Cruise Line Upright

R2D-CL-SL

Technical Manual

Installation, Operation, and Maintenance Instructions

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Chapter 1—General Information

1.1 Introduction

This technical manual provides information for the installation, operation, maintenance, and inspection of this unit manufactured by Cospolich, Inc., Norco, Louisiana. A complete parts breakdown is also provided in Appendix A on page 39.

1.2 Scope of the Manual

This manual provides sufficient information for maintenance of the equipment.

1.3 Equipment Description

The unit consists of the following parts:

A. Storage compartment – The insulated food storage compartment is clear storage area. Included in this area are the adjustable shelves, an interior light (for refrigerators), and the cooling coil.

B. Doors – Access to the storage compartment is through a hinge-mounted, insulated door(s). The door is fully "gasketed" to provide a tight seal.

C. Condensing Unit Compartment – This area contains the condensing unit(s) along with the necessary controls and other components.

D. Evaporator Coil – The evaporator coil is located in the storage compartment and is responsible for distributing the cold air associated with the refrigeration system.

E. Cabinet – The cabinet is the enclosure in which all of the above mentioned items are housed.

1.4 Equipment Supplied

The unit is shipped from the factory fully assembled except for the adjustable shelving that will require positioning on the pilaster standards as needed. The complete assembly is palletized and crated to minimize the possibility of damage in shipping and storage.

Table A—Leading Particulars

MANUFACTURER:	**Cospolich Inc.** **Norco, Louisiana 70079**
TYPE:	2-Door Cruiseline Upright Refrigerator
Model Number:	R2D-CL-SL
Refrigerant	R404A
PURPOSE:	Storage of Chilled Food Items
Power Supply:	208/230
Operating Currents:	8.8 AMPS
Drain Requirements:	NONE

Chapter 2—Operation

2.1 Introduction

This models is a heavy-duty pieces of food service equipment designed for continuous use. It incorporates automatic controls to regulate the cycling of the refrigeration system.

2.2 Table B—Controls and Indicators

Name	Type	Function
Suction Valve	Manual Plunger Valve	Isolates suction at the compressor
Discharge Valve	Manual Plunger Valve	Isolates discharge line at the receiver.
Power Control Switch (On/Off)	Contact Points	Terminates all of the electrical into and past the supply cord.
Light Switch [1]	Contact Points	Activates interior lighting with the opening of the cabinet door.
Thermostat	Contact Points	Cycles the refrigerator system. (automatic).
Solenoid Valve [1]	Automatic Plunger	Shuts off refrigerant flow.

[1] ***Refrigerators***

2.3 Start-Up Procedures

The refrigeration system is completely factory-assembled, pre-charged, and ready for operation. To energize the system it is only necessary to locate the power supply cord and connect it to a proper electrical supply source. Once the supply cord has been connected to a power source the unit can be started by flipping the power control switch to the "ON" position.

Table C—Start-Up Procedure

	Operation	Results
1.	Activate system by inserting electrical service cord into electrical supply source and flip power control switch.	Compressor should immediately come on line along with the condenser fan. Evaporator fans will not energize until the coil temperature is approximately 40°F. At initial start up, the fans may even cycle a few times until the coil temperature maintains 40°F or below.
2.	Locate liquid refrigerant indication glass, mounted on the receiver.	Once the system has been operating for 20 minutes, the glass should appear clear and full of liquid refrigerant.
3.	Wait 15 minutes.	The temperature in the storage area should being approaching set point of 38°F.
4.	Wait 3 hours.	Once the operating temperature has been reached, stocking of the containment area can begin.

Table D—Hot Gas Defrost Procedures

Operation	Results
Hot Gas Solenoid	Hot gas defrosts is controlled by time and temperature. The sensor attached to the suction line inside the evaporator sense temperature. The sensor controls the evaporator fans and defrost cycle. When evaporator temperature is above 50°F the unit will not initiate defrost cycle. Also if the temperature of the evaporator coil rises above 50°F while a defrost cycle is in progress, defrost will be terminated and the unit will be returned to refrigeration mode. Evaporator fans will not energize until evaporator coil is back down to 40°F.

2.4 Shut Down Procedures

To shut down, disconnect the electrical supply cord and open the door(s) allowing the interior cabinet temperature to equalize with the room temperature. A mild detergent diluted in warm water should be used to wash down the interior and exterior surfaces of the cabinet.

WARNING: PRIOR TO CLEANING ANY OF THE UNIT, THE SYSTEM SHOULD BE DEACTIVATED BY DISCONNECTING THE POWER SUPPLY.

Table E—Shut Down Procedures

Operation	Results
De-energize the system by flipping the power control switch to the "OFF" position and disconnecting the electrical supply cord.	Once the system is de-energized, the condenser fan and the evaporator fan will cease to operate.

2.5 Preparation for an Extended Period of Inactivity

This unit is designed for continued use at automatically cycled intervals. However, in the event of an extended shut down, both the mechanical refrigeration system and the food storage compartment system must be serviced.

Table F—Extended Period Shut-Down Procedures

	Operation	Results
1.	Fully close discharge valve at the receiver	Compressor will pump liquid refrigerant from system to receiver
2.	Fully close suction valve at the compressor	This will isolate the refrigerant between the two valves
3.	Disconnect power supply.	De-energize the system.
4.	Clean and wipe dry the food storage compartment.	This will reduce the odor buildup during shut down.

Chapter 3—Functional Description

3.1 System Description

The unit is a remote, automatically controlled continuous duty perishable food storage system. It is designed with the intent and purpose of storing food items.

The operating temperature is automatically monitored by controls that are factory set to maintain a predetermined adequate condition.

The equipment is installed in two basic compartment assemblies. They are:

1. Condensing Uit Compartment– This area contains the condensing unit Along with the necessary controls.

2. Storage Compartment – This insulated food storage area is clear storage area. Included in this compartment is the adjustable shelving.

3.2 System Operation

The design of the refrigerated cabinet focuses primarily on the safe storage of food products requiring refrigeration. In engineering, considerable attention was placed on its functional and its serviceable capabilities.

The system is dependent a close loop system. Barring a leak in the system, the Addition of refrigerant is not required. However, a periodic check of its level is recommended to insure that the system operates at the optimum level at which it was designed.

Special care in the initial loading of the storage compartment should be taken. It is suggested that the loading be scheduled in three equal portions allowing three hours between each loading.

The condensing unit is found within the regular equipment compartment. Also, In this compartment is the electrical control panel that contains the power switch and a terminal box. On all models that feature forced air evaporators, a heated condensation evaporator pan or a heated condensing unit base is provided. The evaporator pan is also located in the equipment compartment. On remote applications, the evaporator pan is optional.

