

Service & Parts Manual

DIAGNOSTIC CUBER

C-61,81,121-C

ICE-O-MATIC®

A **WELBILT** Company

OK



11100 E. 45TH AVE.
DENVER, COLORADO 80239
(303) 371-3737

MILE HIGH EQUIPMENT COMPANY
ICE MACHINE TWO-YEAR WARRANTY
To the original owner of an ICE-O-MATIC MACHINE.

We warranty every Ice-O-Matic Ice Machine to be free from defects in material and factory workmanship if properly installed, cared for and operated under normal conditions with competent supervision. **WITHIN TWO YEARS FROM DATE OF ORIGINAL INSTALLATION WHEN REPORTED ON A WARRANTY CARD RETURNED TO THE FACTORY** we will replace, F.O.B. our plant, Denver, CO, or F.O.B. authorized Mile High Equipment Co. Parts Depots, without cost to the customer, that part of any such machine that becomes defective, BUT no part or assembly which has been subject to any alteration or misuse, accident, or is from a machine on which the serial number has been altered or removed. We will also honor warranty for **27 MONTHS (THIS TWO YEAR WARRANTY SHALL APPLY TO MACHINES SHIPPED ON OR AFTER JANUARY 1, 1978)** from date of shipment whichever period is last to expire, provided in either such case installation of the equipment is reported on warranty card and returned to the factory at the time of installation. After thorough examination, the decision of our Service Department shall be final. Any defective parts to be repaired or replaced must be returned to us, transportation charges prepaid, and they must be properly sealed and tagged. The serial and model number of the machine, and the date of original installation of such machine must be given. We will not, however, assume any responsibility for any expenses (including labor) incurred in the field incidental to the repair or replacement of equipment covered by this warranty. Our obligation hereunder to repair or replace a defective part is the exclusive remedy for breach of this warranty; and we will not be liable for any other damages or claims, including consequential damages.

No representation, dealer, distributor or any other person is authorized or permitted to make any other warranty or obligate MILE HIGH EQUIPMENT COMPANY, to any liability not strictly in accordance with this policy. **THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY, AND OF ALL OTHER OBLIGATIONS OR LIABILITIES ON OUR PART.**

MILE HIGH EQUIPMENT COMPANY
ICE MACHINE FIVE-YEAR WARRANTY
For Motor Compressor

On the said ICE-O-MATIC Ice Machine, we warrant to the original purchaser for a period of five years following the date of installation, the repair or replacement of the motor compressor only if it is shown to our satisfaction that the motor-compressor is not operative due to defects in factory workmanship or material as originally supplied and that normal use and reasonable care have been exercised. We will not, however, assume any responsibility for any expenses "including labor" incurred in the field incidental to the repair or replacement of compressor covered by this warranty. Our obligation hereunder to repair or replace the motor compressor is the exclusive remedy for breach of this warranty; and we will not be liable for any other damages or claims, including consequential damages.

This warranty does not apply to destruction or damage caused by alterations by unauthorized service, using other than identical replacements, risk of transportation, accidents, misuse, abuse, damage by fire, flood or acts of God. After thorough examination, the decision of our Service Department shall be final.

No representative, dealer, distributor or any other person is authorized or permitted to make any other warranty or obligate MILE HIGH EQUIPMENT CO., to any liability not strictly in accordance with this policy. **THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY, AND OF ALL OTHER OBLIGATIONS OR LIABILITIES ON OUR PART.**

ICE-O-MATIC®

ICE-O-MATIC C SERIES DIAGNOSTIC CUBERS

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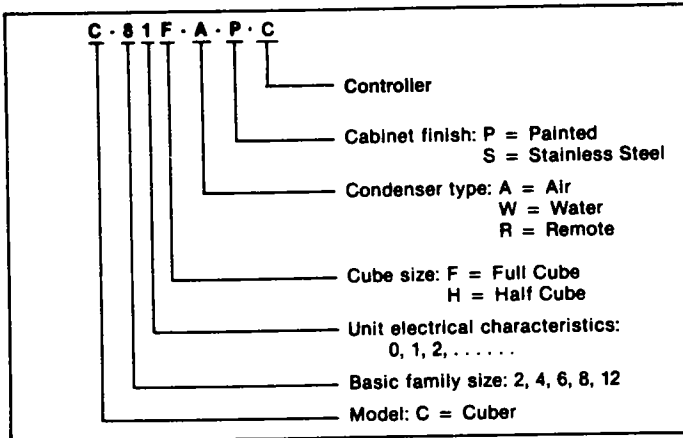
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|--|-----------|
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ICE-O-MATIC® | MODEL NUMBERING SYSTEM

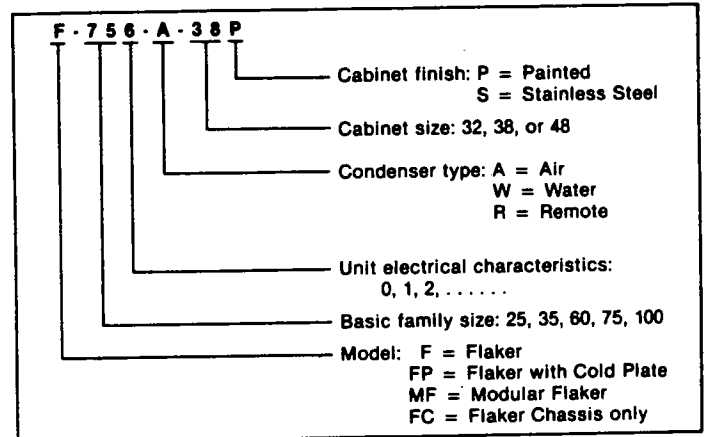
The Model Number fully describes the unit. A letter code identifies the model series. A two or three digit number identifies the basic family size and electrical characteristics. A second letter code identifies the type of condenser. Cabinet size is identified by a two digit number. Finish is identified by a letter code.

The following examples illustrate how Model Numbers are developed:

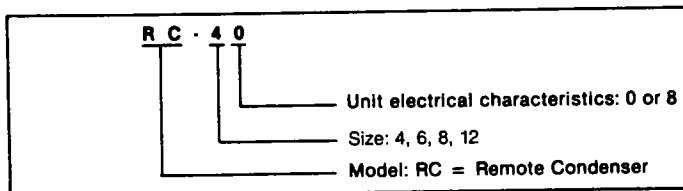
CUBERS



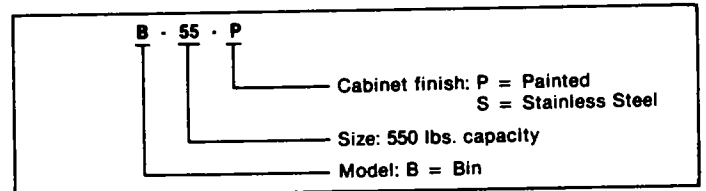
FLAKERS



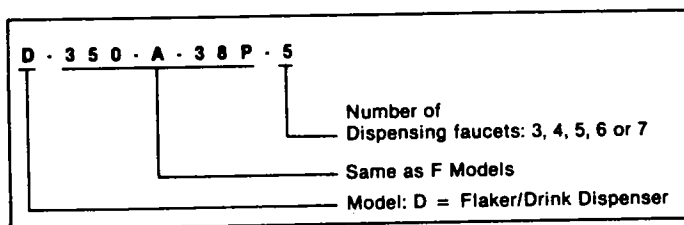
REMOTE CONDENSERS



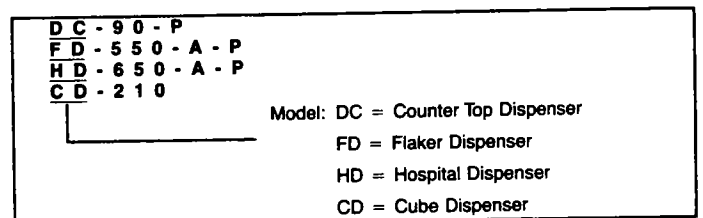
BINS



FLAKER/DRINK DISPENSERS



DISPENSERS



Other model nomenclature same as Flaker or Cuber nomenclature.

Electrical characteristics of all units are coded in the Model Number by a one digit number appearing after the basic family size. The code is as follows:

| Code Number | *Volts | **Cycles | Phase | No. of Service Wires Required |
|-------------|-------------|----------|-------|-------------------------------|
| 0 | 115 | 60 | 1 | 2 |
| 1 | 208-230/115 | 60 | 1 | 3 |
| 2 | 208 | 60 | 1 | 2 |
| 3 | 230 | 60 | 1 | 2 |
| 4 | 230/115 | 60 | 3 | 4 |
| 5 | 230 | 50 | 1 | 2 |
| 6 | 208-230 | 60 | 1 | 2 |
| 7 | 208-230 | 60 | 3 | 3 |
| 8 | 208-230 | 50-60 | 1 | 2 |

*Two voltage values separated by a hyphen (-) means that the unit is capable of operating over this voltage range.

Two voltage values separated by a slant line(/) means that both voltages must be supplied at the installation. This is usually done by a neutral wire.

**Two cycle values separated by a hyphen (-) means that the unit is capable of operating at either cycle value.

FOREWORD

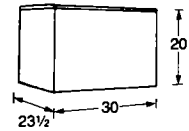
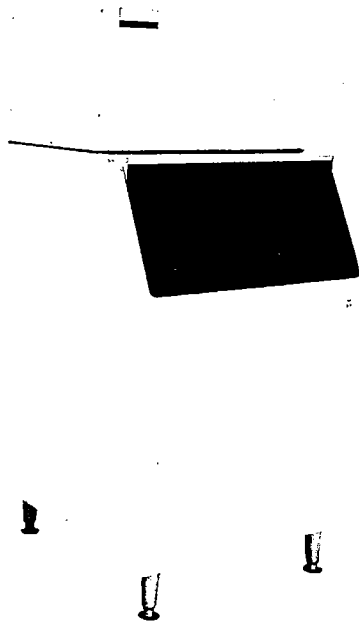
We, ICE-O-MATIC, present this service manual to aid the service men and users in the installation, operation, and maintenance of your equipment.

If, at any time, you encounter conditions that are not answered in this manual, write or call the service department of ICE-O-MATIC explaining the conditions in detail, giving THE MODEL NUMBER AND SERIAL NUMBER of the unit, and we will give your questions our immediate attention and reply.

**ICE-O-MATIC
11100 E. 45th Avenue
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ICE-O-MATIC[®]

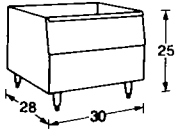
MODEL C-61-C



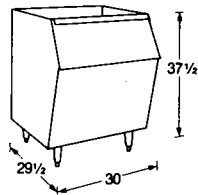
C-61

DIMENSIONS (Inches)

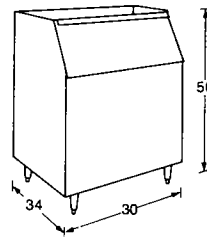
STORAGE BINS



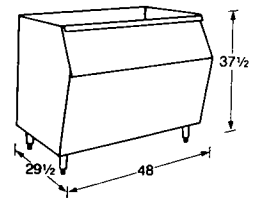
B-20
Storage Capacity 170 lb.



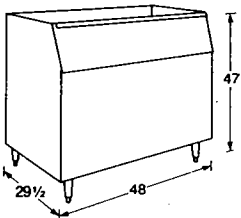
B-40
Storage Capacity 365 lb.



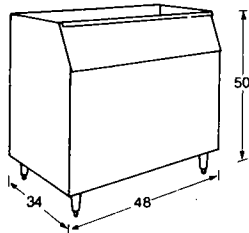
B-55
Storage Capacity 550 lb.



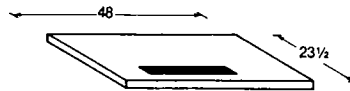
B-60
Storage Capacity 580 lb.
(KBT-5 Bin Top Required)



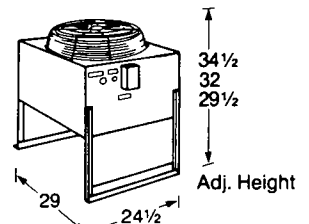
B-80
Storage Capacity 800 lb.
(KBT-5 Bin Top Required)



B-100
Storage Capacity 1000 lb.
(KBT-5 Bin Top Required)



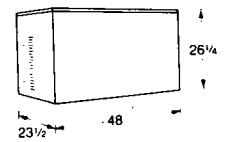
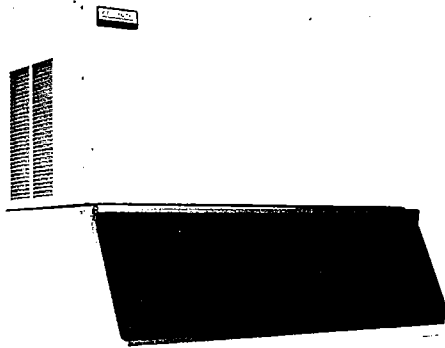
KBT-5



RC-60-2
Remote Condenser

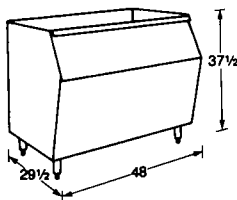
ICE-O-MATIC®

MODEL C-81/121-C

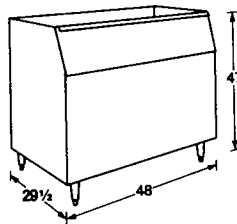


C-81/121
DIMENSIONS (Inches)

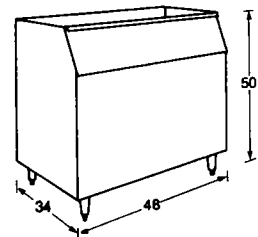
STORAGE BINS



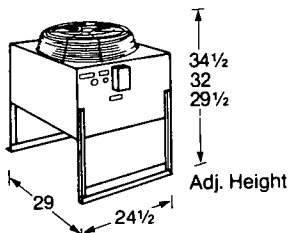
B-60
Storage Capacity 580 lb.



B-80
Storage Capacity 800 lb.

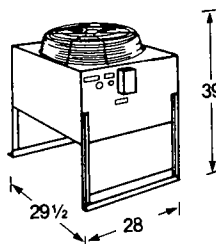


B-100
Storage Capacity 1000 lb.

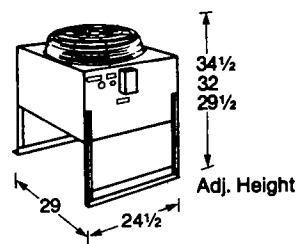


RC-80

Remote Condensers

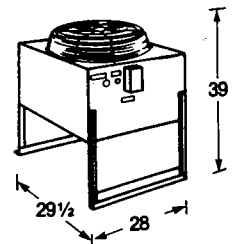


RC-80-2



RC-120

Remote Condensers



RC-120-2

ELECTRICAL AND MECHANICAL SPECIFICATIONS SERIES C CUBERS

| MODEL NUMBER | CONDENSING UNIT | COMP. H.P. | VOLTAGE REQUIREMENTS | NO. OF WIRES | OPERATING AMPS @ RATED VOLTAGE | MAX. AMP FUSE SIZE | REFRIGERANT | | APPROX. SHIPPING WEIGHT (lbs.) |
|--------------|-----------------|------------|----------------------|--------------|--------------------------------|--------------------|-------------|--------------|--------------------------------|
| | | | | | | | TYPE | CHARGE (oz.) | |
| C-61-A-C | AIR | 3/4 | 208-230/115-60/1 | 3 | 8.9 | 15 | R-502 | 28 | 180 |
| C-61-W-C | WATER | 3/4 | 208-230/115/60/1 | 3 | 8.2 | 15 | R-502 | 18 | 188 |
| C-61-R-C | REMOTE AIR | 3/4 | 208-230/115/60/1 | 3 | 12.7 | 20 | R-502 | 144 | 186 |
| C-81-A-C | AIR | 1 | 208-230/115/60/1 | 3 | 12.2 | 20 | R-12 | 44 | 292 |
| C-81-W-C | WATER | 1 | 208-230/115/60/1 | 3 | 10.5 | 20 | R-12 | 30 | 286 |
| C-81-R-C | REMOTE AIR | 1 | 208-230/115/60/1 | 3 | 14.0 | 20 | R-12 | 208 | 295 |
| C-84-A-C | AIR | 1 | 208-230/115/60/3 | 4 | 8.2 | 15 | R-12 | 44 | 292 |
| C-84-W-C | WATER | 1 | 208-230/115/60/3 | 4 | 6.6 | 15 | R-12 | 30 | 286 |
| C-84-R-C | REMOTE AIR | 1 | 208-230/115/60/3 | 4 | 9.2 | 15 | R-12 | 208 | 295 |
| C-121-A-C | AIR | 1 1/2 | 208-230/115/60/1 | 3 | 15.1 | 20 | R-502 | 50 | 297 |
| C-121-W-C | WATER | 1 1/2 | 208-230/115/60/1 | 3 | 13.5 | 20 | R-502 | 32 | 293 |
| C-121-R-C | REMOTE AIR | 1 1/2 | 208-230/115/60/1 | 3 | 16.1 | 20 | R-502 | 208 | 302 |
| C-124-A-C | AIR | 1 1/2 | 208-230/115/60/3 | 4 | 10.4 | 15 | R-502 | 50 | 297 |
| C-124-W-C | WATER | 1 1/2 | 208-230/115/60/3 | 4 | 8.8 | 15 | R-502 | 32 | 293 |
| C-124-R-C | REMOTE AIR | 1 1/2 | 208-230/115/60/3 | 4 | 13.4 | 15 | R-502 | 208 | 302 |

ICE PRODUCTION CHARTS POUNDS PRODUCED PER 24 HOURS

| CONDENSING UNIT | AIR TEMP. (°F) | WATER TEMP. (°F) | | | AIR TEMP. (°F) | WATER TEMP. (°F) | | | AIR TEMP. (°F) | WATER TEMP. (°F) | | | |
|---------------------|----------------|------------------|-----|-----|----------------|------------------|-----|----------------|----------------|------------------|------|------|--|
| | | 50° | 70° | 80° | | 50° | 70° | 80° | | 50° | 70° | 80° | |
| AIR | 70° | 636 | 550 | 537 | 70° | 815 | 785 | 715 | 70° | 1160 | 1040 | 1005 | |
| | 80° | 587 | 503 | 490 | 80° | 732 | 698 | 630 | 80° | 1070 | 950 | 920 | |
| | 90° | 541 | 455 | 443 | 90° | 670 | 621 | 585 | 90° | 990 | 855 | 825 | |
| WATER | 70° | 640 | 566 | 540 | 70° | 733 | 700 | 683 | 70° | 1275 | 1137 | 1040 | |
| | 80° | 635 | 561 | 534 | 80° | 693 | 651 | 638 | 80° | 1268 | 1123 | 1026 | |
| | 90° | 630 | 556 | 527 | 90° | 654 | 697 | 598 | 90° | 1261 | 1109 | 1012 | |
| REMOTE AIR | 0° | 598 | | | 0° | 802 | | | 0° | 1155 | | | |
| | 30° | 596 | | | 30° | 790 | | | 30° | 1153 | | | |
| | 50° | 594 | 555 | | 50° | 780 | 700 | | 50° | 1152 | 1090 | | |
| | 70° | 593 | 550 | | 70° | 775 | 690 | | 70° | 1135 | 1056 | | |
| | 90° | 570 | 510 | 473 | 90° | 710 | 662 | 567 | 90° | 1005 | 895 | 841 | |
| | 110° | 526 | 473 | 433 | 110° | 605 | 555 | 480 | 110° | 871 | 782 | 700 | |
| MODEL NUMBER | | C-61-C | | | C-81-C | | | C-121-C | | | | | |

ELECTRONIC CONTROLLER GLOSSARY OF TERMS

- Crystalline** — A substance composed of crystals whose atoms are arranged with order and regularity.
- Error Code** — Occurs if or when there is a malfunction with a component that is being monitored by the controller or a malfunction of the controller itself. The error code is visually indicated on the digital LED display on the electronic controller. Designated EC-1, -2, etc. throughout manual.
- Light Emitting Diode** — Abbreviated LED. A semiconductor diode that converts electrical energy into visible light. Also known as a solid-state lamp.
- Loop** — A closed path or circuit over which a signal can circulate and cycle back to its point of origin.
- Microcomputer** — A single silicon chip on which the arithmetic and logic functions of a computer are placed.
- Momentary Switch** — A push-type switch that completes a circuit only while it is depressed.
- Random-Access Memory** — Abbreviated RAM. A computer memory in which the data can be retrieved at a speed which is independent of its location in the memory.
- Read-Only Memory** — Abbreviated ROM. A computer memory in which the data is pre-programmed and permanent. It is used primarily for rapid information retrieval applications.
- Semiconductor** — A group of solid crystalline materials having electrical conductivity properties between those of conductors and insulators.
- Solid-State** — Relating to any device, usually crystalline semiconductors, that can control electrical current without moving parts or vacuum tubes.
- Static Electricity** — The transfer of an electric charge from one object to another by means of a spark that bridges an air gap between the objects.
- Thermistor** — A solid-state semiconducting device whose electrical resistance varies with temperature.
- Time Delay Switch** — A rocker-type, dual in-line pin (DIP) switch that is soldered directly onto a circuit board. Moving the individual switch segments to the 'ON' position increases the time (or delay) that the switch remains active in the circuit.
- Triac** — A three-terminal semiconductor switch used for a-c power control.

HOW THE ICE-O-MATIC DIAGNOSTIC CUBERS WORK

Description of Controller Operational and Diagnostic Functions:

The Ice-O-Matic diagnostic cubers contain an electronic controller which is microcomputer based. It is designed to control the motors, compressor, solenoid valves, and pumps used for ice-making. The automatic control decisions throughout the ice-making process are made based on information continuously received from temperature sensors, pressure controls and switches, time, and the control program itself.

The electronic controller is connected to four machine-status lights (LEDs) which are displayed on the machine front panel. The status lights and their symbols indicate the current operational status of the ice machine. The colors, symbols, and meanings of the indicators are shown below:



(Green) Unit is making ice; all components functioning normally

(Red) Computer has detected a malfunction in component performance that has caused the machine to shut off; call Serviceman

(Yellow) Unit has completed freeze cycle and is now in harvest cycle; ice will be dropping into bin

(Green) Bin storage capacity has been reached; unit is not making ice

HOW THE ICE-O-MATIC DIAGNOSTIC CUBERS WORK

(Continued)

The electronic controller also has several integral self-diagnostic capabilities which operate continuously. The controller monitors and stores various types of operational data, such as number of harvest cycles and any malfunction since initial start-up or last reset. When malfunctions are detected, in either the controller's operation or in the operation of the machine being controlled, the machine may discontinue operation and a specific error code description will be stored in the controller's memory until the machine is serviced. In addition, the red 'Call Serviceman' LED will remain lit until the controller is reset by a Serviceman. The LED display is located on the controller board behind the machine front panel in the electrical control box area.

The electronic controller consists of a microcomputer with two types of internal memory that perform distinct functions in the ice machine:

1. Read-Only Memory (ROM) — contains the control program and controls the sequence of operations of the ice machine based on input signals received from devices and components external to the controller.
2. Random-Access Memory (RAM) — stores the system's operational history data and logs the number of harvests and any error codes.

The computer program and its process that controls the ice machine can be thought of as a 'Loop' or cycle in which a predetermined sequence of events are repeated indefinitely. At initial power-up or upon a reset condition, the microcomputer will execute the program from the top (or beginning) of the loop which initiates the freeze cycle. During normal operation, when the bottom of the loop (harvest cycle) is reached and concluded, the program will automatically return itself and the ice machine to the top of the loop and begin another freeze cycle.

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

NOTE: If above cleaning procedures are not performed every six (6) months, harvest problems may occur.

INSTALLATION

A. Uncrating & Inspection Procedures

1. Inspect exterior of shipping carton and skid for any signs of shipping damage.
2. Using a pry bar or large screwdriver, remove all staples from bottom of carton. Do not pry against carton.
3. Lift carton straight up, entirely off machine. Do not discard carton until satisfactory inspection of machine is complete.
4. Inspect machine cabinet for any signs of shipping damage.
5. Remove top, front, left and right hand side panels for access to skid attachment bolts. With panels removed, inspect machine for damaged refrigeration lines and any other signs of shipping damage. On air cooled machines, make certain that fan blade(s) turn freely. Should any damage be noted, follow Freight Claim Procedures on page B2.
6. Remove the four skid bolts. Lift machine off skid and place on bin.
7. Securely attach machine to bin using the supplied attachment straps and hardware located on the rear of the machine and bin.
8. Remove tape from splash curtain(s).
9. Fill out and return Installation and Warranty card to factory.

FREIGHT CLAIM PROCEDURES

IMPORTANT

THIS MERCHANDISE HAS BEEN CAREFULLY INSPECTED AND PACKED IN ACCORDANCE WITH THE CARRIER'S PACKING SPECIFICATIONS. RESPONSIBILITY FOR SAFE DELIVERY HAS BEEN ASSUMED BY THE CARRIER. IF LOSS OR DAMAGE OCCURS, YOU AS CONSIGNEE MUST FILE A CLAIM WITH THE CARRIER, AND HOLD CONTAINER FOR CARRIER'S INSPECTION.

CONCEALED LOSS OR DAMAGE

IF LOSS OR DAMAGE DOES NOT APPEAR UNTIL MERCHANDISE HAS BEEN UNPACKED MAKE A WRITTEN REQUEST FOR INSPECTION BY THE CARRIER WITHIN 15 DAYS OF THE DELIVERY DATE. THEN FILE A CLAIM WITH THE CARRIER.

DO NOT RETURN DAMAGED MERCHANDISE TO US WITHOUT WRITTEN PERMISSION. INSPECT PROMPTLY AND FILE CLAIM WITHOUT DELAY.

VISIBLE LOSS OR DAMAGE

ANY EXTERNAL EVIDENCE OF LOSS OR DAMAGE MUST BE FULLY DESCRIBED AND NOTED ON YOUR FREIGHT BILL OR EXPRESS RECEIPT AND SIGNED BY THE CARRIER'S AGENT. CLAIM SHOULD THEN BE FILED ON A FORM AVAILABLE FROM THE CARRIER ON REQUEST.

