THE HOTTEST MACHINES ON ICE™

"I" Series

Ice Cube Machine

SERVICE MANUAL & MAINTENANCE GUIDE

(Includes Installation Instructions)

166240004

12/1/94
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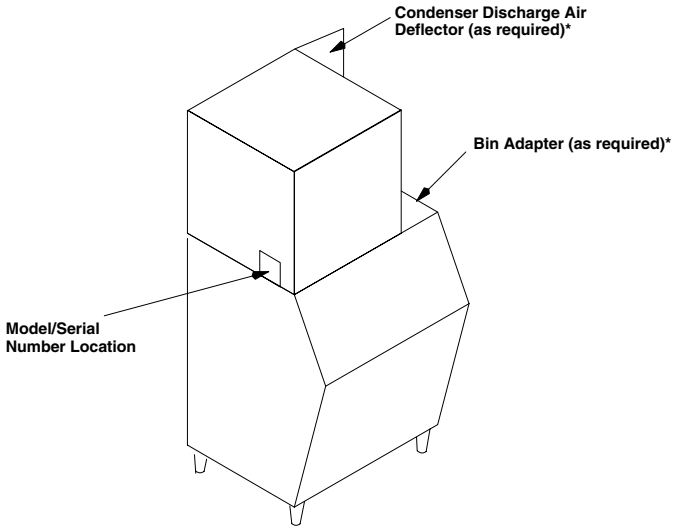
MODEL AND SERIAL LOCATION

"I" SERIES CUBER

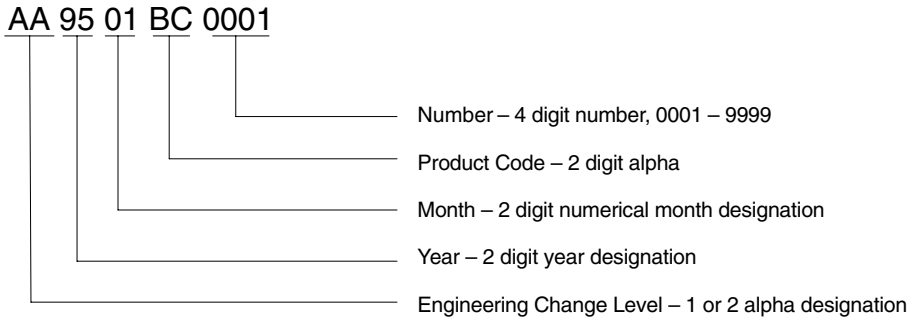


*Bin adapters and condenser discharge air deflector may be equipped depending on your location or the size of the storage bin.

Record the model number and the serial number of your ice equipment. These numbers are required when requesting information from your local dealer/distributor/service company.

Model Number –	Date Installed –
Serial Number –	Purchased From -

SERIAL NUMBER EXPLANATION



REMOTE CONDENSER SPECIFICATION

MODEL	CR800	CR1200	CR1400
Volts	208/230	208/230	208/230
Phase	1	1	1
Hertz	60	60	60
Amps	1.0	1.0	1.0
Output, HP	1/6	1/6	1/6
Max. fuse size, Amps (HVAC circuit breaker required)	20	20	20

ICE CUBER SPECIFICATION

MODEL	IAC322/330 IAC227	IWC322/330 IWCS227	IAC522/530	IWC522/530
UNIT				
Volts	115	115	115	115
Phase	1	1	1	1
Hertz	60	60	60	60
No. Wires	2+ground	2+ground	2+ground	2+ground
MIN. CIRCUIT				
Amps	20	20	20	20
MAX FUSE SIZE (HVAC CIRCUIT BREAKER REQUIRED)				
Amps	20	20	20	20
REFRIGERANT				
Type	R404A (HP62)	R404A (HP62)	R404A (HP62)	R404A (HP 62)
Weight (oz)	17	15	26	23
Weight (g)	482	425	737	652
COMPRESSOR				
Volts	115	115	115	115
Phase	1	1	1	1
Hertz	60	60	60	60
LRA	51	51	59	59
RLA	11.5	11.5	11.6	11.6
CONDENSER FAN MOTOR (Air-Cooled Systems only) of AIR CIRCULATION FAN MOTOR (Water-Cooled and Remote Systems only)				
Volts	115	115	115	115
Phase	1	1	1	1
Hertz	60	60	60	60
Amps Running	1.7	0.38	1.75	0.38
Watts	50	6	50	6
WATER PUMP				
Volts	115	115	115	115
Phase	1	1	1	1
Hertz	60	60	60	60
Amps Running	0.88	0.88	0.76	0.88
HP	1/40	1/40	1/40	1/40

SPECIFICATIONS – 60 HZ

ICE CUBER SPECIFICATION				
MODEL	**IAC322E60 IAC330E60 IACS227E60**	**IWC322E60 IWC330E60 IWCS227E60**	**IAC522E60 IAC522E60L IAC530E60 IAC530E60L**	**IWC522E60 IWC522E60L IWC530E60 IWC530E60L**
UNIT				
Volts	230	230	230	230
Phase	1	1	1	1
Hertz	60	60	60	60
No. Wires	2+ground	2+ground	2+ground	2+ground
MIN. CIRCUIT				
Amps	15	15	15	15
MAX FUSE SIZE (HVAC CIRCUIT BREAKER REQUIRED)				
Amps	15	15	15	15
REFRIGERANT				
Type	R404A(HP62)	R404A(HP62)	R404A(HP62)	R404A(HP 62)
Weight (oz)	17	15	26	23
Weight (g)	482	425	737	652
COMPRESSOR				
Volts	230	230	230	230
Phase	1	1	1	1
Hertz	60	60	60	60
LRA	24.1	24.1	45	45
RLA	5.7	5.7	9.2	9.2
CONDENSER FAN MOTOR (Air-Cooled Systems only) or AIR CIRCULATION FAN MOTOR (Water-Cooled and Remote Systems only)				
Volts	230	230	230	230
Phase	1	1	1	1
Hertz	60	60	60	60
Amps Running	0.89	0.36	0.89	.036
Watts	50	6	50	6
WATER PUMP				
Volts	230	230	230	230
Phase	1	1	1	1
Hertz	60	60	60	60
Amps Running	0.5	0.5	0.5	0.5
HP	1/30	1/30	1/30	1/30

SPECIFICATIONS – 60 HZ

ICE CUBER SPECIFICATION						
MODEL	**IAC630**	**IWC630**	**IRC630**	**IAC830**	**IWC830**	**IRC830**
UNIT						
Volts	230	230	230	230	230	230
Phase	1	1	1	1	1	1
Hertz	60	60	60	60	60	60
No. Wires	2+ground	2+ground	2+ground	2+ground	2+ground	2+ground
MIN. CIRCUIT						
Amps	20	20	20	20	20	20
MAX FUSE SIZE (HVAC CIRCUIT BREAKER REQUIRED)						
Amps	20	20	20	20	20	20
REFRIGERANT						
Type	R404A(HP62)	R404A(HP62)	R404A(HP62)	R404A(HP62)	R404A(HP62)	R404A(HP62)
Weight (oz)	43	35	170	55	33	170
Weight (g)	1219	992	4820	1559	936	4820
COMPRESSOR						
Volts	230	230	230	230	230	230
Phase	1	1	1	1	1	1
Hertz	60	60	60	60	60	60
LRA	69	69	69	61	61	61
RLA	8.8	8.8	8.8	12.5	12.5	12.5
CONDENSER FAN MOTOR (Air-Cooled Systems only) or AIR CIRCULATION FAN MOTOR (Water-Cooled and Remote Systems only)						
Volts	230	230	230	230	230	230
Phase	1	1	1	1	1	1
Hertz	60	60	60	60	60	60
Amps Running	1.09	0.36	0.36	1.09	0.36	0.36
Watts	75	6	6	75	6	6
WATER PUMP						
Volts	230	230	230	230	230	230
Phase	1	1	1	1	1	1
Hertz	60	60	60	60	60	60
Amps Running	0.5	0.5	0.5	0.5	0.5	0.5
HP	1/30	1/30	1/30	1/30	1/30	1/30

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SPECIFICATIONS – 60 HZ

ICE CUBER SPECIFICATION			
MODEL	**IAC1030 IAC1030L**	**IWC1030 IWC1030L**	**IRC1030 IRC1030L**
UNIT			
Volts	230	230	230
Phase	1	1	1
Hertz	60	60	60
No. Wires	2+Ground	2+Ground	2+Ground
MIN. CIRCUIT			
Amps	20	20	20
MAX FUSE SIZE (HVAC CIRCUIT BREAKER REQUIRED)			
Amps	20	20	20
REFRIGERANT			
Type	R404a(HP62)	R404a(HP62)	R404a(HP62)
Weight (oz)	60	42	210
Weight (g)	1701	1191	5954
COMPRESSOR			
Volts	230	230	230
Phase	1	1	1
Hertz	60	60	60
LRA	82	82	82
RLA	13.0	13.0	13.0
CONDENSER FAN MOTOR (Air-Cooled Systems only) or AIR CIRCULATION FAN MOTOR (Water-Cooled and Remote Systems only)			
Volts	230	230	230
Phase	1	1	1
Hertz	60	60	60
Amps Running	0.89×2	0.36	0.36
Watts	50W×2	6W	6W
WATER PUMP			
Volts	230	230	230
Phase	1	1	1
Hertz	60	60	60
Amps Running	0.5	0.5	0.5
HP	1/30	1/30	1/30

SPECIFICATIONS – 60 HZ

ICE CUBER SPECIFICATION						
MODEL	**IAC1230**	**IWC1230**	**IRC1230**	**IAC1448**	**IWC1448**	**IRC1448**
UNIT						
Volts	230	230	230	230	230	230
Phase	1	1	1	1	1	1
Hertz	60	60	60	60	60	60
No. Wires	2+ground	2+ground	2+ground	2+ground	2+ground	2+ground
MIN. CIRCUIT						
Amps	20	20	20	25	25	25
MAX FUSE SIZE (HVAC CIRCUIT BREAKER REQUIRED)						
Amps	20	20	20	25	25	25
REFRIGERANT						
Type	R404A(HP62)	R404A(HP62)	R404A(HP62)	R404A(HP 62)	R404A(HP 62)	R404A(HP 62)
Weight (oz)	49	45	210	92	44	250
Weight (g)	1389	1276	5954	2608	1247	7088
COMPRESSOR						
Volts	230	230	230	230	230	230
Phase	1	1	1	1	1	1
Hertz	60	60	60	60	60	60
LRA	96	96	96	95.6	95.6	95.6
RLA	13.5	13.5	13.5	23.9	23.9	23.9
CONDENSER FAN MOTOR (Air-Cooled Systems only) or AIR CIRCULATION FAN MOTOR (Water-Cooled and Remote Systems only)						
Volts	230	230	230	230	230	230
Phase	1	1	1	1	1	1
Hertz	60	60	60	60	60	60
Amps Running	0.89 X 2	0.36	0.36	0.4	0.36	0.36
Watts	50 W X 2	6 W	6 W	1/15 HP	6 W	6 W
WATER PUMP						
Volts	230	230	230	230	230	230
Phase	1	1	1	1	1	1
Hertz	60	60	60	60	60	60
Amps Running	0.5	0.5	0.5	0.5	0.5	0.5
HP	1/30	1/30	1/30	1/30	1/30	1/30

SPECIFICATIONS – 50 HZ

MODEL	IAC322E50 IAC330E50 IACS277E50	IWC322E50 IWC330E50 IWCS227E50	IAC522E50 IAC522E50L IAC530E50 IAC530E50L	IWC522E50 IWC522E50L IWC530E50 IWC530E50L
UNIT				
Volts	220	220	220	220
Phase	1	1	1	1
Hertz	50	50	50	50
No. Wires	2+ground	2+ground	2+ground	2+ground
MIN. CIRCUIT				
Amps	15	15	15	15
MAX FUSE SIZE (HVAC CIRCUIT BREAKER REQUIRED)				
Amps	15	15	15	15
REFRIGERANT				
Type	R404A(HP62)	R404A(HP62)	R404A(HP62)	R404A(HP 62)
Weight (oz)	17	15	26	23
Weight (g)	482	425	737	652
COMPRESSOR				
Volts	220	220	220	220
Phase	1	1	1	1
Hertz	50	50	50	50
LRA	26	26	33	33
RLA	5.3	5.3	8.2	8.2
CONDENSER FAN MOTOR (Air-Cooled Systems only) or AIR CIRCULATION FAN MOTOR (Water-Cooled and Remote Systems only)				
Volts	220	220	220	220
Phase	1	1	1	1
Hertz	50	50	50	50
Amps Running	0.75	0.3	0.75	0.3
Watts	50	6	50	6
WATER PUMP				
Volts	220	220	220	220
Phase	1	1	1	1
Hertz	50	50	50	50
Amps Running	0.5	0.5	0.5	0.5
HP	1/30	1/30	1/30	1/30

SPECIFICATIONS – 50 HZ

MODEL	IAC630E50 IAC630E50L	IWC630E50 IWC630E50L	IRC630E50 IRC63050L	IAC830E50 IAC830E50L	IWC830E50 IWC830E50L	IRC830E50 IRC830E50L
UNIT						
Volts	220	220	220	220	220	220
Phase	1	1	1	1	1	1
Hertz	50	50	50	50	50	50
No. Wires	2+ground	2+ground	2+ground	2+ground	2+ground	2+ground
MIN. CIRCUIT						
Amps	20	20	20	20	20	20
MAX FUSE SIZE (HVAC CIRCUIT BREAKER REQUIRED)						
Amps	20	20	20	20	20	20
REFRIGERANT						
Type	R404A(HP62)	R404A(HP62)	R404A(HP62)	R404A(HP 62)	R404A(HP 62)	R404A(HP 62)
Weight (oz)	43	35	170	55	33	170
Weight (g)	1219	992	4820	1559	936	4820
COMPRESSOR						
Volts	220	220	220	220	220	220
Phase	1	1	1	1	1	1
Hertz	50	50	50	50	50	50
LRA	53	53	53	58	58	58
RLA	8	8	8	12	12	12
CONDENSER FAN MOTOR (Air-Cooled Systems only) or AIR CIRCULATION FAN MOTOR (Water-Cooled and Remote Systems only)						
Volts	220	220	220	220	220	220
Phase	1	1	1	1	1	1
Hertz	50	50	50	50	50	50
Amps Running	1.06	0.3	0.3	1.06	0.3	0.3
Watts	75	6	6	75	6	6
WATER PUMP						
Volts	220	220	220	220	220	220
Phase	1	1	1	1	1	1
Hertz	50	50	50	50	50	50
Amps Running	0.5	0.5	0.5	0.5	0.5	0.5
HP	1/30	1/30	1/30	1/30	1/30	1/30

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SPECIFICATIONS – 50 HZ

MODEL	IAC1030E50 IAC1030E50L	IWC1030E50 IWC1030E50L	IRC1030E50 IRC103050L	IAC1230E50 IAC1230E50L	IWC1230E50 IWC1230E50L	IRC1230E50 IRC1230E50L
UNIT						
Volts	220	220	220	220	220	220
Phase	1	1	1	1	1	1
Hertz	50	50	50	50	50	50
No. Wires	2+ground	2+ground	2+ground	2+ground	2+ground	2+ground
MIN. CIRCUIT						
Amps	20	20	20	25	25	25
MAX FUSE SIZE (HVAC CIRCUIT BREAKER REQUIRED)						
Amps	20	20	20	25	25	25
REFRIGERANT						
Type	R404A(HP62)	R404A(HP62)	R404A(HP62)	R404A(HP 62)	R404A(HP 62)	R404A(HP 62)
Weight (oz)	49	45	210	92	44	250
Weight (g)	1389	1276	5954	2608	1247	7088
COMPRESSOR						
Volts	220	220	220	220	220	220
Phase	1	1	1	1	1	1
Hertz	50	50	50	50	50	50
LRA	64	64	64	75.9	75.9	75.9
RLA	12.5	12.5	12.5	13	13	13
CONDENSER FAN MOTOR (Air-Cooled Systems only) or AIR CIRCULATION FAN MOTOR (Water-Cooled and Remote Systems only)						
Volts	220	220	220	220	220	220
Phase	1	1	1	1	1	1
Hertz	50	50	50	50	50	50
Amps Running	0.75×2	0.3	0.3	0.75×2	0.3	0.3
Watts	0.50W×2	6W	6W	0.75W×2	6W	6W
WATER PUMP						
Volts	220	220	220	220	220	220
Phase	1	1	1	1	1	1
Hertz	50	50	50	50	50	50
Amps Running	0.5	0.5	0.5	0.5	0.5	0.5
HP	1/30	1/30	1/30	1/30	1/30	1/30

SPECIFICATIONS – 50 HZ, REMOTE CONDENSER

MODEL	CR800E50	CR1200E50	CR1400E50
UNIT			
Volts	220	220	220
Phase	1	1	1
Hertz	50	50	50
Amps	1.1	1.1	1.1
Output H.P.	1/6	1/6	1/6
MAX fuse size, Amps (HVAC circuit breaker required	20	20	20

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FREIGHT DAMAGE CLAIMS PROCEDURE

The deliverer of your equipment (freight company, distributor or dealer) is responsible for loss or damage of your shipment. All claims must be filed with the deliverer of your equipment. Please follow the steps below to determine if your shipment is satisfactory or if a claim must be filed:

1. Check the number of products delivered against the number of products listed on the delivery receipt. Should the totals not match, have the driver note all errors on both copies and both you and the driver sign and date said notation.
2. Inspect all cartons for visible damage. Open and inspect as required before the driver leaves and have him or her note any damage on the receipts. All damaged claims must be inspected within 15 days of delivery. Notify your carrier immediately if concealed damage is found after delivery.
3. Should concealed damage be found when product is unpacked, retain the packing material and the product and request an inspection from the deliverer.
4. All claims for loss or damage should be filed at once. Delays in filing will reduce the chance of achieving a satisfactory resolution to the claim.

INSTALLATION INSTRUCTIONS

Installation and start-up of the equipment should be performed by the distributor or the dealer's professional staff.

LOCATION OF EQUIPMENT

For maximum performance the location should be away from heat sources such as ovens, direct sunlight, hot air discharge, etc.

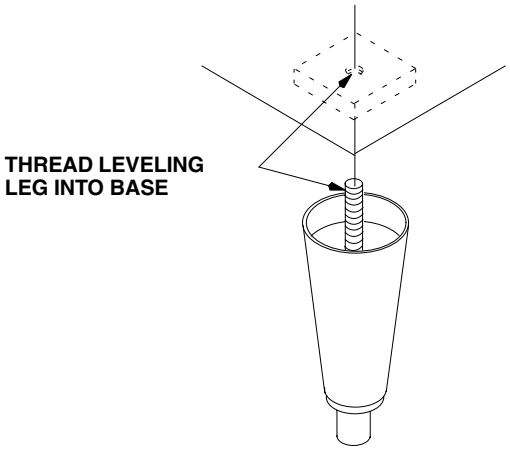
To reduce cost of maintenance and loss of efficiency, avoid placing air-cooled equipment in areas where grease, flour and other airborne contaminants are present. Allow a minimum of 6″ (15.24 cm) clearance on all sides and top for proper air circulation. Restricted air circulation will affect the efficiency and required maintenance of the product.

IMPORTANT: Never operate your equipment in room temperature below 50°F (10°) or above 100°F (38°C). Should the location of your product ever be exposed to freezing temperatures, it must be shut down and winterized.

EQUIPMENT SET-UP

The following steps refer to the set-up of the ice bin and the cuber:

1. Remove the bin from its carton, place it on its back and install the legs into the bottom of the bin. Bins must be installed on legs or sealed to the floor with RTV-732 sealant.
2. Set the bin up on its legs. Place the bin in its final location and level it with the adjustable feet in the legs.
3. Unpack the cuber from its carton, and set in place on the bin and adjust as required. Leave all panels on the cuber until it is set in place on the dispenser or bin.
4. Remove all internal packing from the cuber.

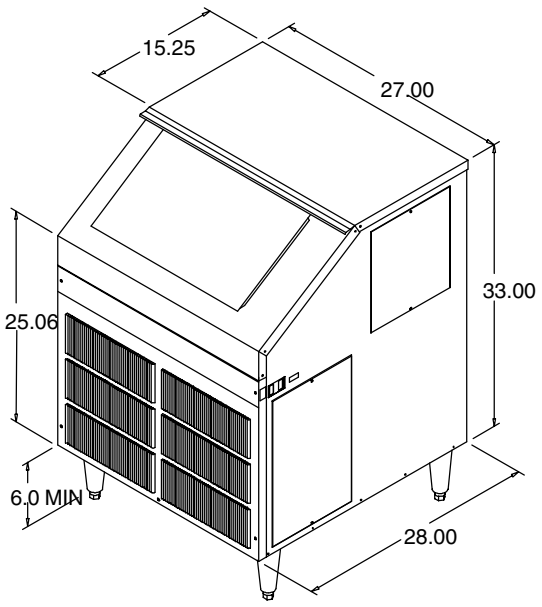


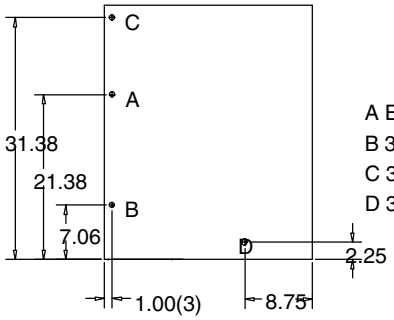
NOTE: Bin adapter andcondenser air baffles may be required in certain installations.

DISPENSER INSTALLATION

The proper cuber/dispenser installation package should be ordered. This package will include gasket material and hold-down bracket.

