

ICE RINK DEFOGGER MODELS



FOR APPLICATIONS FROM +80°F TO +30°F (+27°C TO -1°C)

INSTALLATION, OPERATION AND MAINTENANCE SERIES "IRD R404A"

IRD-050-4E	IRD-050-5E	IRD-050-7E	IRD-050-8E
	IRD-075-5E	IRD-075-7E	IRD-075-8E
	IRD-100-5E	IRD-100-7E	IRD-100-8E
(208-240/1/60)	(208-230/3/60)	(460/3/60)	(575/3/60)

GENERAL

Thermoplus Air packaged dehumidifiers are designed for installation on a platform well above the ice surface - (**Fig. 1** recommended). A large size platform must be provided for ease of installation and **SERVICE**. The units must be suspended **at least 15 feet (4.6 m)** above the ice surface. For lower installation, the discharge louvers must be adjusted so that the air does not blow directly onto the ice surface.

INSPECTION

The **Thermoplus air** dehumidifier must be inspected for damage immediately upon delivery. Any damage must be reported immediately to the carrier. The bill of lading must be marked "Received Damaged" and a claim filed with the Carrier. After reception, missing parts or damage to the unit must also be reported and a claim must be filed with the Carrier.

Ensure that the electrical specifications on the nameplate **correspond to the power supply voltage requested on the purchase order** and with the power supply available on site.

INSTALLATION

These units must be installed on a service platform 15 to 25 feet (4.6 to 7.6 m) above the ice surface. Since these machines operate on the cooling and reheat principle, the discharge air could cause the ice to melt if it is too close to the ice surface. If the unit is to be installed less than 15 feet (4.6 m) from the ice surface, then the horizontal duct louvers (by others) must be adjusted to direct the airflow away from the ice surface.

It is mandatory that this unit have a 36 inch (0.9 m) discharge duct, complete with horizontal and vertical adjustable louvers or at least with horizontal adjustable louvers (supplied by others). See Fig. 2. The discharge duct and louvers must not have a static pressure drop greater than 0.2 inch (5 mm). Excessive pressure drop will reduce unit capacity and cause system unbalance.

Check blower rotation. On three phase units, if it is necessary to reverse the rotation, interchange any two supply leads.

The unit must be level for proper condensate drainage. A **"P"** trap must be installed on the drain pan outlet. Drain connection is 1-1/4" MPT. On installations where the unit is to operate at temperature below freezing, a drain line **heater must be wrapped around the condensate drain to prevent freeze up**. The drain pan itself is heated to prevent condensate freeze-up inside the unit.

Removal of the drain pan for cleaning requires access from side opposite to drain to disconnect the drain pan heater line.

ELECTRICAL CONNECTION

Site power supply must correspond with the unit serial plate data. All connections must be made in accordance with local and national codes. Power line supply must be of suitable size and adequately protected.

Power disconnect must be installed next to the unit.

MAINTENANCE

Units must be inspected at least twice per season.

CHECK LIST

- 1) Belt tension -
Check deflection at mid point between pulleys.
- 2) Coils -
Clean and free of dust or grease.
- 3) Oil on fittings -
Possible leak, contact refrigeration mechanic.
- 4) Drain pans -
To be free of obstructions (dirt, etc.).
- 5) Electrical connections -
All contacts must be tight to avoid overheating.

- 6) Air filters -
Must be replaced at least every two months.

NOTES:

1. Warranty will be void if units operate under low airflow conditions due to blocked filters.
2. Unit must not be operated without filters.

REFRIGERANT CHARGE

These units are not standard packaged air conditioners. They are specially engineered refrigeration products. **Only qualified service personnel should start and service these machines. They can operate as low as 70 psig (483 kPa) head pressure. The refrigerant charge of R404A is marked on the nameplate. Do not exceed the refrigerant charge marked thereon.**

DEFROST SYSTEM

Field adjustment is provided for a selective defrosting frequency at 30 - 45 - 90 minute intervals. Also the defrost temperature termination is adjustable **from 55°F to 70°F (13°C to 21°C)**. In effect, the defrost system is engineered to work on a **time initiated - temperature terminated principle** with a frequency and termination adjustment range, if required.

