THE HOTTEST MACHINES ON ICE™

“I” Series

IRC 2448

IWC 2448

Ice Cube Machine

INSTALLATION INSTRUCTIONS

Part No. : 630460026
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Revision: B

THIS DOCUMENT CONTAINS IMPORTANT INFORMATION
This Manual must be read and understood before installing or operating this equipment

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GENERAL

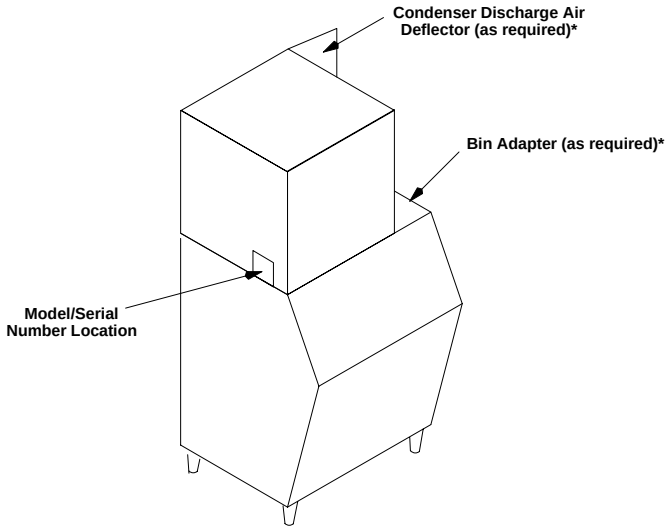
FREIGHT DAMAGE CLAIMS PROCEDURE

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.

MODEL AND SERIAL LOCATION

“I” SERIES CUBER

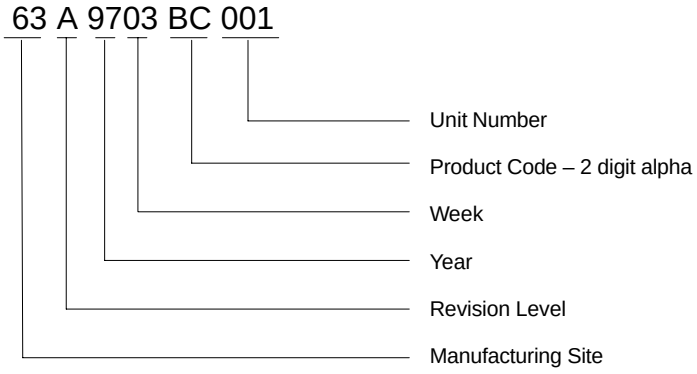


*Bin adapters and condenser discharge air deflector may be equipped depending on your location or the size of the storage bin.

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



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.

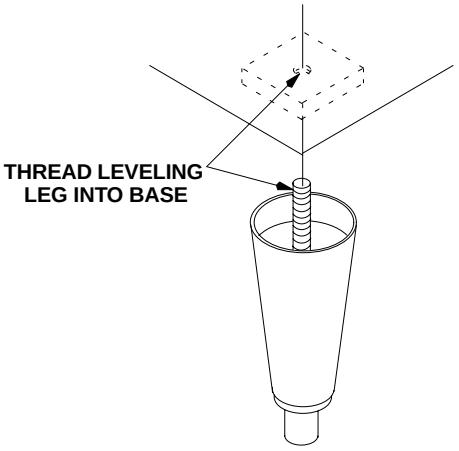
To reduce cost of maintenance and loss of efficiency, avoid placing air-cooled equipment in areas where grease, flour and other airborne contaminants are present. Allow a minimum of 6″ (15.24 cm) clearance on all sides and top for proper air circulation. Restricted air circulation will affect the efficiency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

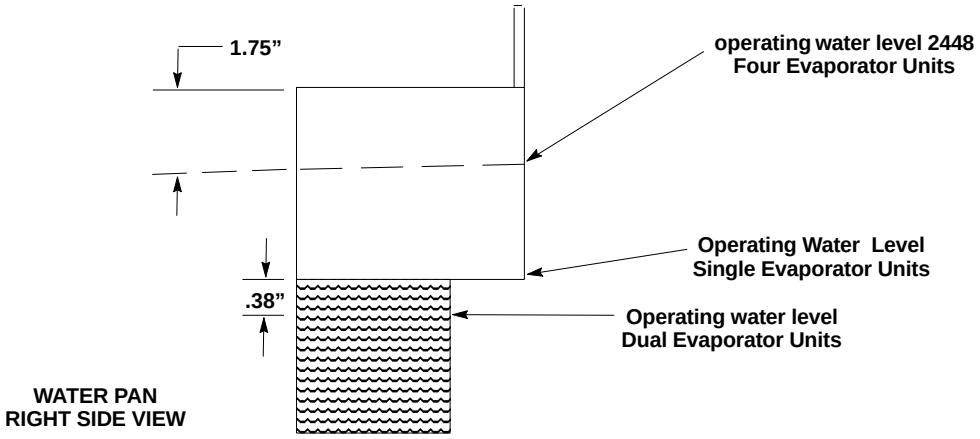
ELECTRICAL

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.

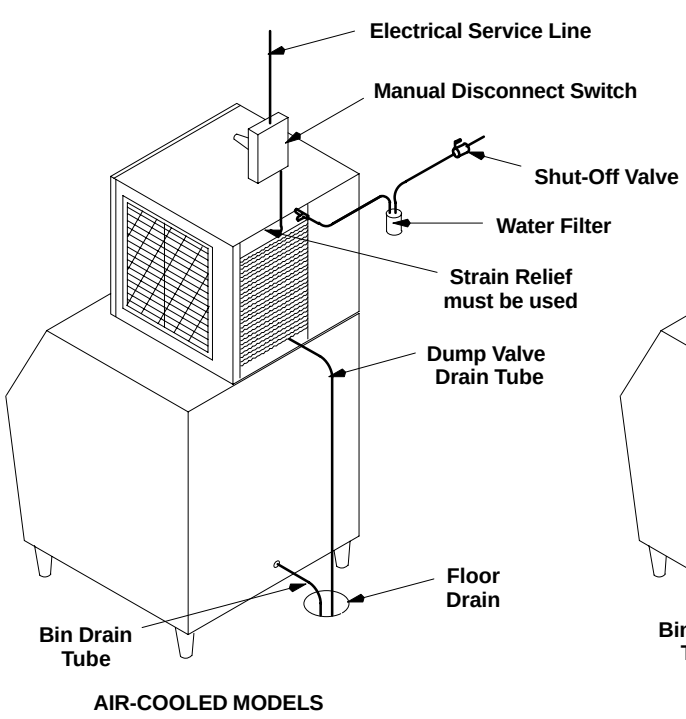
5. A manual disconnect in a convenient location to the cuber must be installed.

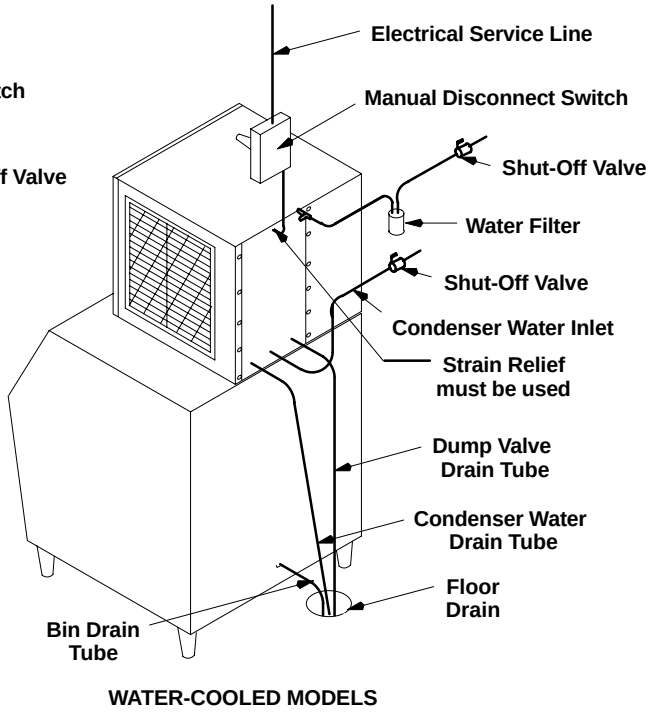
INSTALLATION CHECK POINTS

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.



