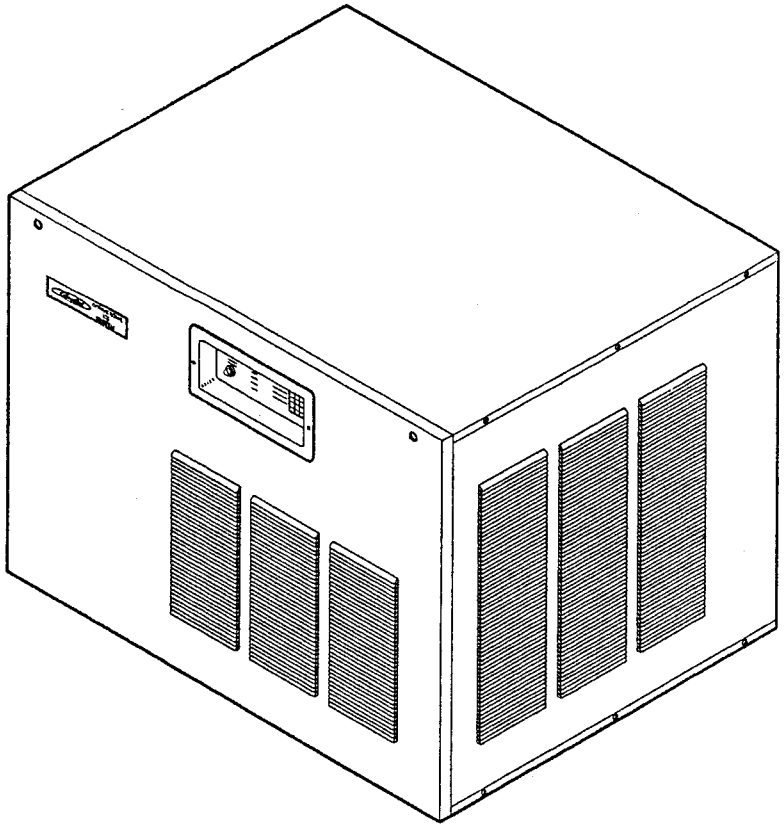
Quality Designers & Manufacturers for the Ice Maker Industry

IMI CORNELIUS INC.

MODULAR CUBED ICE MAKER

SERVICE MANUAL

SERIES 500



MANUAL PART NUMBER 16-1951-812

THIS DOCUMENT CONTAINS IMPORTANT INFORMATION

This Service Manual must be read and understood before the installation and operation of this Ice Maker.

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IMI CORNELIUS INC. P.O. BOX 1527 MASON CITY, IOWA 50402
AC 515-424-9324 TOLL FREE 1-800-531-5767 FAX 515-424-3601

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INTRODUCTION

We have strived to produce a quality product. The design has been kept simple thus insuring trouble-free operation.

This manual has been prepared to assist servicemen and users with information concerning installation, construction and maintenance of the ice making equipment. The problems of the serviceman and user have been given special attention in the development and engineering of our ice makers.

If you encounter a problem which is not covered in this manual, please feel free to write or call. We will be happy to assist you in any way we can.

When writing, please state the model and serial number of the machine.

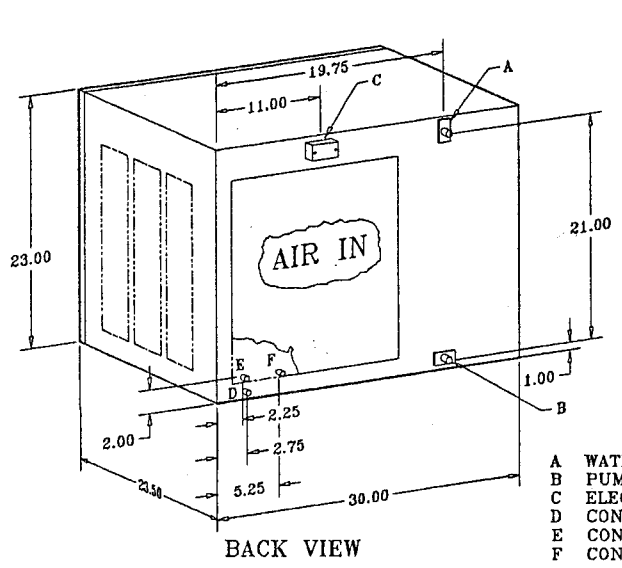
Address all correspondence to:

A Product of IMI Cornelius Inc.
2421-15th St. SW PO Box 1527
Mason City, Iowa 50401

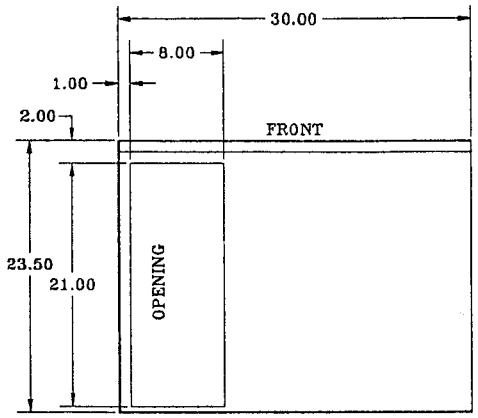
Phone 515-424-6150/800-554-3526
FAX 515-424-4305

SPECIFICATIONS

500 SERIES



BACK VIEW



BOTTOM VIEW

A WATER INLET
B PUMP OUT DRAIN
C ELECTRICAL CONNECTION
D CONDENSATE DRAIN
E CONDENSER (WATER OUT)(W/C ONLY)
F CONDENSER (WATER IN)(W/C ONLY)

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ICE PRODUCTION CAPACITY (approximate)

Model Number (Condenser)	Ambient Temp F	Incoming Water Temp F 50°	70°	80°
AC-500 (Air Cooled)	70°	460#	400#	380#
	80°	430#	390#	360#
	90°	400#	370#	330#
WC-500 (Water Cooled)	70°	500#	450#	400#
	80°	495#	445#	395#
	90°	490#	440#	390#

Compressor Electrical Rating ..... 3/4 H.P.
Compressor Model ..... Tecumseh AK9474J
Condenser ..... Air or Water Cooled
Refrigerant Charge ..... AC - 30 oz. R-22
..... WC - ~~24~~ oz. R-22
Refrigerant Control ..... TXV
TXV Superheat Setting ..... 6° to 10°
Inlet Water Supply ..... 3/8" SAE Male Flare
Voltage 115V-60hz-1ph
Total Amp. Draw ..... 10.0 amps

UNPACKING

1. Uncrate machine and/or bin by removing the staples from around the bottom of cardboard crate and lift off.

2. Remove bolts fastening the crate skid to the bottom of the unit. If auxiliary legs have been purchased for the bin, they should be installed at this time.

LEVELING

1. If legs are used, adjust the leveling legs of the storage bin until the unit is level and all four (4) legs are in solid contact with the floor. Leveling is very important to obtain proper draining and to maintain the proper level in the water pan of the ice cuber.

