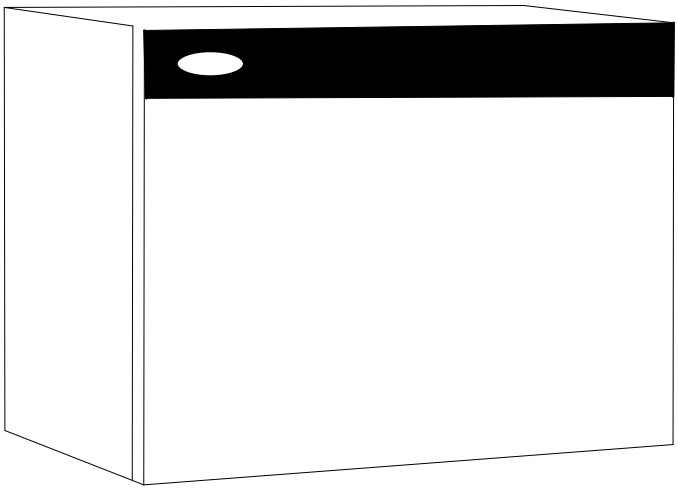
THE HOTTEST MACHINES ON ICE™

Installation Instructions

“I” Series Flaker/Nugget Ice Machines



Model Number	Description
IAF1000 / IAF650	**Flaker/Nugget Modular Head Ice Maker Air Cooled**
IWF1000 / IWF650	**Flaker/Nugget Modular Head Ice Maker Water Cooled**
IRF1000 / IRF650	**Flaker/Nugget Modular Head Ice Maker Remote Cooled**

Part No. 630460004
3/31/97
Revised 4/11/97

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

PRINTED IN U.S.A

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FIGURE AND INSTALLATIONS

INTRODUCTION

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

This manual has been prepared to assist the Installer.

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

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

Address all correspondence to:

A Product of IMI Cornelius Inc.
One Cornelius Place
Anoka, MN 55303–1592

Phone 800–554–3526
FAX 612–422–3232
PRINTED IN USA

INSTALLATION INSTRUCTIONS

You will get better service from the ice machine, longer life and greater convenience if you choose its location with care. Select a location as close as possible to where the highest volume of ice will used.

Here are a few points to consider:

1. Select a location as close as possible to where you are going to use the most ice.
2. Allow a minimum of 6” space at sides and rear of machine for ventilation.
3. A kitchen installation is not desirable as a rule. If a kitchen installation is necessary, locate the machine as far away from the cooking area as possible. Grease laden air will form a greasy deposit on the condenser. This reduces the ice making efficiency and necessitates thorough cleaning quite often.
4. If you install the unit in a storeroom, be sure the room is well ventilated.

NOTE: Do not install where the ambient and incoming water temperature will drop below 50˚ F or rise to over 100˚ F.

WARNING: If water pressure exceeds 50 pounds, a water pressure regulator should be installed in water inlet line between water shut–off valve and strainer. Minimum incoming water pressure required is 22 pounds.

5. Uncrate the unit by cutting the lower band on the carton and lift the carton off the unit.
6. All “I” series flakers are supplied with bin sealing gasket material. Install the gasket around the bottom outside edge of the unit by removing the protective paper and pressing in place.
7. Uncrate the ice storage bin and set in place. Connect a drain hose to the bin and level the bin. Install any required bin adapter(s) at this time.
8. Carefully place the flaker on the bin. Be careful not to damage the flaker gasket material.
9. Remove the flaker front panel. Position the bin thermostat in place and install the hold down screws as shown in Figure 1.

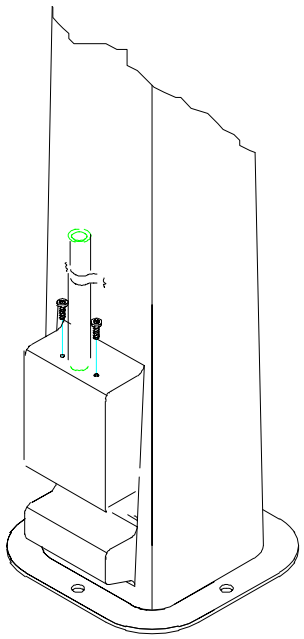


FIGURE 1. BIN THERMOSTAT INSTALLATION

10. The incoming water for the ice making section requires a 3/8” copper tube. Connect this water tube to the 3/8” male flare fitting on the back of the unit. Make all drain connections. Drain tubes cannot be teed together. See Figure 2 for location of all plumbing connections.

NOTE: For water cooled units, a separate 3/8” copper water line is required to be connected to the flare fitting on the back of the unit marked condenser water in. A 3/8” flare connected line will have to be provided from the fitting marked condenser water out to the drain.

A water regulating valve installed at the factory was set to maintain 290 to 310 PSI head pressure for R–404a units. After 10 minutes of operation check the water temperature at condenser outlet and adjust to 100°F, 105°F if necessary.

11. Connect a drain hose to the condensate drain stub tube.

NOTE: All plumbing must be done in accordance with national and local codes.