Initiation of the defrost cycle can only occur if the suction temperature is below the fixed initiation temperature of 26°F (-3°C) for more than the defrost timer setting (30-45-90 min.). If the suction temperature is above 26°F (-3°C) during the first sixty seconds then the cycle is skipped. If the suction temperature is 26°F (-3°C) or lower at any time during the first sixty seconds, then the defrost cycle will occur, timer will start counting at the end of the defrost timer setting (30-45-90 min.) the defrost cycle will be initiate.

The defrost will end when the suction temperature reaches 55°F (13°C) or higher depending on the field adjustments made afterwards. If the suction cannot reach the desired preset temperature due to excess ice or malfunction, a time safe termination will occur **after 10 minutes**.

POSSIBLE MALFUNCTION

- 1) Low refrigerant charge
- 2) High refrigerant charge
- 3) Defective hot gas valve
- 4) Defective de-ice control

Refer to piping diagram for gas flow. (Fig. 5)

The installation of one or even two IRD Series units

may not be sufficient to eliminate stagnation, especially when the ceiling structure creates obstacles for good air distribution. A minimum of two IRD Series units **MUST** be used in ice rink applications.

IMPORTANT!!!

It is of utmost importance that NO air is blown directly onto the ice surface since this causes the ice to melt. The units must be equipped with a 36 inch (0.9 m) discharge duct extension complete with adjustable horizontal and vertical louvers in the discharge grill.

Units must be installed as shown in the drawing on the following page paying particular attention to the mounting height above the ice surface, and allowing a minimum of four feet between the inlet and any obstacles such as an end wall. This configuration is necessary in order to "scoop" out the moist air from the ice surface, without causing the ice to melt.

IMPORTANT!!!

Provide service access to the unit for maintenance, inspection and service of components. Minimum access area on all sides is 24 inches (0.6 m). A step ladder is not considered a safe means of access. Provide clearances according to the local building and electrical codes.

Step 1**Pre-installation Inspection**

Remove packing material and inspect for internal and external shipping damage. In case of transport damage, notify the carrier as per instructions posted on the shipping crate.

Step 2**Location of the IRD Series Units**

(See also drawing fig 1 and 3)

Provide service access to the unit for maintenance, inspection and service of components. Filters must be changed, the belt tension adjusted and the drain pan may require periodic cleaning. A step ladder is not considered a means of service access. Minimum service access clearance on all sides is two feet.

DO NOT install the unit over the ice surface, as servicing will be dangerous.

Units must be level to ensure proper draining of the condensate.

Allow a minimum of four feet clearance from any obstruction on the return side of the unit.

Check that the unit will not block the view if the ice rink has a spectator area. The unit can be moved as long as the discharge location is not affected.

Use anti-vibration pads such as machinery cork or rubber pads to isolate the unit from the supportive structure. The units are normally installed on platforms (see drawing). DO NOT mount units on plywood sheets or similar materials, which are prone to cause resonance.

Step 3 Condensate Drain

The unit has a 1-1/4" MPT drain connection. The drain line and external P-TRAP must be heated if the machine is to operate at temperature below freezing.

Step 4 Electrical Hook-up

Provide and install a main disconnect switch within the vicinity of the unit. Refer to the unit nameplate for proper voltage, ampacity and maximum main fuse protection. Wires and main disconnect switch should be provided in accordance with local electrical codes. Use copper conductors only. Power leads are brought into the unit through the top or bottom of the main control panel. Supply voltage must not vary more than 10% of the nameplate voltage. Unbalanced phase voltage must not exceed 2% between phases. Ensure that the unit is connected to the ground lug terminal, located in the control panel.

The unit is controlled by a humidistat (factory installed). Control voltage is 240 volts. If a remote on/off switch (supplied by others) is installed, mount the on/off switch in a convenient location using wiring according to the local electrical codes. The switch provided should be a double pole switch, so that two units can use the same switch.

Step 5 Discharge Duct Extension

Provide a 36 inch (0.9 m) discharge duct extension complete with horizontally and vertically adjustable louvers.

IMPORTANT!!!
Before starting up the IRD, enclosure temperature must be between 30°F and 80°F (-1°C and 27°C).

Step 6

Leak test the entire unit. Abnormal transportation and handling shocks may have caused a refrigerant leak. In case of solder repair use an inert gas to prevent scale formation in tubing.

