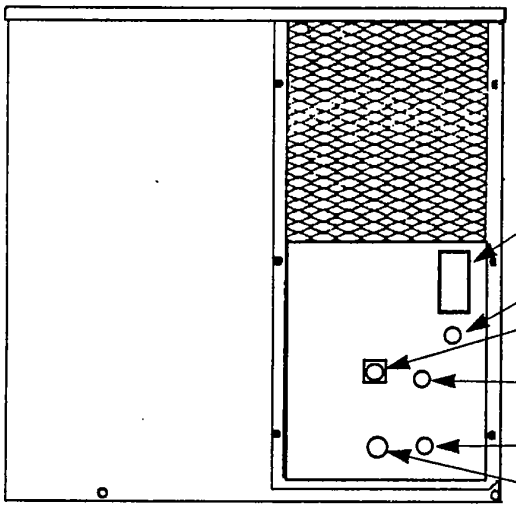
DO Add 3 lbs (1.4 kg)of refrigerant to system.
DO Slope refrigerant lines downward toward condenser



DO NOT Install the condenser lower than 6' (1.8 m)below the quick connect fittings at rear of machine.
DO NOT Create oil traps in refrigerant lines by sloping lines downward then rising upward.



22" (56 cm) Wide Models



Junction box for electrical connections.

7/8" (2.2 cm) dia. knock-out for electrical connections.

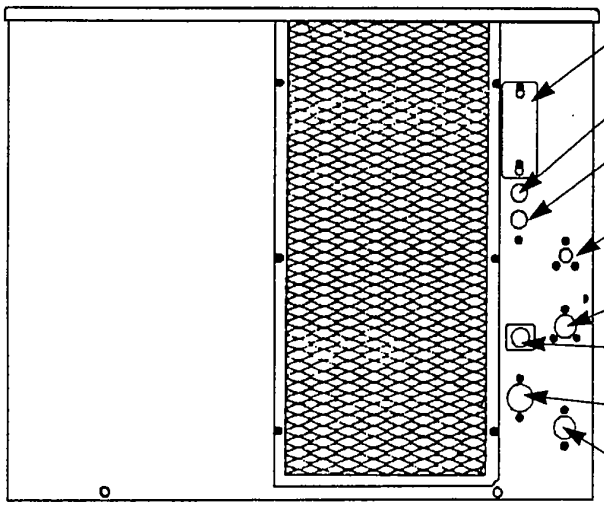
Ice making water inlet fitting, 3/8" FPT.

Condenser water in (water cooled), 3/8" FPT.

Condenser water drain (water cooled), 1/2" FPT.

Purge drain fitting, 3/4" FPT. Some models may have 9/16" (1.42 cm) ID plastic tubing.

30" (76 cm) Wide Models



Junction box for electrical connections.

7/8" (2.2 cm) dia.hole for electrical connections.

7/8" (2.2 cm) dia.knock-out for remote electrical connections.

Liquid line fitting, 3/8" male quick connect (remote only).

Discharge fitting, 1/2" male quick connect (remote only). / Condenser water in (water cooled), 3/8"FPT.

Ice making water inlet fitting, 3/8" FPT.

Purge drain fitting, 3/4" FPT. Some models may have 9/16" (1.42 cm ID) plastic tubing.

Condenser water drain (water cooled), 1/2" FPT.

NORMAL ICE MAKING CYCLE

The information below is a general description of how the GC Model machines operate. A more detailed description of each individual component is described in the service information pages later in this manual.

When the machine is switched from the OFF or WASH position to the ICE position or if there is a power interruption, the machine will start in the harvest cycle. If the machine shuts off due to a full bin, it will restart in the freeze cycle.

When the machine enters the freeze cycle, the water pump, compressor, water inlet valve and purge valve are energized. The water inlet valve remains energized (open), filling the sump, until the water level in the sump is high enough to lift the float on the water level sensor. At this point the valve de-energizes stopping the water flow into the sump. The purge valve will remain open until the time set on the purge timer has past. Minerals and other foreign matter are pumped through the purge valve and to the drain during this time. On machines manufactured before 10/96 the purge valve opens at the beginning of the harvest cycle. The condenser fan motor will energize once the head pressure reaches 250 psi (17 bar). If the head pressure drops below 210 psi (15 bar) the fan motor will de-energize. During freeze, water in the sump is circulated over the evaporator(s) where ice is then formed. As ice forms on the evaporator plate(s) the low side refrigerant pressure and the suction line temperature begin to drop. When the suction line temperature drops to 21°F (-6°C) on R-404a units and 25°F (-3.9°C).on R-22 (50Hz) units the timer initiate closes energizing the timer. The timer then keeps the machine in the freeze cycle until all time, set on the timer, has passed. The machine then enters harvest. At this point in the cycle the ice on the bottom 3 rows of the evaporator should be even with the outer edge of the vertical dividers on the evaporator. The cubes will then be 3/8" thick when the machine enters harvest..

When the machine enters the harvest cycle the hot gas valve opens. Hot gas enters the evaporators through the hot gas valve and heats the evaporator(s) to harvest the ice. The purge valve, on machines manufactured before 10/96, also opens at this time. The water pump continues to run allowing water to run over the evaporator(s) to assist in ice harvest. The Harvest timer also opens at the beginning of harvest. The harvest timer controls the length of harvest. The length of time on the harvest timer is determined by the ambient temperature (liquid line temperature on water cooled and remote units). The ambient or liquid line temperature is sensed by a thermistor and this information is sent to the timer. The harvest timer then adjusts itself to the proper amount of time. The lower the temperature sensed by the thermistor the longer the harvest time will be. Once the time on the harvest timer passes, the machine returns to the freeze cycle.

If the bin control opens due to a full bin, the machine will continue to run until the harvest cycle has ended.

Danger

Electrical shock and/or injury from moving parts inside this machine can cause serious injury.
Disconnect the electrical supply to machine prior to performing any adjustments or repairs.

Periodic Maintenance

1. Clean the ice-making section, per instructions on the following page. Cleaning should be performed a minimum of once every 6 months. Local water conditions may require that cleaning be performed more often.

THE FOLLOWING MAINTENANCE SHOULD BE PERFORMED ONCE EVERY 3 MONTHS.

2. Check optional air filter (if used), clean or replace if necessary.
3. Clean the condenser (air cooled machines) to insure unobstructed air flow.
4. Check for leaks of any kind; water, refrigerant, oil, etc.
5. Check to see that the T.X.V. bulb is securely fastened.
6. Check all electrical connections.
7. Oil fan motor (self contained air cooled).

CLEANING AND SANITIZING INSTRUCTIONS

Harvest problems may occur if the following procedures are not performed at least every 6 months.

1. Remove all ice from the bin.
2. Remove the front panel and push switch to "WASH". All other panels must stay on during cleaning operation as a safety precaution
3. Push and hold fill switch to allow water to fill the sump, if not already full.
4. Add ice machine cleaner to water sump following manufactures instructions; sump volume is approximately 1.6 gallons.
5. Re-install the front panel as a safety precaution.
6. Allow solution to circulate for 15 to 20 minutes, then remove front panel.
7. With the machine in WASH, push "PURGE" & hold to flush the ice machine cleaner out the drain.
8. Check that all visible deposits are removed from the evaporators. If not, repeat steps 3 through 7.
9. If necessary, remove water distribution pan and ice rack. Use a brush to remove any deposits.
10. Wipe out any deposits in water sump.
11. Add an EPA/FDA approved sodium hypocloride sanitizer to 1-1/2 gallons (5.7 liters) of water to yield 100 ppm free chlorine. Fill sump with solution and push "WASH". Allow solution to circulate for 10 minutes. Use a clean, soft cloth to wipe down all areas of evaporators, evaporator compartment, ice rack, and sump with sanitizing solution.
12. Add enough sanitizing solution to fill the water sump to overflowing and press the "WASH" button and allow circulation to occur for 10 minutes. During this time, wipe down all other ice machine splash zones, plus the interior surfaces of the bin and door with the remaining sanitizing solution. Inspect to insure that all functional parts are in place.
13. Repeat step 7.
14. Wipe out storage bin with warm, soapy water; rinse and sanitize with remaining solution from step 11.
15. Push fill switch and fill with fresh water. Replace front panel.
16. Discard the first two batches of ice.

Winterizing Procedure

Important

Whenever the ice machine is taken out of operation during the winter months, the procedure below must be performed. Failure to do so may cause serious damage and will void all warranties.

1. Shut water off to the machine.
2. Push the selector switch to the "Off" position.
3. Make sure all ice is off evaporator. If ice is being made, wait for cycle completion, then push the selector switch to the "Off" position.
4. Drain the water system completely by pushing the purge switch.
5. Disconnect the tubing between the pump discharge and the water distributor pan.
6. On water cooled machines, hold water regulating valve open by prying upward on the spring with a screwdriver while using compressed air to blow all the water out of the condenser.
7. Wipe out the storage bin.

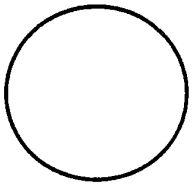
Notes

How To Use The Troubleshooting Trees

Introduction

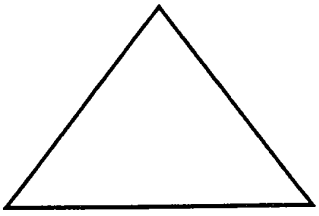
The troubleshooting trees on the following pages were developed to be used in conjunction with the service information section of this manual. If used together as intended, these two sections of the manual will help the ice machine service technician, to quickly diagnose many of the problems often encountered with ice machines. When used as designed, the troubleshooting trees can lead you from a general symptom to the most likely component to suspect as the cause of the problem. The trees are not designed to be "parts changer guides;" please do not use them as such!

The trees are made of three types of boxes:



QUESTION

CHECK



SOLUTION

QUESTION boxes ask a yes/no question and the answer will lead to either another question box, a check box, or a solution box.

CHECK boxes will suggest a point to check for proper operation, and will often refer you to a page in the SERVICE INFORMATION SECTION of this manual. The result of the check may lead to another box, or a solution box.

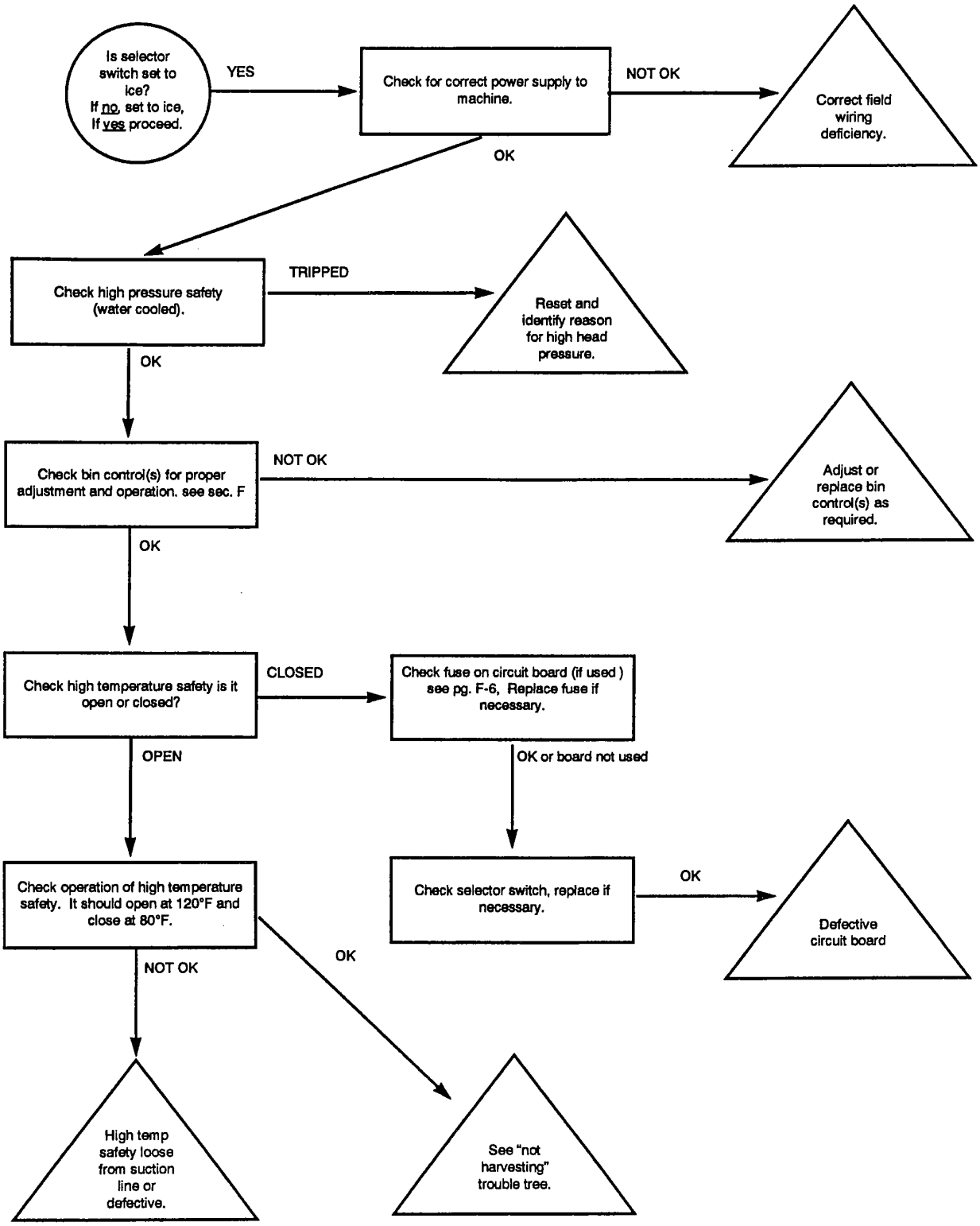
SOLUTION boxes suggest the most likely component to cause the malfunction described in the heading of the tree. When reaching a solution box, **DO NOT** immediately assume the component is defective. The final step is to use the **SERVICE INFORMATION SECTION** of this manual to verify that the component is, indeed defective.

To use the troubleshooting trees, first find the page with the heading describing the type of problem occurring. Begin at the top of the page and follow the tree, step-by-step. When a check box is reached, refer to the service information section to make the check suggested. Once a solution box is reached, refer to the service information section to verify that the component in the solution box is, indeed, defective, and repair or replace per the directions in that section.