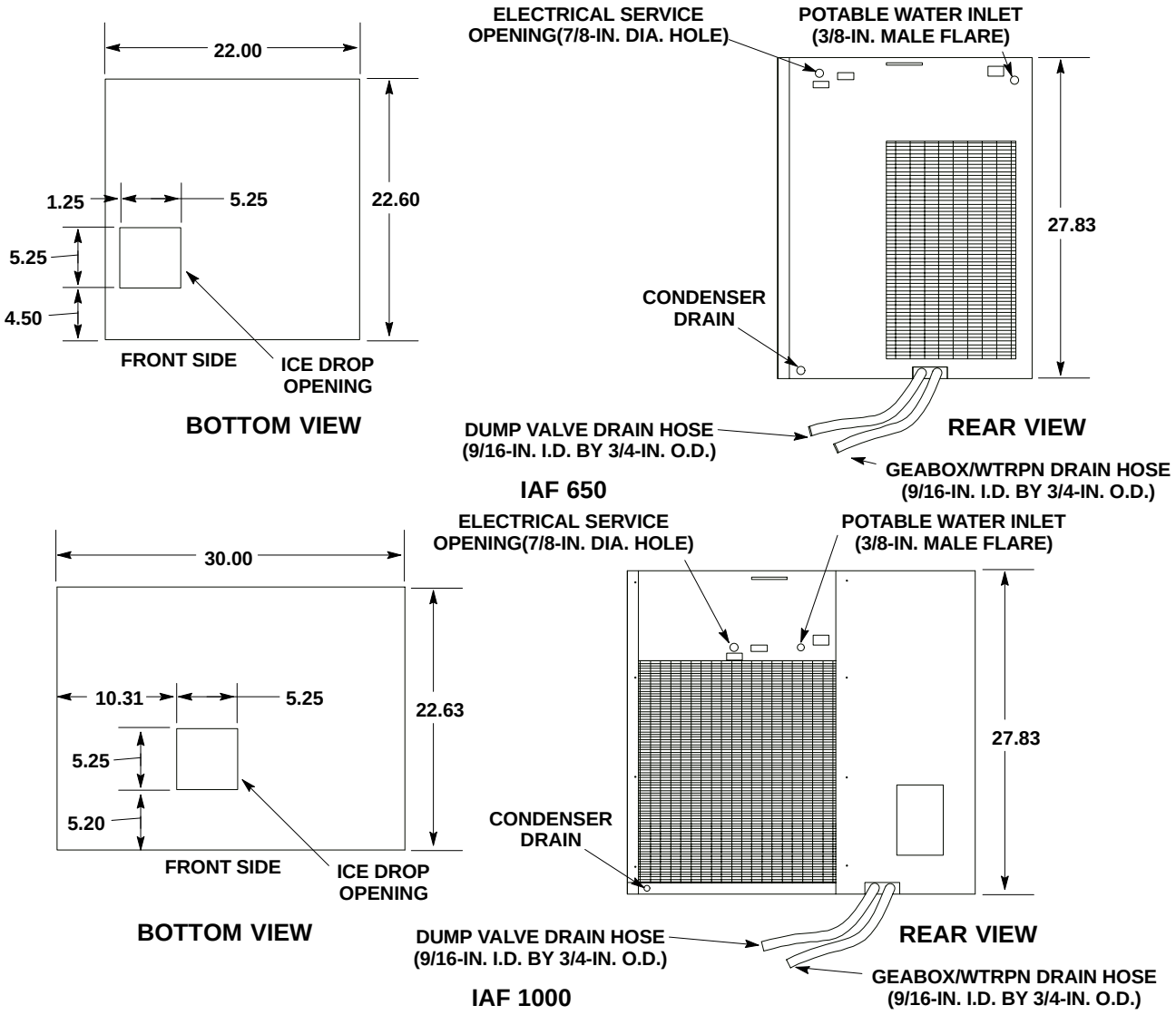
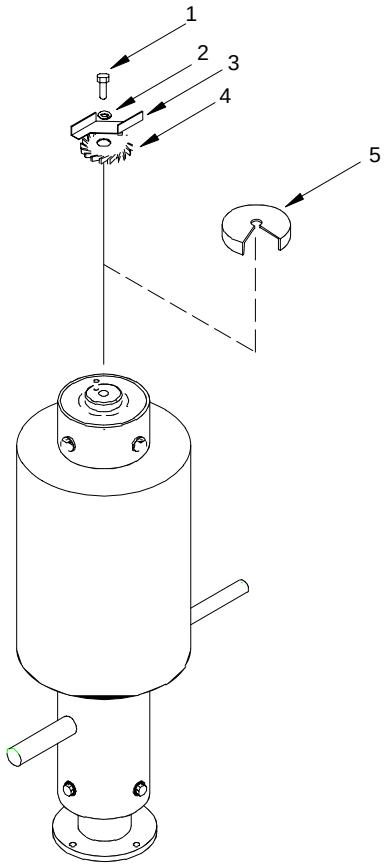


FIGURE 2. SERVICE CONNECTIONS

12. Bring the electrical supply (20 Amp.) into the unit at the rear of the cabinet and enters the unit control box. The power and ground connections are completed to the leads in the control box. Strain relief connections must be made at the cabinet and at the control box.

NOTE: Make sure the proper voltage and number of wires are provided. See serial plate for proper configuration.

NOTE: All wiring must conform to national and local codes.



1. Remove the chute from the evaporator assembly
2. Remove item 1, .50-20 x 1.25 bolt; item 2, .50 lockwasher; item 3, ice paddle, and item 4, flaker cutter head.
3. Install item 5, nugget ice cutter head, and re-install items 1, 2, & 3
4. Re-install chute. (RTV must be used around the base of the chute.)

FIGURE 3. INSTRUCTIONS FOR CONVERTING FLAKED ICE TO NUGGET ICE.

WATER AND ICE CIRCUIT

The supply water enters the float chamber through a small orifice. The water level rises and lifts the float arm on the float valve and seats the valve, shutting off the water supply when the water is at the desired level. As the water leaves the float chamber, filling the evaporator, the float drops and allows additional water to enter refilling the float chamber. Thus the water level is maintained automatically as the unit operates.

The water level in the evaporator shell will rise to the same level as the water in the float chamber. The water in direct contact with the evaporator wall freezes and forms ice on the evaporator wall. As the freezing continues the ice becomes thicker and exceeds the space between the evaporator wall and the auger. The auger rotating at 8 RPM then chips off the ice and moves it to the surface of the shell. When the ice reaches the top surface of the water in the shell it is pushed upward through the extruder opening into the cutter heads. From the cutter head the ice enters the drop chute and falls into the storage bin. This action continues until the ice comes in contact with the bin thermostat and the unit is shut down. The unit will remain off until the ice drops from the bin thermostat through consumption or melting, at which time the unit will restart.