Step 7

Wire connections may become dislodged or loosened during shipment. Check screws for tightness.

Step 8

Check drain connection. Test condensate drain by pouring water into the drip pan. This will also fill P-trap. The access panel must be removed for this procedure.

Step 9

Check to see that clean filters are installed. If filters are dirty, check coils. Dirty coils must be cleaned and filters replaced.

Step 10

Move on/off switch on the unit to the OFF position.

Step 11

Check line voltage to match with unit nameplate. Install line voltage disconnect switch (see field wiring diagram). Connect power supply. Check ground connections.

Step 12

Wire the remote manual on/off switch to the terminals on the panel and move switch to OFF position.

Step 13

Turn the power on. For compressors without service valves the crankcase heater must be energised at least one hour before start-up. The crankcase heaters are energised as soon as power is supplied to the unit (if so equipped).

Step 14

Move unit on/off switch to the ON position. Move the remote on/off switch to the ON position.

Step 15

After the initial time delay, the compressor and blower will start. Control light indicates compressor in operation. If the compressor does not start (locked rotor) or knocks during start-up, stop the compressor and leave the crankcase heater on for at least 12 hours before attempting start-up again.

Step 16

Check that the blower has correct rotation on three phase units. If not, then switch two of the three legs and try again.

Step 17

Check blower motor amperage. Check compressor amperage. Reading must not exceed that indicated on nameplate.

Step 18

Check compressor discharge line temperature. If above 200°F (93°C) and if the sight glass is full, adjust expansion valve to maintain 50-70°F (10-21°C) above condensing temperature. If the sight glass is empty or bubbling, then refrigerant has been lost. Look for the leak, repair and recharge system until sight glass is full. Do not overcharge.

Step 19

Adjust louvers in discharge duct so that air is directly along the boards. **DO NOT DIRECT OVER THE ICE SURFACE!**

Step 20

Fill in the start-up report and warranty registration form, and forward a copy to sales agent, or

Thermoplus air factory.

Warranty is not valid until start-up report received at the factory.

Leave the owner's manual complete with start-up report with the IRD unit.

The IRD Series is remotely started by the remote on/off switch. Turn on the IRD units approximately one to two hours before the ice rink is to be used, and leave the units running continuously during the

active period or whenever high humidity is a problem.

When the return air temperature is low, the IRD Series actually freezes moisture out of the air. The coils have been designed for frost build-up. An automatic built-in defrost cycle engages periodically to eliminate the ice build-up. When a defrost cycle is initiated, the blower is shut off. The compressor continues to run during the defrost cycle. Once the defrost cycle is completed, the compressor stays in operation and the blower restarts.

The IRD Series units are protected by an internal temperature limiting thermostat which is factory set at 30°F (-1°C). The IRD Series technology is so far advanced that it requires virtually no maintenance.

Air Filters

The air filters should be checked once per month. Dirty filters should be changed immediately and replaced with identical filters, which should be available locally. Clogged and dirty filters will seriously hamper the performance of the equipment.

Blower Belt

The following procedure should only be performed by a factory trained service technician.

Check the belt for signs of wear and replace if severely worn or cracked.

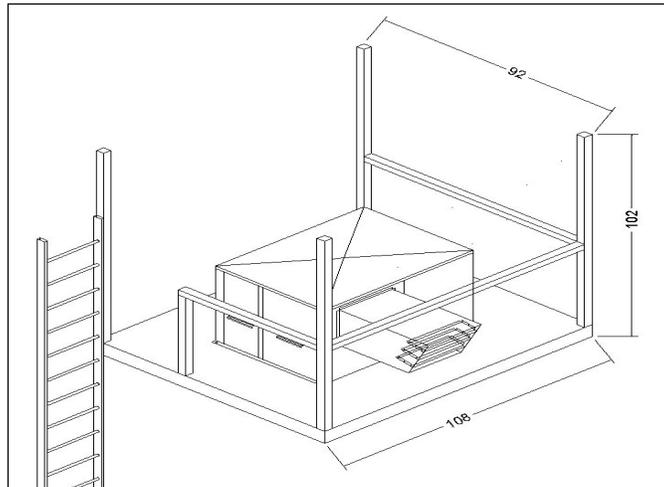
IMPORTANT!