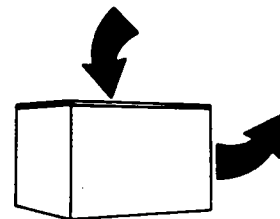
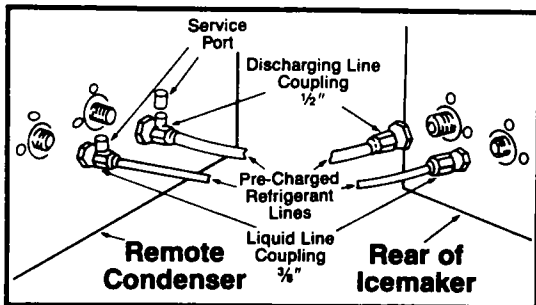
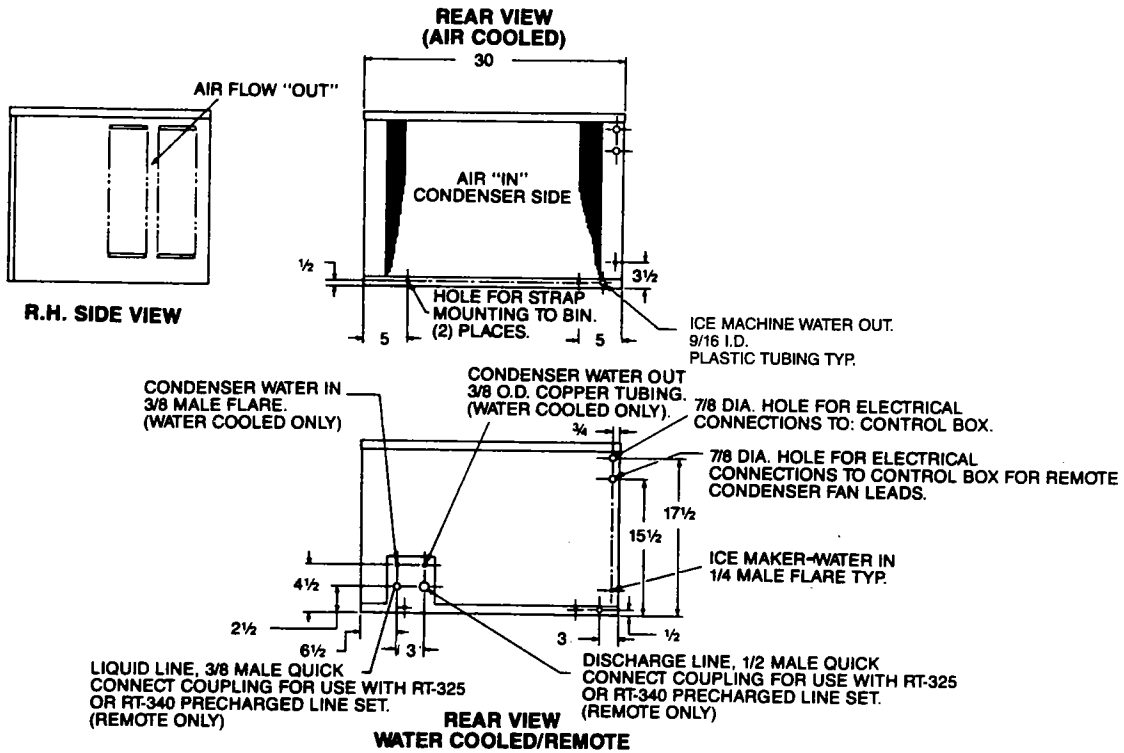
**DO NOT RETURN DAMAGED
MERCHANDISE TO ICE-O-MATIC**

FILE YOUR CLAIM AS ABOVE

ICE-O-MATIC[®]

MODEL C-61-C

PLUMBING/ELECTRICAL CONNECTIONS DIAGRAM:

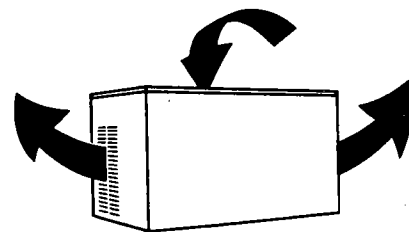
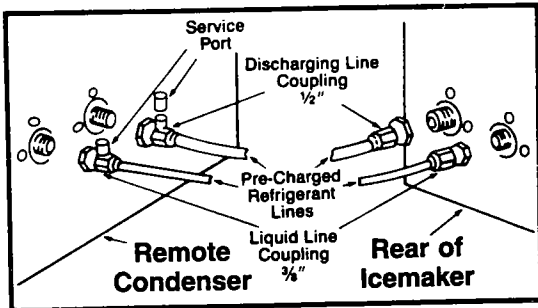
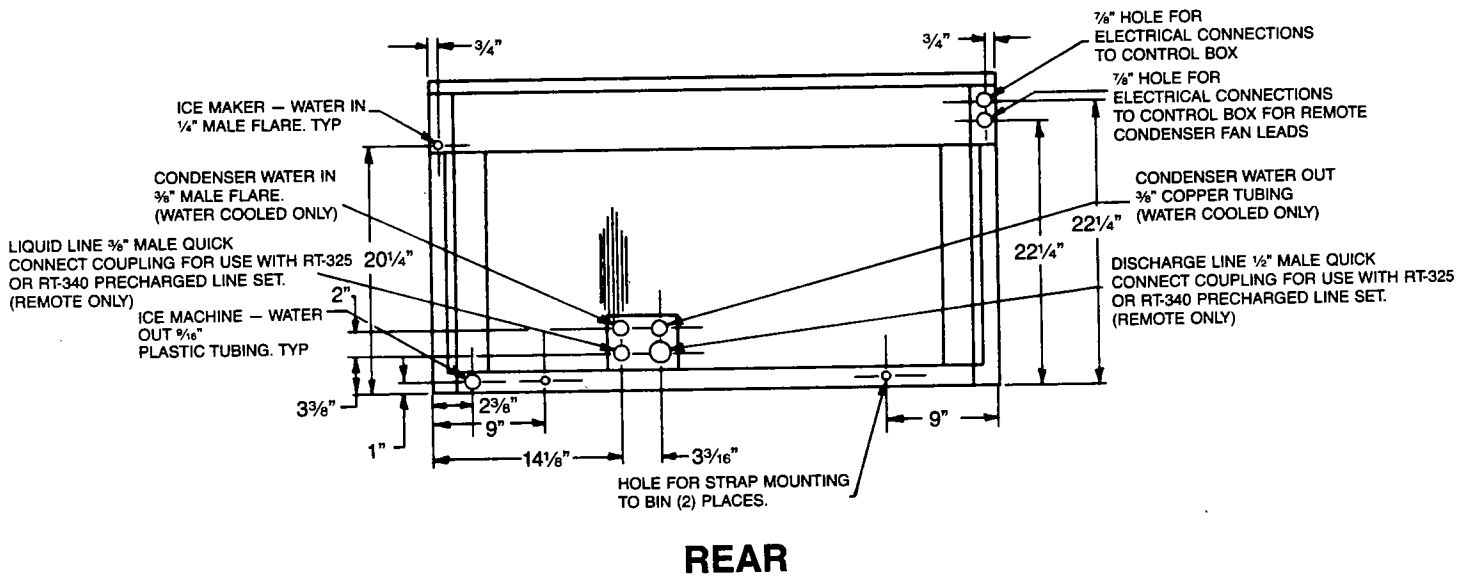


Air Circulation Pattern
(Air Cooled Models)

ICE-O-MATIC[®]

MODEL C-81/121-C

PLUMBING/ELECTRICAL CONNECTIONS DIAGRAM:



Air Circulation Pattern
(Air Cooled Models)

INSTALLATION

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

B. Set-up Procedure

Note: All installations must conform with local plumbing and electrical codes.

Caution: Make certain all power to equipment is off during installation!

1. Check for proper utility connections for installation. Refer to diagrams on pages B3 and B4.

ELECTRICAL: Check for proper voltage, current and fusing size according to requirements on model/serial number plate on rear of machine.

Note: On single voltage machines (208 or 230), voltage must be $\pm 10\%$ of machine voltage requirements. On dual voltage machines (208-230), voltage must be $+10\%$ and -5% of machine voltage requirements.

Note: A separate electrical circuit must be provided specifically for the ice machine.

WATER: Inlet water pressure must range from 20 to 60 p.s.i.g.; $\frac{1}{4}$ " male flare water supply inlet connection is standard.

Water cooled machine connections:

Condenser in — $\frac{3}{8}$ " male flare

Condenser out — $\frac{3}{8}$ " copper tube

Connections must be run separately

DRAIN: Connections

Bin Drain — $\frac{3}{4}$ " F.P.T.

Purge Drain — $\frac{9}{16}$ " I.D. Plastic Tube

2. Connect the purge, bin and condenser drains (water cooled only) to well-pitched drain lines. Run all drain lines *separately* to an open or trapped drain.
3. Electrical connections are made in the electrical control box with the left side panel removed. Route lines from a standard electrical circuit (as required and indicated on serial plate) through side of cabinet to terminal block. Terminal block connections are made with #10 fork terminals.

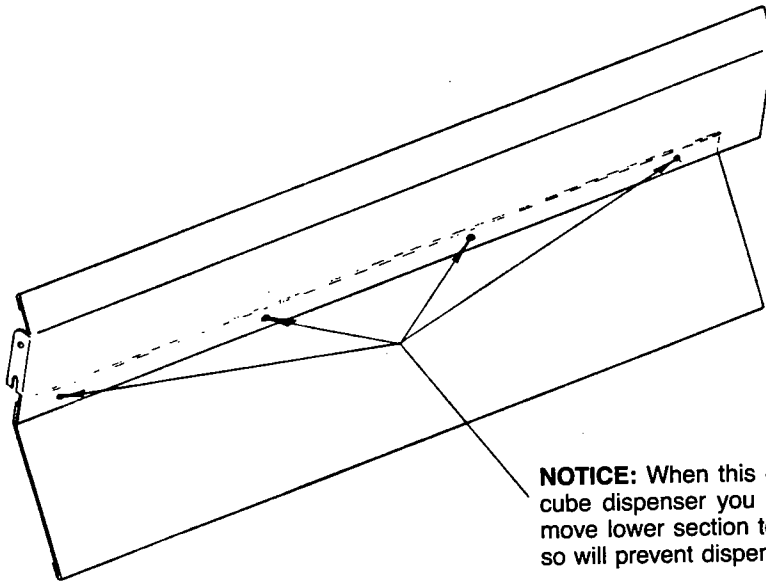
Note: All wiring must conform with local codes.

4. Place machine/bin unit in its permanent location while maintaining a minimum clearance of 5" between the back, left and right hand sides and any wall. This clearance is necessary to allow for adequate machine air ventilation.
5. After ice machine is in permanent location, make certain that unit is level side-to-side and front-to-back. Accurate leveling is essential for proper machine operation.

INSTALLATION

(Continued)

6. Install ice deflector per instructions below.
 - a. Locate the four threaded inserts, two on the L.H. front, lower side panel and two on the R.H. front, lower side panel. Refer to figure 1.
 - b. Install screws into each lower hole. (Note: leave these screws loose)
 - c. Install the ice deflector over these screws as per figure 2. Install the two screws in the top mounting holes and securely tighten all four screws.



NOTICE: When this deflector is used on any kind of cube dispenser you must drill out pop rivets and remove lower section to shorten deflector. Failure to do so will prevent dispenser from operating.

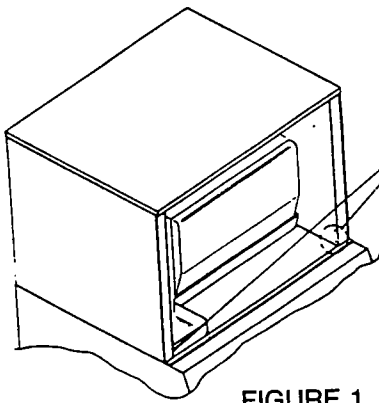


FIGURE 1

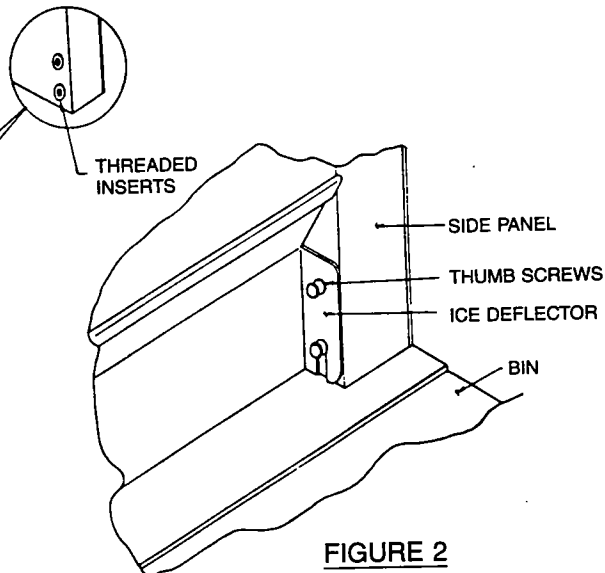


FIGURE 2

INSTALLATION

(Continued)

7. Check probe alignment per instructions below.

It is possible for the evaporator to shift in transit, causing misalignment between the evaporator probe guide and the probe assist motor assembly. It is recommended to check alignment of the probe(s) at the time of installation. This should be done as follows:

- a. Make sure evaporator mounts are resting in the small part of the key hole slot. If not, loosen mounting screws, re-position and re-tighten mounting screws.

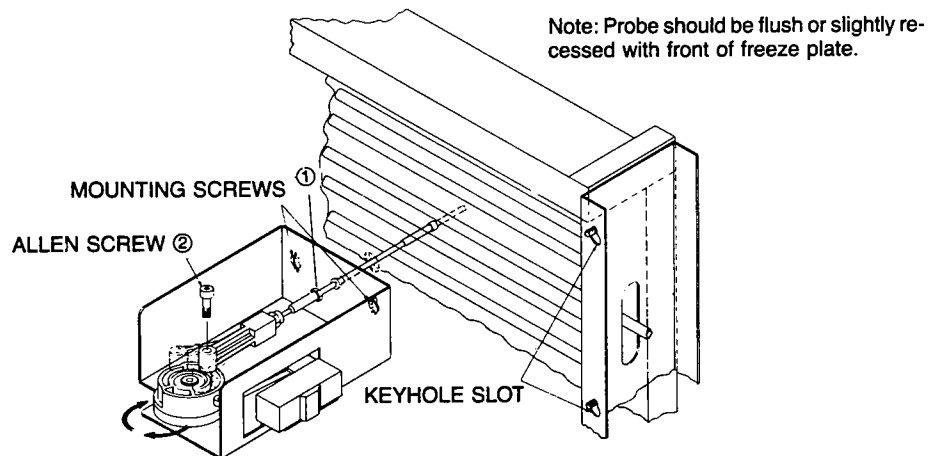
At this time remove allen screw from the arm part of the probe shaft. Rotate the arm by hand in direction of arrow following the clutch as if it were in normal operation.

If there is any binding, re-adjust by loosening mounting screws on the assembly bracket, once shaft is free (there should be no drag at all) re-tighten mounting screws.

NOTE: When aligning probes, check probe lock nut (indicated by arrow marked ①) is tight and that tip of probe shaft does not extend out of the evaporator bushing into the freezing surface of the evaporator. When re-tightening probe lock nut always secure with a non-hardening Loc-tite.

Also check probe clutch allen set screw in stainless steel portion of clutch (indicated by arrow marked ②) to insure it's tight against the flat portion of the harvest motor drive shaft.

Audibly check cam switch. Switch should change contacts when moving in and out of cam depression. Adjustment should be made by bending the switch arm.



8. Turn water supply on. Check water flow through float assembly. Check water level in water trough; level should be 1/2" above water pump impeller housing (base).

NOTES

OPERATION

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

A. Start-up Descriptions and Procedure

1. Check position of ICE/OFF/WASH selector switch and test purge function (Step C).
 - a. ICE Position: The bin (curtain) switch(es) will be tested. If the bin is not full, all ice-making components will turn on, the 'OK' LED will illuminate, and the machine will begin a freeze cycle from the top of the loop.

If the bin is full, and the bin (curtain) switch(es) are actuated, all controlled components will be turned off except the 'BIN FULL' LED, which will be illuminated. The controlled components will remain off until the bin switch(es) indicate that the bin is no longer full, then the unit will begin a freeze cycle, deactivate the 'BIN FULL' LED, and illuminate the 'OK' LED. Ice making cycles will continue until the bin again becomes full or the selector switch is moved to either the OFF or WASH position.

- b. OFF Position: Entire machine and all components will be off when selector switch is in this position, except the LED display on the electronic controller which will still display evaporator and condenser temperatures.
 - c. WASH Position: All controlled machine components will be off except the water pump. The water pump will remain on until the selector switch is moved to either the OFF or ICE position.

At this time the purge function can be tested by depressing and holding down the purge switch. The purge valve will open allowing all water in the water trough to be removed by the water pump.
2. Move selector switch to ICE position for initial self-test and freeze cycle.

When a machine is powered-up for the first time, upon a manual reset, or upon a memory loss condition (as would occur in a severe partial or total power loss), and the bin is not full, the controller will run a self-test of itself and check the status of the single/dual evaporator switch which determines the number of evaporators being controlled. This switch is preset at the factory and should not be changed. Refer to page D-2 for further details on the single/dual evaporator switch.

Once the initial self-test process is completed and the bin is not full, the freeze cycle will begin. Water is now flowing over the evaporator and freezing and the 'OK' LED is illuminated.

OPERATION (Continued)

3. Check LED display on the controller board for monitoring of evaporator and condenser temperatures.

The controller constantly monitors the evaporator outlet and condenser temperatures. When the machine is operating properly the temperatures are displayed in a sequence (detailed below) on the seven-segment LED found on the controller board.

The LED displays the evaporator outlet temperature as 'E' and the condenser temperature as 'C' in the following sequence:

- An 'E' will display for $\frac{1}{2}$ of a second (indicating evaporator temperature to follow)..

The readout will go blank for $\frac{1}{4}$ of a second.

The first digit of the temperature will display for $\frac{1}{2}$ of a second.

The readout will go blank for $\frac{1}{4}$ of a second.

The second digit of the temperature will display for $\frac{1}{2}$ of a second (if necessary).

The readout will go blank for $\frac{1}{4}$ of a second.

The third digit of the temperature will display for $\frac{1}{2}$ of a second (if necessary).

The readout will go blank for $\frac{1}{2}$ of a second.

- A 'C' will display for $\frac{1}{2}$ of a second (indicating condenser temperature to follow).

The readout will go blank for $\frac{1}{4}$ of a second.

The first digit of the temperature will display for $\frac{1}{2}$ of a second.

The readout will go blank for $\frac{1}{4}$ of a second.

The second digit of the temperature will display for $\frac{1}{2}$ of a second (if necessary).

The readout will go blank for $\frac{1}{4}$ of a second.

The third digit of the temperature will display for $\frac{1}{2}$ of a second (if necessary).

The readout will go blank for 1 second.

The sequence repeats itself.

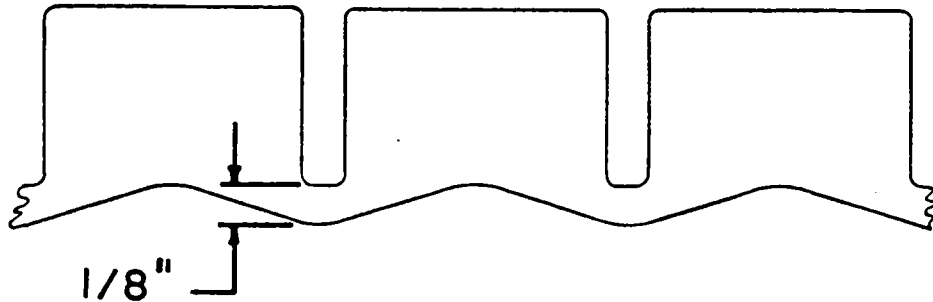
Note: The readout will not display '0' preceding any temperature reading. i.e., 5°F evaporator temperature will display as E5.

All temperatures are displayed in degrees Fahrenheit.

OPERATION (Continued)

4. Observe first slabs of ice for proper $\frac{1}{8}$ " bridge thickness.

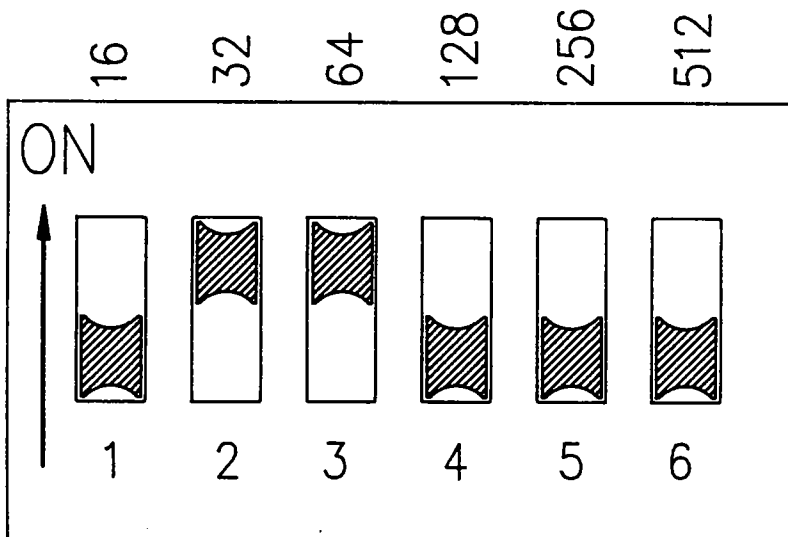
If adjustments are necessary, follow procedure below.



Proper Bridge thickness

CHANGING ICE BRIDGE THICKNESS

The ice bridge thickness is controlled by the time delay switch. To increase the bridge thickness, increase the timer setting. To decrease the bridge thickness, decrease the timer setting.



TIMER ADJUSTMENT

To change timer settings — Move the switch next to the number to an 'ON' position (note the ON marking on the timer) to activate that number. The numbers indicate seconds. To determine total time delay add up the numbers moved to the ON position. Timer shown above has a 96 second setting.

Note: System will not purge during cycle if there is no time set on timer.

OPERATION (Continued)

5. Check bin control for proper operation.

The bin control is a mechanical switch that is actuated by the opening of the splash curtain. When the curtain is opened for more than 10 seconds at the end of the freeze cycle, the switch is actuated, all machine components except the controller should turn off and stay off until the curtain can close to its original position. Machine should now resume normal operation.

If adjustments are necessary, follow procedure below.

a. Make sure power is disconnected.

b. Disconnect one lead from bin switch.

c. Connect ohm meter to bin switch terminals as shown in figure 1 to read through bin switch.

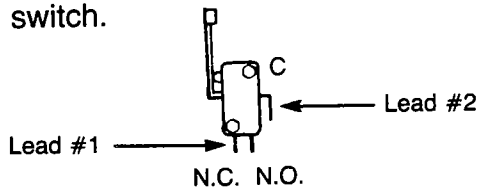


FIGURE 1

d. Loosen the adjustment screw on the bin switch bracket (ref. to figure 2) while holding the evaporator splash curtain even with the edge of water trough (ref. to figure 3) connect a continuity test across terminals N.C. and C. terminals, you should have no continuity. Once the splash curtain is beyond the outside edge of water trough, you should have continuity.

e. Check the curtain and switch movement per figure 3, and re-adjust as necessary.

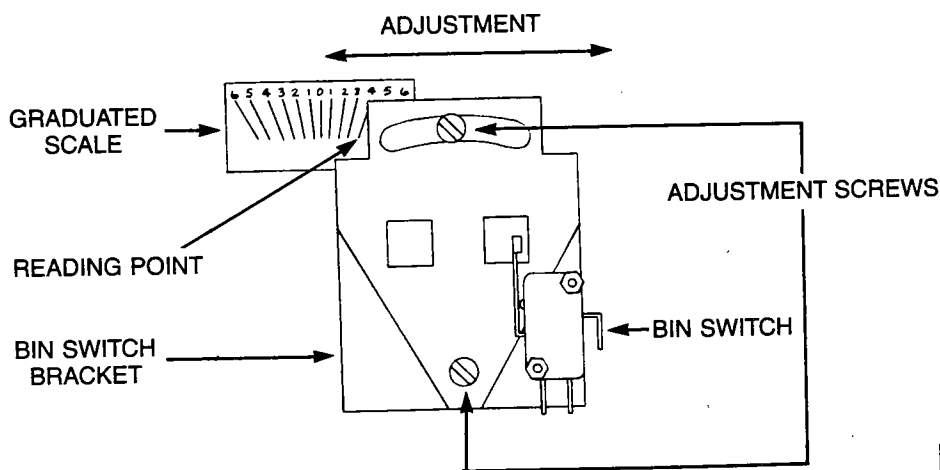


FIGURE 2

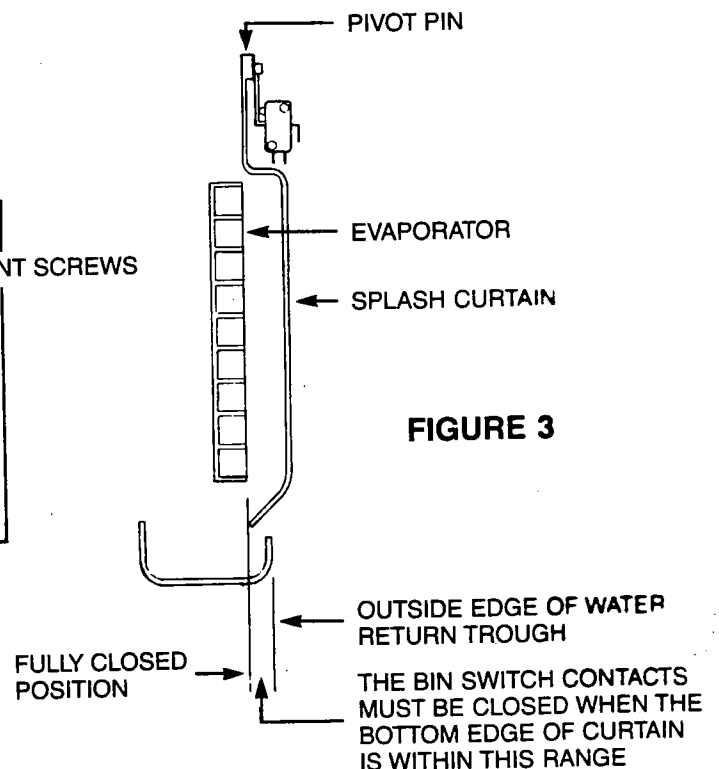


FIGURE 3

Description of Devices Connected to the Electronic Controller

Refer to diagram on page C-8.

External Input Devices

The following are devices external to the controller which have inputs to the controller board. The input signals that the external devices provide to the controller board influence and determine the sequence and timing of the ice making cycle.

Note: The external input devices will be referred to hereafter by the term shown in parentheses.

1. Evaporator Outlet Temperature Thermistor (Evap)
2. Condenser Temperature Thermistor (Cond)
3. Ice-Off-Wash Toggle Selector Switch (Ice/Wash)
4. Momentary Purge Switch (Purge Sw)
5. Door Switch #1 (Door 1)
6. Door Switch #2 (Door 2)
7. Time Delay Switch (Six Segment Time Delay Switch)
8. Momentary Reset Switch (Summary/Reset Switch)
9. Cam Switch #1 (Cam 1) (Probe 1)
10. Cam Switch #2 (Cam 2) — only on C-81/121 (Probe 2)
11. Stacking Connection (Stack 1 and Stack 2)

Note: Fan Controls are present on machines with electronic controllers that do not have single/dual evaporator switches. Fan operation is regulated by the electronic controller if it has a single/dual evaporator switch.

External Controlled Devices

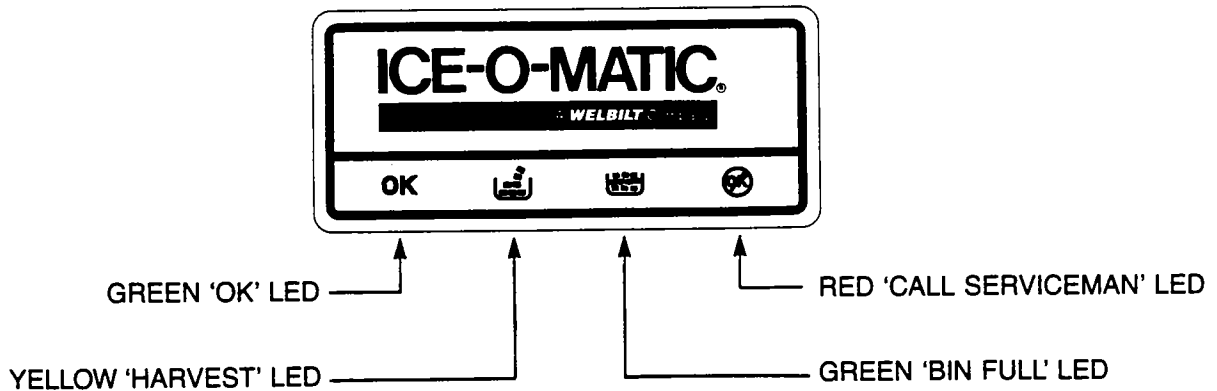
The following are devices external to the controller which are directly regulated by the controller board. The controlled devices are activated only when they receive power based on decisions made by the electronic controller.

Note: The external controlled devices will be referred to hereafter by the term shown in parentheses.