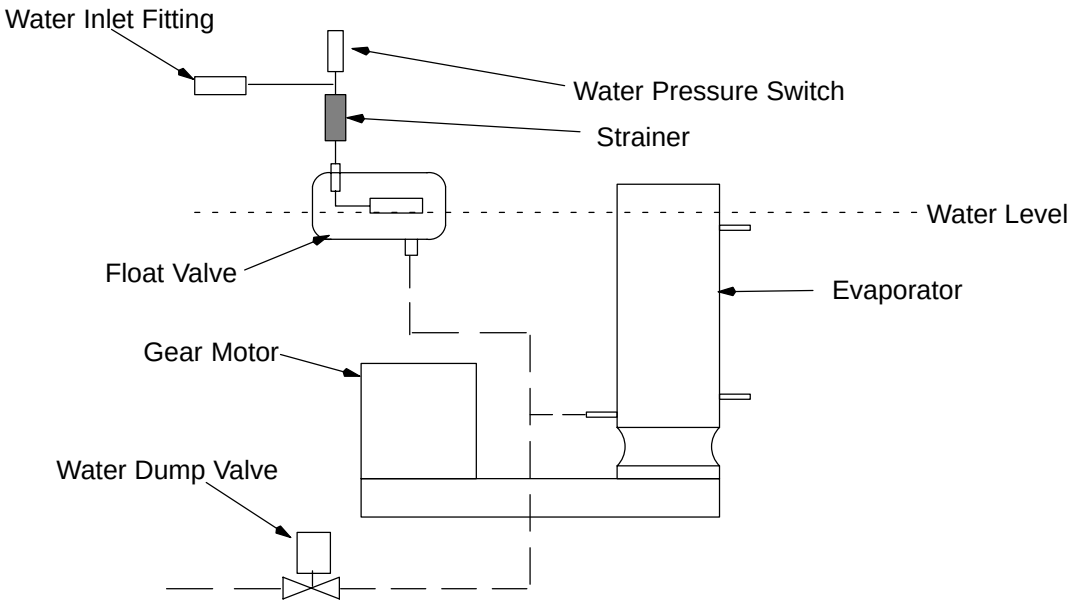


FIGURE 4. WATER LEVEL

“I” SERIES FLAKER CLEANING AND SANITIZING PROCEDURE

1. To eliminate water from entering the reservoir, block up the float located inside the reservoir, activate the dump switch to the “ON” position and turn the power switch to “ON”. Allow the evaporator to drain. Turn the power switch to the “OFF” position.

2. Remove the ice chute by removing the hold-down nuts at the base and the self-clamping bolt at the top. Lift the chute clear of the evaporator assembly.

3. Return the float to it’s normal position. As the float chamber refills with water and fills the evaporator, add 3 oz. of Calgon Nickel-Safe ice machine cleaner to the float chamber. (Gravity will feed the cleaner to the evaporator.)

NOTE: <u>Do not</u> remove the auger, extruder head, or other parts from the evaporator assembly.

4. Allow the cleaning solution to stand in the evaporator for 20 - 30 minutes. Block up the float and drain the evaporator as in step 1.

5. Rinse/flush by carefully filling with warm water (100°F) and drain by following step 1 again. Repeat at least 3 times. During the final rinse/flush cycle, add 1 tablespoon of regular Baking Soda and allow it to stand for 10 - 15 minutes.

6. Drain the evaporator and rinse/flush one more time.

7. Install the ice chute and panels. (RTV must be used around the base of the chute.)

CAUTION: Should sanitizing be required, <u>DO NOT</u> use a mixture of household bleach and water Chlorine will attack stainless steel. Use only a commercial ice machine sanitizer such as Calgon Sanitizer for ice machines, following the directions on the container.

NOTE: When cleaning and/or sanitizing is complete return the machine back to an ice making cycle. Discard the first 30 minutes of ice production. <u>DO NOT</u> allow any ice that has been in contact with sanitizer to <u>ever</u> be used.

WATER TREATMENT

During the freezing process, as water passes over the evaporator, the impurities in the water have a tendency to be rejected and the plate will freeze only the pure water.

However, the more dissolved solids in the water, the more troublesome the freezing operation will be. Bicarbonates in the water are the most troublesome of the impurities. These impurities will cause scaling on the evaporator, clogging of the float valve mechanism and other parts in the water system. If the concentration of impurities is high, mushy ice may be the result.

Parts of the Flaker, that are in contact with the water or ice, may corrode if the water is high in acidity. In some areas, water may have to be treated in order to overcome some of the problems that arise because of the mineral content.

IMI Cornelius has water filter/treatment systems available to control impurities found in most water supplies. Contact your local dealer for more information.

WINTER STORAGE

If the unit is to be stored in an area where the temperature will drop below freezing, it is most important that all water lines be drained to prevent them from freezing and possible rupture.

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

WATER COOLED CONDENSER – To remove water from condenser unhook water supply and attach compressed air hose. Start machine. As head pressure reaches the appropriate level opening the water regulating valve, the compressed air will force the water out. Do not let the machine operate longer than necessary.

CLEANING THE CONDENSER (AIR COOLED)

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

With a vacuum cleaner, remove all accumulated dust and lint that has adhered to the finned condenser at the rear of the unit. The use of a stiff bristle brush may be helpful.

CAUTION: CONDENSER COOLING FINS ARE SHARP. USE CARE WHEN CLEANING.