The IRD Series units must be fine-tuned on start-up for maximum energy efficiency and moisture removal capacity. Adjust the expansion valve for proper operation, a 8 to 12°F (-13 to -11°C) superheat is recommended for optimal performance.

If You Have a Problem...	
Problem	Suggested Causes and Solutions
Dehumidifying coil iced-up	<p>With return air temperature below 64°F (18°C), this is normal. Unit should defrost automatically about every 30 - 45 - 90 minutes, as adjusted.</p> <p>Check operation of defrost timer and hot gas valve solenoid, replace if defective.</p> <p>Obstruction at air inlet. Allow 4 feet (1.2 m) minimum clearance between air inlet and nearest obstruction.</p> <p>Poor return air ductwork (if so equipped) creates stratification at air inlet.</p> <p>Ducts not recommend.</p> <p>Loose blower belt, adjust.</p> <p>Low refrigerant charge, add refrigerant.</p> <p>Dirty filters, replace.</p> <p>Wrong filter with too much air resistance, replace with disposable type.</p> <p>Return air too dry, set point to low (50% recommended).</p>
High Humidity	<p>Obstruction at air inlet. Allow 4 feet (1.2 m) minimum clearance between air inlet and nearest obstruction.</p> <p>Poor return air ductwork (if so equipped) creates stratification at air inlet.</p> <p>Follow duct design standards.</p> <p>Unit undersized. Recheck load calculations.</p>
High head pressure	<p>Do not operate unit above 80°F (27°C).</p> <p>Low airflow, adjust blower belts.</p> <p>Restricted filter dryers, replace.</p> <p>Manual shut off valve(s) not fully open, if so equipped. Open valves fully.</p> <p>Non-condensable gases in system.</p>
Low head pressure	<p>Do not operate unit below 30°F (-1°C) due to low limit thermostat adjustment.</p> <p>Low refrigerant charge, add refrigerant.</p> <p>Return air too dry, set point to low (50% recommended).</p>
Unit will not start	<p>This is normal if space above 80°F (27°C) or below 30°F (-1°C).</p> <p>Loose control or power wiring, tighten and check continuity.</p> <p>Anti-short cycle timer prevents start-up. 5 minutes maximum.</p> <p>Open thermal compressor protection, allow 1 hour for compressor to cool.</p> <p>Defective 240V control voltage transformer, replace.</p> <p>Defective fuse, replace.</p> <p>Check operation of defrost timer, replace if defective.</p> <p>Compressor "on" light not illuminated, unit off or no power supplied.</p> <p>Humidity is lower then set point (50% recommended).</p>
Unit noisy	<p>Verify crankcase heater.</p> <p>Blower ball bearing failure, replace.</p> <p>Loose belt or pulley, adjust.</p>