NOTE: *If the bin is to be installed flush to the floor, the machine must be sealed to the floor with an approved mastic such as Sears #3803-0 Caulk, Dow R.T.V 101, 102 or G.E. 731, 732. This is an N.S.F. requirement and is the responsibility of the installer.*

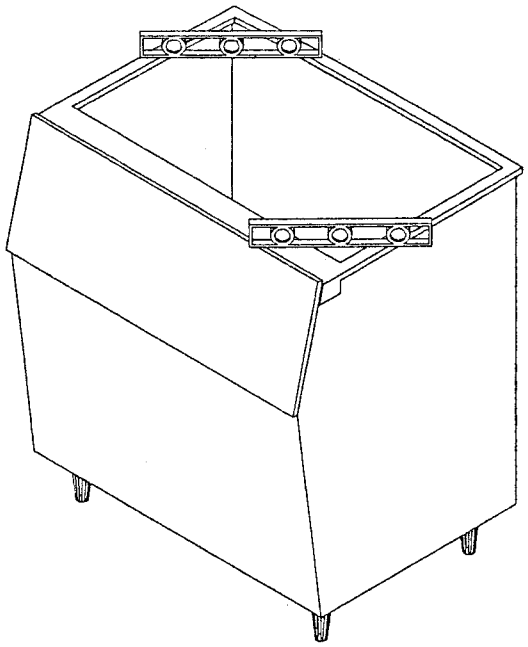


Diagram 1

UNIT LOCATION

1 Allow at least a minimum of six (6) inches at the rear and side of the ice machine for proper air circulation.

2. This unit has been designed to be installed in an indoor location which is clean and which can be adequately ventilated. The air and water temperatures should never exceed 100° F or fall below 50° F. (Temperatures above 100° F will cut the ice making capacity below an economical level. Temperatures below 50° F will cause a malfunction of thermostatic sensors).

3. The unit should be located where air circulation is not restricted. The unit should not be located near a kitchen grill. Air which contains grease vapors will deposit grease on the condenser. The condenser should always be kept clean.

UNIT SET-UP

1. Take off front panel of machine and remove hardware bag or service manual envelope with the water strainer enclosed.

2. Mount the ice maker to the top of the ice storage bin or adapter in the proper position over the ice drop opening. The ice maker must then be sealed both on the outside and the inside bottom edges with an approved N.S.F. mastic such as Dow Silastic #732, 734 or General Electric RTV #101, 102. This is and N.S.F. requirement and the responsibility of the installer.

3. Remove shipping tape from evaporator curtains.

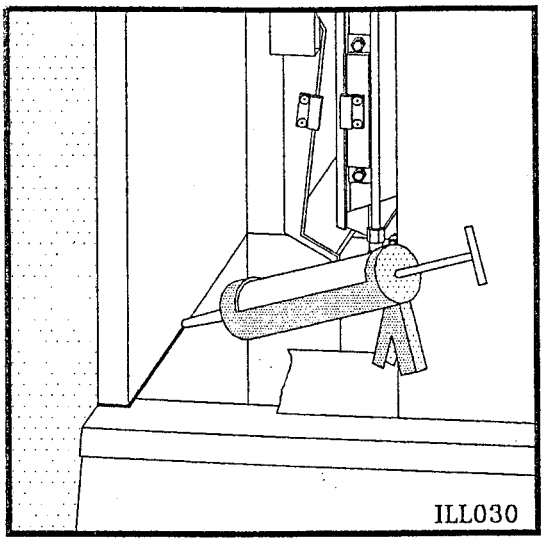


Diagram 2

MAKE ELECTRICAL POWER SUPPLY CONNECTION

Requirements: 115v/60hz. 1 ph. or 220v 50hz. 1 ph when used.

REFER TO SERIAL PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM TIME DELAY FUSE SIZE.

ALL WIRING MUST CONFORM TO NATIONAL AND LOCAL ELECTRICAL CODES.

MAKE PLUMBING CONNECTIONS

Water supply - (Install per local codes)(See diagram 3)

The water inlet connection to the unit is a 3/8" male flare connection located at the rear of the ice machine.

NOTE: *It the water pressure exceeds 50 pounds, a water pressure regulator should be installed in the water inlet line between the water shut-off valve and the strainer.*

Install a reducer fitting on the shut-off valve to accommodate the water strainer, which is supplied with each ice machine and MUST be used. Install the water strainer with the arrow in the proper direction of flow and with the clean out plug down. This is very important for cleaning. Connect either 3/8" or 1/2" copper tubing between the water inlet fitting of the ice machine and the water strainer.

For water cooled units, two water inlet connections are provided. One for the ice making (evaporator) section which is located on the back of the machine and is a 3/8" flared connection. The other is for the water cooled condenser.

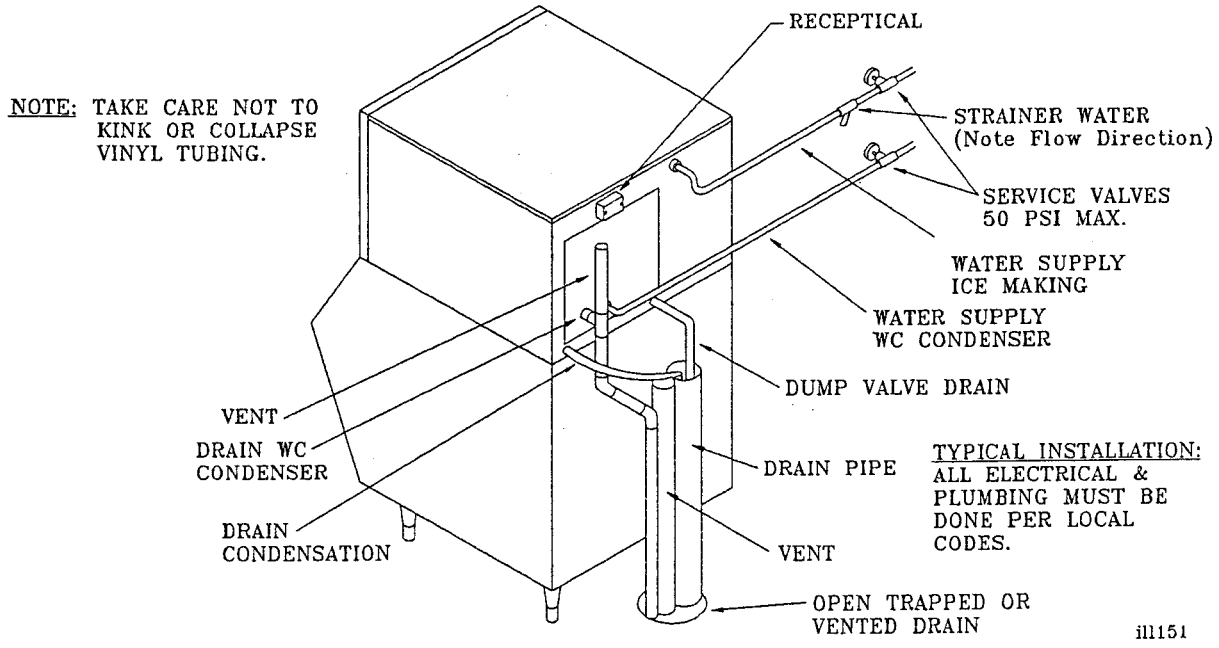


Diagram 3

The reason for the separate water inlet connections is that some installations use a water tower for cooling the water used in the water cooled condenser and some installations use treated water (filtered) for the ice making inlet water connection. Be sure to install water line (incoming) to the 3/8" male flare connection on the back of the unit that supplies water to the water regulating valve inside. The setting of the water regulating valve from the factory should be 200 pounds for R-22 units. NOTE: Always flush out water lines before starting unit. Adjustments, if necessary, should be done at installation.