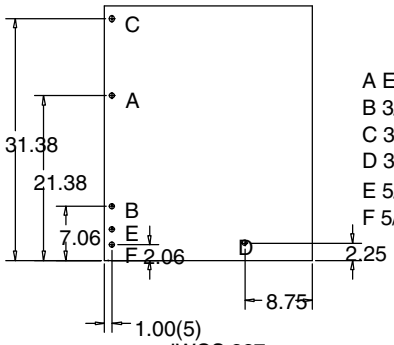
IACS/IWCS 227





IACS 227
REAR VIEW

A ELECTRICAL CORD ATTACHED (20
B 3/4 DRAIN – TUBING SIZE 5/8 I.D.
C 3/8 WATER INLET (SEA MALE FLAF
D 3/4 BIN DRAIN – STD PIPE SAE

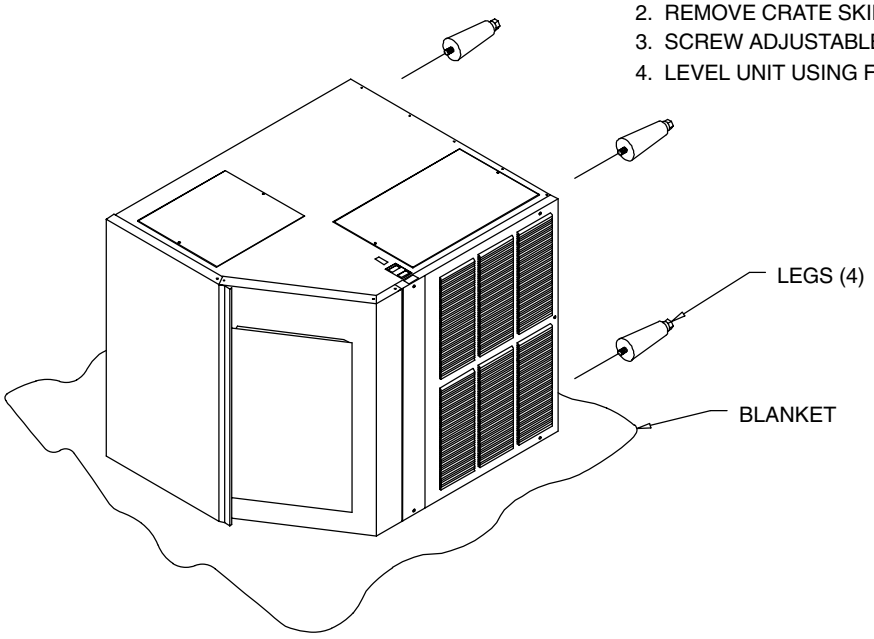


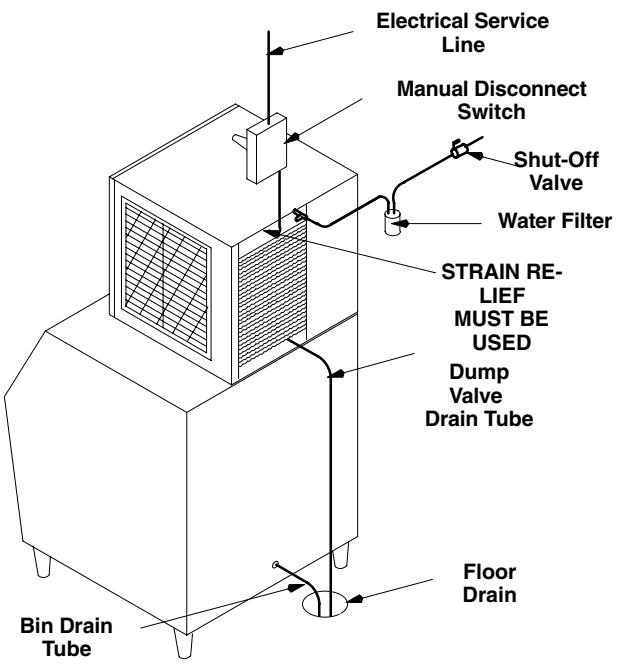
IWCS 227
REAR VIEW

A ELECTRICAL CORD ATTACHED (20
B 3/4 DRAIN – TUBING SIZE 5/8 I.D.
C 3/8 RESERVOIR WATER INLET (SAI
D 3/4 BIN DRAIN – STD PIPE SAE
E 5/8 CONDENSER WATER OUTLET (
F 5/8 CONDENSER WATER INLET (MA

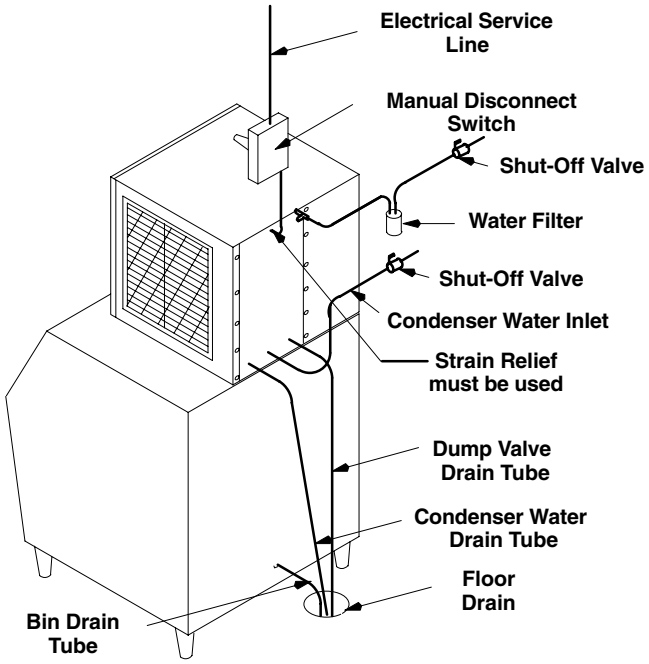
INSTRUCTIONS FOR ATTACHING SUPPORT LEGS

1. LAY CABINET ON BACK OR SIDE USING BLANKET OR PADDING TO AVOID MARRING.
2. REMOVE CRATE SKID FROM UNIT BOTTOM.
3. SCREW ADJUSTABLE LEGS INTO RECESSED THREAI
4. LEVEL UNIT USING FEET FOR ADJUSTMENT.





AIR-COOLED MODELS



WATER-COOLED MODELS

Note: Leave all panels on the cuber until it is in place on the bin.

PLUMBING CONNECTIONS

1. All plumbing lines and connections must conform to local and national plumbing codes.
2. Line shut-off valves must be located in supply water lines for cuber and condenser if product is water-cooled. Water supply to water-cooled condenser must include a stand-pipe to prevent “water hammer”.
3. Should your local water supply quality require the installation of a water filter system, consult your local distributor or dealer for proper size required.
4. Water supply pressure must not be lower than 20 PSI (1.37 BAR), nor should it exceed 120 PSI (8.16 BAR).

NOTE: Water filters larger then 5 microns do not give proper protection. Water pressures above 80 PSI (5.44 BAR) will destroy the filter.

DRAIN LINES: Bin and cuber drain lines must never be connected together and must be vented.

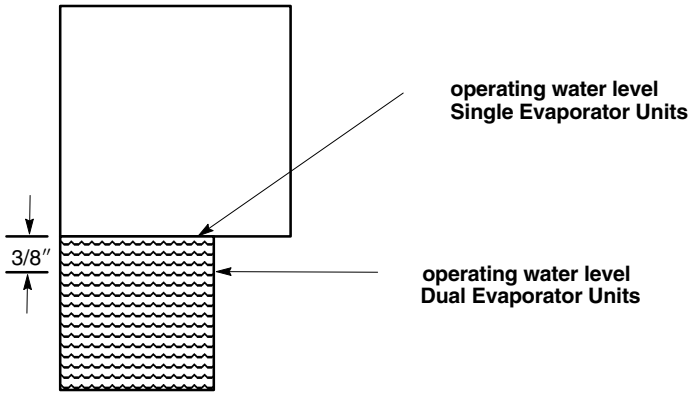
NOTE: All HP-62 (R404A) ice machines have a voltage range of –5%, +10% from the serial palte rating.

ELECTRICAL

1. All wiring and connections must conform to national and local electrical codes.
2. Wire size and circuit protection must conform to specifications and cuber must be on a separate electrical circuit.
3. Strain relief connectors must be used at the junctions box of the control box and the cuber.
4. Cuber must be grounded by the control box ground screw or other method for intentional safety grounding that meets code requirements.
5. A manual disconnect in a convenient location to the cuber must be installed.

INSTALLATION CHECK POINTS

1. Has bin and cuber been leveled and sanitized?
2. Does electrical and plumbing meet code requirements?
3. Check correct operating water level in the water pan.

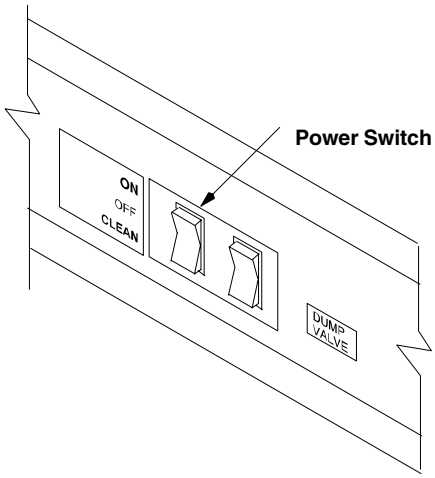


WATER PAN
RIGHT SIDE VIEW

4. If water-cooled, are inlet and drain connections to condenser correct to prevent “water hammer”?
5. Are drain lines separate and vented?
6. Is there 6″ clearance on all sides and top for proper air circulation?
7. Does the water curtain move freely, and does the float valve shut off incoming water to the water pan?

START-UP AND CHECK OUT

1. Turn the Cuber’s power switch to the clean (pump only) position. The water pump only should be operational. Wipe the top extrusion briskly with a ScotchBrite pad. Check for an even, steady flow of water over evaporator top extrusion and down over evaporator surface. Check that all ports of the water distribution tube are open for even water discharge. The water pan should refill and the float should stop the incoming water supply.



NOTE: On the IACS222/IWCS227 to service the float valve:
1. Compress the John Guess fitting remove the 1/4” tubing.
2. Remove the screws that hold the float bracket to the liner wall.
3. Carefully remove float strainer and bracket as one assembly.
4. Reverse procedure to reinstall.

Should service be required on the float valve or strainer, turn the water supply off, loosen the float, hold down nut and remove the float and strainer as an assembly for ease of service.

2. Place the Cuber’s power switch in the ON position. After a 2-second delay the compressor will start. The condenser fan will operate when the condenser sensor signals the circuit board its temperature is 100°F (38°C). The water pump will operate when the evaporator cools to 25°F (–3.9°C). Depress the manual harvest switch (on the circuit board). The fan motor will stop and the water dump valve will open. In 3 seconds the hot gas solenoid will open and 15 seconds after depressing the manual harvest switch, the water pump and dump valve will close terminating the dump cycle.
3. Hold the water curtain open for a maximum of 30 seconds; the Cuber should shut down. Release the water curtain(s). When the curtain(s) closes, there will be a 2-second delay, then the compressor will start and the start-up process should begin for the next ice-making mode.
4. If all Cuber operation is as stated, allow product to operate and produce one slab of ice, then discard the ice. Allow the Cuber to continue operation to fill the storage bin.

OWNER -OPERATOR

The installation is not complete until you are sure the owner-operator understands the cuber operation and his or her responsibility of preventative maintenance.

Does the owner-operator know:

1. Location of electrical disconnect switch and water shut-off valves?
2. How to start and/or shut down the product, clean and sanitize it?
3. Bin full operation and reset operation of high pressure cutout (water-cooled and remote products only)?
4. How to clean the condenser and fan blade?
5. Whom to call for product information and/or service?

CLEANING PROCEDURES

Approved ice machine cleaners by brand names:

- Lime–A–Way
- Calgon Nickel Safe (green color only)

NOTE: All ice machine cleaners labeled safe for nickel ARE NOT the brand CALGON NICKEL SAFE.

CAUTION: Ice machine cleaners are acidic-based chemicals. Before beginning any cleaning of the cuber, the ice in the storage bin or dispenser must be removed.

WARNING: When using any chemical, rubber gloves and eye protection should be worn.

PREP – CLEANING

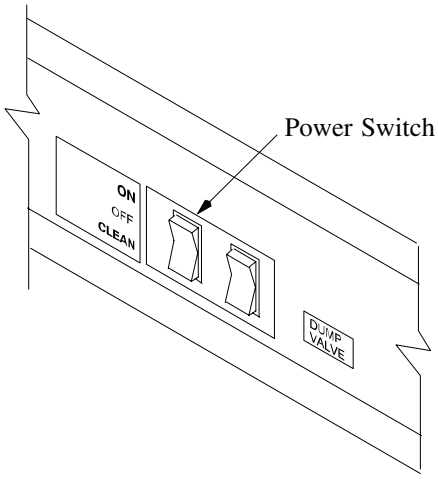
Use full-strength ice machine cleaner on a coarse-surface cloth material (such as terry cloth) and wipe down the inside wall of the evaporator area, the water pan, the water curtain and evaporator plastic extrusions. If the water distributor tube has heavy scale build-up, remove and soak it in full-strength ice machine cleaner (or exchange the tube and clean the scaled tube at a later date).

Cleaning the Water System and Evaporator

1. Set the switch to *Clean* and allow any ice on the evaporator to release and melt away.
2. Remove all ice from the storage bin.
3. Remove the water curtain(s), pour 1/2 oz. of ice machine cleaner down the rear key-slot openings. The cleaner will drain into the water pan.
4. Return the water curtain(s) to their proper operating positions.
5. Add 3 oz. for a single evaporator, or 5 oz. for a dual evaporator of “Calgon Nickel Safe” or “Lime-A-Way” ice machine cleaner directly into the water pan. The float will balance with inlet water. Set switch to CLEAN, circulate for a maximum of 15 minutes.
6. Depress and hold the dump switch to allow the cleaner to drain away.
7. Fill the water pan with clean fresh water, circulate for approximately 3 minutes. Depress and hold the DUMP switch and allow the water to drain away. **Repeat the procedure 3 times.**
8. After third rinse cycle, place product power switch in ice position. Allow Cuber to produce one slab of ice – DISCARD THE ICE.
9. When the clean cycle is complete, return cuber to normal operating mode.

NOTE: Please Take Note of the Following:

- Ice machines should only be cleaned when needed, not by a timed schedule of every 60 days, etc.
- Should your ice machine require cleaning more than twice a year, consult your distributor or dealer about proper water treatment.

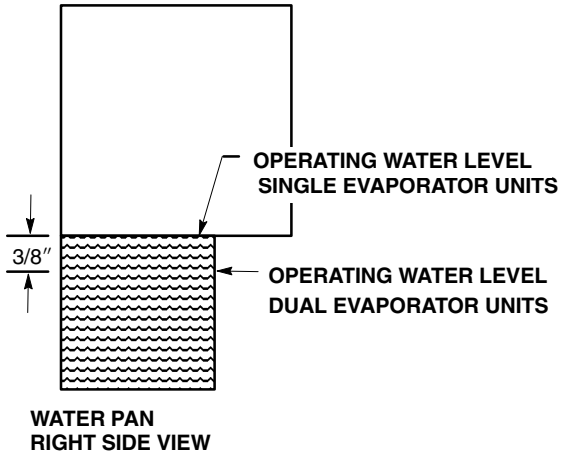


SANITIZING PROCEDURES

NOTE: To be performed only after cleaning the ice machine:

1. Add 1/4 ounce (7.08 g) sodium hypochlorite solution (common liquid laundry bleach) to the water pan and allow the pump to circulate the solution for 5 minutes. You may also use a commercial sanitizer such as Calgon Ice Machine Sanitizer following the directions on the product label.
2. Turn the Cuber power switch off and depress and hold the dump switch to drain the water pan.
3. To sanitize the bin and other surface areas, use 1 ounce of liquid bleach per gallon of water and wipe all areas with the solution. Or use a commercial sanitizer.
4. Place the Cuber power switch in the ice position. Discard the first batch of ice produced.
5. Cleaning and sanitizing are now complete. Cuber may be returned to normal service.

DUMP CYCLE

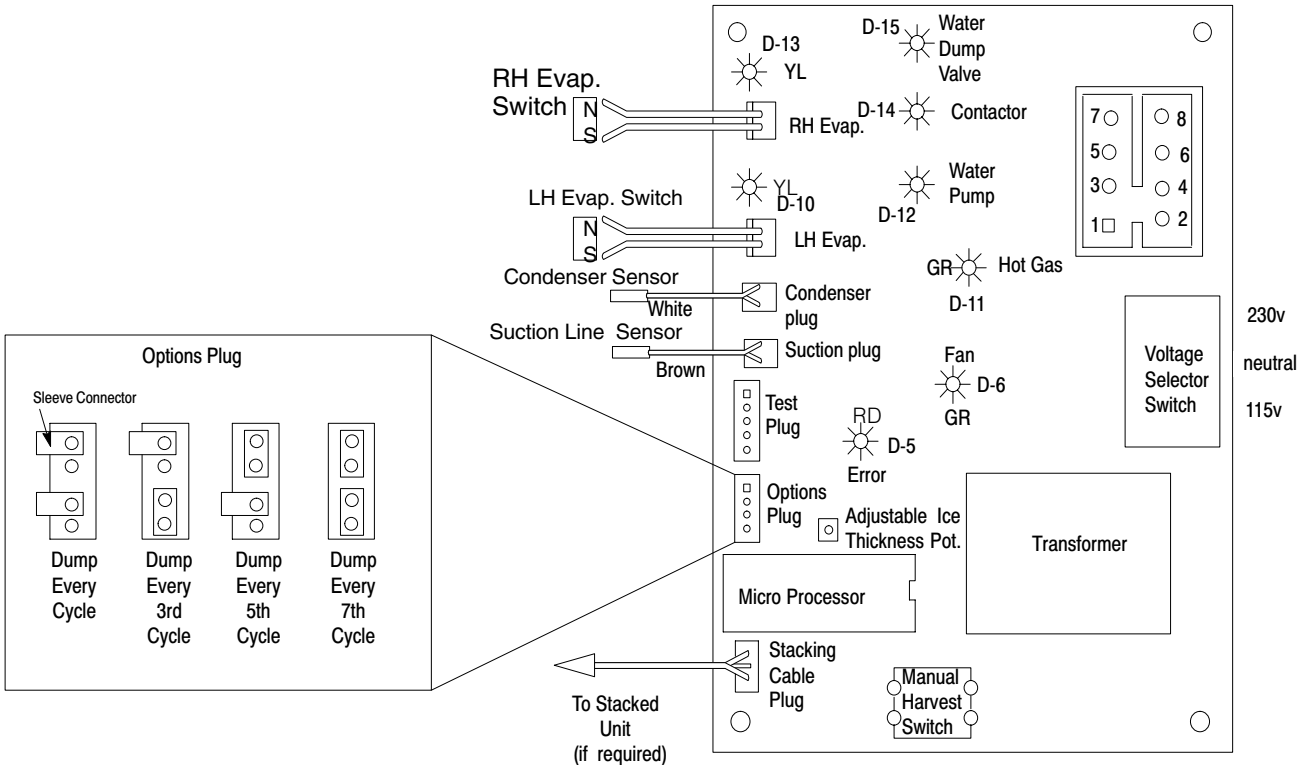


1. With the proper water level in the water pan, start the water pump to circulate the water. Check that the float will return water level to original setting and stop inlet water.
2. There is a flow washer in the inlet side of the float assembly that will control inlet water pressure from 20/120 PSI (3.4/8.16 Bars). This will prevent float flutter. In low water pressure conditions, 20 PSI (1.37 Bars) or less, the flow washer may have to be removed from the float assembly for proper volume.

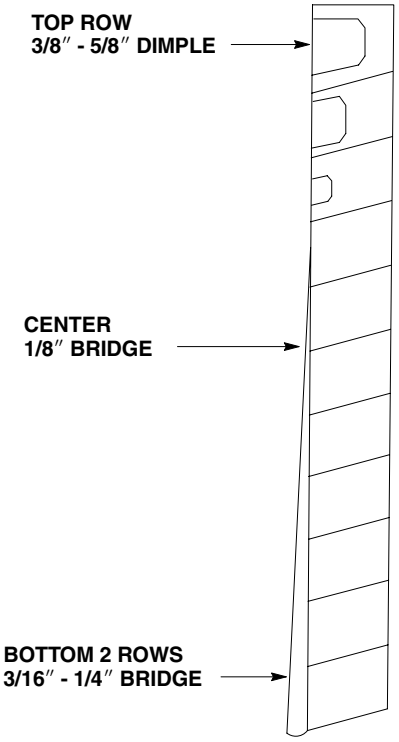
3. Push the manual dump switch – allow dump action to drain the water pan. When you release the momentary switch, the pump will stop and the float will return the water level back to its original setting and shut off the water supply.

4. You have the option of selecting dump cycle intervals of:
   - every cycle; (Standard setting from factory)
   - every 3rd cycle;
   - every 5th cycle;
   - every 7th cycle.

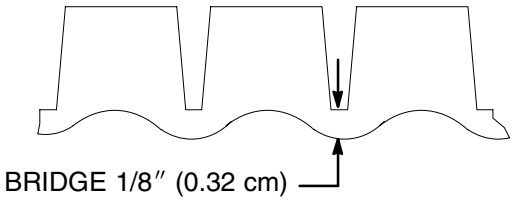
Remember, the higher the mineral content in the water supply the more often it will be required to dump the water and/or clean the product if proper water treatment is not used.



ADJUSTING BRIDGE THICKNESS



For optimum ice production and maximum cube separation, the ice connecting the individual cubes should be a minimum of 1/8″ (.32cm) thick at the center area of the ice waffle.



It is normal for the ice slab to be slightly thicker at the bottom and taper off in a slight wedge pattern at the top. The top row of cubes must have a complete pattern of ice on all four sides and the back wall. Remember, when you operate the product with the panels off during testing the additional heat at the top of the evaporator will cause thinner ice at the top than when the panels are in place.

Should a different thickness of the bridge be desired, it will be required to adjust the ice thickness “POT”, located on the circuit board, as follows:

1. Thinner Bridge – turn the ice thickness “pot” adjustment screw ↻CW one full turn. Allow two cycles before determining if additional adjustments are required.

2. Thicker Bridge – turn the ice thickness “pot” adjusting screw ↺CCW one full turn. Allow two cycles before determining if additional adjustments are required.

NOTE: Never judge the thickness of the ice from the first batch of the ice produced – the first cycle is a balance cycle. Always wait for the second cycle before making any adjustments.

TOTAL ICE CAPACITY

Ice capacity of any ice maker is affected by many operating conditions, such as water and air temperature and location factors. Please review the capacity tables in this manual for average 24-hour capacity under various conditions.

NOTE: All printed capacity ratings are ± 10% except 50 HZ units. These products have 12% increase in cycle time and capacity decrease of approximately 17%.

ICE PRODUCTION CHECK

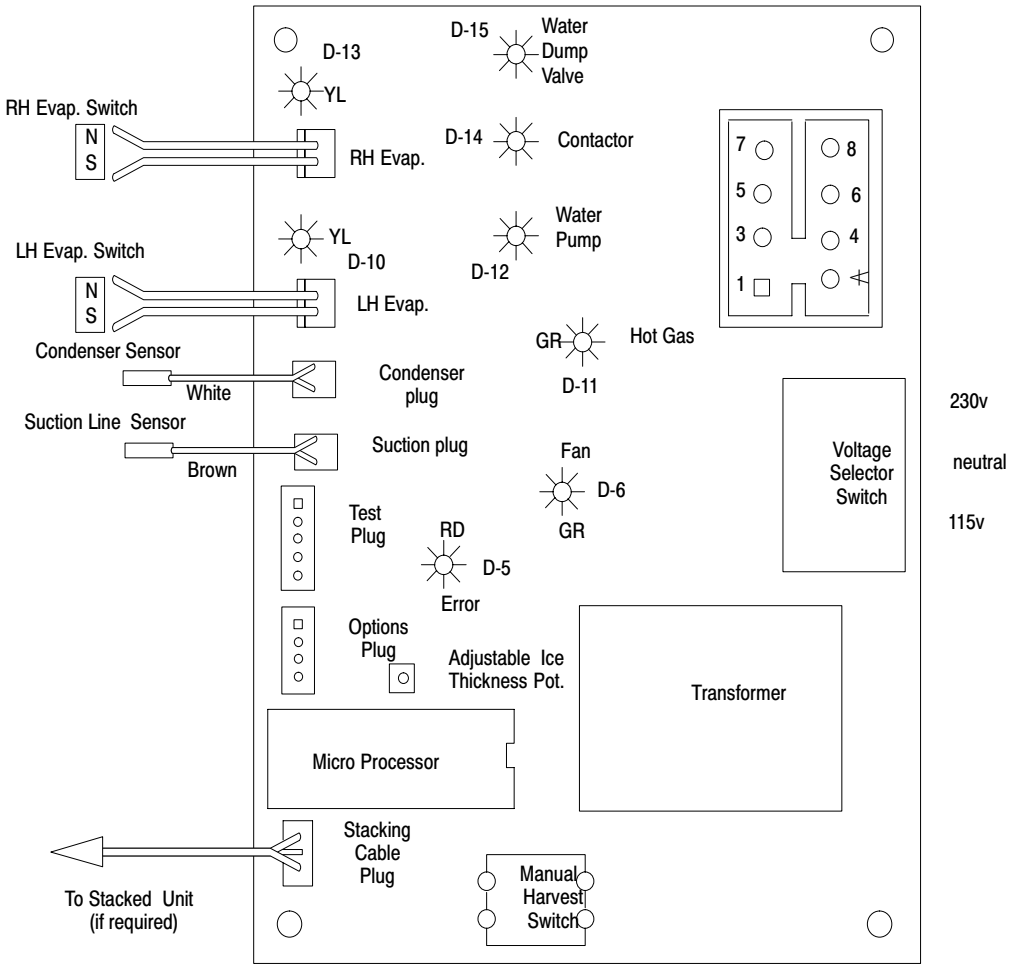
If air cooled, take air temperature at the intake of the condenser, 2″ from the condenser fins, and Incoming water temperature at the outlet of the “float” valve.*

Cycle time (CT) = freeze time plus harvest time, in minutes and seconds. 1440 divided by CT = number of cycles per 24 hours.

Measure weight of ice from one cycle in pounds and fractions of a pound.

EXAMPLE: Weight/cycle x cycles/day = total production/24 hrs. Compare to the production tables.

* If water cooled, be certain water regulator valve is set to maintain 300/310 PSI head pressure.