Troubleshooting Trees

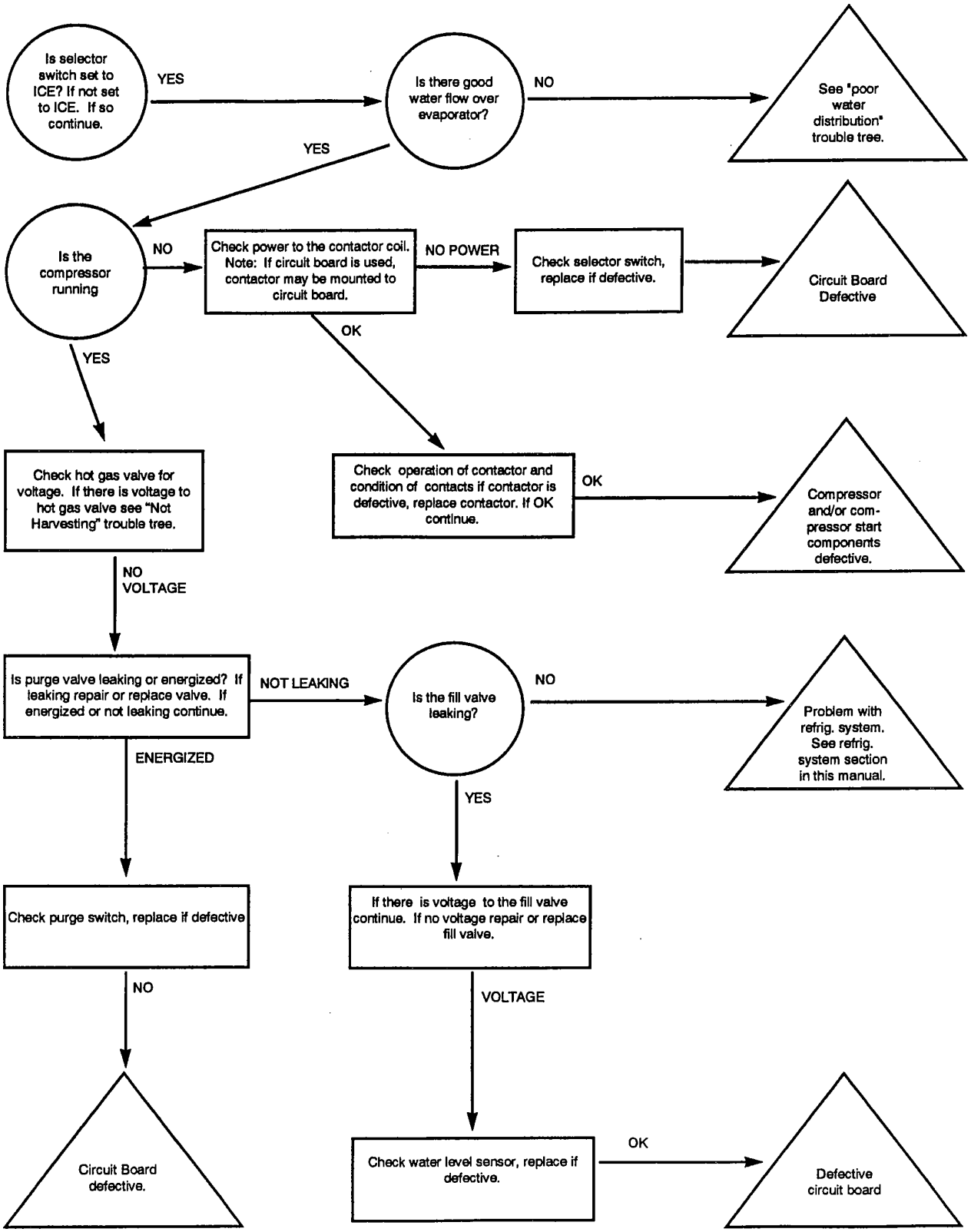
Table Of Contents

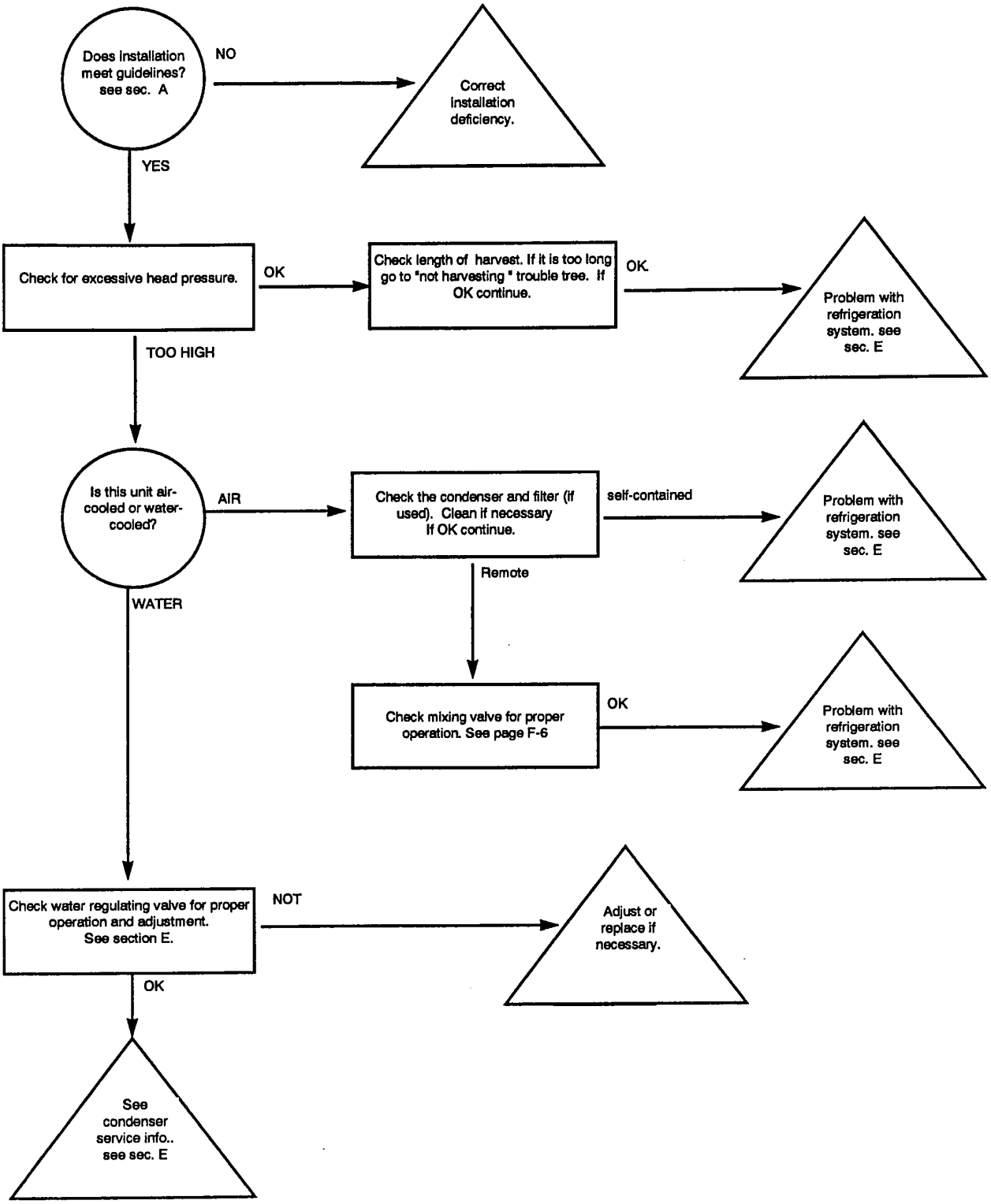
Machine Does Not Run



Troubleshooting Trees

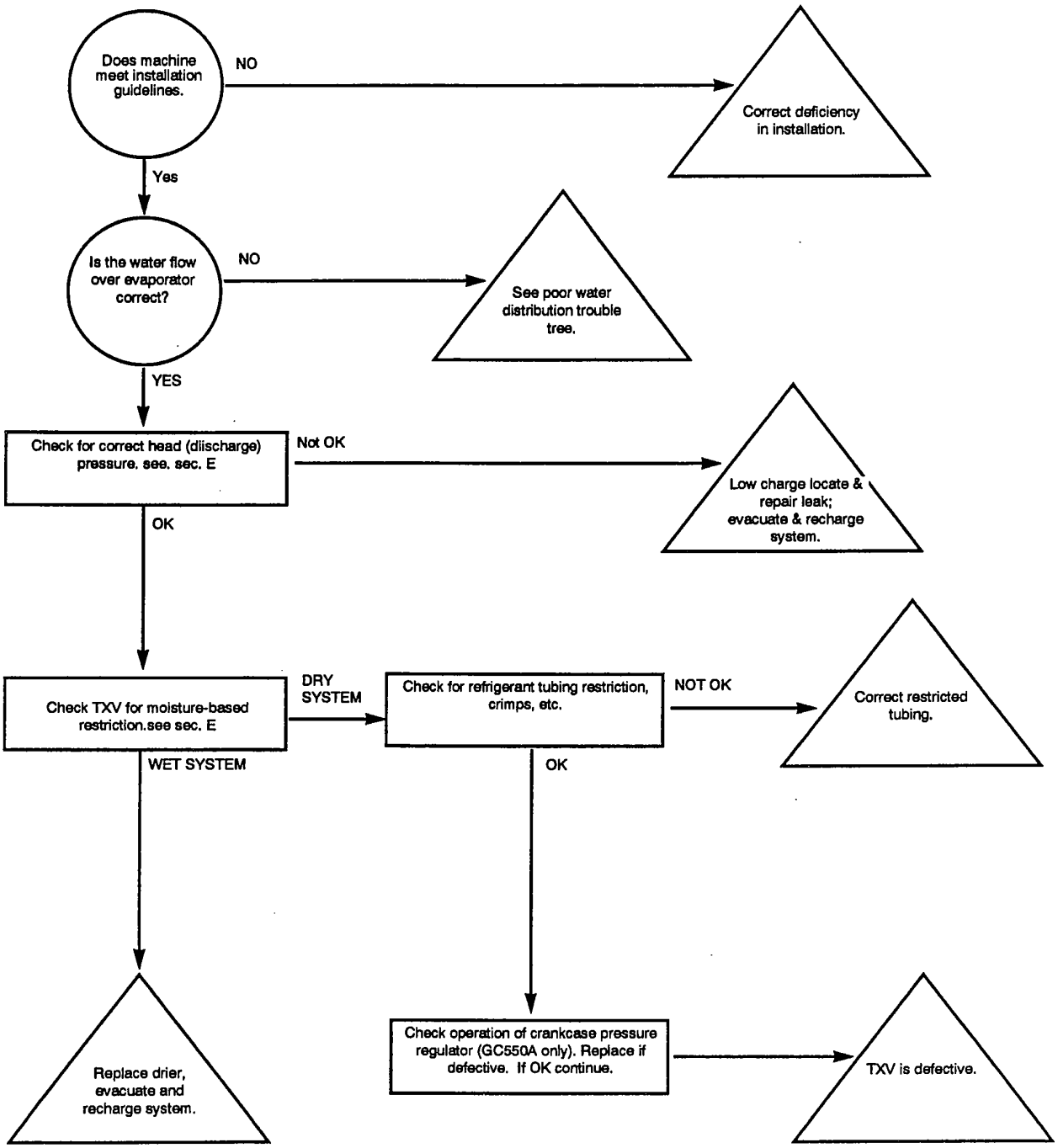
Machine Runs, Does Not Make Ice



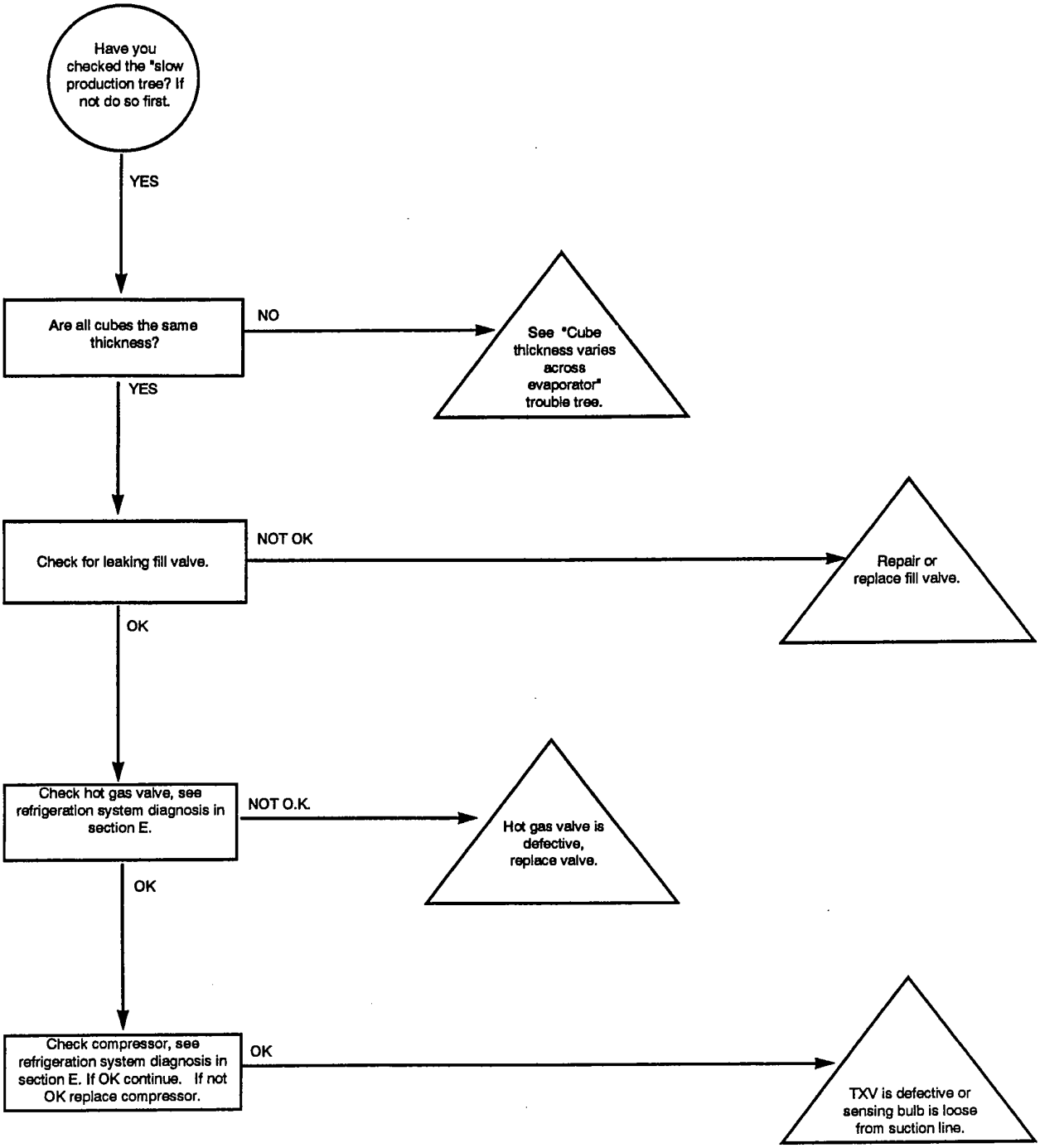

Does installation meet guidelines? see sec. A
NO
Correct installation deficiency.
YES
Check for excessive head pressure.
OK
Check length of harvest. If it is too long go to "not harvesting" trouble tree. If OK continue.
OK
Problem with refrigeration system. see sec. E
TOO HIGH
Is this unit air-cooled or water-cooled?
AIR
Check the condenser and filter (if used). Clean if necessary If OK continue.
self-contained
Problem with refrigeration system. see sec. E
Remote
WATER
Check mixing valve for proper operation. See page F-6
OK
Problem with refrigeration system. see sec. E
Check water regulating valve for proper operation and adjustment. See section E.
NOT
Adjust or replace if necessary.
OK
See condenser service info.. see sec. E