DRAIN

Provide a suitable trapped open drain as close as possible to the area where the ice maker is going to be installed. This may be an existing floor or a 1-1/4" trapped open drain. Two separate drain lines are required for air cooled units, one for the storage bin and one for the dump valve drain hose.

An additional separate drain line will be required for water cooled units from the outlet of the condenser coil to the drain. Run all gravity drain lines with a good fall to the open drain.

ALL PLUMBING MUST BE INSTALLED IN ACCORDANCE WITH LOCAL CODES.

NOTE: *In some cases it may be necessary to insulate the water supply line and drain line. Condensate dripping to the floor can cause serious staining of carpets or hardwoods.*

DRAIN CONNECTION INSTALLATION INSTRUCTIONS

Taking care not to kink or collapse vinyl tubing at any point, route tubes to any open, trapped or vented floor drain. Run tubing to drain separately. Do not tee any drain hoses together. Add drain tubing required to reach floor drain.

WATER LEVEL RESERVOIR

The Float Valve is mounted in a fixed position thru it's mounting bracket to maintain the proper water level inthe water reservoir. For the 500 series units the bracket is mounted thru the top hole of the bracket.

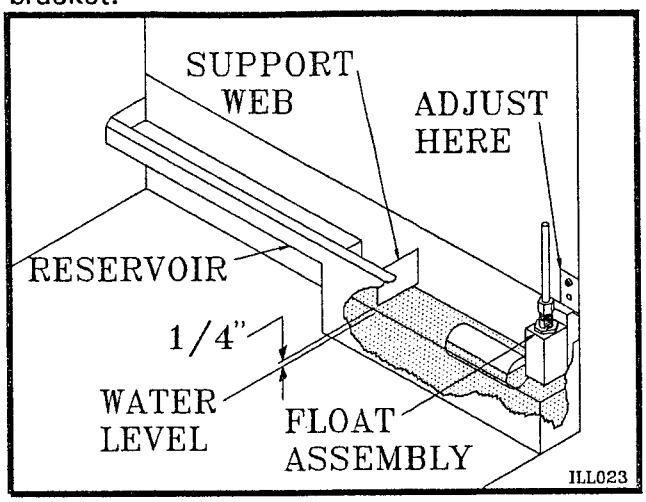


Diagram 4

WARNING: Ice maker will not operate properly when water supply temperature is below 50° F or above 100° F. Water supply pressure must not exceed 50 PSI.

STARTING THE UNIT

After the ice cuber has been unpacked and leveled and all plumbing and electrical connections have been made, start the unit, and check for proper operation.

A cuber has three separate circuits: the water circuit, the refrigerant circuit and the electrical circuit.

1. Start checking the water circuit by making sure that there are not thread or flare joint leaks, either outside the unit or in the compressor section. Next check the water flow over the evaporator and make sure that all holes in the water distributor are open, (See Diagram 5) and that there is no undue splash or loss of water into the ice bin.

Also check to see if the float valve is functioning properly and the correct water level is being maintained. Re-adjust if necessary.

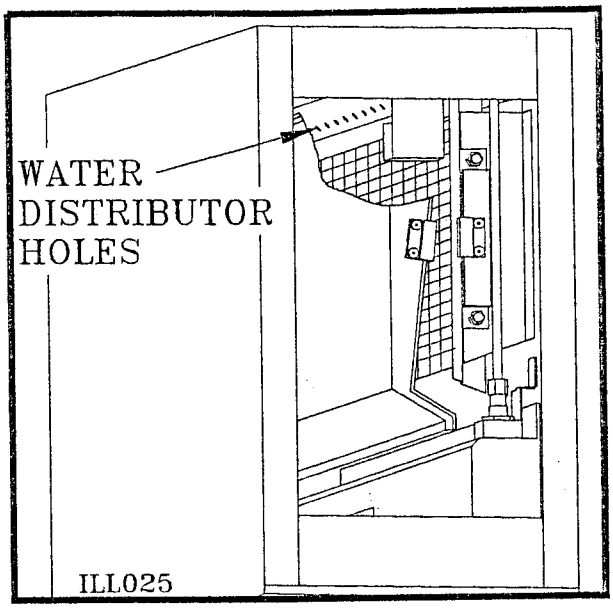


Diagram 5

2. Check the refrigerant circuit by making sure that the condenser fan is running. (This will be evident by air noise.) Is the compressor running? (Feel the casing for vibration.) Is the evaporator getting cold.

3. Check bin-harvest switch operation. (See procedure in manual).

ELECTRICAL CIRCUIT SEQUENCE OF OPERATION

An L.E.D. digit display mounted on the solid state control board will show a status number 0, 1, 2, 4, & 6 and a decimal point to indicate what is happening in the operation of the unit.

The electrical sequence of operation you will see on the digit display for a normal ice making cycle will be as follows:

The status number 0 will be shown telling you the unit is making ice. The solid state control DELAYS the start of the water pump until the evaporator temperatures reaches 20° F. Approximately six minutes after the start up in the freeze cycle a decimal point will appear to the lower right of the "0" to tell you that the evaporator sensor has been switched on. After the evaporator temperature has pulled down low enough for the correct amount of ice to be on the evaporator, the decimal point will begin to flash and stay flashing for approximately 20 seconds. If evaporator stays below the set point, the harvest cycle will start. A number "1" on the digit display will indicate that the machine is in its harvest cycle with the hot gas valve open. The water pump continues to operate and the water dump solenoid valve is now open. The water pump shuts off approximately 15 seconds later after the water reservoir is pumped out.

PLEASE NOTE: *During the freeze cycle in low ambient condition the condenser fan motor will be cycled on and off through the condenser sensor and solid state control board. The fan cycling pressures in relation to the temperatures sensed will be approximately 180# for cut out and 230# for cut in of the fan motor.*

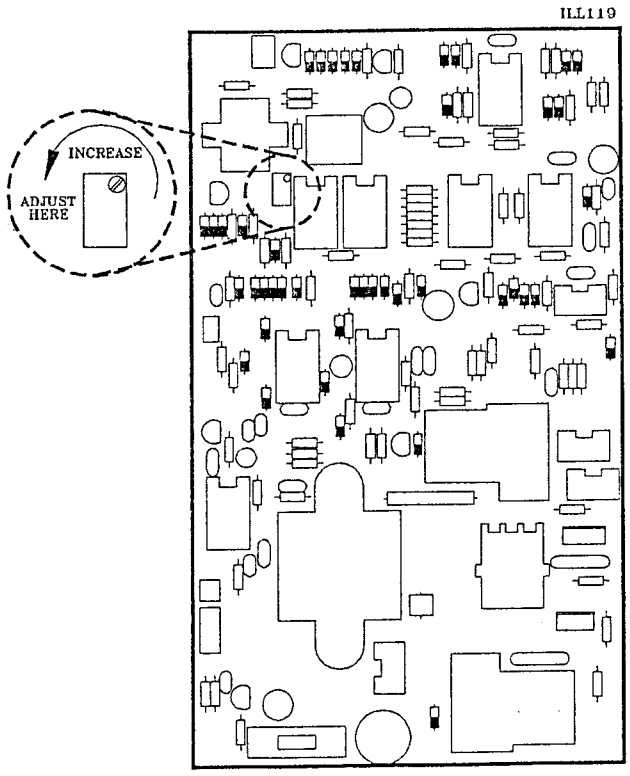


Diagram 6

ADJUSTMENT FOR ICE BRIDGE THICKNESS

An ice bridge connecting all cubes is necessary for a proper harvest of discharge of cubes from the evaporator.