LED INDICATORS

The LEDs are board circuit indicators. If the LED in the functional board circuit is complete, check component.

Example: Contactor does not energize and LED is “ON”, board circuit is OK. Check contactor, coil, leads, & connections.

Yellow:

- Evaporator switch(s) (proximity)

Green:

- Water dump valve
- Compressor contactor
- Water Pump
- Hot Gas Valve
- Condenser Fan (cycles on & off with fan)

Red:

Error in system operation. Product shut down.

STATUS INDICATOR

D6	Green LED	Condenser Fan
D10	Yellow LED	Left Water Curtain
D11	Green LED	Hot Gas Valve
D12	Green LED	Water Pump
D13	Yellow LED	Right Water Curtain
D14	Green LED	Compressor Contactor
D5	Red LED	Error
D15	Green LED	Dump Valve

Curtain Open

D13	Yellow LED	off	Right evaporator curtain open.
D10	Yellow LED	off	Left evaporator curtain open.

Pre-Chill Mode

D6	Green LED	(on or off)	Condenser fan cycles on & off depending upon condenser temperature.
D14	Green LED	(on)	Compressor contactor active – Compressor running.
D13	Yellow LED	(on)	Right evaporator curtain closed.
D10	Yellow LED	(on)	Left evaporator curtain closed (only if unit has two evaporators).

Ice-Making Mode

D6	Green LED	(on or off)	Condenser fan cycles on and off depending upon condenser temperature.
D12	Green LED	(on)	Water pump active.
D14	Green LED	(on)	Compressor contactor active – compressor running.
D13	Yellow LED	(on)	Right evaporator curtain closed.
D10	Yellow LED	(on)	Left evaporator curtain closed (only if unit has two evaporators).

Harvest Mode

D11	Green LED	(on)	Three seconds after water dump valve becomes active, the hot gas valve becomes active.
D12	Green LED	(on) 15 sec.	Fifteen seconds after water dump valve becomes active, the water pump deactivates.
D14	Green LED	(on)	Compressor contactor active – compressor running.
D15	Green LED	(on) 15 sec.	Water dump valve becomes active at the start of harvest. Water dump valve is active for 15 seconds.
D13	Yellow LED	(on)	Right evaporator curtain closed. When the ice falls and the curtain opens, the LED will turn off.
D10	Yellow LED	(on)	Same as D13 if there is a second (left) evaporator.

Error LED

D5	Red LED	(on)	EVAPORATOR OPEN THERMISTOR CIRCUIT - thermistor open / broken wire / poor connection. Ice maker is SHUT DOWN. Consult service manual (Diagnostic Section) for troubleshooting guide.
D5	Red LED	(on)	EVAPORATOR HIGH TEMP. ERROR: Six minutes into the Freeze cycle the suction line temperature failed to reach 40°F or below. Ice Maker is SHUT DOWN. Consult service manual (Diagnostic Section) for troubleshooting guide.
D5	Red LED	(on)	TWO REPEATED FAILED HARVEST CYCLES - No ice drop.
D5	Red LED	Flashing, 1/sec	CONDENSER OPEN THERMISTOR CIRCUIT (Air Cooled only) - Thermistor open / broken wire / poor connection. Ice Maker is SHUT DOWN. Consult service manual (Diagnostic Section) for troubleshooting guide.
D5	Red LED	Flashing, 1/sec	CONDENSER LOW TEMPERATURE CONDITION. - Condenser midpoint reaches 36°F - Ice Maker is SHUT DOWN.
D5	Red LED	Flashing, 1/sec	CONDENSER HIGH TEMPERATURE SAFETY SHUT DOWN.

CIRCUIT BOARD DIAGNOSTIC PROCEDURE

Turn the power switch to the “ON” position. The D-5 red LED (error indicator) will be illuminated for 2 seconds. After the D-5 red LED goes out, short across the bottom two terminals of the Test Plug with a jumper wire or a pocket screwdriver and then remove the jumper. The circuit board is now in the test mode.

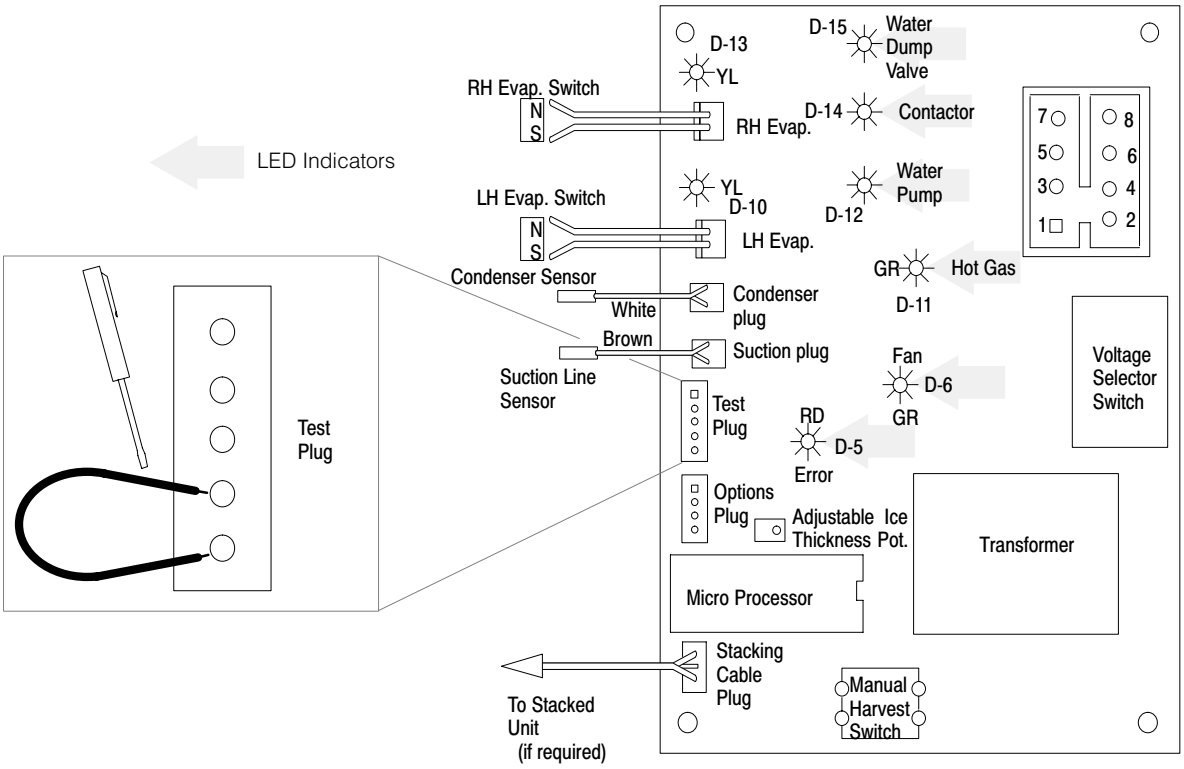
One of these two conditions will exist:

- If the Ice Thickness Potentiometer <u>is</u> within the factory setting the D-5, red LED will flash continiously.
- If the Ice Thickness Potentiomater <u>is not</u> within the factory setting, the D-5 red LED will not be illuminated.

In either case the Green LED indicators will illuminate for 2 seconds each in the sequence shown below. They will continue to sequence until you turn the power off and stop the procedure.

D-11	Green	Hot Gas
D-12	Green	Water Pump
D-14	Green	Contactor
D-6	Green	Fan
D-15	Green	Dump Valve

Failure of the green LED’s to cycle in this sequence indicates a defect in the circuit board.



RESTORING ICE THICKNESS POTENTIOMETER TO FACTORY SETTING

1. Turn cuber power switch to the OFF (center) position.
2. Unplug the proximity switch(es) and the thermistor(s) from the circuit board.
3. Turn the cuber power switch to the ON position. The red LED D-5 will illuminate for 2 seconds and then go out.
4. Short across the bottom 2 pins of the Test Plug using a wire jumper or a pocket screwdriver. Immediately remove the jumper.

One of these two conditions will exist:

- If the Ice Thickness Potentiometer is within the factory setting the D-5, red LED will flash continiously.
- If the Ice Thickness Potentiomater is not within the factory setting, the D-5 red LED will not be illuminated.

In either case the Green LED indicators will illuminate for 2 seconds each in the sequence shown below. They will continue to sequence until you turn the power off and stop the procedure.

D-11	Green	Hot Gas
D-12	Green	Water Pump
D-14	Green	Contactor
D-6	Green	Fan
D-15	Green	Dump Valve

Making Adjustments

When making adjustments, turn the Ice Thickness Potentiometer screw slowly to allow the circuit board time to react. Always turn the screw one full 360° turn, rest several seconds, then adjust another 360° turn.

Turn the Ice Thickness Potentiometer screw 10 (ten) turns clockwise or until the red LED D-5 starts to flash – should the LED not start to flash after 10 (ten) turns clockwise – reverse the direction and turn the screw slowly counterclockwise until the red LED D-5 starts to flash.

When the LED *starts to flash, stop turning*. You have reached the original factory setting.

Important: Erratic component operation (water pump, condenser fan, hot gas valves, etc.) are usually a result of a poor connection at the 8-pin connector. Before doing any diagnostic test on the control board, be sure to check the 8-pin connector to ensure that all wires are properly installed and the connector is securely in place.

COMPONENT FUNCTION (CIRCUIT BOARD ETC.)

TEST PLUG

Board manufactures check point. DO NOT ATTEMPT ANY VOLTAGE CHECKS AT THESE PINS.

SENSORS

Condenser sensor **(WHITE)** and suction line sensor **(BROWN)** are thermistors rated 1k ohm at room temperature.

- Condenser sensor signals the circuit board for fan cycling and also serves as the high temperature safety shut down. The red “Error LED” will flash on and off every second, during high temperature safety shut down. Product is functionally shut down. Reset procedure must be performed to restart product operation.
- Suction line sensor signals the circuit board the suction line temperature, to control ice bridge thickness. Also the sensor serves as suction line high temperature signal (Cuber has 6 minutes to reduce suction line temperature to 40°F (4.4°C) in the freeze mode). The red “Error LED” will be steady on. Should this time frame not be met, product is functionally inoperative during this safety shut down. Reset procedure must be performed to restart product operation.

RESET OPERATION

When Cuber is functionally shut down and red “Error LED” is operational, the Cuber power switch must be turned off for 5 seconds and returned to the ON position to reset the circuit board and allow the Cuber to restart operation.

Evaporator Switches

Proximity Switches are half mounted to the water curtain, and the other half mounted to the evaporator side rail.

Switch Notes

1. Manually holding the curtain open during freeze mode will shut the Cuber down in 5 seconds.
2. During harvest cycle, if curtain is open for 10 seconds, the water pump will stop. The compressor will operate for 20 additional seconds before Cuber shut down takes place. When the water curtain is closed, the Cuber will begin the normal start-up process.
3. In single evaporator machines, the proximity switch connection must be on the top (RH) connection on the circuit board.
4. In dual evaporator machines, both RH and LH switches must open and reset to start the next freeze mode.

Harvest Safety Termination

After 4 minutes in the harvest mode, the safety timer in the circuit board will terminate the harvest mode and place the Cuber back into a freeze mode. This safety cycle will protect the evaporator, etc. should the product fail to terminate the harvest mode for any reason.

VOLTAGE CHECKS

Evaporator Proximity Switch

Turn Cuber power switch OFF. Disconnect proximity switch plug(s) from the circuit board. Use a digital multimeter set for D.C. Voltage; turn power switch ON, connect leads of meter across the top two terminal pins on the board, (for the switch being tested), meter should read 5VDC ± 0.2 output voltage. If not, replace the circuit board.

NOTE: The proximity switch on the IACS 227 or the IWCS 227 is mounted inside the right hand evaporator side rail. To test the switch, make the voltage test at the circuit board. To replace the switch, remove the upper right hand side service panel. Carefully remove the Mylar shield to gain access to the two nylon screws that hold the proximity switch. Remove the screws and the switch through the service opening. After installing the new switch, replace the Mylar shield and seal with a bead of silicone sealant.

VOLTAGE SELECTOR SWITCH

1. Selector bar in center position, switch is open. Product is inoperative.
2. Selector bar in down position, selection is for 115 VAC.
3. Selector bar in up position, selection is for 230 VAC.

STACKING CABLE

When stacking the "I" series cuber the connecting cable (connecting the two (2) circuit boards) will allow: the bottom Unit to shut off on the full bin signal (or any error code), the top Unit will then finish the cycle it is in and shut down. The "I" series should never be stacked more than two high.

Sensor [Thermistor] Diagnosis

Sensors

Condenser or suction line – Turn Cuber power switch OFF. Disconnect sensor plug from board. Use digital multimeter set for D.C. Voltage. Turn power switch ON. Connect leads of meter across the two pins of the sensor being checked. Meter should read 2.5 VDC$\pm$0.2 output voltage from the board. If voltage is not correct, replace the circuit board.

Should the cuber operation indicate there may be a fault in the sensor [thermistor] or the control board circuit proceed as follows.

1. Using a good multimeter, check the control board sensor output voltage.
2. If voltage checks are correct do the following:
   A. Disconnect the suction line sensor (brown lead) from the control board.
   B. Install the special test cord* to the control board and reinstall the sensor to the test cord terminals.
   C. Connect the multimeter (set on VDC - milli-volts) to the test cord leads.
   D. Operate the cuber in the freeze cycle.
3. As the suction line temperature decreases the milli-volt reading will increase.
4. **Sensor Shorted** – milli-volt reading will cease to increase and will remain steady indicating a shorted sensor.
5. **Sensor Open** – The voltage reading will indicate the control board output voltage of 2.5 VDC.
6. Should step 4 or 5 occur during this test, the sensor will require replacement.
   * Special test cord, part # 164984009, may be ordered through the Service Department.
7. Condenser Sensor **(white leads) – self-contained air-cooled only – water cooled and remote systems use a resistor plug on the control board.**
   Complete the sensor and multimeter connections as described in
   2- B, C, D
8. **Shorted sensor** – a steady low milli-volt reading will be recorded. The reading will not change.
9. **Open sensor** – the multimeter will record control board output voltage of 2.5 VDC.
10. Should sensor (thermistor) pass the voltage test proceed to the control board diagnosis for LED sequence (see page 22).

NOTE: The sensor controls the condenser fan cycling from 88/100 degree Fahrenheit. Thus any defects in the condenser circuit will effect the fan cycling rate.

CONDENSER FAN CYCLING CONTROL

The condenser fan on air-cooled cubers is cycled by the circuit board. The condenser sensor signals the circuit board when the condenser temperature reaches 100°F (38°C) the fan starts and continues to run until the temperature is reduced to 88°F (31°C).

NOTE: There is no pressure control used to cycle the fan motor on intergal condensor unit.

THERMOSTATIC EXPANSION VALVES

The following suggestions for diagnosis of automatic Thermostatic Expansion Valve (TXV) are given with the understanding that the following have been checked and are correct and/or have been corrected prior to proceeding.

1. The condenser and fan blade are clean and have proper operating conditions.

2. Water supply to the product is correct and flow over the evaporator is correct.
3. Cuber refrigerant charge is correct.
4. TXV sensing bulb is properly located and secured to the suction line and correctly insulated.
5. Hot gas valve(s) are not leaking and/or seeping through.

Starving TXV - Product Symptoms

1. Suction pressure lower than normal for the operating conditions.
2. Ice production lower than normal and/or none.
3. Ice pattern on evaporator (if any) thin at top and thick at bottom.

Flooding TXV - Product Symptoms

1. Ice production lower than normal and/or none.
2. Suction pressure stabilizes at higher than normal pressure for operating conditions. Suction pressure does not modulate and may start to slowly rise.
3. Ice pattern will be very heavy at the bottom and thin at the top of the evaporator. Product may not enter harvest cycle because of higher than normal suction line temperature.

IMPORTANT: Frost on the suction line may be normal on medium temperature refrigeration equipment. Frost should be considered a red flag, long run times will normally produce some type of frost pattern. Before checking the sealed refrigeration system, the external conditions that could lead to frost follow:

1. Dirty condenser
2. Dirty condenser fan blade
3. Improper air clearance around Cuber
4. Loose TXV bulb mount
5. Poor water flow over evaporator
6. Ventilation problems

The expansion valves used on Cornelius “I” series ice equipment have special super heat settings and bulb charge designed for the product load and HP 62 refrigerant. Should the need arise to replace this or any refrigerant components, be certain to use only components recommended by Cornelius for the model of the Cuber being serviced. Use of nonapproved components will compound system difficulties and may void product warranty.

WATER REGULATING VALVE

The water regulating valve is used on water-cooled cubers only. The valve is installed in the condenser outlet water line. It’s function is to control the proper operating head pressure by regulating the amount of water flowing through the condenser. The valve is adjustable and factory set to maintain condenser discharge water temperature @ 108/112°F (42-44°C). Setting the water regulating valve to maintain discharge water temperature eliminates the need to enter the sealed refrigeration system. When checking the valve, the water temperature should be taken as close to the condenser discharged as possible. The water temperature will equate to operating head pressure of approximately 310 PSI (21.1 BAR).

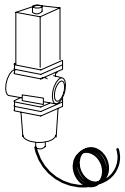
Should adjustment be required, the valve has an adjustment stem on the top of the valve. After allowing the cuber to operate for 10 minutes in the ice– making mode to balance the system, turning the adjusting stem CW ↻ will increase the discharge water temperature, and CCW ↺ will decrease the discharge water temperature.

The water regulating valve must close off condenser water flow completely during the “hot gas” harvest cycle. There should be no discharge water flowing out of the condenser during the harvest cycle. Should the valve fail to close during the harvest mode, the condenser will continue to condense the compressor discharge vapor needed for the harvest cycle and this will result in long harvest times.

Also discharge water temperature below 108°F /112°F will result in long harvest times.

Leaking (bypassing) water regulating valves are normally the result of scale build-up on the valve diaphragm and the valve should be flushed, not replaced. To flush the valve, open the adjusting stem wide open CCW (or force the valve spring up with a screwdriver), open and close the water supply to the condenser resulting in the flushing action. Should this not correct the problem, replace the valve diaphragm. This can be done without entering the sealed refrigeration system.

Damage to the water regulating valve may also be caused by water hammer. Water hammer will result from the condenser inlet and outlet water lines being reversed or defective valve stops in the water supply line. Proper installation of water–cooled equipment should always include an anti-water hammer standpipe in the supply inlet line as close to the cuber as possible.



SERVICE STEM VALVES

When closing the service stem valves to remove your gauge and manifold set always close the high side stem valve first. Following this procedure will allow the system to “PULL” the refrigerant vapor from your manifold set to reduce refrigerant loss. When the pressure has been reduced, close the low side stem valve.

MOISTURE CONTAMINATION

With the major changes in refrigerants in today’s marketplace and the use of hydroscopic oils the control of moisture and contaminates have become more critical to safeguard against than ever before in the history of mechanical refrigeration.

Contaminates are also the most difficult of all problems to determine. A Meg-Ohm meter “Megger” can be a valuable tool to aid in the analysis of this problem. A Meg-Ohm reading log may be started any time after 90 days of operation of the product. To perform the test, proceed as listed.

Disconnect all three (3) compressor leads, take a Meg-Ohm meter reading from each compressor terminal to a good chassis ground. Compare reading to chart below:

Meter Reading Meg-Ohm	Compressor Condition	Maintenance Required
100 - ∞	Okay	None needed.
50 to 100	Moisture present	Replace drier.
20 to 50	Severe moisture & possible contaminated oil with acid present	Replace drier with acid hold type. Run 24 hours, change to regular drier.
.5 to 20	System has severe contamination	Remove compressor oil and refrigerant charge. Evacuate, install liquid and suction line driers (acid hold type). Recharge with new oil and refrigerant. Run 24 hours. Discharge system, discard suction line drier, replace the liquid line drier. Evacuate and recharge.

Readings in the range listed below 100 Meg-Ohm would be an indicator that the system being tested may have a contamination problem. Where does the problem come from? As an example, the filter drier may become saturated and hold large percentages of moisture and the system function without a problem until such time as the product operating conditions change. Should the room temperature increase, or the condenser plug-up etc., the higher operating pressures and temperatures may cause the drier filter to release a portion of it’s held moisture. It is also imperative to avoid opening the sealed refrigeration system whenever possible and when it is done to be certain the true problem is correctly diagnosed and repaired. Remember, service gauge sets should only be installed after all external checks have been performed.

CAUTION: Megger checks should NEVER be performed on any compressor that is under a vacuum.

COMPRESSOR CONTACTOR

The contactor serves as the voltage supply switch for the compressor circuit. Voltage to the coil of the contactor is supplied by the circuit board.

Check Out:

The two (2)* line supply screws of the contactor should always have supply voltage present when voltage is on to the product.

The other two (2)* screws (load) should have line voltage when the contactor is energized. The contactor coil receives its supply voltage from the circuit board. Should the contactor fail to energize:

Check for supply voltage from circuit board, lead connections to contactor coil, and ohms value of coil.

* (3) if the product is 3 phase

Note: See compressor run-on condition check procedure on page 31.

COMPRESSOR & STARTING COMPONENT CHECK-OUT PROCEDURE

When compressors fail to start or run properly, it is normally the external electrical supply or the compressor start components that are defective – the overload protector, start and/or run capacitor, relay, circuit board, safety controls, etc.

1. Check voltage at compressor terminals. NO voltage will require checking the electrical circuit working back from the compressor to determine where the voltage supply is interrupted and correct as required. The load voltage, while compressor is trying to start, should not be less than 90% of rated required voltage.

Line voltage and wire size effect the life expectancy of the electrical components, compressor, motor winding, solenoid coils, etc.

Poor line quality voltage will cause many erratic electrical problems. Remember every electrical product, ice machine, dispenser, walk-in, reach-in, air conditioner, etc. required proper power supply to operate. Be certain when voltage checks are performed that you are measuring load voltage, not line voltage.

2. A defective capacitor or start relay may prevent the compressor from starting. Should the compressor attempt to start, but is unable to do so, or if the compressor hums or trips off on the over protector, check the following:

NOTE: For 50 HZ application on dual rated 50/60 HZ models, load voltage while compressor is starting must not be less than 90% of 50 HZ rating.

Relay

Potential –

For the potential type, contacts are normally closed. The start contacts open by C.E.M.F. generated by the compressor at approximately 80% of the normal operating speed. As the contacts open, only the start capacitor is removed from the start circuit. Both the start and run winding and the run capacitor remain in the circuit. **This relay may or may not be directional in mounting.**

Current –

For the current type, contacts are normally open. The start contacts close by the high current draw from the locked rotor condition with only the run winding in the circuit. As the contacts close, the start capacitor and the start winding is energized and the compressor starts. At approximately 80% of its operating speed the current draw drops off, the relay contacts open removing the start winding and start capacitor from the circuit. **(Remember, current relays are directional in their mounting to allow contacts to lift and close)**.

Capacitors

A quick check is to replace suspected defective capacitors with known good capacitors being careful to stay within the range for substitute values. Should those values be unknown, a basic rule for capacity is: for start capacitors ±10% and run capacitors ±5% of the rating on the defective original capacitor being replaced. Voltage should always try and be matched; if it cannot be, it is acceptable to increase up to 10% higher than the voltage listed on the capacitor being replaced. NEVER put a capacitor on a product with a voltage rating lower than the original being replaced. If a capacitor analyzer is not available, an ohm meter may be used to check a capacitor for short or open circuits. Set the ohm meter to its highest scale and connect its leads to the capacitor terminals.

1. With a capacitor, without plate defect, the indicator should first move to zero (0) and then gradually increase to infinity.
2. If there is no movement of the ohm meter indicator, an open circuit is indicated.
3. If the ohm meter indicator moves to zero (0) and remains there, or on a low resistance reading, a short circuit is indicated.
4. Please note this check does not determine if the capacitor will deliver the proper rated MFD/UFD required, it only shows if the capacitor has shorted or open circuits.
5. Capacitors that show any signs of leakage of electrolyte, or damage of the can, should be replaced. DO NOT TEST!