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?





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”. Supply line must be 1/2” pipe.
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.

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.

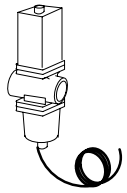
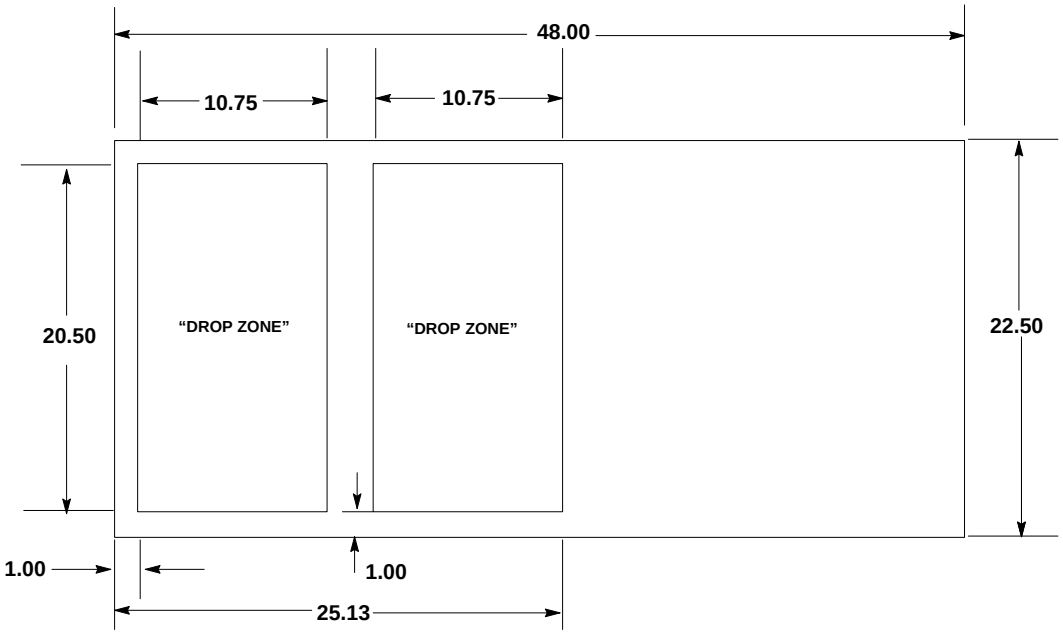
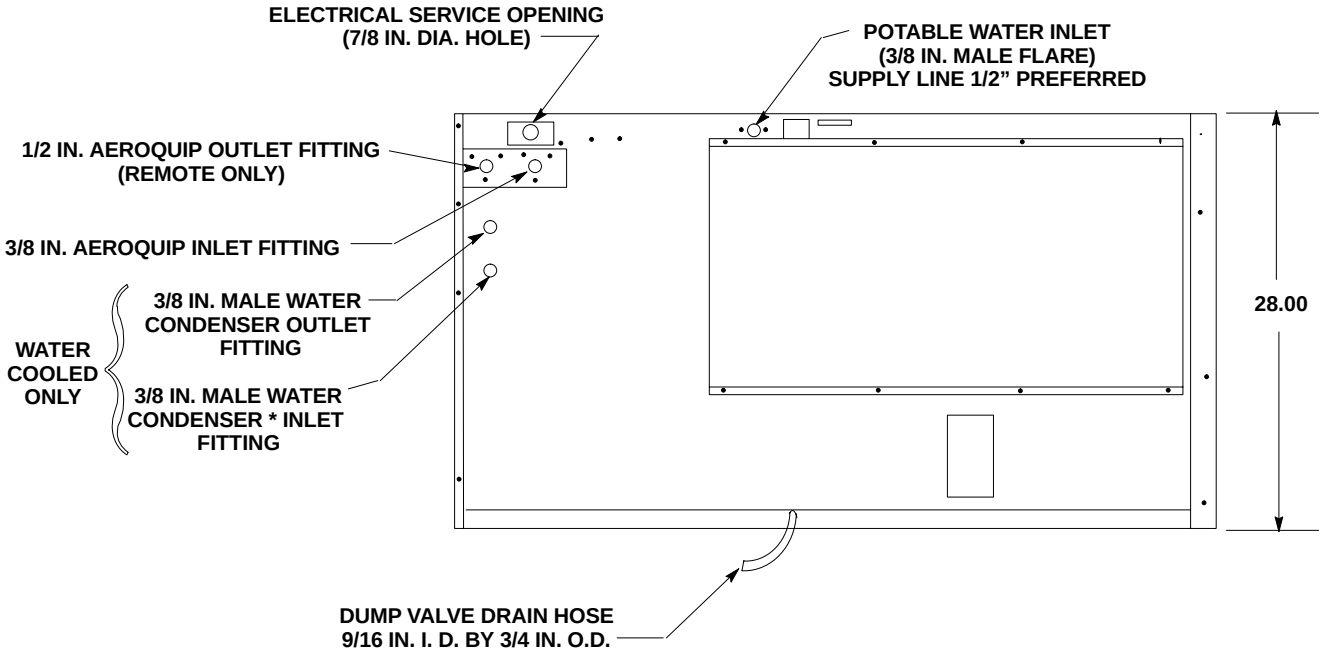


FIGURE 1. ICE–DROP ZONE



BOTTOM VIEW

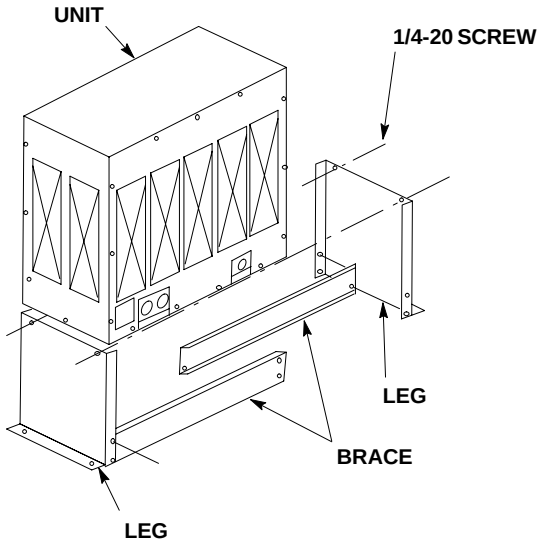
FIGURE 2. ELECTRICAL & PLUMBING PLUS AERO–EQUIP CONNECTIONS



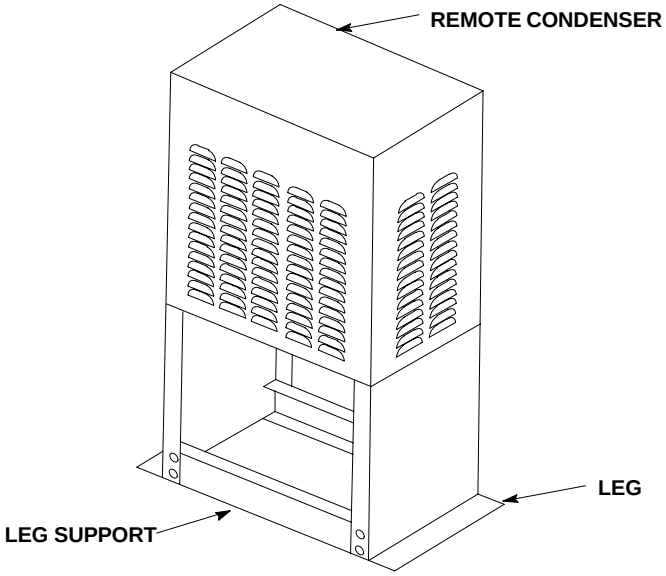
* BOTH CONDENSER AND POTABLE WATER INLETS REQUIRE A 1/2" WATER VOLUME SUPPLY LINE.