To increase ice bridge thickness carefully turn adjustment screw counter-clockwise no more than one turn at a time. Wait and check thickness before re-adjusting. (See Diagram 6 & 7)

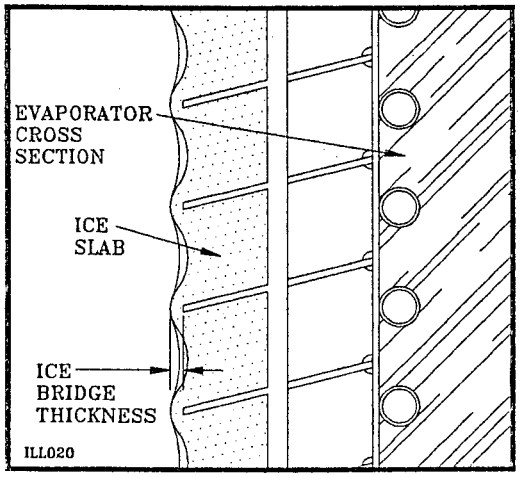


Diagram 7

CHECKOUT PROCEDURE FOR HARVEST BIN SWITCHES

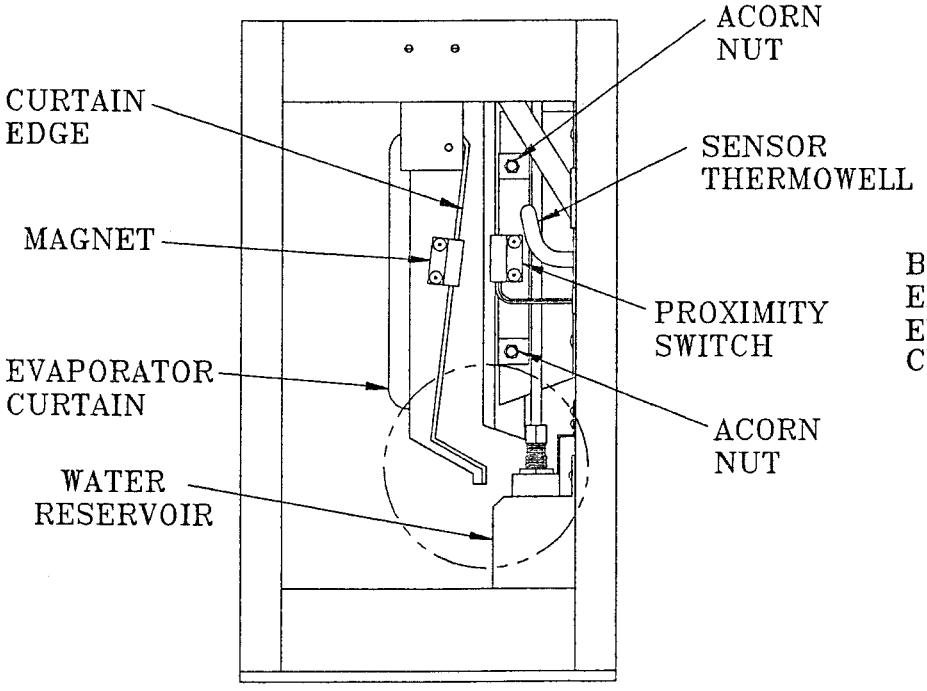
Turn on the ice machine and move the evaporator curtain(s) away from the evaporator(s). The ice machine should then shut off in approximately 8 seconds. (See detail A & B).

Slowly let the evaporator curtain(s) move back toward the evaporator(s) until the bottom edge of the curtain(s) is at least at edge on the water reservoir or closer to the evaporator. With the curtain(s) at that position, the machine should start. (See detail C).

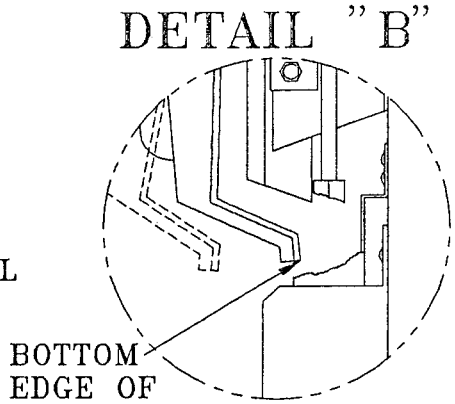
ADJUSTMENT PROCEDURE FOR HARVEST BIN SWITCHES

If adjustment is necessary, loosen acorn nuts and move proximity switch closer to the curtain(s) and make sure the curtain is properly mounted. (See detail A).

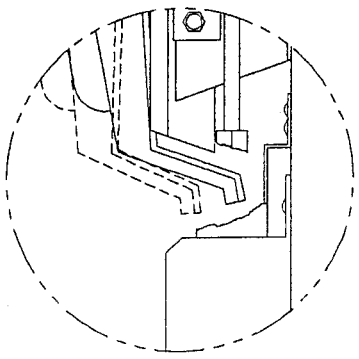
Re-check per above procedure.



DETAIL "A"



DETAIL "B"



DETAIL "C"

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STACKING KIT INSTALLATION INSTRUCTIONS

5 - Screw 8/32 x 3/8
2 - Tie strap
1 - Ice slide diverter
1 - Retainer shield assembly
1 - Interface cable

PLEASE SEE ILLUSTRATIONS FOR REFERENCE FOR THE FOLLOWING INSTALL PROCEDURE

1. After the bottom unit of the stack has been positioned on the bin, the sealing gasket supplied with second unit must be cemented to the base. Nearly any adhesive can be used, however it should not be water soluble. This is an N.S.F. requirement and the responsibility of the installer.

2. Remove the top and front panels from both units.

3. Mount the unit on top of the bottom one of the stack. (It is not recommended to stack more than one unit.)

4. Remove evaporator curtain cover.

5. N/A

6. Put the ice slide diverter through the top unit evaporator section and hook over the front edge of the top unit water reservoir.

7. Secure ice slide diverter to the back wall of the lower unit with a provided screw.

8. Insert the retainer shield from the front of the lower unit evaporator section and align the holes to the diverter and support bracket and secure with the screws provided.

9. Remove electrical box covers from both units.

10. Remove lowest grommet from the left side of each electrical box.

11. Insert the interface cable through each hole and insert into the split grommets. NOTE, the cable will fall across the front of both machines with the front panel covering the cable.

12. Reinstall grommets into electrical box.

13. Plug the interface cable end into the open middle left socket on each solid state board being careful to make sure of a good connection.