Compressor

1. Using an ohm meter, check for continuity from compressor terminal C to R and C to S. If the compressor is hot, wait one (1) hour for compressor to cool and recheck. An open internal overload protector can cause a lack of continuity. If continuity cannot be measured through all windings, the compressor must be replaced.

2. To check the compressor motor for accidental ground, perform a continuity check between terminals C, R and S to the compressor shell or a copper line of the refrigeration system (do not use a painted surface). Continuity present, the compressor windings are grounded and the compressor must be replaced.

If the compressor starts, but trips repeatedly on the overload protector, remember that the overload is both temperature and current activated. Be sure to check:

- Low voltage
- Undersized supply lines
- High head pressure
- High suction pressure
- Defective capacitors
- Compressor mechanical problems
- Low refrigerant charge

LEAK DETECTION

The new non-chlorine based refrigerants such as [HP - 62/R 404A] require special leak detection devices other than what has been standard for the CFC's.

While the instruments for leak detection are different, the processes have not changed.

Basics to remember:

1. Look for signs of oil when you visually start your leak check process. Oil is carried with the refrigerant. If the oil has leaked out so will the refrigerant.
2. Refrigerant vapor is heavier than air. When leak checking suspect areas, probe below the joints or connections.
   A. Always check the high-side of the system with the compressor operational.
   B. Check the low-side of the system, with the system idle.
   C. Following a & b will normally allow the highest pressure on each portion of the system for the best detection.
3. Systems short of refrigerant will show improper operational results in both the freeze and harvest cycles. Many systems will appear normal in higher operating temperatures and change drastically in cooler condenser temperatures.
4. Many new and reworked leak detection instruments have the ability to detect CFC's, HCFC's and the new HFC's by making a simple switch selection. This type of detector will be more sensitive on one setting than the other. This results in finding some leaks that are so small it may take years before the actual leak rate would create adverse operating conditions in the product.

   A bubble test and/or additives with UV lamp may be the best team for the most positive leak testing results.
5. Never pressurize a system with oxygen or a mixture of refrigerant and air. **Either of these methods may cause a system explosion to occur.**
6. Pressurizing systems to leak test should only be done with dry nitrogen. Be sure the regulator setting does not exceed the recommended system pressure.

CAUTION: A full cylinder of nitrogen will have pressure of approximately 2700 PSI.

7. Failure to correct leaks will also cause shorter compressor life as a result of the higher operating temperatures. **Always leak check the total system as one located leak may not be the only leak.**

SYSTEM EVACUATION & RECHARGING

Should service work ever be required on a product where the sealed refrigeration is opened for any reason, the refrigerant must be recovered, drier/filter replaced, evacuated and recharged. The old method of "purging" is NOT ACCEPTABLE. Always evacuate the system through both the high and low side service valves. Be certain both valves are completely open when evacuating and the drier/filter has been replaced.

SELF-CONTAINED PRODUCTS

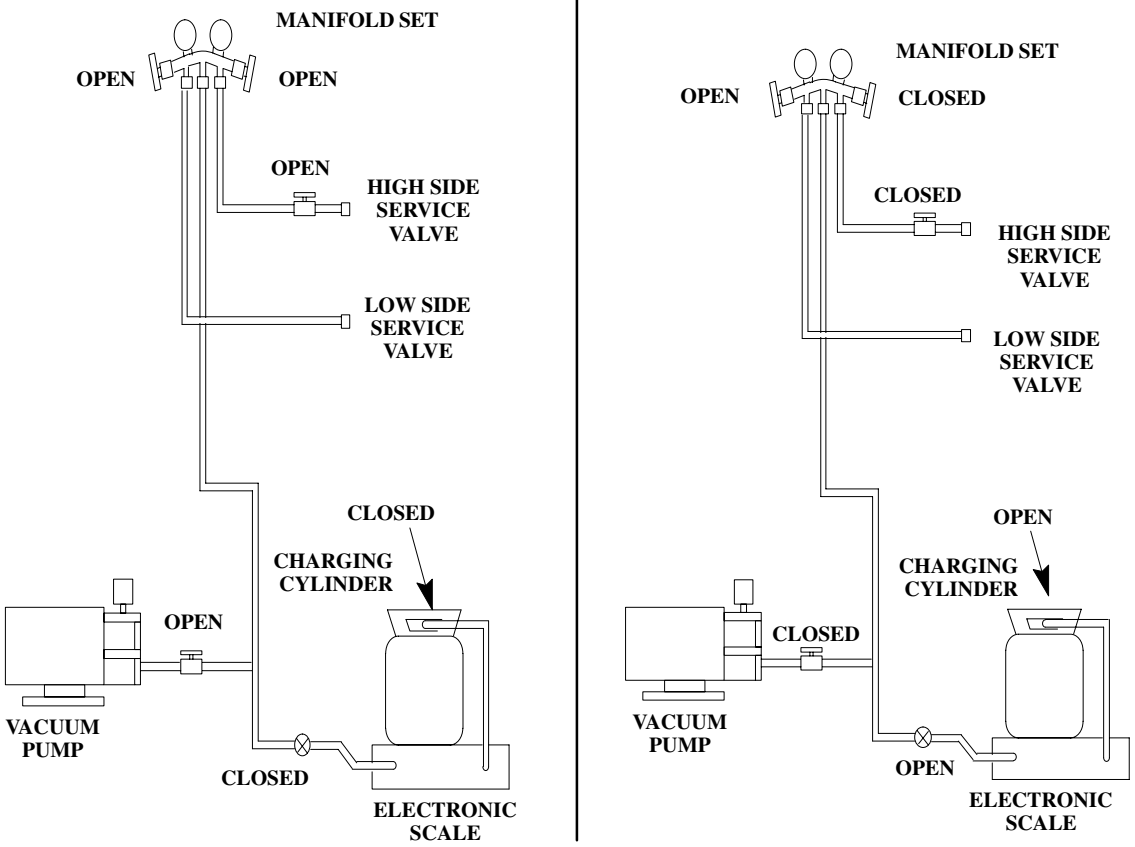
With the new POE [Polyol Ester] oils, the refrigeration system is more prone to moisture problems than the CFC systems. Every effort should be made to never have the system open to the atmosphere for longer than 15 minutes, and the replacement of the drier/filter is no longer an option, [IT IS MANDATORY].

A good vacuum is not always easy to measure, however the goal is to have less then 1% non-condensible vapors in the system at the completion of the evacuation. Basic guidelines with a good pump would be to evacuate a selfcontained product 30 to 45 minutes and a remote product no less than 60 minutes.

The system should be evacuated to approximately 200/250 microns. Then perform a 5 minute holding test. You may expect a low grade loss of the vacuum as normal. However, a rapid rise to normal atmospheric pressure would signal a system leak is present and must be located and repaired before recharging the product. A slower pressure rise to approximately 1500 microns would signal moisture still present in the refrigeration system.

On a “WET” system, it would be beneficial to use heat lamps to raise the temperature of the compressor dome and evaporator surface area during the evacuation.

To assure a properly recharged product, the refrigerant charge must be weighed into the product using an electronic charging scale or dial-a-charge. On air- and water-cooled products the charge should be introduced into the high side service valve. On remote systems, the charge should be introduced into the product receiver.



IMPORTANT: Service personnel are held responsible for ALL ASPECTS OF THE CLEAN AIR ACT OF JULY, 1992.

REFRIGERANT DEFINITIONS (ASHRAE 3-1990)

RECOVERY

To remove refrigerant in any condition from a system and store it in an external container without necessarily testing or processing it in any way.

RECYCLING

To clean refrigerant for reuse by oil separation and single or multiple passes through devices, such as replaceable core filter-driers, which reduce moisture, acidity, and particulate matter. This term usually applies to procedures implemented at the field job site or at a local service shop.

RECLAIM

To reprocess refrigerant to new product specifications by means which may include distillation. Will require chemical analysis of the refrigerant to determine that appropriate product specifications are met. This term usually implies the use of processes or procedures available only at a reprocessing or manufacturing facility.

NOTES REGARDING RECLAIM:

“New product specifications” currently means ARI standard 700-88. Note that chemical analysis is required to assure that this standard is met.

Chemical analysis is the key requirement to the definition of “Reclaim”. Regardless of the purity levels reached by a re-processing method, the refrigerant is not “reclaimed” unless it has been chemically analyzed and meets ARI Standard.

HIGH PRESSURE SAFETY SWITCH

All water-cooled and remote products contain a high pressure safety cut-out switch. The function of this switch is to shut down the cuber should excessive pressure develop in the high side of the refrigeration system. This switch will open the power supply at 450 PSI (30.61 BAR) high side pressure. Should this control open, it must be reset manually and the cause for the increase in pressure determined.

COMPRESSOR RUN-ON

Contactor remains energized when curtains are in a full bin condition – compressor runs but water pump and condenser fan (AC) are off.

1. Check VAC at contactor coil with an analog voltmeter (dial type, not digital).
   A. Voltage at the contactor coil 12 VAC or higher may hold the coil energized. Turn the power switch OFF, if contactor de-energizes, replace the circuit board, the snubber circuit is leaking.
   B. Should you find 1/2 normal line voltage, replace the circuit board, the triac is shorted.
   C. If no voltage or very low voltage (6 VAC or less) is present and plunger is still closed, replace the contactor.

AVERAGE OPERATING CHARACTERISTICS
IACS227/IAC322/IAC330

IP Units

AMBIENT TEMP °F	WATER TEMP °F	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT lb/Cycle	AVERAGE ICE WEIGHT lb/Day
		HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec	HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec		
70	50	200	39	9:5	150	105	1:1	2.4	325
80	70	228	42	12:4	160	110	0:9	2.4	260
90	70	267	44	14:3	183	133	0:7	2.5	240
90	80	270	45	15.1	181	130	0.7	2.4	220
100	70	299	47	19:8	199	142	0:6	2.8	200

SI Units

AMBIENT TEMP °C	WATER TEMP °C	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT kg/Cycle	AVERAGE ICE WEIGHT kg/Day
		HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec	HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec		
21	10	1379	269	9:5	1034	724	1:1	1.1	147
27	21	1572	290	12:4	1103	758	0:9	1.1	118
32	21	1841	303	14:3	1262	917	0:7	1.1	109
32	27	1862	310	15.1	1248	896	0.7	1.1	100
38	21	2062	324	19:8	1372	979	0:6	1.3	91

AVERAGE OPERATING CHARACTERISTICS
IWCS227/IWC322/IWC330

IP Units

AMBIENT TEMP °F	WATER TEMP °F	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT lb/Cycle	AVERAGE ICE WEIGHT lb/Day
		HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec	HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec		
70	50	300	40	12:1	143	103	0:9	2.8	310
80	70	300	42	15:3	160	116	1:1	2.8	245
90	70	300	43	16:2	160	118	1:2	2.9	240
90	80	303	44	16.4	173	120	1.1	2.8	230
100	70	300	44	16:3	160	117	1:3	2.6	215

SI Units

AMBIENT TEMP °C	WATER TEMP °C	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT kg/Cycle	AVERAGE ICE WEIGHT kg/Day
		HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec	HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec		
21	10	2068	276	12:1	986	710	0:9	1.3	141
27	21	2068	290	15:3	1103	800	1:1	1.3	111
32	21	2068	296	16:2	1103	814	1:2	1.3	109
32	27	2089	303	16.4	1193	827	1.1	1.3	104
38	21	2068	303	16:3	1103	807	1:3	1.2	98

AVERAGE OPERATING CHARACTERISTICS
IAC522/IAC530

IP Units

AMBIENT TEMP °F	WATER TEMP °F	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT lb/Cycle	AVERAGE ICE WEIGHT lb/Day
		HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec	HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec		
70	50	220	38	12:5	155	95	1.0	5.1	540
80	70	250	42	14:6	175	111	0:9	4.8	450
90	70	275	41	17:4	195	120	0:7	5.1	405
90	80	290	45	17.9	200	120	0.6	5.0	387
100	70	320	46	20:9	220	120	0:6	5.2	350

SI Units

AMBIENT TEMP °C	WATER TEMP °C	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT kg/Cycle	AVERAGE ICE WEIGHT kg/Day
		HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec	HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec		
21	10	1517	262	12.5	1069	655	1:0	2.3	245
27	21	1724	290	14.6	1207	765	0.9	2.2	204
32	21	1896	283	17.4	1344	827	0.7	2.3	184
32	27	1999	310	17.9	1379	827	0.6	2.3	176
38	21	2206	317	20.9	1517	827	0.6	2.4	159

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AVERAGE OPERATING CHARACTERISTICS
IWC522/IWC530

IP Units

AMBIENT TEMP °F	WATER TEMP °F	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT lb/Cycle	AVERAGE ICE WEIGHT lb/Day
		HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec	HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec		
70	50	323	44	11:3	156	106	1:3	4.3	490
80	70	327	45	13:7	168	115	1.2	4.4	425
90	70	326	45	13:8	173	117	1:1	4.3	420
90	80	328	47	15.2	184	127	1:1	4.3	384
100	70	327	45	13:9	175	119	1:1	4.3	415

SI Units

AMBIENT TEMP °C	WATER TEMP °C	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT kg/Cycle	AVERAGE ICE WEIGHT kg/Day
		HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec	HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec		
21	10	2227	303	11:3	1076	731	1:3	1.9	222
27	21	2255	310	13:7	1158	793	1:2	2.0	193
32	21	2248	310	13:8	1193	807	1:1	2.0	191
32	27	2261	324	15:2	1269	876	1:1	2.0	174
38	21	2255	310	13:9	1207	820	1:1	2.0	188

AVERAGE OPERATING CHARACTERISTICS
IAC630

IP Units

AMBIENT TEMP °F	WATER TEMP °F	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT lb/Cycle	AVERAGE ICE WEIGHT lb/Day
		HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec	HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec		
70	50	225	34	8:4	148	88	1:5	5.4	755
80	70	261	37	11:3	166	101	1.2	5.6	640
90	70	296	40	12:6	183	113	1:1	5.6	590
90	80	297	40	13:2	184	113	1:0	5.5	560
100	70	333	43	17:1	200	125	1:1	6.0	475

SI Units

AMBIENT TEMP °C	WATER TEMP °C	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT kg/Cycle	AVERAGE ICE WEIGHT kg/Day
		HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec	HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec		
21	10	1551	234	8:4	1020	607	1:5	2.4	342
27	21	1800	255	11:3	1145	696	1:2	2.5	290
32	21	2041	276	12:6	1262	779	1:1	2.6	268
32	27	2048	276	13:2	1269	779	1:0	2.5	254
38	21	2296	296	17:1	1379	862	1:1	2.7	215

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AVERAGE OPERATING CHARACTERISTICS
IWC630

IP Units

AMBIENT TEMP °F	WATER TEMP °F	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT lb/Cycle	AVERAGE ICE WEIGHT lb/Day
		HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec	HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec		
70	50	299	35	10:1	143	86	1:6	5.8	715
80	70	299	38	12:4	152	92	1.4	6.0	622
90	70	300	38	12:3	153	93	1:4	5.9	620
90	80	304	39	14:0	166	100	1:2	6.0	570
100	70	300	38	12:2	152	93	1:4	5.8	615

SI Units

AMBIENT TEMP °C	WATER TEMP °C	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT kg/Cycle	AVERAGE ICE WEIGHT kg/Day
		HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec	HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec		
21	10	2062	241	10:1	986	593	1:6	2.6	324
27	21	2062	262	12:4	1048	634	1:4	2.7	282
32	21	2068	262	12:3	1055	641	1:4	2.7	281
32	27	2096	269	14:0	1145	689	1:2	2.7	259
38	21	2068	262	12:2	1048	641	1:4	2.6	279

AVERAGE OPERATING CHARACTERISTICS
IRC630

IP Units

AMBIENT TEMP °F	WATER TEMP °F	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT lb/Cycle	AVERAGE ICE WEIGHT lb/Day
		HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec	HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec		
70	50	225	34	8:4	148	88	1:5	5.2	755
80	70	261	37	11:3	166	101	1.2	5.6	640
90	70	296	40	12:6	183	113	1:1	5.6	590
90	80	297	40	13:2	184	113	1:0	5.5	560
100	70	333	43	17:1	200	125	1:1	6.0	475

SI Units

AMBIENT TEMP °C	WATER TEMP °C	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT kg/Cycle	AVERAGE ICE WEIGHT kg/Day
		HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec	HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec		
21	10	1551	234	8:4	1020	607	1:5	2.4	342
27	21	1800	255	11:3	1145	696	1:2	2.5	290
32	21	2041	276	12:6	1262	779	1:1	2.6	268
32	27	2048	276	13:2	1269	779	1:0	2.5	254
38	21	2296	296	17:1	1379	862	1:1	2.7	215

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AVERAGE OPERATING CHARACTERISTICS
IAC830

IP Units

AMBIENT TEMP °F	WATER TEMP °F	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT lb/Cycle	AVERAGE ICE WEIGHT lb/Day
		HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec	HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec		
70	50	253	29	7:6	163	83	1:5	5.3	840
80	70	293	33	9:0	187	97	1.0	5.2	745
90	70	335	36	11:5	210	111	0:9	5.8	680
90	80	339	37	12:0	209	111	0:9	5.8	645
100	70	379	40	13:8	232	126	0:8	6.0	595

SI Units

AMBIENT TEMP °C	WATER TEMP °C	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT kg/Cycle	AVERAGE ICE WEIGHT kg/Day
		HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec	HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec		
21	10	1744	200	7:6	1124	572	1:5	2.4	381
27	21	2020	228	9:0	1289	669	1:0	2.3	338
32	21	2310	248	11:5	1448	765	0:9	2.7	308
32	27	2337	255	12:0	1441	765	0:9	2.6	293
38	21	2613	276	13:8	1600	869	0:8	2.7	270

AVERAGE OPERATING CHARACTERISTICS
IWC830

IP Units

AMBIENT TEMP °F	WATER TEMP °F	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT lb/Cycle	AVERAGE ICE WEIGHT lb/Day
		HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec	HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec		
70	50	298	32	8:6	154	81	1:5	5.6	795
80	70	296	34	10:2	163	86	1.3	5.7	715
90	70	295	34	10:7	164	87	1:3	5.9	710
90	80	298	37	12:1	166	88	1:2	6.0	650
100	70	295	34	11:1	175	93	1:3	5.9	690

SI Units

AMBIENT TEMP °C	WATER TEMP °C	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT kg/Cycle	AVERAGE ICE WEIGHT kg/Day
		HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec	HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec		
21	10	2055	221	8:6	1062	558	1:5	2.5	361
27	21	2041	234	10:2	1124	593	1:3	2.6	324
32	21	2034	234	10:7	1131	600	1:3	2.7	322
32	27	2055	255	12:1	1145	607	1:2	2.6	295
38	21	2034	234	11:1	1207	641	1:3	2.7	313

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AVERAGE OPERATING CHARACTERISTICS
IRC830

IP Units

AMBIENT TEMP °F	WATER TEMP °F	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT lb/Cycle	AVERAGE ICE WEIGHT lb/Day
		HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec	HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec		
70	50	253	29	7:6	163	83	1:5	5.3	840
80	70	293	33	9:0	187	97	1.0	5.2	745
90	70	335	36	11:5	210	111	0:9	5.8	680
90	80	339	37	12:0	209	111	0:9	5.8	645
100	70	379	40	13:8	232	126	0:8	6.0	595

SI Units

AMBIENT TEMP °C	WATER TEMP °C	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT kg/Cycle	AVERAGE ICE WEIGHT kg/Day
		HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec	HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec		
21	10	1744	200	7:6	1124	572	1:5	2.4	381
27	21	2020	228	9:0	1289	669	1:0	2.3	338
32	21	2310	248	11:5	1448	765	0:9	2.7	308
32	27	2337	255	12:0	1441	765	0:9	2.6	293
38	21	2613	276	13:8	1600	869	0:8	2.7	270

AVERAGE OPERATING CHARACTERISTICS
IAC1030

IP Units

AMBIENT TEMP °F	WATER TEMP °F	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT lb/Cycle	AVERAGE ICE WEIGHT lb/Day
		HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec	HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec		
70	50	240	33	13:5	164	75	1:7	11.6	1101
80	70	276	36	14:2	177	83	1.4	10.5	969
90	70	312	38	15:9	196	91	1:1	10.5	890
90	80	313	38	16:8	198	91	1:1	10.5	840
100	70	349	41	18:7	215	100	1:0	10.8	793

SI Units

AMBIENT TEMP °C	WATER TEMP °C	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT kg/Cycle	AVERAGE ICE WEIGHT kg/Day
		HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec	HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec		
21	10	1655	228	13:5	1131	517	1:7	5.3	499
27	21	1903	248	14:2	1220	572	1:4	4.8	440
32	21	2151	262	15:9	1351	627	1:1	4.8	404
32	27	2158	262	16:8	1365	627	1:1	4.7	381
38	21	2406	283	18:7	1482	689	1:0	4.9	360

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AVERAGE OPERATING CHARACTERISTICS
IWC1030

IP Units

AMBIENT TEMP °F	WATER TEMP °F	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT lb/Cycle	AVERAGE ICE WEIGHT lb/Day
		HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec	HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec		
70	50	296	34	13:0	155	73	1:8	10.7	1046
80	70	297	35	15:3	161	75	1.7	10.9	925
90	70	297	36	15:7	161	77	1:5	11.0	920
90	80	300	36	17:9	175	81	1:4	11.0	823
100	70	297	36	15:8	164	77	1:5	11.0	915

SI Units

AMBIENT TEMP °C	WATER TEMP °C	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT kg/Cycle	AVERAGE ICE WEIGHT kg/Day
		HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec	HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec		
21	10	2041	234	13:0	1069	503	1:8	4.9	474
27	21	2048	241	15:3	1110	517	1:7	4.9	420
32	21	2048	248	15:7	1110	531	1:5	5.0	417
32	27	2068	248	17:9	1207	558	1:4	5.0	373
38	21	2048	248	15:8	1131	531	1:5	5.0	415

AVERAGE OPERATING CHARACTERISTICS
IRC1030

IP Units

AMBIENT TEMP °F	WATER TEMP °F	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT lb/Cycle	AVERAGE ICE WEIGHT lb/Day
		HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec	HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec		
70	50	240	33	13:5	164	75	1:7	11.6	1101
80	70	276	36	14:2	177	83	1.4	10.5	969
90	70	312	38	15:9	196	91	1:1	10.5	890
90	80	313	38	16:8	198	91	1:1	10.5	840
100	70	349	41	18:7	215	100	1:0	10.8	793

SI Units

AMBIENT TEMP °C	WATER TEMP °C	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT kg/Cycle	AVERAGE ICE WEIGHT kg/Day
		HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec	HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec		
21	10	1655	228	13:5	1131	517	1:7	5.3	499
27	21	1903	248	14:2	1220	572	1:4	4.8	440
32	21	2151	262	15:9	1351	627	1:1	4.8	404
32	27	2158	262	16:8	1365	627	1:1	4.7	381
38	21	2406	283	18:7	1482	689	1:0	4.9	360

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AVERAGE OPERATING CHARACTERISTICS
IAC1230

IP Units

AMBIENT TEMP °F	WATER TEMP °F	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT lb/Cycle	AVERAGE ICE WEIGHT lb/Day
		HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec	HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec		
70	50	231	30	8:8	175	75	1:5	8.9	1249
80	70	266	33	11:4	191	84	1.1	9.5	1090
90	70	296	35	13:6	211	95	1:0	10.1	1000
90	80	295	36	14:5	211	93	0:9	10.1	948
100	70	331	38	16:3	232	105	0:9	10.3	865

SI Units

AMBIENT TEMP °C	WATER TEMP °C	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT kg/Cycle	AVERAGE ICE WEIGHT kg/Day
		HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec	HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec		
21	10	1593	207	8:8	1207	517	1:5	4.1	567
27	21	21834	228	11:4	1317	579	1:1	4.3	494
32	21	2041	241	13:6	1455	655	1:0	4.6	454
32	27	2034	248	14:5	1455	641	0:9	4.6	430
38	21	2282	262	16:3	1600	724	0:9	4.7	392