REAR VIEW

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.

NOTE: DO NOT turn condenser on until cuber install and refrigerant line connections are complete!

A.. Never wire condenser into cuber section. The condenser is an independent electrical connection.

B.. Fan motor will not start until pressure rises to 205 PSIG [14.07 Bars] closing fan cycling switch.

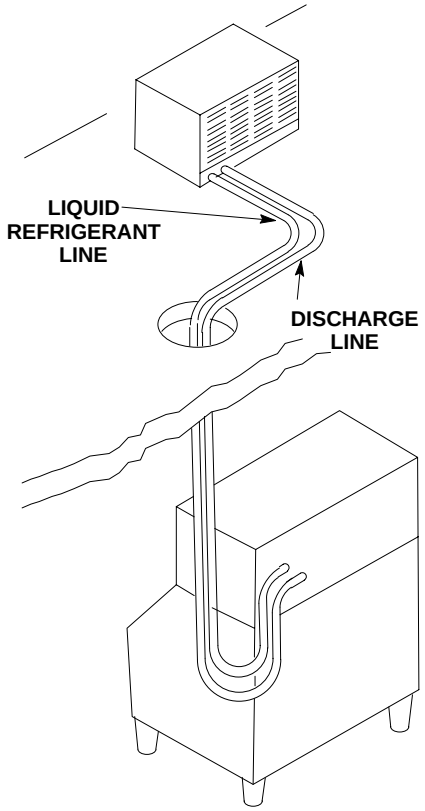
C.. The condenser fan may cycle off during the harvest cycle – this would be normal.

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

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.



CORRECT

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.

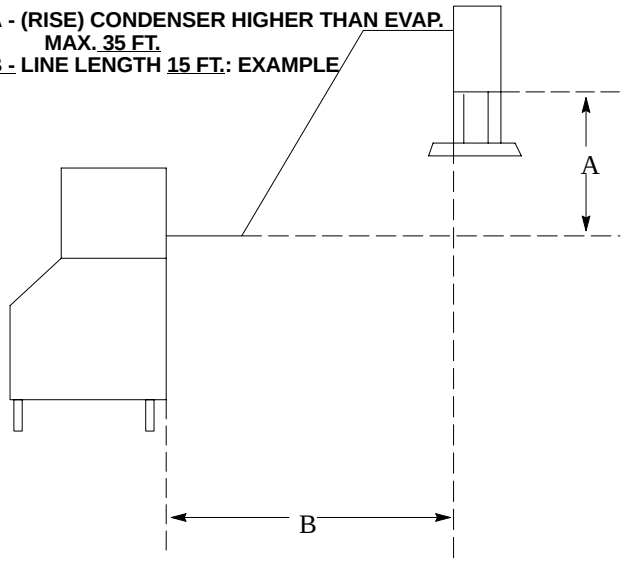
   Line-Set Rise: 35 Ft. Maximum [10.66 meters]
   Line-Set Drop: 15 Ft. Maximum [4.57 meters]

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

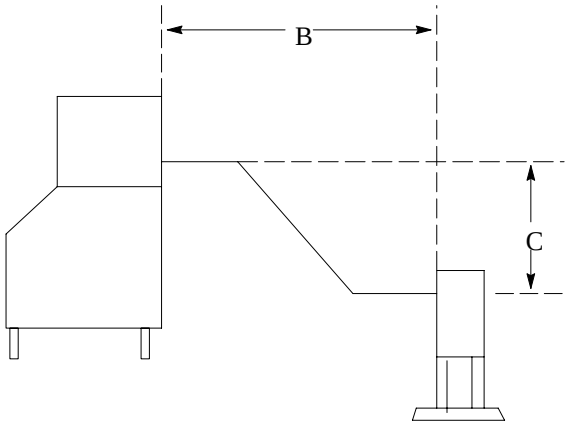
   To prevent the combination of rises, drops and horizontal runs exceeding the compressor start-up and pumping design limit, the following calculations should be made:

NOTE: Max. line–set for 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.



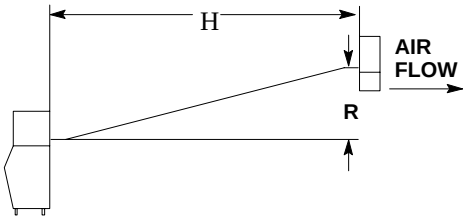
Maximum Line-Set Distance Formula

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:

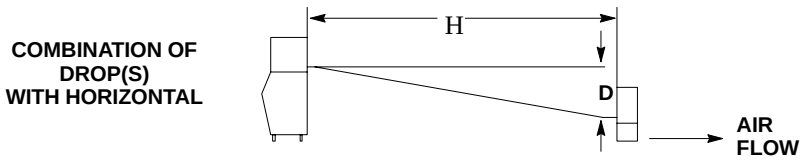
a. Insert measured rise (R) into the formula and multiply it by 1.7 to get a calculated rise.

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).



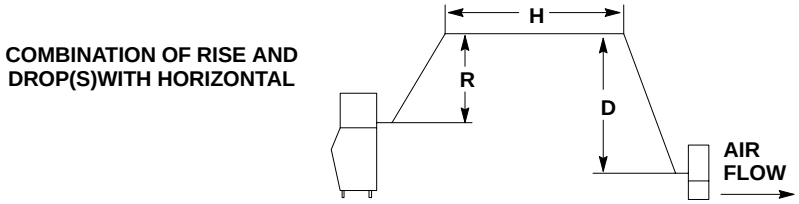
b. Insert measured drop (D) into formula and multiply by 6.6 to get a calculated drop.

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.

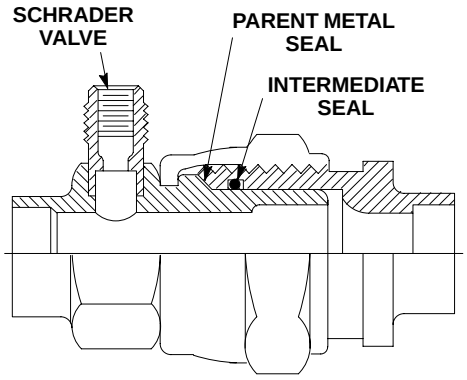


CAUTION: If a line-set rise is followed by a line-set drop, a second line-set rise cannot be made. Or If a line-set drop is followed by a line-set rise, a second line-set drop cannot be made.

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:**

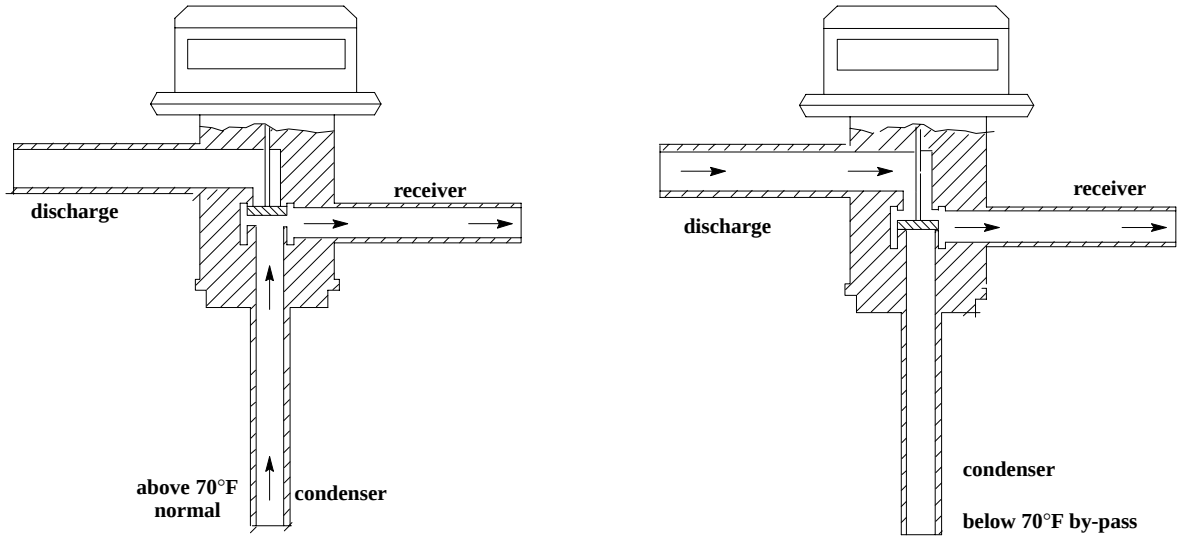
A. Remove grill from the right-hand side panel of cuber.