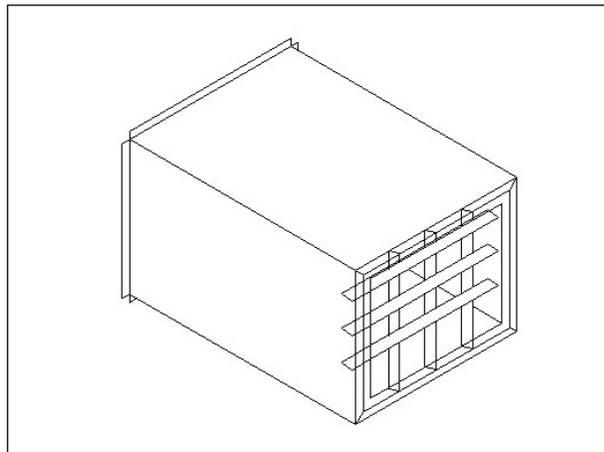
PROPOSED PLATFORM

Fig. 1



PROPOSED DIFFUSER

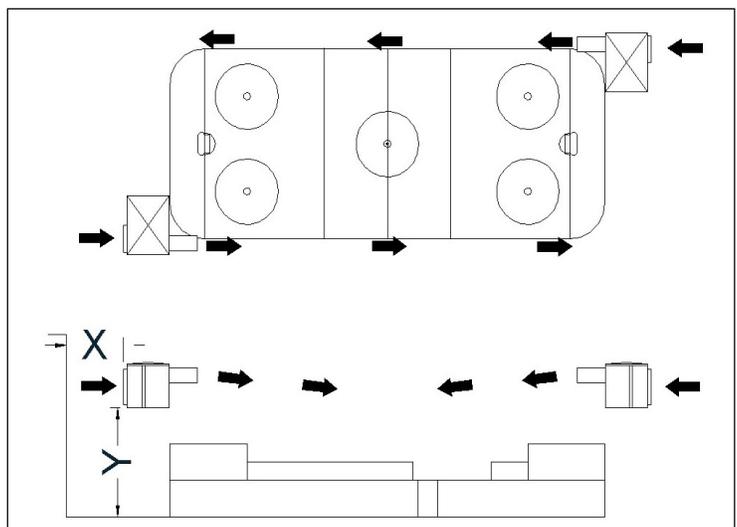
Fig. 2



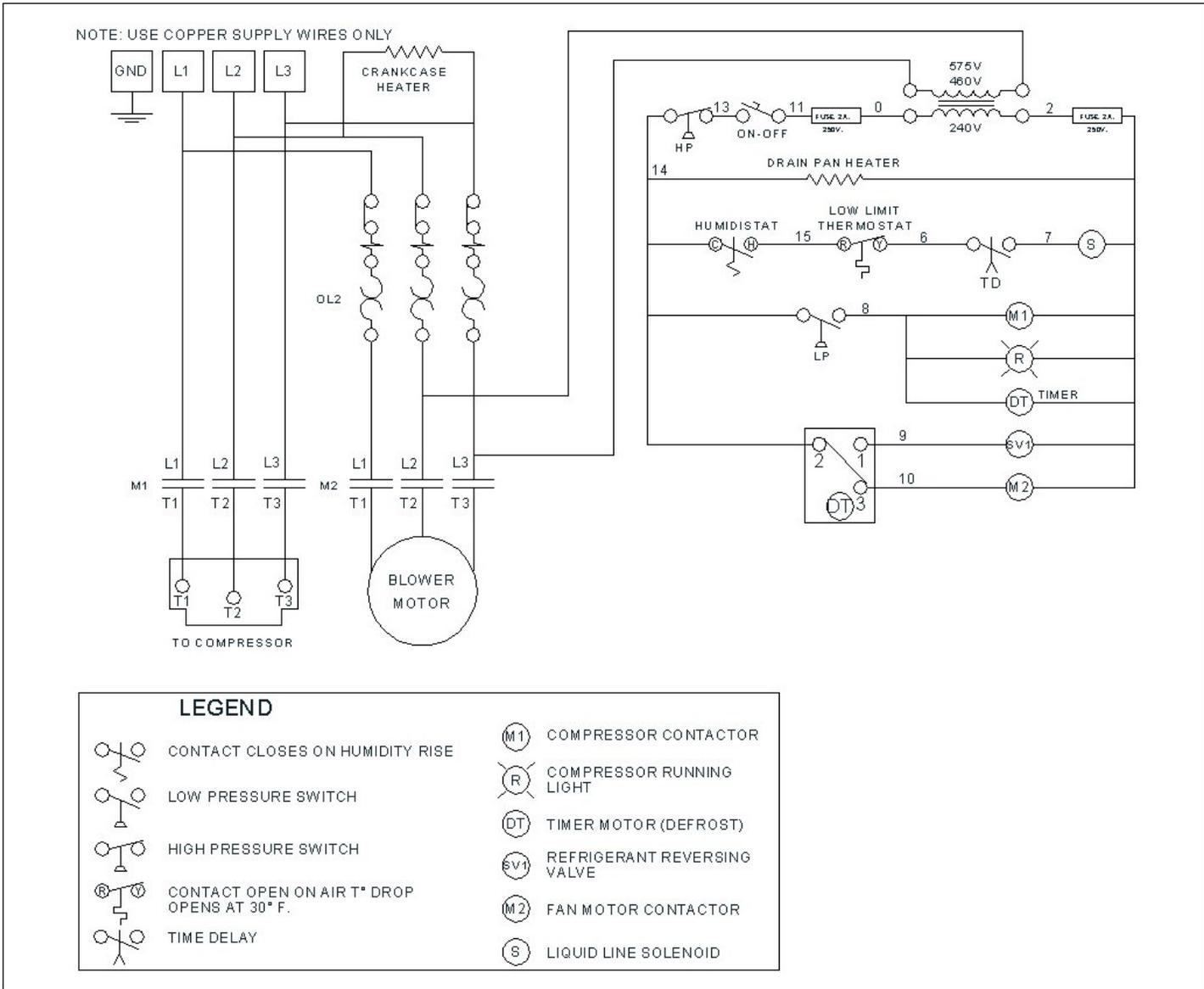
**LOCATING THE UNITS
IN AN ICE-RINK**

Fig. 3

1. Direct the airflow along the boards; do not direct air over the ice surface.