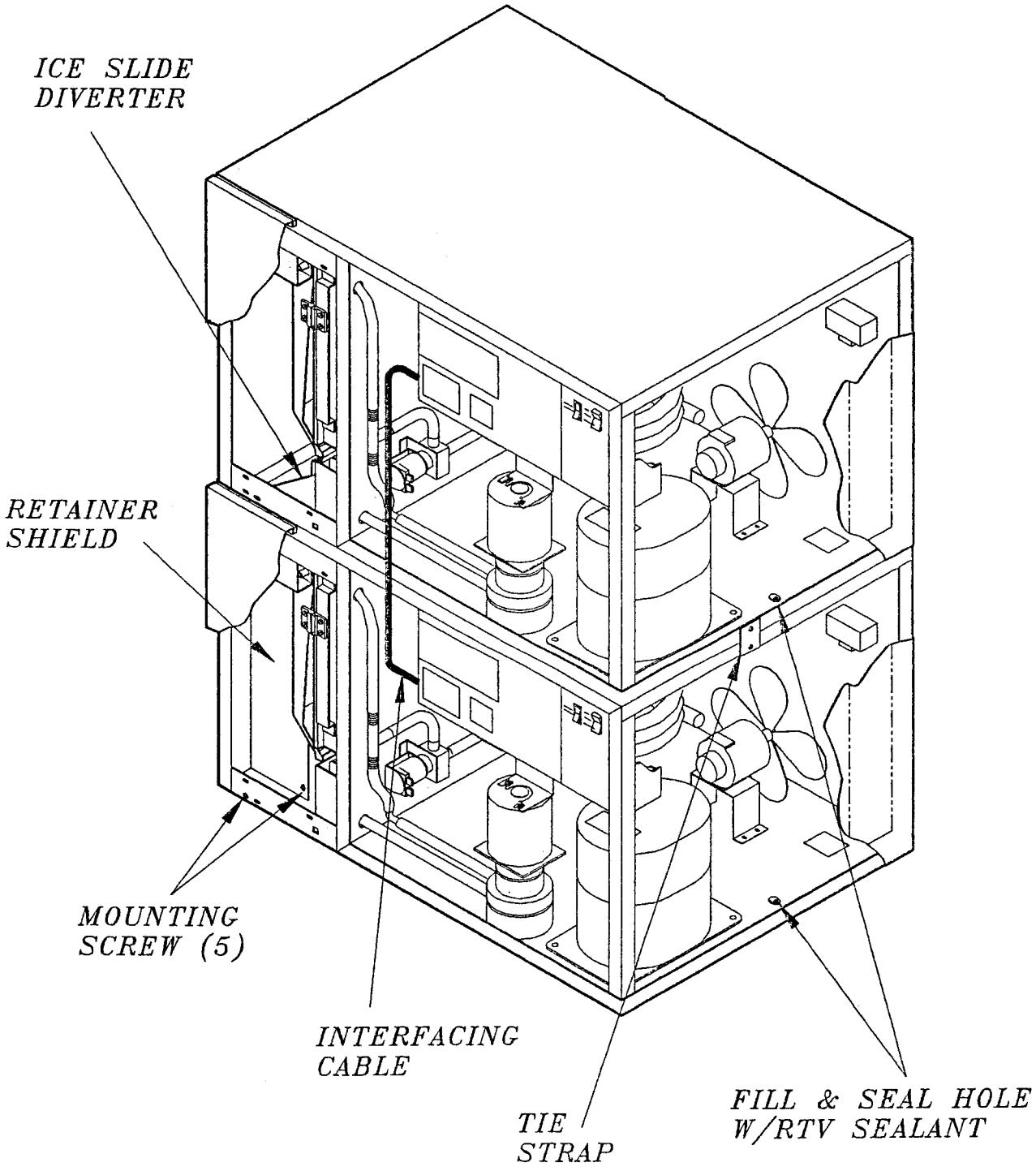
14. Replace electrical box covers.

15. Plug the weld nut hole found to the right of the compressor with RTV sealant.

16. Remove the screws from both sides of both units and insert the tie straps. Reinstall screws.

17. When reinstalling the front panels, take care in the positioning of the interface cable.

STACKING KIT ILLUSTRATION



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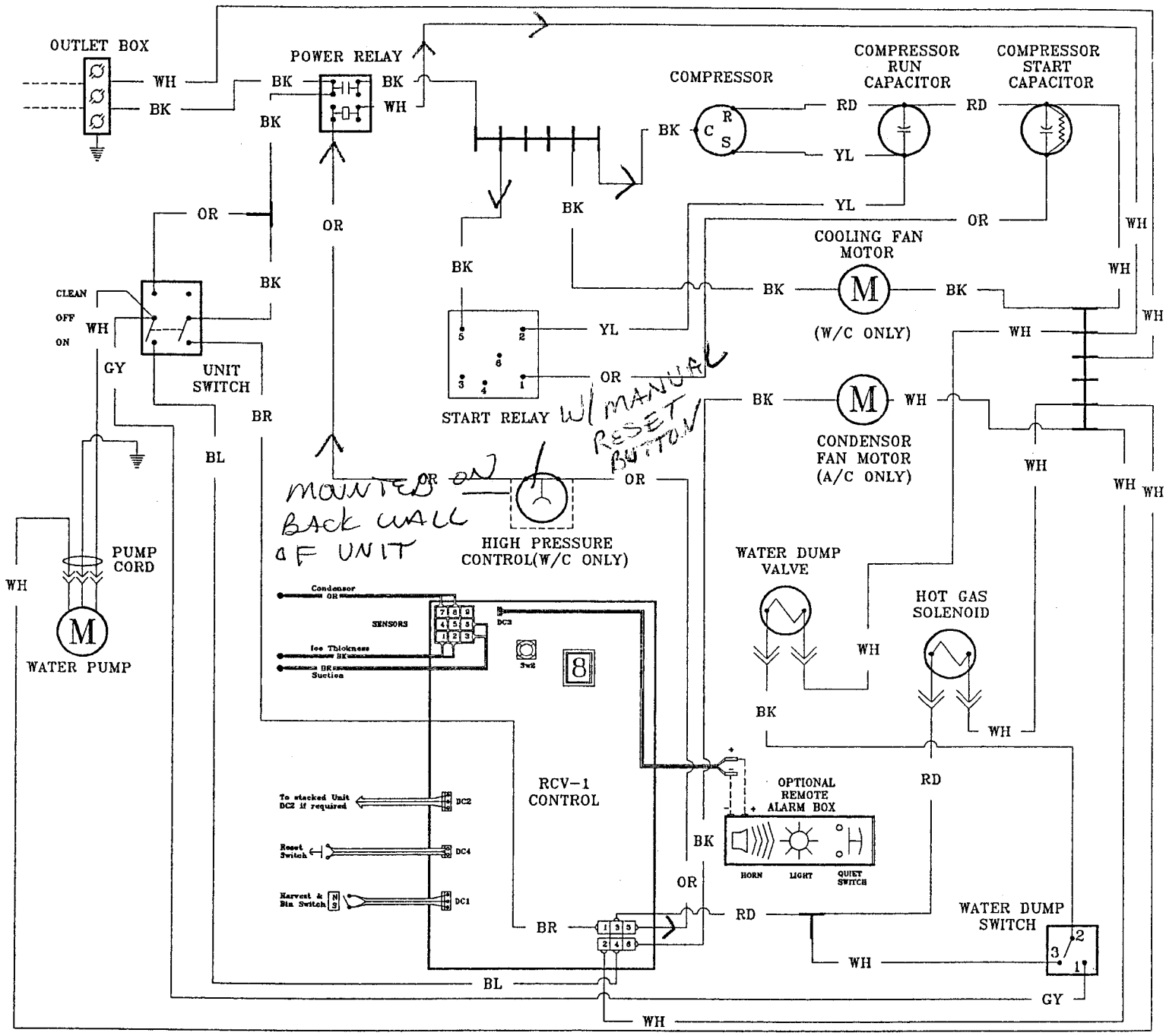

AC&WC-500-MH

115 VOLTS 60 HZ

Cornelius

IMI CORNELIUS INC.