AVERAGE OPERATING CHARACTERISTICS
IWC1230

IP Units

AMBIENT TEMP °F	WATER TEMP °F	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT lb/Cycle	AVERAGE ICE WEIGHT lb/Day
		HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec	HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec		
70	50	336	30	10:1	187	73	1:4	9.8	1221
80	70	324	30	13:2	177	76	1.3	10.7	1065
90	70	330	33	14:0	180	76	1:3	10.9	1030
90	80	323	32	14:8	180	78	1:3	10.9	973
100	70	324	30	14:0	180	76	1:3	10.9	1025

SI Units

AMBIENT TEMP °C	WATER TEMP °C	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT kg/Cycle	AVERAGE ICE WEIGHT kg/Day
		HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec	HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec		
21	10	2317	207	10:1	1289	503	1:4	4.4	554
27	21	2234	207	13:2	1220	524	1:3	4.9	483
32	21	2275	228	14:0	1241	524	1:3	5.0	467
32	27	2227	221	14:8	1241	538	1:3	4.9	441
38	21	2234	207	14:0	1241	524	1:3	4.9	465

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AVERAGE OPERATING CHARACTERISTICS
IRC1230

IP Units

AMBIENT TEMP °F	WATER TEMP °F	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT lb/Cycle	AVERAGE ICE WEIGHT lb/Day
		HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec	HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec		
70	50	231	30	8:8	175	75	1:5	8.9	1249
80	70	266	33	11:4	191	84	1.1	9.5	1090
90	70	296	35	13:6	211	95	1:0	10.1	1000
90	80	295	36	14:5	211	93	0:9	10.1	948
100	70	331	38	16:3	232	105	0:9	10.3	865

SI Units

AMBIENT TEMP °C	WATER TEMP °C	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT kg/Cycle	AVERAGE ICE WEIGHT kg/Day
		HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec	HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec		
21	10	1593	207	8:8	1207	517	1:5	4.1	567
27	21	1834	228	11:4	1317	579	1:1	4.3	494
32	21	2041	241	13:6	1455	655	1:0	4.6	454
32	27	2034	248	14:5	1455	641	0:9	4.6	430
38	21	2282	262	16:3	1600	724	0:9	4.7	392

AVERAGE OPERATING CHARACTERISTICS
IAC1448

IP Units

AMBIENT TEMP °F	WATER TEMP °F	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT lb/Cycle	AVERAGE ICE WEIGHT lb/Day
		HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec	HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec		
70	50	246	31	10:1	185	79	1:3	12.1	1525
80	70	280	34	11:8	201	88	1.3	12.3	1355
90	70	315	35	13:2	220	97	1:1	12.6	1275
90	80	317	37	13:7	222	98	1:1	12.4	1205
100	70	352	38	15:8	242	106	0:8	13.1	1140

SI Units

AMBIENT TEMP °C	WATER TEMP °C	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT kg/Cycle	AVERAGE ICE WEIGHT kg/Day
		HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec	HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec		
21	10	1696	214	10:1	1276	545	1:3	5.5	692
27	21	1931	234	11:8	1386	607	1:3	5.6	615
32	21	2172	241	13:2	1517	669	1:1	5.7	578
32	27	2186	255	13:7	1531	676	1:1	5.6	547
38	21	2427	262	15:8	1669	731	0:8	6.0	517

AVERAGE OPERATING CHARACTERISTICS
IWC1448

IP Units

AMBIENT TEMP °F	WATER TEMP °F	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT lb/Cycle	AVERAGE ICE WEIGHT lb/Day
		HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec	HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec		
70	50	316	32	9:9	180	73	1:7	12.1	1505
80	70	318	35	11:9	188	77	1.4	12.7	1370
90	70	318	36	12:2	190	78	1:3	12.8	1360
90	80	317	37	13:0	194	80	1:3	12.6	1270
100	70	316	36	12:7	189	77	1:4	13.1	1335

SI Units

AMBIENT TEMP °C	WATER TEMP °C	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT kg/Cycle	AVERAGE ICE WEIGHT kg/Day
		HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec	HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec		
21	10	2179	221	9:9	1241	503	1:7	5.5	683
27	21	2193	241	11:9	1296	531	1:4	5.8	621
32	21	2193	248	12:2	1310	538	1:3	5.8	617
32	27	2186	255	13:0	1338	552	1:3	5.7	576
38	21	2179	248	12:7	1303	531	1:4	5.9	606

AVERAGE OPERATING CHARACTERISTICS
IRC1448

IP Units

AMBIENT TEMP °F	WATER TEMP °F	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT lb/Cycle	AVERAGE ICE WEIGHT lb/Day
		HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec	HEAD PRESSURE Psig	SUCTION PRESSURE Psig	CYCLE TIME Min:Sec		
70	50	246	31	10:1	185	79	1:3	12.1	1535
80	70	280	34	11:8	201	88	1.3	12.4	1365
90	70	315	35	13:2	220	97	1:1	12.7	1285
90	80	317	37	13:7	222	98	1:1	12.5	1215
100	70	352	38	15:8	242	106	0:8	13.3	1150

SI Units

AMBIENT TEMP °C	WATER TEMP °C	FREEZE CYCLE			HARVEST CYCLE			AVERAGE ICE WEIGHT kg/Cycle	AVERAGE ICE WEIGHT kg/Day
		HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec	HEAD PRESSURE kPa	SUCTION PRESSURE kPa	CYCLE TIME Min:Sec		
21	10	1696	214	10:1	1276	545	1:3	5.5	696
27	21	1931	234	11:8	1386	607	1:3	5.6	619
32	21	2172	241	13:2	1517	669	1:1	5.8	583
32	27	2186	255	13:7	1531	676	1:1	5.7	551
38	21	2427	262	15:8	1669	731	0:8	6.0	522

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TROUBLESHOOTING

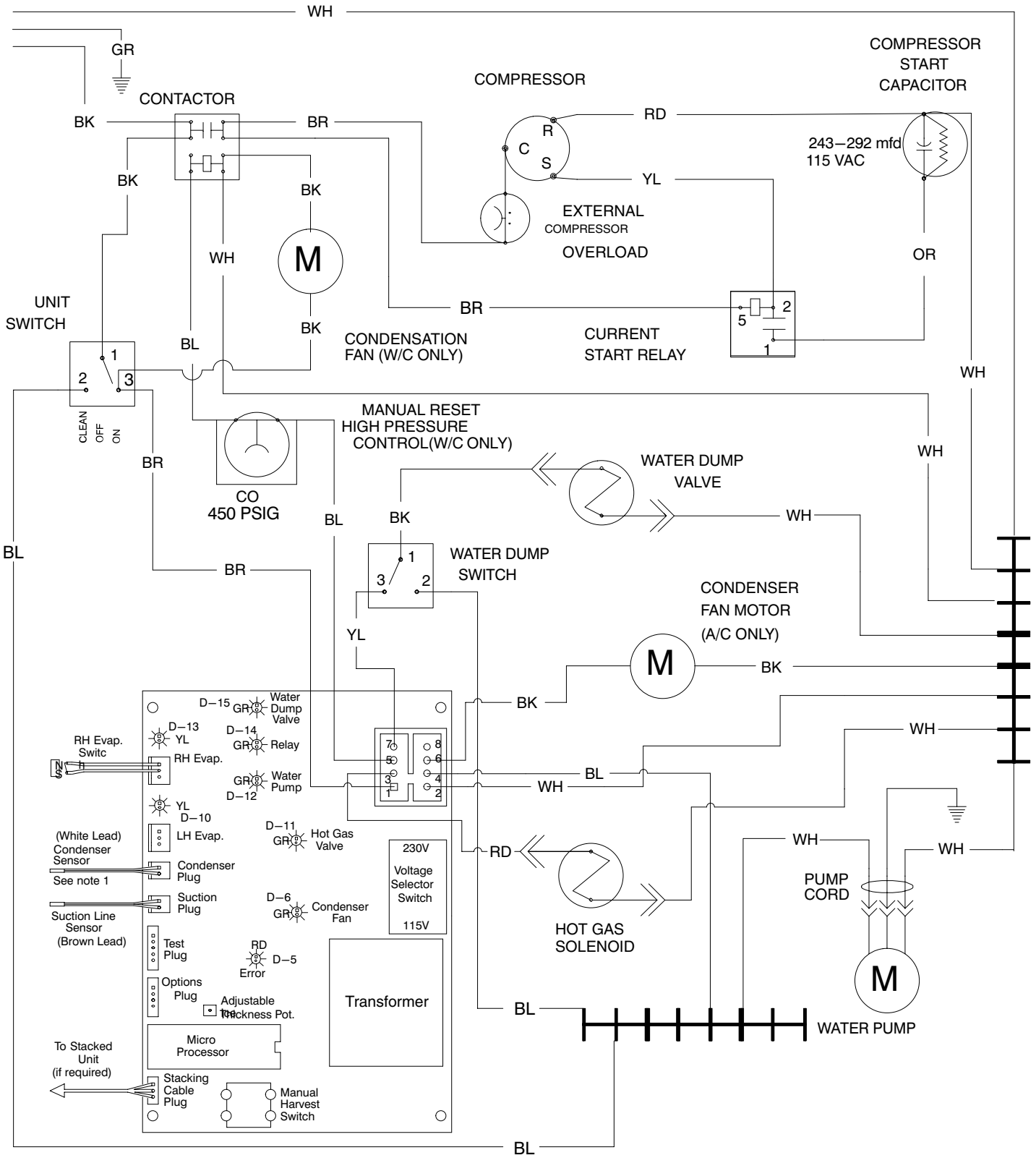
IMPORTANT: Only qualified personnel should service internal components or electrical wiring.

Trouble	Probable Cause	Remedy
CUBER NOT OPERATING	A. Power switch in center “OFF” position.	A. Place switch in “ON” position.
CUBER NOT OPERATING, INDICATOR LIGHTS “OFF”, NO POWER TO CIRCUIT BOARD	A. Test power switch and leads.	A. If defective, replace.
	B. High pressure cut-out open. (water cooled or remote systems)	B. Press manual reset. Determine cause: Water supply shut off; water pressure too low; water valve defective or out of adjustment; water condenser dirty or corroded; unit overcharged; water inlet pressure too high. Replace defective component as needed.
CUBER NOT OPERATING, INDICATOR LIGHTS “OFF”, POWER TO THE CIRCUIT BOARD	A. Magnet not in proximity switch field.	A. Water curtain drifting out of switch range. Reduce clearance between curtain and proximity switch.
	B. No curtain movement.	B. Adjust proximity switch.
	C. Faulty proximity switch.	C. Replace proximity switch.
	D. Unit “OFF” due to bin full.	D. Remove ice from curtain. Eliminate curtain restriction.
COMPRESSOR DOES NOT RUN, CIRCUIT BOARD INDICATOR LIGHTS “ON”	A. Check contactor and leads.	A. Replace if defective.
	B. Compressor overload “open”.	B. Permit overload to cool and reset or replace.
	C. Check compressor and start components.	C. Replace as needed.

Trouble	Probable Cause	Remedy
COMPRESSOR RUNS BUT DOES NOT COOL, CIRCUIT BOARD INDICATOR LIGHTS "ON"	A. Low charge.	A. Leak check – Recharge.
	B. Hot gas solenoid leaking.	B. Replace.
	C. Defective expansion valve.	C. Replace.
	D. Inefficient compressor.	D. Replace.
	E. Internal by-pass open, compressor noisy.	E. Permit pressures to equalize.
CUBER REMAINS IN THE FREEZE CYCLE	A. Check suction line thermistor (sensor) lead wire connection at the circuit board.	A. Tighten, reattach.
	B. Evaporator thermistor shorted.	B. Replace.
	C. Check thermistor (1K ohm).	C. Replace if out of range.
	D. Ice bridge setting too low.	D. Adjust per bridge adjustment instructions.
	E. Expansion valve failure (will not pull down).	E. Tighten bulb, replace as needed. See check-out procedure.
CUBER REMAINS IN THE HARVEST CYCLE	SUCTION LINE THERMISTOR OPEN (STARTS IN HARVEST)	
	A. Loose connection at the circuit board.	A. Tighten or reconnect.
	B. Test thermistor.	B. Replace if out of range.
	PROXIMITY SWITCH LIGHT "OUT"	
	C. Loose wire connection at circuit board.	C. Tighten, reattach wire.
	D. Proximity switch defective, see check-out procedure.	D. Replace as needed.
	E. Water curtain stuck, curtain frozen to ice on evaporator. Curtain hung on water pan, proximity switch out of range.	E. Check and adjust as needed.
	PROXIMITY SWITCH LIGHT "ON"	
	F. Circuit board failure. Check voltage output.	F. Replace as needed.
	G. Ice weight too light.	G. Adjust bridge per Bridge Adjustment instructions.
	H. Potentiometer set too high.	H. Adjust bridge per Bridge Adjustment instructions.
	I. Water curtain stuck, curtain frozen to ice on evaporator. Curtain hung on water pan, proximity switch out of range.	I. Check and adjust as needed.

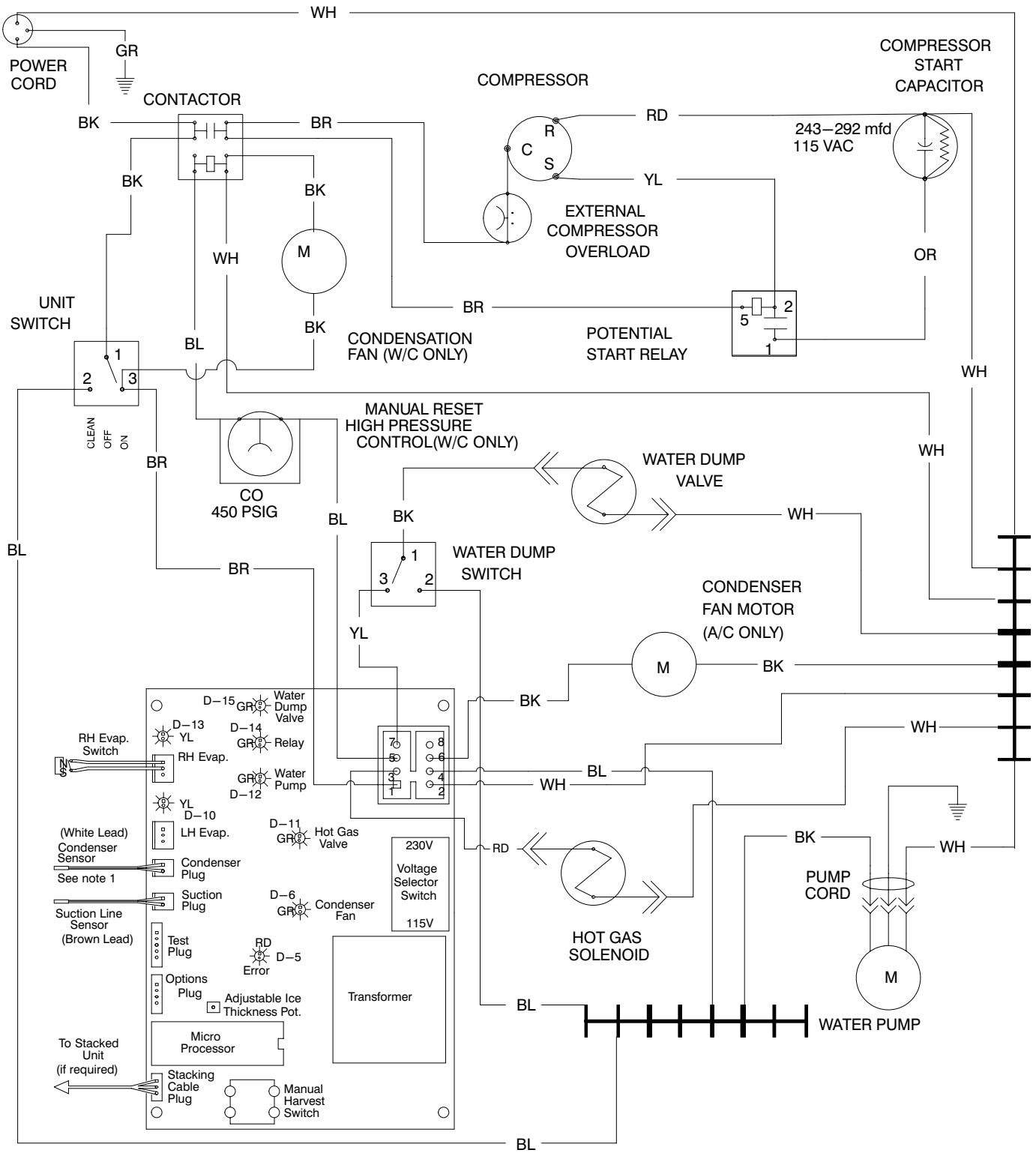
Trouble	Probable Cause	Remedy
LONG FREEZE CYCLE WATER FLOW ASSOCIATED	A. Float set too high.	A. Adjust.
	B. Float stuck.	B. Clean or replace.
	C. Flow control washer missing or upside down (number must be facing up).	C. Replace or re-install.
LONG FREEZE CYCLE GENERAL	A. Water leaking around pan or curtain.	A. Adjust as needed.
	B. Dirty condenser or fan blade.	B. Clean as required.
	C. Louvers at condenser obstructed.	C. Remove obstruction.
	D. Ambient air or water temperature too high.	D. Advise customer.
	E. Condenser discharge air re-circulating.	E. Install condenser baffle.
	F. Low charge.	F. Check for leak, correct, evacuate and recharge.
	G. Hot gas solenoid valve leaking (not seating).	G. Replace.
	H. Water regulator valve set too high or stuck (water cooled units only).	H. Adjust, clean or replace (setting to be 300 to 310 PSI).
LONG HARVEST CYCLES	A. Ice weight set too light.	A. Adjust bridge per adjustment instructions.
	B. Unit not level.	B. Level the unit.
	C. Water curtain movement restricted.	C. Remove restriction.
	D. Low head pressure: ambient too low.	D. Minimum ambient temperature 50°F (10°C).
	E. Low head pressure; water valve set too low (water cooled units only) or leaking during harvest.	E. Adjust water regulator valve or replace (300 to 310 PSI).
	F. Scale build-up on evaporator.	F. Clean per instructions.
	G. Hot gas solenoid valve not opening. Slow rise of low side pressure.	G. Replace valve.
	H. Expansion valve leaking.	H. Replace valve.

Trouble	Probable Cause	Remedy
ICE WEIGHT LIGHT AT TOP OF PLATE AND HEAVY AT THE BOTTOM	A. Float stuck open.	A. Replace the float valve.
NOTE: REVIEW DRAWING ON PAGE 19 OF THIS MANUAL FOR NORMAL ICE SLAB.	B. Flow control washer missing from the float or installed upside-down (numbers must be facing up).	B. Replace or re-install as needed.
	C. Water flow rate over the evaporator too fast.	C. Check position of distribution tube (inner & outer).
	D. Water leaking around curtain and pan; curtain frozen in the ice.	D. Correct.
	E. Expansion valve flooding.	E. Tighten and seal bulb. Replace TXV if required.
	F. Condenser air re-circulating.	F. Install baffle.
	G. Low charge.	G. Leak check, evacuate & recharge.
	H. Hot gas solenoid valve leaking.	H. Replace.
	I. Evaporator wall gasket torn or missing, allowing condenser air to reach top of evaporator.	I. Replace.
SOFT WHITE ICE OR WATER PUMP NOT PUMPING	A. Distribution tube or water system scaled.	A. Clean distribution system as required.
	B. Water temperature too cold.	B. 50°F (10°C) minimum.
	C. Inadequate water system; water pressure too low (below 20 PSI).	C. Correct.
	D. Inadequate water system; float plugged or damaged.	D. Replace.
	E. Distributor tubes – old style	E. Replace with new style, 47 hole, distributor tube. High flow tubes require new style water curtains to contain water.



NOTE 1: CONDENSER SENSOR USED ONLY ON A/C UNITS.
1.8K ohm RESISTOR USED ONLY ON W/C UNITS.

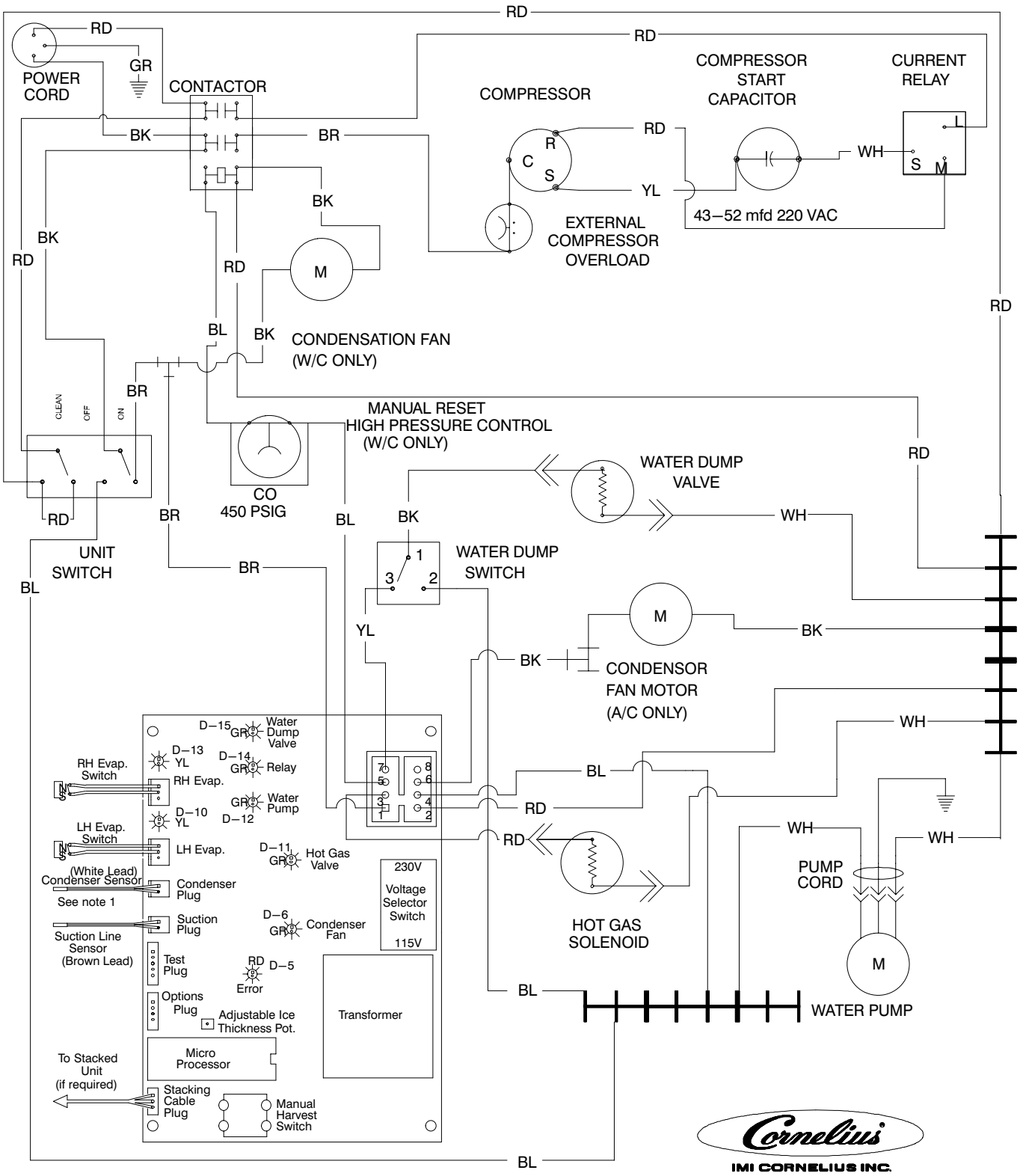
IAC 322 & IWC 322
IAC 330 & IWC 330



NOTE 1: CONDENSER SENSOR USED ONLY ON A/C UNITS.
1.8K ohm RESISTOR USED ONLY ON W/C UNITS.