Special care in the initial loading of the storage compartment should be taken. It is suggested that the loading be scheduled in three equal portions allowing three hours between each loading.

The chilled food compartment is designed for the storage of perishable food items that require a temperature range of 37 to 40°F on refrigerators and –5 to 0°F on freezers. It is a general rule that adequate spacing is allowed between stored items to allow for proper air circulation.

Chapter 4—Scheduled Maintenance

4.1 Introduction

To insure the longest and most trouble free operation, a thorough periodic maintenance schedule is required. The maintenance system should be aimed at maximizing the efficient utilization of maintenance personnel, minimizing down time, and providing the orderly acquisition of spare parts support.

The Cospolich refrigeration cabinet will generally be in operation in a facility where scheduled maintenance is performed according to the Maintenance Index Plans. This chapter of the manual is intended as an alternate to any standard maintenance program that may exist. The preventive maintenance schedule is based upon similar maintenance requirements for commercial refrigeration equipment.

4.2 Preventive Maintenance Action Index

If there is not a maintenance index plan, we have formulated our schedule for periodic maintenance in Table G.

4.3 Preparation for Maintenance

Since many areas affected in the maintenance schedule are electrically supplied, it may be necessary to de-energize the system when making these inspections.

4.4 Maintenance

A. Weekly Maintenance

1. The unit should first be de-energized by switching the main power breaker to the “OFF” position. The switch is found on the control panel in the condensing unit compartment.

***Note**: It is necessary to first remove the front air grill. This is done by lifting it straight up then pulling the bottom out and down.

2. Using a vacuum or small hand broom, brush the condenser in a vertical motion to remove any dust or debris that may have accumulated.

B. Monthly Maintenance

1. Check the drain line at both the inlet and outlet ends to make certain that there are no obstructions (forced air evaporator models only). It is not recommended to use any chemicals in clearing a clogged drain. The preferred method of unstopping an obstructed drain is to use compressed air. Approximately 60 lbs. should be sufficient. Simply remove the drain line at the evaporator coil and attach an air-line to it.

2. With the unit in a cooling cycle, use a flashlight and locate the refrigerant sight glass. If the compressor has been running for three minutes there should be no visible bubbles.

3. If bubbles are present:

   a. Determine if there is a leak by using an electronic leak detector rated for the refrigerant listed on the condenser.
   b. Repair leak(s).

4. Using a mild non-abrasive detergent and soft cloth, wipe the interior lining beginning with the top and working down. Also, wipe the gasket and where it sits on the cabinet exterior.

5. Remove the front air grill and unbolt the condensing unit. Once unbolted, slide it out. The unit is capable of being completely removed due to the extra tubing coiled up behind the unit. With the unit de-energized, check the condenser fan motor and make certain that it is not loose. Inspect the fan for cracks and make sure that it is tight on the motor.

6. To inspect the evaporator motor, first turn the unit off. Next, remove the cover on the right side of the evaporator pan by lifting up and pulling out gently, thus exposing the components underneath. With the cover out of the cabinet, proceed to inspect the motor mounting bolts and the fan for cracks or excessive play.

7. Using a mild detergent and water, wipe the vinyl gasket. Make certain to also clean under the gasket to remove any mildew or residue.

8. Using a mild, non-abrasive detergent and warm water, wipe the cabinet exterior. When cleaning always follow the grain of the stainless steel to prevent scratching or marring of the finish surface.

C. Annual Maintenance

1. Visually, inspect the outer panel and components of the cabinet. Check screws and bolts to make certain they are tight. Check the bolts that secure the base frame to the deck to make certain the are tight.

2. Inspect electrical connections to make certain that there is a good contact and that wires are neither weakened or frayed.

3. Inspect the integrity of the cabinet.

NOTE: Grease and water may leak under faulty seals onto insulation and heating element causing a hazard.

D. Three Year Frequency

1. Replace the door gasket(s). To accomplish this, it is first necessary to remove all products from the refrigerated compartment to avoid spoilage. Take the door off of the cabinet and lay it on a flat surface gasket up. Lift the flange of the gasket and remove the fasteners that secure the gasket to the door. Remove the original gasket and replace with a new one by reversing the process.

2. Inspect all motors and shafts for both noise and wear. If they show age, replace them.

3. With the main power off, remove the condensing unit from its compartment and inspect all wiring. Also, remove the cover from the controls and check them to make certain that they are operational and do not show signs of wear.

Table G—Preventive Maintenance Action Index

	Frequency	Description
1.	Weekly	A. Inspect condenser coil[1] to make certain that air flow is not ham-pered and that it is clear of dust and debris.
2.	Monthly	A. Inspect and clear drain line. B. Check the liquid refrigerant sight glass to make certain that the system is completely charged. C. Clean the inte-rior of the cabinet with a mild soap and warm water solution. Be certain to dry thoroughly. D. Check both the condenser fan motori[1] and the evaporator fan motor to make certain that they are operational and that the fans are tight and secure (evaporator motor on ADS models and forced air evapo-rator units only). E. Clean door gaskets and breaker strips with a damp cloth. F. Clean exterior of cabinet with mild soap and warm water. Dry thoroughly.
3.	Annually	A. Slide condensing unit[1] from the refrigeration compartment and check all joints and fittings for any signs of leaks or fatigue. B. Inspect electri-cal connections to confirm that there is good contact and that wires are neither weakened nor frayed. C. Check the integrity of the cabinet.
4.	Three Year	A. Replace door gasket(s). B. Inspect motor shafts[1] for noise or wear. C. Inspect electrical controls and wiring. D. Inspect door hinges.

[1]Applicable on units with condensing unit included.

Table H—Cleaning

NOTE: It is highly recommended that the unit be turned off and disconnected from power prior to all cleaning.

Detail	Solution	Frequency
Spills—Clean all spills promptly to avoid staining and odors.	Warm, soapy water	Immediately
Cabinet - Remove all contents. Wipe cabinet interior, exterior, and doors (drawers) with solution.	1-2 tablespoons of baking soda per 1 quart of warm water	Weekly
Gasket(s) - Clean gasket(s) thoroughly with solution. Clean sealing surface and the surface behind the flap.	1-2 tablespoons of baking soda per 1 quart of warm water	Weekly
Condenser Coils—Brush coils in direction of fins. Vacuum dust and debris from fins.	Coil brush, vacuum	Monthly
Fan blades - Wipe evaporator fan blades clean.	Warm water	Monthly
Drain lines - Clean all drain lines (evaporator, cabinet).	Warm water and bleach	Monthly

Table I—Start-Up Procedure (Refrigerated Storage)

	Operation	Results
1.	Activate system by inserting electrical service cord into electrical supply source and flip power control switch.	Compressor should immediately come on line along wit the condenser fan and the evaporator coil.
2.	Locate liquid refrigerant indication glass mounted on the receiver.	Once the system has been operating for two minutes, the glass should appear clear and full of liquid refrigerant.
3.	Wait 15 minutes.	Observe the LED temperature display, the interior cabinet temperature should begin to steadily decrease.
4.	Wait 3 hours.	Once the operating temperature has been reached, stocking of the containment area can begin.