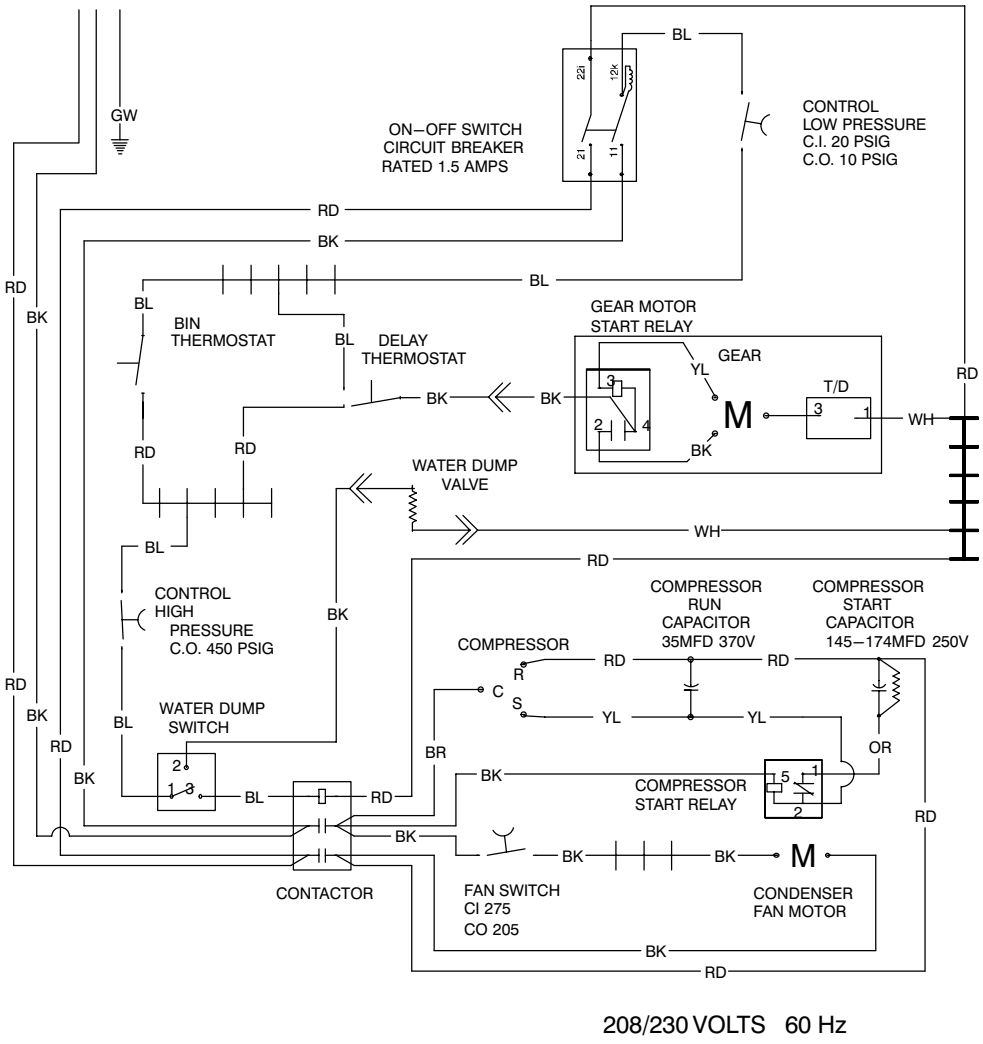


FIGURE 5. WIRING DIAGRAM IAF1000

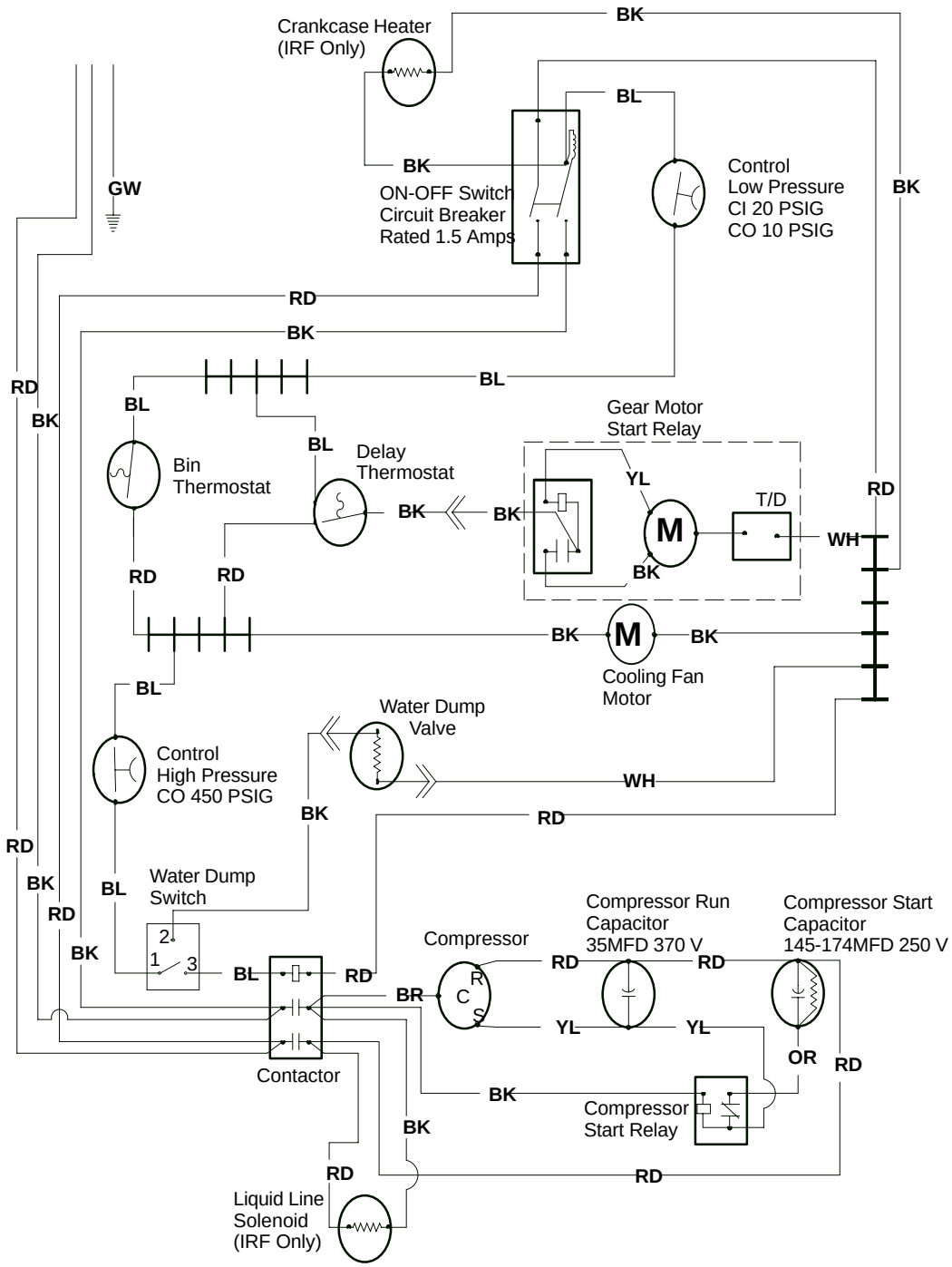