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.

HEAD PRESSURE CONTROL [HEADMASTER]



The Cornelius “I” series remote systems use an Alco Head Pressure Control, normally referred to as a head-master. 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 by-pass 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.

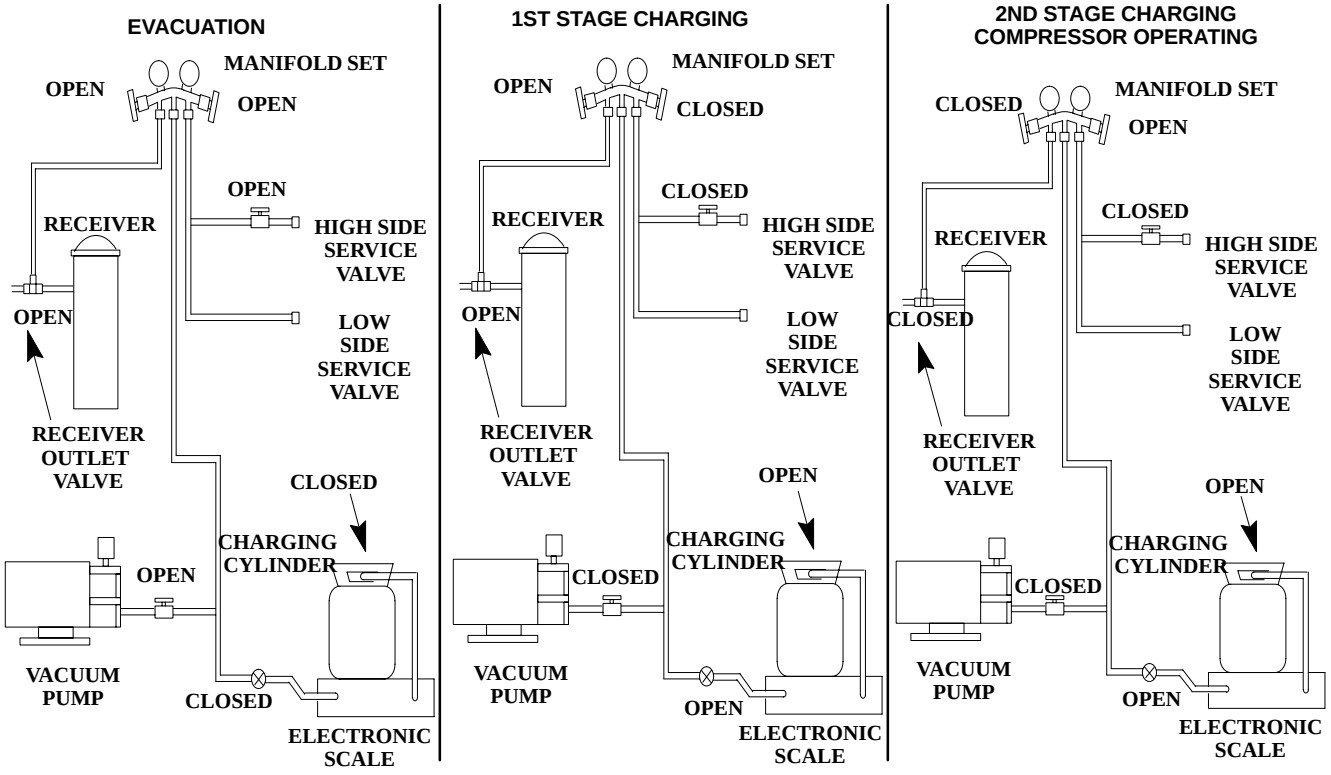
Proper evacuation of the total remote system will require a three (3) point hook-up of your manifold and hose set, (see drawing):

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.

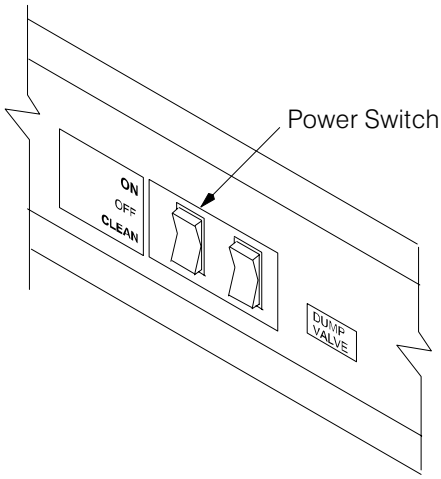


START-UP AND CHECK OUT

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: 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.

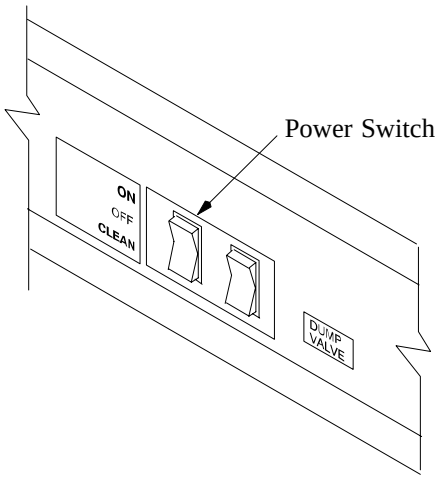
CAUTION: Ice machine cleaners are acidic-based chemicals. Before beginning any cleaning of the cuber, the ice in the storage bin or dispenser must be removed.

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.

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 filter–driers, which reduce moisture, acitity, 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.

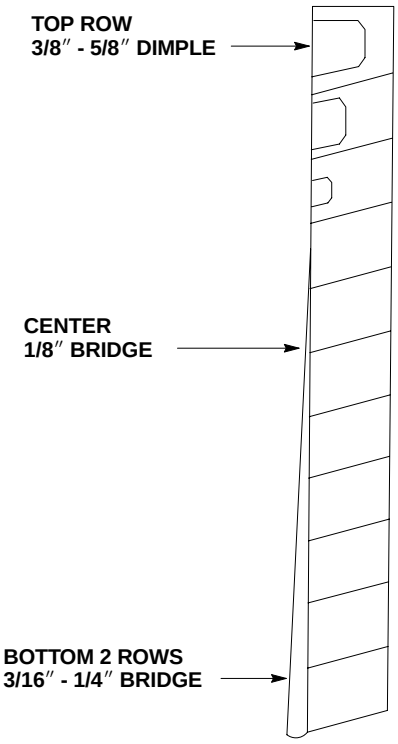
NOTES REGARDING RECLAIM:
“New product specification” currently means ARI standard 700–878. Note that chemical analysis is required to assure that this standard is met.

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

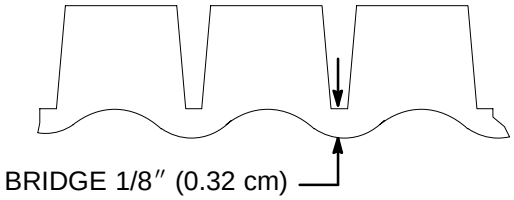
HIGH PRESSURE SAFETY SWITCH

All water-cooled and remote products contain a igh 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.

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%.