Troubleshooting Trees

Low Suction Pressure

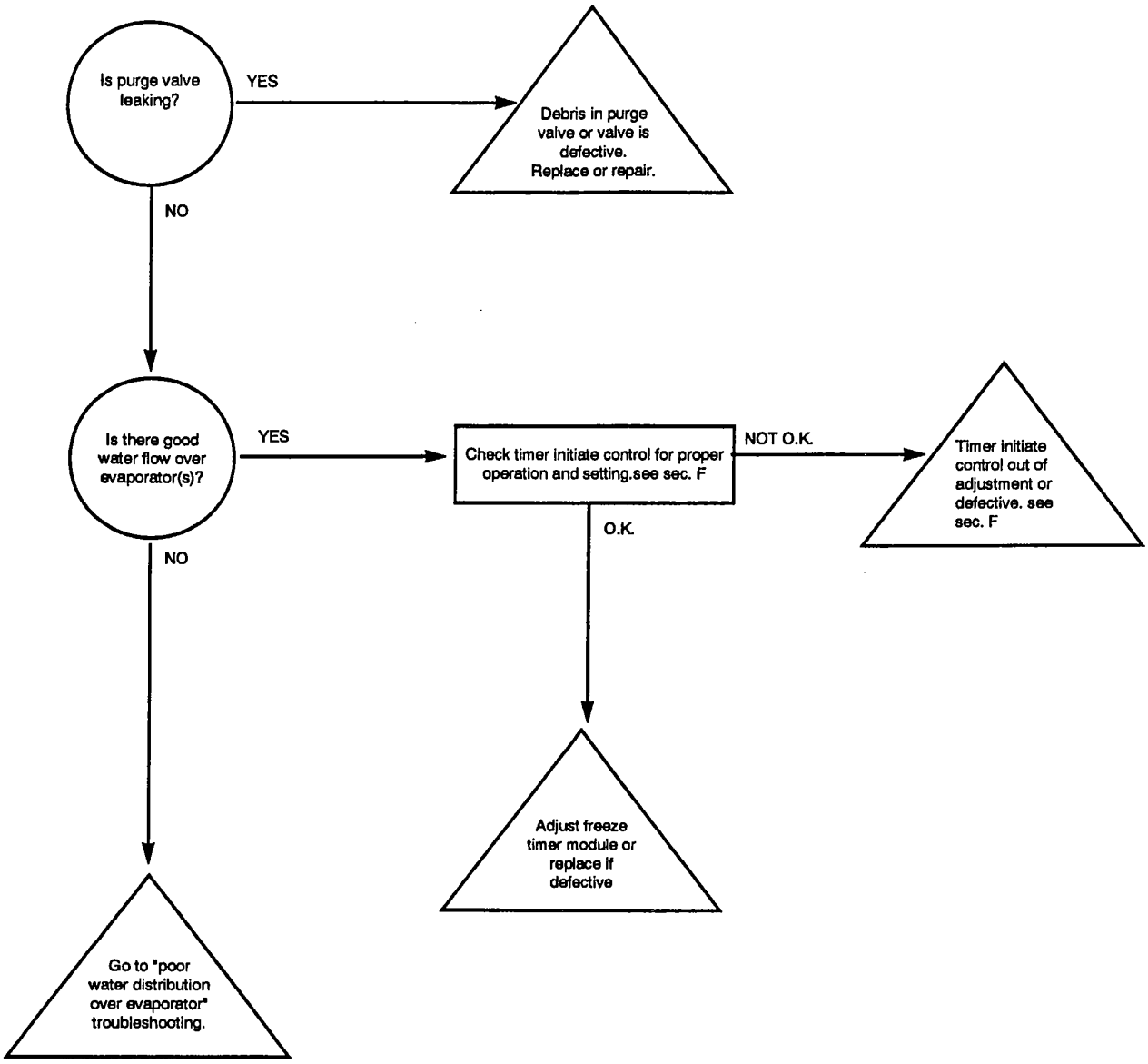


Suction Pressure Not Dropping

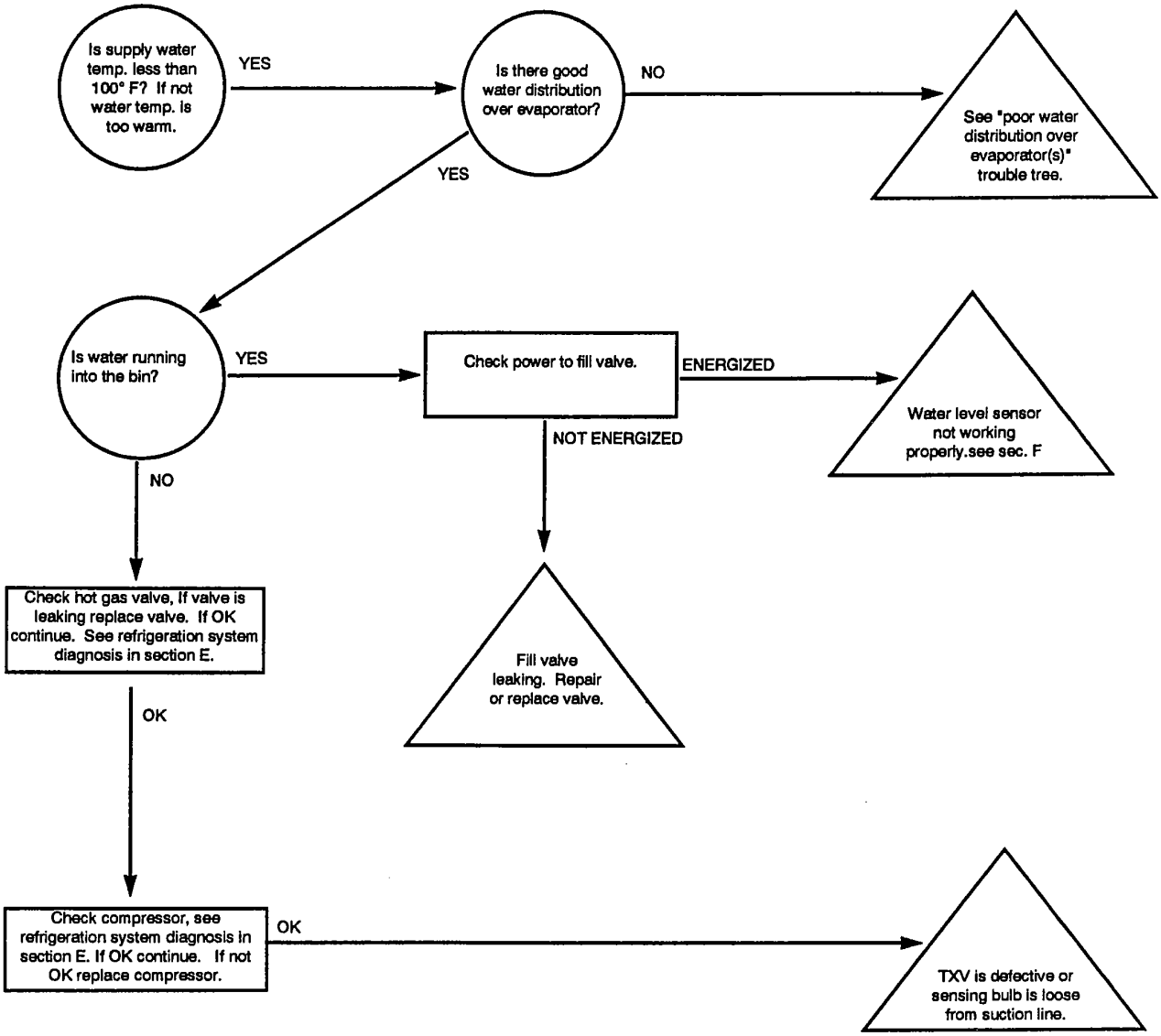


Troubleshooting Trees

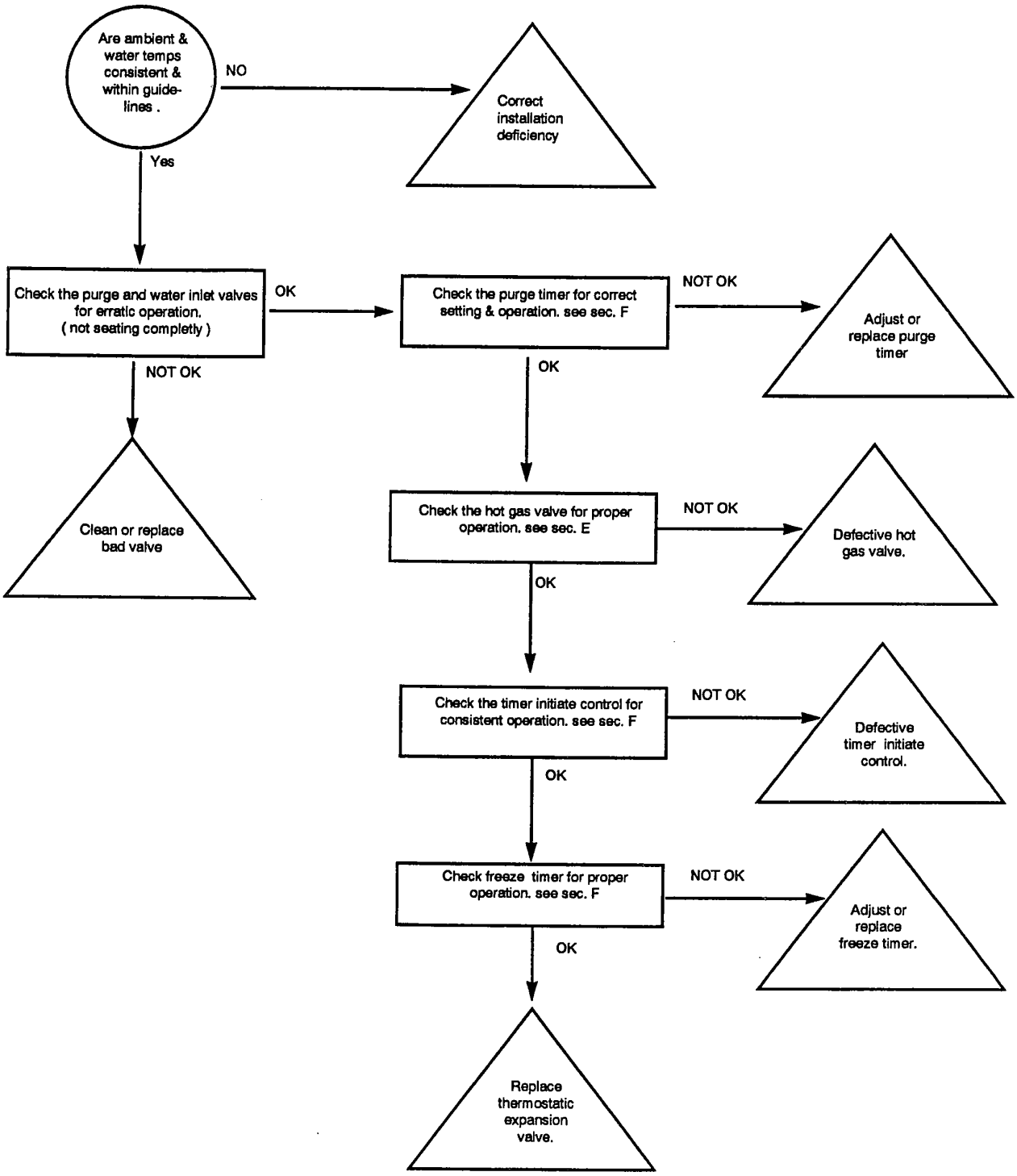
Cubes are too Thin



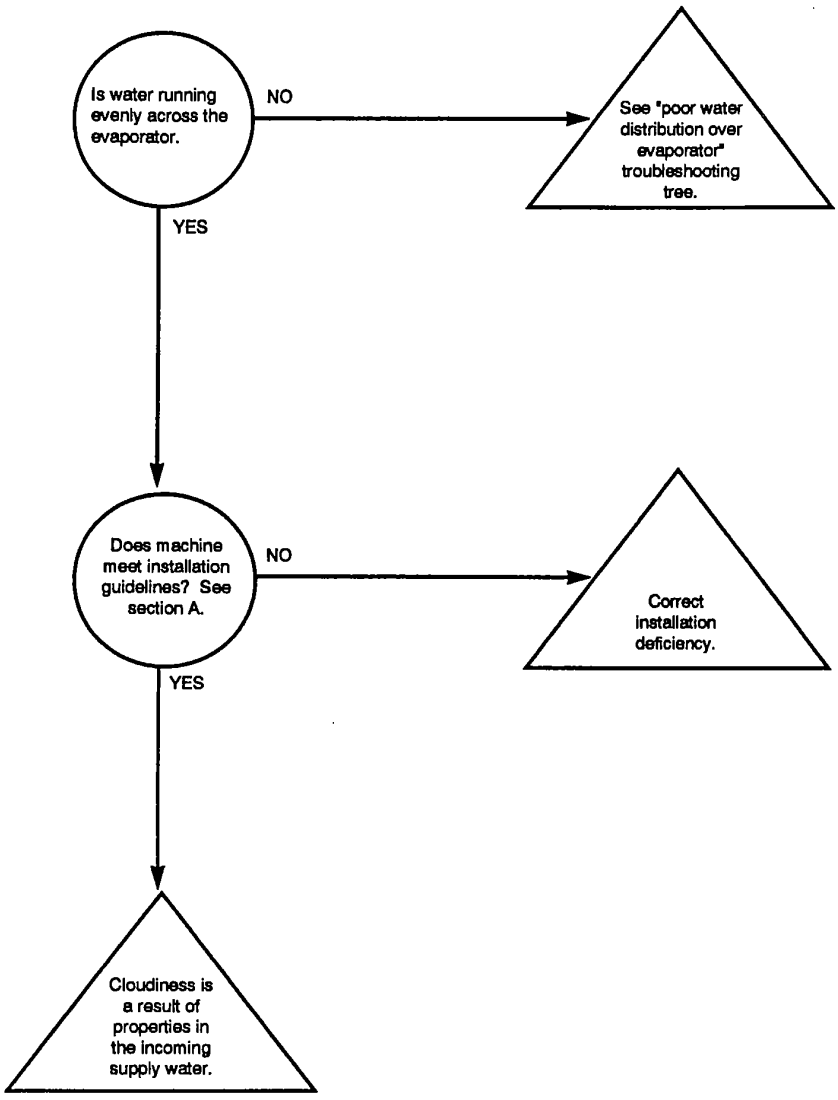
Cube Thickness Varies Across Evaporator



Cube Thickness Varies Cycle to Cycle

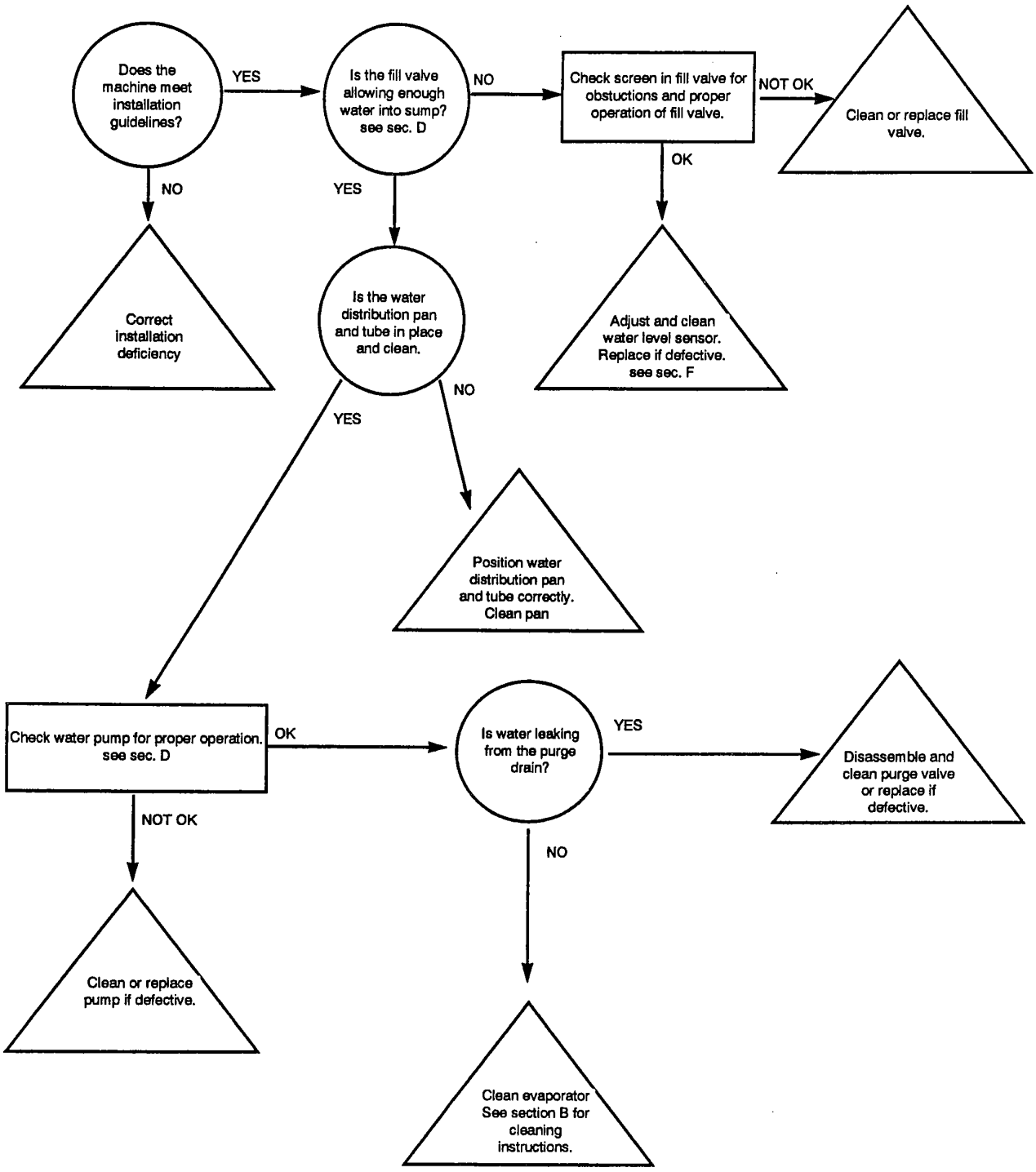


Machine Produces Cloudy Ice

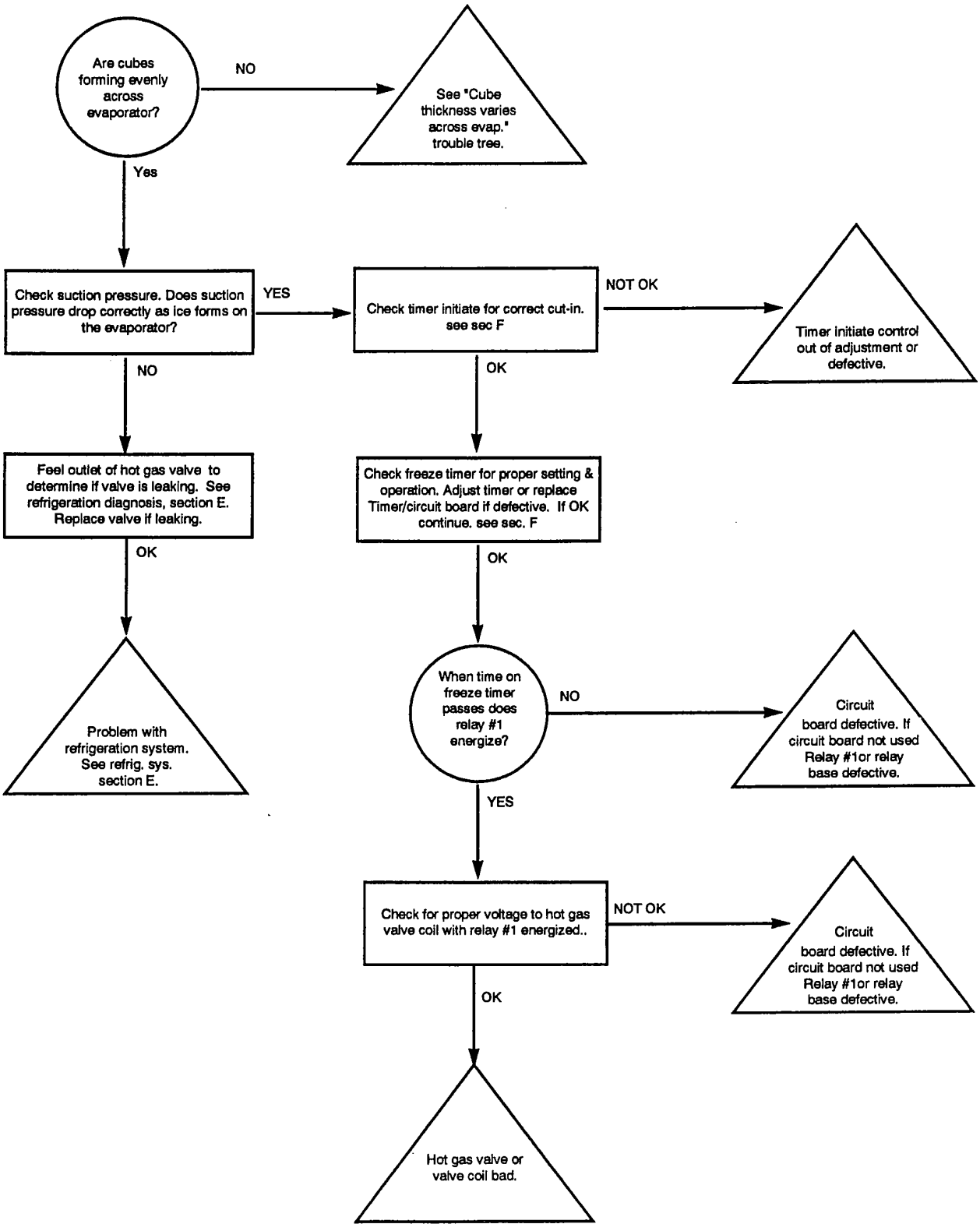


Troubleshooting Trees

Poor Water Distribution Over Evaporator

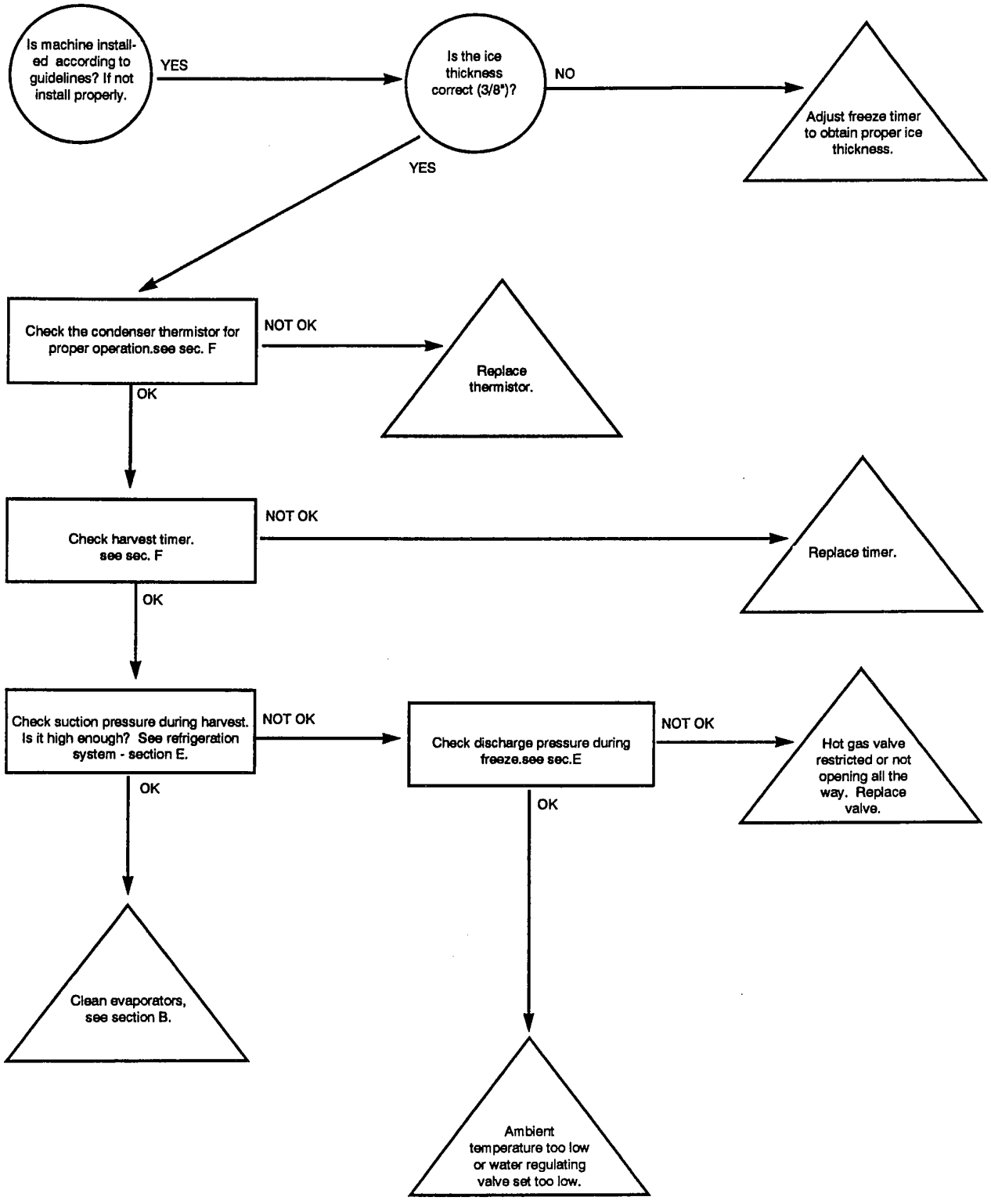


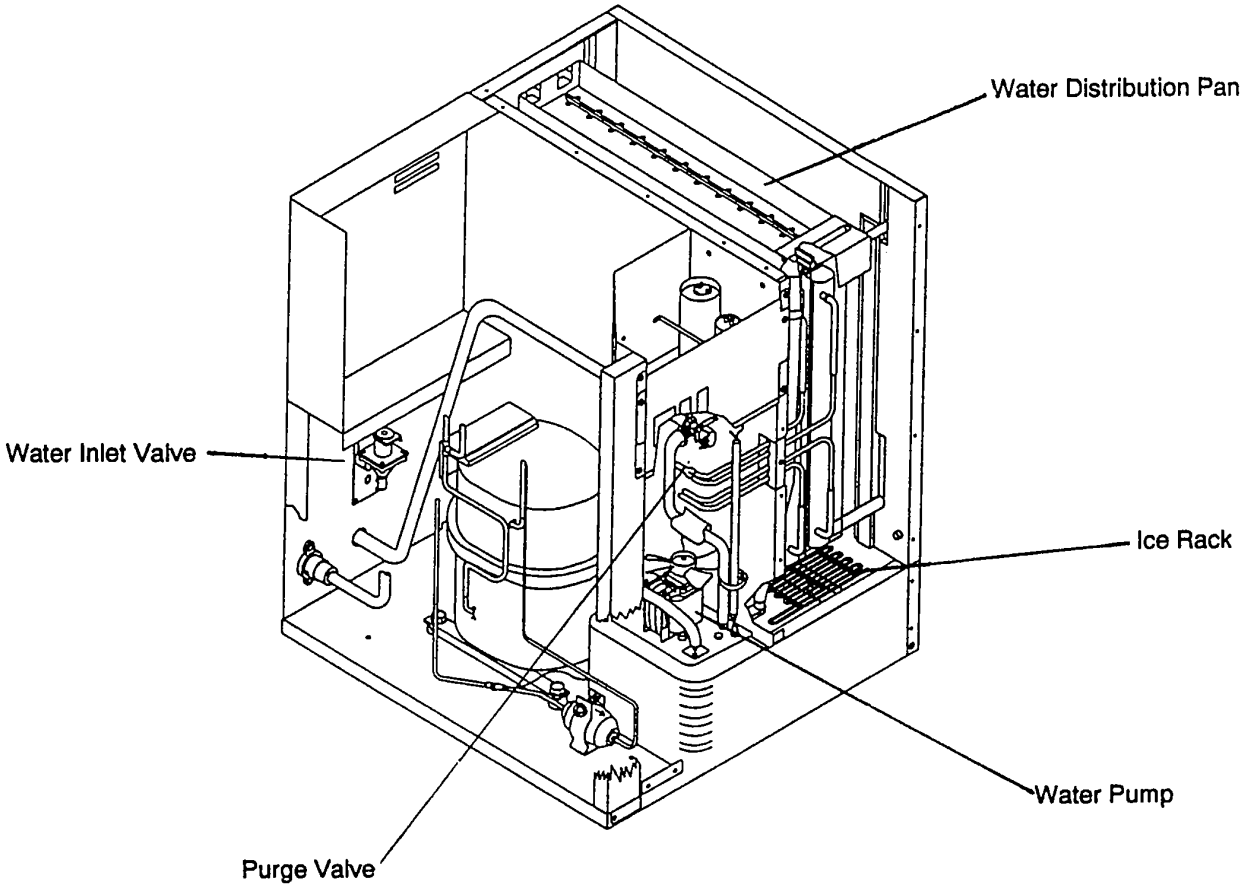
Machine Does Not Enter Harvest



Troubleshooting Trees

Not Harvesting / Not Harvesting Completely





Ice Rack (D-2)
A plastic or metal grate that covers the sump preventing ice from falling in sump.

Purge Valve. (D-3)
A solenoid valve, used to flush mineral-laden water from the sump at the beginning of each harvest cycle.

Water Distribution Pan (D-4)
A water reservoir that holds and evenly distributes water over distribution tubes.

Water Distribution Tubes (Not Shown) (D-5)
A water tube that evenly distributes water over evaporators.

Water Inlet Valve (D-6)
A solenoid valve, used to supply water to the sump. Inlet screen in valve traps particles, preventing them from entering valve.

Water Pump (D-7)
An impeller type pump, used to move water throughout the water distribution system.

ICE RACK

Location
Above trough.

Access
Remove front panel.

Operation
Ice drops onto the ice rack as it is being harvested. The ice rack covers the sump preventing ice from falling into the sump.

Problem	Possible Cause	Remedy
1. Water running into bin.	a. Rack out of place.	a. Position rack correctly. Back of ice ice rack should fit under s/s bracket.
2. Ice getting into sump.	a. Rack out of position.	a. Position rack correctly. Back of ice ice rack should fit under s/s bracket.

Replacement Procedure
Remove front panel.
Remove rack by lifting front and pulling forward.
Reverse procedure for installation.

PURGE VALVE

Location
Front of machine compartment, mounted to the bottom of the electrical box. The purge valve may be mounted to machine compartment base on models manufactured before 10/96. See note below.

Access
Remove front panel and machine compartment access panel.

Operation
The purge valve is energized during harvest and remains open until the purge timer contacts close. When energized (open), the purge valve allows the pump to empty the mineral laden water from the sump keeping mineral build-up on the evaporator to a minimum. The purge valve can also be energized manually by pushing the purge switch.

Note: If purge valve leaks have been expienced on machines manufactured before 10/96 the valve should be moved from the machine base to the bottom of the electrical box. See box below.

Problem	Possible Cause	Remedy
1. Does not open when power is applied.	a. Open circuit in coil.	a. Replace coil.
2. Leaking during freeze cycle.	a. Obstruction in valve. b. Worn seal in valve. c.Valve location too low causing excessive water pressure against valve.	a. Disassemble valve and remove obstruction. b. Replace valve. c. Relocate valve. See note above.

Replacement Procedure
Disconnect electrical supply.
Disconnect electrical plug from valve coil.
Remove clamps and hoses from valve.
Remove 2 phillips head mounting screws.
Reverse procedure for installation.

WATER DISTRIBUTION PAN

Location
Mounted above the evaporators.

Access
Remove front panel.

Operation
Water is pumped into the distribution pan where it is distributed evenly over the distribution tubes and evaporator(s). The distribution pan also allows a small flow of water to run over the rear evaporator insulator. This prevents the possibility of ice forming on the evaporator insulator. On units manufactured after 1/96 the water pan has weep holes in the front of the pan which allow water to flow over the front evaporator insulator. Lack of water over the evaporator insulators could cause a freeze-up condition.

The back of the water pan fits into indentions in the back of the cabinet. The front of the pan must be seated onto the tabs at the top of the stainless steel support bracket. On machines with three evaporators or 30" (76 cm) wide machines manufactured before 1/95, the front of the pan must be tightly seated behind the plastic tabs on top of the evaporator. If the machine was manufactured after 6/96 a stainless steel hold down bracket is also used to hold the pan in place.

Problem	Possible Cause	Remedy
1. Uneven, little or no water flow over evaporator.	a. Holes plugged with mineral deposits.	a Remove and clean pan. Clean water system with ice machine cleaner. See cleaning instructions in section B.
	b. Pan not in proper position.	b. Position pan correctly.
2. Water leaking from pan.	a. Pan cracked or broken.	a. Replace distribution pan.

Replacement Procedure
Remove front panel.
Remove hold down bracket if used.
Remove water tube from distribution pan.
Lift pan over evaporator support bar and pull forward out of machine.
Reverse procedure for installation.

WATER DISTRIBUTION TUBES

Location
Mounted above the evaporators between distribution pan and evaporators.

Access
Remove front panel.

Operation
As water leaves the distribution pan it flows over the water distribution tubes causing an even flow of water over the evaporator(s). The distribution tube should fit tightly over top of evaporator.

Problem	Possible Cause	Remedy
1. Poor water flow over evaporator.	a. Excessive mineral deposits build up on distribution tube.	a. Remove tube. Clean water system with ice machine cleaner. See cleaning instructions in section B.
	b. Tube not in proper position.	b. Position tube correctly.
	c. Tube cracked or broken.	c. Replace distribution tube.

Replacement Procedure
Remove front panel.
Remove water tube from distribution pan and remove pan.
Remove distribution tube by pulling on front of tube.
Reverse procedure for installation.

WATER INLET VALVE

Location
In back of machine compartment, mounted to a removable access panel. Machines manufactured before 10/96 may not have access panel. The water inlet valve is mounted directly to the back panel.

Access
Remove front panel and machine compartment access panel.

Operation
The water inlet valve energizes (opens) during the beginning of the freeze cycle allowing water to enter the sump. When the sump becomes full the contacts in the water level sensor close, causing the water inlet valve to de-energize (close).

Problem	Possible Cause	Remedy
1. Valve has voltage but does not allow water into sump.	a Burnt coil (open windings) b. Valve restricted.	a. Replace valve b. Remove valve, disassemble and clean. Replace if necessary.
2. Valve does not stop water flow when de-energized.	a. Valve seal worn. b. Water pressure too high.	a. Replace valve. b. Install water pressure regulator. (See Installation guidelines for proper pressures.)

Replacement Procedure
Turn off incoming electrical & water supply.
Remove electrical line from coil.
Remove water inlet and outlet line from valve.
Remove (2) mounting screws that secures the water valve access panel to the back of the machine.
Remove panel and attached valve from machine.
Remove valve from access panel.
On models that do not have access panel remove condenser fan blade to access valve.
Reverse procedure for installation.

WATER PUMP

Location
Front of machine compartment, in water sump.