Chapter 5—Troubleshooting

5.1 Introduction

This chapter provides a systematic check of components in determining a possible cause of failure in the event of various symptoms.

It is necessary that the individual performing the troubleshooting tasks be familiar with the function of the equipment as described in Chapter 3.

The following tables list the most common symptoms that may be experienced and the recommended corrective action.

Table J—Mechanical and Electrical Troubleshooting Guide

Symptom	Possible Failure	Remedy
Unit does not operate	A. Control failure or sensor B. Incorrect voltage C. Failed Compressor	A. Adjust control or replace sensor B. Correct C. Replace
Unit runs continuously	A. Control failure B. Bad connection at TXV C. Restricted air flow or dirty D. TXV stuck open E. Ineffective door seal F. Restricted circulation in storage compartment G. Temperature setting changed	A. Adjust or replace control B. Check and secure sensor bulb to suction line C. Rectify air flow problem and clean condenser D. Replace E. Adjust door hinges F. Redistribute food for even air flow G. Operating unit at temperature colder than original set point may cause evaporator icing.
Low head pressure	A. Low refrigerant B. Ambient temperature too low	A. Leak check system and recharge B. Raise room temperature
High head pressure	A. Ambient temperature too high B. System contains air C. Refrigerant overcharge	A. Lower room temperature B. Evacuate, change filter dryer, recharge C. Reduce amount of refrigerant in system
Short cycling	A. Maladjusted control B. Low refrigerant	A. Adjust control B. Leak check and recharge

Table K—Operator's Troubleshooting Guide

Symptom	Possible Failure	Remedy
Unit does not cool	A. Blown fuse/circuit breaker B. Bad connection at supply cord C. Ill fitting gasket D. Hot gas solenoid valve stuck open or leaking	A. Replace fuse/reset circuit breaker. B. Check supply cord at outlet. C. Adjust door hinge or replace gasket D. Replace valve.
Evaporator Fan is not operational	A. Bad fan motor B. Probe failure or probe has come loose from suction line	A. Replace motor B. Evaporator fans are controlled by temperature through main control by way of a sensor. The sensor is mounted in side the evaporator on the suction line and must be secured to the suction line to insure proper operation of the fans and defrost cycle.

Installation precautions:

- **the connection cables should be suitable for up to 195°F operation;**

Caution: Low voltage and probe wiring must be properly separated from high voltage wiring

DISPLAY

During normal working conditions, the display shows the value measured by the air regulation probe or by the second probe (parameter /4). In case of active alarm, the temperature flashes alternately to the code alarm.

ALARMS AND SIGNALS

Alarm code	Description
E0	fault air regulation probe
E1	evaporator product/food probe fault digital input alarm
IA	immediate external alarm (A4 and A7 parameters)
LO	low temperature alarm (AL, Ad and A0 parameters)
HI	high temperature alarm (AH, Ad and A0 parameters)
EE	data acquisition failure (see the manual for the default procedure)
Ed	timeout-ended defrost (dt, dP and r3 parameters)
dF	defrost in progress

OPERATING INDICATIONS ON THE DISPLAY

- LED Button indicates compressor ON;
- LED Button indicates defrosting ON;
- LED Button indicates presence of alarms.

The blinking indicates that controller is waiting for a time delay to expire.

SET-POINT (desired temperature value)

- Press the SET button for one second to display the Set-Point value;
- After few seconds, the set value blinks;
- Press UP or DOWN to increase or decrease the set-point value; press the button once/more to confirm the new value.

MANUAL DEFROST

Besides the automatic defrost: it is possible to activate a manual defrost by pressing the button for more than 5 seconds (it occurs only in the appropriate temperature conditions).

ACCESS AND MODIFICATION OF THE FREQUENT PARAMETERS (F TYPE)

1) Press the button for more than 5 seconds (in case of alarm, first silence the buzzer);
2) the display displays PS;
3) Press or to show the parameter whose value has to be changed; press to display the associated value;
4) Press or to change the value;
5) Press to temporarily confirm the new value and go back to display the parameter code; In order to modify the other parameters, start back from point 3.

Storage of the new values: press at least for 5 seconds to store the new value and exit the "PARAMETERS MODIFICATION" procedure. For timing parameters only: switch off and switch on the controller in order to make them immediately effective without waiting for the following cycle. **To exit without modifying any parameter:** do not press any button for at least 60 seconds (TIME OUT).

ACCESS AND MODIFICATION OF THE CONFIGURATION PARAMETERS (C TYPE)

Configuration parameters (type C in the table); a PASSWORD is required to enter.

1) Press for more than 5 seconds, after the set-point, PS will be displayed;

2) Press , then using or select 22 value (PASSWORD); press to confirm;

3) Press or to show the parameter that has to be changed; press to display the associated value;

4) Press or to change the value;

5) Press tc temporarily confirm the new value and go back to the parameter code display;

Storage of the new values: press at least for 5 seconds to store the new value and exit the "PARAMETERS MODIFICATION" procedure. For timing parameters only: switch off and switch on the controller in order to make them immediately effective without waiting for the following cycle. **To exit without modifying any parameter:** do not press any button for at least 60 seconds (TIME OUT).