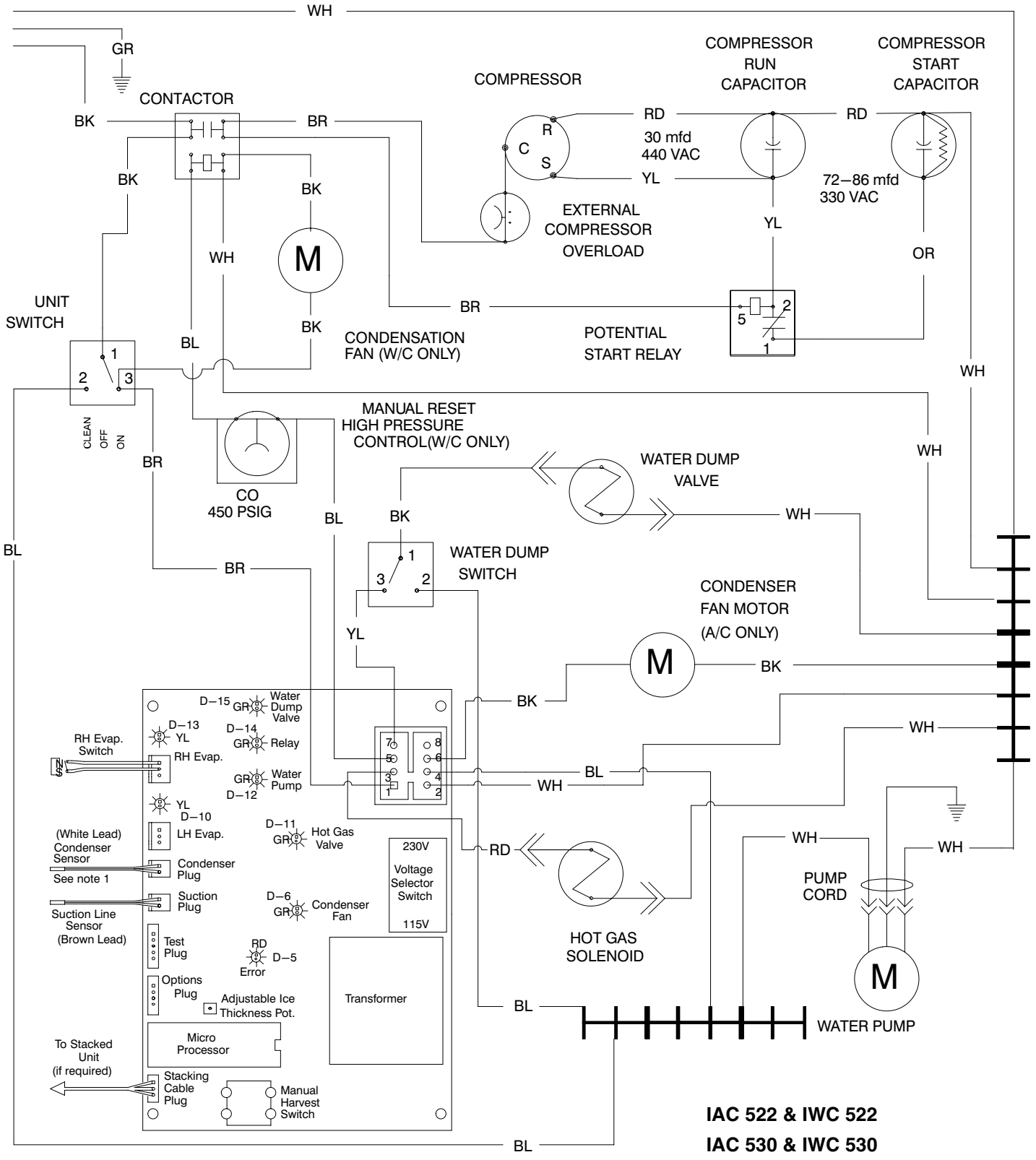
IACS 227 & IWCS 227 **115 Volts 60 HZ**

ILL339



IACS227E60, IWCS227E60, 208/230V 60HZ

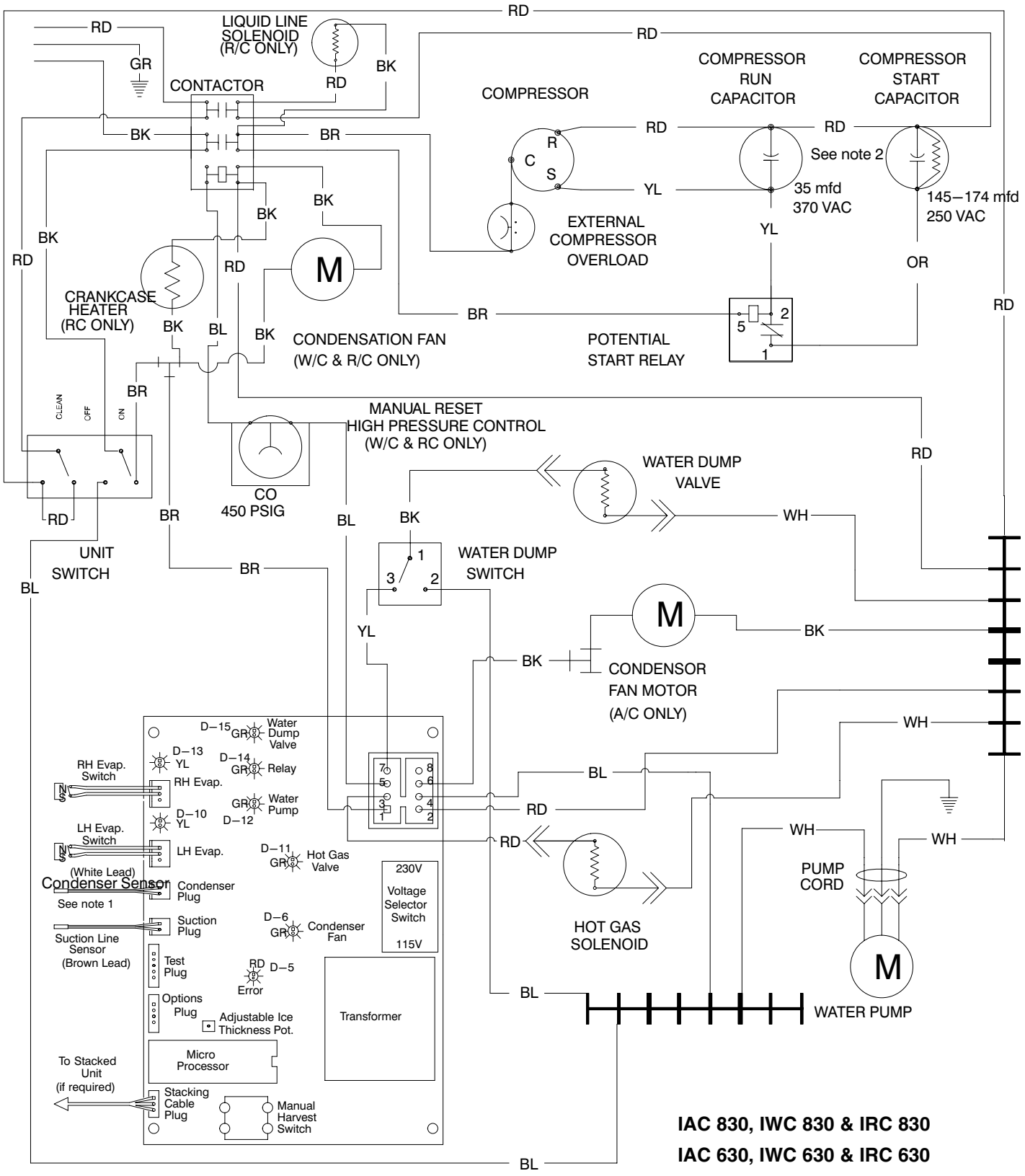
Artwork 50910



IAC 522 & IWC 522

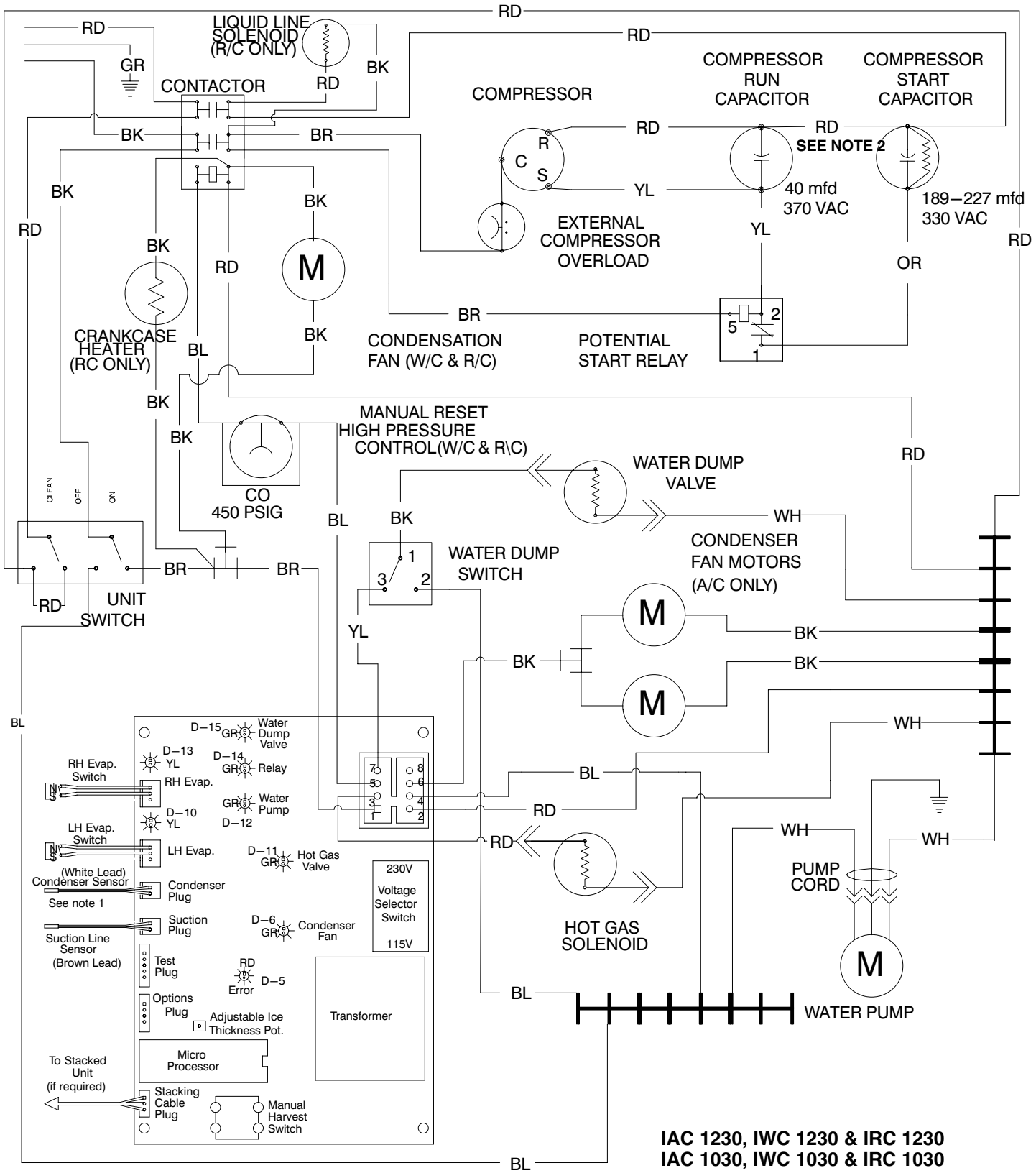
IAC 530 & IWC 530

NOTE 1: CONDENSER SENSOR USED ONLY ON A/C UNITS.
1.8K ohm RESISTOR USED ONLY ON W/C UNITS.



NOTE 1: CONDENSER SENSOR USED ONLY ON A/C UNITS.
1.8K ohm RESISTER USED ONLY ON W/C & R/C UNITS.

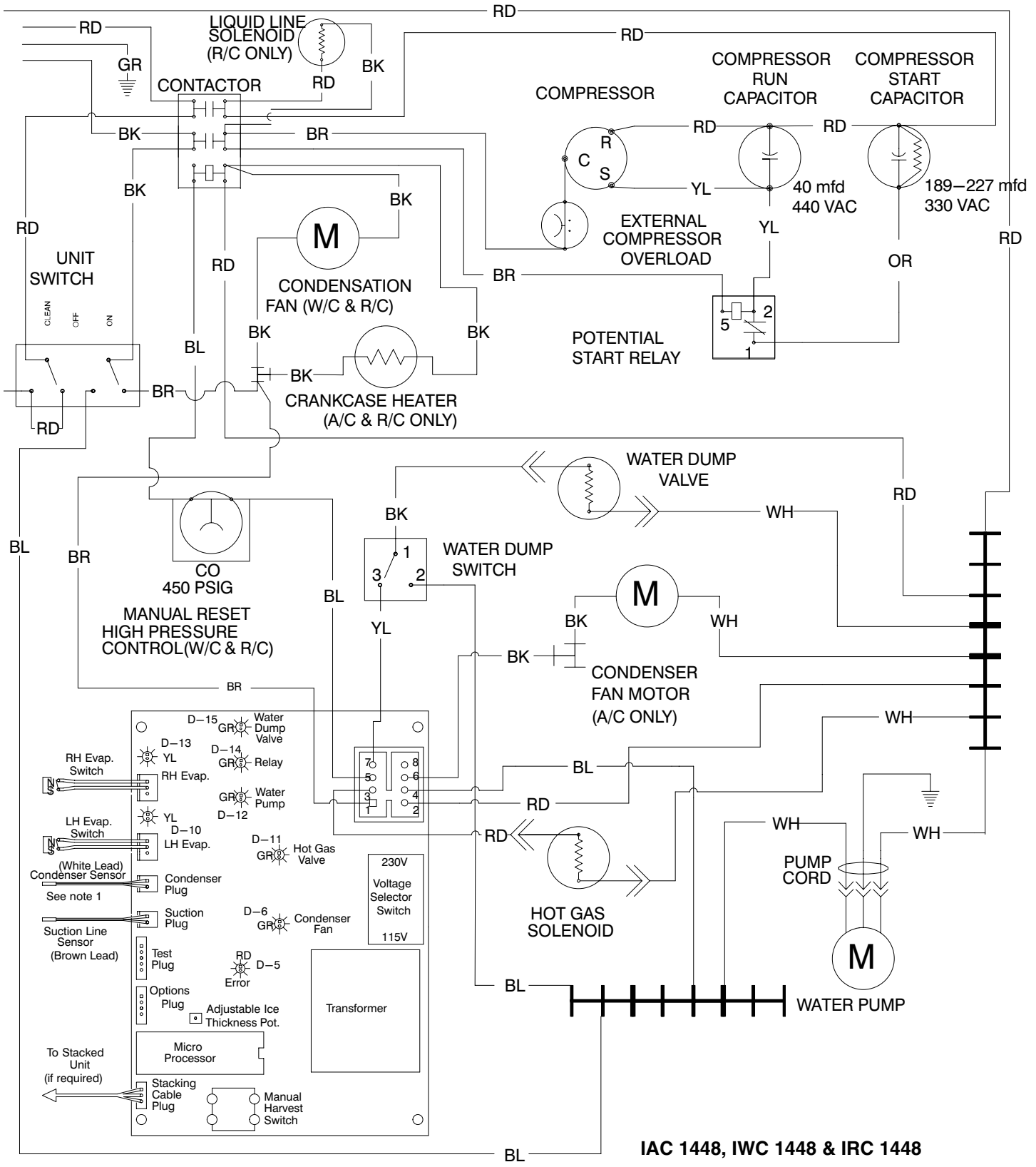
NOTE 2: CAPACITORS USED ON 630 BRISTOL COMPRESSOR:
RUN CAP, 25mfd 440 VAC
START CAP. 161–193mfd 250 VAC



IAC 1230, IWC 1230 & IRC 1230
IAC 1030, IWC 1030 & IRC 1030

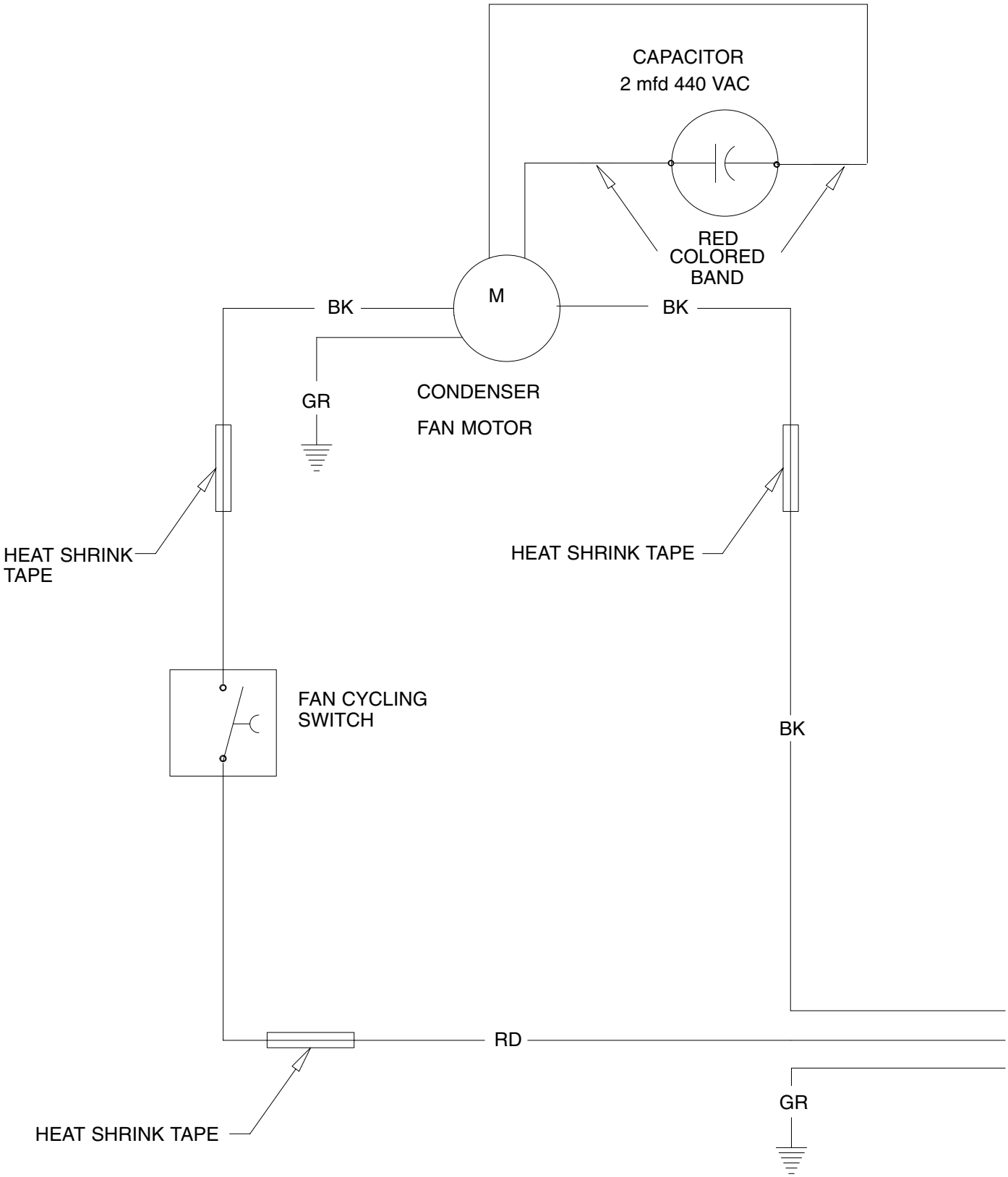
NOTE 1: CONDENSER SENSOR USED ONLY ON A/C UNITS.
1.8K ohm RESISTOR USED ONLY ON W/C & R/C UNITS.

2: CAPACITORS USED ON 1030 COMPRESSOR
RUN CAP. 37MFD 370V
START CAP. 145 - 174 MFD 250V



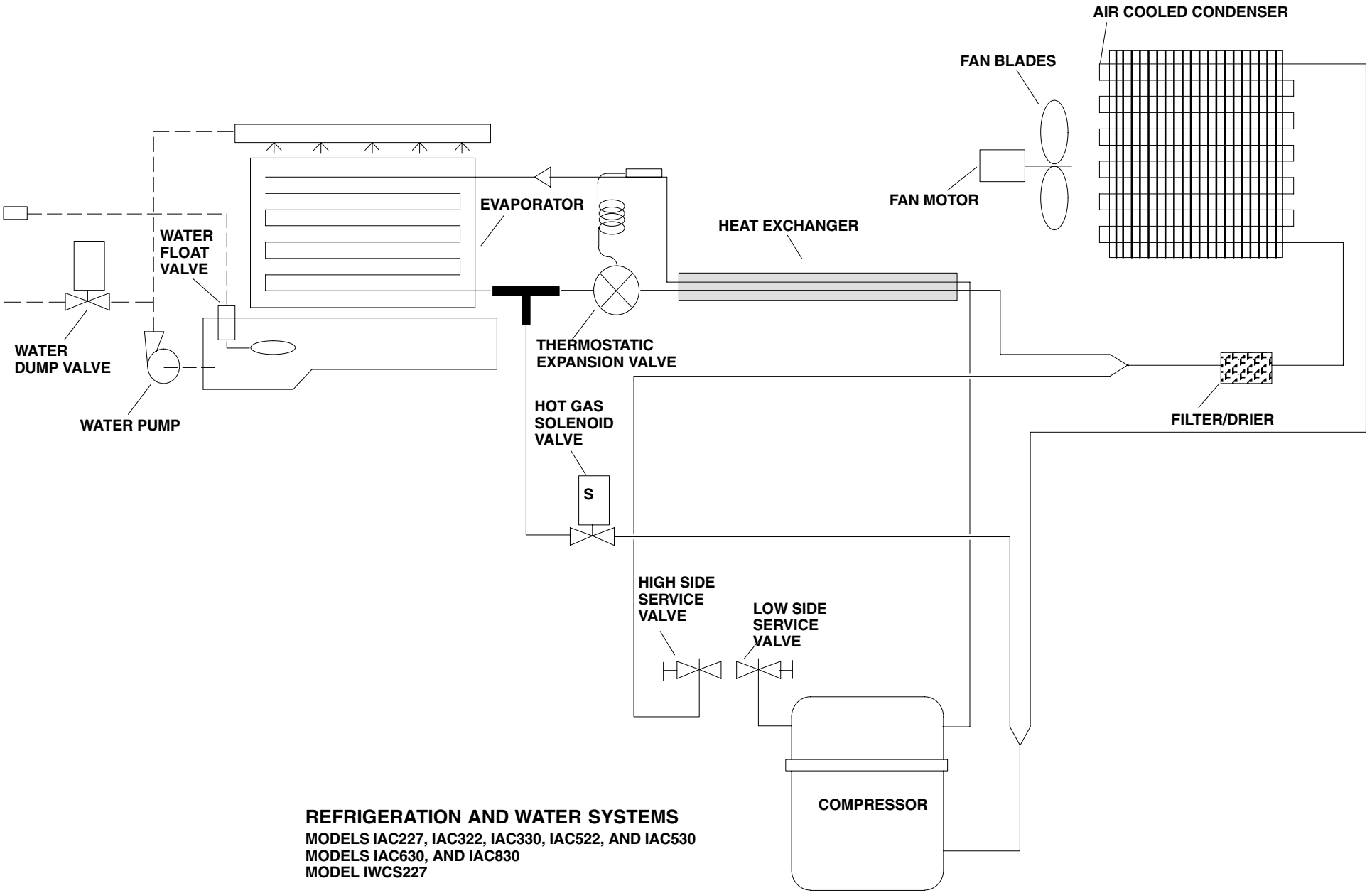
IAC 1448, IWC 1448 & IRC 1448

NOTE 1: CONDENSER SENSOR USED ONLY ON A/C UNITS.
1.8K ohm RESISTOR USED ONLY ON W/C & R/C UNITS.