1. Hot Gas Solenoid (Hot Gas)
2. Water Pump (Pump)
3. Compressor (Comp)
4. Purge Solenoid (Purge)
5. Harvest Motor #1 (Motor 1)
6. Harvest Motor #2 — only on C-81/121 (Motor 2)
7. Machine 'OK' green LED (Ok LED)
8. Machine 'Harvest' yellow LED (Har LED)
9. 'Bin Full' green LED (Full LED)
10. Machine malfunction 'Not OK' red LED (Service LED)
11. LED Digital Readout (Readout)

DESCRIPTION OF DEVICES

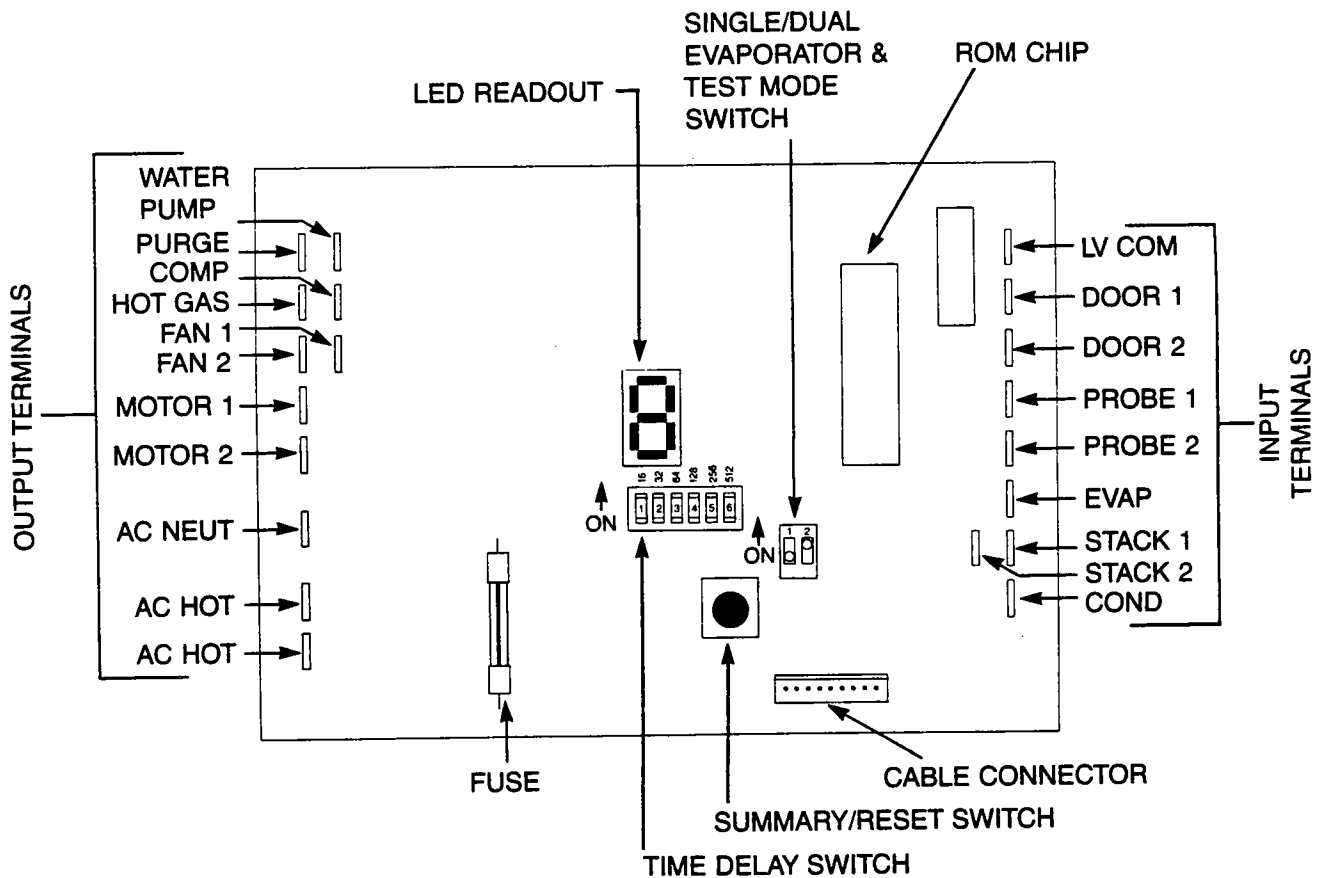
(Continued)



STATUS INDICATOR LEDES

115 VAC SIDE — OUTPUT

5 VDC SIDE — INPUT



ELECTRONIC CONTROLLER CIRCUIT BOARD

ICE MACHINE CLEANING INSTRUCTIONS

1. Remove ice machine front panel.
2. Make sure all ice is off evaporator. If ice is being made, initiate harvest or wait for cycle completion, then turn machine "OFF" at the ICE/OFF/WASH switch.
3. Remove or melt all ice from bin.
4. Add recommended amount of approved ice machine cleaner to water through according to label instructions on container.
5. Initiate the wash cycle at the ICE/OFF/WASH switch by moving switch to the "WASH" position. Allow the cleaner to circulate for approximately 15 minutes to remove mineral deposits.
6. Depress the purge switch and hold until cleaner has been flushed down the drain and diluted by fresh incoming water.
7. Terminate the wash cycle by moving the ICE/OFF/WASH switch to the "OFF" position. Remove the splash curtain, inspect the evaporator and water spillways to assure all mineral residue has been removed.
8. If necessary, wipe evaporator, spillway and other water transport surfaces with a clean, soft cloth to remove remaining residue. If necessary, remove water distribution tube, disassemble and clean with a bottle brush. Reassemble all parts and repeat Steps 4 through 7 as required to remove residue.
9. Turn off machine water supply and clean water trough thoroughly to remove all scale or slime build-up. If necessary, remove through to reach all splash areas and float.
10. Prepare 1-1/2 to 2 gallons of approved (EPA/FDA) sodium hypochloride food equipment sanitizer to form a solution with 100 ppm free chlorine yield minimum.
11. Add enough sanitizing solution to fill the water through to overflowing and move the ICE/OFF/WASH switch to the "WASH" position and allow circulation to occur for 10 minutes and inspect all disassemble fittings for leaks. During this time, wipe down all other ice machine splash zones, plus the interior surfaces of the bin, deflector and door with the remaining sanitizing solution. Inspect to insure all functional parts, fasteners, thermostat bulbs (if used), etc. are in place.
12. Depress the purge switch and hold until sanitizer has been flushed down the drain. Turn on the machine water supply and continue to purge the diluted sanitizing solution for another 1-2 minutes,
13. Move the ICE/OFF/WASH switch to the "ICE" position and replace the front panel.
14. Discard the first two ice harvests.

MAINTENANCE INFORMATION

WINTERIZING AND STORAGE PROCEDURE

1. Shut the water off to the machine.
2. Turn the On-Off Switch on the Control box to the "OFF" position.
3. Let the machine stand for one hour (or as long as necessary to melt all the ice out of the evaporator freeze plate.
4. Disconnect the tubing between the pump discharge and the water distributor manifold.
5. Drain complete system. Do not replace the tubes.
6. On water cooled machines, blow condenser completely dry.
7. Wipe out the storage bin.

NOTES



SERVICE

CONTROLLER SELF-DIAGNOSTIC FUNCTION

The self-diagnostic function of the electronic controller will assist the Serviceman in troubleshooting and diagnosis of machine problems. The controller automatically and continuously monitors and tests itself as well as key controlled components in the ice machine. If the controller detects a malfunction or fault, an error code is identified and logged into the random access memory (RAM) of the controller. Certain malfunctions and corresponding error codes (detailed on pages D-5 through D-6) will cause the machine to shut down and the 'SERVICE' LED to illuminate. The specific malfunction that caused the machine to shut down can be determined by observing the illuminated error code that appears on the seven-segment LED on the controller board. Other less serious malfunctions may occur that do not shut down the machine, but their corresponding error codes will still be logged into the controller's memory. Regardless of whether or not the machine has been shut down by the controller, the nature of error codes can be displayed at any time. Also, the total number of ice harvests since power-up, power loss, or last reset (up to 65,000) can be displayed at any time.

DISPLAYING SUMMARY TEST MODE DATA: The error codes and/or number of harvests can be displayed at any time by momentarily pressing the Summary/Reset switch on the controller board. This can be done regardless of the position of the selector switch and will not shut the machine down.

The summary test mode is entered by momentarily pressing the Summary/Reset switch. When the Summary/Reset switch is pressed, the LED display on the controller board will display error codes that have an accumulated total greater than zero and the number of harvests. This information is displayed as follows:

1. An 'E' will display for $\frac{1}{2}$ a second.
2. There will be a $\frac{1}{4}$ second pause (LED display is blank).
3. A 'C' will display for $\frac{1}{2}$ a second (indicating error codes to follow).
4. The error code number (1-8) will display for $\frac{1}{2}$ a second.
5. There will be a 1 second pause (LED display is blank).
6. The controller will then go on to the next error code or the harvest count.
7. The harvest count will follow all error codes. An 'H' will display for $\frac{1}{2}$ a second.
8. A '-' (dash) will display for $\frac{1}{2}$ a second.
9. The number of accumulated harvests will display, one number at a time, each for $\frac{1}{2}$ a second, with a $\frac{1}{4}$ second delay between digits. (Harvests will count to 65,000 and then hold until reset to '0' [zero].)
10. The readout will go blank for 1 second.
11. The readout will start showing 'evap temp' and 'cond temp'.

To reset the count on error codes, you must hold the Summary/Reset switch for a minimum of 5 seconds. At this point all accumulated error codes will reset to zero. To reset harvest counts the Summary/Reset switch must be held in for 10 seconds.

Power Failure Considerations

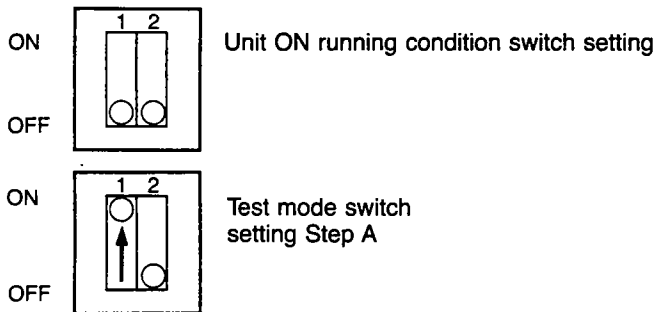
In the event of a power failure, voltage drops (more than 10%), or the ice machine is unplugged, all accumulated data in the RAM will be lost. Machine will remain off until power is resumed, with the controller resetting itself.

Test Mode Operation

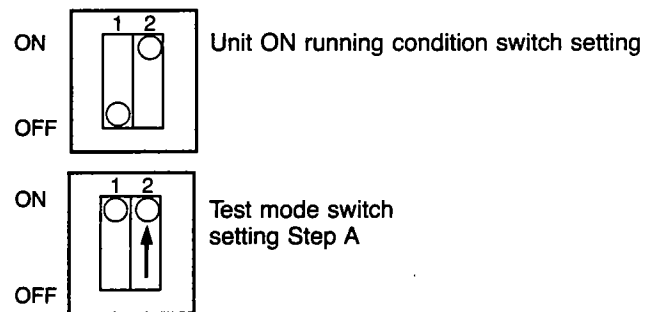
The serviceman can put the electronic controller into a test mode to check the 115 volt outputs from the controller (purge, hot gas, etc.). To access the test mode, the procedure below must be followed:

1. With power being supplied to the ice machine, move the ICE/OFF/WASH selector switch to the OFF position. The LED display on the controller board will still display evaporator and condenser temperatures.
2. Remove all time from the time delay switch by moving all switches to the OFF position.
3. Depress and hold the Summary/Reset switch through Step 4.
4. Refer to figure below while observing positions of single/dual evaporator and test mode switches.

C-61-C: Single Evaporator Unit



C-81/121-C: Dual Evaporator Unit



As shown above, with either single or dual evaporator machines, move switch 1 to ON position (Step A).

5. Release the Summary/Reset switch. The LED display on the electronic controller will stop displaying evaporator and condenser temperatures. The electronic controller is now in the test mode.

Note: If the LED display continues to display evaporator and condenser temperatures, start again at Step 1.

6. Move the ICE/OFF/WASH selector switch to the ON position.

The 115 volt outputs can now be checked individually by moving to ON each of the six segments on the time delay switch one at a time. The six switch segments control the output in the test mode as follows from left to right:

1. Purge Solenoid
2. Hot Gas Valve Solenoid
3. Water Pump
4. Fans (Air-cooled only)
5. Compressor
6. Harvest Motor (Right hand motor as viewed from front on C-81/121-C)

7. Connect either a multimeter or 115 volt test lamp from the 115 volt (AC) side component terminal being tested to the AC HOT terminal on the electronic controller. If component is to be energized, you will read 115 volts on your meter. (See Figure 1 below.)

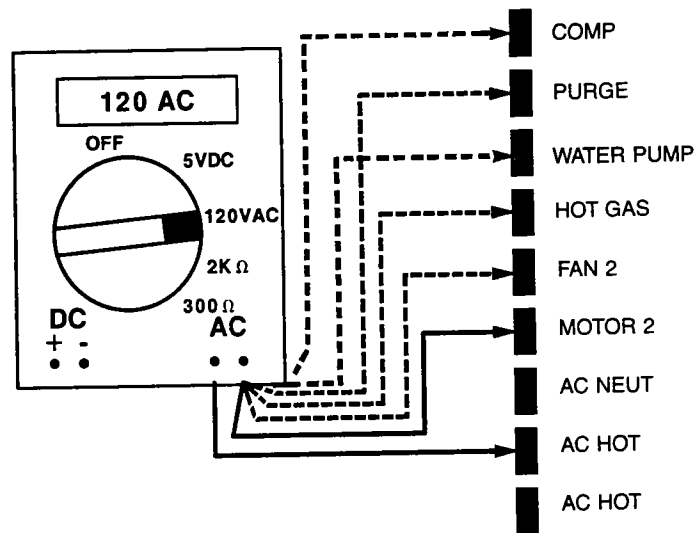
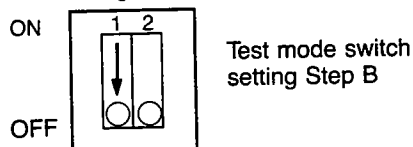


Figure 1 – 115 Volt Output

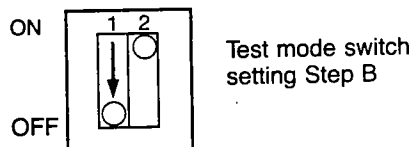
8. To bring the ice machine out of the test mode and resume normal operation, the following procedure must be followed:

1. Move the ICE/OFF/WASH selector switch to the OFF position.
2. Move switch 1 on Test Mode switch to OFF position (Step B).

C-61-C: Single Evaporator Unit



C-81/121-C: Dual Evaporator Unit



3. Depress the Summary/Reset switch momentarily.
4. Reset the time delay switch to the time that was on it before entering the test mode.
5. Move ICE/OFF/WASH selector switch to ICE position to resume normal ice-making operation.
6. The ice machine is now out of the test mode and the LED display on the controller board will again display evaporator and condenser temperatures.

Error Code Definitions, Possible Causes and Possible Solutions

Note: All error codes are designated EC-1, EC-2, etc.

IMPORTANT: The error codes listed assist the serviceman in diagnosing and troubleshooting the ice machine. The error codes do *not* diagnose every problem that could occur. Refer to the complete Diagnosis and Troubleshooting Guide beginning on page D-7 for problems not addressed by the electronic controller error codes.

If LED is displaying appropriate data, microcomputer on electronic controller is functioning correctly.

Resetting Error Code and Harvest Count Memory

To clear and reset the type of Error Code, press the Summary/Reset switch on the electronic controller for a minimum of 5 seconds. All previous error codes will be erased and the controller will reset all accumulated data to zero.

To clear and reset the Harvest Count, press the Summary/Reset switch on the electronic controller for a minimum of 10 seconds. All previously accumulated data on harvest counts will be erased and reset to zero.

Once the controller memory has been cleared and reset, move the selector switch to ICE position, reinstall front panel, and resume the ice-making process. The icemaking process will now start at the top of the loop.

IMPORTANT NOTICE

ALL SOLID STATE ELECTRONIC CONTROLLER COMPONENTS ARE, IN GENERAL, SUSCEPTIBLE TO DAMAGE FROM STATIC ELECTRICITY, ELECTRICAL, MAGNETIC FIELDS AND POWER SURGES. WE AT THE FACTORY, TO PROTECT THE CONTROLLER, DESIGNED IN AS MANY SAFETY DEVICES AS POSSIBLE. TO REDUCE THE POSSIBILITY OF DAMAGE TO THE CONTROLLER, PLEASE SEE THE FOLLOWING.

- A. BEFORE WORKING ON THIS UNIT, A PERSON SHOULD GROUND THEMSELVES, TO DISCHARGE STATIC ELECTRICITY (I.E. TOUCH THE UNIT'S GROUND SCREW, OR WEAR A U.L. APPROVED WRIST OR ANKLE GROUND STRAP).
- B. NYLON OR OTHER STATIC GENERATING MATERIAL SHOULD NOT COME IN CONTACT WITH THE CONTROLLER OR ITS COMPONENTS.
- C. IT IS STRONGLY RECOMMENDED THAT ALL ELECTRICAL EQUIPMENT BE KEPT AWAY FROM ANY PORTION OF THE CONTROL BOARD. (I.E. FAN MOTORS, HAND DRILLS, ETC.)
- D. IT IS STRONGLY RECOMMENDED THAT ALL MAGNETIC DEVICES BE KEPT AWAY FROM THE CONTROL BOARD AND ITS COMPONENTS. (I.E. SCREWDRIVER, HAND WRENCHES, ETC. WITH MAGNETIC HEADS.)
- E. WHEN HANDLING THE CONTROL BOARD, PLEASE DO SO BY THE CORNERS. IF YOU MUST HANDLE A COMPONENT, IT IS STRONGLY RECOMMENDED THAT YOU GROUND YOURSELF AS PER ITEM "A" ABOVE.

If replacing a controller board, make certain it remains in its protective plastic bag to prevent damage to it.

ERROR CODES & DIAGNOSIS

EC-1 — Freeze cycle exceeds 50 minutes, or the evaporator(s) fail to reach 40°F in 6 minutes. Machine does not shut down. 'SERVICE' LED does not illuminate. EC-1 will display only when the summary switch is depressed.

Possible Cause

- Low on refrigerant charge
- Defective compressor
- Dirty air condenser
- Blocked air flow
- Defective evaporator thermistor

Possible Solution

- Check for leaks, evacuate & recharge unit
- Check and/or replace compressor
- Clean air condenser
- Check for and remove obstruction
- Check and/or replace thermistor

EC-2 — Both cam switches do not activate and deactivate within 45 minutes of harvest initiate. Machine is shut down and red 'SERVICE' LED is illuminated.

Possible Cause

- Stuck or bent harvest probe
- Defective harvest assist motor
- Cam switch out of adjustment or defective

Possible Solution

- Adjust harvest probe assembly or replace harvest probe
- Check and/or replace harvest assist motor
- Check and/or replace cam switch

EC-3 — Splash curtain(s) do not open within 5 minutes after harvest initiate. Machine does not shut down. 'SERVICE' LED does not illuminate. EC-3 will display only when the summary switch is depressed.

Possible Cause

- Ice slab hung-up in evaporator
- Poor harvest probe alignment or bent probe
- Defective harvest assist motor
- Defective hot gas valve
- Curtain switch shorted
- Curtain switch open
- Poor curtain switch alignment
- No ice slab is made
- Thin ice slab, probe produces holes in or breaks slab

Possible Solution

- Free ice slab and check adjustment of harvest probe assembly
- Adjust harvest probe assembly to proper alignment and/or replace harvest probes
- Check and/or replace harvest assist motor
- Check and/or replace hot gas valve
- Check and/or replace curtain switch
- Check and/or replace curtain switch
- Adjust curtain switch to proper alignment
- Check that water pump is functioning properly
- Check for proper water circulation over evaporator, check that machine is level, add time to time delay switch.

EC-4 — All of controller read-only memory (ROM) lost. Machine is shut down and red 'SERVICE' LED is illuminated.

Possible Cause

- Memory loss

Possible Solution

- Replace controller board

EC-5 — Condenser thermistor malfunction. Machine is shut down and ‘SERVICE’ LED is illuminated.

Possible Cause

- Defective condenser thermistor

Possible Solution

- Check and/or replace thermistor

EC-6 — Evaporator thermistor malfunction. Machine is shut down and ‘SERVICE’ LED is illuminated.

Possible Cause

- Defective evaporator thermistor

Possible Solution

- Check and/or replace thermistor

EC-7 — Air or water condenser temperature exceeds 150°F. Machine will shut down and red ‘SERVICE’ LED will be illuminated.

Possible Cause

- Stuck or defective fan (air cooled unit)
- Defect condenser water valve (water cooled unit)
- Surrounding (ambient) air temperature exceeds 120°F
- Dirty air condenser
- Defective condenser thermistor

Possible Solution

- Check that fan turns freely and/or replace fan
- Check and/or replace condenser water valve
- Wait until ambient air temperature decreases to start machine
- Clean air condenser
- Check and/or replace thermistor

EC-8 — Freeze Cycle exceeds 80 minutes. Machine is shut down and red ‘SERVICE’ LED is illuminated.

Possible Cause

- Low on refrigerant charge
- Defective compressor
- Defective evaporator thermistor

Possible Solution

- Check for leaks, evacuate and recharge unit
- Check and/or replace compressor
- Check and/or replace thermistor

GENERAL SERVICE INFORMATION

SERVICE DIAGNOSIS

| Condition | Possible Cause or Remedy |
|--|---|
| 1. Unit runs but no ice production. | <ul style="list-style-type: none"> a. Water shut off. b. Hot gas valve defective. c. Unit out of gas. d. Motor compressor not pumping e. ON/OFF/ON switch on "WASH" position. f. Refrigerant drier plugged. g. TX valve defective. h. Defective probe assist motor. i. Cam switch defective or not tripping. j. Water pump defective k. Thermistor defective. l. Defective electronic controller. m. Low line voltage. |
| 2. Low ice production | <ul style="list-style-type: none"> a. Dirty condenser b. Valves in compressor not functioning properly c. Refrigeration system under or over charged d. Leak in water circulating system. e. Hot gas valve not seating properly. f. Evaporator in need of cleaning. |
| 3. Dimples in ice too large. | <ul style="list-style-type: none"> a. Time not properly set b. Problem with refrigerant feed. (Low on charge, T.X. valve defective, dirty condenser, etc.) |
| 4. Cloudy ice. | <ul style="list-style-type: none"> a. Water system in need of cleaning. b. Water pump not pumping properly. c. Purge drain plugged up. d. Purge valve not opening. |
| 5. Machine fails to shut off when bin is full. | <ul style="list-style-type: none"> a. Bin switch defective or out of adjustment. |
| 6. Machine is noisy. | <ul style="list-style-type: none"> a. Defective compressor b. Loose components c. Fan hitting shroud. d. Defective purge valve. |

GENERAL SERVICE INFORMATION

SERVICE DIAGNOSIS

(CONTINUED)

| Condition | Possible Cause or Remedy |
|---|---|
| 7. Probe assist motor runs continuously. | a. Cam switch defective or needs adjustment. |
| 8. Machine will not go into harvest cycle. | a. Defective hot gas solenoid. b. Defective probe assist motor. c. Defective thermistor. d. Defective electronic controller. |
| 9. Machine in defrost too long. | a. System low on refrigerant b. Defective probe assist motor. c. Head pressure setting too low. d. Probe assist assembly needs adjustment. |
| 10. Compressor cuts out on overload. | a. Low line voltage. It should be within 10% of rated voltage. b. High head pressure. Dirty condenser. c. Defective compressor unit, starting capacitor relay or overload device. d. Loose electrical connection, probably in compressor junction box. |
| 11. Motor compressor runs but condenser fan does not. | a. Loose electrical connections. b. Fan blade cannot turn due to obstruction. c. Motor burned out. d. Fan control inoperative. |
| 12. Machine not operating at all. | a. Check voltage supply. b. Check ON/OFF switch. c. Check bin control with continuity tester. d. Check for loose connections. e. Defective wiring harness. f. Defective contactor. g. Out of refrigerant. h. Water supply shut off (water cooled). |

GENERAL SERVICE INFORMATION

SERVICE DIAGNOSIS

(CONTINUED)

| Condition | Possible Cause or Remedy |
|---|--|
| 13. High head pressure. | <ul style="list-style-type: none"> a. Dirty condenser. b. System is overcharged. c. Air in refrigeration system. d. Defective fan motor. |
| 14. Low suction pressure. | <ul style="list-style-type: none"> a. Restricted flow through filter-drier. b. System is low on refrigerant. c. Moisture in refrigeration system. d. Water distribution restricted. e. Defective T.X.V. |
| 15. Ice slabs break when moving out of evaporator. | <ul style="list-style-type: none"> a. Bridging across front of ice slab too thin. Must be a minimum of 1/8" thick for proper harvest. b. Probe shaft is loose and has worked out into evaporator. c. Dirty evaporator (see page C-9 for cleaning instructions). |
| 16. Water dripping into ice storage area from evaporator plate. | <ul style="list-style-type: none"> a. Cam switch out of adjustment. b. Dirty evaporator (see page C-9 for cleaning instructions) c. Bin control switch out of adjustment (see bin control switch adjustment page C-6) |

STEP-BY-STEP WIRING DIAGRAM DESCRIPTION

The following machine conditions are assumed:

1. Ice/Off/Wash selector switch is in Ice position.
2. Bin control switches are in closed position.

Freeze Cycle — Step 1.

The cycle begins when the electronic controller signals that the machine is at the top of the loop. Throughout Step 1 the following components are energized through the electronic controller board: water pump, fan motor(s) and contactor coil. The compressor is energized through the contactor. The green 'OK' LED on the machine front panel is illuminated.

Freeze Cycle — Step 2.

When the suction line temperature drops to 14°F, the evaporator thermistor energizes the time delay on the electronic controller board. The machine remains in the freeze cycle for the amount of time set on the time delay. Throughout Step 2 the water pump, fan motor(s) contactor coil and compressor remain energized. The green 'OK' LED is illuminated.

Freeze Cycle — Step 3.

When the time remaining on the time delay reaches 12 seconds on a C-61 and 20 seconds on a C-81/121, the electronic controller energizes the water purge valve solenoid. The machine will now purge (empty) the water from the water trough. Throughout this process the machine is still in the freeze mode. Throughout Step 3 the water pump, fan motor(s), contactor and compressor remain energized. The green 'OK' LED is illuminated.

Harvest Cycle — Step 4.

When the harvest cycle begins, the water pump, fan motor(s) and purge valve are shut off by the electronic controller. The contactor coil, compressor, hot gas solenoid and harvest assist motor(s) are energized and the yellow 'Harvest' LED is illuminated.

As the ice is pushed off the evaporator plate(s) by the harvest assist motor(s) the bin switch(es) will momentarily open. The open bin switch(es) will momentarily illuminate the green 'Bin Full' LED.

After the harvest assist motor(s) have made a complete rotation and the ice has cleared the evaporator plate(s), the cam switch(es) return to the N.C. position and terminate the harvest cycle.

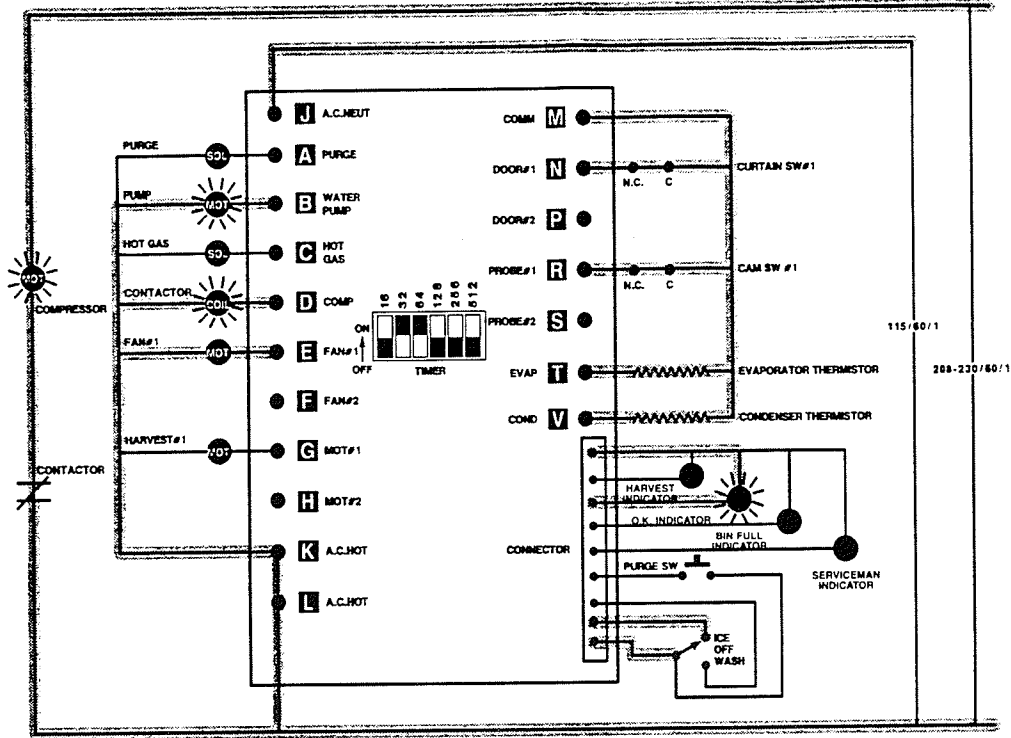
The machine will begin another freeze cycle from the top of the loop and the green 'OK' LED will be illuminated. Should the bin switch(es) remain open for more than 10 seconds, the machine will shut off and the 'Bin Full' LED will remain illuminated.