LIST OF PARAMETERS TYPE C

	Parameter	Type	Min	Max	Unit	Default	Value*
/	**PROBE PARAMETERS**						
/2	Measurement stability	C	1	15	-	4	
/4	probe display: 0 = regulation probe, 1 = product food probe (second probe)	C	0	1	flag	0	
/5	°C /°F (0=°C, 1=°F)	C	0	1	flag	0	
r	**REGULATOR PARAMETERS**						
r1	Minimum allowable set	C	-50	r2	°C/°F	-50	
r2	Maximum allowable set	C	r1	127	°C/°F	60	
r3	Enabling Ed alarm: max duration of defrost is reached (0=no, 1=yes)	C	0	1	flag	0	
r4	Automatic variation of the Set-Point with closed curtain-switch (A4=4)	C	-20	20	°C/°F	3	NU*
c	**COMPRESSOR PARAMETERS**						
c0	Delay in the compressor start-up after switch-on	C	0	15	min	0	
c1	Minimum time between two following compressor start-ups	C	0	15	min	0	
c2	Compressor shutdown minimum time	C	0	15	min	0	
c3	Compressor operation minimum time	C	0	15	min	0	
c4	Safety compressor (0=OFF, 100=ON)	C	0	100	min	0	
cc	Continuous cycle duration	C	0	15	hours	4	
c6	Alarm delay after continuous cycle	C	0	15	hours	2	
d	**DEFROST PARAMETERS**						
d0	defrost type (0=heater, 1=hot gas, 2= time resistance, 3= time hot gas)	C	0	3	flag	0	
d4	Defrost after start-up (0=no, 1=yes)	C	0	1	flag	0	
d5	Delay defrost after control Switch-On or from digital input (A4 or A5=4)	C	0	199	min	0	
d6	Block temperature display during defrost (0=no, 1=yes)	C	0	1	flag	1	
d9	defrost priority over compressor protection (0=no, 1=yes)	C	0	1	flag	0	
dC	Time base (0=hours/min, 1=min/s) Only for dI and dP	C	0	1	flag	0	
A	**ALARM PARAMETERS**						
A0	Alarms and fans differential (0=0.5 °C/°F)	C	0	19	°C/°F	0	
Ad	Temperature alarm delay	C	0	199	min	0	
A7	Measurement delay time for the input "delayed alarm" (A4 or A5=2)	C	0	199	min	0	NU*
F	**FAN PARAMETERS**						
F0	Management of fans: 0=fans ON, specific phases excluded (F2, F3 and Fd) 1=fans ON (dependent on parameter F1) specific phases excluded	C	0	1	flag	0	
F2	Fans OFF when the compressor is OFF (0=no, 1=yes)	C	0	1	flag	1	
F3	Fans OFF during defrost (0=no,1=yes)	C	0	1	flag	1	
H	**OTHER SELECTIONS**						
H0	Serial address	C	0	199	-	1	
H1	Selection of the alarm relay operation: 0=alarm ON, energized relay, 1= alarm ON, disenergized relay,	C	0	1	flag	1	
H2	0=disabled buttons, 1=enabled buttons	C	0	1	flag	1	

* show the set value

NU*: no used parameter, leave the default value

Chapter 6—Corrective Maintenance

6.1 Introduction

This chapter focuses on the instruction needed in the removal and replacement of certain components. It also addresses the repair of components not listed under the scheduled maintenance index covered in Chapter 4.

The level of skills required to perform the service or repair will vary. Some may require specific training while others may be performed by any type of mechanic. It is up to the individual and his/her supervisor to determine the breadth of knowledge required to perform the necessary service or to make the necessary repairs.

It is also important to know that any procedure requiring the handling of refrigerant requires proper certification.

The service or repair items are limited to those parts listed in Appendix A on page 39.

6.2 Repair Procedures

WARNING: Prior to performing any work on the refrigeration system, it is required that the unit be de-energized.

A. Replacement of Compressor Motor

1. Evacuate the refrigerant from the system using a refrigeration recovery system.

Note: Federal laws require the proper handling and disposal of refrigerants. It is unlawful to release any refrigerant into the atmosphere.

2. Disconnect the electrical power to the unit. This is done by turning off the circuit in the main supply panel. It should be noted on the panel that the refrigerator (freezer) is being serviced and that the breaker must remain off.

3. To reach the condensing unit, the ventilation grill on the front of the cabinet must be removed. This is done by pulling the grill up vertically about one inch, out over the retainer angles and then down.

4. With the grill removed, use a 3/8” wrench or socket and ratchet to unscrew the mounting bolt that secures the condensing unit to the cabinet base.

5. Once the mounting bolt is removed, carefully slide the whole condensing unit forward. Due to extra copper coil refrigeration lines, the unit can be completely removed from the compartment and placed on the deck.

6. Find the electrical terminal box on the side of the compressor and remove the front cover. Disconnect the wires from the compressor. Remove the screws that attach the terminal box to the compressor. At this point, the compressor will be electrically detached.

7. Using wrenches, remove the suction and discharge valve stem cover caps on each side of the compressor. Also, remove the cap nut on the suction and discharge side as well.

8. Disconnect the high-side line at the compressor. This is done by heating the brazed connection using an acetylene and oxygen torch set.

Note: Do not apply a flame to a line containing refrigerant.

9. To remove the low-pressure control capillary tube and service fitting, loosen the ¼” brass flare nut on the suction valve.

10. The final step in removing the compressor is to disconnect it from its mounting. To free the compressor, remove the wire clips/bolts on each of the four feet.

11. To install the new compressor, place it in position on the base and reinstall the four wire clips/bolts.

12. Reattach the suction and discharge valve blocks to the appropriate sides of the compressor.

13. Reattach the low-pressure control capillary tube and service fittings to the suction side of the compressor.

14. Reattach the suction line to the compressor.

15. In reconnecting the high-pressure line, it is necessary to first prepare the line's end. Using a fine sandpaper or emery cloth, clean the residue off of the end. Also, clean the connection on the compressor. Apply flux to both ends and braze the connections into place.

16. Remove the valve stem cap from the suction valve block on the side of the compressor. Run the valve stem all of the way out and then in one turn clockwise.

17. Place the refrigeration service manifold gauge hoses on the suction and high-side valves. Attach a bottle of refrigerant to the charging hose and charge the system with 150 psi of vapor. Using an electronic leak detector, check the new connections for leaks. Should a leak appear, evacuate the charge and repair the leak. Repeat the leak check process again.

18. If the system checks out with no leaks, recover the test charge using a vacuum recovery pump.

19. With the system pressure at zero, connect the vacuum pump and evacuate the system. The pump should run for one hour. The vacuum pump should pull the system down to 30 inches of vacuum.

20. Reattach the electrical terminal box and secure all wiring.

21. Check the refrigeration tag on the unit for the number of ounces of refrigerant to place into the system for start-up. Monitor the pressure on both the suction and discharge sides of the manifold gauges. As the temperature in the storage area begins to fall, check the refrigerant flow through the sight glass. The unit is fully charged when there are no bubbles in the sight glass. If after five minutes of operation, bubbles are still present, it may be necessary to add more refrigerant (add refrigerant in small amount to keep from overcharging).

WARNING:
Overcharging a refrigeration system can be dangerous.

If the system overcharge is sufficient enough to immerse the major parts of a hermetic compressor in liquid refrigerant, a situation has been created that when followed by unusual but possible circumstances, can lead to compressor housing seam separation or rupture.