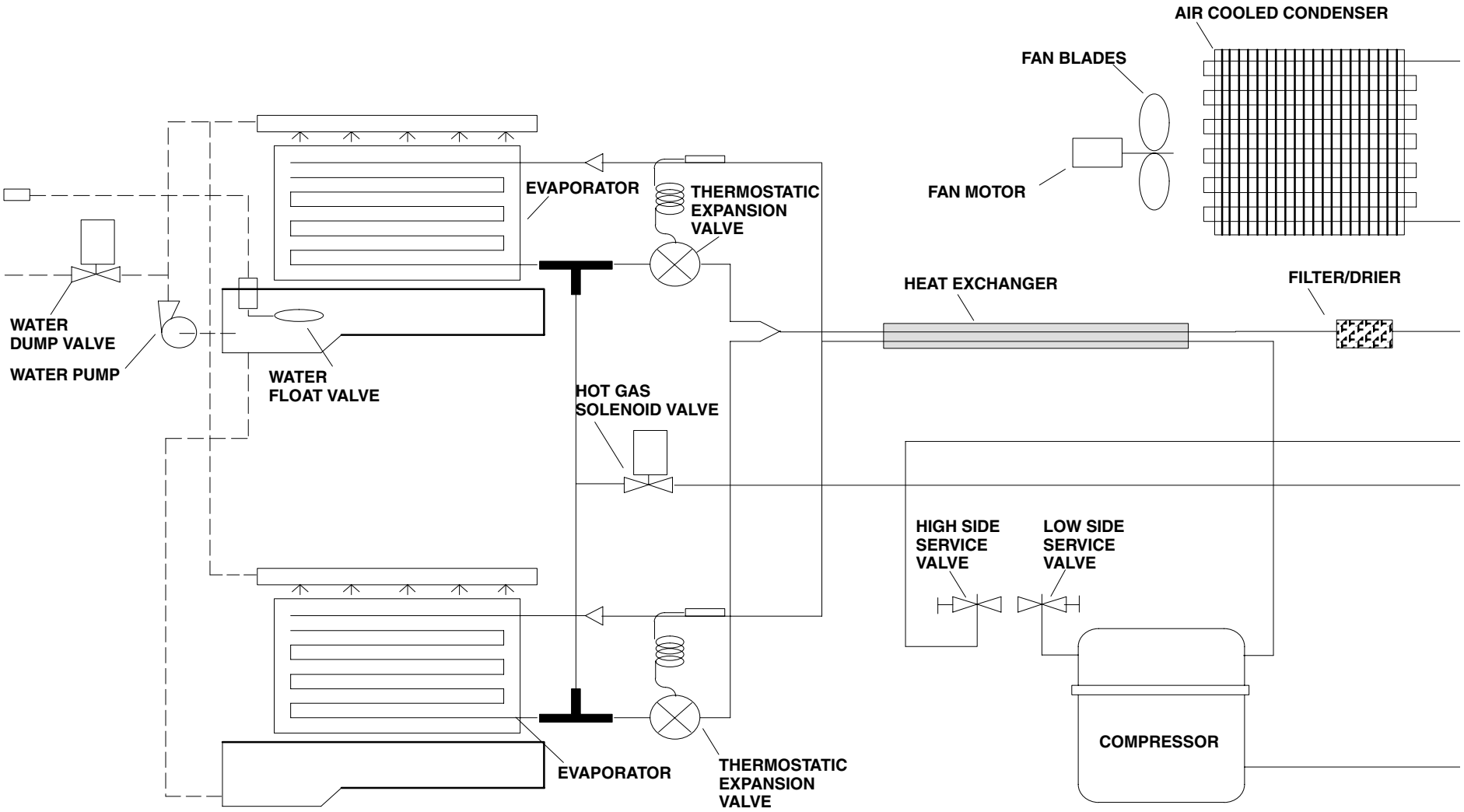
CR800, CR1200, & CR1400 REMOTE CONDENSERS

208/230 VOLTS 60 HZ

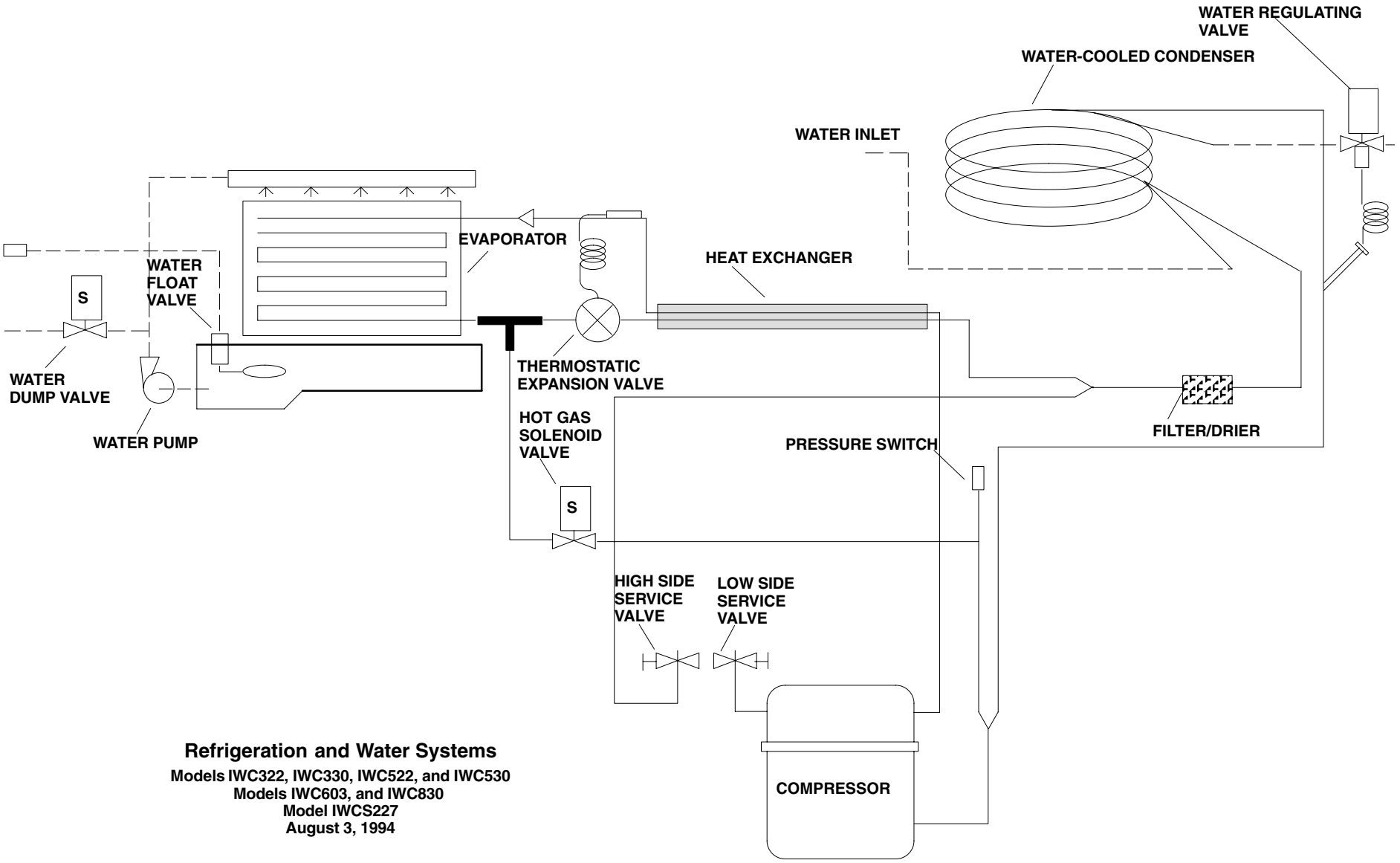


REFRIGERATION AND WATER SYSTEMS

MODELS IAC227, IAC322, IAC330, IAC522, AND IAC530
MODELS IAC630, AND IAC830
MODEL IWCS227

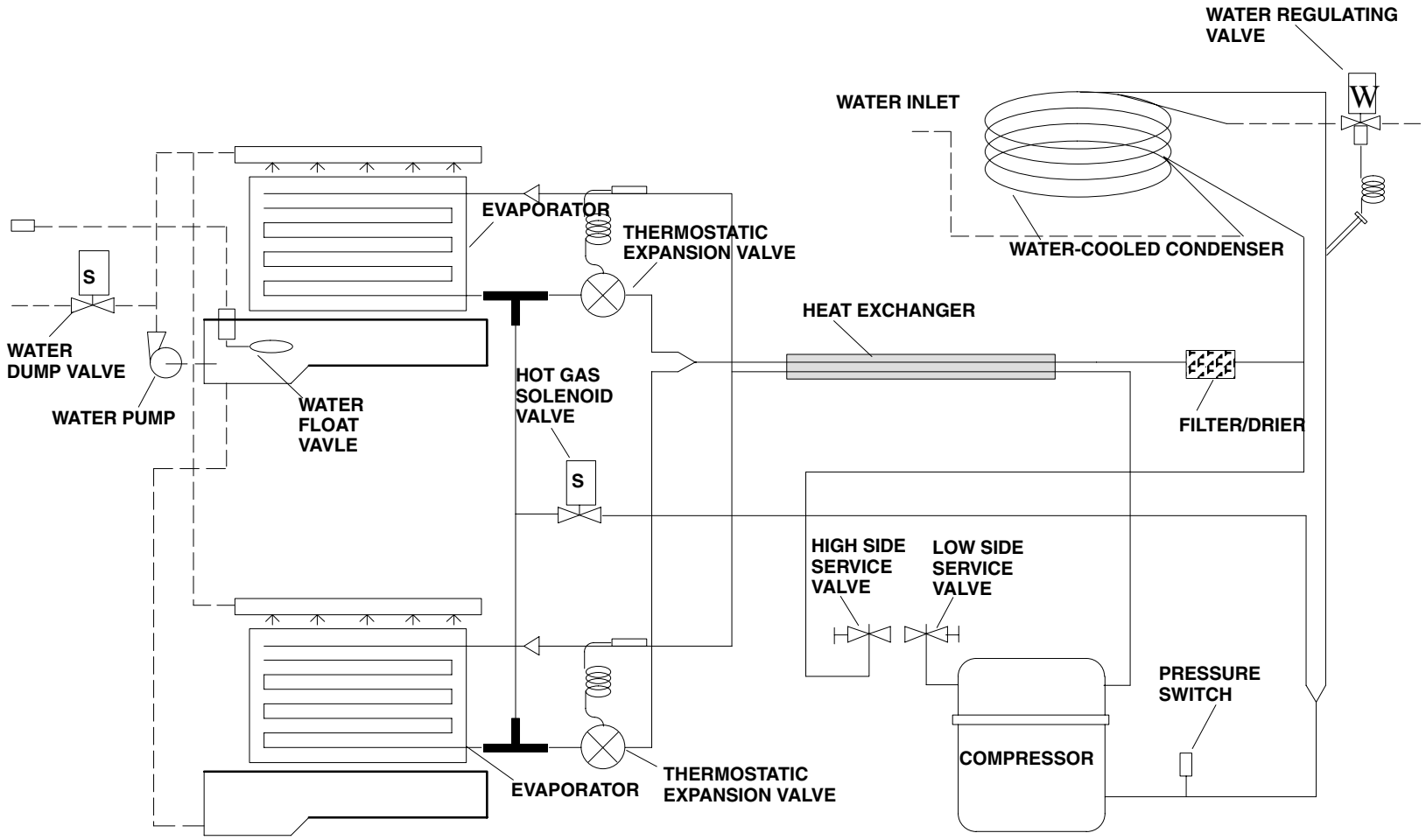


Refrigeration and water system
Models IAC1030, IAC1230, and IAC1448
August 3, 1994

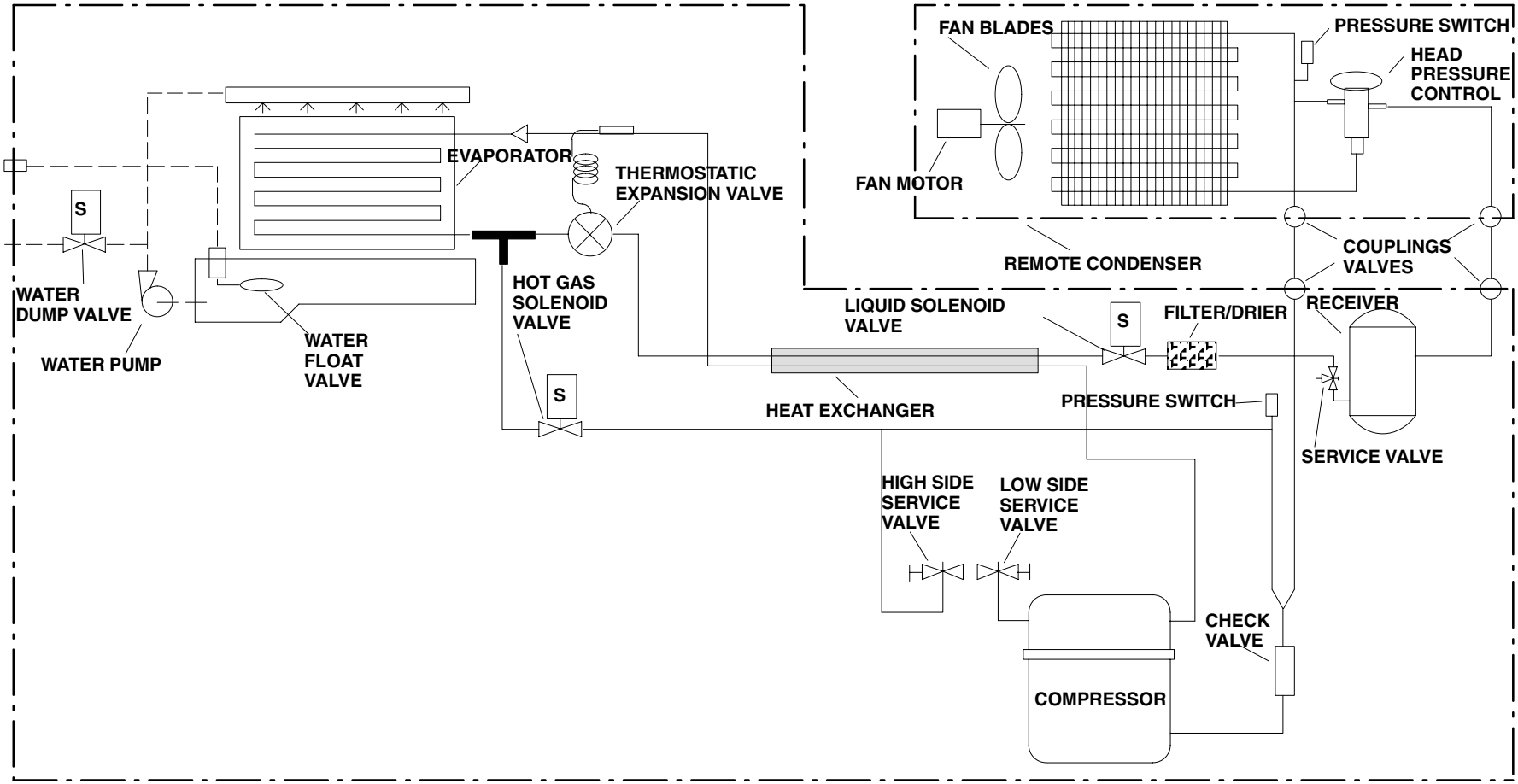


Refrigeration and Water Systems

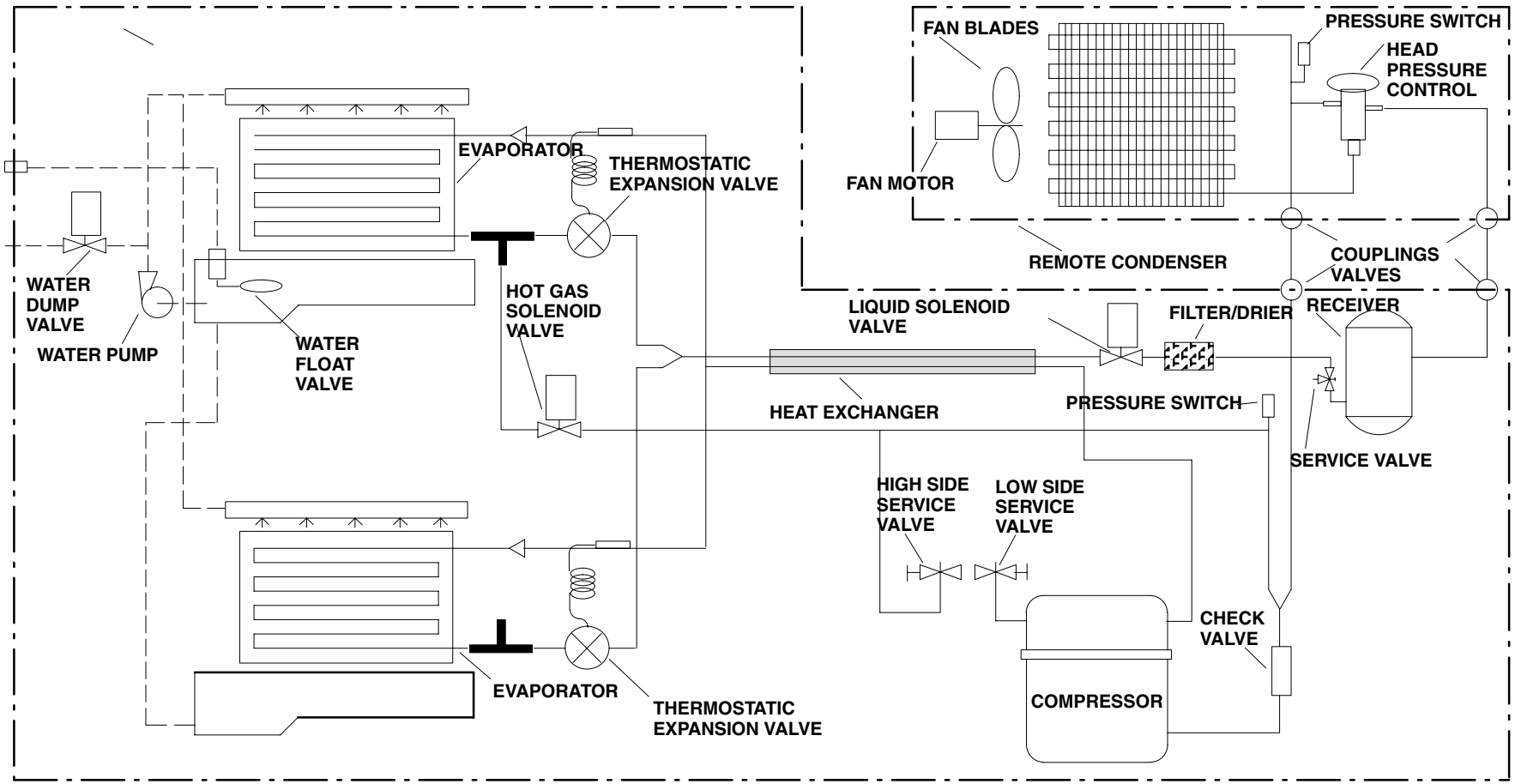
Models IWC322, IWC330, IWC522, and IWC530
Models IWC603, and IWC830
Model IWCS227
August 3, 1994



REFRIGERATION AND WATER SYSTEM
MODELS IWC1030, IWC1230 AND 1WC1448
AUGUST 3, 1994

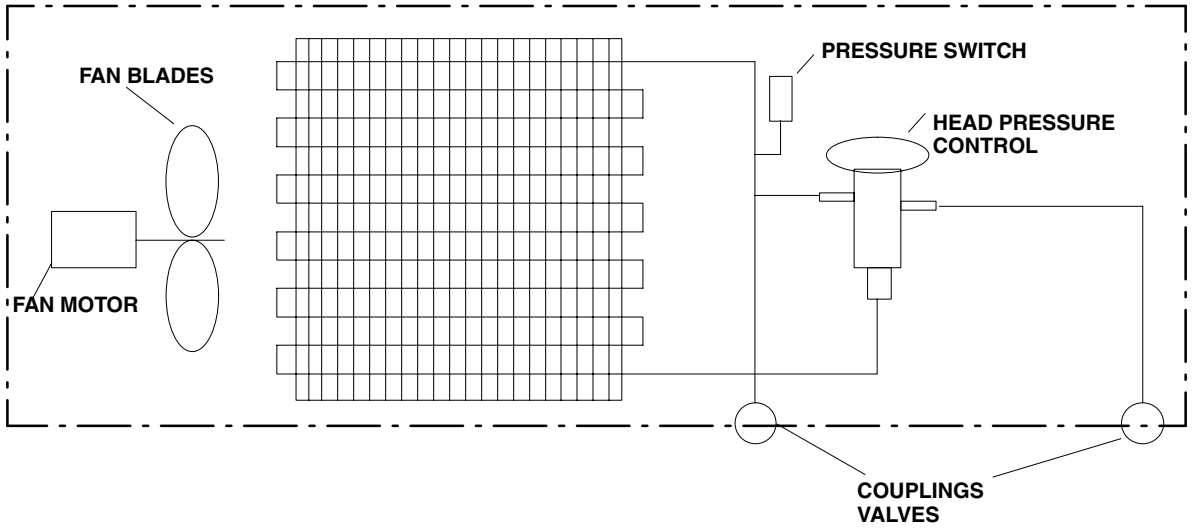


REFRIGERATION AND WATER SYSTEMS
MODELS IRC630 AND IRC830
AUGUST 3, 1994



REFRIGERATION AND WATER SYSTEM

MODELS IRC1030, IRC1230 AND IRD1448
AUGUST 3, 1994



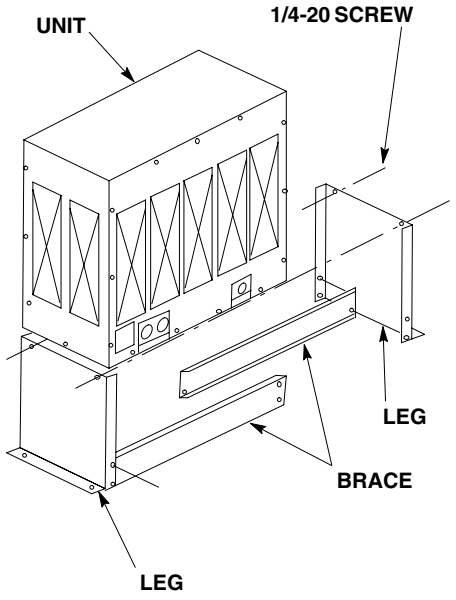
REMOTE CONDENSER

MODELS CR800, CR1200, AND CR1400
AUGUST 5, 1994

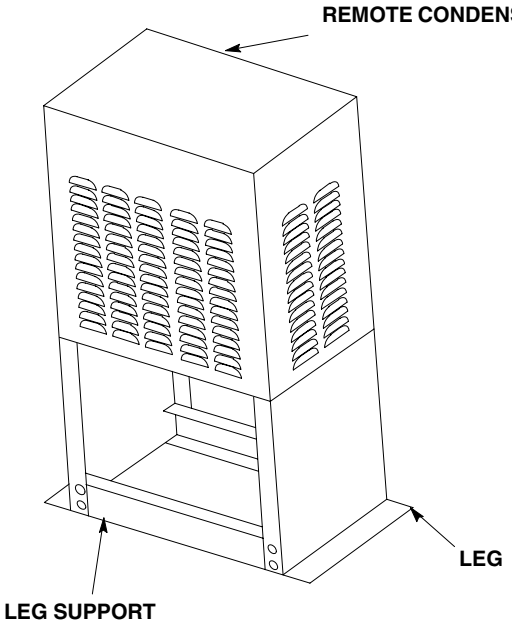
“I” Series “Remote”

Ice Machine

INSTALLATION INSTRUCTIONS REMOTE CONDENSERS



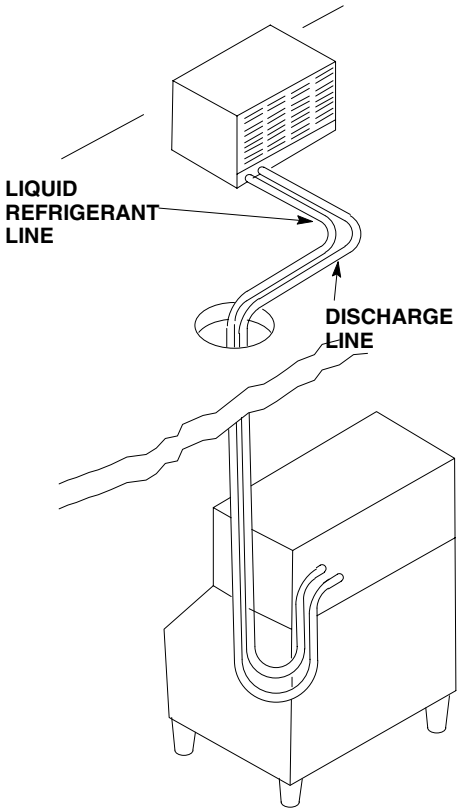
1. Follow the standard installation instructions supplied with cuber. Do not hook cuber into the power source until the remote condenser and line set installation is complete.
2. Assembly of remote condenser (see drawing):
   A. Assemble legs to base panel. Install leg supports on legs.
   B. Locate the remote condenser in a well–ventilated area on the roof away from other refrigeration equipment's condenser discharge air flow.
   C. Use the mounting holes provided to secure the remote condenser to the roof. Seal over heads of bolts or fasteners with tar or pitch to prevent entrance of moisture.