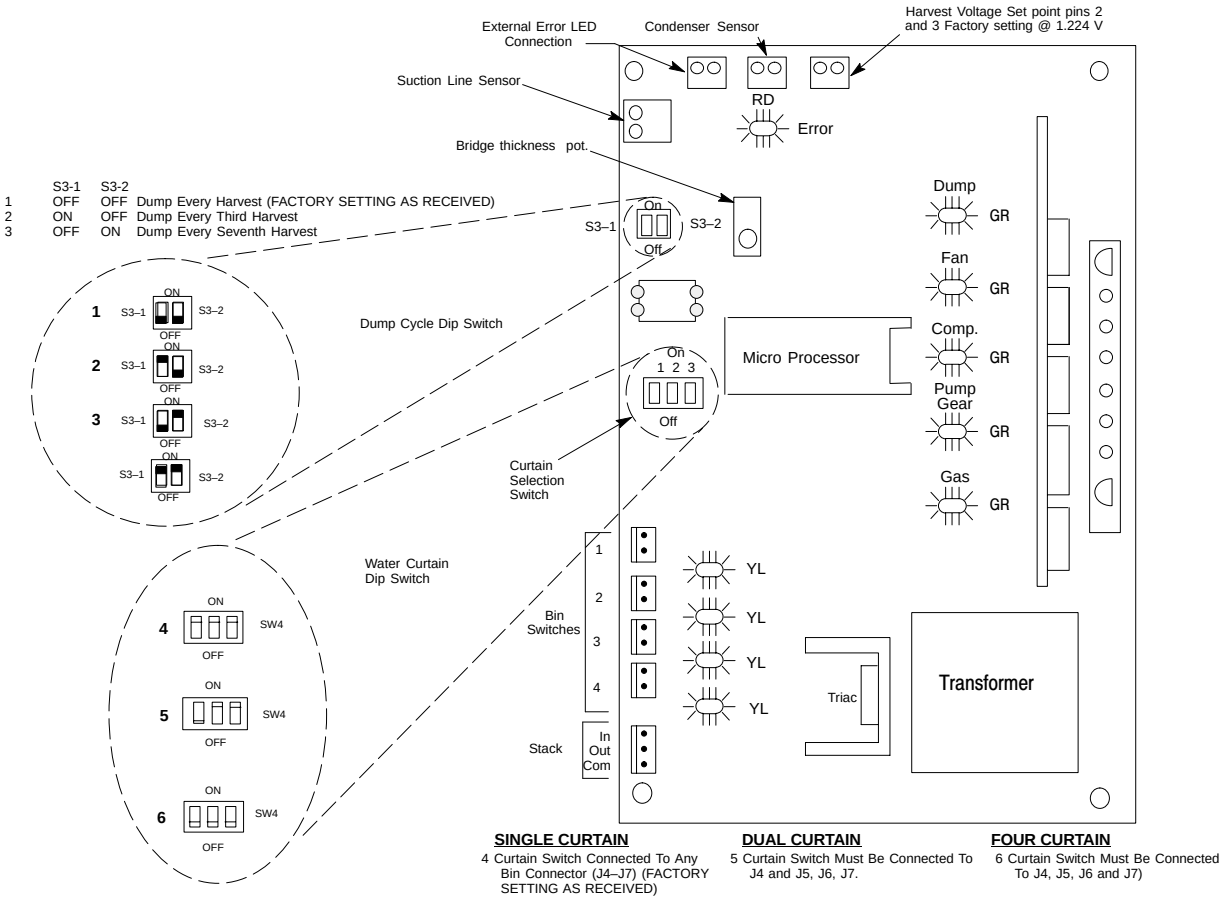
ICE PRODUCTION CHECK

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.



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) – self contained air cooled only.

Red:

Error in system operation. Product shut down.

STATUS INDICATOR (2448)

D1-2 3-4	Yellow LED	Water Curtain(s)-Dip switch can be set for 1,2, or 4 curtain units
D9	Red LED	Error
D12	Green LED	Hot Gas Valve(s)
D13	Green LED	Condenser Fan
D14	Green LED	Water Pump
D15	Green LED	Compressor Contactor
D16	Green LED	Dump Valve

Water Curtain(s) Open

D1-2 3-4	Yellow LED	on or off	curtain(s) Closed. curtain(s) open.

Pre-Chill Mode

D1-2 3-4	Yellow LED	(on)	Water Curtain(s) closed.
D13	Green LED	(on or off)	Condenser fan, cycles on and off depending upon condenser temperature.
D15	Green LED	(on)	Contactor closed, compressor active.

Ice-Making Mode

D1-2 3-4	Yellow LED	(on)	Water Curtain(s) closed.
D13	Green LED	(on or off)	Condenser fan, cycles on and off depending upon condenser temperature.
D14	Green LED	(on)	Water pump active at evaporator temperature of 20°F or lower, except during dump cycle.
D15	Green LED	(on)	Compressor contactor closed..

Harvest Mode

D1-2 3-4	Yellow LED	(on)	Water curtain(s) closed.
D14	Green LED	(on) 15 sec.	Water pump active for 15 sec., then deactivate.
D15	Green LED	(on)	Compressor contactor closed – compressor active.
D16	Green LED	(on) 15 sec.	Dump valve active 15 sec.

Error LED

D9	Red LED		Turns on when the system is shut down.
D9	Red LED	(on) or flashing	Assists to indicate where the error may be and or what may have caused the error.
D9	Red LED	(on)	EVAPORATOR temperature drops below -25°F.
D9	Red LED	(on)	OPEN THERMISTOR CIRCUIT (Air Cooled only) - Thermistor open/broken wire/poor connector.
D9	Red LED	(on)	High evaporator temperature: evaporator does not fall below 40°F within 6 minutes into freeze cycle.
D9	Red LED	Flashing, 1/2 sec. on / 1/2 sec. off	High temperature shutdown - condenser temperature exceeds 150°F +2, -6°F.
D9	Red LED	Flashing, 1/4 sec. on / 1/4 sec. off, 1 sec. delay then re-peat	Low temperature shutdown - condenser temperature less than 36°F +2, -6°F.

COMPONENT FUNCTION

SENSORS

Suction line sensor **(BLUE)** is a thermistor rated 1k ohm at room temperature.

- 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 4.5 / 5 VDC output voltage. If not replace the circuit board.

STACKING CABLE

The IRC 2448 and or the IWC 2448 are not stackable.

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 4.5 / 5 VDC 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 or gray 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 aboard output voltage of 4.5 / 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 4.5 / 5 VDC.
10. Should sensor (thermistor) pass the voltage test proceed to the control board diagnosis for LED sequence (see page 19).