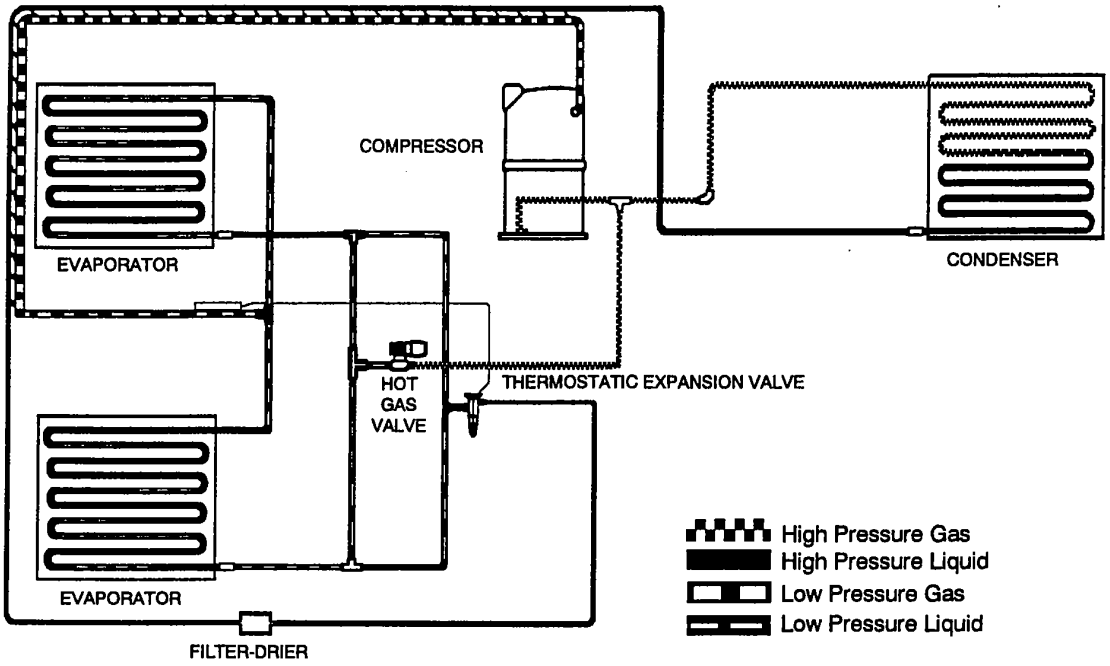
Access
Remove front panel and machine compartment access panel.

Operation
The water pump runs continuously throughout the freeze and harvest cycles pumping water through the water distribution system or through the purge valve.

Problem	Possible Cause	Remedy
1. Pump does not run with correct voltage applied.	a.Pump impeller obstructed. b.Pump motor defective.	a. Remove obstruction. b. Replace pump motor.
2. Noisy pump.	a.Pump impeller hitting obstruction. b.Bad bearing in pump motor.	a. Remove obstruction. b. Replace pump motor.
3. Pump stops intermittently during freeze cycle.	a. Cooling fan blade broken or missing. b. Pump motor is defective.	a. Replace fan blade. b. Replace pump motor.

Replacement Procedure
Shut off incoming water supply and electrical supply.
Disconnect electrical wires from pump.
Remove purge tubing.
Remove (2) phillips head screws holding water level sensor housing in place.
Move water level sensor out of the way.
Remove 2 phillips head mounting screws from pump housing.
Lift pump partially out of sump and remove water tube; remove pump.
Reverse procedure for installation.

Notes



Compressor (E-3)
A hermetically sealed motor which pumps refrigerant throughout system.

Condenser (E-4)
A tubing coil, which refrigerant flows through, that is designed to remove heat from the refrigerant, changing its state from a high pressure vapor to a high pressure liquid.

Crankcase Pressure Regulator (GC550 A Only, Not Shown) (E-5)
A regulating valve that reduces the pressure going into the compressor if it exceeds 75 psi (5.2 bar).

Evaporator (E-6)
A stainless steel plate where refrigerant vaporizes and absorbs heat from the water flowing over the the evaporator plate, turning it to ice.

Filter-Drier (E-7)
Filters liquid refrigerant, keeping the system clean. Desiccant traps small quantities of moisture, keeping the system dry. Must be replaced any time the refrigeration system is opened.

Hot Gas Valve (E-8)
A solenoid valve which is energized during defrost allowing hot refrigerant gas to enter the evaporator(s), warming it to break the bond of the ice to the evaporator.

Thermostatic Expansion Valve Assembly (E-9)
A metering device which reduces the pressure of the liquid refrigerant flowing into the evaporator, causing it to boil and absorb heat.

Water Regulating Valve (Water Cooled Only, Not Shown) (E-10)
Controls the amount of water flow through the condenser to maintain a proper head pressure.

Refrigeration System
Diagnosis

One of the characteristics of an ice machine that makes it different from most other refrigeration equipment is that the evaporator(s) needs to be completely flooded with liquid during the freeze cycle. Without a completely flooded evaporator the cubes in the upper portion of the evaporator will be less developed than those in the lower portion. This can be caused by a low refrigerant charge, leaking hot gas valve, defective T.X.V., or a weak compressor. Below is information that will help the service technician diagnose this problem as well as other problems that may arise in the refrigeration system. It is important that when diagnosing the refrigeration system, the procedure for diagnosis be followed in the order presented below.

Refrigerant Charge
Before diagnosing the refrigeration system, it is very important that refrigerant charge be correct. Whenever the refrigeration system has been opened, the filter-drier must be replaced and the proper refrigerant charge must be weighed in. The type of refrigerant and the charge can be found on the serial plate behind the front panel to the left of the control box.

Refrigerant Pressures
At the beginning of the freeze cycle, at the point the water begins to freeze, the suction pressure should be at approximately 60 p.s.i. (4.1 bar). This starting pressure may be up to 10 p.s.i. (.7 bar) less than stated, depending on operating conditions. Pressures less than this may indicate an under charge. With proper cube thickness, the suction pressure at the end of the freeze cycle will be approximately 40 p.s.i. (2.8 bar) on R-404a units, and 30 psi (2.1 bar) on R-22 (50 Hz) units. This may also vary with operating conditions. The head pressure should be adjusted to 250 p.s.i. (17.2 bar) on R-404a water cooled units and 225 p.s.i. (15.5 bar) on R-22 (50 Hz) units. Head pressure on air cooled units will vary with ambient conditions but will typically run higher than water cooled units.

Hot Gas Valve
If the suction pressure is higher than normal and the evaporator(s) is not completely flooded, check the hot gas valve to make sure it is not leaking, allowing hot gas into the evaporator(s). To check the hot gas valve let the machine run in the freeze cycle for about 5 minutes, then feel the difference in temperature between the inlet and outlet of the valve. A definite temperature difference should be felt. If the lines feel close to the same temperature the hot gas valve is leaking and should be replaced. If a hot gas valve does not open enough during harvest it will not allow enough hot gas into the evaporator to defrost the ice. This can be checked by watching the suction pressure during harvest. If this pressure is below 75 p.s.i.(5.2 bar) the valve should be replaced.

Compressor
If the valves in the compressor are weak you will normally see a high suction pressure and lower than normal head pressure. Also the compressor will have an amperage draw of less then 70% of full load amps. An excessively long freeze cycle will also be experienced. The evaporator may not always be starved of refrigerant if the compressor is weak.

Thermostatic Expansion Valve
On models manufactured prior to 7/96 one expansion valve is used for each evaporator. After 7/96, a single expansion valve is used to feed multiple evaporators. A thermostatic expansion valve which is restricted or not opening properly will starve the evaporator(s) it is feeding. If single valve is being used to feed more than one evaporator, the evaporator farthest from the valve will be affected first. The evaporator(s) closest to the valve may or may not be affected depending on the severity of the problem. A starved evaporator will have thin or no ice at the top and the outlet tube will not frost until late in the cycle or not at all. This will usually cause pressures simular to an under charged unit. A defective or restricted T.X.V. should be replaced. If a T.X.V. sticks open it will keep the evaporator(s) flooded but the suction pressure will not drop and the suction line temperature will remain too high. This will cause the machine to stay in the freeze cycle too long causing thick cubes and eventually a freeze-up. This problem may be erratic and the T.X.V. should be replaced if the valve is not closing properly.

COMPRESSOR

Location
In center of machine compartment

Access
Remove front panel and machine access panel.

Operation
The compressor runs during the freeze and harvest cycles pumps refrigerant throughout system.

Problem	Possible Cause	Remedy
1. Compressor running but not pumping.	a. Compressor valves leaking. (See compressor diagnosis at beginning of this section)	a. Replace compressor.
2. Compressor tripping circuit breaker.	a. Compressor windings shorted. (See compressor diagnosis at beginning of this section)	a. Replace compressor.
3. Compressor not running.	a. Open windings. b. Locked rotor. (See compressor diagnosis at beginning of this section)	a. Replace compressor. b. Replace compressor.

Replacement Procedure
Disconnect power supply.
Recover refrigerant.
Remove water valve and purge valve.
Disconnect compressor wiring.
Unsweat refrigerant lines.
Remove compressor mounting bolts.
Braze in new compressor.
Replace filter drier, if electrical burn out has occurred install suction filter.
Evacuate and weigh in proper refrigerant charge.
Leak check system, connect wiring and remount compressor.

CONDENSER

Location
Air Cooled: Left side of machine compartment
Water Cooled: Rear right side of machine compartment

Access
Air Cooled: Remove front panel and machine access panel.
Water Cooled: Remove front panel and top panel.

Operation
High pressure discharge gas is pumped into the condenser where heat is removed from the refrigerant by either air or water.

Problem	Possible Cause	Remedy
1. High head pressure (condenser temperature too high).	a. Air condenser dirty.	a. Clean air condenser.
	b. Fins on condenser bent.	b. Straighten fins.
	c. Water valve out of adjustment (water cooled).	c. Adjust valve (see water regulating valve service information).
	d. Non-condensables in system.	d. Evacuate system and weigh in proper charge.
	e. Low water pressure (water cooled).	e. Increase water pressure to machine.
	f. Water lines plugged with mineral deposits (water cooled).	f. Clean water lines in condenser. Replace if severe.

Replacement Procedure
Recover refrigerant.
Unsweat refrigerant lines from condenser.
Unsweat water lines (water cooled units).
Remove mounting bolts from condenser.
Mount new condenser and braze refrigerant lines to condenser.
Replace filter-drier, evacuate system and weigh in proper refrigerant charge.
Leak check system.

CRANKCASE PRESSURE REGULATOR (GC550A AND GC555A ONLY)

Location
In suction line between evaporator and compressor.

Access
Remove front panel and machine compartment panel.

Operation
Gas pressure inside the dome, on the top of the valve, keeps a downward force on the plunger inside the valve body. When the suction pressure becomes greater than 75 p.s.i. (5.2 bar), the upward pressure on the plunger overcomes the downward pressure causing the outlet of the valve to partially close. This reduces the refrigerant pressure leaving the valve and entering the compressor. This reduction in suction pressure keeps the compressor from operating under an excessive load. During the freeze cycle the suction pressure is normally below 75 p.s.i. (5.2 bar), therefore the crankcase pressure regulator is wide open and there is no pressure drop through the valve. During harvest however; the suction pressure normally exceeds 75 p.s.i. (5.2 bar). During this time the valve regulates the pressure entering the compressor keeping it at 75 p.s.i. (5.2 bar).

Problem	Possible Cause	Remedy
1. Suction pressure running in a vacuum.	a. Gas charged dome on valve ruptured/leaking.	a. Replace valve.

Replacement Procedure
Recover refrigerant from system.
Remove insulation from around valve body.
Unsweat the valve from the suction line.
Solder in new valve making sure valve body is wrapped with heat sink.
Replace filter-drier, evacuate system and weigh in proper charge.
Leak check and wrap valve body with insulation.

EVAPORATOR

Location
Mounted on the right side of machine.

Access
Remove front panel.

Operation
As water is circulated over the evaporator, liquid refrigerant is circulated through the refrigerant passes of the evaporator. As the liquid refrigerant in the passes vaporizes, it absorbs heat from the water, causing it to freeze.

Problem	Possible Cause	Remedy
1. Ice not harvesting properly.	a. Evaporator plate dirty.	a. Clean evaporator and water system with ice machine cleaner, see cleaning instructions in section B.

Replacement Procedure
Remove water distribution pan.
Recover refrigerant from system and unsweat tubing from evaporator.
Remove evaporator mounting bar and remove the evaporator out the front or top of the machine.
Remount new evaporator and solder tubing to evaporator using silver bearing solder.
Replace filter-drier.
Evacuate system and weigh in proper refrigerant charge and leak check.

FILTER DRIER

Location
In liquid line between condenser and T.X.V.

Access
Remove front panel and machine access panel.

Operation
As liquid refrigerant passes through the filter drier it traps particles and small amounts of moisture. The filter drier must be replaced whenever refrigeration system is opened.

Problem	Possible Cause	Remedy
1. Frost appears on or at outlet of filter-drier.	a. Moisture or other contaminant's in system causing restriction.	a. Replace filter-drier.
2. Low suction pressure.	a. Same as above.	a. Replace filter-drier.

Replacement Procedure
Recover refrigerant.
Unsweat filter-drier and braze in new filter-drier.
Evacuate system, weigh in proper charge and leak check.

HOT GAS VALVE

Location
In compressor discharge line between compressor and evaporator.

Access
Remove front, top panel and machine access panel.

Operation
When the machine enters harvest the hot gas valve opens allowing hot refrigerant gas into the evaporator. This causes the evaporator to become warm, allowing the ice to release.

Problem	Possible Cause	Remedy
1. Evaporator not heating properly.	a. Hot gas valve not opening properly, see diagnosis in first part of this section.	a. Replace valve.
2. Poor ice formation at top of evaporator.	a. Hot gas valve leaking, see diagnosis in first part of this section.	a. Replace valve.
3. Evaporator not heating at all.	a. Hot gas valve coil burnt out. b. Valve stuck closed.	a. Replace coil. b. Replace valve.

Replacement Procedure
Recover refrigerant.
Remove coil.
Unsweat valve.
Wrap valve body with a heat sink to prevent damage to valve and silver solder new valve in place.
Replace filter-drier.
Evacuate and weigh in proper charge.
Leak check and install coil.

THERMOSTATIC EXPANSION VALVE

Location
In machine compartment, in the refrigerant line between the filter-drier and evaporator.

Access
Remove front panel and machine access panel.

Operation
The thermostatic expansion valve meters the flow of refrigerant into the evaporator(s) and changes its state from a high pressure liquid to a low pressure liquid. A thermostatic type sensing bulb, which is clamped to the suction line, allows the valve to meter the correct amount of refrigerant into the evaporator. On models manufactured prior to 7/96 one expansion valve is used for each evaporator. After 7/96, a single expansion valve is used to feed multiple evaporators.

Problem	Possible Cause	Remedy
1. Evaporator flooded but suction pressure not dropping.	a. T.X.V. allowing too much refrigerant into evaporator.	a. Check T.X.V. sensing bulb. It must be mounted securely to a clean suction line and insulated.
	b. T.X.V. stuck open.	b. Replace T.X.V.
2. Evaporator starved, little or no frost on suction line leaving evaporator. Also see page E-2	a. T.X.V. not allowing enough refrigerant into evaporator.	a. Check T.X.V. sensing bulb. It must be located on top of suction line.
	b. T.X.V. restricted or stuck closed.	b. Remove restriction or replace T.X.V. if necessary.

Replacement Procedure
Note: On models that use two evaporators and two TXV's, it is recommended that the complete TXV assembly be replaced if either TXV goes bad.

Recover refrigerant from system.
Remove insulation from around expansion valve body and bulb and remove sensing bulb clamp.
Use the new assembly as a guide to determine which joints to unsweat in order to remove the defective assembly.
Note: On some models the hot gas valve is located very close to the TXV, in this case it is important that a heat sink be used on the hot gas valve or the valve be disassembled to prevent damage to the H.G.V.
Solder in new valve assembly making sure valve body is wrapped with heat sink.
Clean tubing where sensing bulb will mount and clamp sensing bulb to top of suction line.
Replace filter-drier, evacuate system and weigh in proper charge.
Leak check and wrap valve body and sensing bulb with insulation.

WATER REGULATING VALVE (WATER COOLED ONLY)

Location
Connected to incoming condenser water supply.

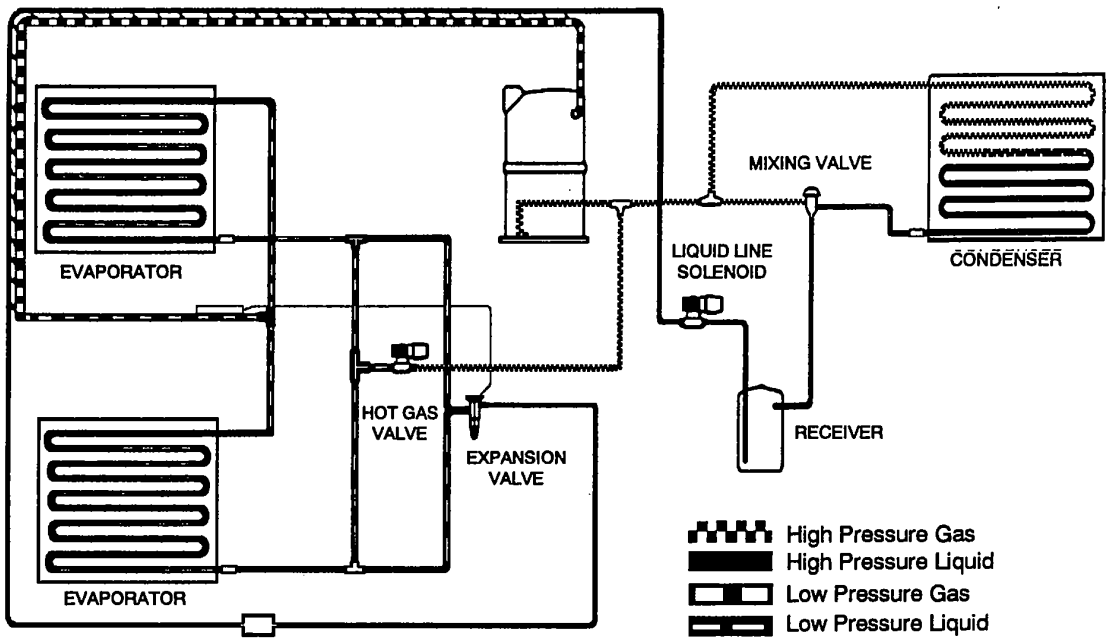
Access
Remove top panel or metal fan guard and fan blade.

Operation
The water regulating valve controls the head pressure by regulating the amount of water flowing through the condenser. The bellows of the regulating valve are connected to the high side of the system As the head pressure rises the bellows expand increasing the water flow through the condenser. The rate of water flow can be changed by adjusting the spring pressure on top of the valve.

Adjustment
Turn the adjusting screw on top of the valve to maintain a head pressure of 250 p.s.i.(18.3 bar) on R-404a units and 225 p.s.i. (15 5 bar) on R-22 (50 Hz) units. Resulting water temperature at outlet of condenser should be between 100° F and 110° F (38° C and 43° C).

Problem	Possible Cause	Remedy
1. Head pressure too high or too low.	a. Valve not adjusted properly.	a. Adjust Valve, see above.
2. Water flowing through condenser when machine is off.	a. Valve not closing completely.	a. Replace valve.

Replacement Procedure
Turn off water supply.
Disconnect incoming water line from valve and remove mounting nut and fitting from valve body.
Unsweat out-going waterline from valve and remove fitting.
Recover refrigerant.
Unsweat cap tube from refrigeration system.
Braze cap tube from new valve in place.
Replace filter-drier.



Condenser (F-3)
A tubing coil, which refrigerant flows through, that is designed to remove heat from the refrigerant, changing its state from a high pressure vapor to a high pressure liquid.

Fan Motor (F-4)
A motor used to turn a fan blade which forces air through the condenser .

Liquid Line Solenoid (F-5)
A valve which remains energized (open) while the machine is in the normal ice making mode.

Mixing valve (F-6)
A three way valve used to regulate head pressure.

Pump Down Control (F-7)
A low pressure control used to shut the machine off after pump down.

Receiver (F-8)
A storage tank which holds liquid refrigerant.

Remote Defrost Thermistor Assembly
A temperature control and thermistor that increases the harvest time on remote units.

Remote System
Operation

Because the condenser on a remote system is often installed in an area where the ambient temperature may vary dramatically, a remote ice machines must incorporate a few additional parts so the machine can operate properly under these changing ambient conditions. A description of the operation of the remote system is given below.

On a properly charged system, the **mixing valve** begins to open when the ambient condenser temperature drops below 70° F (21° C). At this temperature the pressure in the bellows of the valve begins to equalize with the discharge pressure. The valve now begins to bleed a small amount of discharge gas directly into the receiver. As the ambient temperature at the condenser drops, the amount of discharge gas by-passed into the receiver increases. The remote system depends on an adequate refrigerant charge in order for the system to remain balanced during ambient temperature changes.

If a remote machine is shut down either by the ICE/OFF/WASH switch, bin control, or high pressure safety, the **liquid line solenoid** is de-energized allowing the valve to close. This blocks the flow of refrigerant causing all the refrigerant to be pumped in to the condenser and **receiver**. This is done to prevent liquid refrigerant from migrating into the compressor during the off cycle, which could cause damage to the compressor upon start-up. As the refrigerant is pumped into the receiver the suction pressure begins to drop. Once the suction pressure reaches 17 p.s.i. (1.2 bar) the **pump down control** opens, de-energizing the compressor contactor.

When the machine is turned back on, power is then supplied to the liquid line solenoid allowing the suction pressure to rise enough to close the pump down control.

There are four things that can affect the balance of a remote system.

-An improper refrigerant charge.
-An improperly sized condenser.
-A condenser installed below the ice machine. This creates excessive pressure drop which affects the mixing valve.
-A defective mixing valve.

CONDENSER

Location
In remote condenser housing, located not more that 12' (3.6 m) above or 40' (12.2 m) away from ice machine.

Access
Remove fan blade guard.

Operation
Removes heat from refrigerant which was absorbed from water running over the evaporator.

Problem	Possible Cause	Remedy
1.High head pressure (condenser temperature too high).	a.Air condenser dirty.	a.Clean air condenser.
	b.Fins on condenser bent.	b.Straighten fins.

Replacement Procedure
Recover refrigerant, disconnect refrigerant lines from condenser.
Remove bolts holding condenser stand in place.
Replace condenser, fan motor and housing as one unit.
Replace filter drier, evacuate and weigh in proper charge.

FAN MOTOR

Location
Above condenser.

Access
Remove fan guard and blade.

Operation
Turns blade to draw air up and through the condenser and exhaust it through the top of the housing.
The remote condenser fan motor runs continuously during normal ice making functions and will only shut off when the machine is off due to a full bin.