NOTE: On C-61-C only — Machine has one fan motor, one harvest assist motor, one bin switch and one cam switch.

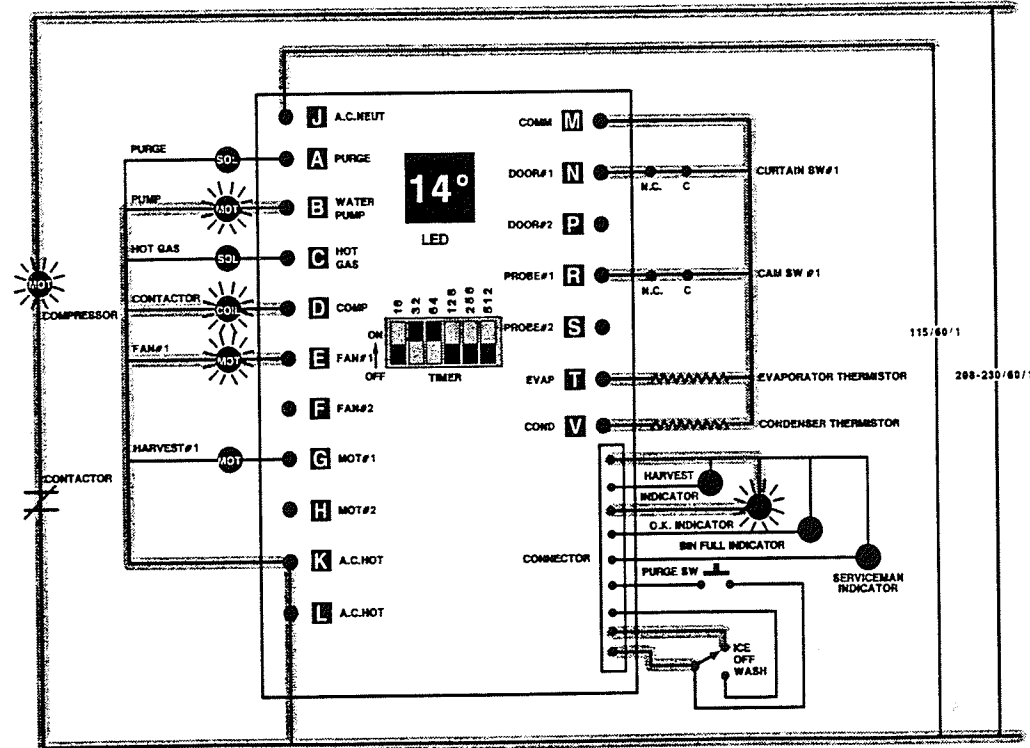
STEP-BY-STEP WIRING DIAGRAMS

C-61-C

Freeze Cycle — Step 1



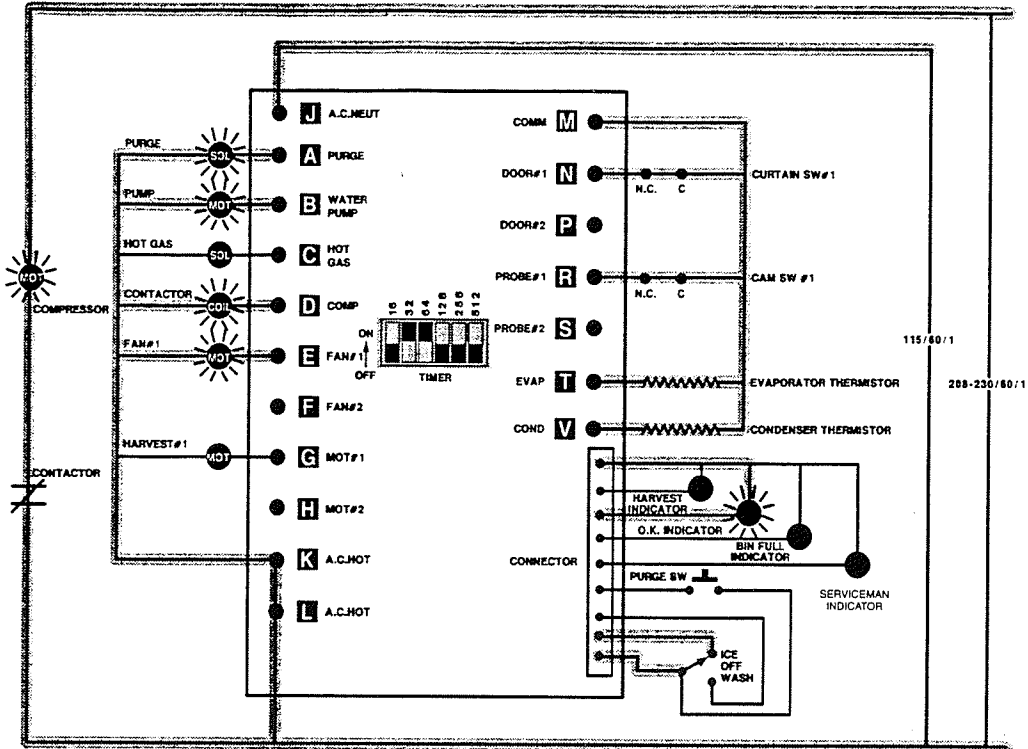
Freeze Cycle — Step 2



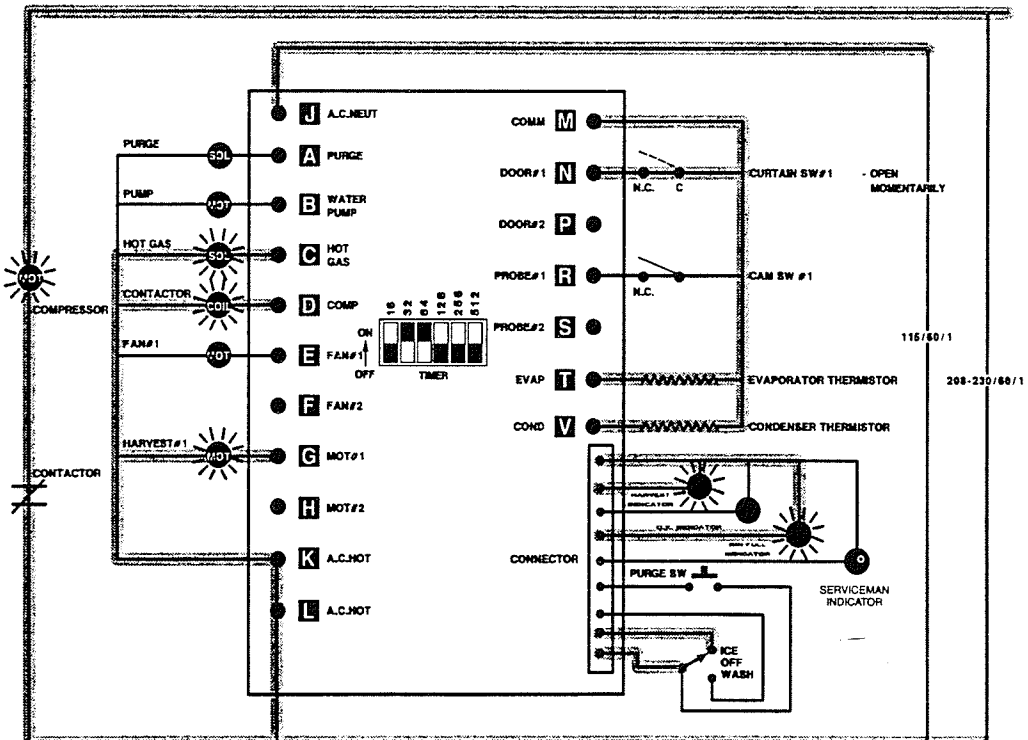
STEP-BY-STEP WIRING DIAGRAMS

C-61-C

Freeze Cycle — Step 3



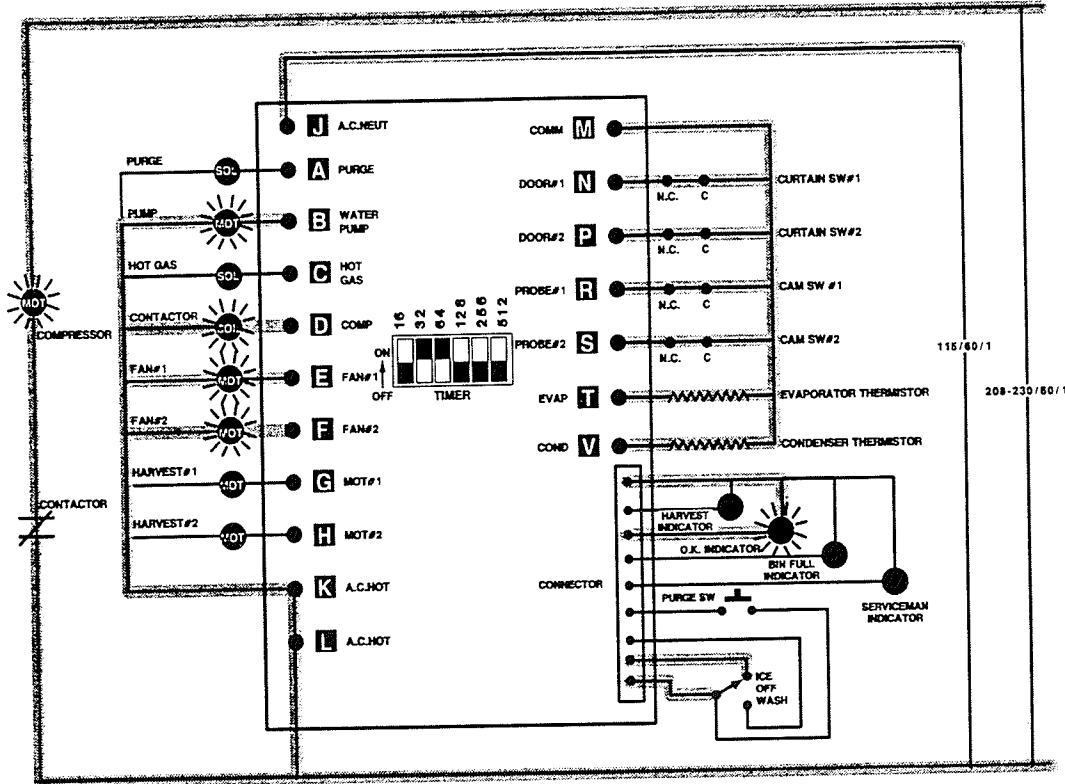
Harvest Cycle — Step 4



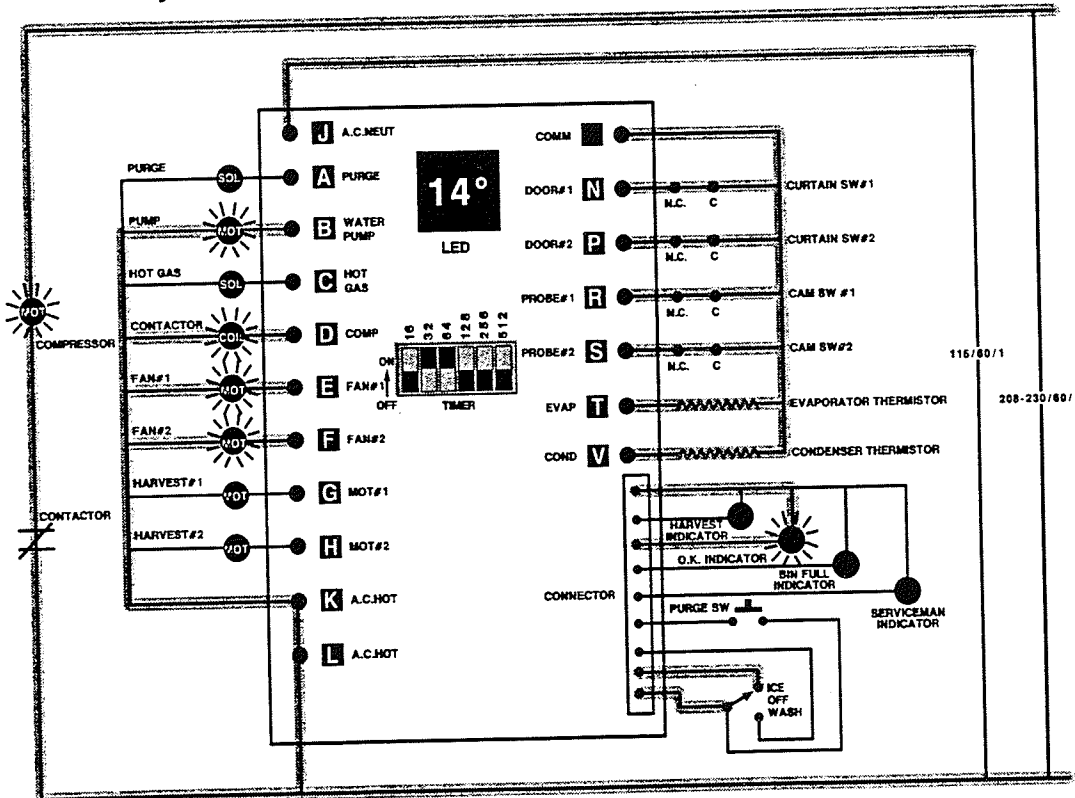
STEP-BY-STEP WIRING DIAGRAMS

C-81/121-C

Freeze Cycle - Step 1



Freeze Cycle - Step 2



THERMISTOR DIAGNOSIS

The evaporator and condenser thermistors continuously sense temperature and send a DC voltage signal to the electronic controller board. Thermistor temperatures are translated by the controller board and appear on the LED display.

To determine if the thermistors are functioning properly and the electronic controller is receiving the correct DC voltage signal from the thermistors according to the temperature displayed on the LED, the following procedure must be followed:

NOTE: The evaporator and condenser thermistors can be checked at any time while the machine is running. The only piece of equipment required is a multimeter that can measure low range DC voltages.

1. Be certain machine is running.
2. Set multimeter to low DC voltage range (no lower than 5 volts DC).
3. Place the black multimeter lead on the terminal labeled COMM on the 5 volt DC (input) side of the controller board. Refer to Figure 1.
4. To check the evaporator thermistor, place the red multimeter lead on the terminal labeled EVAP on the 5 volt DC side of the controller board. Refer to controller board drawing on page C-8.
5. The multimeter should now display a DC voltage.
6. Observe the voltage on the multimeter and the temperature on the LED display on the controller board. Compare these observed figures with evaporator figures listed in the voltage/temperature thermistor chart on page D-16.

Example: Checking an evaporator thermistor. 1.70 volts DC is observed on the multimeter and 30° is observed on the LED display on the electronic controller. Referring to the voltage/temperature thermistor chart shows that the evaporator thermistor is functioning properly.

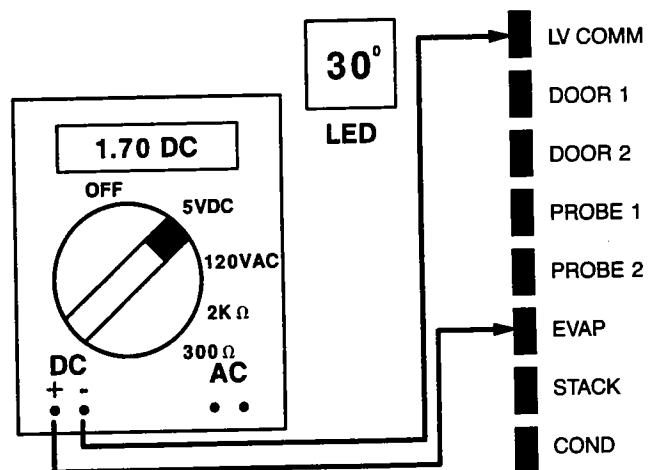


Figure 1 — Evaporator Thermistor Diagnosis

7. To check the condenser thermistor, leave the black multimeter lead on the COMM terminal. Place the red multimeter lead on the terminal labeled COND on the 5 volt DC side of the controller board. Refer to controller board drawing on page C-6.
8. Follow steps 5 and 6 from above. Compare observed figures with condenser figures listed in the voltage/temperature thermistor chart on page D-16.

Example: Checking a condenser thermistor. 2.30 volts DC is observed on the multimeter and 90° is observed on the LED display on the controller board. Referring to the voltage/temperature thermistor chart shows that the condenser thermistor is functioning properly.

VOLTAGE/TEMPERATURE THERMISTOR CHART

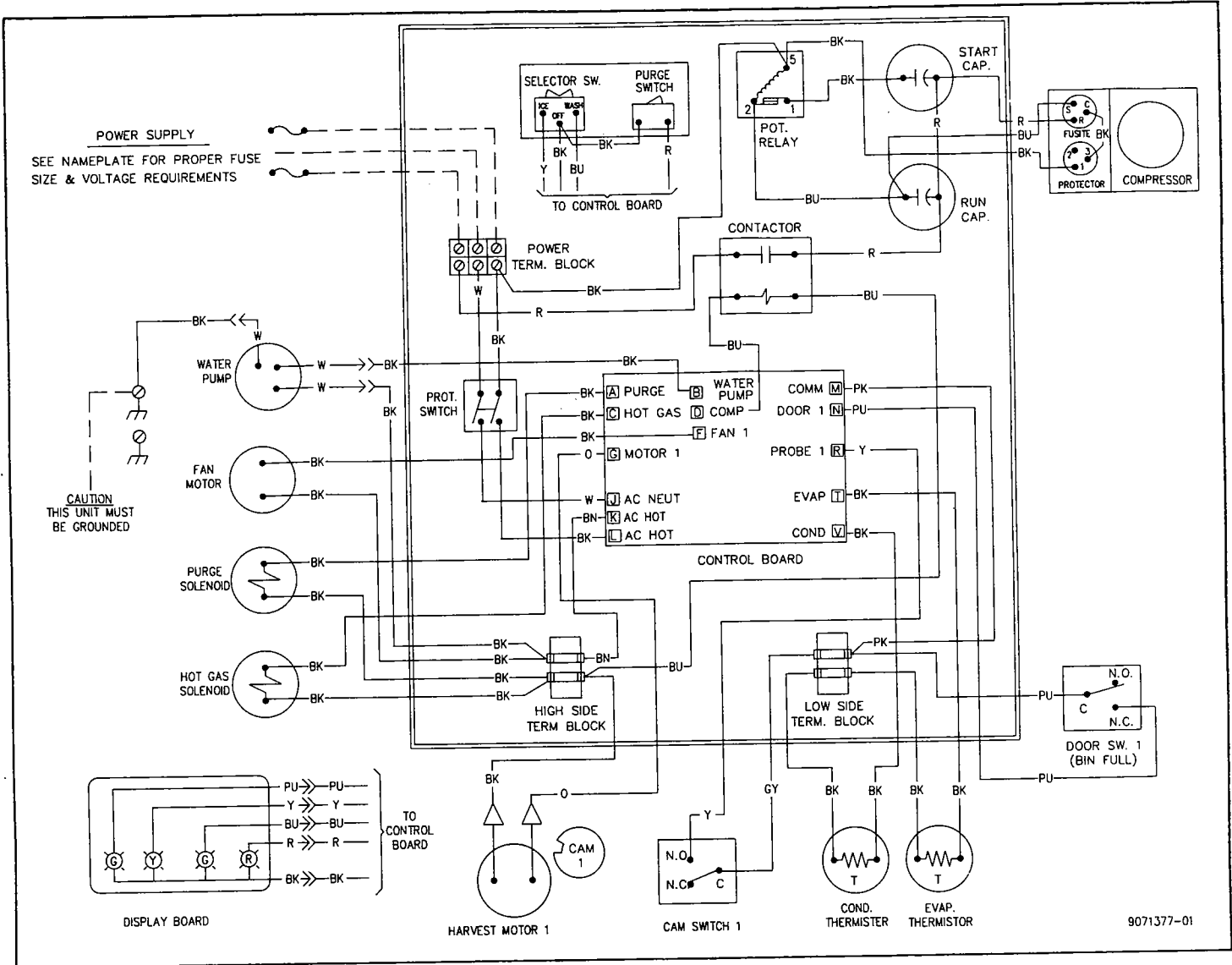
EVAPORATOR THERMISTOR

| DC VOLTS | °F TEMP | DC VOLTS | °F TEMP |
|-------------|------------|-------------|------------|
| .00 | OPEN | 2.60 | 6.08 |
| .10 | 170.56 | 2.70 | 3.42 |
| .20 | 133.70 | 2.80 | 0.52 |
| .30 | 113.35 | 2.90 | - 2.65 |
| .40 | 99.50 | 3.00 | - 5.12 |
| .50 | 88.90 | 3.10 | - 7.13 |
| .60 | 80.32 | 3.20 | - 9.37 |
| .70 | 73.09 | 3.30 | -11.87 |
| .80 | 66.66 | 3.40 | -14.68 |
| .90 | 61.14 | 3.50 | -17.87 |
| 1.00 | 56.20 | 3.60 | -20.90 |
| 1.10 | 51.30 | 3.70 | -23.86 |
| 1.20 | 47.38 | 3.80 | -26.31 |
| 1.30 | 43.42 | 3.90 | -29.21 |
| 1.40 | 39.67 | 4.00 | -32.69 |
| 1.50 | 36.32 | 4.10 | -36.94 |
| 1.60 | 32.78 | 4.20 | -43.80 |
| 1.70 | 30.09 | 4.30 | -44.35 |
| 1.80 | 27.54 | 4.40 | -48.70 |
| 1.90 | 24.80 | 4.50 | -54.80 |
| 2.00 | 21.92 | 4.60 | -62.00 |
| 2.10 | 18.80 | 4.70 | -69.50 |
| 2.20 | 15.49 | 4.80 | -77.00 |
| 2.30 | 12.87 | 4.90 | -86.00 |
| 2.40 | 10.78 | 5.00 | SHORT |
| 2.50 | 8.52 | | |

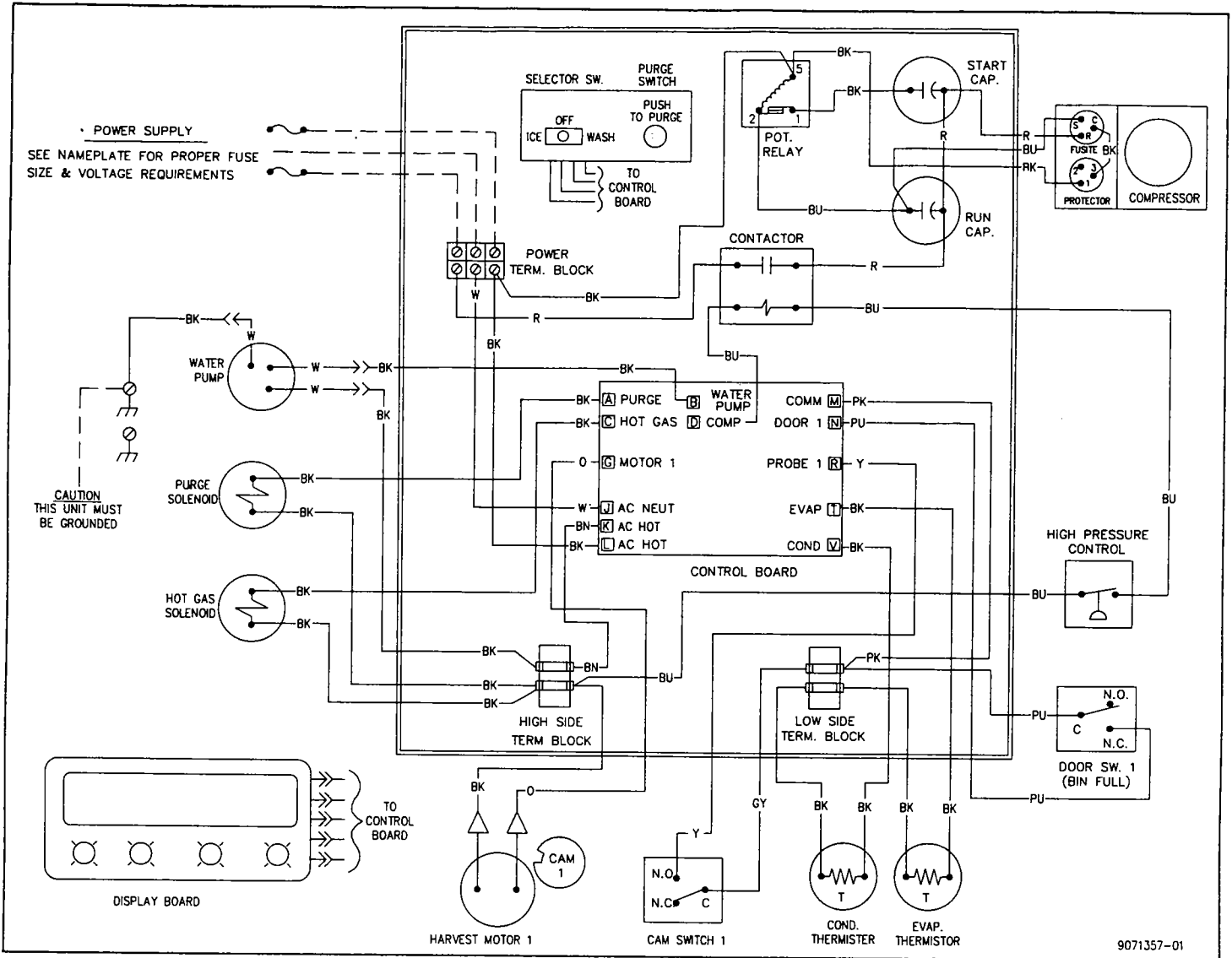
CONDENSER THERMISTOR

| DC VOLTS | °F TEMP | DC VOLTS | °F TEMP |
|-------------|------------|-------------|------------|
| .00 | OPEN | 2.60 | 79.87 |
| .10 | 310.00 | 2.70 | 76.42 |
| .20 | 253.00 | 2.80 | 73.31 |
| .30 | 225.00 | 2.90 | 69.91 |
| .40 | 205.20 | 3.00 | 66.60 |
| .50 | 191.15 | 3.10 | 63.43 |
| .60 | 179.55 | 3.20 | 59.92 |
| .70 | 169.80 | 3.30 | 56.65 |
| .80 | 158.33 | 3.40 | 53.23 |
| .90 | 153.90 | 3.50 | 49.51 |
| 1.00 | 147.13 | 3.60 | 46.13 |
| 1.10 | 140.98 | 3.70 | 42.24 |
| 1.20 | 135.54 | 3.80 | 38.51 |
| 1.30 | 130.18 | 3.90 | 34.44 |
| 1.40 | 125.45 | 4.00 | 30.43 |
| 1.50 | 120.74 | 4.10 | 26.63 |
| 1.60 | 116.47 | 4.20 | 21.87 |
| 1.70 | 112.08 | 4.30 | 15.74 |
| 1.80 | 108.22 | 4.40 | 10.50 |
| 1.90 | 104.19 | 4.50 | 4.28 |
| 2.00 | 100.64 | 4.60 | - 4.54 |
| 2.10 | 96.94 | 4.70 | -12.65 |
| 2.20 | 93.41 | 4.80 | -25.43 |
| 2.30 | 90.00 | 4.90 | -44.67 |
| 2.40 | 86.37 | 5.00 | SHORT |
| 2.50 | 83.20 | | |