NOTES: The solid state control DELAYS the start of the water pump until the evaporator temperature reaches 20° F.

IMPORTANT: White and black connector blocks are -KEYED- and MUST be inserted correctly on circuit board. DO NOT USE FORCE.

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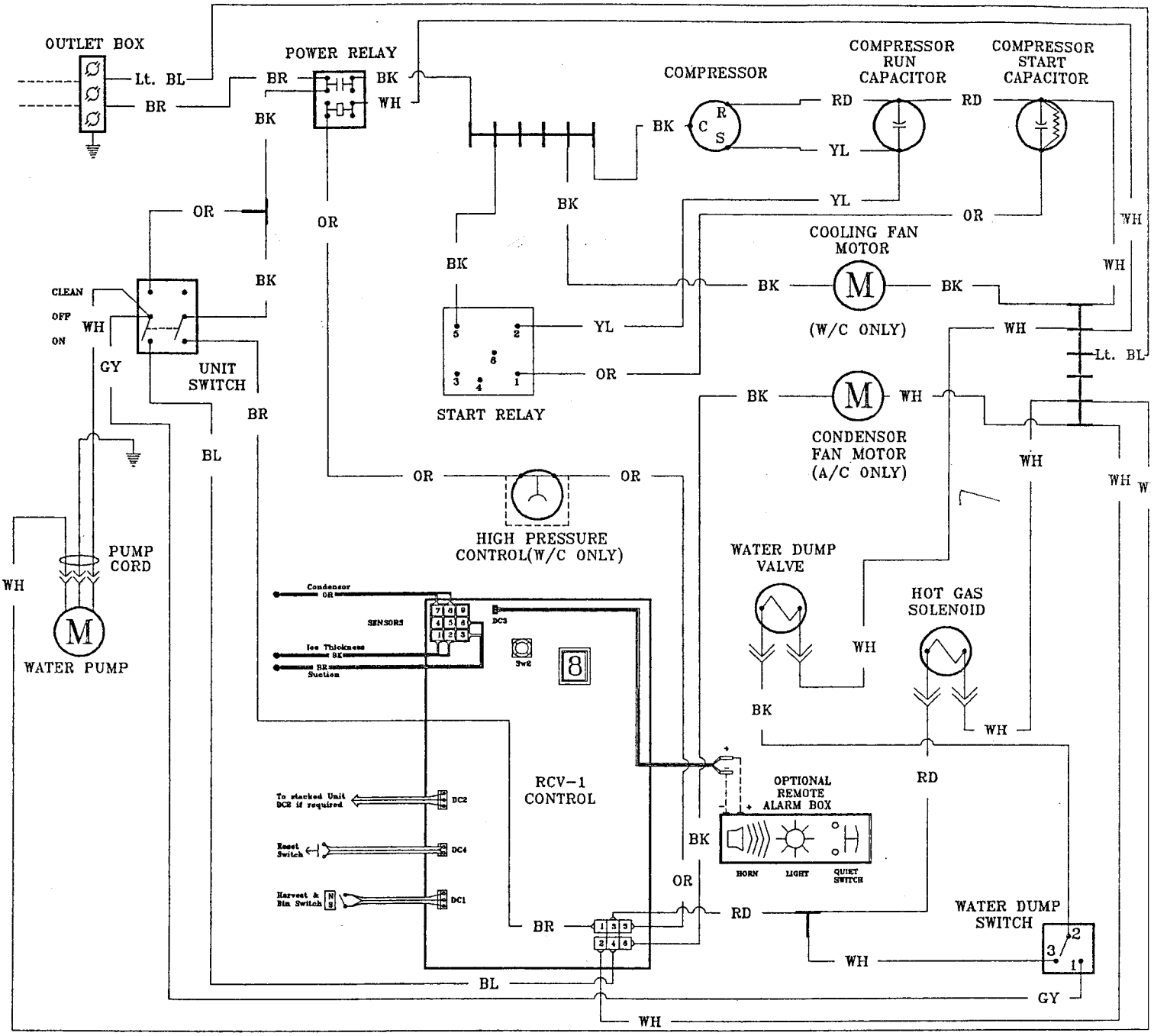


208/230 VOLTS 50 HZ

AC&WC-500-MH-50

Cornelius

IMI CORNELIUS INC.

NOTES: The solid state control DELAYS the start of the water pump until the evaporator temperature reaches 20° F.

IMPORTANT: White and black connector blocks are -KEYED- and MUST be inserted correctly on circuit board. DO NOT USE FORCE.

SANITIZING AND CLEANING PROCEDURE

1. Remove front panel to gain access to the on-off-clean switch.

2. Push switch to "clean" and allow the ice on the evaporator to release or melt away.

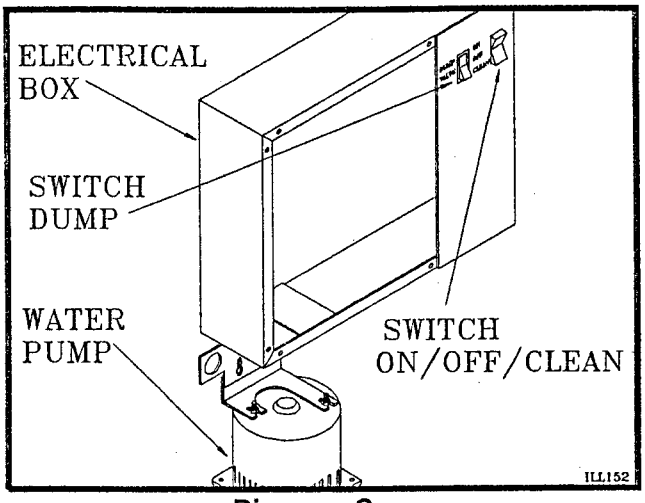


Diagram 8

3. Remove ice from storage bin.

4. If lime scale is present add 2 oz. of "Lime-A-Way" or "Calgon NickelSafe Ice Machine Cleaner" directly into water reservoir. Circulate for no longer than 15 minutes. Depress dump valve switch on control box and allow cleaner or sanitizer to drain away. Allow float valve to fill reservoir with clean, fresh water. Circulate for approximately 1 minute. Depress dump valve switch and allow water to drain away. Repeat three times.

CAUTION: All ice machine cleaner must be flushed out of the system before the sanitizing solution is used in Step 5. The reaction of the two chemicals can cause hazardous gases to be generated.