Problem	Possible Cause	Remedy
1.Not running.	a.Motor burnt out.	a.Replace motor.
2.Noisy	a.Bearings in motor bad.	a.Replace motor.

Replacement Procedure
Disconnect power supply and electrical leads from motor.
Remove fan guard and fan blade.
Remove mounting screws.
Install new motor.

LIQUID LINE SOLENOID

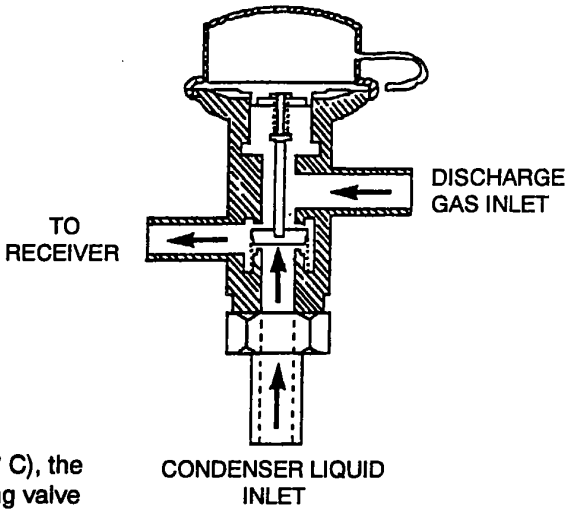
Location
In liquid line between receiver and filter drier.

Access
Remove front panel and machine access panel.

Problem	Possible Cause	Remedy
1.Machine continues to pump down even though power is applied to coil.	a.Valve coil defective. b.Valve stuck closed.	a.Replace coil. b.Replace valve.
2.Machine will not pump down or takes a long time to pump down when coil is de-energized.	a.Valve stuck open. b.Obstruction in valve.	a.Replace valve. b.Remove obstruction.

Replacement Procedure
Recover refrigerant.
Remove coil and unsweat valve.
Disassemble new valve or wrap valve body with a heat sink to prevent damage to valve.
Silver solder new valve in place.
Replace filter-drier.
Evacuate and weigh in proper charge.
Leak check and install coil.

MIXING VALVE



Location
In liquid line between condenser and receiver.

Access
Remove front panel and machine compartment access panel

Operation
When the temperature at the condenser is above 70° F (21° C), the refrigerant flow from the compressor is directed by the mixing valve through the condenser and into the receiver. As the temperature at the condenser drops below 70° F (21° C), the pressure in the bellows of the mixing valve becomes greater than the pressure of the liquid refrigerant coming from the condenser. This change allows the valve to partially restrict the flow of liquid refrigerant leaving the condenser, at the same time allows discharge gas to by-pass the condenser and flow directly into the receiver, mixing with the liquid refrigerant from the condenser. This action of the mixing valve allows the head pressure to be maintained at approximately 240 p.s.i.(16.5) bar on machines during low ambient conditions.

Problem	Possible Cause	Remedy
1.Head pressure low/liquid line between valve and receiver cold. Ambient condenser temp. below 70°F (21° C).	a.Valve defective, not allowing discharge gas into receiver.	a.Replace valve.
2.Head pressure low /liquid line between valve and receiver hot.	a.System low charged. b.Valve defective, not allowing enough sub-cooled liquid into receiver.	a.Find and repair leak if present. Recover refrigerant and weigh in proper charge. b.Replace valve.
3.Head pressure high/liquid line returning from condenser is cool. Ambient condenser temperature above 70°	a.Valve defective, not allowing refrigerant to circulate through condenser.	a..Replace valve.

Replacement Procedure
Recover refrigerant.
Cut off process tube on dome of valve to release pressure and unsweat valve.
Wrap new valve body with a heat sink to prevent damage to valve.
Silver solder new valve in place.
Replace filter-drier.
Evacuate and weigh in proper charge and leak check.

PUMP DOWN CONTROL
(Low Pressure Control)

Location
In electrical control box.

Access
Remove front panel and lower control box cover.

Operation
Opens on pressure drop, de-energizing the compressor contactor after pump down.

Adjustment
Control is factory set to close at 17 p.s.i. (1.2 bar) and open at 45 p.s.i. (3.1 bar). Minor field adjustments may be made by turning adjusted screw.

Problem	Possible Cause	Remedy
1.Control does not open or close at proper pressures.	a.Control out of adjustment. b.Control defective.	a.Adjust control. b.Replace control.
2.Does not open or close consistently at set pressures or does not open or close at all.	a.Control defective.	a.Replace control.

Replacement Procedure
Disconnect power supply. Recover refrigerant from system. Remove wires and mounting screws from control. Unsweat cap tube from suction line. Braze cap tube from new control to suction line. Mount new control and connect wires. Replace filter drier, evacuate and weigh in refrigerant charge. Leak check and check adjustment.

RECEIVER

Location
In machine compartment.

Access
Remove front panel and machine access panel.

Operation
Holds reserve liquid refrigerant during the freeze cycle to insure the liquid line is provided with enough liquid refrigerant to prevent flash gas. Also stores liquid refrigerant during the off cycle.

Problem	Possible Cause	Remedy
1.Fusible plug on Receiver leaking.	a.Temperature of receiver has exceeded 430° F (221° C).	a.Replace Receiver.
	b.Bond between fusible plug and Receiver broken.	b.Replace Receiver.

Replacement Procedure
Recover refrigerant from system.
Unsweat refrigerant lines from receiver and filter- drier and remove filter-drier.
Remove bolts holding base plate to machine, pry up on base plate enough to reach receiver mounting nut taking care not to crimp refrigerant tubing.
Remove receiver mounting nut and remove receiver. Install new receiver and filter-drier, evacuate and weigh in proper refrigerant charge.

REMOTE DEFROST THERMISTOR ASSEMBLY

Location
The control is mounted to the back of the electrical box. The sensing bulb is clamped to the liquid line between the mixing valve and the back panel.

Access
Remove the top panel and/or the left side panel.

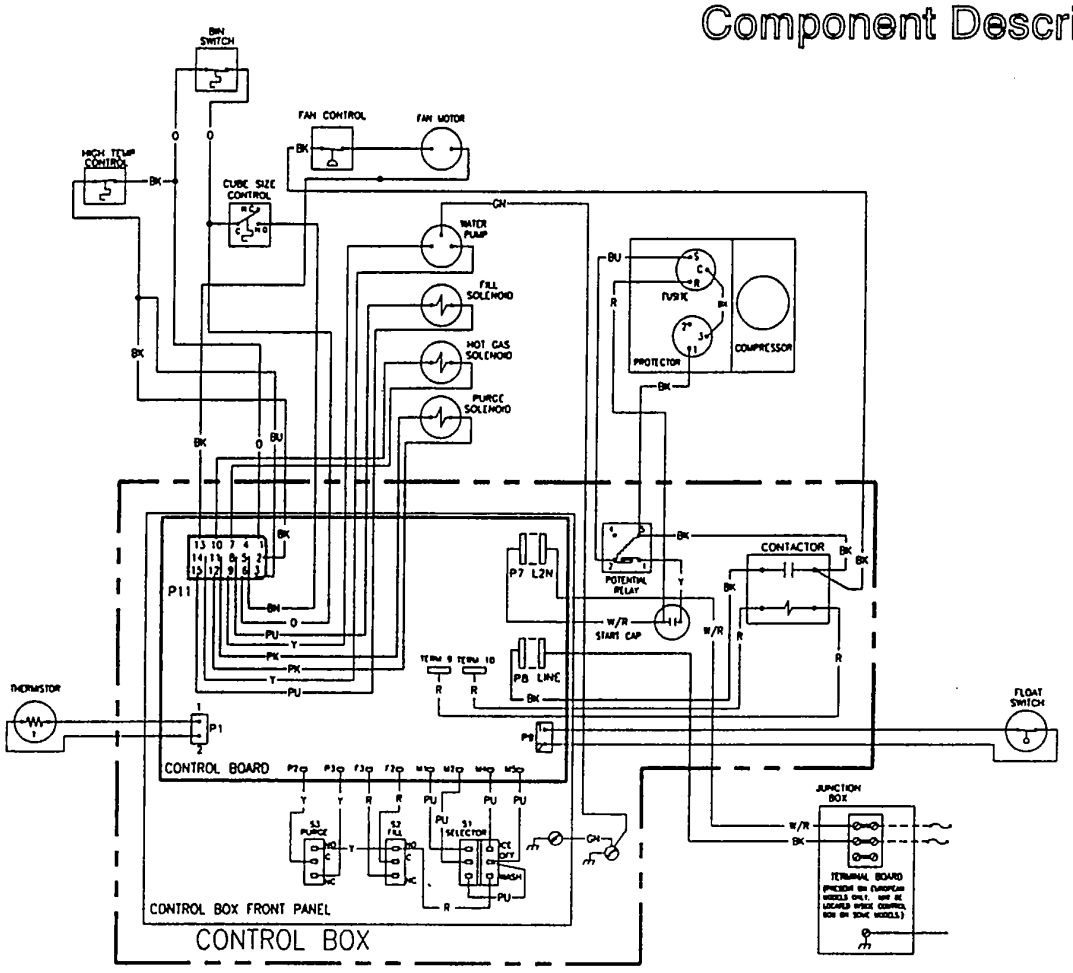
Operation
When the liquid line temperature drops to 70°F (21°C), the harvest control opens adding approximately 7K ohms resistance to the condenser thermistor. The harvest time, at 70°F (21°C) or below, will be approximately 3 to 4 minutes. When the liquid line temperature rises to 75°F (24°C) the control closes.adding approximately 3K ohms resistance to the condenser thermistor. This adds approximately 30 seconds to the harvest times shown in the chart on page G-12.

Adjustment
Control is factory set to open at 70°F (21°C) with a 5°F (-15°C) differential. Minor field adjustments may be made by turning adjusted screw if settings are outside of this range.

Problem	Possible Cause	Remedy
1.Control does not open or close at proper temperature.	a.Control out of adjustment. b.Control defective.	a.Adjust control. b.Replace control.
2.Does not open or close consistently at set temperatures or does not open or close at all.	a.Control defective.	a.Replace control.

Replacement Procedure
Disconnect power supply. Remove wires and mounting screws from control. Remove clamp that holds sensing bulb to liquid line. Mount new control and connect wires. Check adjustment.

Notes



GC300A with Circuit Board Shown

Bin Control (G-4)
A thermostatically controlled switch used to shut the machine off when the bin becomes full.

Capacitor (Run) (G-5)
Electrical storage device used to improve running characteristics and efficiency of compressor. Not used on all models.

Capacitor (Start) (G-5)
Electrical storage device used to provide starting torque to compressor.

Circuit Board (G-6)
A control board that incorporates freeze, harvest and purge timers and control relays

Contactor (G-7)
A relay that controls power to the compressor.

Fan Control (G-8)
A pressure control used to cycle the condenser fan motor.

Fan Motor (Air Cooled Only) (G-9)
Motor used to turn a fan blade which moves air across the condenser removing heat from the condenser.

Fill Switch (G-10)
Manual momentary switch used to energize water inlet valve. Used to flush cleaning solution from water trough after cleaning.

Freeze Timer (G-11)
Delay timer used to control ice thickness.

Harvest Timer (G-12)
A delay timer used to control harvest time.

High Pressure Safety (water cooled & remotes only) (G-13)
A pressure control that de-energizes the contactor when condenser pressure gets too high.

High Temperature Safety (G-14)
A thermal disc which electrically opens and shuts machine off if evaporator temperature gets too high.

Overload (Compressor) (G-15)
Safety device which opens electrical circuit to compressor if temperature of compressor body gets too hot or if compressor draws too much current.

Purge Switch (G-16)
Manual momentary switch used to energize purge valve. Used to flush cleaning solution from water trough after cleaning.

Purge Timer (G-17)
An electronic timer used to control the length of purge.

Relay (Control) (G-18)
A relay used to energize or de-energize components.

Selector Switch (G-19)
Manual 3-position switch used to turn the machine on, off or to wash.

Start Relay (G-20)
Compressor relay which breaks electrical circuit to start windings in compressor.

Thermistor (G-21)
An electronic sensors which change resistance with a change in temperature. The thermistor sends an input to the harvest timer. The harvest timer adjusts itself depending on the thermistor input.

Timer Initiate (G-22)
A thermostatically controlled switch which closes upon temperature drop to energize the freeze timer.

Water Level Sensor (G-23)
A magnetic float switch used to de-energize the water inlet solenoid when the sump becomes full.

Most of the components in the electrical system are easily diagnosed by using an ohm meter or volt meter. However, the compressor and starting components are not as easily diagnosed. The procedure for checking these components are described below.

Compressor
If the compressor uses an internal overload, be certain that the compressor has cooled and the overload has reset before diagnosing the compressor. If the compressor is cool and is still not running, check the windings by first removing the wires at the compressor terminals. With an ohm meter, check for continuity between all three terminals, if an open circuit exists between any of the terminals the compressor must be replaced. Check for continuity from each terminal to the compressor body, if continuity is found from any terminal to the compressor body, the compressor windings are shorted to ground and the compressor will need to be replaced. If the compressor appears to be good at this point, it is advisable to use a compressor analyzer to isolate the compressor from the start components while checking for a locked rotor. If an analyzer is not available, the compressor starting components must be checked before proceeding.

If all starting components are good, check the amperage draw from the common terminal of the compressor, making sure proper voltage is supplied to the compressor and all wiring is properly connected. If the compressor does not start and there is excessive amperage draw, the compressor has a locked rotor and the compressor should be replaced.

Overload
The compressor overload can be checked for continuity after removing it from the compressor and letting it cool to room temperature. If there is no continuity between the two terminals replace the overload. If the overload is suspected of opening prematurely it is best checked by replacing it with an overload which is "known to be good".

Capacitor
Before checking a capacitor, it should be discharged by shorting across the terminals. If a run or start capacitor is leaking or bulging it should be replaced. If a capacitor is suspected of being defective it can easily be checked by replacing it with a capacitor of the correct size which is "known to be good", if the compressor starts and runs properly replace the original capacitor. If a good capacitor is not available, the capacitor can be checked with an ohm meter set to the highest resistance scale. Remove and discharge the capacitor, then connect the meter leads across capacitor terminals. The indicator should first move to zero then gradually increase towards infinity. If there is no movement of the ohm meter indicator the capacitor circuit is open. If the ohm meter indicator moves to zero and remains there or if the indicator remains on a low resistance reading, a short circuit is indicated. A run capacitor can be further tested by checking for continuity between each terminal and the case. Continuity indicates a short and the capacitor should be replaced.

Relay
A compressor relay can be easily checked by replacing it with one that is "known to be good", if the compressor then starts and runs correctly, replace the original relay. If a good relay is not available, remove the relay and check the relay contacts for damage and check for continuity across the closed relay points. Check the relay coil with a ohm meter. If no continuity is read, replace the relay.

BIN CONTROL

Location
Mounted to back of the electrical control box to the right of the timer initiate. The sensing bulb is located at the bottom of the machine.

On machines manufactured before 12/95 there may be two bin controls, primary and secondary. The primary bin control to back of electrical control box below secondary bin control. The capillary tube of primary bin control is located in 1/4" (.64 cm) brass housing on bottom of machine. Secondary: Mounted to back of electrical control box above primary bin control. Capillary tube of secondary bin control is located in 1/4" (.64 cm) brass housing on right side of machine.

Access
Remove front panel and control box cover to access adjusting screw. Also remove the machine compartment panel and top panel when replacing the control.

Operation
When the ice in the bin comes in contact with the bin control sensor housing, the contacts in the bin control open, allowing the machine to shut off. When ice is removed the sensor becomes warmer and contacts close. On older machines, the primary bin control should always shut the machine down before ice reaches the secondary control. The secondary bin control is used as a safety to prevent the possibility of a freeze up if the primary control fails.

NOTE: The bin control sensor on current models and the primary bin control cap tube housing on older models must be moved to the proper position during installation. See installation instructions in section A.

Adjustment
The bin control can be adjusted for sensitivity by turning the adjustment screw on the front of the control. Turning adjustment screw C.W. for a colder setting (less sensitive) and C.C.W. for a warmer setting (more sensitive). When making initial adjustment of bin control turn adjusting screw all the way C.C.W. and then C.W. 1/8 turn. Then check operation of control by holding ice against capillary tube housing. Once ice comes in contact with the capillary tube housing, the bin control contacts should open after approximately 1 minute.

NOTE: A holding relay prevents the machine from shutting off, due to open contacts of the bin control,until the end of the harvest cycle. On machines manufactured after 12/94 this relay is incorporated into the circuit board.

Problem	Possible Cause	Remedy
1. Bin control contacts do not open when ice contacts cap. tube housing.	a. Control adjusted too cold.	a. Adjust control.
2. Bin control contacts do not close when ice is removed from cap. tube housing.	a. Control adjusted too warm. b. Cap. tube broken or leaking.	a. Adjust control. b. Replace bin control.
3. Ice not contacting cap tube housing.	a. Cap tube housing not positioned properly.	a. Move cap tube housing into position. See installation instructions in section A.

Replacement Procedure
Disconnect electrical supply and remove electrical wires and mounting screws from bin control.
On machines manufactured after 12/95 remove clamps holding torsion bar and capillary tube to bottom of machine. It may be necessary to remove bin deflector to gain access to bottom of machine. Pull torsion bar/capillary tube through hole in bottom of machine.
On machines manufactured prior to 12/95 pull capillary tube from housing.
Reverse procedure for installation. Adjust control.

CAPACITOR

Location
In control box.

Access
Remove front panel and control box cover.

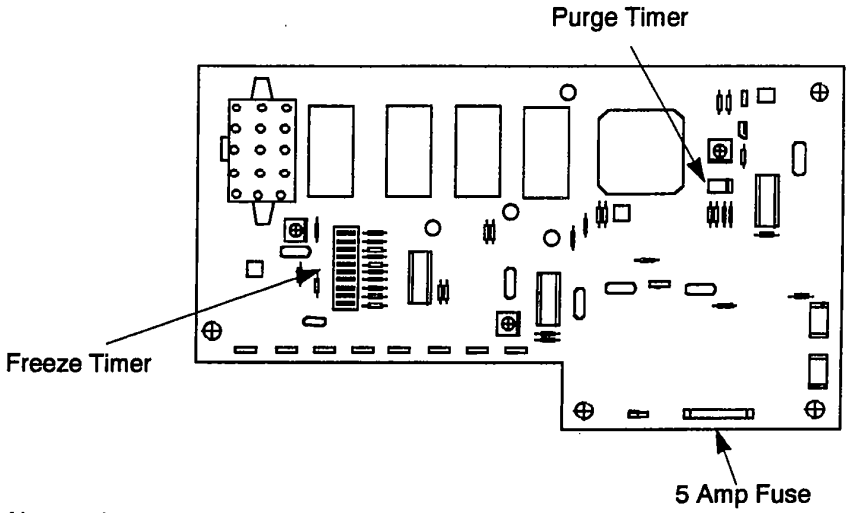
Operation
The start capacitor provides starting torque to compressor.

The run capacitor stores electrical energy used to improve compressor efficiency. The run capacitor may not be used in all machines.

Problem	Possible Cause	Remedy
1. Electrical contacts not closing.	a. Contactor coil burnt out.	a. Replace contactor.
2. Contacts sticking or arcing.	a. Contacts pitted or burnt.	a. Replace contactor.

Replacement Procedure
Disconnect electrical supply and discharge capacitor by shorting across terminals. Remove capacitor mounting bracket and electrical wires. Install new capacitor.

CIRCUIT BOARD



Location
Mounted to back of control box. Not used on machines manufactured before 12/95

Access
Remove front panel, top panel and control box cover.

Operation
Controls the operation of the machine by energizing and de-energizing components through the relays and timers which are incorporated onto the board. Also see Freeze Timer, Purge Timer, and Harvest Timer

Problem	Possible Cause	Remedy
1.Machine not running.	a.Bin control(s) open	a.Adjust or replace bin control.
	b.High temp safety open	b.Check H.T.S. for proper operation, relace if necessary.
	c.Selector switch bad	c.Check switch for proper operation, relace if necessary.
	d.Fuse on board blown	d.Replace fuse and check the electrical components for shorts.

Replacement Procedure
Disconnect electrical supply.
Remove wires from circuit board noting location of wires.
Unclip board from stand-offs.
Install new board making sure wires are connected to proper terminals.

CONTACTOR

Location
In electrical control box.
Machines that were manufactured before 3/96 have the contactor mounted to circuit board.

Access
Remove front cover panel and lower control box cover.

Operation
When power is supplied to the contactor coil the contacts are pulled closed energizing the compressor.

Problem	Possible Cause	Remedy
1. Electrical contacts not closing.	a. Contactor coil burnt out.	a. Replace contactor.
2. Contacts sticking or arcing.	a. Contacts pitted or burnt.	a. Replace contactor.

Replacement Procedure
Disconnect power supply and remove electrical wires.
Remove mounting screws and install new contactor.

FAN CONTROL

Location
Mounted to back of control box. (Used on self-contained air cooled units only.)

Access
Remove front panel, top panel and control box cover.

Operation
During the freeze cycle the fan control contacts close when the head pressure reaches 250 psi (17 bar) allowing condenser fan to start. If head pressure drops below 210 psi (15 bar) the control opens, turning the fan off.

Problem	Possible Cause	Remedy
1.Control opens and closes at the improper pressures.	a.Control out of adjustment. b.Control defective.	a.Adjust control. b.Replace control.
2.Control opens and/or closes erratically.	a.Control defective.	a. Replace control.
3.Control will not open or close at all.	a.Control defective.	a. Replace control.

Replacement Procedure
Disconnect electrical supply.
Recover refrigerant from system.
Remove electrical wires from control.
Unsweat cap tube from discharge tube and braze in cap tube from new control.
Remove mounting screws from control, mount new control and connect electrical wires.
Replace filter-drier, evacuate system and weigh in proper charge.
Leak check.

FAN MOTOR

Location
Mounted to back panel of machine section (air cooled only).

Access
Remove front panel, machine compartment access panel and top panel.