C-61-C-AIR WIRING DIAGRAM

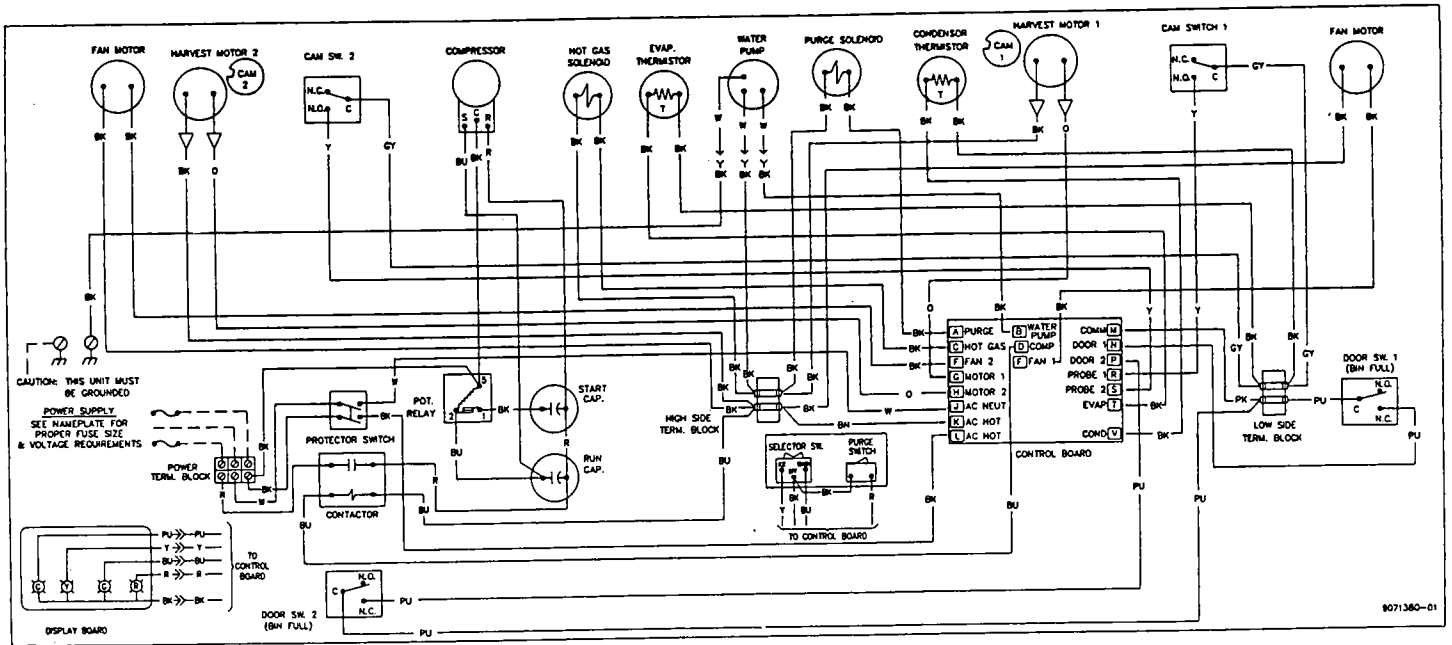


C-61-C-WATER WIRING DIAGRAM

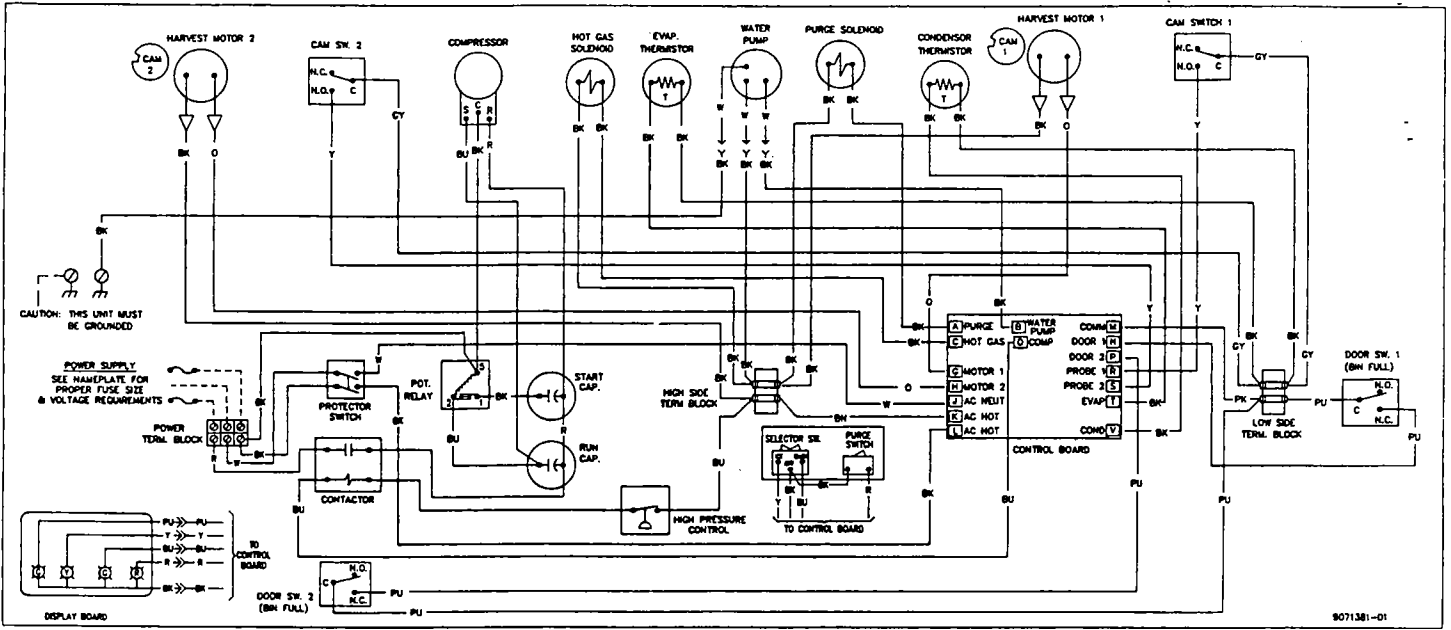


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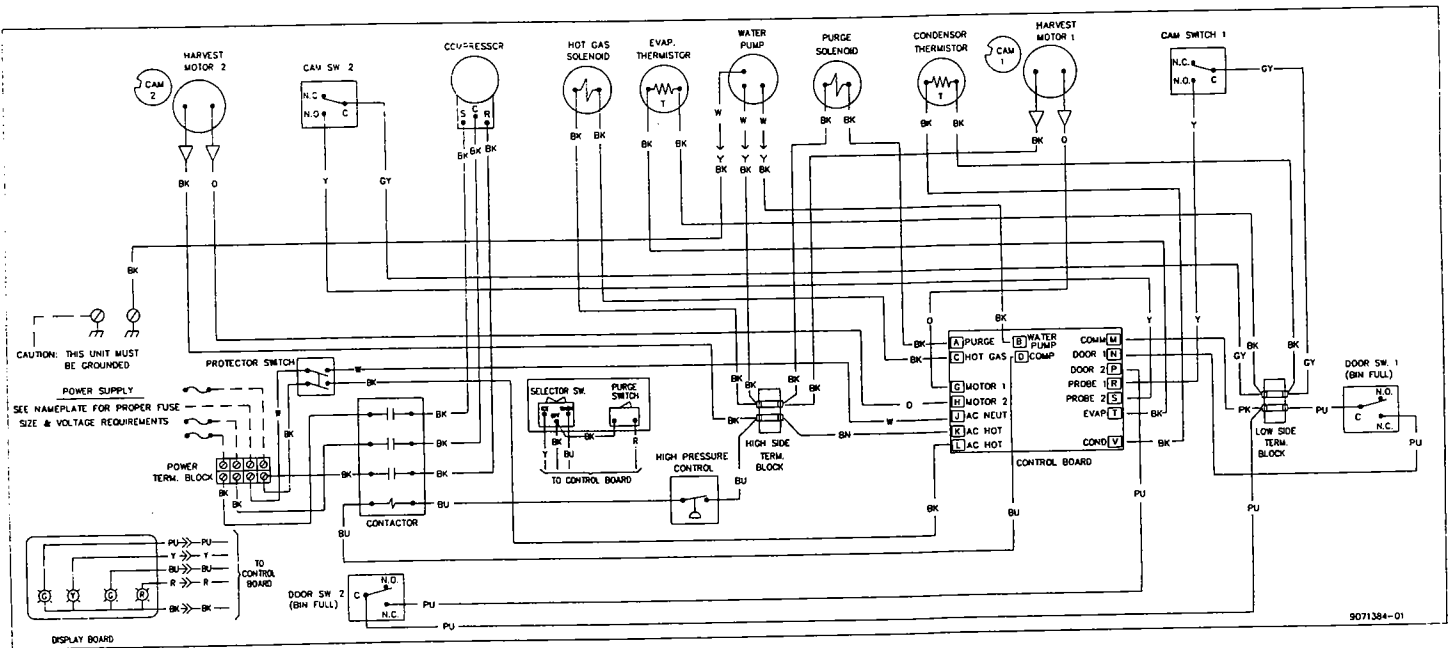
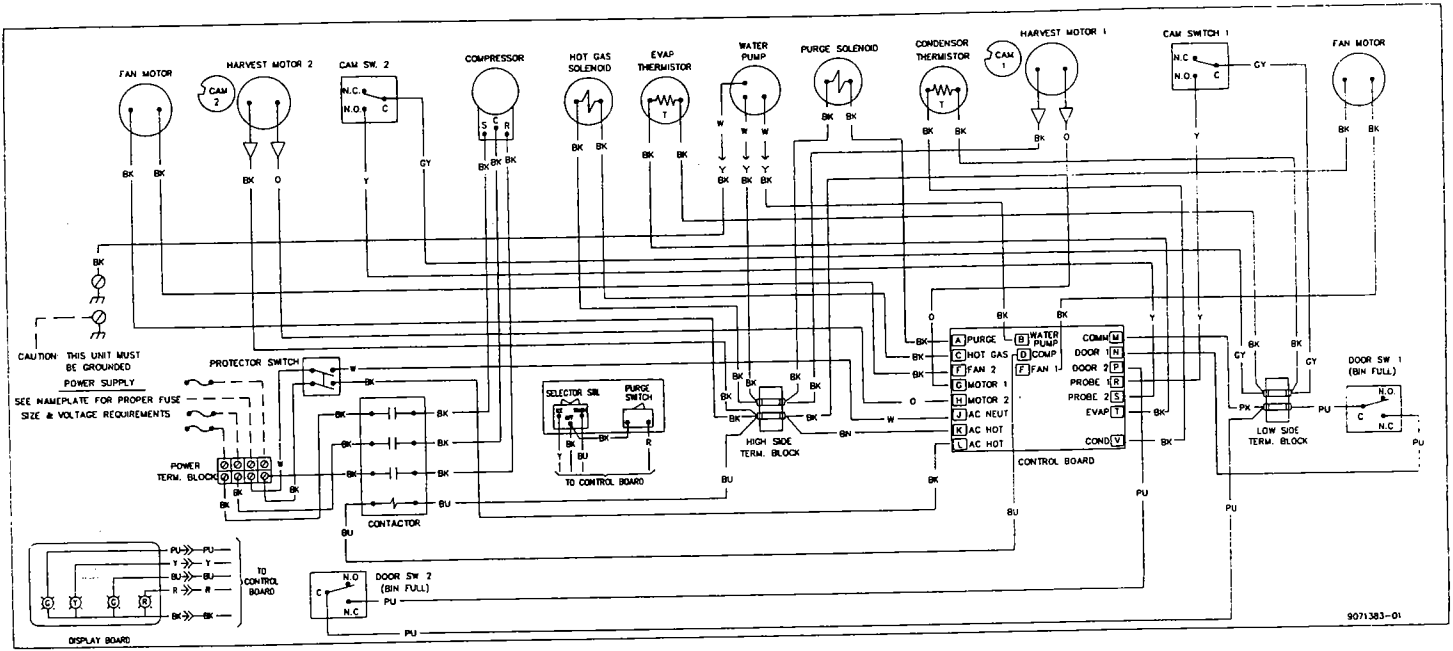
C-81/121-C-AIR WIRING DIAGRAM



C-81/121-C-WATER WIRING DIAGRAM

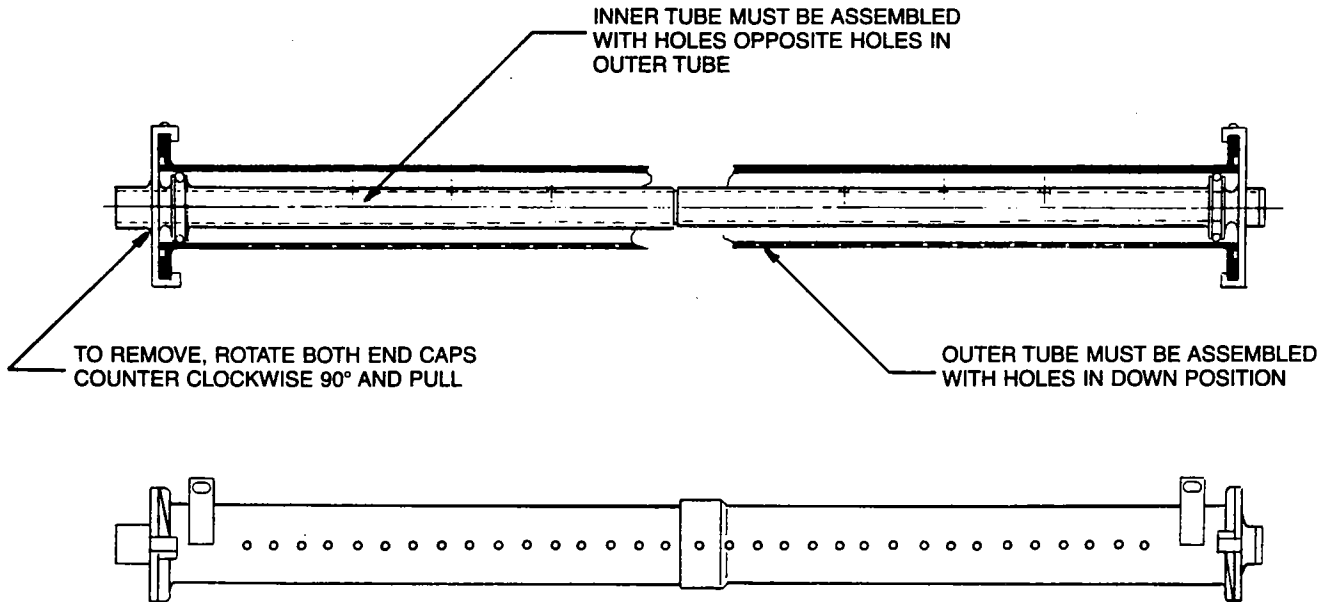


C-84/124-C-AIR & WATER WIRING DIAGRAM

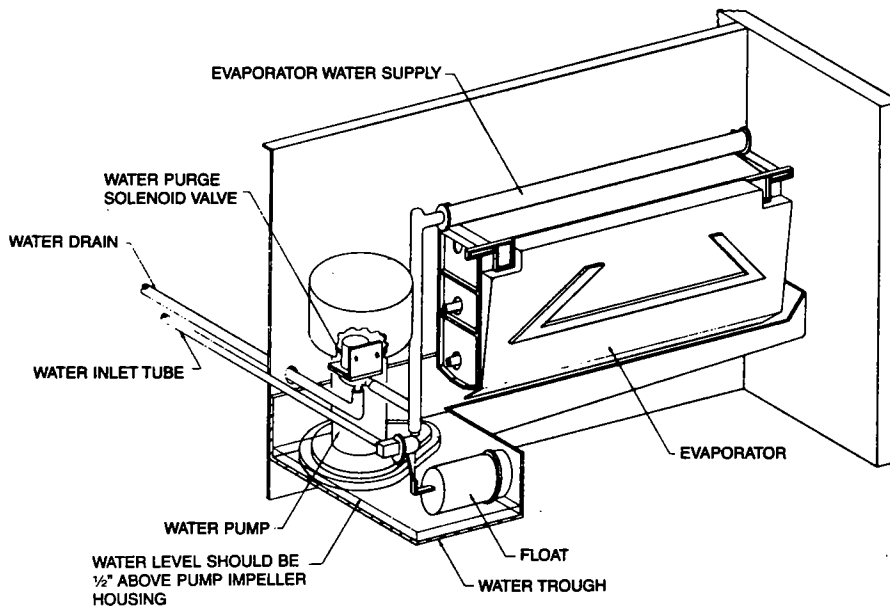


GENERAL INFORMATION

WATER DISTRIBUTION TUBE ASSEMBLY



Water System



Water is circulated, by a water pump, from the water trough over the evaporator freeze plate(s) to be frozen. Any water that is not frozen returns to the trough to be re-circulated. Near the end of the freeze cycle, a water purge valve opens and the water pump continues to run. This empties all water from the trough out through the purge valve drain. Completely dumping the water in this manner keeps the cubes clear, and lengthens the time between cleanings. This allows the water trough to refill in preparation for the next freeze cycle.

GENERAL INFORMATION

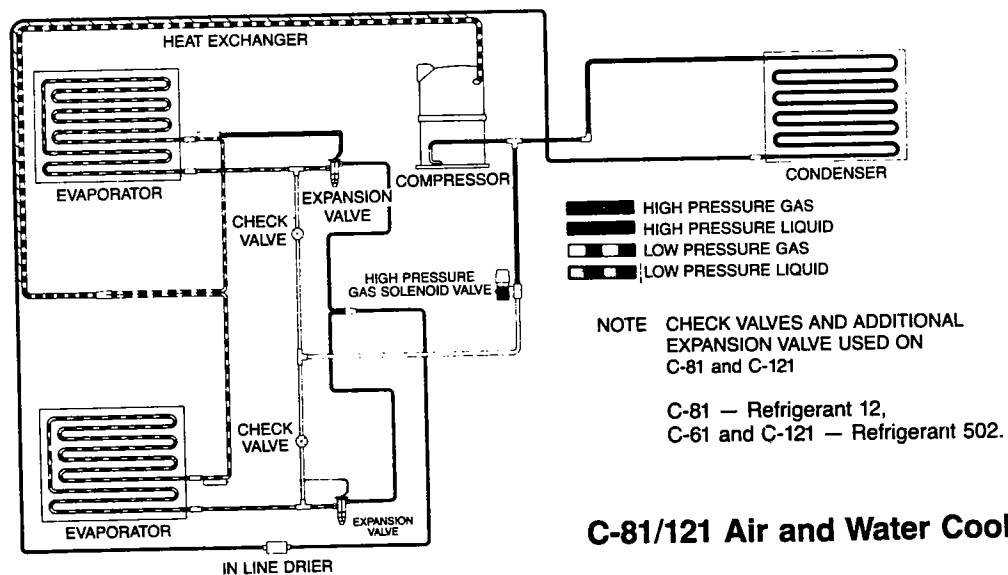
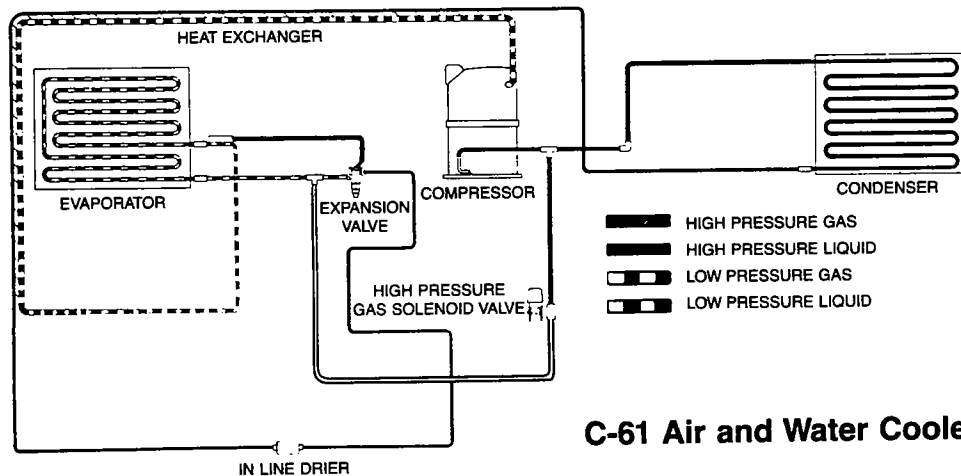
REFRIGERATION SYSTEM FUNDAMENTALS

(Air and Water Cooled)

The below figure shows the Refrigeration System Schematic. During the freezing cycle high temperature and pressure liquid refrigerant is fed from the condenser through a drier and heat exchanger to a thermostatic expansion valve. This valve meters the refrigerant to the coils on the back side of the evaporator. The refrigerant absorbs heat causing a portion of the water flowing over the evaporator to freeze into ice. The refrigerant is maintained at a low pressure by the action of the compressor.

The low temperature and pressure refrigerant leaving the evaporator is directed through the heat exchanger and is returned to the compressor. There it is compressed to a high temperature and pressure gas. It is then directed to a condenser to be converted again to high temperature and pressure liquid.

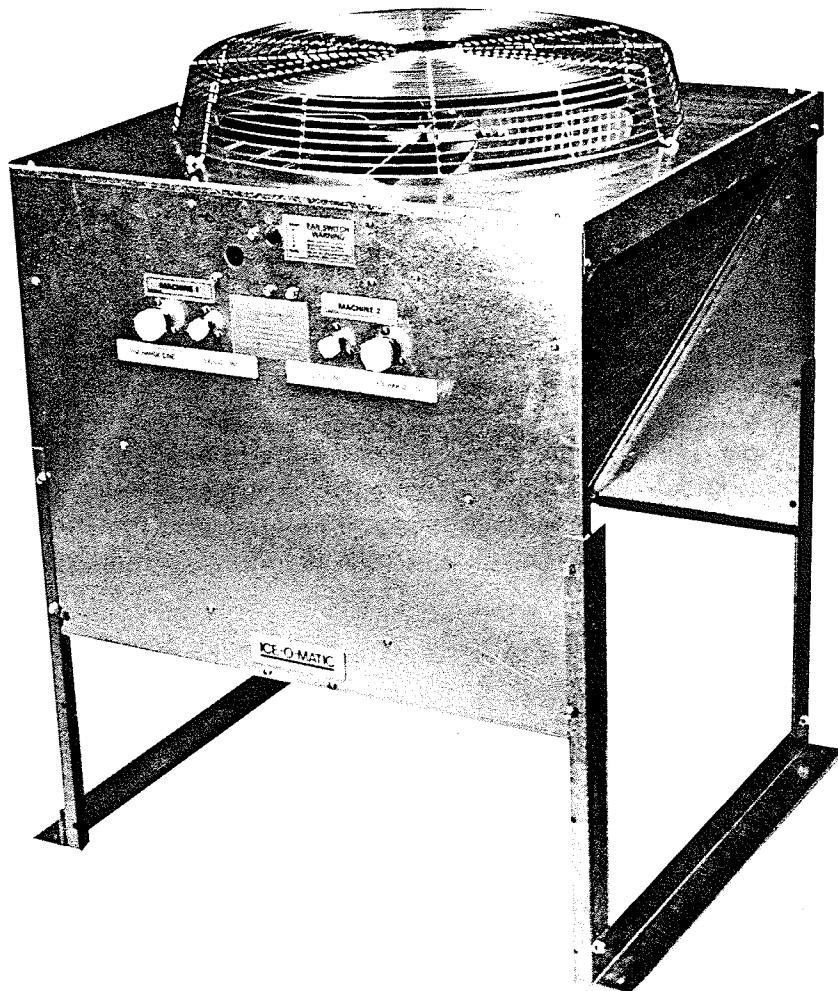
During the harvest cycle, the hot gas solenoid valve (normally closed during the freezing cycle) opens to direct the high temperature gas leaving the compressor into the evaporator ahead of the expansion valve. This gas rapidly warms up the evaporator to above freezing. The ice slab is thawed loose from the evaporator and then released by the probe assist motor. At the end of the harvest cycle the hot gas solenoid valve closes and a freezing cycle starts.



NOTES

REMOTE CONDENSER MODELS INFORMATION, INSTALLATION AND SERVICE

RC-60-2
RC-80
RC-80-2
RC-120
RC-120-2



ICE-O-MATIC REMOTE CONDENSER SYSTEMS

INTRODUCTION

Ice-O-Matic Remote Condenser Systems are made up of three packages. The remote condenser, the ice making unit, and the pre-charged line set. Pre-charged line sets are available in either 25 or 40 foot lengths.

Normal installation of the ice making unit should be followed. Please see installation instructions included with the ice maker.

In any installation, the pre-charged line sets, consisting of a liquid line ($\frac{3}{8}$ " dia.) and a discharge line ($\frac{1}{2}$ " dia.) are used as a one time, initial charge type of installation. Once the sealed couplings are connected and the internal seal is broken, the lines cannot be disconnected without losing the refrigerant charge. They are, however, reusable and when they are removed and re-connected the complete refrigeration system must be evacuated and re-charged with the proper amount of refrigerant. See page A6 for proper refrigerant charges.

GENERAL DESCRIPTION

The remote condenser should be used in areas where sufficient airflow is not available in the area the ice maker is being installed or the heat being rejected by the condenser coil is undesirable.

The condenser coil should not be exposed to temperatures below -20°F or above 120°F .

The remote condenser functions as a normal refrigeration system until the temperature at the condenser coil drops below 70° fahrenheit. At this time the mixing valve will begin to bypass enough hot gas from the discharge line directly into the receiver to keep the liquid line feeding the expansion valve at a steady 125 p.s.i. on R-12 (225 p.s.i. on R-502 units). This bypassing is done in spurts through the mixing valve. The amount of gas being bypassed will depend on the temperature at the condenser coil (e.g. the colder the temperature at the condenser coil, the more gas will bypass, the warmer the line between the valve and the receiver will become). For the complete explanation of this valve please refer to the schematic on page E4 of this manual.

The condenser fan will run throughout the cycle. The 'bypassing' action of the mixing valve eliminates the need for a fan control.

There is an off-on switch provided at the condenser coil. This switch turns off only the condenser fan and should always be in the ON position when the icemaker is running. For proper wiring of the condenser to the ice maker please refer to the wiring diagrams included in this manual beginning on page E-10.

For individual part description of the components in the remote condenser refer to page E3 of this service manual.

GENERAL SERVICE INFORMATION

COMPONENT DESCRIPTION

- 1. Mixing Valve** — This valve serves as the head pressure regulating valve. It contains a pre-determined charge of nitrogen in the bellows. Refer to page E4 for diagram and description.
- 2. Receiver** — The amount of liquid in the receiver will vary with the temperature at the condenser coil.
- 3. Liquid solenoid valve and pump-down low pressure control** — When the bin control opens or the on-off switch is turned to the OFF position, the liquid line solenoid valve closes and the system begins to pump down. When the low pressure reaches 5 p.s.i. on R-12 and 502 units, the dual pump-down low pressure control opens the contactor and shuts the machine off. After the bin control closes or the on-off switch is turned back on, the liquid line solenoid valve opens and the high and low side pressures start to equalize. When the low side pressure reaches 55 p.s.i. on R-12 and 502 units the pump-down low pressure control closes and the machine starts into a freeze cycle. When the machine is off for extended periods of time (e.g. overnight) it will pump itself down approximately once every hour. This is due to the equalizing of the pressures during the off cycle resetting the pump-down low pressure control. It is a normal function of the system. The high pressure control opens at 250 p.s.i. on R-12 units (400 p.s.i. on R-502 units) in the event of extremely high discharge pressure.
- 4. Condenser fan motor** — Is a single-speed, permanent-split capacitor motor and should be wired according to the wiring diagram beginning on page E-10 in this manual. The motor should be oiled every six months with 5 ccs of 20 weight SAE non-detergent oil. Apply oil through the neoprene oil hole in the center of the motor. The on-off switch mounted on the outside of the condenser cabinet should be left in an on position for proper operation. Turning this switch off cuts power only to the fan motor.

Note: If two machines are being run on an (RC-60-2, RC-80-2, or RC-120-2, the fan motor should be wired to a separate power source to run 100% of the time.