FIGURE 6. WIRING DIAGRAM IWF1000 AND IRF1000

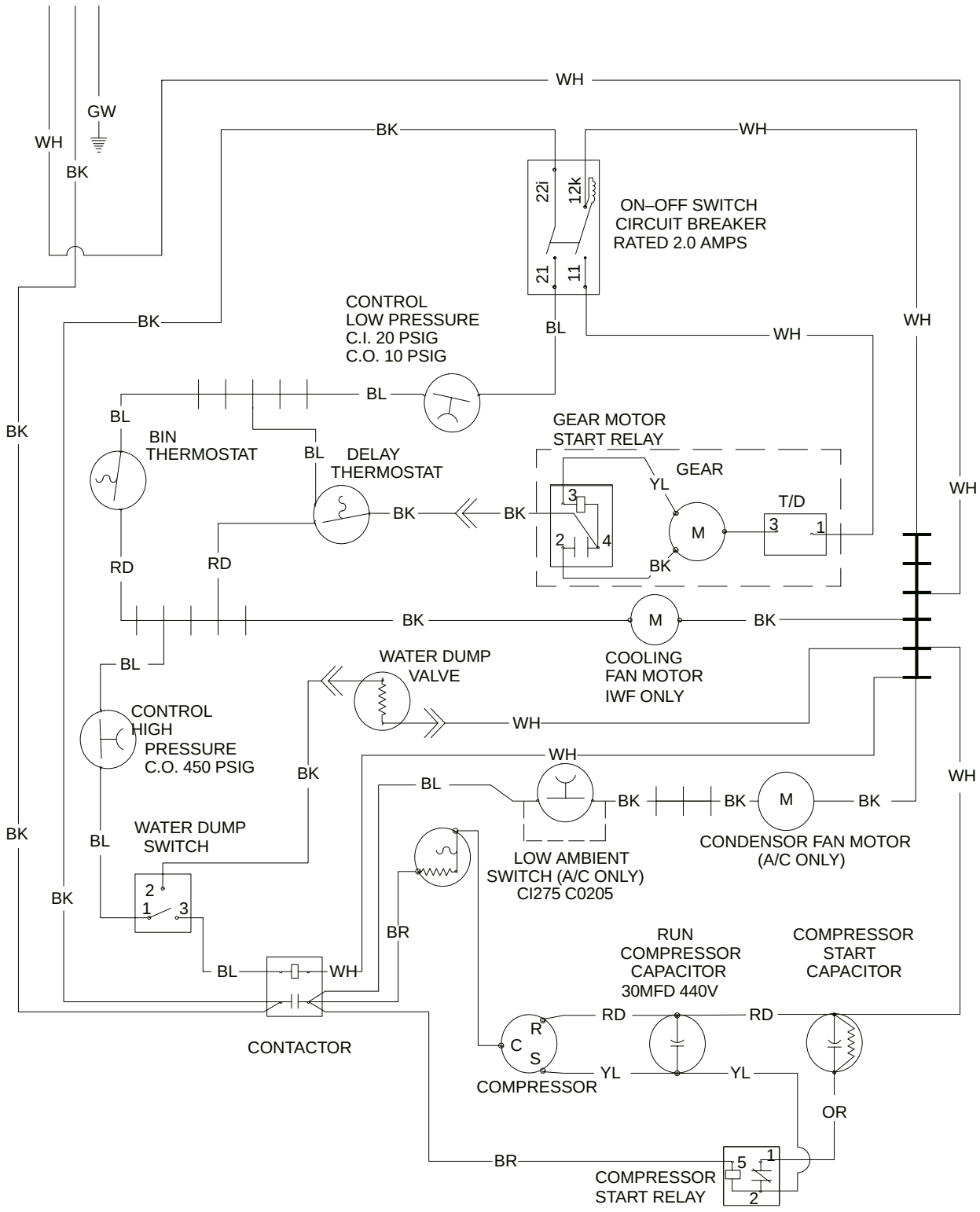
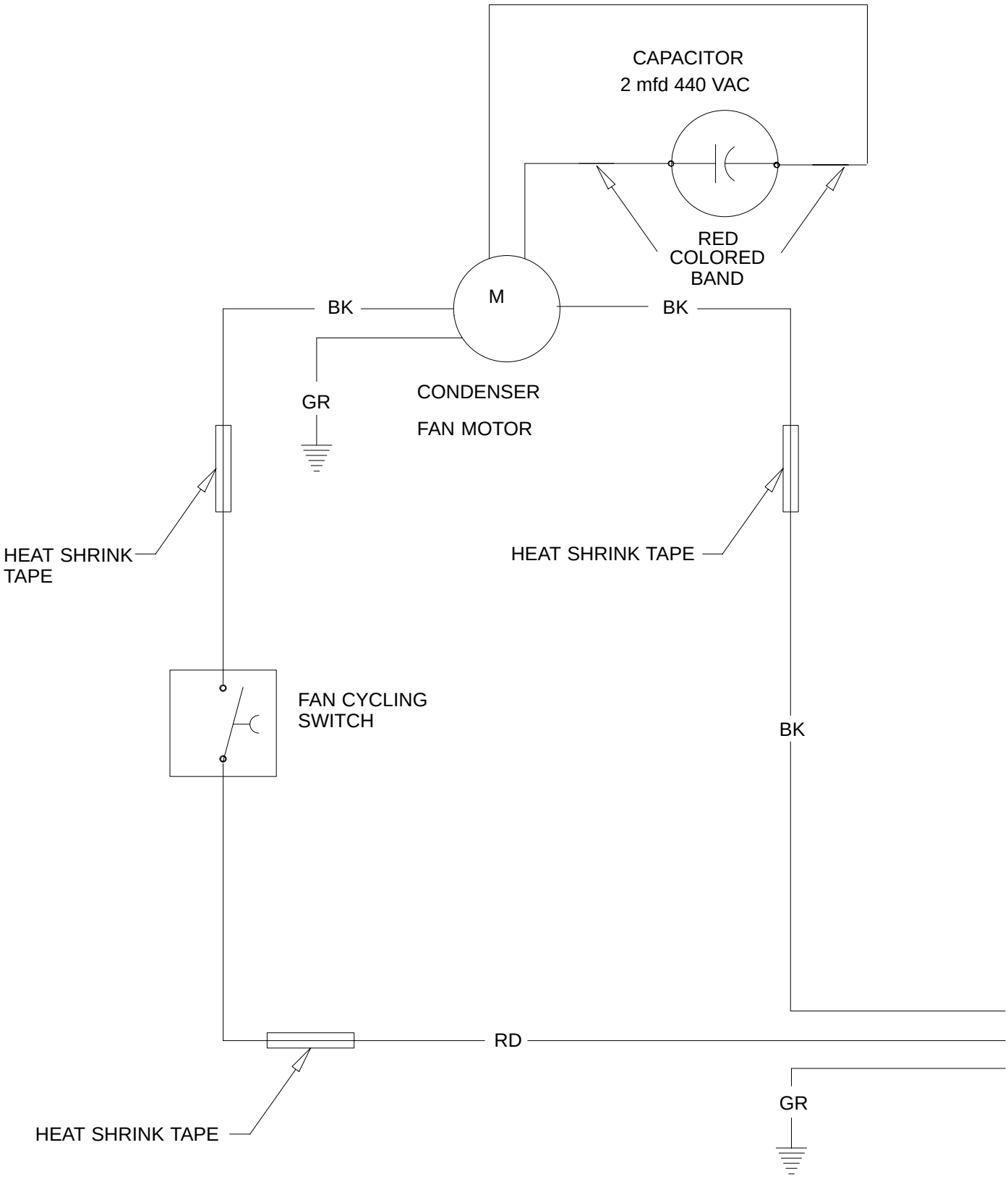