Operation
The fan motor can only be energized in freeze and is controlled by the fan control. The fan motor turns the blade to draw air in through the rear of the machine and exhaust it out through condenser.

Problem	Possible Cause	Remedy
1. Not running.	a. Motor burnt out. b. Fan motor obstructed.	a. Replace motor. b. Remove obstruction.
2. Noisy	a. Bearings in motor bad.	a. Replace motor.

Replacement Procedure
Disconnect power supply and electrical leads from motor.
Remove rear panel.
Remove mounting screws and motor.
Remove fan blade.
Reverse procedure for installation.

FILL SWITCH

Location
In control box.

Access
Remove front cover panel and lower control box cover.

Operation
When the fill switch is depressed, the water inlet valve energizes (opens), allowing the sump to fill with water. The valve will remain energized until the switch is released. The fill switch is only active when the selector switch is in the WASH position. The fill switch is used to fill the sump upon initial start-up of the machine and during periodic cleaning.

Problem	Possible Cause	Remedy
1. Does not energize water inlet solenoid valve when manually depressed.	a. Normally open contacts not closing.	a. Replace switch.

Replacement Procedure
Disconnect power supply.
Remove wires from switch terminals.
Push in on tabs on side of switch and remove switch.
Install new switch.

FREEZE TIMER

Location
Located on the circuit board. Machines that where manufactured without circuit board (before 12/95), the timer is located in control box, the farthest timer to the left.

Access
Remove front cover panel and control box cover.

Operation
The freeze timer controls the ice thickness by timing out the end of the freeze cycle. Once the time on the freeze timer has passed, relay #1 is energized and the harvest cycle begins.

Adjustment
Time may be added to the timer by moving any number of switches, located on the timer, to the on position. Subtract time by moving any number of switches to the off position. The number by each switch indicates seconds. Adjust switches for the amount of time needed to produce a batch weight between 3 1/4 lbs to 3 3/4lbs (1. 47 kg to 1.7kg) of ice per evaporator. The cube thickness should be approximately 3/8" (.95 cm) thick.

Note: Cubes at the bottom of the evaporator will be slightly thicker then those at the top.

Problem	Possible Cause	Remedy
1. Ice too thick or too thin.	a.Timer out of adjustment.	a.Adjust timer.
2. Timer does not close after amount of time adjusted on timer has past.	a.Timer defective.	a. Replace circuit board or timer.
3. Timer closes before amount of adjusted on timer has past.	a.Timer defective.	a. Replace circuit board or timer.

Replacement Procedure
Disconnect power supply.
Disconnect wires from circuit board or timer and remove stand offs or mounting screw.
Install new circuit board or timer.

HARVEST TIMER

Location
Located on the circuit board. Machines that where manufactured without circuit board (before 12/95), the timer is located in control box, the farthest timer to the right.

Access
Remove front cover panel and control box cover.

Operation
The harvest timer controls the amount of time that the machine is in harvest. Power is supplied to the harvest timer when the machine enters harvest. The harvest timer then begins timing out the length of the harvest cycle. Once the time on the harvest timer has past, the harvest cycle is terminated. The amount of time on the harvest timer will vary according to the ambient temperature (liquid line temperature on water cooled and remote machines). The colder the ambient temperature, the longer the harvest time will be. The temperature is sent to the harvest timer via a thermistor. The thermistor changes resistance with temperature change. The harvest timer changes its setting depending on this resistance. See Thermistor Service Information later in this section.

The chart below shows the relationship between the temperature the thermistor is reading and the harvest time.

All ice must fall from the evaporator before the machine returns to the freeze cycle. This can be checked by removing the water distribution pan during the harvest cycle and watching the ice as it falls from the evaporator(s). If any ice remains on the evaporator(s) when the machine returns to freeze make the following checks:
1. Clean the water system with ice machine cleaner. Make sure water pan is clean and has no plugged holes, adjust purge time if necessary.
2. Check the condenser thermistor for proper operation, see page G21.
3. Make sure the machine has the correct refrigerant charge.
4. Check the harvest timer per instructions below.

Harvest Timer Check
Note: The check below does not apply to remote units. Harvest time on remotes will be approximately 30 seconds longer then the times shown below. When the liquid line temperature drops below 70°F (21°C) the harvest time will be between 3 and 4 minutes. Also see Remote Defrost Thermistor operation on page F7.

Before making the following check the thermistor must be checked for proper operation. See page G21. Turn machine off at the selector switch. Check the ambient temperature at the thermistor by placing a thermometer next to thermistor sensing bulb. If machine is water cooled, unclamp thermistor from liquid line and allow thermistor to sense ambient temperature. Turn the selector switch back to the ICE position (the machine will start in harvest) and time the harvest cycle. Use the chart below to compare the ambient temperature to the harvest time. If there is a difference greater than 5%, the harvest timer is defective.

Temperature - Harvest Time

50°F (10°C)	242sec	60°F (16°C)	192sec	70°F (21°C)	155sec	80°F (27°C)	127sec	90°F (32°C)	105sec
52°F (11°C)	231sec	62°F (17°C)	184sec	72°F (22°C)	148sec	82°F (28°C)	122sec	92°F (33°C)	102sec
54°F (12°C)	220sec	64°F (18°C)	176sec	74°F (23°C)	143sec	84°F (29°C)	118sec	94°F (34°C)	98sec
56°F (13°C)	210sec	66°F (19°C)	168sec	76°F (24°C)	137sec	86°F (30°C)	113sec	96°F (36°C)	95sec
58°F (14°C)	201sec	68°F (20°C)	162sec	78°F (26°C)	132sec	88°F (31°C)	109sec	98°F (37°C)	91sec

Replacement Procedure
Disconnect power supply.
Disconnect wires from circuit board or timer and remove stand offs or mounting screw.
Install new circuit board or timer.

HIGH PRESSURE SAFETY
(Water cooled)

Location
Mounted to back of bulkhead on left side of machine.

Access
Remove front panel and machine compartment access panel.

Operation
The high pressure safety is a pressure operated control that shuts machine off if head pressure exceeds 450 p.s.i.(31 bar)

Problem	Possible Cause	Remedy
1.High pressure control tripped.	a.Head pressure too high.	a.Reset machine by pushing in on red button. Find problem, see page C-5.
2.Control will not reset.	a.Head pressure too high. b.Control defective.	a.Be certain head pressure has dropped to proper operating pressure. b.Replace control.
3.Control opens too soon or too late.	a.Control defective.	a. Replace control.

Replacement Procedure
Disconnect electrical supply and remove electrical wires.
Recover refrigerant from system.
Unsweat cap tube from discharge tube and braze in cap tube from new control.
Remove mounting screws from control, mount new control and connect electrical wires.
Replace filter-drier, evacuate system and weigh in proper charge.
Leak check.

HIGH TEMPERATURE SAFETY

Location
Clamped to suction line near T.X.V. sensing bulb.

Access
Remove top panel and insulation around control.

Operation
The high temperature safety electrically opens, shutting machine off, if suction temperature reaches 120°F (49°C). Once the suction line cools to 80°F (27°C) the safety closes restarting the machine.

Problem	Possible Cause	Remedy
1.Does not open or close at correct temperature.	a.Safety control not clamped securely to suction line. b.Safety control defective.	a.Clamp control to suction line. b.Replace control.
2.Machine not coming on when selector switch turned to the ICE position.	a.High temperature safety open. b.High temperature safety control defective.	a.Allow evaporator to cool to below 80°F (27°C)to reset high temperature safety. b.Replace control.

Replacement Procedure
Disconnect power supply.
Remove insulation from around control.
Remove clip from suction line.
Disconnect wiring.
Securely clamp new safety control to suction line and wrap with insulation.

OVERLOAD (COMPRESSOR)

Location
Mounted to compressor near electrical terminals.

Access
Remove front panel and machine access panel. Remove electrical terminal cover.

Operation
The compressor overload opens the electrical circuit to compressor if the compressor body gets too hot or if compressor draws too much current.

Problem	Possible Cause	Remedy
1.Compressor not running.	a.Overload tripped.	a.Allow compressor to cool so overload will reset, see electrical system diagnosis.
	b.Overload defective.	b.Replace overload.

Replacement Procedure
Disconnect electrical supply. Remove electrical wires from overload. Remove spring clip holding overload in place. Install new overload.

PURGE SWITCH

Location
In control box.

Access
Remove front panel and control box cover.

Operation
The purge switch is used during periodic cleaning to purge the sump. When the purge switch is depressed, the water purge valve energizes (opens), allowing the water pump to flush mineral laden water or cleaning solution through the purge valve. The valve will remain energized until the switch is released. The purge switch is only active when the selector switch is in the WASH position.

Problem	Possible Cause	Remedy
1.Does not energize purge valve when manually depressed.	a.Normally open contacts not closing.	a.Replace switch.
2.Purge valve does not open at the beginning of harvest.	a.Normally closed contacts open.	a.Replace switch.

Replacement Procedure
Disconnect power supply.
Remove wires from switch terminals.
Push in on tabs on side of switch and remove switch.
Install new switch.

PURGE TIMER

Location
Located on the circuit board. See diagram on page G6. Machines that where manufactured without circuit board (before 12/95), the timer is located in control box between, the freeze timer and harvest timer.

Access
Remove front cover panel and control box cover.

Operation
On machines manufactured after 10/96 the purge timer is energized at the beginning of the freeze cycle. Machines manufactured before 10/96, the purge timer is energized at the beginning of harvest. Once the timer is energized the purge valve will remain energized (open) for the period of time on the timer.

Note: The date mentioned above is an approximation, also all replacement circuit boards will have the "new" purge sequence. If in doubt as to when the harvest occurs, check the purge timer, if the purge timer can be adjusted up to 60 seconds purge will occur at the beginning of freeze. If the timer can be adjusted to 8 seconds purge will occur at the beginning of harvest.

Adjustment
The purge timer is factory set for a 45 second purge however most water conditions will require a longer purge time. The amount of purge time required will depend on water conditions and the type of water filtration system used. If unsure, adjust timer to 60 seconds or to the maximum time available up to 60 seconds. To change the timer setting, on machines with circuit boards, slide the adjusting tab to the right to increase time or to the left to decrease time. The increments in seconds are marked on the board. On machines without circuit boards, time may be added to the timer by moving any number of switches, located on the timer, to the ON position. Subtract time by moving any number of switches to the OFF position. The number by each switch indicates seconds.

Caution: Do not adjust potentiometer located above timer. The purge timer is a slide adjustment, the potentiometer is a screw type adjustment. See drawing on Page G6 for exact location of purge timer.

Problem	Possible Cause	Remedy
1. Purge cycle too long or too short.	a.Timer out of adjustment.	a.Adjust timer.
2. Timer does not close after amount of time adjusted on timer has past.	a.Timer defective.	a. Replace circuit board or timer.
3. Timer closes before amount of adjusted on timer has past.	a.Timer defective.	a. Replace circuit board or timer.

Replacement Procedure
Disconnect power supply.
Disconnect wires from circuit board or timer and remove stand offs or mounting screw.
Install new circuit board or new timer.

RELAY (1 THROUGH 6) (MACHINES WITHOUT CIRCUIT BOARD)

Location
In control box. Relay 1 is the top relay. Relay 3 is second from top. Relay 4 is third from top. Relay 5 is forth from top relay 6 is the bottom relay. Relay 2 is mounted to control box cover.

Access
Remove front panel and control box cover.

Operation
When the selector switch is put into the ICE position, power is supplied to relay 1 causing the harvest components to energize. The condenser fan and water inlet valve circuits are de-energized when relay 1 is powered. When the harvest time has past, power is sent to relay 2 causing relay 1 to be de-energized terminating harvest and powering the condenser fan and water inlet valve circuits. Relay 3 is also powered at this time and will remain energized until the machine is turned off at the selector switch or power to the machine is interrupted. Relay 3 allows the machine to restart in freeze after a full bin and to start in harvest when the machine is turned from the OFF to the ICE position. When relay 4 is powered, it by-passes the bin control preventing the machine from shutting off if the bin control opens. Relay 4 is de-energized for a very short time when harvest is terminated. During this time the bin control is not being by-passed and the machine will shut off if the bin is full. Relay 5 is powered by the purge time r and de-energizes the purge valve. Relay 6 is powered during freeze when the water level sensor contacts close. This de-energizes the water inlet solenoid.

Problem	Possible Cause	Remedy
1. Electrical contacts not closing.	a. Coil burnt out.	a. Replace relay.
2. Contacts sticking or arcing.	a. Contacts pitted or burnt.	a. Replace relay.

Replacement Procedure
Unplug relay from socket.

SELECTOR SWITCH

Location
In control box.

Access
Remove front panel and control box cover.

Operation
The selector switch is used to switch the machine to the off, wash or ice mode. The purge and fill switches are only active when the selector switch is in the WASH position.

Problem	Possible Cause	Remedy
1.Switch does not put the machine into all three modes.	a.Switch contacts not working properly.	a.Replace switch.

Replacement Procedure
Disconnect power supply.
Squeeze side tabs and push switch foreword out of mounting hole.
Remove wires from switch terminals.
Install new switch.

START RELAY

Location
In control box.

Access
Remove front panel and lower control box cover.

Operation
The start relay breaks the electrical circuit to start capacitor as motor speed increases.

Problem	Possible Cause	Remedy
1. Compressor will not start or starts but runs for only a short time.	a. Defective relay, see electrical system diagnosis.	a. Replace relay.

Replacement Procedure
Disconnect power supply.
Remove electrical wires from relay terminals.
Remove relay mounting screw and install new relay.

THERMISTOR

Location
Air cooled 22" (56cm) models: Mounted to the fan shroud on back of machine.
Water and Air cooled 30" (76cm) models: Clamped to liquid line at filter drier.
Remote: Mounted to liquid line between the mixing valve and the back panel.

Access
Air cooled 22" (56cm) models: Outside of back panel.
Water cooled, Remote and Air cooled 30" (76cm) models: Remove front panel and machine compartment panel.

Operation
The thermistor measures the ambient temperature and changes resistance with ambient temperature change. This information is sent to the harvest timer. The harvest timer changes its setting depending on this resistance.

Thermistor Check
Note: When checking a thermistor on a remote machine, the themistor wires must be cut rather then unplugged from the timer. The wires should be cut in the control box where they exit the 1/4" insulation tube. Use butt connectors to splice the wires when reconnecting the thermisor.

There are two methods of checking a thermistor. The first requires the use of an accurate thermometer. Disconnect the thermistor leads from the harvest timer. If the machine is water cooled, unclamp the thermistor bulb from the liquid line and allow the thermistor to sense ambient temperature. Use a thermometer to check the ambient temperature at the location of the thermistor. Check the resistance across the thermistor leads with an ohm meter. Using the chart below, find the correct resistance reading for the ambient temperature that was checked earlier. The resistance in the chart should be the same as the resistance read across the thermistor leads. A difference greater then + or - 5% indicates a defective thermistor.

The second method uses a ice bath.
Disconnect the thermistor leads from the harvest timer and place the thermistor bulb in an ice bath of 50% ice and 50% water. Wait several minutes to allow the ice bath to reach 32° F (0°C). Check the resistance across the thermistor leads with an ohm meter. The correct resistance reading is between 31K and 34.3K ohms. If the reading is outside of this range, replace the thermistor.

Ambient Temperature - Thermistor Resistance

50F(10C)	20.1K Ω	58F(14C)	16.3K Ω	66F(19C)	13.2K Ω	74F(23C)	10.8K Ω	82F(28C)	8.9K Ω	90F(32C)	7.4K Ω
52F(11C)	19.1K Ω	60F(16C)	15.5K Ω	68F(20C)	12.6K Ω	76F(24C)	10.3K Ω	84F(29C)	8.5K Ω	92F(33C)	7.0K Ω
54F(12C)	18.1K Ω	62F(17C)	14.6K Ω	70F(21C)	12.0K Ω	78F(26C)	9.8K Ω	86F(30C)	8.1K Ω	94F(34C)	6.7K Ω
56F(13C)	17.2K Ω	64F(18C)	13.9K Ω	72F(22C)	11.4K Ω	80F(27C)	9.4K Ω	88F(31C)	7.7K Ω	96F(36C)	6.4K Ω

Problem	Possible Cause	Remedy
1. Harvest is too long or too short.	a. Thermistor defective.	a. Replace thermistor.
	b. Condenser thermistor disconnected or not connected properly.	b. Check all electrical connections.
2. Machine does not enter harvest.	a. Thermistor shorted.	a. Replace thermistor.

Replacement Procedure
Unclamp thermistor bulb and unplug leads from harvest timer.
On remote units cut the wires in the control box where they exit the 1/4" insulation tube. Use butt connectors to splice the wires when reconnecting the thermisor.

TIMER INITIATE

Location
Mounted to back of control box to the left of the bin control.

Access
Remove front panel, top panel and control box cover.

Operation
The sensing bulb of the timer initiate is clamped to the suction line. When the temperature of the suction line drops to 21°F (-9°C) the contacts in the timer initiate close energizing the timer. When the suction line temperature rises during harvest the contacts open again.

Adjustment
The control should be adjusted to close when suction line temperature drops to 21°F (-9°C) on R-404a units and 25°F (-4°C) on R-22 (50 Hz) units. The control should open when the temperature rises to 24°F.(-4°C) on R-404a units and 32°F (0°C) on R-22 (50 Hz) units. Adjust control by turning adjusting screw. Turn adjusting screw C.W. for a colder cut-in temperature.

Problem	Possible Cause	Remedy
1. Timer initiate does not close or open at correct pressure.	a.Timer initiate out of adjustment.	a.Adjust control.
2. Does not close or open consistently at set pressures or does not open or close at all.	a.Timer initiate defective.	a.Replace timer Initiate.

Replacement Procedure
Disconnect power supply.
Recover refrigerant from system.
Remove wires and mounting screws from control.
Unsweat cap tube from suction line and braze cap tube from new control to suction line.
Mount new control and connect wires.
Replace filter drier, evacuate and weigh in refrigerant charge.
Leak check and check adjustment.

WATER LEVEL SENSOR

Location
In water sump, in front of the water pump.

Access
Remove front panel and machine compartment cover panel.

Operation
At the beginning of the freeze cycle, the float on the water level sensor is raised by the water in the sump as the water level rises. When the sump is full the float will be completely lifted causing the magnetic switch to close. Power is then sent to relay #5 (relay #6 on machines without circuit board) latching it and de-energizing the water inlet valve. During the freeze cycle the water level in the sump drops and the water level sensor contacts open again. Relay #5 (relay #6) is unlatched when harvest is terminated allowing the sump to refill.

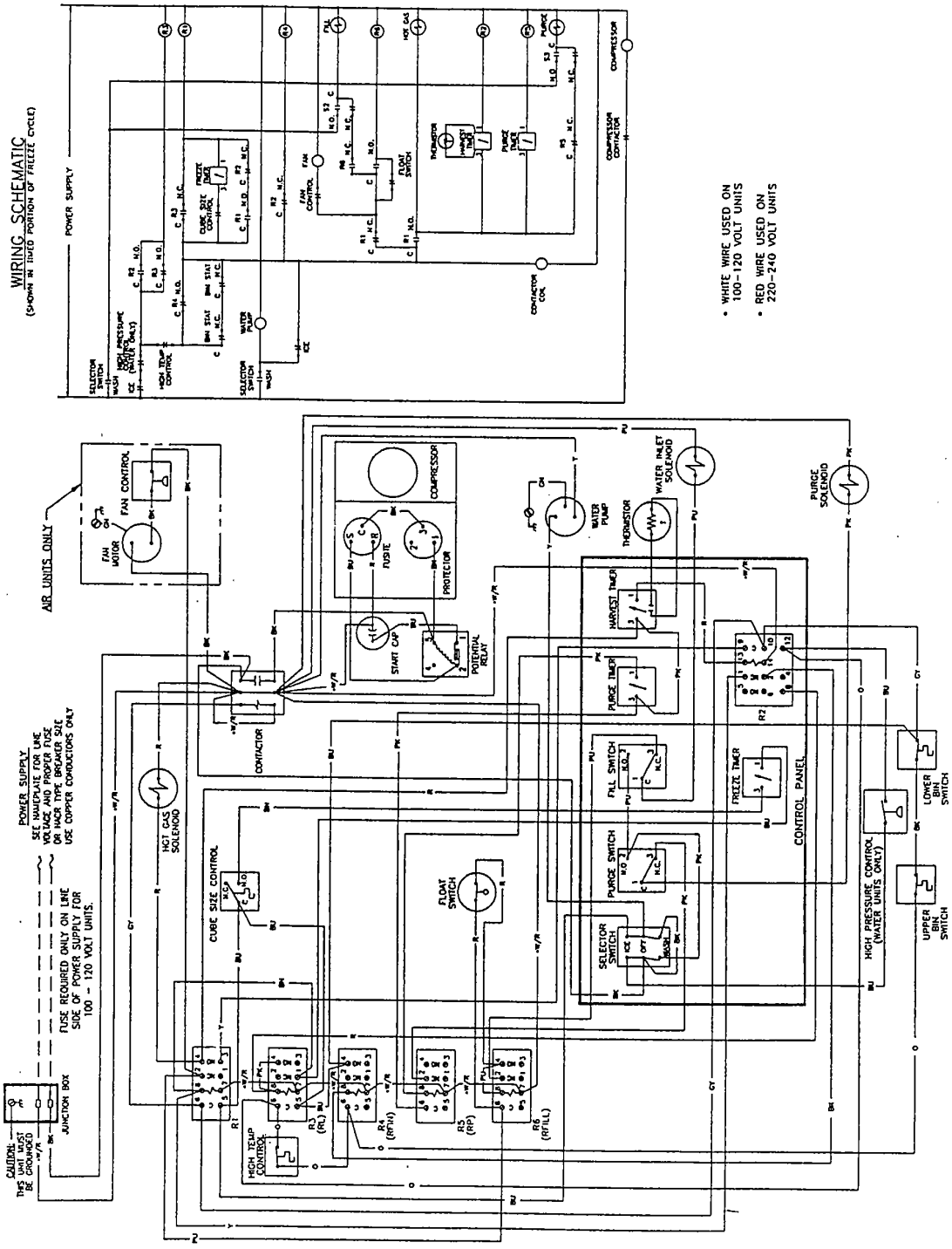
Adjustment
The water level sensor is factory set and should normally not need to be adjusted. However if an adjustment or replacement is required the exposed part of the water level sensor should be 1 3/4" (4.4 cm) above the collar on top of the sensor housing.