GENERAL INFORMATION

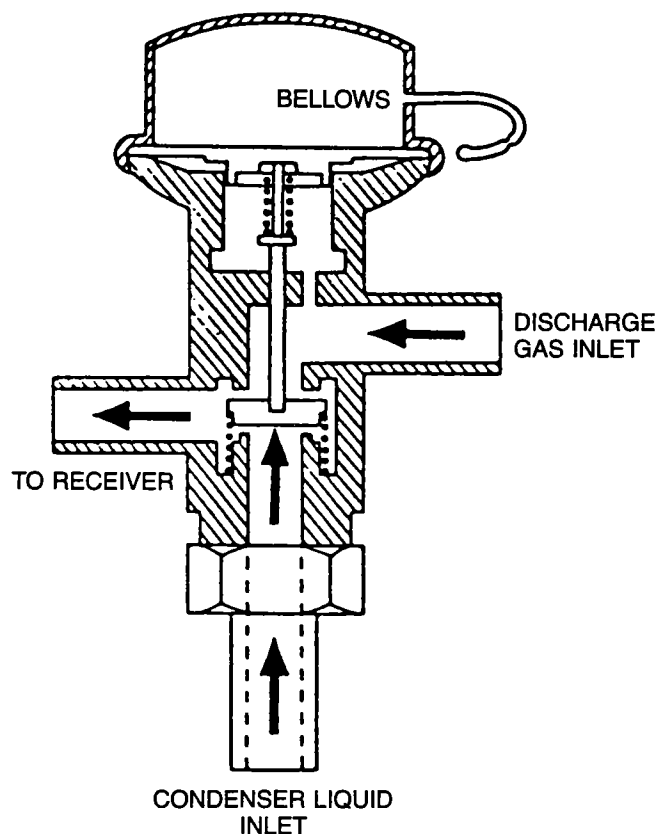
MIXING VALVE OPERATION

The mixing valve is used to maintain a constant head pressure. There is a nitrogen charge contained in the bellows of the valve. This charge works against liquid line pressure going to the receiver.

When the temperature at the condenser is above 70° the refrigerant flow through the valve is from the condenser to the receiver.

When the temperature at the condenser is below 70° the pressure in the bellows of the mixing valve overcomes the pressure in the liquid line going to the receiver, the valve opens and allows discharge high pressure gas, as well as liquid from the condenser, to flow through the valve and mix in the receiver to maintain head pressure and liquid line temperature and pressure.

NOTE: If it becomes necessary to evacuate and recharge the machine, the entire charge (see refrigerant charge on page A6 of this manual) must be added before accurate pressure readings can be taken.



GENERAL INSTALLATION INSTRUCTIONS

GENERAL INSTALLATION INSTRUCTIONS

REMOTE CONDENSER

1. Choose a location that is protected from the extremes of dirt, dust, rain, sun and prevailing winds.
2. Vertical discharge mounting of the condenser is recommended.
3. Unit must be leveled.
4. Installation must meet local building, plumbing and electrical codes.
5. Condenser coil should not be exposed to temperatures above 120°F or below -20°F.

PRE-CHARGED LINE SET

1. Install the $\frac{3}{8}$ " liquid line and $\frac{1}{2}$ " discharge line to the proper ports, as labeled, being sure the service port is towards the remote condenser end. See attached diagram on page E6.
2. See attached diagram on pages E6 & E7 for proper installation techniques and tube routings of the line sets.
3. Lubrication (refrigerant oil) is recommended for both coupling halves to insure proper trouble-free assembly of line sets.
4. Thread coupling valves together by hand to insure proper fit. Using a wrench on both halves, to prevent tubes from twisting, tighten until snug. Then an extra $\frac{1}{4}$ turn to ensure a leak-free joint.
5. Plan ahead when routing lines so that excess tubing remains inside building.

ELECTRICAL CONNECTIONS

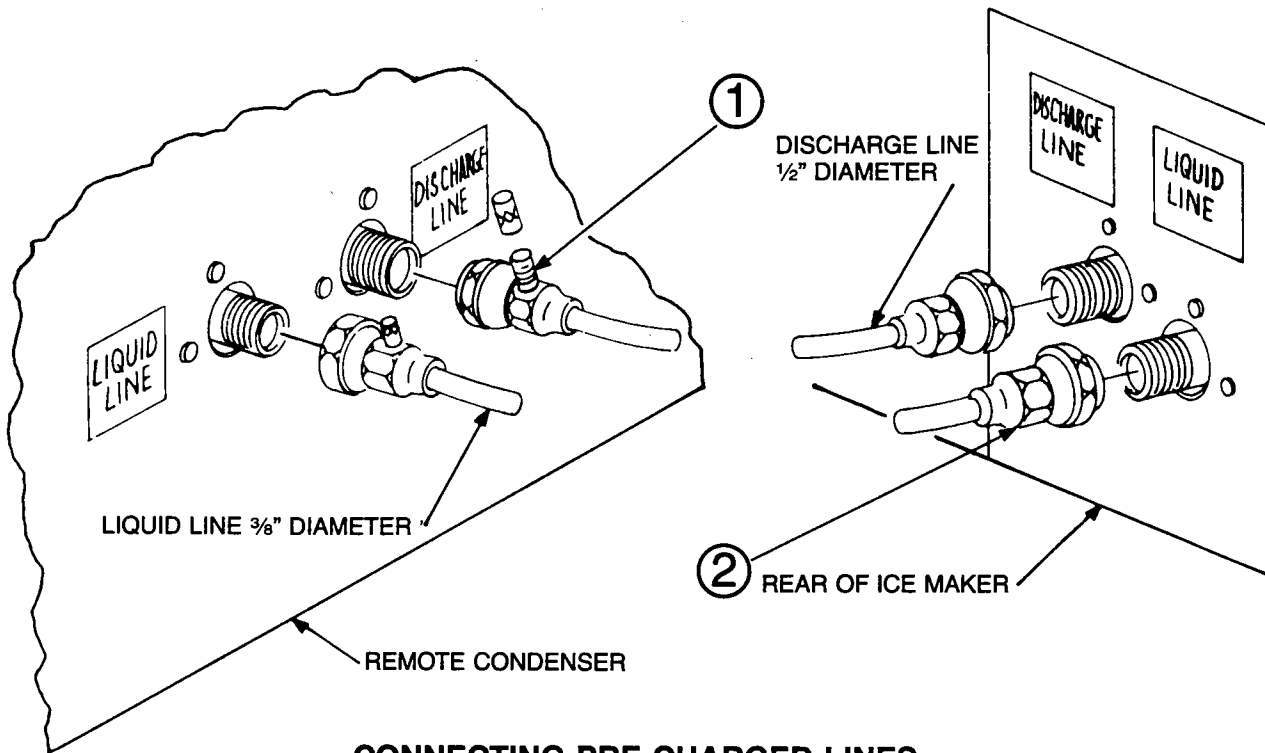
1. The ice maker and the remote condenser both require a solid earth ground that meets national, state and local electrical requirements.
2. See nameplate for current requirements to determine wire size to be used for electrical hook up.
3. Make sure supply voltage is the same as the rated voltage shown on nameplate.
4. See wiring diagram beginning on page E10 for proper connections between remote condenser and ice machine.

RULES FOR RUNNING REMOTE LINES

1. Loops in excess tubing should be run vertically and contained inside building.
2. Condenser should be above ice-maker, lowest part of system should be the ice-maker, lines should not run below the line connections on the ice maker (e.g., lines routed below — then up to connections on ice maker result in oil traps.) See pages E6 & E7.

GENERAL INFORMATION

REMOTE TUBING ROUTING



CONNECTING PRE-CHARGED LINES

Both the discharge and liquid lines come equipped with Schraeder fittings on one end of the tubing. This Schraeder should be connected to the remote condenser on both the discharge and liquid lines for access to pressure readings at the condenser as shown in #1. When connecting the quick connect fittings, #2, always lubricate fittings with refrigerant oil. Fittings should be tightened until snug — and then given another quarter turn. ALWAYS LEAK CHECK AROUND FITTINGS AFTER INSTALLATION HAS BEEN MADE.

PROPER TUBING ROUTING

When installing discharge and liquid lines from remote condenser to the ice making head please use the following guidelines:

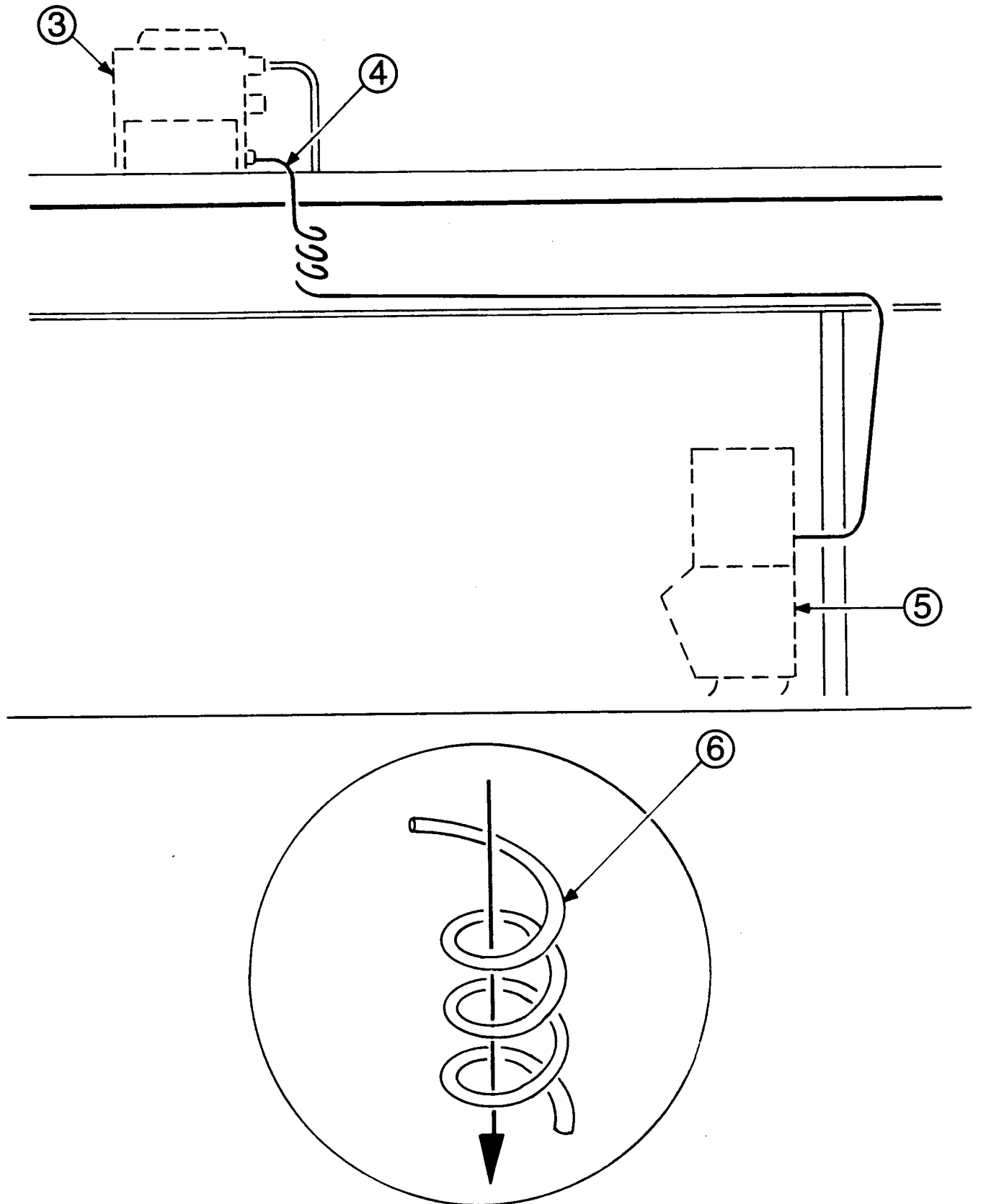
1. Remote condenser #3 should always be installed above the icemaker #5 as shown.
2. All excess tubing #4 should be routed inside the building and coiled in a vertical spiral as shown in #6 to prevent oil trapping in the lines. Any tubing run outside should be insulated to protect it from surrounding ambient conditions. Tubing should follow straight line routing whenever possible. The lowest spot in the remote tubing run should be the connection at the back of the ice maker head.

FOR DUAL CIRCUITED CONDENSER

The dual pass condenser is two separate condensers contained in one shroud. When routing lines insure that the discharge and liquid lines from each machine go to one condenser. Do not connect the discharge line from one machine and the liquid line from another machine to the same condenser. When running two machines on the same condenser the remote fan motor should be wired to run 100% of the time.

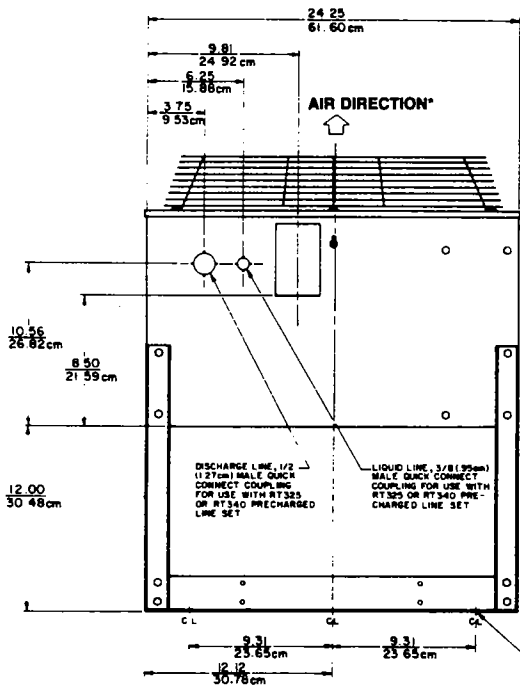
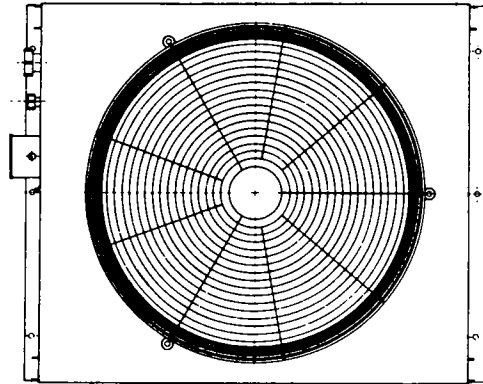
GENERAL INFORMATION

REMOTE TUBING ROUTING (continued)

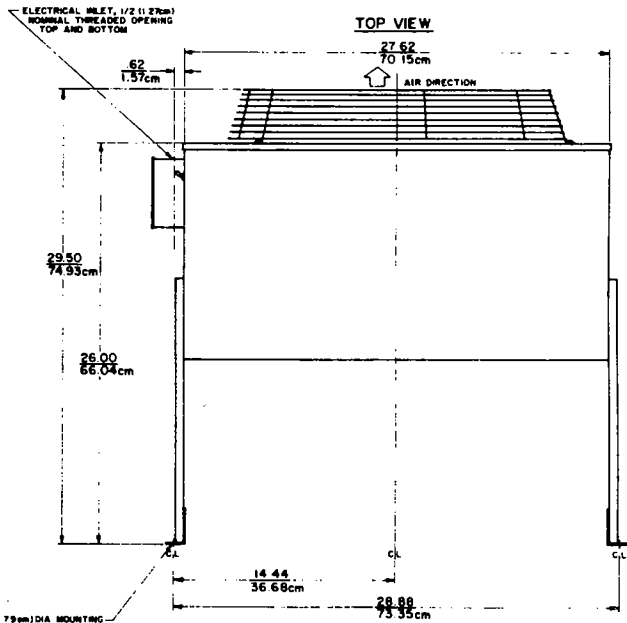


CONDENSER DIMENSIONS

RC-60
RC-80
RC-120



FRONT VIEW
RECOMMENDED VERTICAL DISCHARGE

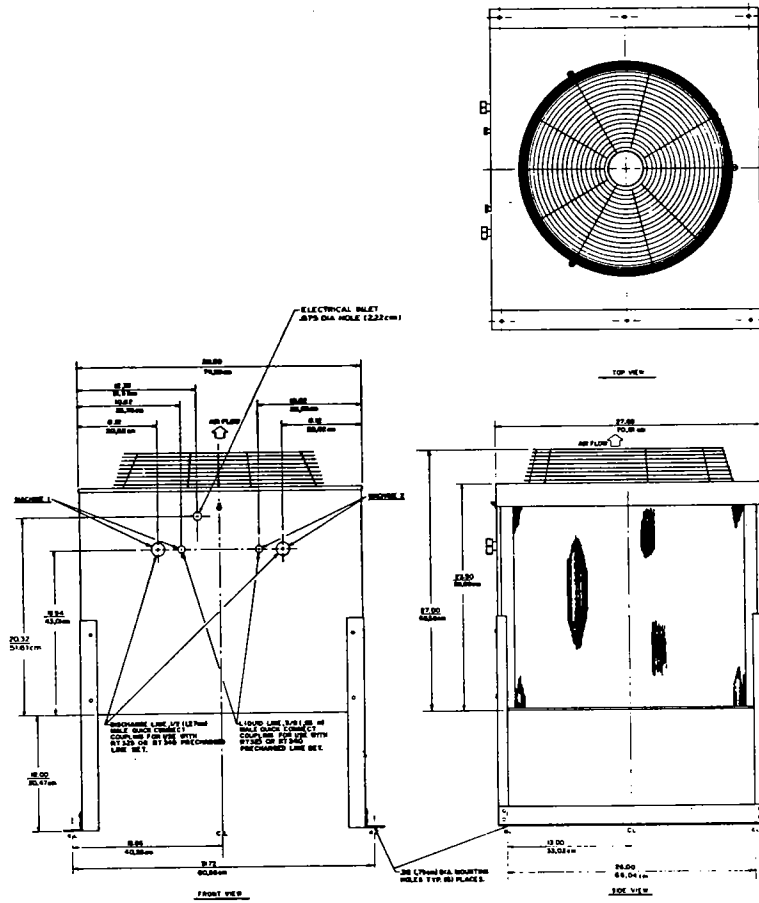
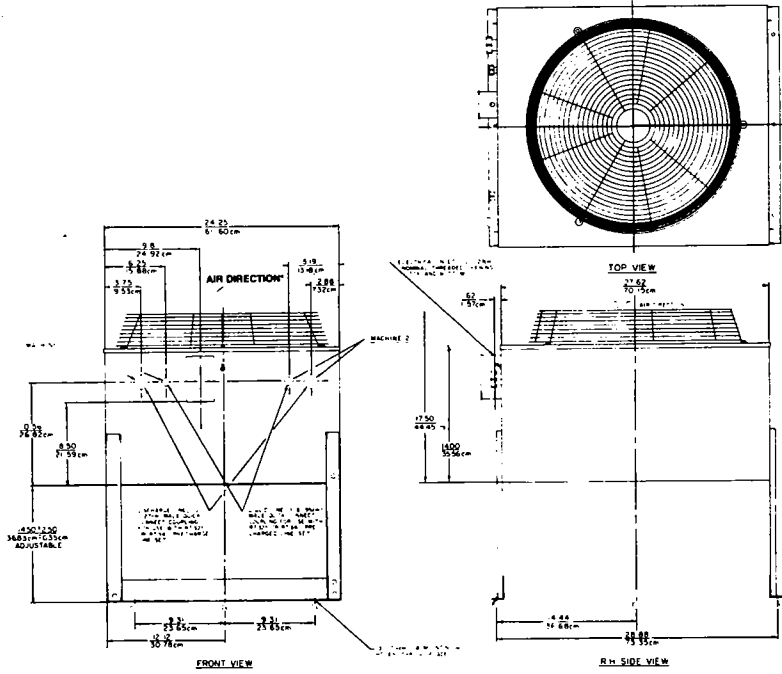


R.H. SIDE VIEW

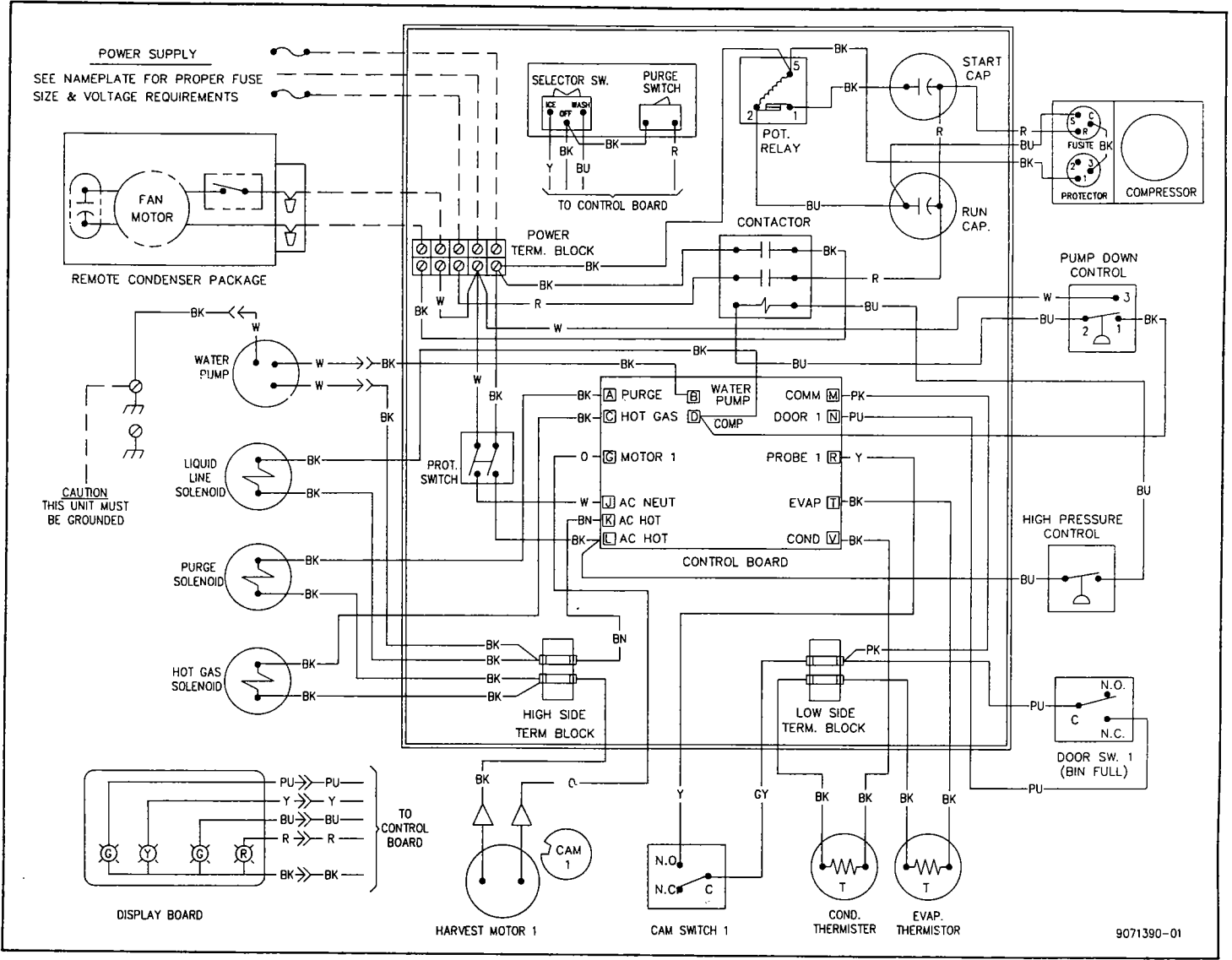
*NOTE AIR FLOW

CONDENSER DIMENSIONS

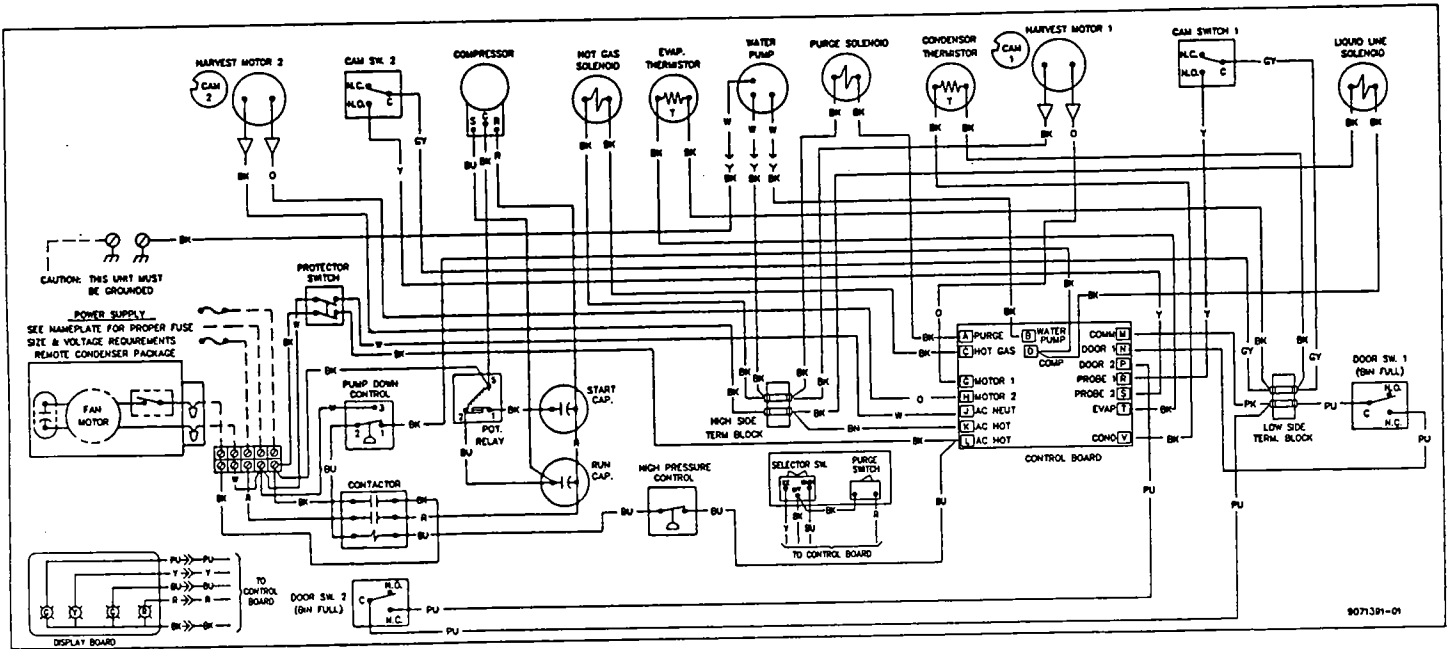
RC-60-2
RC-80-2
RC-120-2



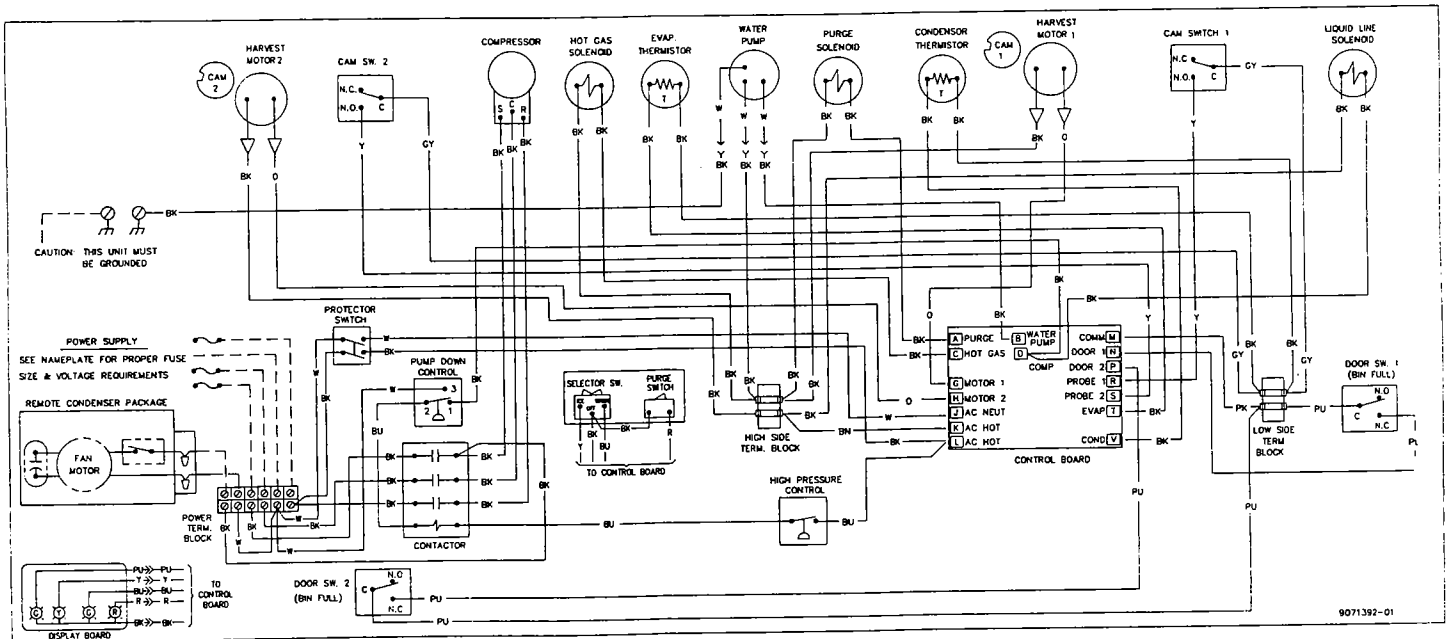
C-61-C-Remote Wiring Diagram



C-81/121-C-Remote & C-84/124-C-Remote Wiring Diagram



C-81/121-C Remote

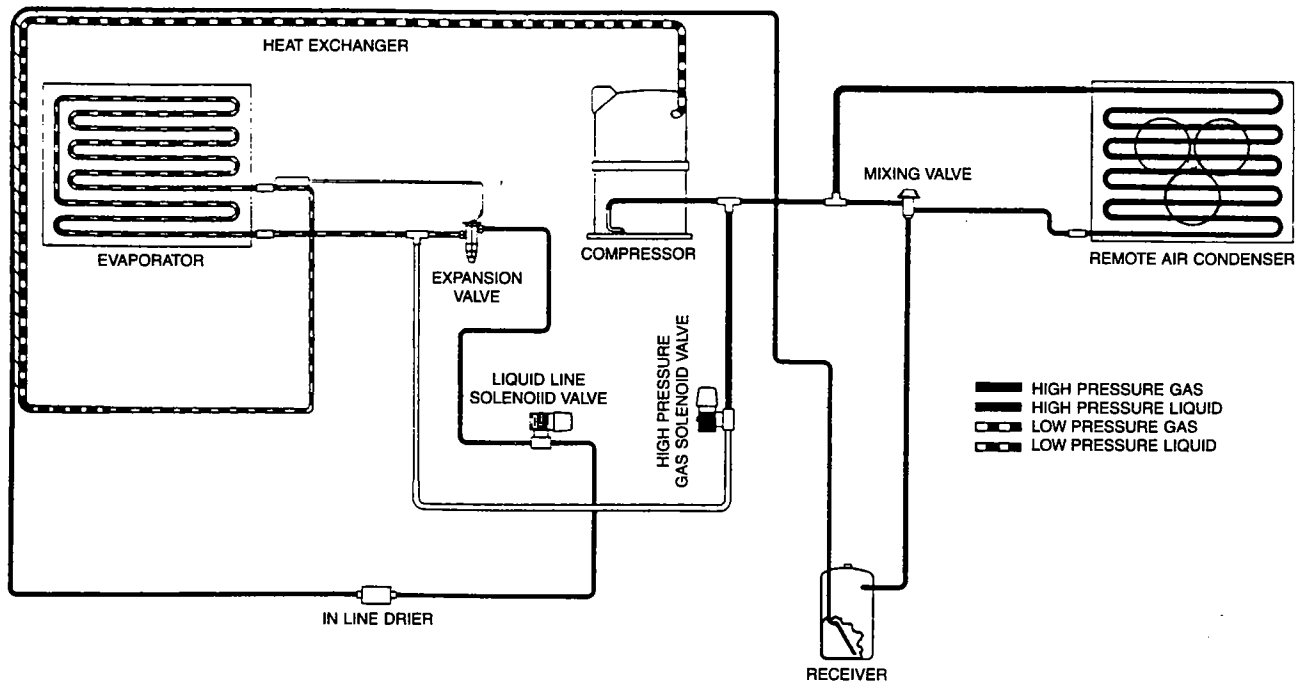


C-84/124-C Remote

GENERAL INFORMATION

REFRIGERATION SYSTEM FUNDAMENTALS

(Remote Air Condenser Cooled)