FIGURE 7. WIRING DIAGRAM IAF650 AND IWF650

“I” Series “Remote” Ice Machine

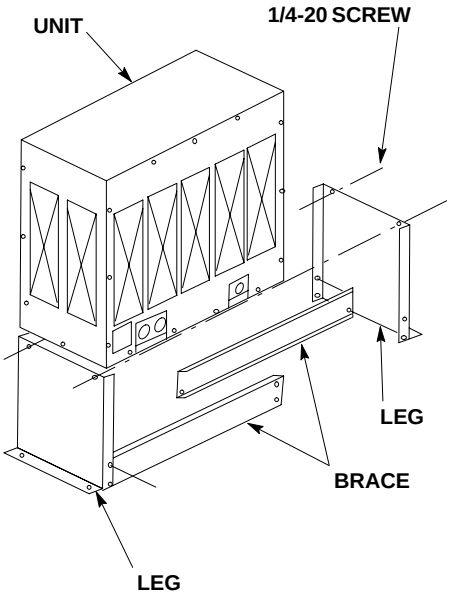
Remote Condenser Specifications

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

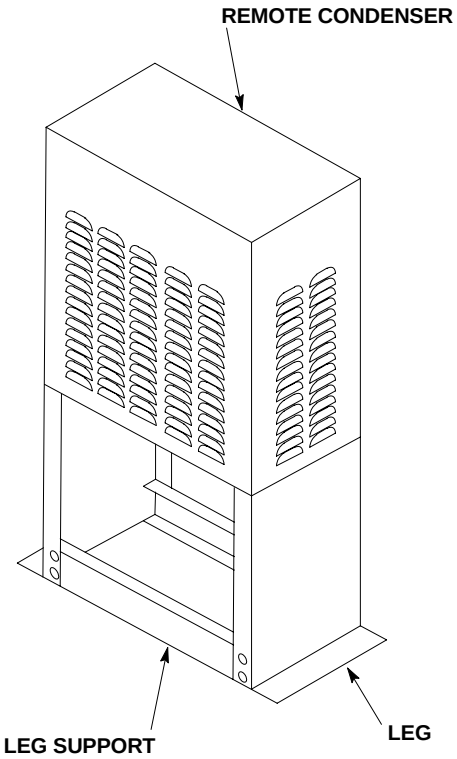


CR800, CR1200, & CR1400 REMOTE CONDENSERS

208/230 VOLTS 60 HZ

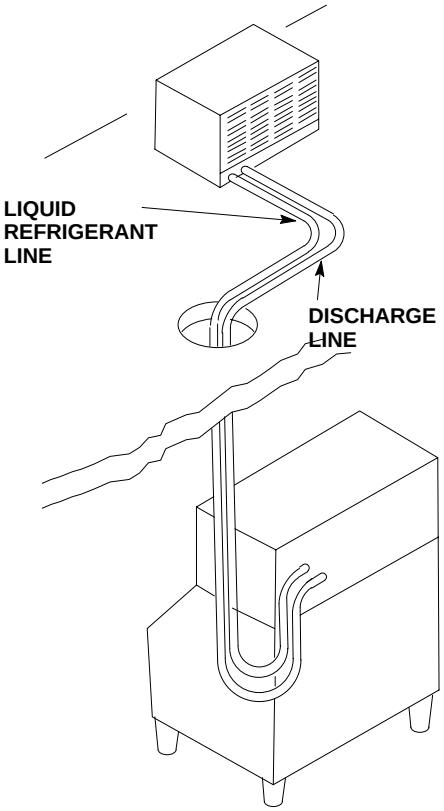


1. Follow the standard installation instructions supplied with flaker. Do not hook flaker into the power source until the remote condenser and line set installation is complete.
2. Assembly of remote condenser (see drawing):
   a. Assemble legs to base panel. Install leg supports on legs.
   b. Locate 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 flaker. 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 flaker install and refrigerant line connections are complete!**
   a. Never wire condenser into flaker 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 IMI Cornelius remote flaker with other than an IMI Cornelius remote condenser and line set may be reason to void the warranty.



CORRECT

4. Each condenser and flaker 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 flaker and condenser.
6. Keep line-set as short as possible. Place a 3-foot service loop behind flaker to allow for rear service should it ever be required.

Remote Condenser Location

NOTE: MAX. LINE-SET LENGTH FOR IMI CORNELIUS FLAKERS IS 55 FT. DO NOT CONFUSE LINE LENGTH WITH CALCULATED LINE DISTANCE.

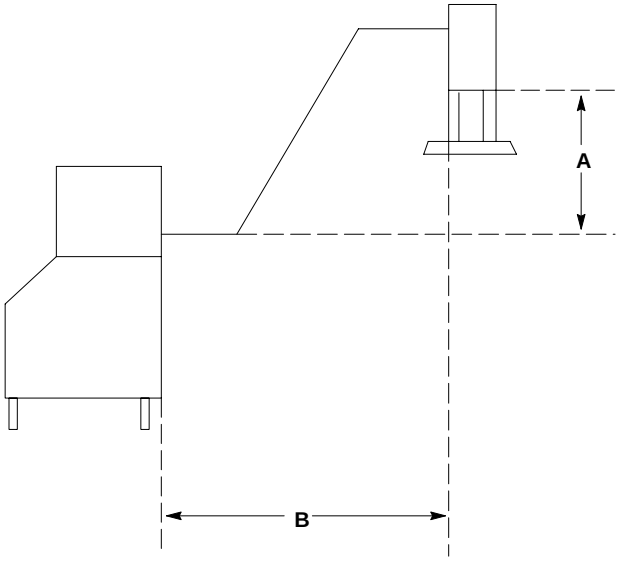
1. **Physical Line-Set Length: 55 Ft. Maximum [16.764 meters]**

   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.