2. Discharge duct equipped with horizontally and vertically adjustable louvers supplied by others.
3. Minimum horizontal distance from nearest obstruction is 4 feet (1.2 m). (X)
4. Unit should be 15 to 25 feet above ice surface (4.6 to 7.6 m). (Y)

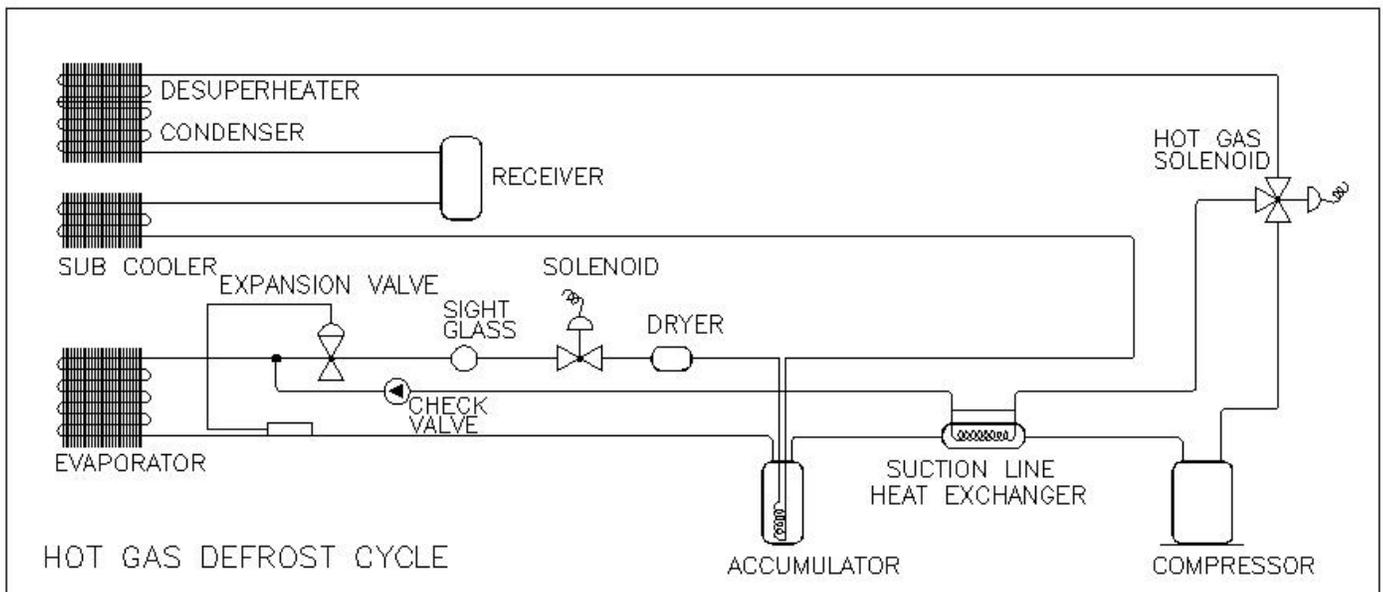
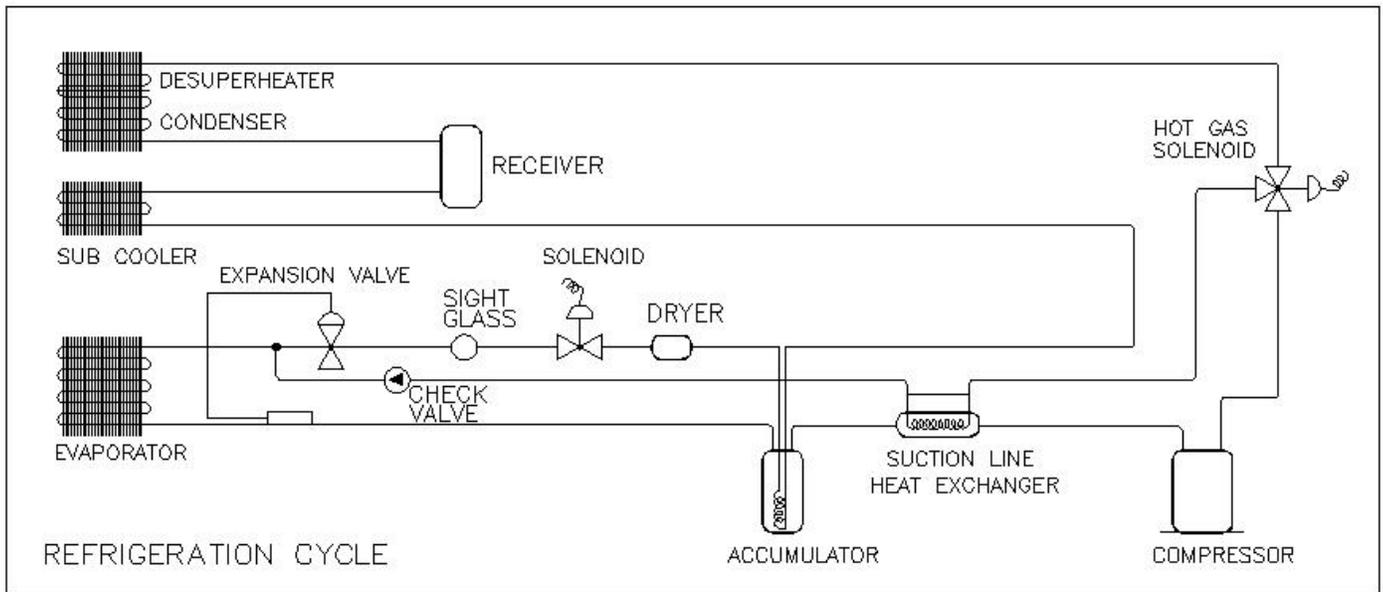