3. Remote condenser electrical hook-up:
   A. Connect remote condenser to a power source (208/230VAC, 60 HZ) separate from the cuber. An external disconnect switch must be used.
   B. Make sure the electrical connections follow all local and national codes.
   C. **DO NOT turn condenser on until cuber install and refrigerant line connections are complete!**
   D. Never wire condenser into cuber section. The condenser is an independent electrical connection.
   E. Fan motor will not start until pressure rises to 205 PSIG [14.07 Bars] closing fan cycling switch.

F. The condenser fan may cycle off during the harvest cycle – this would be normal.

NOTE: Installing an IMI Cornelius remote cuber with other than an IMI Cornelius remote condenser and line set may be reason to void the cuber warranty.



CORRECT

4. Each condenser and cuber is connected with two (2) *pre-charged lines.
   A. The pre-charged lines are ordered separately from the condenser to suit each individual application.
   B. The pre-charged line lengths are 20 feet [6.096 meters], 35 feet [10.66 meters] and 55 feet [16.76 meters].

NOTE (Pre-charged is defined as a vapor holding charge – not a portion of the system charge.)

5. Installation of line kits (see drawing). Remove the tubing from the carton. Carefully uncoil the lines so the tubing doesn't become kinked, and route lines to cuber and condenser.
6. Keep line-set as short as possible. Place a 3-foot service loop behind cuber to allow for rear service should it ever be required.

REMOTE CONDENSER LOCATION

1. **Physical Line-Set Length: 55 Ft. Maximum [16.764 meters]**

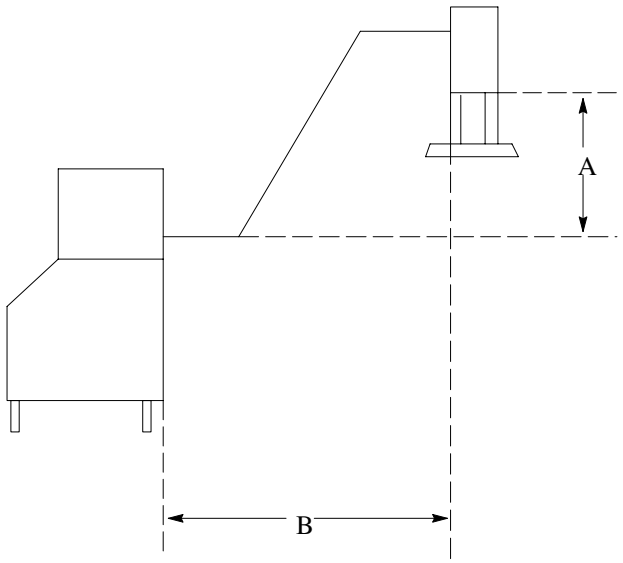
   The ice machine compressor must have the proper oil return. Line-set rises, drop, or horizontal runs greater than the maximum distance allowed will exceed the compressor start-up and pumping design limits, and will result in poor oil return to the compressor.

   Line-Set Rise: 35 Ft. Maximum [10.66 meters]
   Line-Set Drop: 15 Ft. Maximum [4.57 meters]

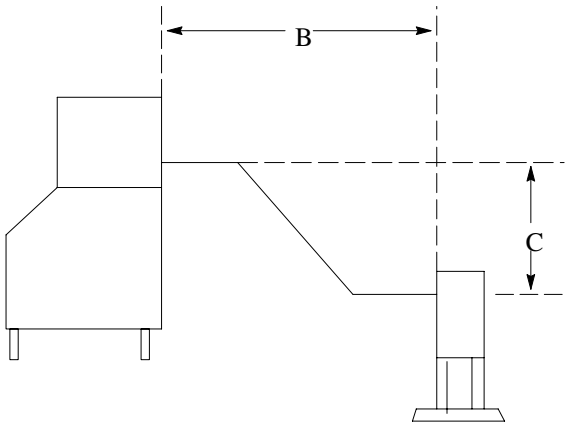
2. **Calculated Line-Set Distance: 100 Ft. [30.48 meters]**

   To prevent the combination of rises, drops and horizontal runs exceeding the compressor start-up and pumping design limit, the following calculations should be made:

NOTE: Max. line–set for IMI Cornelius cubers is 55 ft. Do not confuse line length with calculated line distance



A - (RISE) CONDENSER HIGHER THAN EVAP. MAX. 35 FT.
B - LINE LENGTH 15 FT.: EXAMPLE



B - LINE LENGTH 35 FT.: EXAMPLE
C - (DROP) CONDENSER LOWER THAN EVAP. 15 FT.: MAX.

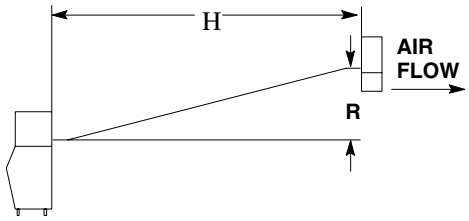
Maximum Line-Set Distance Formula

A. Measured rise x 1.7= Calculated Rise 35 ft. Max) [10.66 meters]
B. Measured drop x 6.6= Calculated Drop 15 ft. Max) [4.57 meters]
C. Measured Horizontal Distance = actual measurement.
D. Total Calculated Distance (A+B+C)=Total Calculated Distance (100 ft. Max.) [30.48 meters]

Examples:

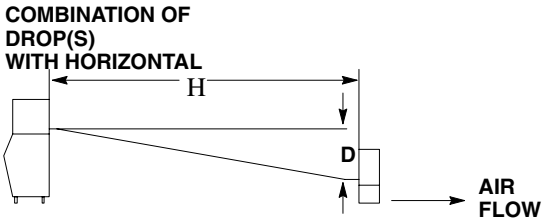
a. Insert measured rise (R) into the formula and multiply it by 1.7 to get a calculated rise.

example: A condenser located 15 ft. [4.572 meters] above the ice machine has a 25.5 ft. [8.874 meters] calculated total (15 ft. x 1.7 = 25.5).



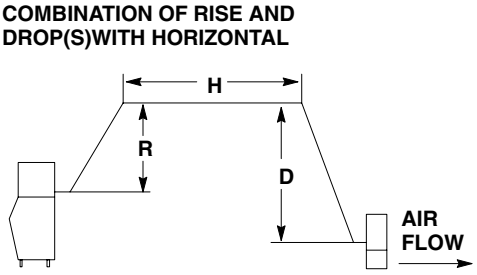
b. Insert measured drop (D) into formula and multiply by 6.6 to get a calculated drop.

example: A condenser located 8 ft. [2.438 meters] below the ice machine has a 52.8 ft. [16.093 meters] calculated total (8 ft. x 6.6 = 52.8 ft.).



c. Insert measured horizontal distance into formula. No calculation is necessary. (6 ft.) [1.828 meters].

d. Add the calculated rise, calculated drop, and horizontal distance together to get the total calculated distance (25.5 + 52.8 + 6) equals 84.3 ft. [25.694 meters]. If 100 ft. [30.48 meters] total calculated distance is exceeded, the condenser must be moved to a new location which permits proper equipment operation.

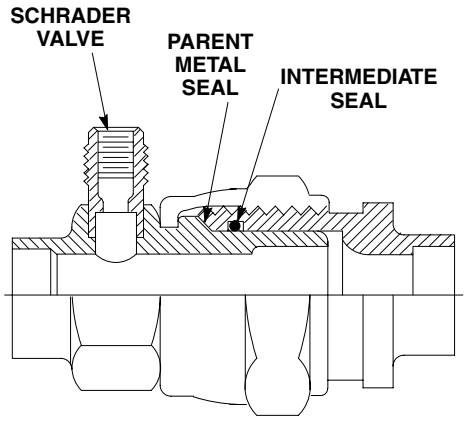


CAUTION: If a line-set rise is followed by a line-set drop, a second line-set rise cannot be made. Or If a line-set drop is followed by a line-set rise, a second line-set drop cannot be made.

3. **Lengthening or Reducing the Line-Set Lengths**

In most cases, by routing the line-set properly, shortening will not be necessary (refer to illustration). However, when shortening or lengthening is required, do so before connecting the line-set to the ice machine or the remote condenser. This prevents the loss of refrigerant from the ice machine or the condenser.

The quick connect fittings on the line-sets are equipped with Schrader Valves. Use these valves to recover any vapor charge from the line-set. When lengthening or shortening lines, apply good refrigeration practices and insulate new tubing. Do not change the tube sizes. Evacuate the lines and place approximately 5 oz. of
vapor refrigerant charge in each line.



4. **Connection of Line-Set**

A. Remove the plastic caps from the line-set, the condenser, and the ice machine.

B. Apply refrigeration oil to the threads on the quick connect couplers before connecting them to the condenser.

C. Carefully thread the female fitting onto the condenser or ice machine by hand.

D. Using the proper size wrench, tighten the couplings until they bottom out. Turn an additional 1/4 turn to ensure proper brass-to-brass seating.

E. Check all fittings for leaks.

5. **Final Installation:**
   A. Remove grill from the right-hand side panel of cuber.
   B. Turn service port on receiver tank to open position releasing refrigerant to the balance of the system.
   C. Leak check line-set connections at cuber and condenser.
   D. Replace grill.
   E. Connect cuber to power source.
   F. Make sure electrical connections follow all local and national codes.
6. **Start Up:**
   A. Use standard procedures from cuber installation instructions.
   B. After the cuber is running, check the remote condenser and verify that the condenser fan is running.

CAUTION: Once the refrigerant lines are connected, the seal is broken in the fittings. If the lines are removed or loosened from the cuber or remote condenser, the refrigerant charge will be discharged to the atmosphere. DISCHARGING TO THE ATMOSPHERE IS IN VIOLATION OF THE CLEAN AIR ACT OF JULY, 1992.

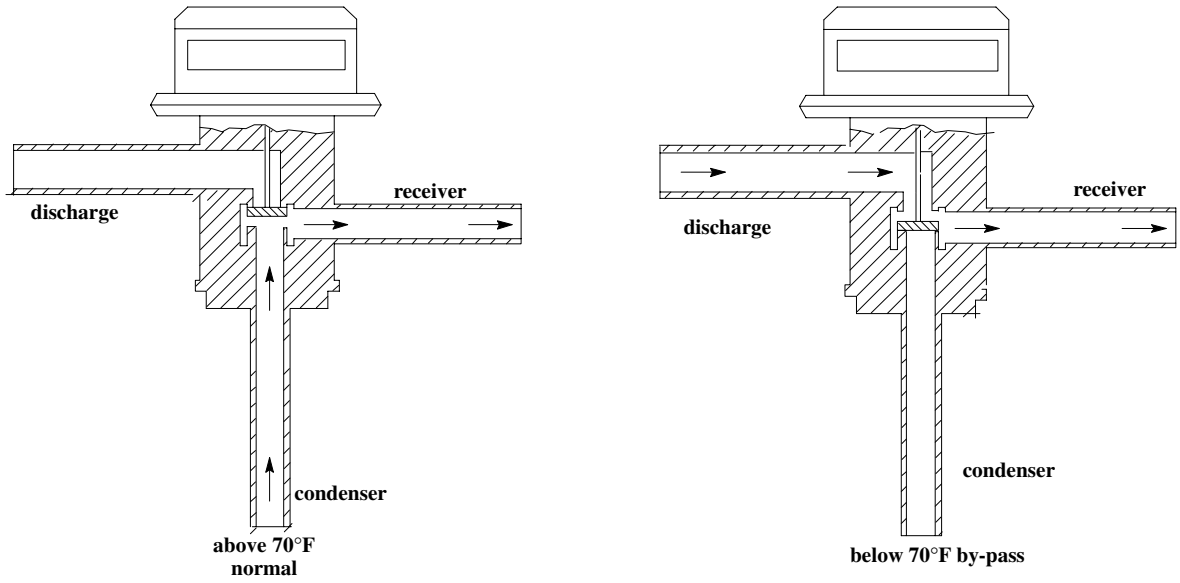
ICE CUBER SPECIFICATION

MODEL	IRC630	IRC830	IRC1230	IRC1448
UNIT				
Volts	208/230 + 10%, –5%	208/230 +10%, –5%	208/230 +10%, –5%	208/230 +10%, –5%
Phase	1	1	1	1
Hertz	60	60	60	60
No. Wires	2+ground	2+ground	2+ground	2+ground
MIN. CIRCUIT				
Amps	20	20	20	25
MAX FUSE SIZE (HVAC CIRCUIT BREAKER REQUIRED)				
Amps	20	20	20	25
REFRIGERANT				
Type	R404a(HP62)	R404a(HP62)	R404a(HP62)	R404a(HP 62)
Weight (oz)	170	170	210	250
Weight (g)	4820	4820	5954	7088
COMPRESSOR				
Volts	230	230	230	230
Phase	1	1	1	1
Hertz	60	60	60	60
LRA	69	61	96	95.6
RLA	8.8	12.5	13.5	23.9
AIR CIRCULATION FAN MOTOR				
Volts	230	230	230	230
Phase	1	1	1	1
Hertz	60	60	60	60
Amps Running	0.36	0.36	0.36	0.36
Watts	6	6	6	6
WATER PUMP				
Volts	230	230	230	230
Phase	1	1	1	1
Hertz	60	60	60	60
Amps Running	0.5	0.5	0.5	0.5
HP	1/30	1/30	1/30	1/30

REMOTE CONDENSER SPECIFICATION

MODEL	CR800	CR1200	CR1400
Volts	230	230	230
Phase	1	1	1
Hertz	60	60	60
Amps	1.0	1.0	1.0
Output, HP	1/6	1/6	1/6
Max. fuse size, Amps (HVAC circuit breaker required)	20	20	20

HEAD PRESSURE CONTROL [HEADMASTER]



The Cornelius “I” series remote systems use an Alco Head Pressure Control, normally referred to as a headmaster. This control is mounted in the remote condenser with a fan cycling control switch. Using both these controls gives the system positive operation under a wide range of condensing temperatures.

The cycling control starts the fan at 270 PSI and stops it at 205 PSI allowing a positive efficient operation at the high temperature operating ranges.

The headmaster controls the operation when the condensing temperature drops below 70°F. The “I” series refrigerant charge is HP - 62 [R - 404A] and the headmaster dome charge setting is 200 PSI of nitrogen pressure making it stable under the low temperature operating range down to - 20°F.

The normal flow pattern through the headmaster is from the condenser port to the receiver port. When this flow pattern is unable to maintain a receiver outlet pressure equal to or above the dome pressure setting of the valve, the dome pressure will force the valve portage to change closing the condenser port and opening the bypass port from the compressor discharge line. This allows the high pressure vapor from the discharge port to “buck” the receiver pressure back up. With the condenser port closed, the refrigerant is backed up in the condenser, basically reducing the condenser size, assisting in maintaining the discharge portage flow and increasing the head pressure.

Remember, sense of touch to the lines of the headmaster will determine the flow path the headmaster is in, condenser to receive, or bypass to receiver.

High side gauge installed at the receiver outlet valve will determine if the headmaster is functioning to maintain the proper operating pressure.

In the event the control appears to be “stuck in bypass”, the pressure drop across the headmaster must be measured. With a gauge installed at the receiver outlet valve and the high side service valve, the pressure difference at these two points must be less than the 15 PSI. The three most common causes of an excessive pressure drop are shortage of refrigerant, kinked remote lines, and excessive line length.

Eliminate refrigerant shortage first. Add refrigerant in two-pound increments **(not to exceed six pounds)** to determine if it corrects the pressure drop. If pressure drop is not corrected, inspect line set for sharp bends or kinks and correct as required. If adding refrigerant does not correct continued (bypass) condition and line set is not damaged, replace headmaster.

REMOTE SYSTEM EVACUATION/RE-CHARGE

All field repairs to the sealed system must start with a total discharge of the system following the requirements of the Clean Air Act of July, 1992.

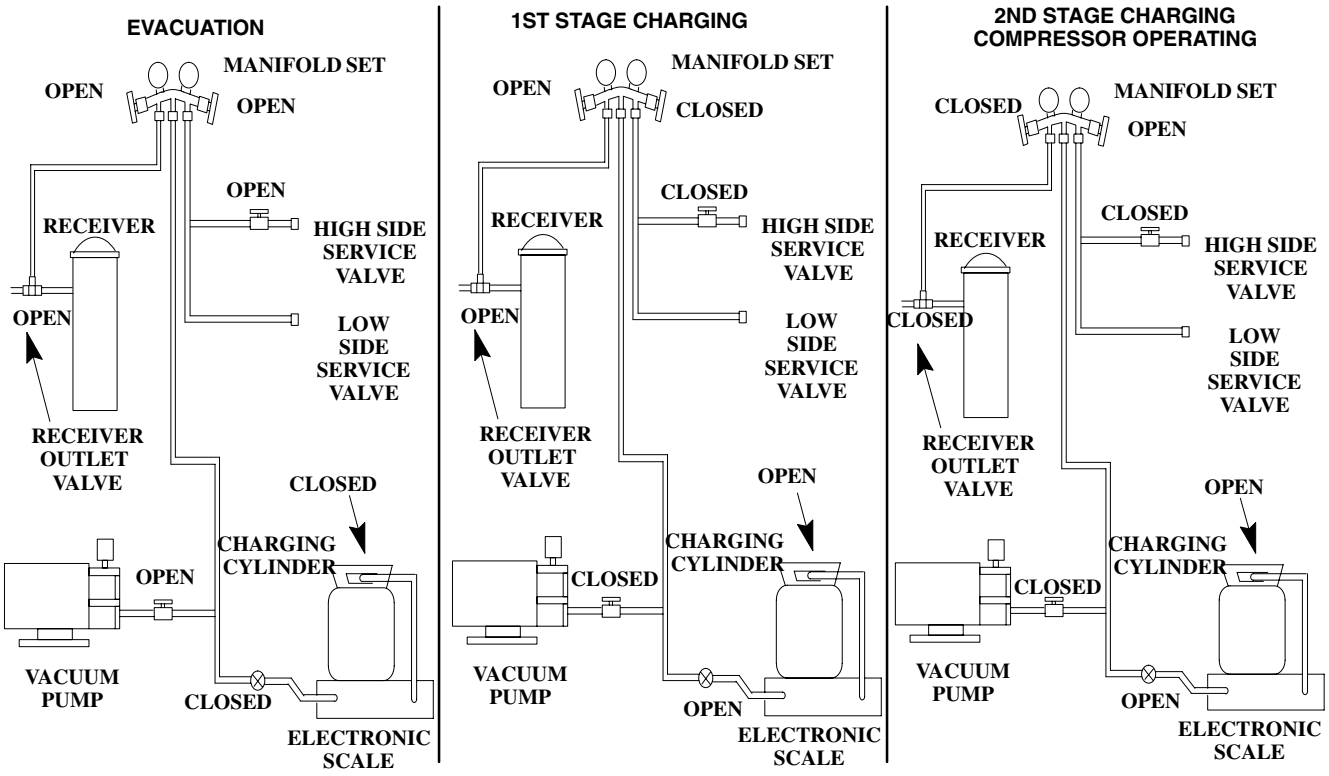
Proper evacuation of the total remote system will require a three (3) point hook-up of your manifold and hose set, (see drawing):

Point #1 - Cuber receiver outlet valve
Point #2 - Cuber high side service valve
Point #3 - Cuber low side service valve

Evacuation:

1. With cuber power supply turned “OFF” disconnect and insulate all 3 compressor leads at the compressor. Turn power supply on, place power switch in the “on” position. This will energize (open) the Liquid Line solenoid allowing evacuation of the Liquid Line between the solenoid and the expansion valve(s).
2. Evacuate system to 200/250 microns or less. At this point, there should be a holding test of five(5) minutes. You may expect a slight loss of vacuum as normal. A rapid rise to normal atmospheric pressure indicates moisture still present in the system. On a “wet” system, it will prove beneficial to use heat lamps to warm the compressor dome and evaporator surface during evacuation.
3. Turn cuber power switch OFF. Reconnect compressor leads.
4. *After proper evacuation hold test has been performed, the refrigerant charge should be “dumped” into the receiver until the pressure equalizes, stopping the flow. Do not try to throttle the refrigerant flow. Doing so will allow system pressure to balance too soon. The high-side service valve should be closed and the balance of the charge fed slowly through the suction side service valve with the compressor operational. Control the feed rate at no faster than four (4) ounces [113.g] per minute to ensure the compressor oil does not become too saturated with refrigerant resulting in a loss of compressor lubrication.
5. All refrigerant re-charging must be weighed into the system, utilizing an electronic charging scale. **DO NOT** attempt to recharge the system by sight glass, system pressure, amperage, frost line or sweat patterns.
6. Always leak check entire system after recharge.

CAUTION: Before programming the electronic scales to “dump” the charge, de-energize the liquid line solenoid, close the shut-off valve on vacuum pump and low side of the manifold set.



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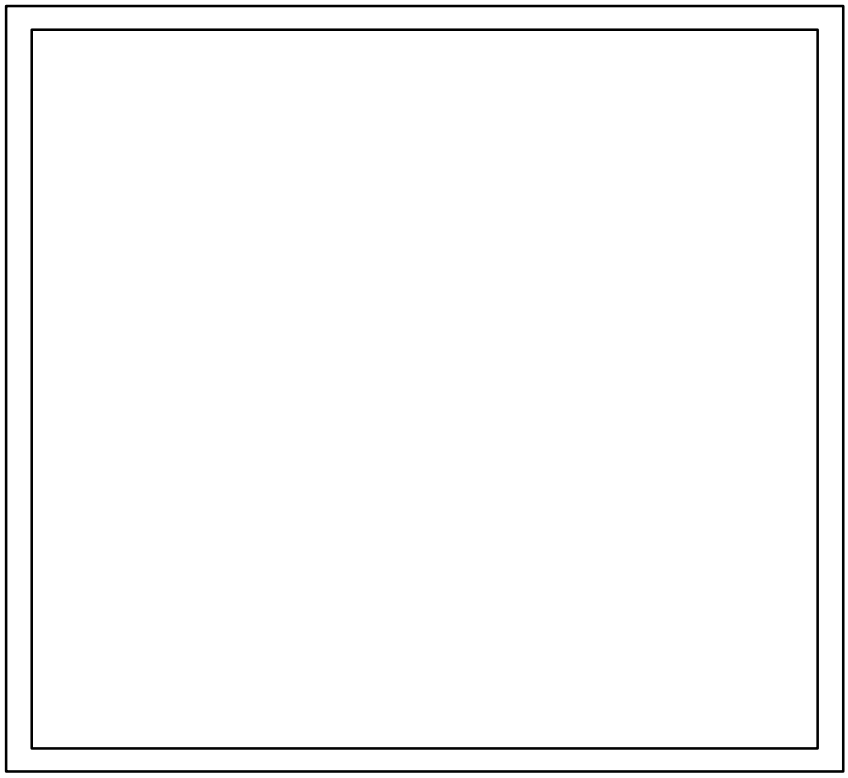

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