5. Pour 1/2 oz. of household bleach into the water reservoir and circulate for 15 minutes to sanitize the circulating water system including the evaporator, pump, distributor and all interconnecting vinyl tubing. Depress dump valve switch on control box and allow cleaner or sanitizer to drain away. Allow float valve to fill reservoir with clean, fresh water. Circulate for approximately 1 minute. Depress dump valve switch and allow water to drain away. Repeat three times.

6. Mix a sanitizing solution of 1 oz. household bleach to one gallon of water. Using a non-metallic bristle brush, scrub the following:

A. Inside surface of the ice bin including top and door.

B. Inside surface of the ice maker to include evaporator section in the ice machine including the top, front panel and evaporator splash curtain.

C. Make sure splash curtain is correctly positioned.

7. Depress dump valve switch on control box and allow cleaner or sanitizer to drain away. Allow float valve to fill reservoir with clean, fresh water. Circulate for approximately 1 minute. Depress dump valve switch and allow water to drain away. Repeat three times.

8. Push switch from "clean" to "on" position.

9. Replace front panel.

WATER TREATMENT

Depending on the water source for the ice maker, water treatment may be necessary to prevent calcium or lime scale deposits, bad taste and odor, clorine problems, as well as slime growth. If these conditions exist, contact your Cornelius Distributor or Dealer for information on water treatment systems Cornelius offers.

WINTER STORAGE

If the unit is to be stored in an area where the temperature will drop below freezing, it is most important that all water lines be

drained to prevent them from freezing and possible rupture.

To blow out the waterline, disconnect the water supply at the cabinet inlet and use air pressure to force the water into the water reservoir pan. This can then be removed from the water pan.

CLEANING THE CONDENSER

In order to produce at full capacity, the refrigeration condenser must be kept clean. The frequency of cleaning will be determined by surrounding conditions. A good maintenance plan calls for an inspection at least every two months.

Remove the front panel of the machine. With a vacuum cleaner, remove all accumulated dust and lint that has adhered to the finned condenser.

CAUTION: Condenser cooling fins are sharp. Use care when cleaning.

1. If the condenser is being cleaned from the back of the machine, remove all accumulated dust, dirt, etc., that has adhered to the finned surface with a vacuum cleaner.

2. If the unit is being cleaned from the front, remove front panel, turn the power switch off and blow through the finned surface of the condenser past the fan blade to remove accumulated dust, etc.

STATUS INDICATOR

STATUS	EXPLANATION	POSSIBLE CAUSE
0	Unit is in freeze cycle, making ice, no problems.	
1	Unit is in harvest cycle, ice should drop shortly, no problems.	
2	Indicates a full bin condition, unit off, water curtain being held open with ice.	If "2" is shown but bin isn't full, check for individual cube holding curtain open. Harvest Bin switch not adjusted properly.
4	Unit OFF due to suction line not pulling down to at least 40°F.	Low on refrigerant. Defective TXV. Compressor defective or inefficient. Defective power relay, won't close. Defective start relay, won't start compressor. Low voltage to compressor, no start. Defective C.P.R. valve. Defective sensor (brown wire). SENSOR NOT INSULATED PROPERLY.
6	Unit is OFF due to condenser temperature climbing too high. Manual reset required.	Dirty condenser. Defective fan motor or blade.* Gross over-charge. Extremely high ambient temperature, above 120°F. Defective sensor (orange wire).**
Decimal Point OFF	Indicates that all sensors, except condenser, are switched off for first six minutes of freeze cycle.	Normal time delay, approximately 6 minutes.
Decimal Point ON	Indicates that evaporator and suction line sensors have switched "ON".	
Decimal Point FLASHING	Indicates evaporator temperature has pulled down and unit will go into harvest after time delay.	Normal time delay, approximately 20 seconds before harvest cycle begins.

FOR MANUAL RESET - PUSH MASTER SWITCH TO "OFF" - WAIT 10 SECONDS - PUSH TO "ON" OR PUSH RESET BUTTON

*Not applicable to Water-Cooled units.
**Not applicable to Remote units.

TROUBLE SHOOTING THE SOLID STATE CONTROL BOARD

To determine if the circuit board and sensors are functioning correctly under all operating parameters, the adverse conditions must be simulated to check out the digital display status numbers.

PROCEDURE

1. To check #6 sensor - Block condenser fan blade on start up. Condenser should get hot within two minutes and shut unit off on #6 condenser too hot.

2. To check #4 sensor - Remove suction line sensor from thermowell anytime during freeze cycle. Machine should shut off on #4, suction line too warm when the evaporator temperature gets low enough to start the harvest cycle.

3. To check #2 sensor - Hold water curtain open anytime after unit goes into harvest. Machine should shut down within approximately 8 seconds on #2, full bin.

4. To check #1 sensor - Push defrost button anytime during freeze cycle and unit should go into harvest. #1 indicates a harvest cycle, no problems.

5. To check #0 sensor -A "0" indicates that the unit is in the freeze cycle and there are no problems.

PLEASE NOTE: *In rare cases a "0" can be displayed on the control board and the compressor not running in water cooled and remote air cooled machines. If this occurs, the manual reset high pressure control will be open and must be reset for proper operation. The control is located in the upper rear, right corner of the compressor compartment.*

After reset, check out the machine for the possible causes of the problem.

TROUBLESHOOTING THE SENSORS

1. Turn off power to machine.

2. Remove the front panel and electrical box cover of the machine.

3. Cut the suspected sensor wire at least six inches from the thermowell in which it is located.

4. Remove the sensor from the thermowell.

5. Carefully separate the wires and strip the insulation off the end.

6. Pack a glass or container with ice and add some water to make an ice water solution. Check the temperature of the ice water with an accurate thermometer. Ice water must be 32° F.

7. Insert the sensor into the ice water and soak for a minimum of two minutes.

8. With a zerod ohmmeter, measure the resistance across the two wires of the sensor lead. It should read 2815 ohms + or -10% (281 ohms).

NOTE: *If the above ohm reading is not within the range stated, the sensor is bad and should be replaced.*

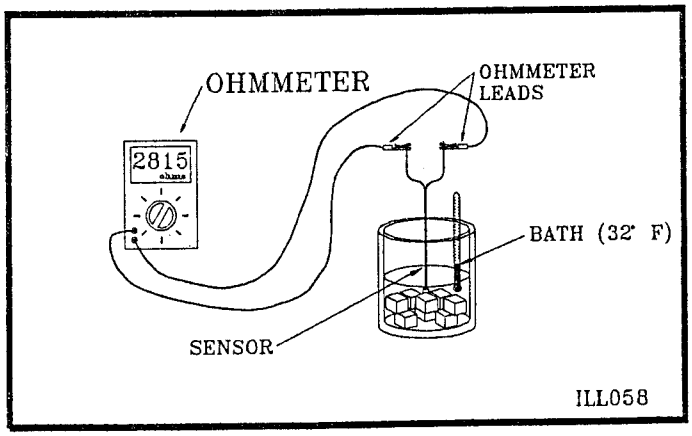


Diagram 9

RECONNECTION OF A GOOD OR REPLACEMENT SENSOR AFTER TROUBLESHOOTING

1. Carefully separate the wires of the sensor leads coming from the solid state control and strip the insulation off the end of each wire.