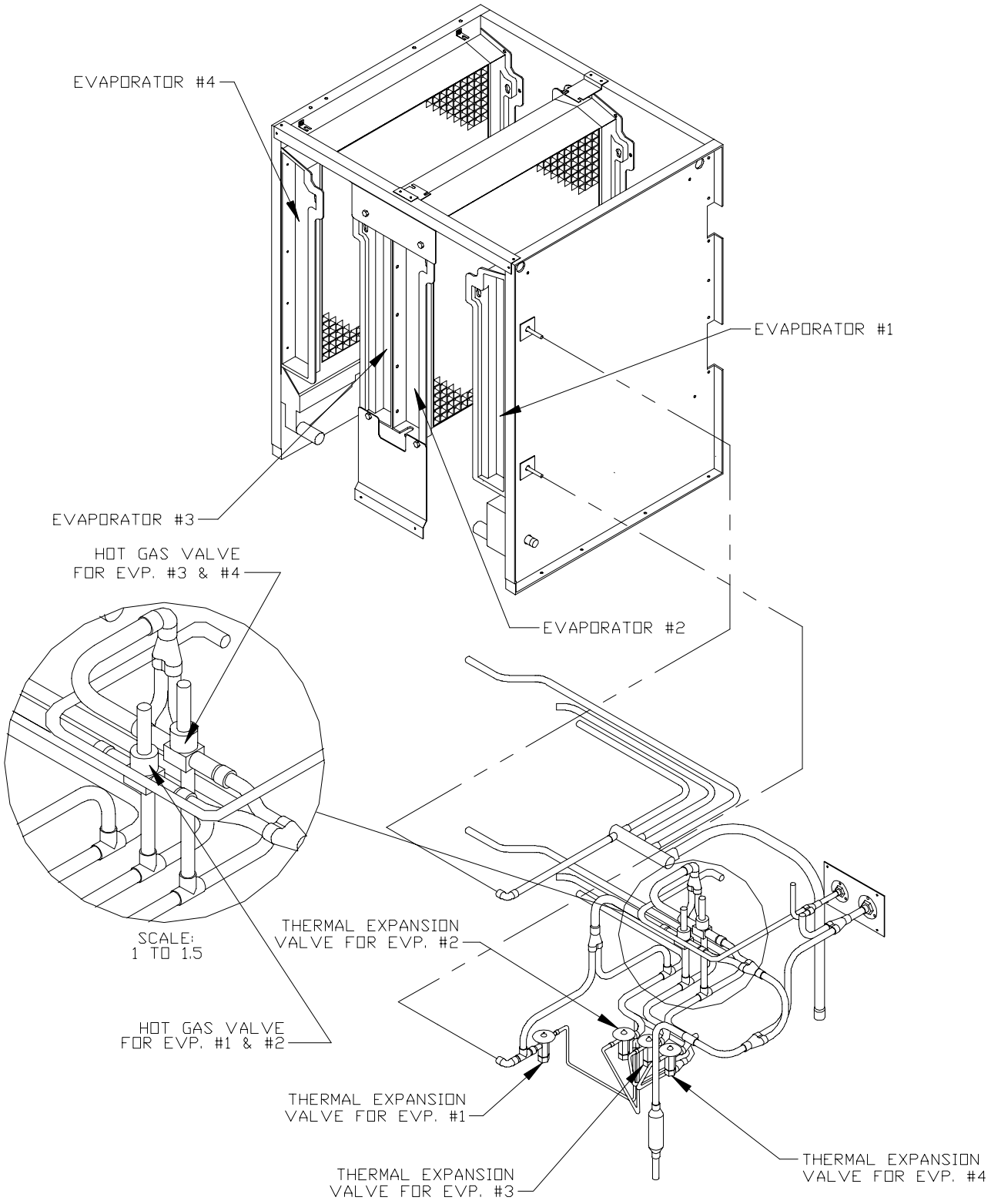
NOTE: The sensor controls the condenser fan cycling from 88/100 degree Fahrenheit. Thus any defects in the condenser circuit will effect the fan cycling rate.

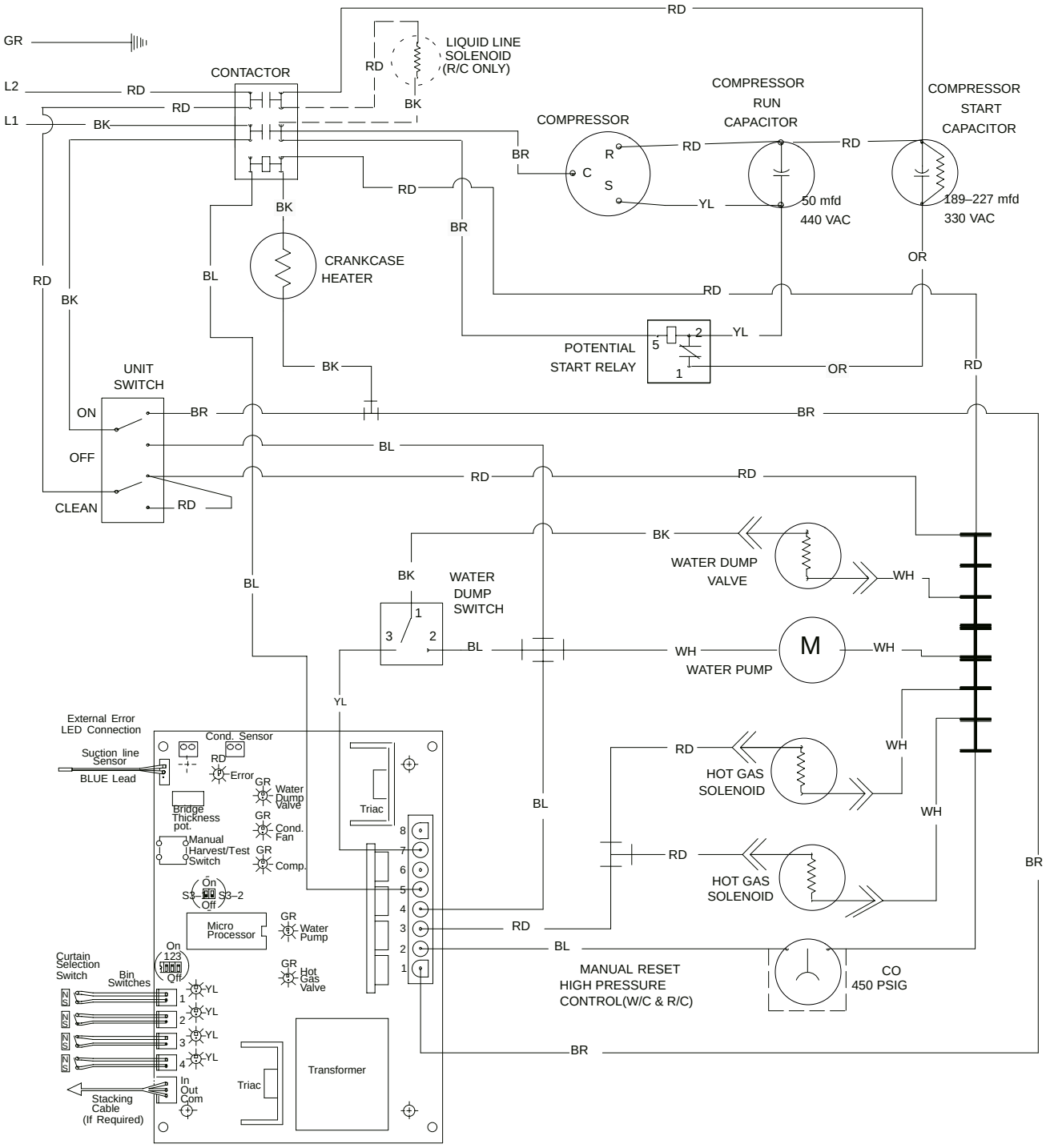
THERMOSTATIC EXPANSION VALVES

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.
6. The 4TXV's are located in the compressor compartment and #1 is at the evaporator bulk head wall, # 2, 3, and 4 follow in line. (see Figure NO TAG).