NOTE: The water level sensor floats should be installed on the sensor with the magnets at the bottom of the float, pointing upward. If the float is installed upside down, the contacts in the sensor will work improperly.

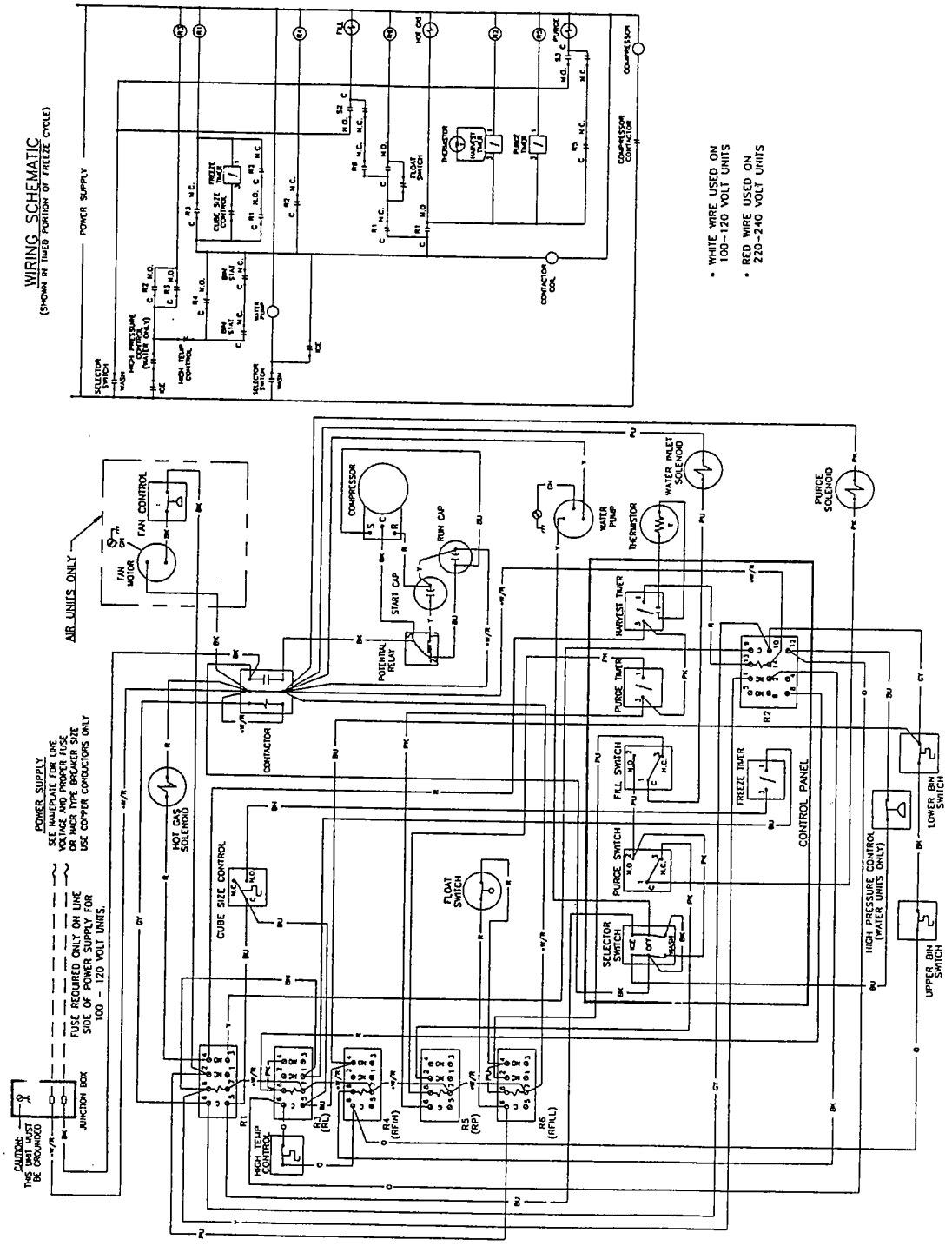
Problem	Possible Cause	Remedy
1. Water over filling sump.	a. Water level sensor disconnected or not connected properly. b. Float on sensor sticking or cracked.	a. Check and repair electrical connections. b. Clean or replace water level sensor.
2. Water inlet solenoid not opening.	a. Float on sensor upside down.	a. Reverse position of float. See note above.

Replacement Procedure
Disconnect power to machine and disconnect sensor wires from circuit board or from relay 6 on machine without circuit boards
Loosen screws holding water pump to housing, remove screws holding float assembly to housing, remove float assembly.
Loosen set screw holding the faulty float switch, remove float switch.
Reverse procedure to install new float switch.

GC 300 AIR and WATER (w/o circuit board)

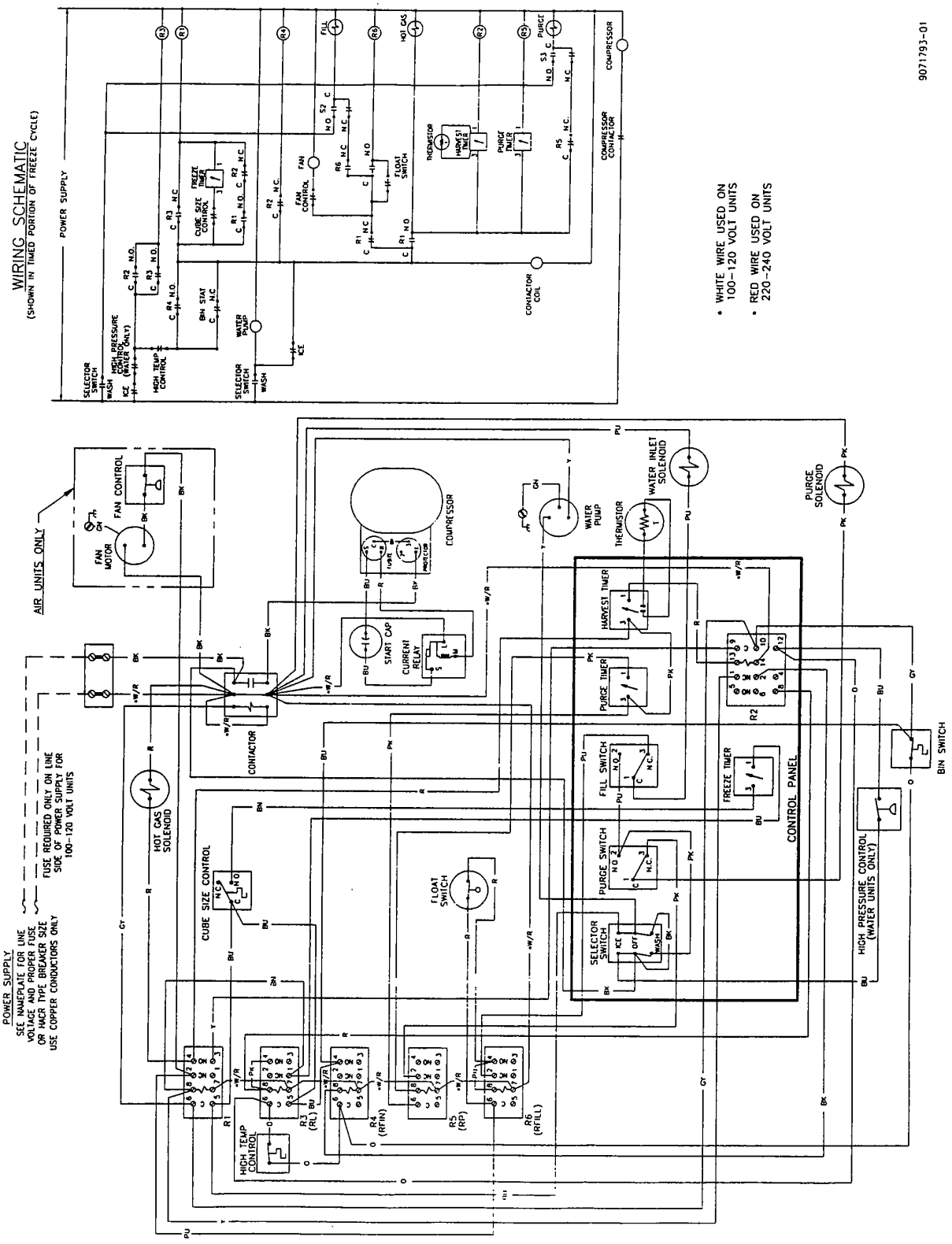


GC 550 AIR and WATER (w/o circuit board)



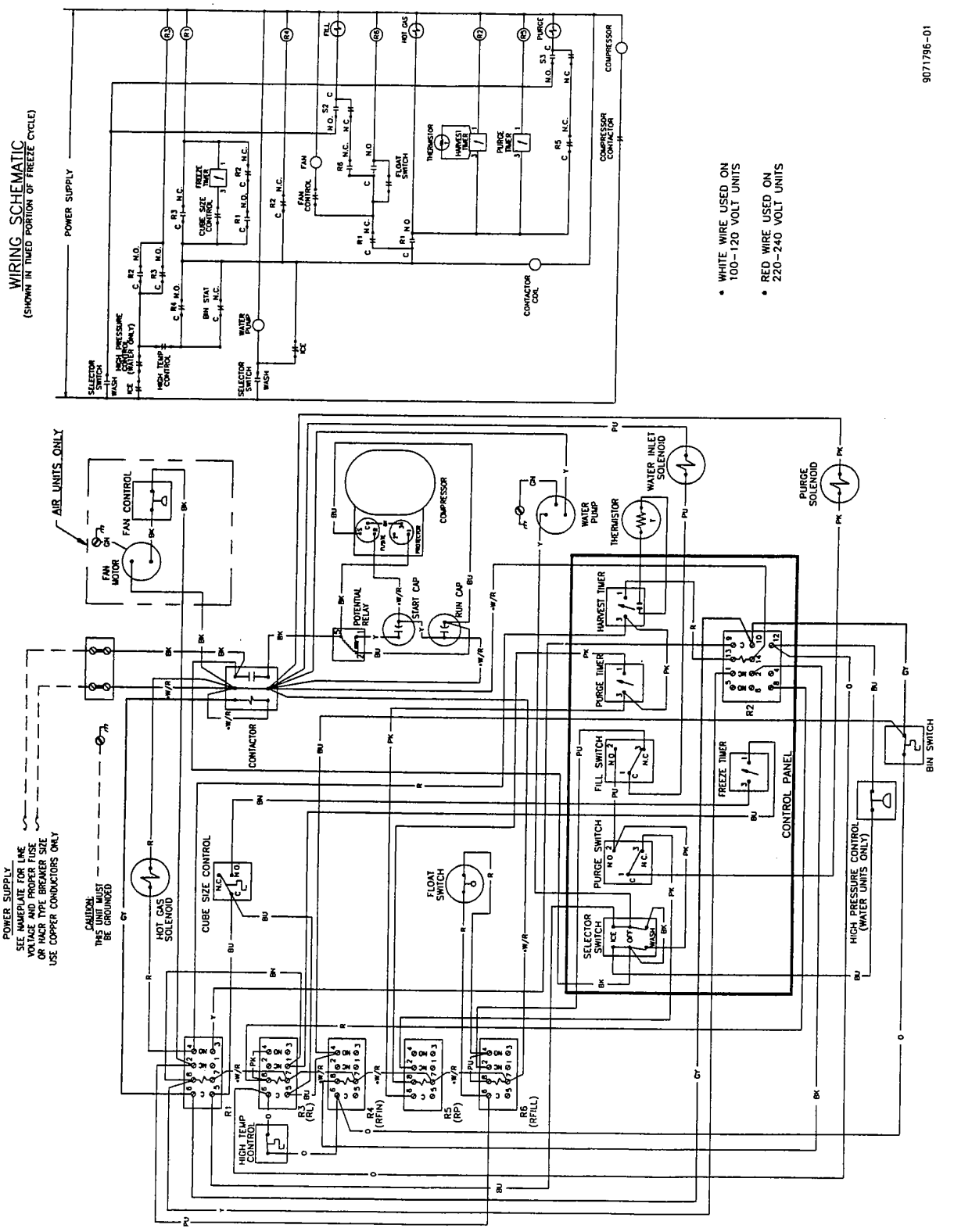
Wiring Diagram

GC 305 AIR and WATER & GC 555 WATER (w/o circuit board)

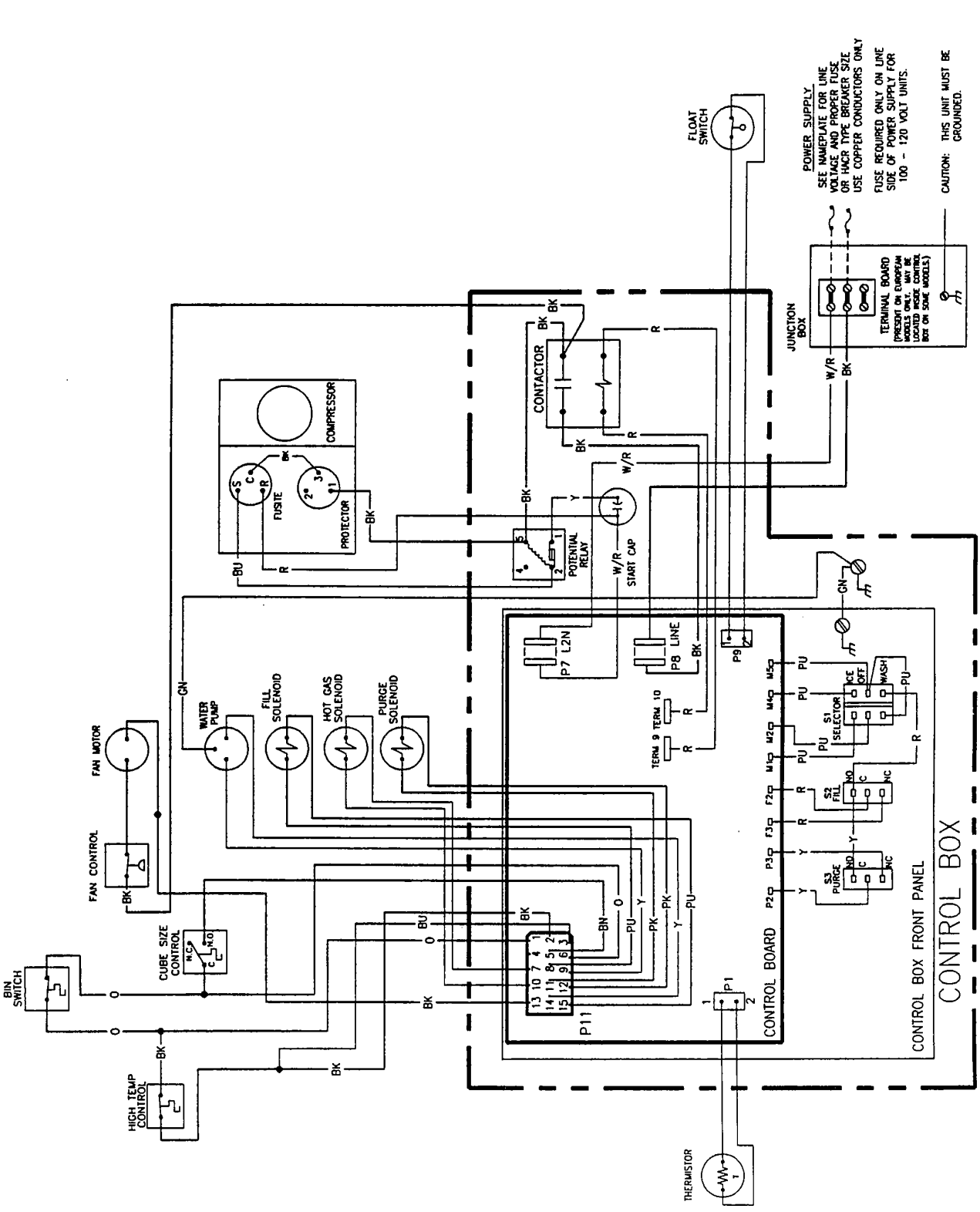


GC 555 AIR (w/o circuit board)

Wiring Diagram

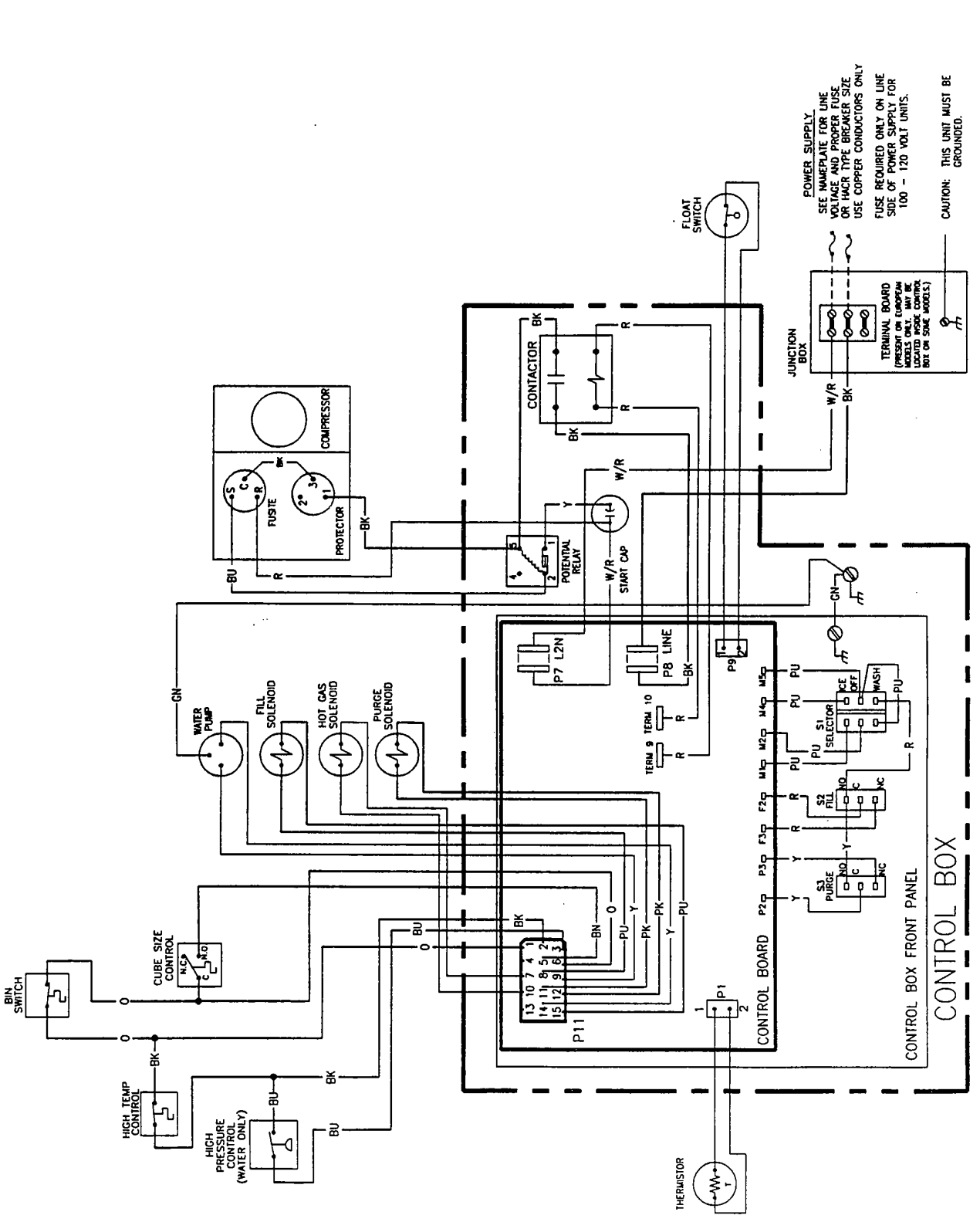


GC 300 AIR


9071846-1
POWER SUPPLY
SEE NAMEPLATE FOR LINE VOLTAGE AND PROPER FUSE OR HACR TYPE BREAKER SIZE
USE COPPER CONDUCTORS ONLY
FUSE REQUIRED ONLY ON LINE SIDE OF POWER SUPPLY FOR 100 - 120 VOLT UNITS.
CAUTION: THIS UNIT MUST BE GROUNDED.
FLOAT SWITCH
JUNCTION BOX
TERMINAL BOARD
CONTACTOR
COMPRESSOR
FUSITE
PROTECTOR
POTENTIAL RELAY
START CAP
P7 L2N
P8 LINE
P9
TERM 9
TERM 10
WATER PUMP
FILL SOLENOID
HOT GAS SOLENOID
PURGE SOLENOID
FAN MOTOR
FAN CONTROL
CUBE SIZE CONTROL
BIN SWITCH
HIGH TEMP CONTROL
THERMISTOR
P11
P1
CONTROL BOARD
S1 SELECTOR
ICE
OFF
WASH
S2 FILL
S3 PURGE
CONTROL BOX FRONT PANEL
CONTROL BOX