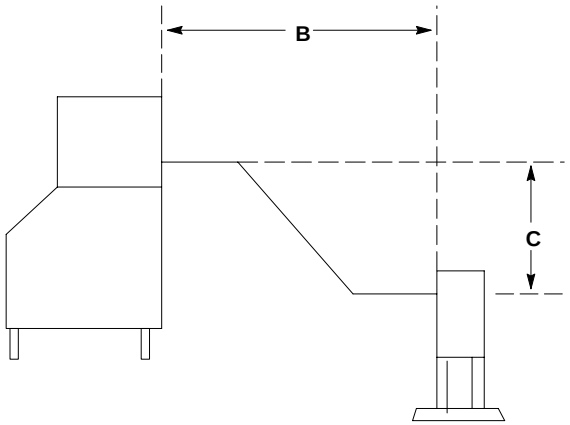
   Line-Set Rise: 35 Ft. Maximum [10.66 meters]
   Line-Set Drop: 15 Ft. Maximum [4.57 meters]

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:



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

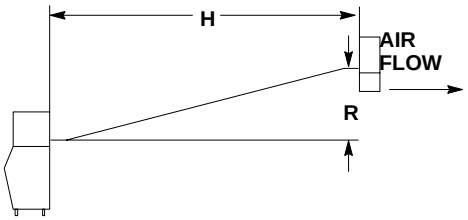
a. Measured rise x 1.7= Calculated Rise 35 ft. Max) [10.66 meters]

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]

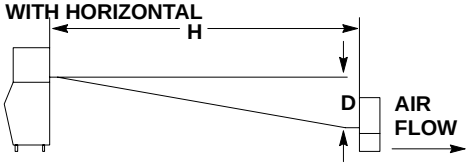
EXAMPLES:



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).

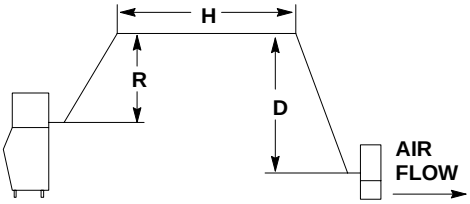
COMBINATION OF DROP(S) WITH HORIZONTAL



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.).

COMBINATION OF RISE AND DROP(S)WITH HORIZONTAL



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

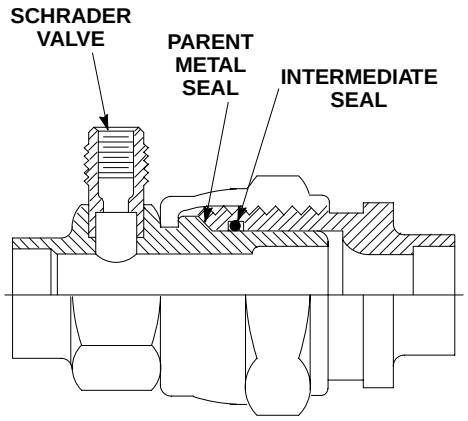
If a line-set rise is followed by a line-set drop, a second line-set rise cannot be made.
Or
If a line-set drop is followed by a line-set rise, a second line-set drop cannot be made.

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.

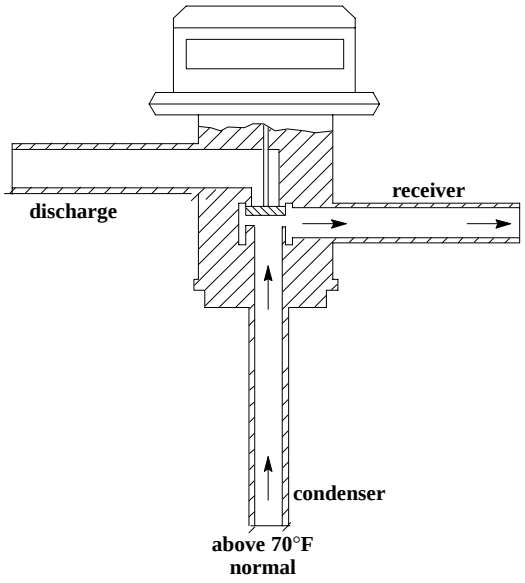
The quick connect fittings on the line-sets are equipped with Schrader Valves. Use these valves to recover any vapor charge from the line-set. When lengthening or shortening lines, apply good refrigeration practices and insulate new tubing. Do not change the tube sizes. Evacuate the lines and place approximately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

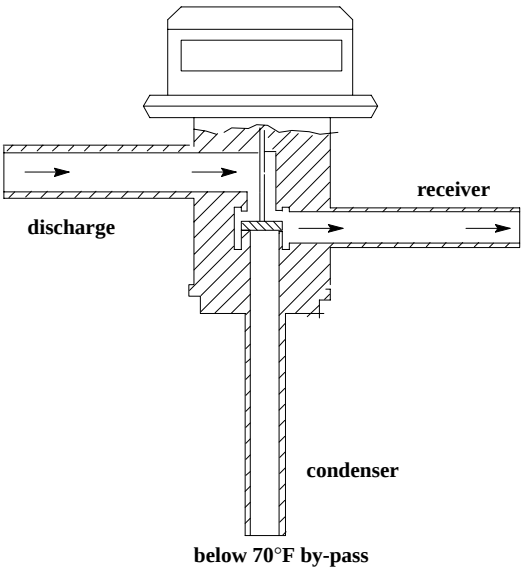


4. **Connection of Line-Set**
   a. Remove the plastic caps from the line-set, the condenser, and the ice machine.
   b. Apply refrigeration oil to the threads on the quick connect couplers before connecting them to the condenser.
   c. Carefully thread the female fitting onto the condenser or ice machine 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 flaker.
   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 flaker and condenser.
   d. Replace grill.
   e. Connect flaker to power source.
   f. Make sure electrical connections follow all local and national codes.
6. **Start Up:**
   a. Use standard procedures from flaker installation instructions.
   b. After the flaker 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 flaker 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 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