The sequence of circumstances that can lead to compressor housing seam separation or rupture occurs in the following manner:

1. The system overcharge immerses the compressor motor, piston, connecting rods, cylinders, etc. in liquid refrigerant, thereby effectively forming a hydraulic block preventing the compressor from starting. This condition is known as locked rotor.

2. Electrical current continues to flow through the compressor motor windings that become, in effect, electric resistance heaters. The heat produced begins to vaporize the excessive liquid overcharge, causing a rapid increase in system pressure.

3. If the system compressor protective devices fail for any reason prior to or during this locked rotor heating cycle or cycles, liquid refrigerant may be vaporized sufficiently fast enough to raise the pressure within the system to extremes far greater that the housing or weld seam is designed to handle.

4. In some instances where the amount of refrigerant overcharge is critical in proportion to the system internal volume, the pressure reached can cause a compressor housing seam separation or rupture that can be hazardous.

The remedy to eliminate this exceedingly rare, but potential hazard is to use correct refrigerant charge amounts and techniques.

Cospolich, Inc. urges that all individuals responsible for training, teaching, or advising installation mechanics and service personnel emphasize proper charging techniques. In addition, Cospolich advises strict adherence to refrigerant charge amounts specifically recommended by the manufacturer of the refrigeration, air conditioning, or heat pump system.

B. Replacement of Low Pressure Control

1. Disconnect the unit from electrical service.

2. Remove control cover and disconnect electrical terminals.

3. Disconnect capillary tube.

4. Remove mounting fasteners on control base and install new control by reversing the procedure.

5. To adjust the control, hook up the service gauges to the suction and discharge valves and crack them to allow the gauges to read.

6. Using a standard screwdriver, coarse adjust the control by turning the adjustment screws on top of the control. Preset the cut-in and cutout and 0 lbs. and 10 lbs. respectively for both a refrigerator and a freezer. Some units will vary so please consult Cospolich service department for a correct setting for your particular unit.

7. Start the system. Allow it to run for five minutes. Monitor the low side pressure. Fine adjustments will be required to achieve the prescribed cycling pressures.

Note: Running the suction valve in or out as required to effectively change the pressures can speed up the control adjustment process.

C. Replacement of Thermal Expansion Valve (TXV)

1. Close liquid valve and run compressor until it pumps refrigerant into the receiver (low side service gauge will read 1 lbs.). Close the suction line valve.

2. Disconnect the sensor bulb on the suction line.

3. Disconnect the liquid line (1/4”) and suction line (3/8”) then remove the TXV.

4. Install new TXV, reconnect lines, and re-fasten the sensor bulb.

Note: It is not recommended to adjust the valve super heat as this comes pre-set from the factory.

D. Replacement of Filter Dryer

1. Close liquid line valve and run compressor until the low side refrigeration gauge indicates zero lbs., then close suction.

2. Remove filter dryer from system and replace with new dryer.

3. Purge system and add refrigerant if needed.

E. Replacement of Condenser Fan Motor

1. Disconnect all electrical power to the unit.

2. Remove the condensing unit from the condensing unit compartment.

3. Remove the protective wire shroud from around the motor.

4. Disconnect the fan motor leads from the terminal box on the compressor.

5. Remove the mounting screws at the motor base.

6. Using an allen wrench, remove the aluminum fan.

7. To install the new motor, reverse the process.

F. Replacement of the Condensing Fan

1. Disconnect all electrical power to the unit.

2. Remove the condensing unit from the condensing unit compartment.

3. Remove the protective wire shroud from around the motor.

4. Using an allen wrench, loosen the set screw on the blade hub and slide the blade from the shaft.

5. Reverse the procedure to reassemble.

G. Replacement of the Door Anti-Condensate Heater

1. Disconnect all electrical power to the cabinet.

2. Mullion heaters can be accessed inside condenser area

3. All electrical connections for the mullion heaters are enclosed in a stainless steel enclosure.

4. The mullion heaters can not be serviced from anywhere else on the unit because the tracks they are installed in are foamed inside the cabinet walls.

5. If a mullion heater must be replaced it can be accomplished by attaching one end of the new heater to the existing heater wire.

6. Locate the opposite end of the old heater wire and begin to pull the old heater out and the new heater in.

7. If the old heater wire is broken and cannot be used there is a pull wire installed from the factory for this purpose. Another pull wire will need to be installed with the new heater for future use.

8. Be very careful not to put to much tension on the heater wire because you may damage the new heater or break the pull wire.

9. If the wire are not going though easily pull it back out and inspect your connection to the pull wire it may be to restrictive.

H. Replacement of Door Hinge

Note: This procedure is best performed with two people – one to hold the door while the other removes the attachment screws.

1. Using a screwdriver, remove the three screws that attach the butt section of the hinges to the cabinet.

2. With the door detached from the cabinet, remove the screws that attach the hinges to the door.

3. To install the replacement hinges, reverse the process.

I. Replacement of Door Gasket

Note: It is suggested that the door be removed from the cabinet and placed gasket up on a table. Also, try not to cut the gasket in the replacement process.

1. Remove gasket from its track.
2. Clean the gasket track and the immediate area.
3. Start new gasket into track.
4. Snap gasket back in track.

J. Replacement of Power Switch

1. Shut off all electrical power going to the unit.
2. Remove the front air grill.
3. Locate breaker or switch.
4. Remove wires then remove breaker or switch off din rail.
5. Reverse the process when installing the new switch.

K. Replacement Food Files

1. No tools are required to remove food files.
2. Lift food files upward and tilt the bottom to the center of the cabinet.
3. Slide food file out and remove from cabinet.

L. Replacement of Defrost Terminator and Fan Sensor

1. Remove evaporator cover.
2. Locate sensor attached to suction line.
3. Remove insulation and strap.

4. Go to condenser compartment and locate the relay board

5. Disconnect the wires for the sensor marked DEF.T.

6. Tie or tape the new sensor to the old sensor

7. Pull new wire through cabinet and reinstall sensor to suction line

8. Reconnect wires to relay board

M. Replacement of Air Temperature Sensor

1. Remove evaporator right side cover

2. Locate sensor near return air and remove strap

3. Go to condenser compartment and locate the relay board

4. Disconnect the wires for the sensor marked AIR.T.

5. Tie or tape the new sensor to the old sensor

6. Pull new wire through cabinet and reinstall sensor to suction line

7. Reconnect wires to relay board

6.3 Charging the Refrigeration System

1. Connect service gauges to the suction and discharge service valves then open valves one full turn.

2. If the system is pressurized slightly, open both manifold gauge valves and purge the service line gauges.

3. With manifold gauge valves closed, start refrigeration system.

4. Attach a drum of refrigerant to the suction service side of the manifold gauges and add refrigerant until the liquid sight glass is clear of bubbles.