GC 300 WATER

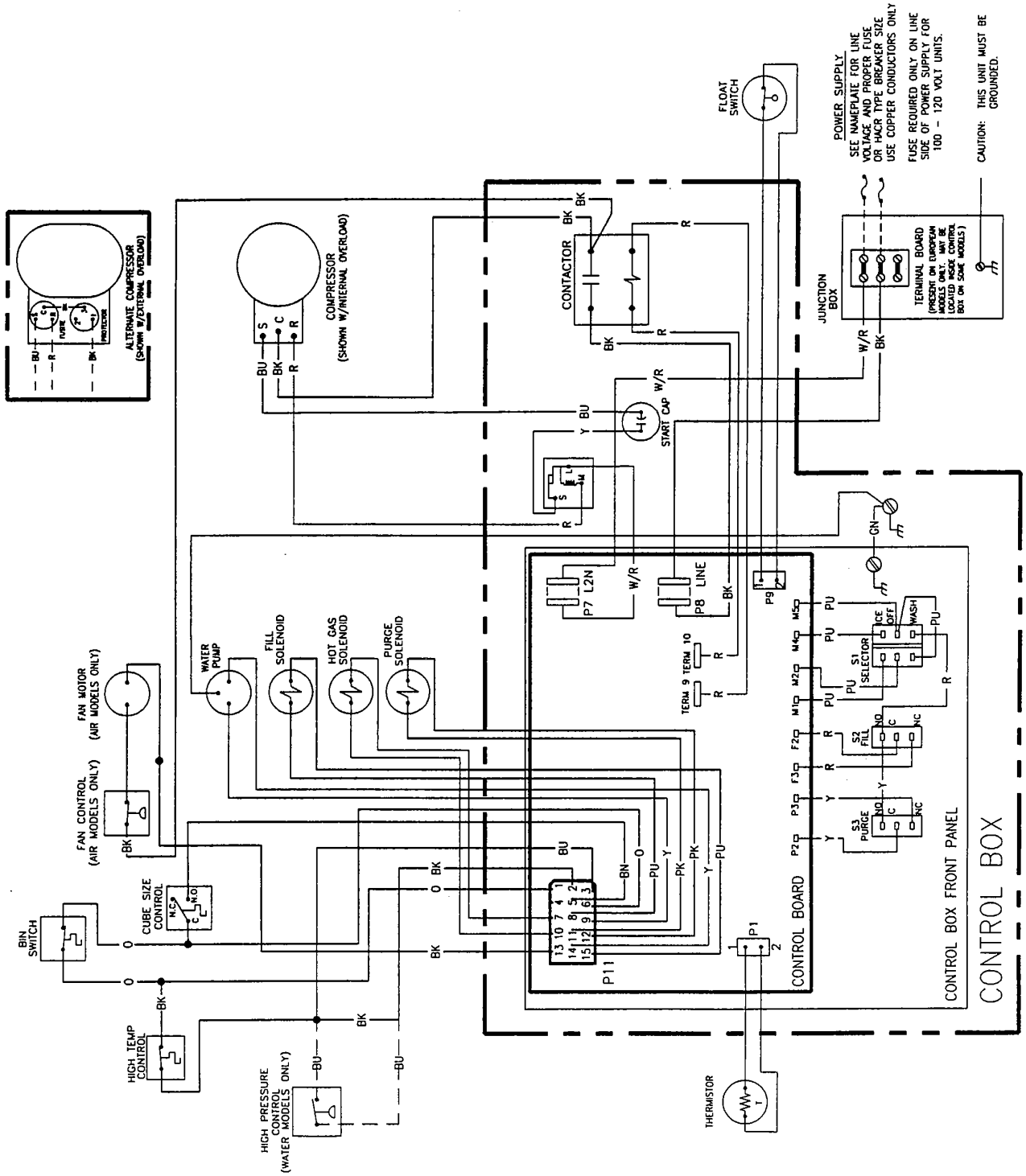
Wiring Diagram



Wiring Diagram

GC 305 AIR and WATER & GC 555 WATER

9071841-01



GC 550 / 555 / 656 / 655 AIR

Wiring Diagram

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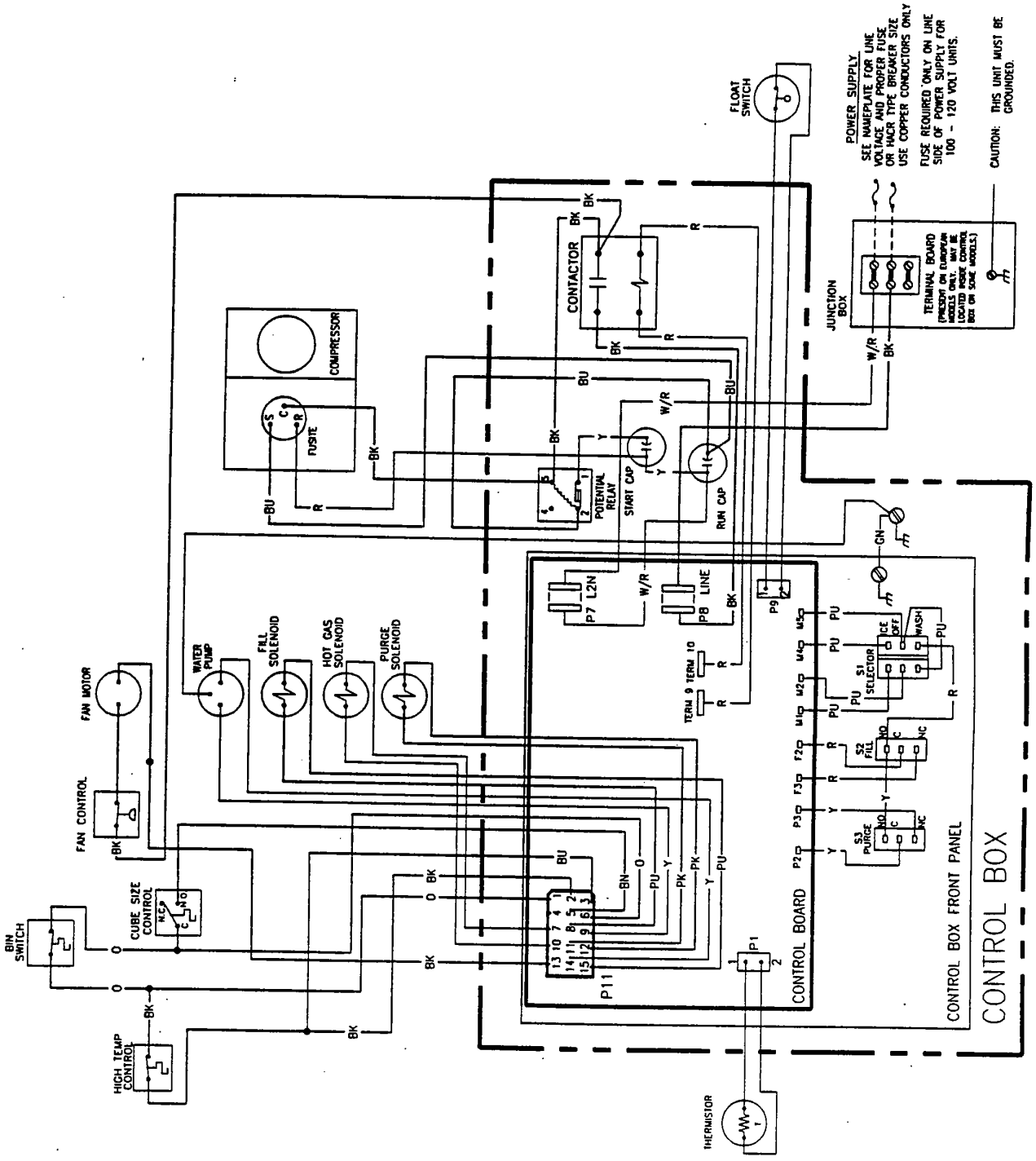

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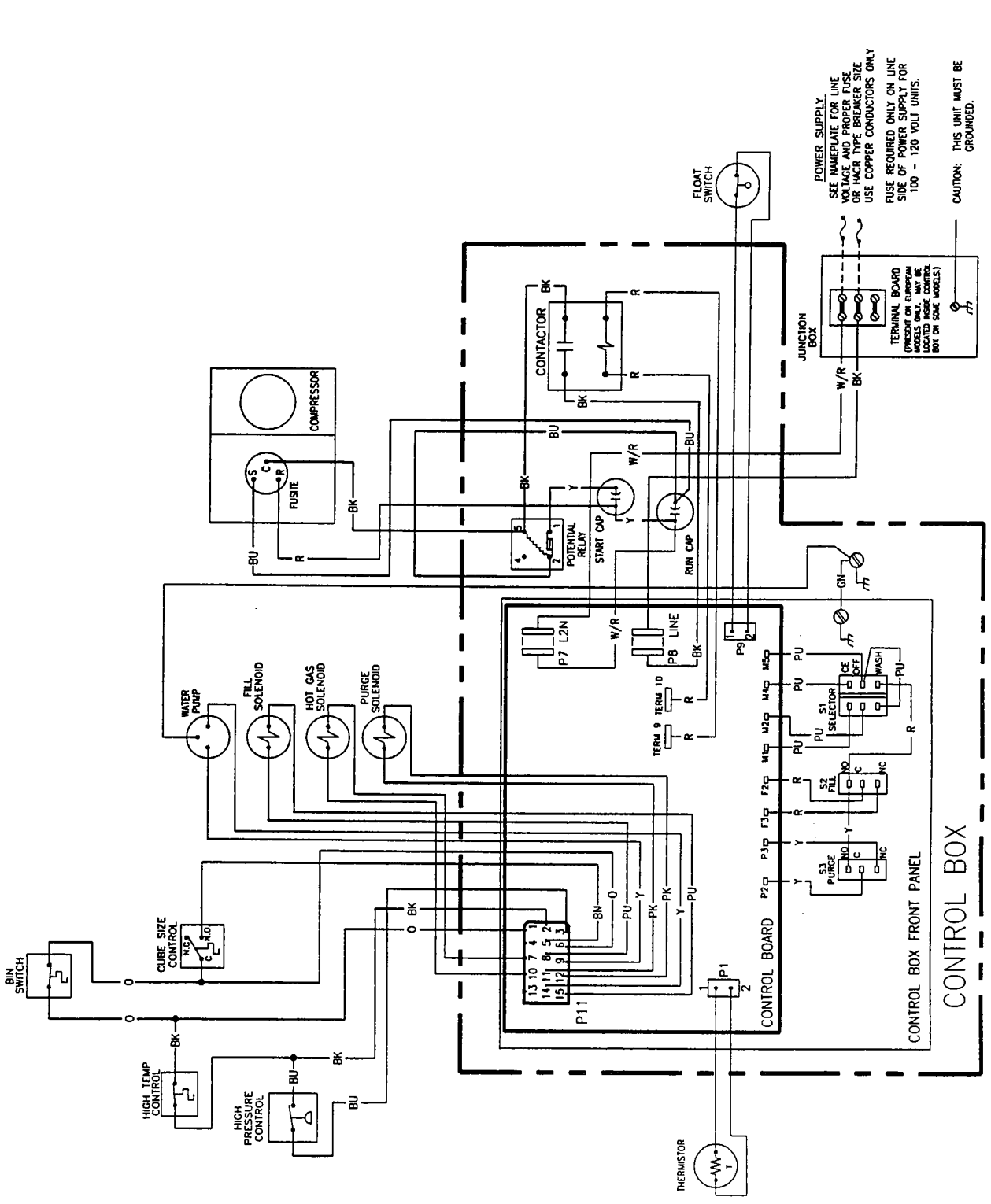
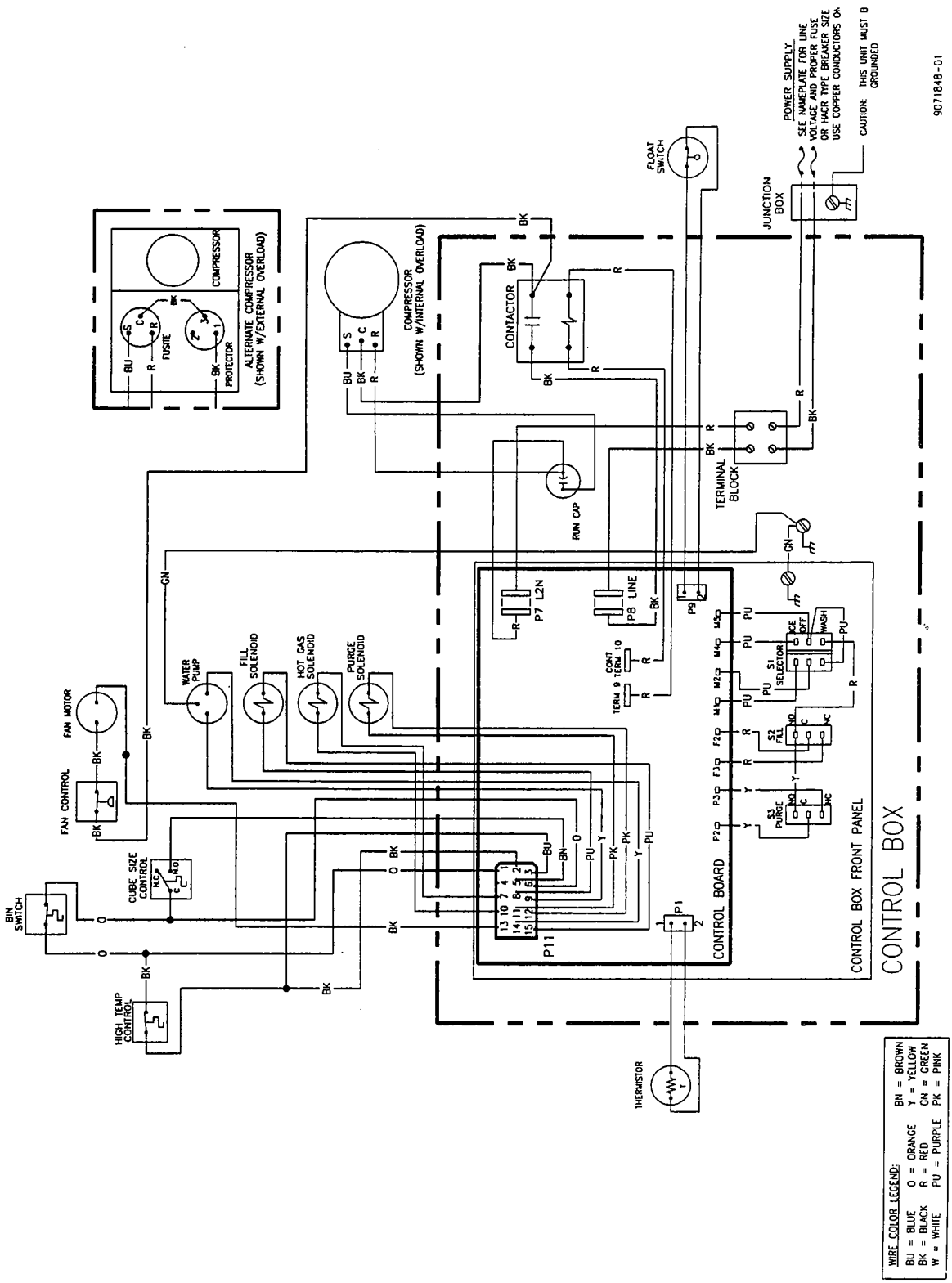


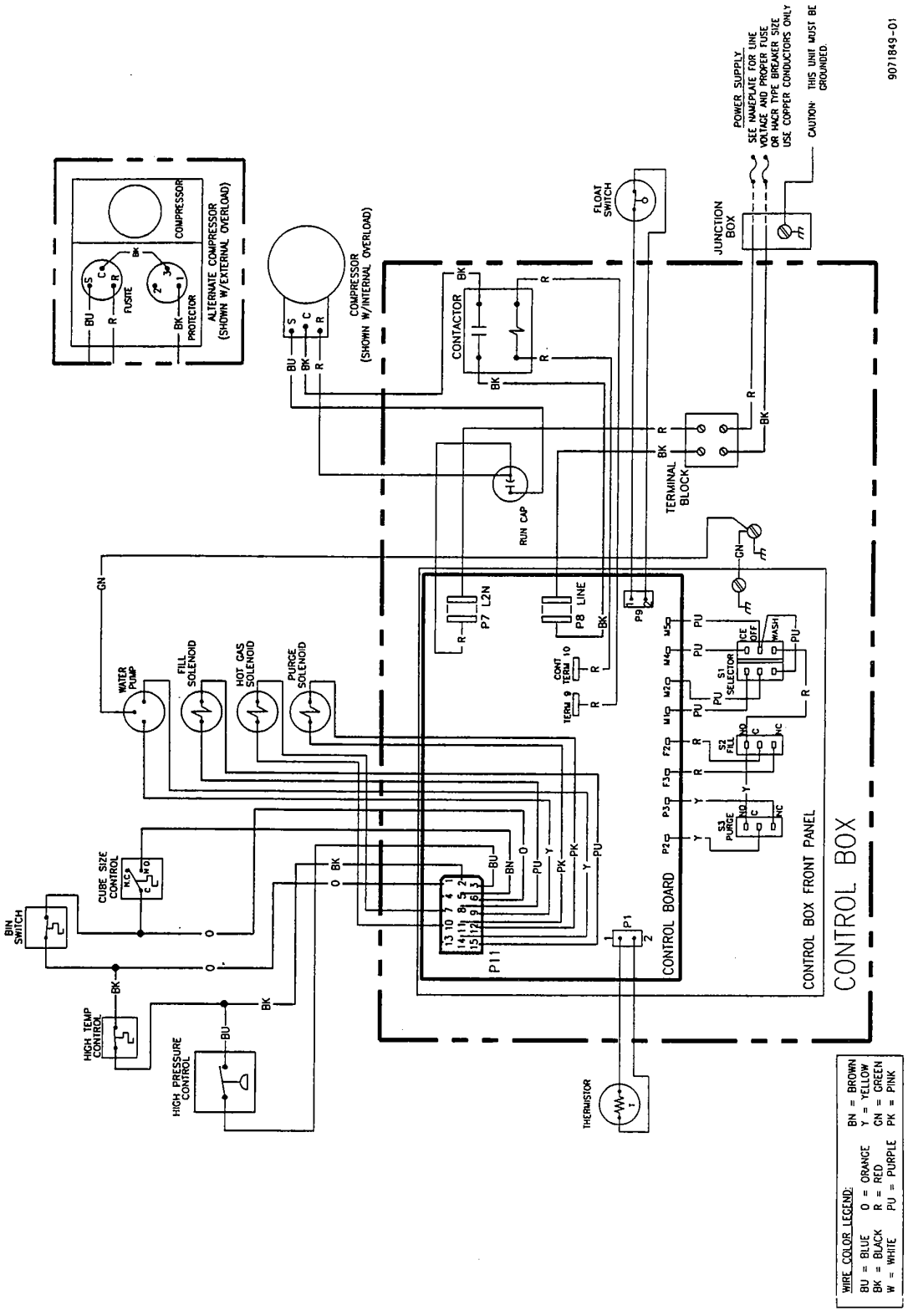
GC 756 / 1206 AIR

Wiring Diagram



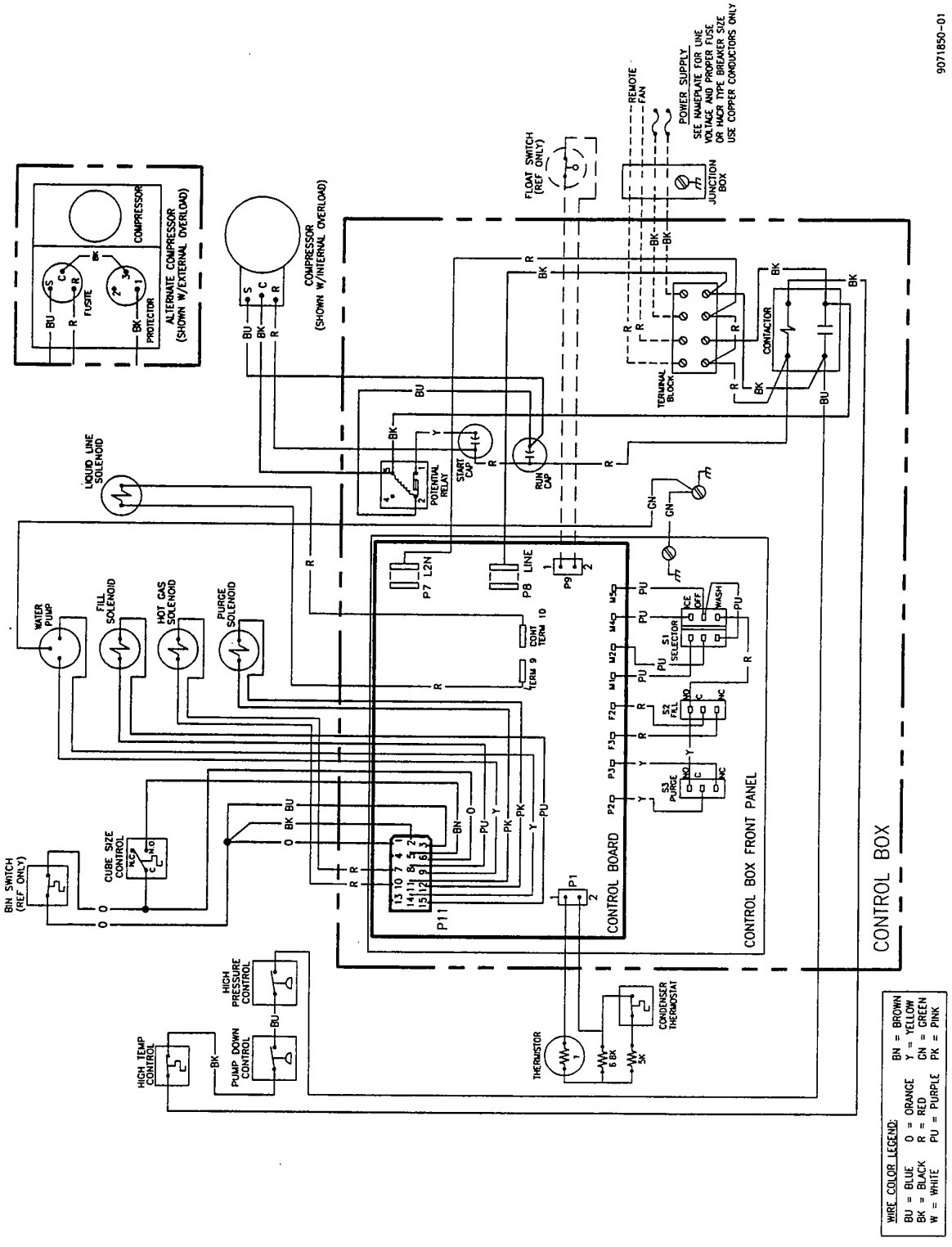
Wiring Diagram

GC 756 WATER



GC 655 / 756 / 1206 REMOTE

Wiring Diagram



Notes

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