The figure above shows the Remote Refrigeration Schematic. During the freezing cycle high temperature and pressure liquid refrigerant is fed from the condenser through a receiver, drier and heat exchanger to a thermostatic expansion valve. This valve meters the refrigerant to the coils on the back side of the evaporator. The refrigerant absorbs heat, causing a portion of the water flowing over the evaporator to freeze into ice. The refrigerant is maintained at a low pressure by the action of the compressor.

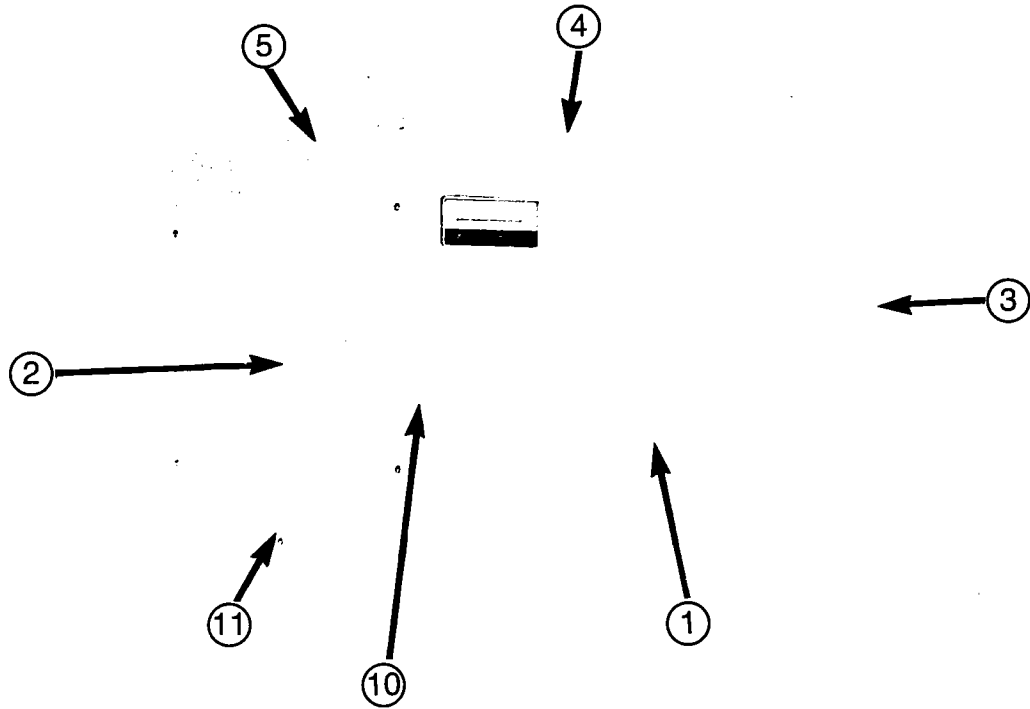
In low ambient conditions (below 70°F air temperature at the condenser) the mixing valve opens to mix discharge gas with liquid returning from the condenser, in the receiver, to maintain discharge and liquid line pressures.

The low temperature and pressure refrigerant leaving the evaporator is directed through the heat exchanger and is returned to the compressor. There it is compressed to a high temperature and pressure gas. It is then directed to a condenser to be converted again to high temperature and pressure liquid.

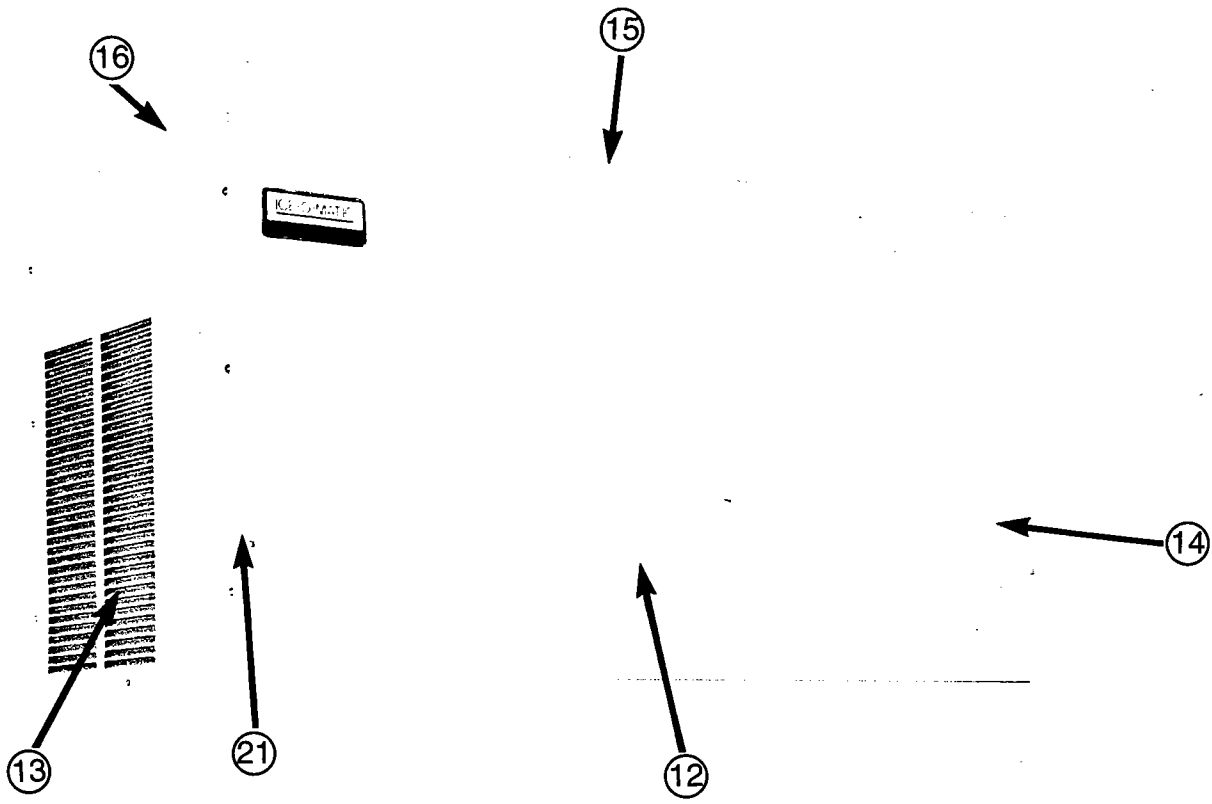
During the harvest cycle, the hot gas solenoid valve (normally closed during the freeze cycle), opens and directs the high temperature gas leaving the compressor into the evaporator. Once the evaporator has reached approximately 40°F, the harvest motor overcomes the capillary attraction of the ice and the evaporator, and releases the ice from the evaporator. At the end of the harvest cycle, the hot gas solenoid valve closes and another freeze cycle begins.

During the off cycle the liquid line solenoid valve is closed to prevent refrigerant migration to the roof-top condenser.

Exterior Panels



C-61-C



C-81/121-C

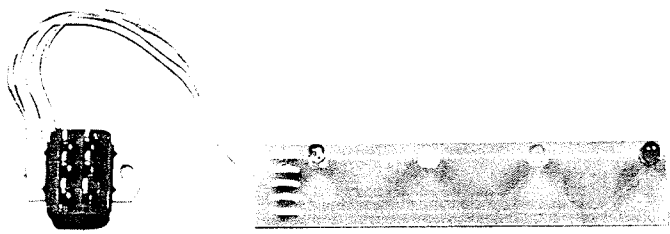
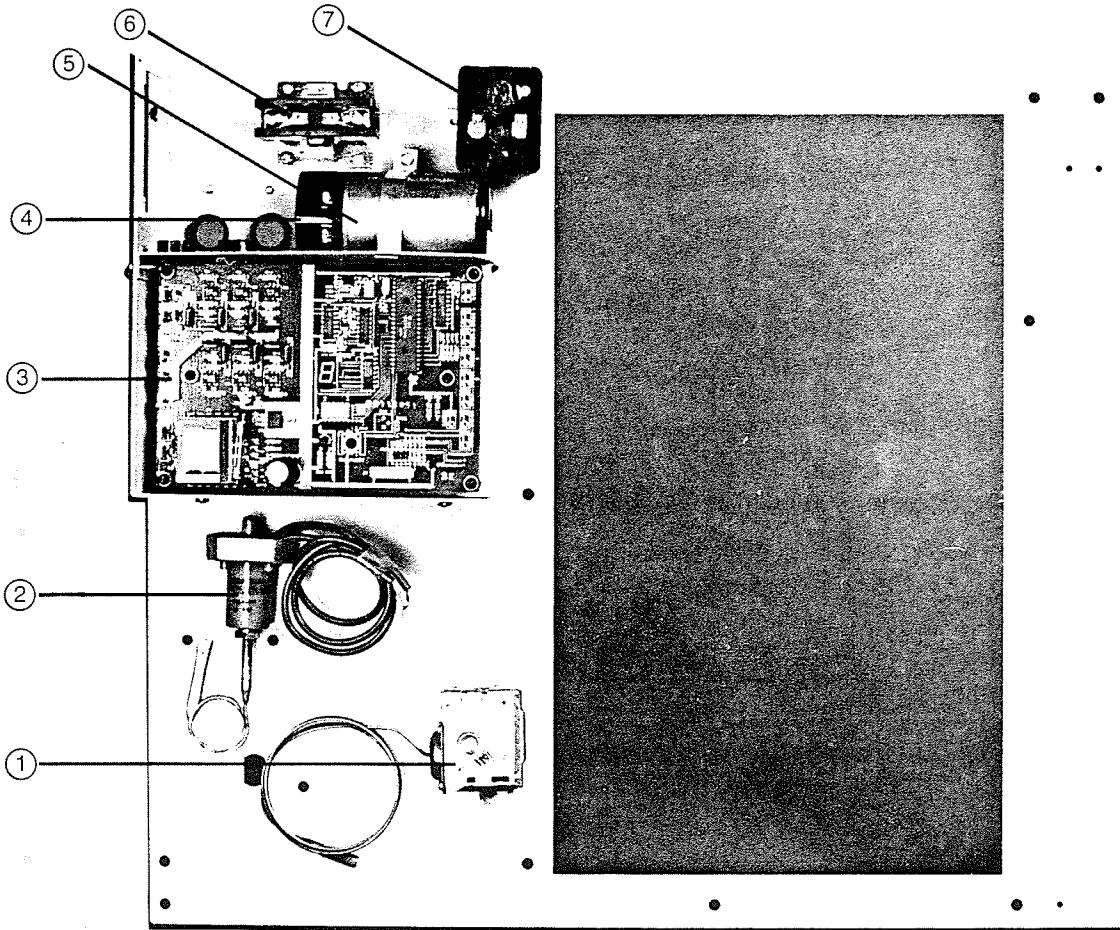
PARTS SECTION

EXTERIOR PANELS

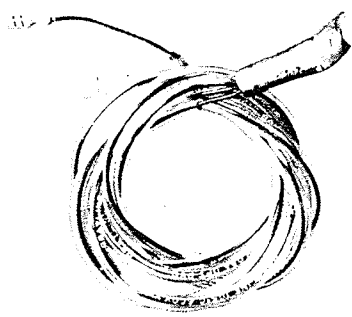
C-61/81/121-C

| Index # | Description | Part Number | Notes | Model | | |
|---------|---|-------------|------------------------------|-------|------|-------|
| | | | | C-61 | C-81 | C-121 |
| 1 | Front Panel (Plastic) | 2031321-03 | w/Indicator LEDs | X | | |
| 2 | Left Hand Side Panel | 3021378-03 | Painted (No Louvers) | X | | |
| 3 | Right Hand Side Panel | 3021378-01 | Painted (Louvered) | X | | |
| 4 | Top Panel | 3021375-01 | Painted | X | | |
| 5 | Rear Panel | 3021377-01 | Galvanized | X | | |
| 6 | Front Panel (S/S) (Not Shown) | 2031321-01 | w/Indicator LEDs | X | | |
| 7 | Left Hand Side Panel (S/S) (Not Shown) | 3021378-04 | Stainless Steel (No Louvers) | X | | |
| 8 | Right Hand Side Panel (S/S) (Not Shown) | 3021378-02 | Stainless Steel (Louvered) | X | | |
| 9 | Top Panel (S/S) (Not Shown) | 3021433-01 | Stainless Steel | X | | |
| 10 | Panel Screws | 9031074-02 | Front Panel | X | | |
| 11 | Panel Screws | 9031074-01 | Side, Back, Top Panel | X | X | X |
| 12 | Front Panel (Plastic) | 2031321-04 | w/Indicator LEDs | | X | X |
| 13 | Left Hand Side Panel | 3021394-03 | Painted (Louvered) | | X | X |
| 14 | Right Hand Side Panel | 3021394-01 | Painted (Louvered) | | X | X |
| 15 | Top Panel | 3021393-01 | Painted | | X | X |
| 16 | Rear Panel | 3021396-01 | Water Cooled & Remote Only | | X | X |
| 17 | Front Panel (S/S) (Not Shown) | 2031321-02 | w/Indicator LEDs | | X | X |
| 18 | Left Hand Side Panel (S/S) (Not Shown) | 3021394-04 | Painted (Louvered) | | X | X |
| 19 | Right Hand Side Panel (S/S) (Not Shown) | 3021394-02 | Stainless Steel (Louvered) | | X | X |
| 20 | Top Panel (S/S) (Not Shown) | 3021432-01 | Stainless Steel | | X | X |
| 21 | Panel Screws (Not Shown) | 9031074-03 | Front Panel | | X | X |

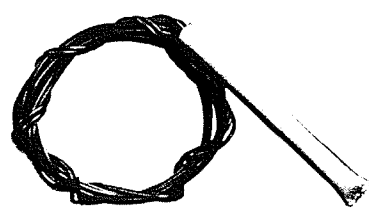
ELECTRICAL CONTROL BOX C-61-C



3A



3C



3D

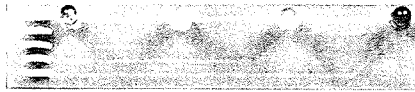
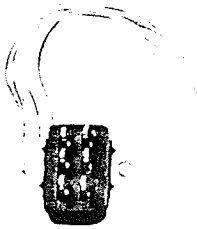
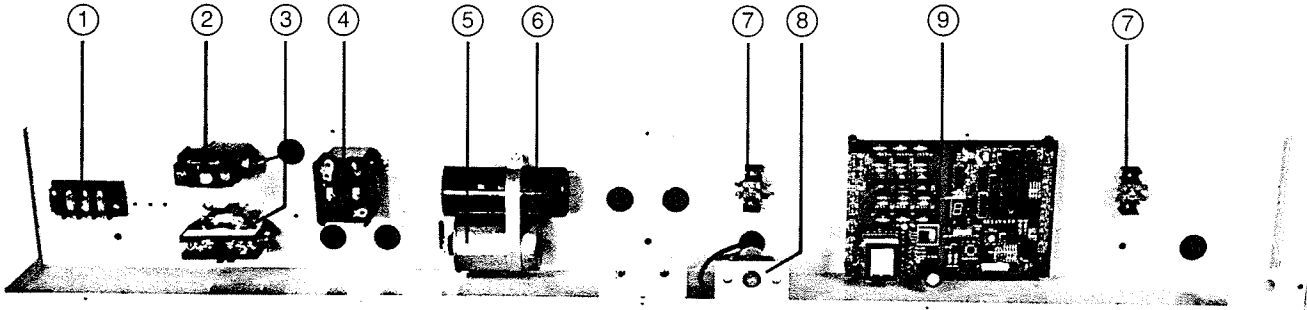
PARTS SECTION

ELECTRICAL CONTROL BOX

C-61-C

| Index # | Description | Part Number | Notes | Model | | | | |
|---------|---|-------------|----------------------------------|-------|------|-------|------|-------|
| | | | | C-61 | C-81 | C-121 | C-84 | C-124 |
| 1 | Pumpdown Control | 9041040-01 | Remotes Only | X | | | | |
| 2 | High Pressure Control | 9041051-02 | Water Cooled and Remote | X | | | | |
| 3 | Controller Board | 9101128-01 | | X | | | | |
| 3A | Indicator Light Assy. | 9101128-02 | | X | | | | |
| 3B | Selector/Purge Switch & Connector Cable Assy. | 9101128-03 | Not Shown | X | | | | |
| 3C | Condensor Thermistor | 9101131-01 | | X | | | | |
| 3D | Evaporator Thermistor | 9101131-02 | | X | | | | |
| 4 | Start Capacitor | 9181003-08 | Air, Water and Remote | X | | | | |
| 5 | Run Capacitor | 9181009-08 | Air, Water and Remote | X | | | | |
| 6 | Contactora, Single Pole | 9101002-03 | Air, Water and Remote | X | | | | |
| 7 | Potential Relay | 9181010-04 | Air, Water and Remote | X | | | | |
| | Terminal Board (2 Positions) | 9101129-01 | Not Shown | X | | | | |
| | Terminal Board (3 Positions) | 9101037-01 | Air and Water Cooled (Not Shown) | X | | | | |
| | Terminal Board (5 Positions) | 9101037-03 | Remote (Not Shown) | X | | | | |
| | Fan Control | 9041003-01 | Air Cooled Only (Not Shown) | X | | | | |

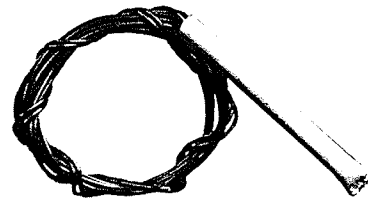
ELECTRICAL CONTROL BOX C-81/121-C



9A



9C



9D

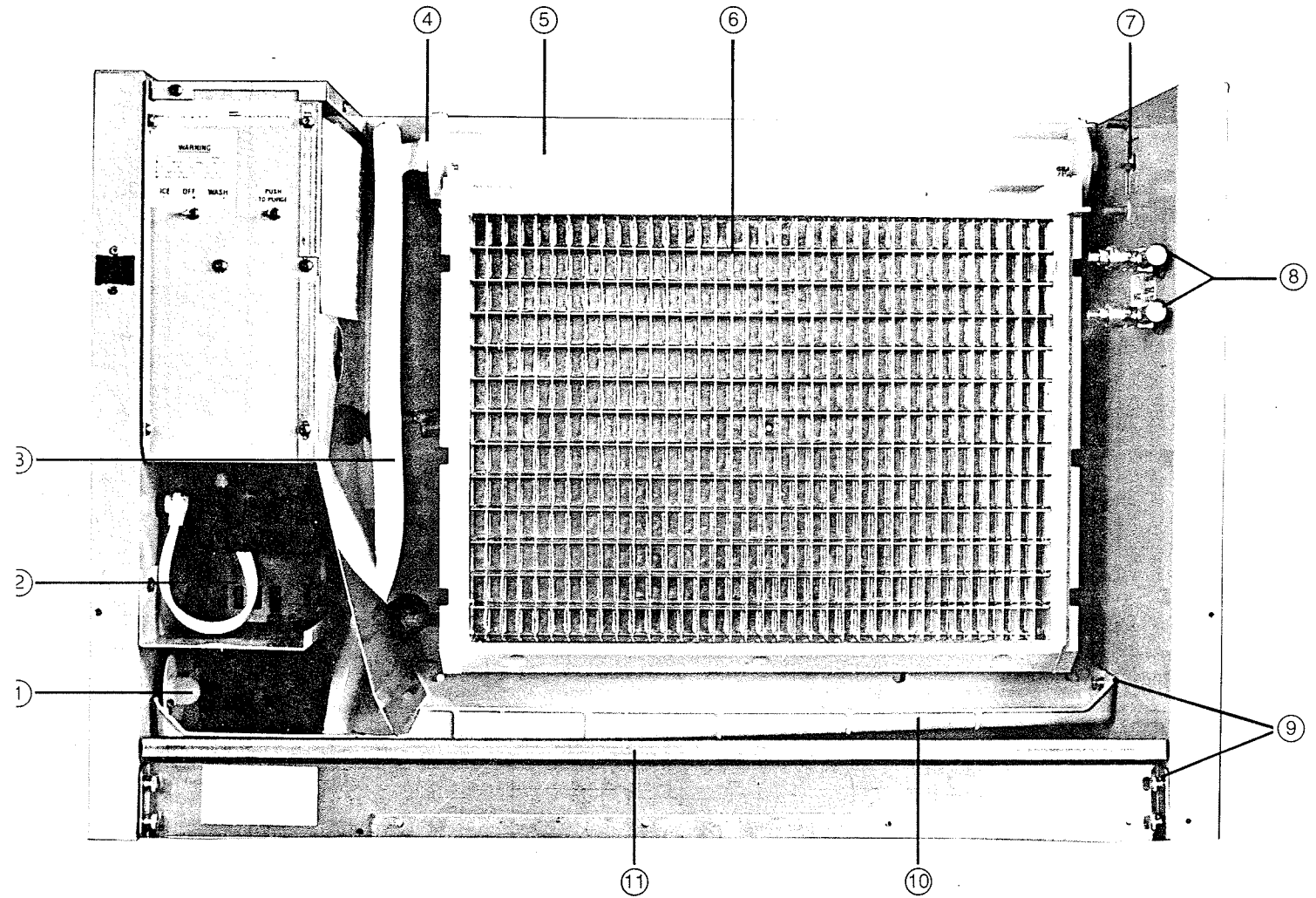
PARTS SECTION

ELECTRICAL CONTROL BOX

C-81/121-C

| Index # | Description | Part Number | Notes | Model | | |
|---------|--|-------------|--|-------|------|-------|
| | | | | C-61 | C-81 | C-121 |
| 1 | Terminal Board (3 Positions) | 9101037-01 | Air and Water Cooled | | X | X |
| 2 | Fan Control | 9041003-01 | Air Cooled Only | | X | X |
| 3 | Contactor, Single Pole | 9101002-03 | Air, Water and Remote | | X | X |
| 4 | Potential Relay | 9181010-06 | Air, Water and Remote | | X | X |
| 5 | Run Capacitor | 9181009-04 | Air, Water and Remote | | X | X |
| 6 | Start Capacitor | 9181003-11 | Air, Water and Remote | | X | X |
| 7 | Terminal Board (2 Positions) | 9101129-01 | | | X | X |
| 8 | High Pressure Control | 9041051-01 | Water Cooled and Remote | | X | |
| 9 | Controller Board | 9101128-01 | | | X | X |
| 9A | Indicator Light Assy. | 9101128-02 | | | X | X |
| 9B | Selector/Purge Switch (Not Shown) & Connector Cable Assy. | 9101128-03 | Not Shown | | X | X |
| 9C | Condenser Thermistor | 9101131-01 | | | X | X |
| 9D | Evaporator Thermistor | 9101131-02 | | | X | X |
| | Terminal Board (4 Positions) (Not Shown) | 9101037-02 | Air and Water Cooled 3 Phase Units | | | |
| | Terminal Board (5 Positions) (Not Shown) | 9101037-03 | Remote | | X | X |
| | Terminal Board (6 Positions) (Not Shown) | 9101037-04 | Remote 3 Phase Units | | | |
| | Contactor, Three Pole (Not Shown) | 9101079-01 | Air, Water and Remote 3 Phase Units | | | |
| | High Pressure Control (Not Shown) | 9041051-02 | Water Cooled and Remote | | | X |
| | Pumpdown Control (Not Shown) | 9041040-01 | Remote Only | | X | X |