2. Reconnect the sensor leads and twist the stripped ends tightly. Secure with the proper sized wire nuts.

3. Tape all wire nut connections to insulate connections from each other.

REMOVAL OF SOLID STATE CONTROL FROM MACHINE

CAUTION: The circuit board is fragile, handle with care.

1. Turn off power to machine.

2. Remove front panel.

3. Remove electrical box left front cover.

4. Disconnect the through wire plug connections from circuit board.

5. Carefully lift any corner of the circuit board while pinching closed the top part of the plastic "stand off " support with needle nose pliers. The circuit board has to be gradually worked up over all of the "stand off" supports. The circuit board will not "pop off" until all supports have been pinched closed and the board is then holding them in that position.

REINSTALLATION OF SOLID STATE CONTROL

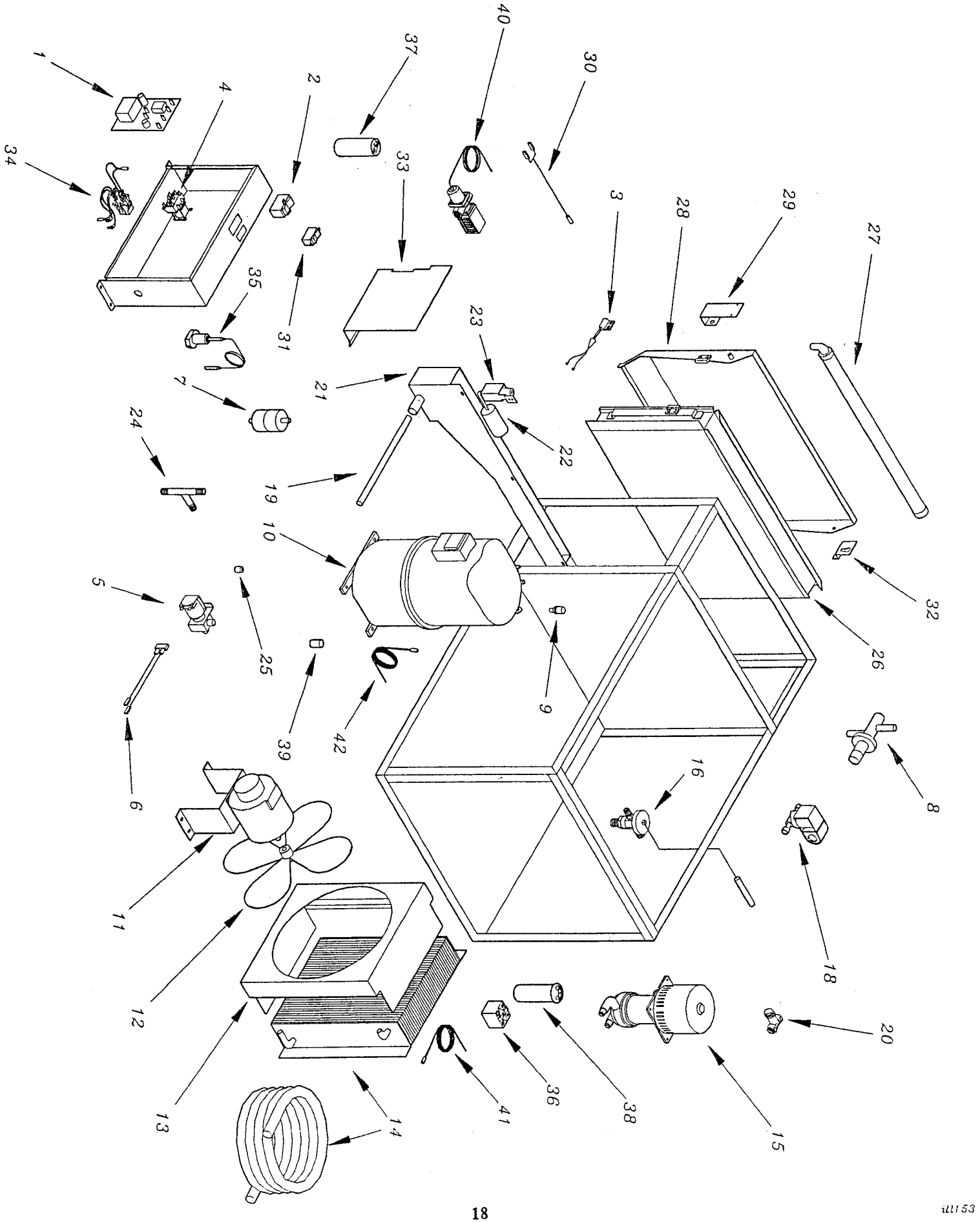
1. Align all holes in the circuit board over the plastic stand-off supports.

2. Carefully push downward at all hole locations until board seats on all the stand-off supports. (Sometimes a snap will be heard as this seating takes place.)

3. After the circuit board is seated, carefully connect the three plugs to the circuit board.

NOTE: *Plug connects are polarized. Make sure the plug is inserted correctly.*

ILL. NO.	DESCRIPTION	A/C P/N	W/C P/N
1	Control, Circuit Board	161079002	161079002
2	Switch, On-Off-Clean	161297002	161297002
3	Switch, Harvest-Bin Prox.	43446	43446
4	Relay, Power	164884002	164884002
5	Valve, Water Dump Solenoid	42297	42297
6	Plug, Dump Valve	45880	45880
7	Drier	21850	21850
8	Valve Crankcase Pressure Reg.	164876001	164876001
9	Valve, Shrader	20654	20654
	Core, Shrader Valve	21214	21214
	Cap, Shrader Valve	23988	23988
10	Compressor	162964004	162964004
11	Motor, Fan	161871002	07470
12	Blade, Fan	38669	09355
13	Shroud	38754	N/A
14	Condenser	38668	22499
15	Pump, Water	41011	41011
16	Valve, Thermo Expansion	161921001	161921001
18	Valve, Hot Gas	09214	09214
19	Tube, Water Pan to Pump Inlet	165636003	165636003
20	Strainer, Water	08023	08023
21	Reservoir, Water	41448	41448
22	Float and Valve	165681000	165681000
23	Bracket, Float and Valve	165692001	165692001
24	Tee	00987	00987
25	Orifice, Restrictor	22176	22176
26	Evaporator	45905	45905
27	Distributor Asy, Water	43056	43056
	Tube Inner, Distributor	45899	45899
	Tube Outer, Distributor	45902	45902
	Cap w/o Hole, Distributor	164951002	164951002
	Cap w/Hole, Distributor	164951001	164951001
28	Cover, Evaporator	166050001	166050001
29	Bracket, Front Cover Mount	43530	43530
30	Kit, Evaporator Sensor	161456002	161456002
31	Switch, Water Dump Valve	45866	45866
32	Bracket, Back Cover Mount	38743	38743
33	Shield, Splash	41464	41464
34	Sensor, Thermo	39130	39130
35	Press Control Asy	N/A	39404
36	Relay, Start	161998004	161998004
37	Capacitor, Start	161165002	161165002
38	Capacitor, Run	28883	28883
39	Cap, Reservoir Drain	45681	45681
40	Valve, Water	N/A	01211
41	Condenser Sensor	38703	38703
42	Suction Line Sensor	38703	38703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