6.4 Recalibrating the Thermometer

1. Can be accomplished with controller program instructions.

Chapter 7—Parts List

7.1 Introduction

This section of the manual contains lists of replaceable parts. Each of the tables contain a list of removable parts associated with an assembly of the cabinet or refrigeration system. No parts identification has been provided for details of permanently assembled items or those items that are not suitable for field repair.

7.2 Source Codes

The sources for some items are shown in Table L.

Table L—Source Codes

Code Number	Name	Address
14852	Bohn Heat Transfer	Danville, IL 61932
32761	Kason Industries	Shenandoah, GA 30265
50992	Ranco Controls	St. Louis, MO 63143
78462	Sporlan Valve	St. Louis, MO 63143
14569	Copeland Corporation	Sidney, OH 45365
17529	Watsco	Hialeah, FL 33010
59431	Tecumseh Products	Tecumseh, MI 49286
49048	Miljoco Corporation	Eastpointe, MI 48021
45020	Nashville Wire Products	Nashville, TN 37202
79264	Jean's Extrusions, Inc.	Salem, IN 47167
2K223	Refrigeration Hardware	Sun Valley, CA 91353
87518	Standard Keil, Inc.	Allenwood, NJ 08720
60886	Idec Corporation	Sunnyvale, CA 94089
19220	Eberhard, Inc.	Cleveland, OH 44136
66682	Cospolich, Inc.	Norco, LA 70079

Table M—Parts List — Special Tools List

Part Number	Description	Quantity
R1412	Refrigerant service gauges with hoses	1
VA 70264	Service valve wrench	1
50992	Refrigerant	30 lbs.

Chapter 8—Installation

8.1 Unpacking

Note: Before unpacking unit, note any crating markings and check for damage to crating and notify the carrier if there should appear to be damage to the equipment.

The unit is shipped from the factory securely fastened to a single shipping pallet protected by an external wrapping.

1. Carefully remove all external wrappings and other protective coverings.

2. Review the installation section of the manual completely prior to installing.

3. Discard crating materials.

8.2 Installation

1. Before moving the unit to the installation site, double-check passageways to make certain that it will move through without modifications.

   Note: in certain instances, it may be necessary to remove the doors and hardware to negotiate tight spaces.

2. On most shipboard applications, a permanent base is fabricated by the ship builder to accommodate the base frame of the unit. If required Cospolich can furnish a foundation which can be attached to the deck.

3. Position the unit to allow for sufficient ventilation. Typically, approximately 3" clearance from bulkheads and other equipment is sufficient. Try not to place the unit near heat producing items such as ovens, ranges, and furnaces.

4. Level the cabinet from front to back and side to side. This is important so that the cabinet will not be pulled out of square when securing it to the deck.

5. Evaporator coil drain lines are factory installed and are either plumbed into a condensate evaporator pan or the condensate evaporative base of the condensing unit to eliminate the need for exterior plumbing. Make certain that the drain outlet is located such that the condensate falls into the pan or base. On units with remotely located refrigeration, the condensate evaporator pan is optional.

6. Check the door gasket to make certain that it is sealing properly to the cabinet. Adjusting the latch strike or the hinges may be necessary to produce a tight seal.

7. Before applying electrical power to the unit, you should first check the electrical characteristics of the condensing unit to ensure that they agree with those of the electrical supply source.

CAUTION:
Low or excessive voltage can severely damage the electrical system.

Note: Adjusting any valves or controls on the system is not necessary and may void your warranty. All valves and controls have been set by the factory.

Chapter 9—Electrical and Mechanical

9.1 Introduction

This section of the manual contains drawings and schematics of the electrical and mechanical piping systems.

9.2 Electrical Abbreviations and Terminology

1. RLA – Rated Load Amperage

   Rated load amps is a measure of the current drawn by a compressor when operated at compressor manufacturer rating conditions at nominal voltage. This value is listed at U.L. and C.S.A. as "RLA". It is in agreement with the N.E.C. definition that the RLA be the current draw when the compressor is delivering rated output.

2. LRA – Locked Rotor Amperage

   A. The locked rotor amps of a compressor is the current value recorded three seconds after rated voltage is applied under locked rotor conditions from a 75°F motor soakout temperature (The voltage drop is to be predetermined and adjusted accordingly prior to testing). This value appears on the compressor serial plate and on all compressor statistics sheets.

   B. It may be well to note that the practice in the past was to show an additional column marked, "LRA U.L. Test Report". This is no longer needed since the U.L. investigation work, regarding component rating, will be guided by the compressor manufacturer's published value.

3. MCC – Maximum Continuous Current

   A. Maximum continuous current is a limiting ampere value that must not be greater than 156% of the RLA of the compressor as marked on the nameplate of the particular unit into which that compressor is applied.

Table N—Operating Pressures

Refrigerant: R-12			
Cabinet	**Ambient**	**Suction Pressure**	**Head Pressure**
-5 degrees F (FRE.)	90 degrees F	0-10 lbs.	120—150 lbs.
37 degrees F (Ref.)	90 degrees F	18—35 lbs.	120– 150 lbs.
Refrigerant: R-22			
Cabinet	**Ambient**	**Suction Pressure**	**Head Pressure**
-5 degrees F (FRE.)	90 degrees F	10—15 lbs.	200—250 lbs.
37 degrees F (Ref.)	90 degrees F	37—67 lbs	200—250 lbs.
Refrigerant: 134A			
Cabinet	**Ambient**	**Suction Pressure**	**Head Pressure**
-5 degrees F (FRE.)	90 degrees F	-5—10 lbs.	120—150 lbs.
37 degrees F (Ref.)	90 degrees F	16—37 lbs.	120—150 lbs.
Refrigerant: 404A			
Cabinet	**Ambient**	**Suction Pressure**	**Head Pressure**
-5 degrees F (FRE.)	90 degrees F	15—20 lbs.	250—300 lbs.
37 degrees F (Ref.)	90 degrees F	68—84 lbs.	250—300 lbs.

Chapter 10—Limited Warranty

Cospolich Inc. warrants their cabinets to consumers against defects in material or workmanship under normal use and service for a period of one year from the date of the shipment. We will repair or replace at our option, any part, assembly or portion thereof which Cospolich's examination discloses to be defective. Cospolich will pay the labor costs for the repair up to twelve (12) months from date of shipment.

In instances where the purchaser is not the owner in possession and the acceptance of Cospolich equipment is closely tied to the completion and delivery of the project, our warranty will begin on the acceptance date and will extend for one year.