ELECTRICAL DIAGRAM
Fig.4



PIPING DIAGRAM

Fig.5



Start-up Report & Warranty Registration

Warranty void unless completed and a copy returned to Thermoplus Air immediately after start-up!

Installation Name			
Installation Address			
Thermoplus Air Representative			
Model #		Serial #	
Compressor Serial #		Belt Size	

Electrical power	L1-L2	L2-L3	L1-L3	Nameplate
Blower amperage				
Blower voltage				
Compressor amperage				
Compressor voltage				

Adequate service access provided?	<input type="checkbox"/>	Main blower connected?	<input type="checkbox"/>	Discharge duct with louvers installed?	<input type="checkbox"/>
Air supply outlets as per installation drawings?	<input type="checkbox"/>	Wire connections checked for tightness?	<input type="checkbox"/>	Air flow and blower speed adjusted?	<input type="checkbox"/>
Units level and vibration isolated?	<input type="checkbox"/>	Drain connection tested and P-trap filled?	<input type="checkbox"/>	Air entering temperature	____°F
Minimum 4 feet Clearance on return side of units?	<input type="checkbox"/>	Compressor service valves opened?	<input type="checkbox"/>	Air leaving temperature	____°F
Condensate drain connected?	<input type="checkbox"/>	Clean air filters installed?	<input type="checkbox"/>	Air leaving evaporator temperature	____°F
Main disconnect switch installed?	<input type="checkbox"/>	Coils are clean?	<input type="checkbox"/>	Refrigerant charge OK?	<input type="checkbox"/>
Remote on/off switch (double pole) installed?	<input type="checkbox"/>	On/Off switch on unit in "on" position?	<input type="checkbox"/>	Compressor discharge temperature	____°F
Enclosure temperature between 35°F and 80°F?	<input type="checkbox"/>	Crankcase heater working?	<input type="checkbox"/>	Supply air directed properly	<input type="checkbox"/>

Comments:

Form completed by		Signature	
Company Name			
Date		Telephone	()