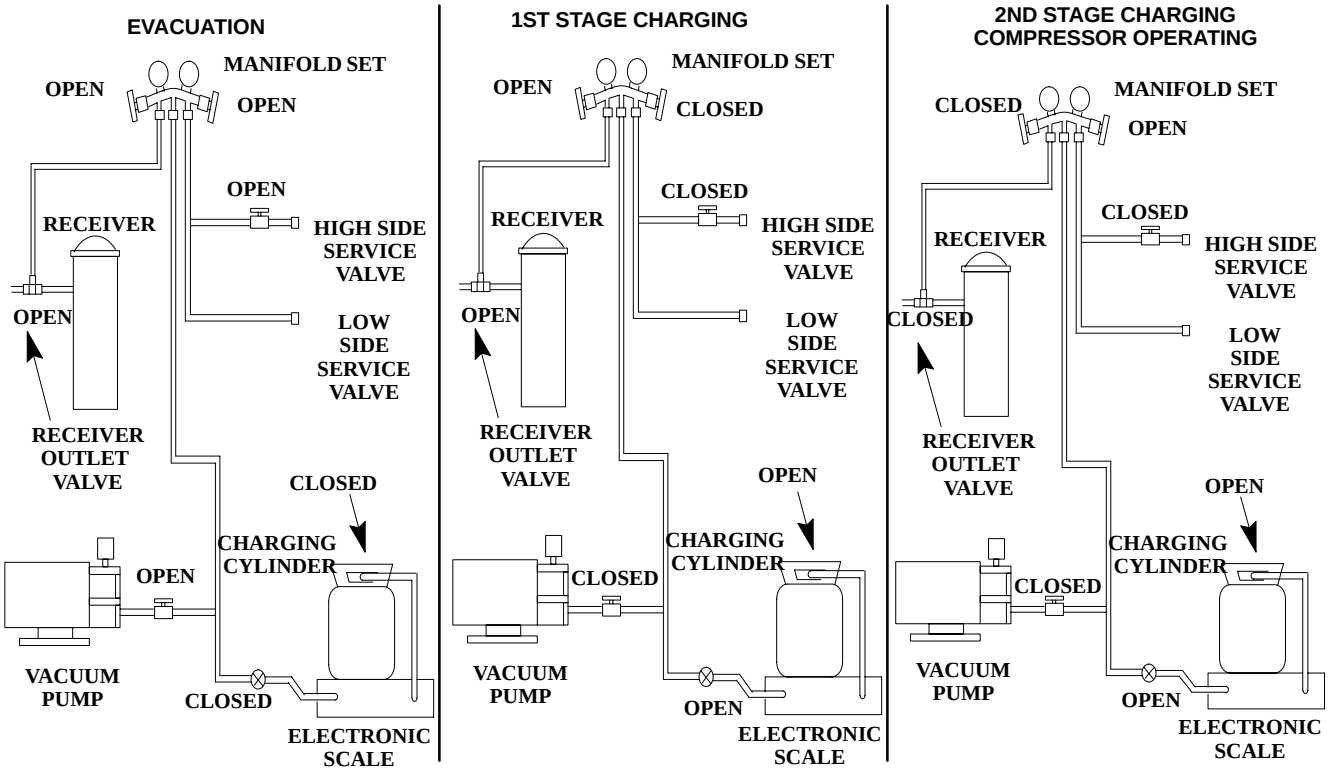
All field repairs to the sealed system must start with a total discharge of the system following the requirements of the Clean Air Act of July, 1992.

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

Evacuation:

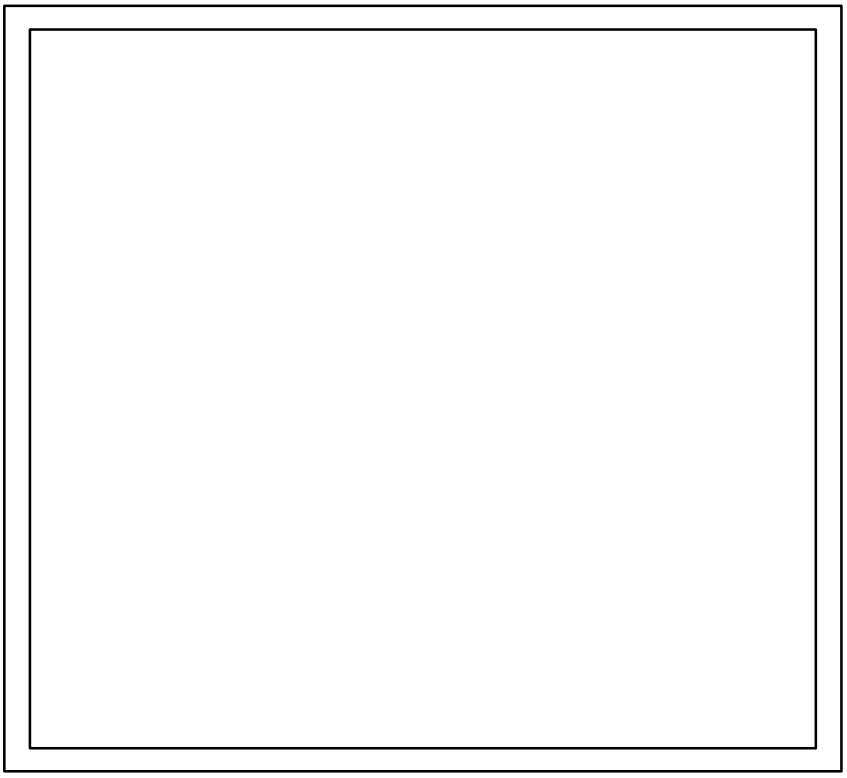
1. With flaker power supply turned “OFF” disconnect and insulate all 3 compressor leads at the compressor. Turn power supply on, place power switch in the “on” position. This will energize (open) the Liquid Line solenoid allowing evacuation of the Liquid Line between the solenoid and the expansion valve(s).
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 flaker power switch OFF. Reconnect compressor leads.


EVACUATION
MANIFOLD SET
OPEN
OPEN
OPEN
RECEIVER
HIGH SIDE SERVICE VALVE
OPEN
LOW SIDE SERVICE VALVE
RECEIVER OUTLET VALVE
CLOSED
CHARGING CYLINDER
OPEN
VACUUM PUMP
CLOSED
ELECTRONIC SCALE
1ST STAGE CHARGING
MANIFOLD SET
OPEN
CLOSED
CLOSED
RECEIVER
HIGH SIDE SERVICE VALVE
OPEN
LOW SIDE SERVICE VALVE
RECEIVER OUTLET VALVE
OPEN
CHARGING CYLINDER
CLOSED
VACUUM PUMP
OPEN
ELECTRONIC SCALE
2ND STAGE CHARGING COMPRESSOR OPERATING
CLOSED
MANIFOLD SET
OPEN
CLOSED
RECEIVER
HIGH SIDE SERVICE VALVE
CLOSED
LOW SIDE SERVICE VALVE
RECEIVER OUTLET VALVE
OPEN
CHARGING CYLINDER
CLOSED
VACUUM PUMP
OPEN
ELECTRONIC SCALE

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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