Terms

Exclusions

Cospolich's obligations under this warranty shall not extend to any malfunction or other problem caused by unreasonable use, such as but not limited to, improper setting of controls, improper installation, improper voltage supply, loose electrical connections or blown fuses, and damage not attributable to a defect in workmanship. This warranty shall not apply to any cabinet or component part that has been suspect to any accident, alteration , abuse, misuse to any damage caused in fire, flood, or other acts of God and to any product that has been serviced by an unauthorized service person or company.

To secure Warranty Service

If you claim a defect under this warranty, direct your claim to whom you purchased the product, giving model, serial and code numbers with a description of the problem. Telephone calls should be directed to the service department at (800)423-7761 or (985)725-0222 with fax request going to (985)725-1564.

If the above procedure fails to satisfy your claim, you may write directly to the following address including the above identifying information.

DIRECTOR of CUSTOMER RELATIONS
COSPOLICH INC.
P.O. BOX 1206
DESTREHAN, LA 70047

There is not other express warranty on the Cospolich units except the terms stated herein. Any implied warrants of fitness and merchantability are limited in duration to the duration of this Warranty. The liabilities of Cospolich are limited solely and exclusively to replacement as stated herein and do not include any liability for any incidental, consequential or other damages of any kind whatsoever, whether any claim is based upon theories of contract negligence or tort. Some states do not allow limitations on how long an implied warranty lasts, or the exclusion of limitations of incidental or consequential damages. So the above limitations and exclusions may not apply to you. This warranty gives you specific legal rights and you may also have other rights that vary from state to state.

Appendix A—Bill of Materials R2D-CL-SL

R2D-CL-SL

Part Number	Description	Quantity	U/M
Control Panel			
	(RCTLM)		
PLSR01	PLASTIC STRAIN RELIEF FITTING, STRAIGHT (.375-.50")	5	EA
PLSR02	PLASTIC STRAIN RELIEF FITTING, STRAIGHT (.50-.62")	1	EA
PLSR03	PLASTIC STRAIN RELIEF FITTING, ELBOW (.375-.50")	1	EA
PLSR04	PLASTIC STRAIN RELIEF FITTING, ELBOW (.50-.62")	2	EA
PCCC56	BREAKER, 2 POLE; S202-K20	1	EA
LENC14	ENCLOSURE, NEMA4, PLASTIC, CLEAR, 12" X 10"	1	EA
LENC14BKPL	PLATE, BACK, A12P10, 12" X 10" NEMA ENCL	1	EA
PCTES35	TERMINAL END STOP, ES35	2	EA
PCTR001	IDEX DIN RAIL, BND1000	0.5	FT
RWTT41	OMNISTAT PLUS ASSEMLBY, 220V, MED TEMP.	1	EA
RWTT38	RELAY, EXTERNAL, 230V, 30 AMP	1	EA
PCTTW2,5-6	TERMINAL DIVIDER, WI 07.311.1255.0	2	EA
PCTTW2,5-4	TERMINAL DIVIDER, WI 07.311.1155.0	2	EA
PCTWK4/U	TERMINAL SECTION, WK4/U, 4MM	16	EA
PCTWK6/U	TERMINAL SECTION, WK6/U	8	EA
Evaporator Assembly (2 EA)*			
	(EVAPASSY-CL)		
RWEM27	MOTOR, AC AXIAL FAN, 230V, 4WT33	4	EA
RWEV39	EXPANSION VALVE, EFS-1/4-C	1	EA
RWE450	EVAPORATOR COIL, BBM16AG, SWEAT	1	EA
CCLEDP01	DRIP PAN, EVAPORATOR, S/S, CRUISE	1	EA
RWQF0048	QUICK CONNECT; 5500-04-08, 1/4"	2	SETS
RWQF0068	QUICK CONNECT; 5500-06-08, 3/8"	1	SET
	***QTY SHOWN FOR 1 EA EVAPORATOR ASSEMBLY**		
Condensing Unit Assembly			
	(RUT720-PM)		
RUT720	C.U., 220V, 404A FJCF-A075-CAV-201	1	EA
RWAC01	ACCUMULATOR, 960115, PA3060-10-4	1	EA
RWBX01	B/X CONNECTOR STRAIGHT; 3/8"; 650-DC2	3	EA
RWBX02	B/X CONNECTOR 90 DEG; 3/8"; 801-DC2	1	EA
RWFD02	FILTER DRYER, C-O52-S	1	EA
RWPL02	PRESSURE SWITCH, 010-1483-070	1	EA
RWPLMB	MOUNTING BRACKET, PRESSURE SWITCH	1	EA
RWSG03	SIGHT GLASS, SA12S	1	EA
RWQF0048	QUICK CONNECT; 5500-04-08, 1/4"	1	SET
RWQF0068	QUICK CONNECT; 5500-06-08, 3/8"	1	SET
Door Assembly (2 EA)			
	(DCLUR1)		
HXHE02	HINGE, CHROME, 0217000008, 1 1/8"	2	EA
HXHE13	HINGE, STOP, CHROME, 217S, 1 1/8"	1	EA
GDCL04S	GASKET, 02-064, 24-5/8" X 57 3/4", SNAP TYPE	1	EA
	***QTY SHOWN FOR 1 EA DOOR ASSEMBLY**		
Additional Components (ENTIRE CABINET)			
L2HA453H	HEATER WIRE, 64-250, 453"/220V/0DEG/1W	1	EA
RWSV20	SOLENOID VALVE, E3S120, 1/4" ODF	2	EA
RWSC02	SOLENOID COIL, MKC-1, 220V	2	EA