FOR SERVICING REFRIGERATION SYSTEMS
TXV'S AND HOT GAS VALVES LOCATION





IRC/IWC2448 208/230VOLTS 60 HZ REV. C

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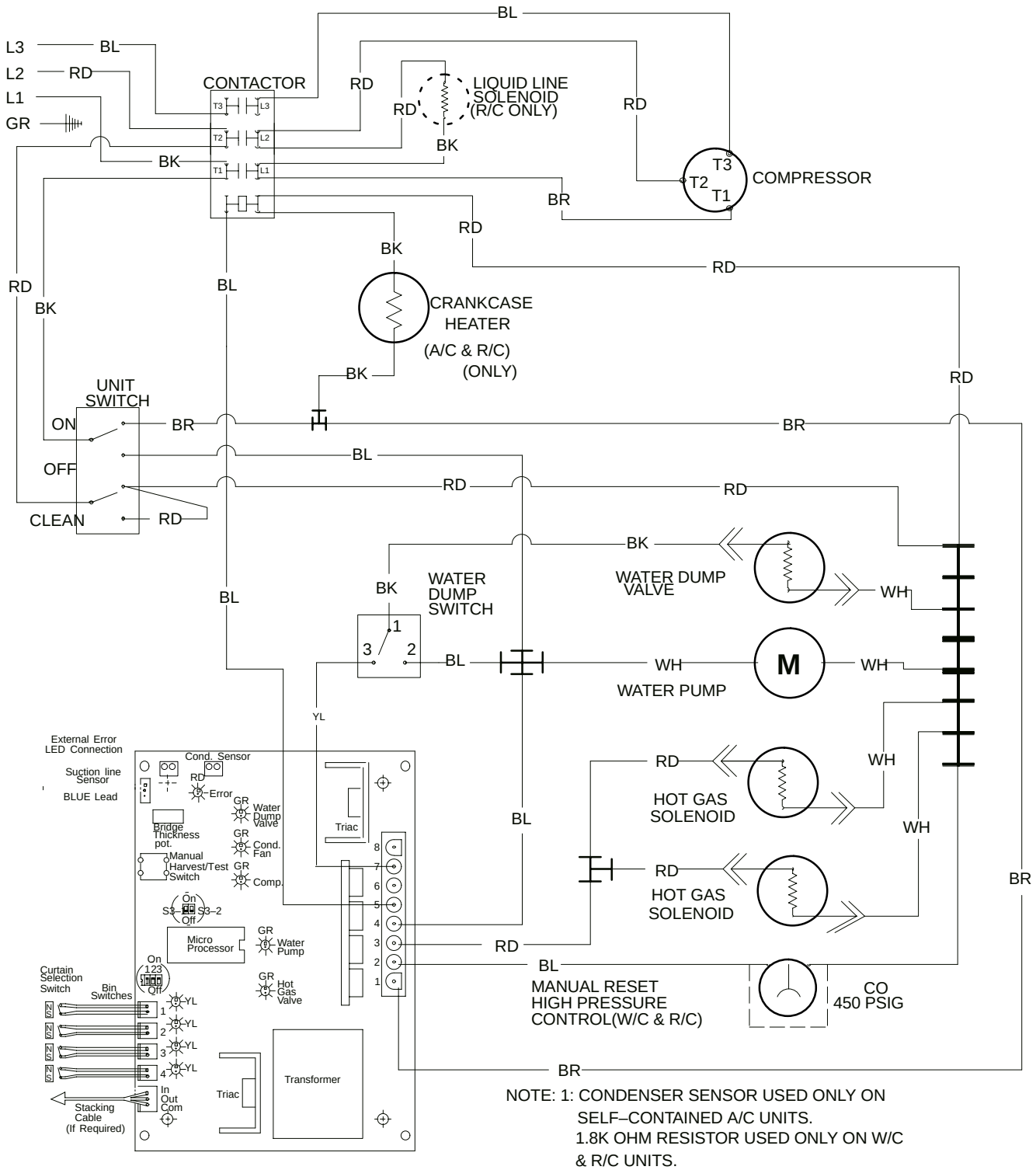
FIGURE 3. IRC/ICW 2448



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IRC/IWC 2448 208/230 Volts 60 Hertz 3PH Rev B