EVAPORATOR & WATER SYSTEM C-61-C



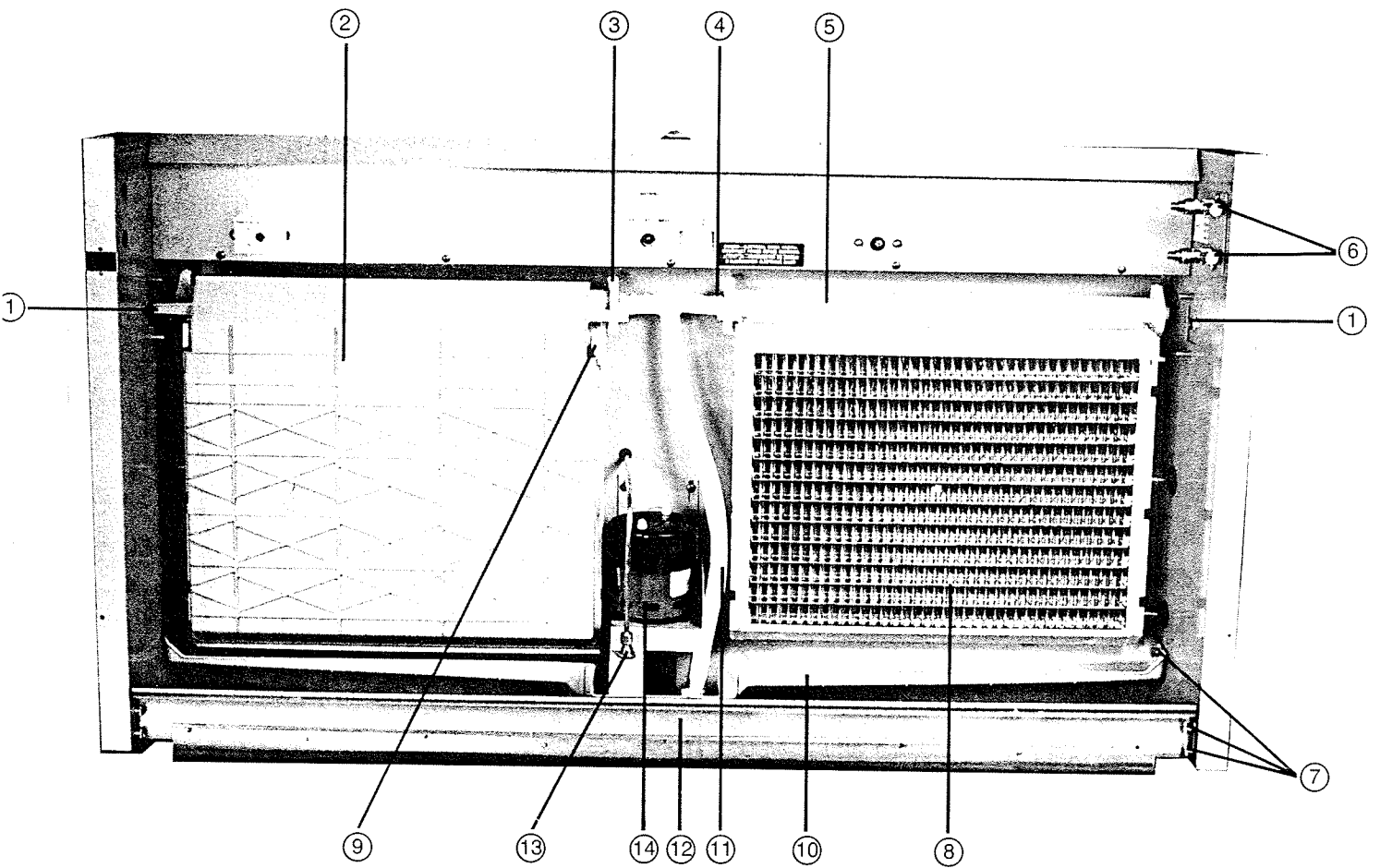
PARTS SECTION

EVAPORATOR & WATER SYSTEM

C-61-C

| Index # | Description | Part Number | Notes | Model | | |
|---------|--------------------------|-------------|-----------------------------------|-------|------|-------|
| | | | | C-61 | C-81 | C-121 |
| 1 | Float Ball and Stem | 9131127-01 | | X | | |
| 2 | Water Pump | 9161076-01 | Plug-in Type | X | | |
| 3 | Water Pump Tube | 9051142-01 | Pump to Dist Tube | X | | |
| 4 | Hose Clamp | 9021010-04 | | X | | |
| 5 | Water Distribution Assy. | 2041338-01 | | X | | |
| 6 | Evaporator | 2051110-05 | C-61, Half Cube | X | | |
| 7 | Bin Control Switch | 9101124-01 | | X | | |
| 8 | Service Valve | 9091064-01 | | X | | |
| 9 | Thumbscrews | 9031051-01 | 8-32x ³ / ₈ | X | | |
| 10 | Water Return Trough | 9051153-01 | | X | | |
| 11 | Ice Deflector | 2021319-01 | | X | | |
| | Evaporator (Not Shown) | 2051110-04 | C-61, Full Cube | X | | |
| | Splash Curtain Assy. | 9051154-02 | Not Shown | X | | |

EVAPORATOR & WATER SYSTEM C-81/121-C



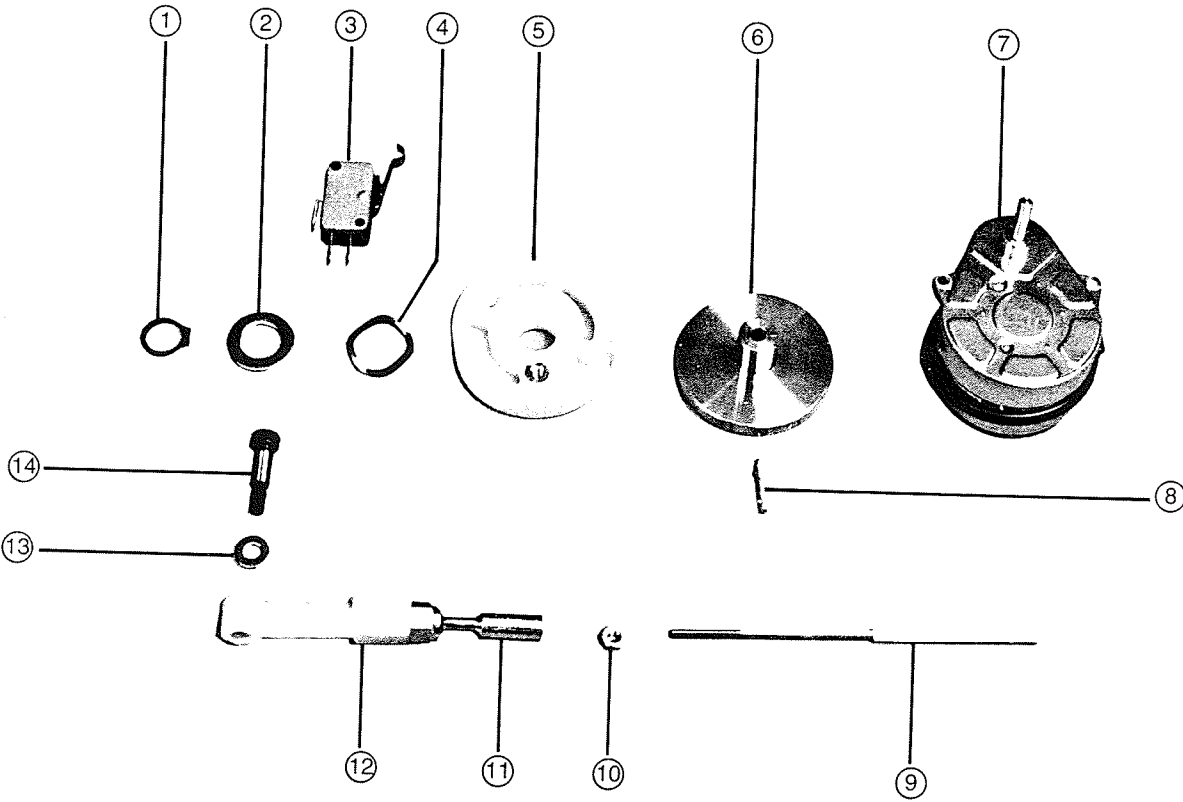
PARTS SECTION

EVAPORATOR & WATER SYSTEM

C-81/121-C

| Index # | Description | Part Number | Notes | Model | | |
|---------|------------------------------|-------------|-----------------------------------|-------|------|-------|
| | | | | C-61 | C-81 | C-121 |
| 1 | Bin Control Switch | 9101124-01 | | | X | X |
| 2 | Splash Curtain Assy. | 9051154-02 | | | X | X |
| 3 | Water Distribution Assy. L/H | 2041338-02 | Left Hand | | X | X |
| 4 | Hose Clamp | 9021010-04 | | | X | X |
| 5 | Water Distribution Assy. R/H | 2041338-01 | Right Hand | | X | X |
| 6 | Service Valve | 9091064-01 | | | X | X |
| 7 | Thumbscrews | 9031051-01 | 8-32x ³ / ₈ | | X | X |
| 8 | Evaporator R/H | 2051111-02 | C81/121, Half Cube | | X | X |
| 9 | Evaporator L/H | 2051110-05 | C81/121, Half Cube | | X | X |
| 10 | Water Return Trough | 9051153-02 | | | X | X |
| 11 | Water Pump Tube | 9051148-01 | Pump to Dist Tube | | X | X |
| 12 | Ice Deflector | 2021326-01 | | | X | X |
| 13 | Float Ball and Stem | 9131111-01 | | | X | X |
| 14 | Water Pump | 9161079-01 | Plug-in Type | | X | X |
| | Evaporator R/H (Not Shown) | 2051111-01 | C81/121, Full Cube | | X | X |
| | Evaporator L/H (Not Shown) | 2051110-04 | C81/121, Full Cube | | X | X |

HARVEST PROBE ASSEMBLY C-61/81/121-C



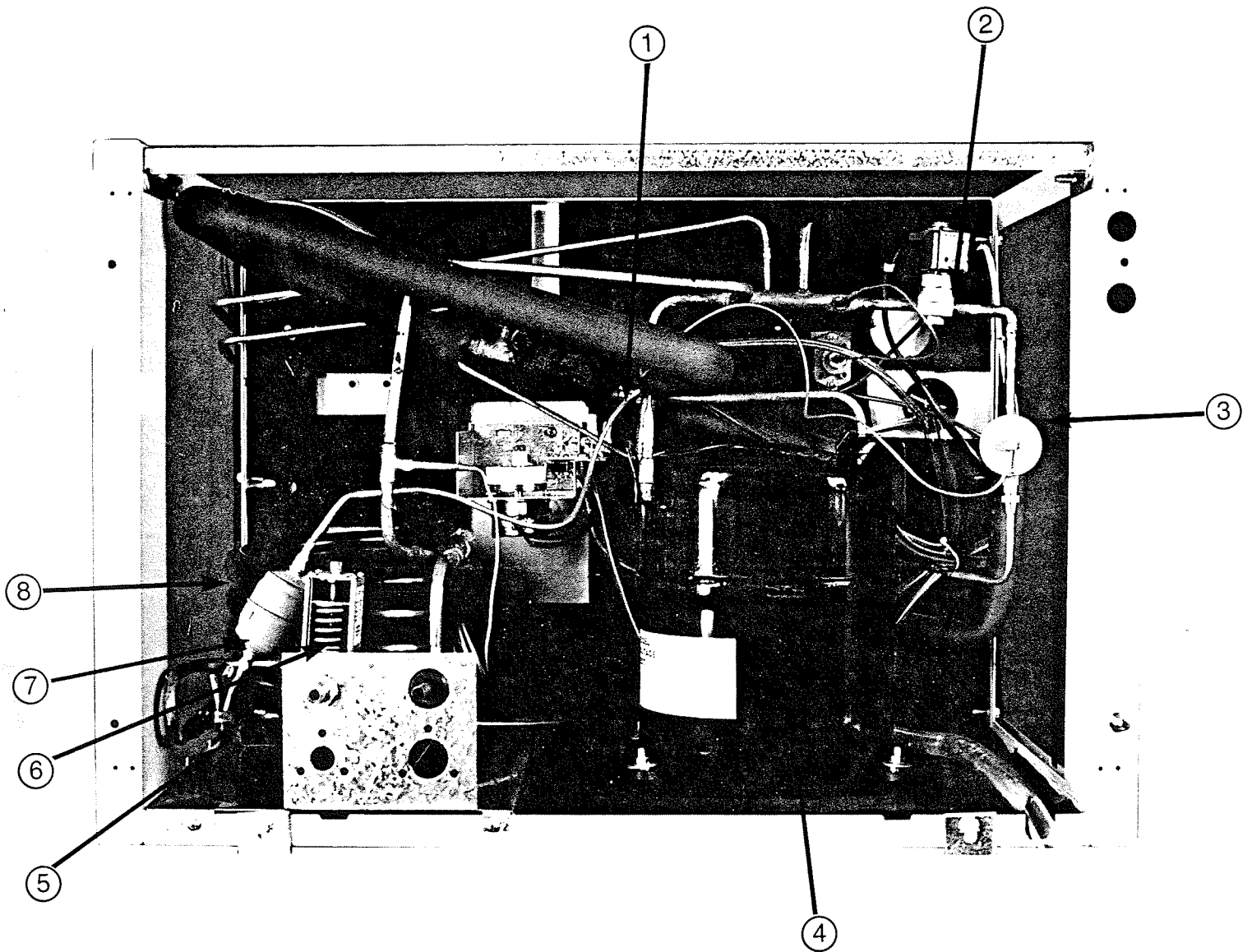
PARTS SECTION

HARVEST PROBE ASSEMBLY

C-61/81/121-C

| Index # | Description | Part Number | Notes | Model | | |
|---------|---------------------------|-------------|-----------------|-------|------|-------|
| | | | | C-61 | C-81 | C-121 |
| 1 | Snap Ring | 9021038-02 | | X | X | X |
| 2 | Flat Washer | 9031003-03 | | X | X | X |
| 3 | Cam Switch | 9101133-01 | | X | X | X |
| 4 | Wave Washer | 9031030-01 | | X | X | X |
| 5 | Cam Driven Clutch Half | 9051031-02 | Plastic | X | X | X |
| 6 | Cam Driver Clutch Half | 3991001-01 | Stainless Steel | X | X | X |
| 7 | Probe Motor | 9161030-01 | 115V | X | X | X |
| 8 | Screw-Set 3/4" | 9031033-04 | | X | X | X |
| 9 | Probe Shaft | 9021053-02 | | X | X | X |
| 10 | Lock Nut | 9031005-09 | | X | X | X |
| 11 | Swivel | 9021017-01 | | X | X | X |
| 12 | Connecting Rod | 9051057-01 | | X | X | X |
| 13 | Washer | 9031004-03 | Flat Washer | X | X | X |
| 14 | Allen Screw | 9031029-01 | | X | X | X |
| | Probe Motor Bracket | 3011857-01 | Not Shown | X | X | X |
| | Motor Mounting Screw | 9031008-28 | Not Shown | X | X | X |
| | Motor Mounting Nut | 9031005-06 | Not Shown | X | X | X |
| | Motor Mounting Lockwasher | 9031006-02 | Not Shown | X | X | X |
| | Cam Switch Mounting Screw | 9031008-16 | Not Shown | X | X | X |
| | Cam Switch Mounting Nut | 9031005-08 | Not Shown | X | X | X |

CONDENSING UNIT C-61-C



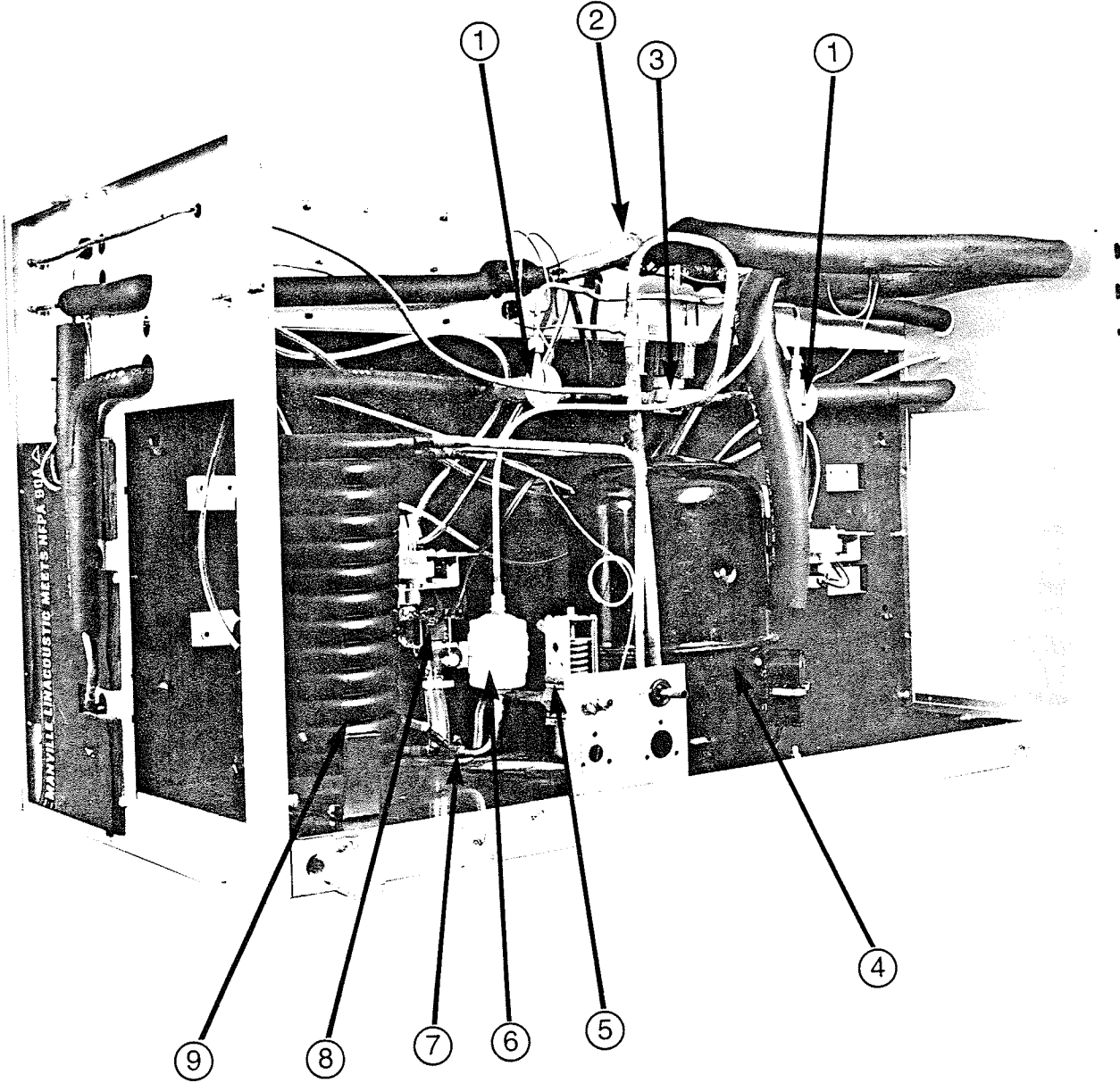
PARTS SECTION

CONDENSING UNIT

C-61-C

| Index # | Description | Part Number | Notes | Model | | |
|---------|-------------------------------------|-------------|-----------------------|-------|------|-------|
| | | | | C-61 | C-81 | C-121 |
| 1 | Evaporator Thermistor | 9101131-02 | | X | | |
| 2 | Hot Gas Valve Assy. | 9151053-01 | Assembly | X | | |
| 2A | Hot Gas Valve Coil | 9151053-91 | Coil Only | X | | |
| 3 | Thermostatic Expansion Valve | 9151006-01 | R-502 | X | | |
| 4 | Compressor | 9181054-91 | Copeland 3/4 HP R-502 | X | | |
| 5 | Condenser Thermistor | 9101131-01 | | X | | |
| 6 | Water Regulating Valve | 9041010-01 | Water Cooled Only | X | | |
| 7 | Filter/Drier | 9151004-02 | | X | | |
| 8 | Water Condenser | 9141024-01 | Water Cooled Only | X | | |
| | Air Condenser (Not Shown) | 9141050-01 | Air Cooled Only | X | | |
| | Fan Motor (Not Shown) | 9161078-01 | Air Cooled Only | X | | |
| | Fan Blade (Not Shown) | 9131053-03 | Air Cooled Only | X | | |
| | Fan Motor Bracket (Not Shown) | 9131054-01 | Air Cooled Only | X | | |
| | Fan Shroud (Not Shown) | 9131122-01 | Air Cooled Only | X | | |
| | Water Purge Valve Assy. (Not Shown) | 9041053-01 | Assembly | X | | |

CONDENSING UNIT C-81/121-C



PARTS SECTION

CONDENSING UNIT

C-81/121-C

| Index # | Description | Part Number | Notes | Model | | |
|---------|----------------------------------|-------------|----------------------|-------|------|-------|
| | | | | C-61 | C-81 | C-121 |
| 1 | Thermostatic Expansion Valve | 9151006-01 | R-502 | | | X |
| 2 | Evaporator Thermistor | 9101131-02 | | | X | X |
| 3 | Hot Gas Valve Assy. | 9151012-02 | Assembly | | X | X |
| 3A | Hot Gas Valve Coil | 9151012-91 | Coil Only | | X | X |
| 3B | Hot Gas Valve Internal Parts Kit | 9151012-93 | | | X | X |
| 4 | Compressor | 9181038-91 | Tecumseh 1½ HP R-502 | | | X |
| 5 | Water Regulating Valve | 9041010-01 | Water Cooled Only | | X | X |
| 6 | Filter/Drier | 9151004-04 | | | X | X |
| 7 | Condenser Thermistor | 9101131-01 | | | X | X |
| 8 | Water Purge Valve Assy. | 9041014-02 | Assembly | | X | X |
| 8A | Water Purge Valve Coil | 9041053-90 | Coil Only | | X | X |
| 9 | Water Condenser | 9141020-01 | Water Cooled Only | | | X |
| | Water Condenser (Not Shown) | 9141024-01 | Water Cooled Only | | X | |
| | Air Condenser (Not Shown) | 9141052-01 | Air Cooled Only | | X | X |
| | Fan Motor (Not Shown) | 9161045-04 | Air Cooled Only | | X | X |

PARTS SECTION

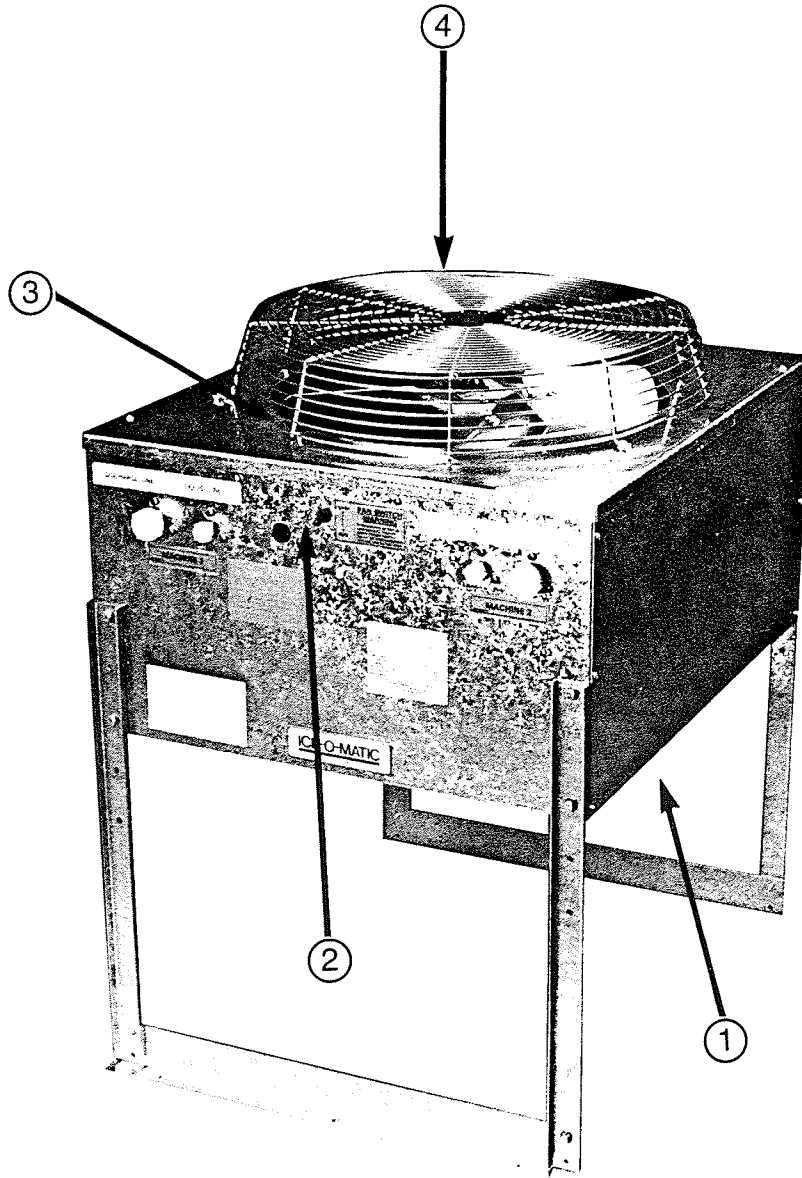
CONDENSING UNIT (continued)

C-81/121-C

| Index # | Description | Part Number | Notes | Model | | |
|---------|--|-------------|---------------------------------|-------|------|-------|
| | | | | C-61 | C-81 | C-121 |
| | Fan Blade (Not Shown) | 9131053-01 | Air Cooled Only | | X | X |
| | Fan Motor Bracket (Not Shown) | 9131054-01 | Air Cooled Only | | X | X |
| | Fan Shroud (Not Shown) | 9131131-01 | Air Cooled Only | | X | X |
| | Thermostatic Expansion Valve (Not Shown) | 9151020-01 | R-12 | | X | |
| | Compressor (Not Shown) | 9181038-92 | Tecumseh 1½ HP 3 phase R-502 | | | |
| | Compressor (Not Shown) | 9181060-91 | Tecumseh 1 HP R-12 | | X | |
| | Compressor (Not Shown) | 9181060-92 | Tecumseh 1 HP 3 phase R-12 | | | |

NOTES

REMOTE CONDENSING UNIT



REMOTE CONDENSING UNIT

| Index # | Description | Part Number | Notes | Model | | |
|---------|--|-------------|----------------------------------|-------|------|-------|
| | | | | C-61 | C-81 | C-121 |
| 1 | Remote Condenser Coil only | 9141025-01 | RC-60-2 | X | | |
| 1a | Remote Condenser Coil only | 9141021-01 | RC-80-2, 120-2 | | X | X |
| 1b | Remote Condenser Coil only | 9141001-01 | RC-80 | | X | |
| 2 | Remote Fan Switch | 9101001-02 | On/Off | X | X | X |
| 3 | Remote Fan Blade | 9131006-01 | Set of 4 (RC-60-2, 80, 120) | X | X | X |
| 3 | Remote Fan Blade | 9131006-02 | Set of 4 (RC-80-2, RC-120-2) | | X | X |
| 4 | Remote Fan Shroud | 9131005-01 | RC-60-2, 80,120 | X | X | X |
| 4a | Remote Fan Shroud | 9131126-01 | RC-80-2, 120-2 | | X | X |
| | Remote Fan Motor (Not Shown) | 9161001-01 | 115 Volt (RC-60-2, 80,120) | X | X | X |
| | Remote Fan Motor (Not Shown) | 9161001-03 | 115 Volt (RC-80-2, 120-2) | | X | X |
| | Remote Fan Motor Capacitor (Not Shown) | 9101036-02 | 8MFD@236V (RC-60-2,80,120) | X | X | X |
| | Remote Fan Motor Capacitor (Not Shown) | 9101036-04 | 12.5MFD@440V (RC-80-2, 120-2) | | X | X |
| | Receiver (Not Shown) | 9151026-01 | | X | | |
| | Receiver (Not Shown) | 9151060-01 | | | X | X |
| | Liquid Line Pumpdown Solenoid Assy. (Not Shown) | 9151039-01 | | X | X | X |
| | Liquid Line Pumpdown Solenoid Coil (Not Shown) | 9151039-91 | | X | X | X |
| | Liquid Line Internal Parts Kit (Not Shown) | 9151039-93 | | X | X | |
| | Mixing Valve (Not Shown) | 9151027-01 | R-12 Units | | X | |
| | Mixing Valve (Not Shown) | 9151027-02 | R-502 Units | X | | |
| | Pumpdown Control (Not Shown) | 9041040-03 | | X | X | X |

SERVICE AND MAINTENANCE RECORD

Date Purchased _____

Date Installed _____

Model Number _____

Serial Number _____

Service Policy Number _____

Have you filled out and mailed in the warranty card?

Service and Cleaning Record

| Date | Maintenance Performed | By Whom |
|------|-----------------------|---------|
| | | |