FIGURE 4. IRC / IWC2448 – 3 PHASE

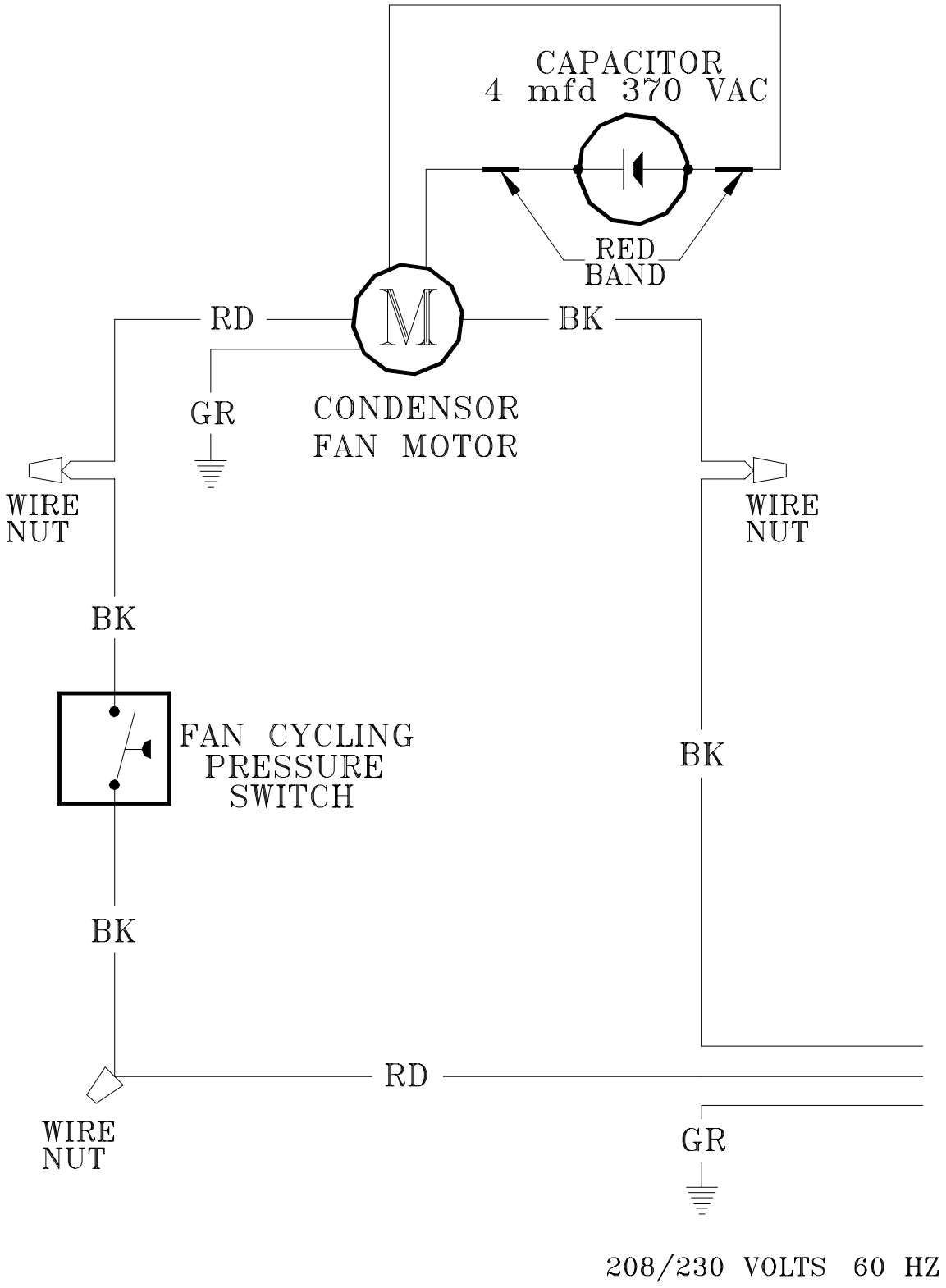

FIGURE 5. CR2400 REMOTE CONDENSER

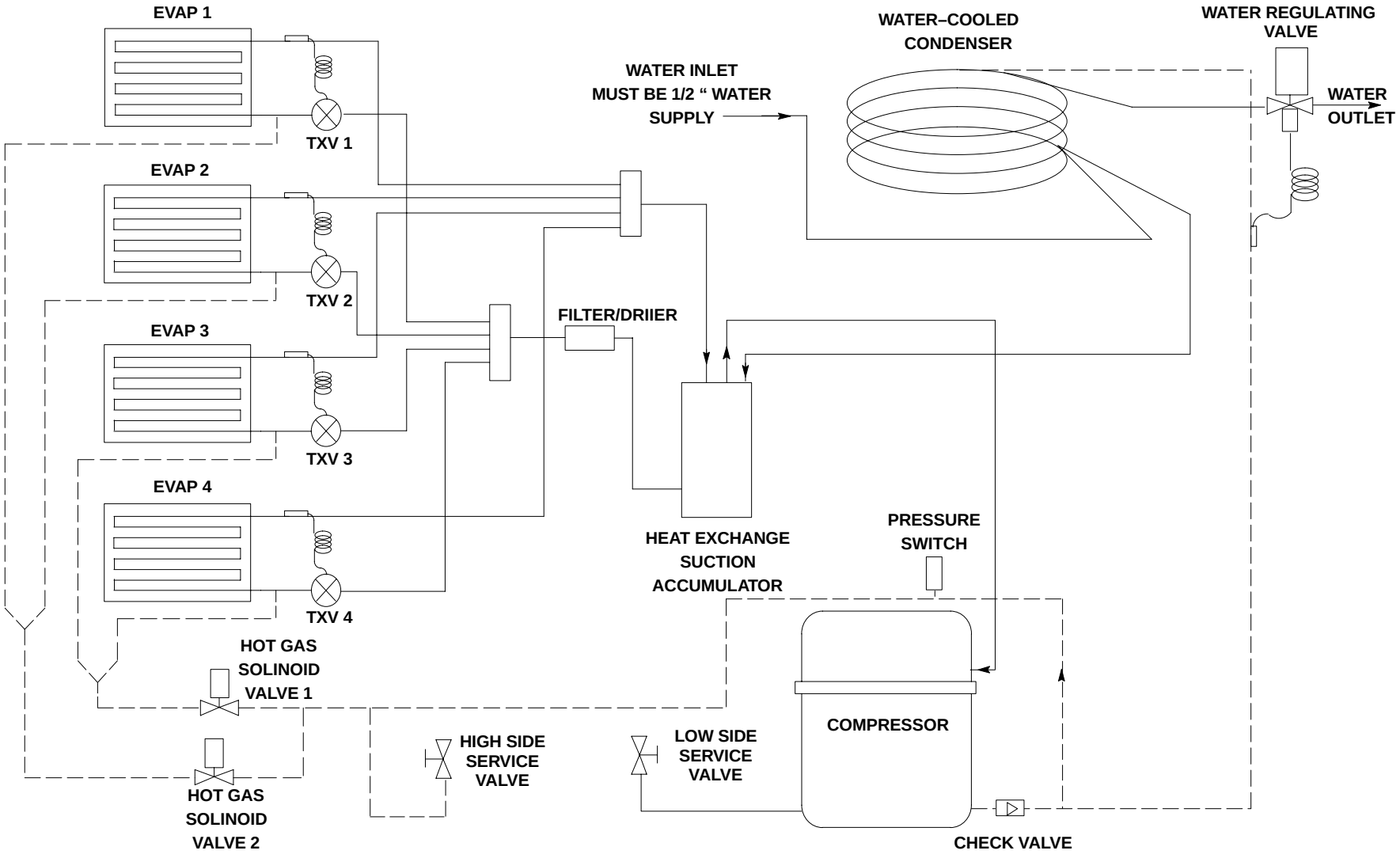

FIGURE 6. REFRIGERANT SYSTEM OF IWC2448

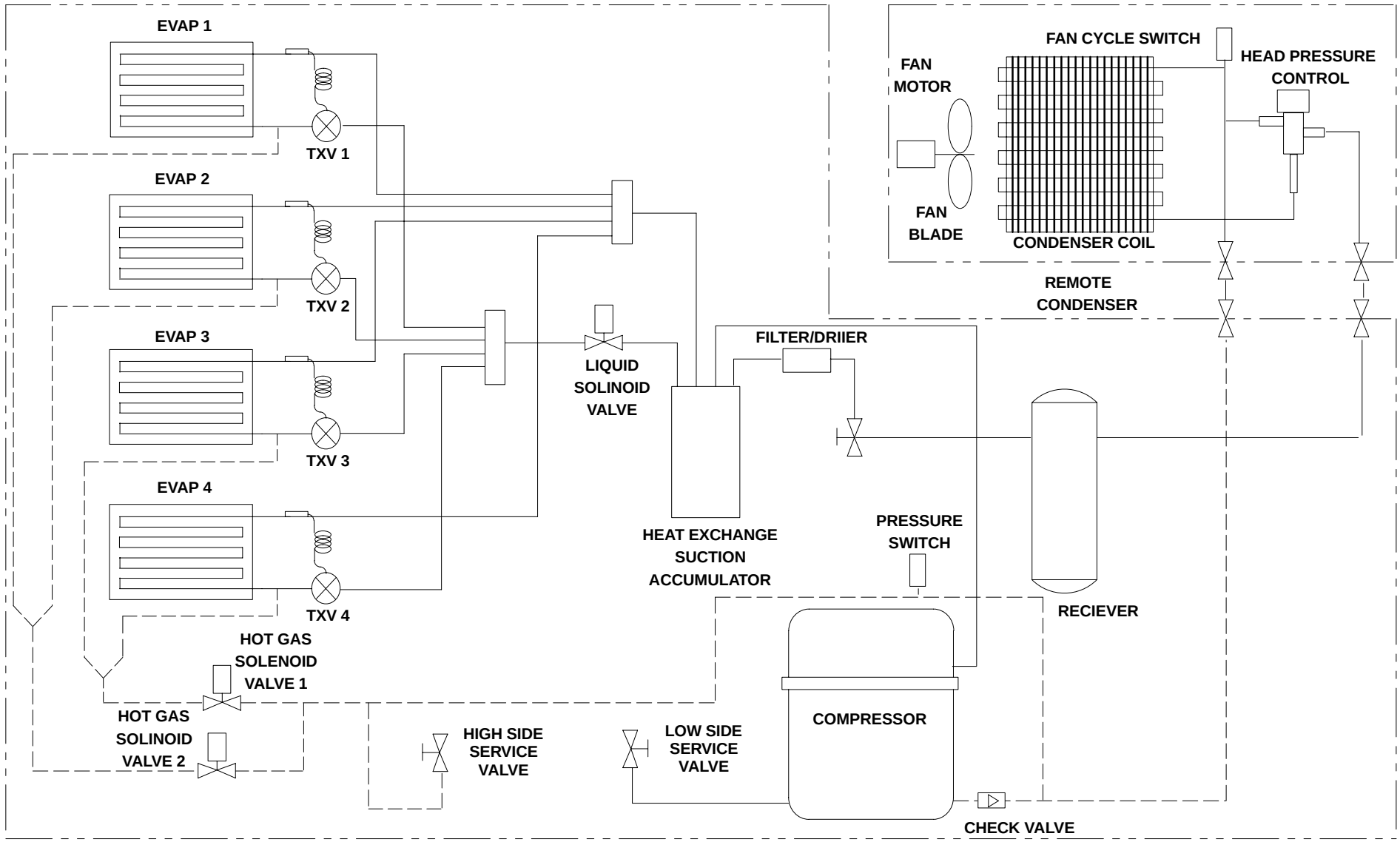

FIGURE 7. REFRIGERANT SYTSTEM OF IRC2448

AVERAGE OPERATING CHARACTERISTICS
IRC2448/IWC2448

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	259	38	14.8	138	79	1:7	28.7	2500
80	70	262	38	16.7	140	82	1.5	27.9	2210
90	70	262	38	17.0	142	82	1:2	27.8	2200
90	80	277	40	18.3	148	86	1:1	27.8	2057
105	70	260	39	18.1	144	83	1:0	28.1	2123

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	1786	262	14.8	951	545	1:7	13.0	1134
27	21	1806	262	16.7	965	565	1:5	12.6	1002
32	21	1806	262	17.0	979	565	1:2	12.6	998
32	27	1910	276	18.3	1020	593	1:1	12.6	933
41	21	1793	269	18.1	993	572	1:0	12.8	963

AVERAGE OPERATING CHARACTERISTICS
IWC2448/IRC2448-3PHASE

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	230	33	12:6	175	85	1:7	23.8	2401
80	70	250	35	15:0	180	90	1.5	24.6	2146
90	70	280	37	16:4	190	100	1:2	24.7	2024
90	80	285	38	17:6	195	104	1:1	25.1	1938
105	70	345	42	19:6	240	118	1:0	25.8	1808

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	1586	228	12:6	1207	586	1:7	10.8	1089
27	21	1724	241	15:0	1241	621	1:5	11.1	973
32	21	1931	255	16:4	1310	689	1:2	11.2	918
32	27	1965	262	17:6	1344	717	1:1	11.4	879
41	21	2379	290	19:6	1655	814	1:0	11.7	820

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