Illustration 1— Evaporator Coil Assembly

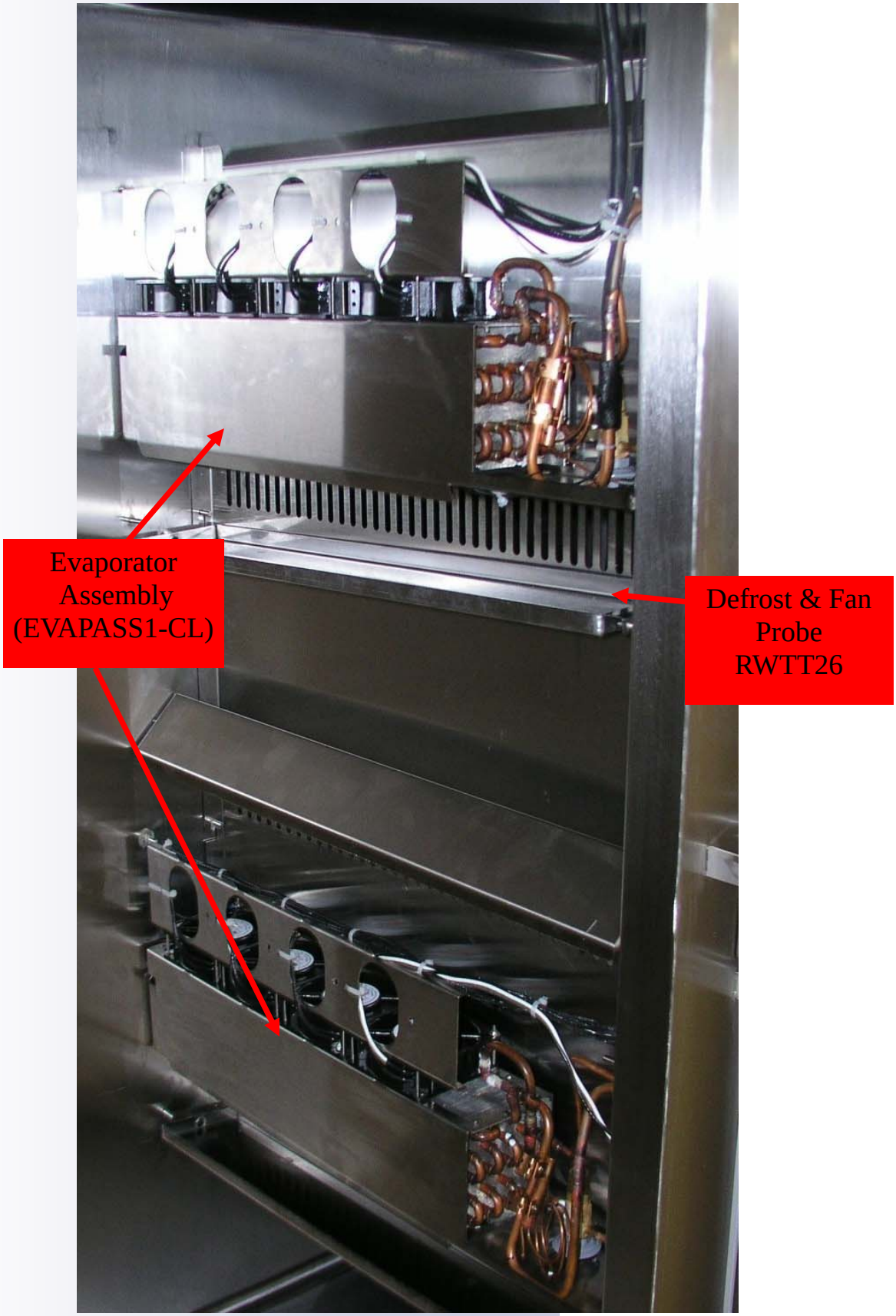


Illustration 2 — EVAPASSY1-CL

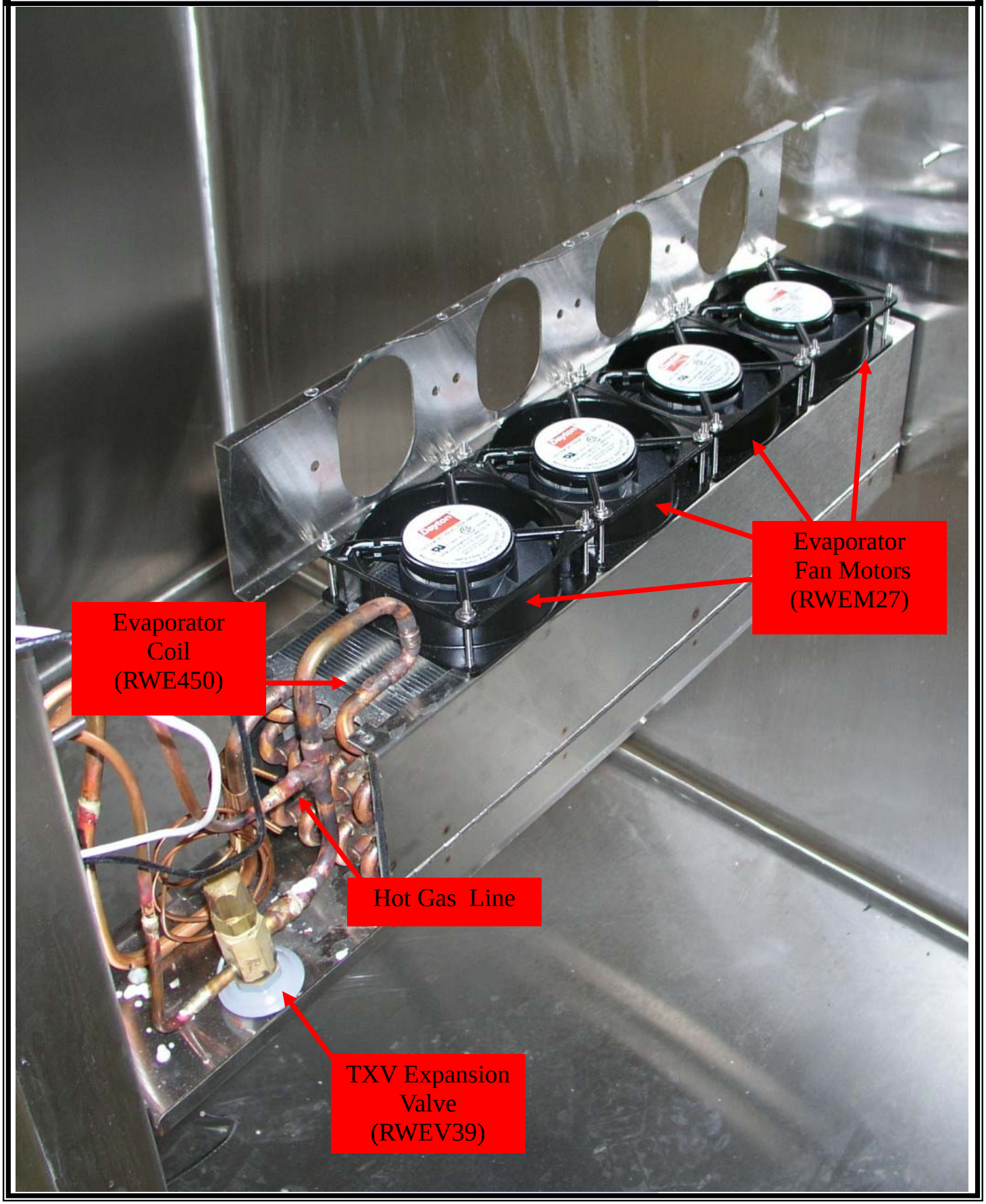


Illustration 3 — Control Panel

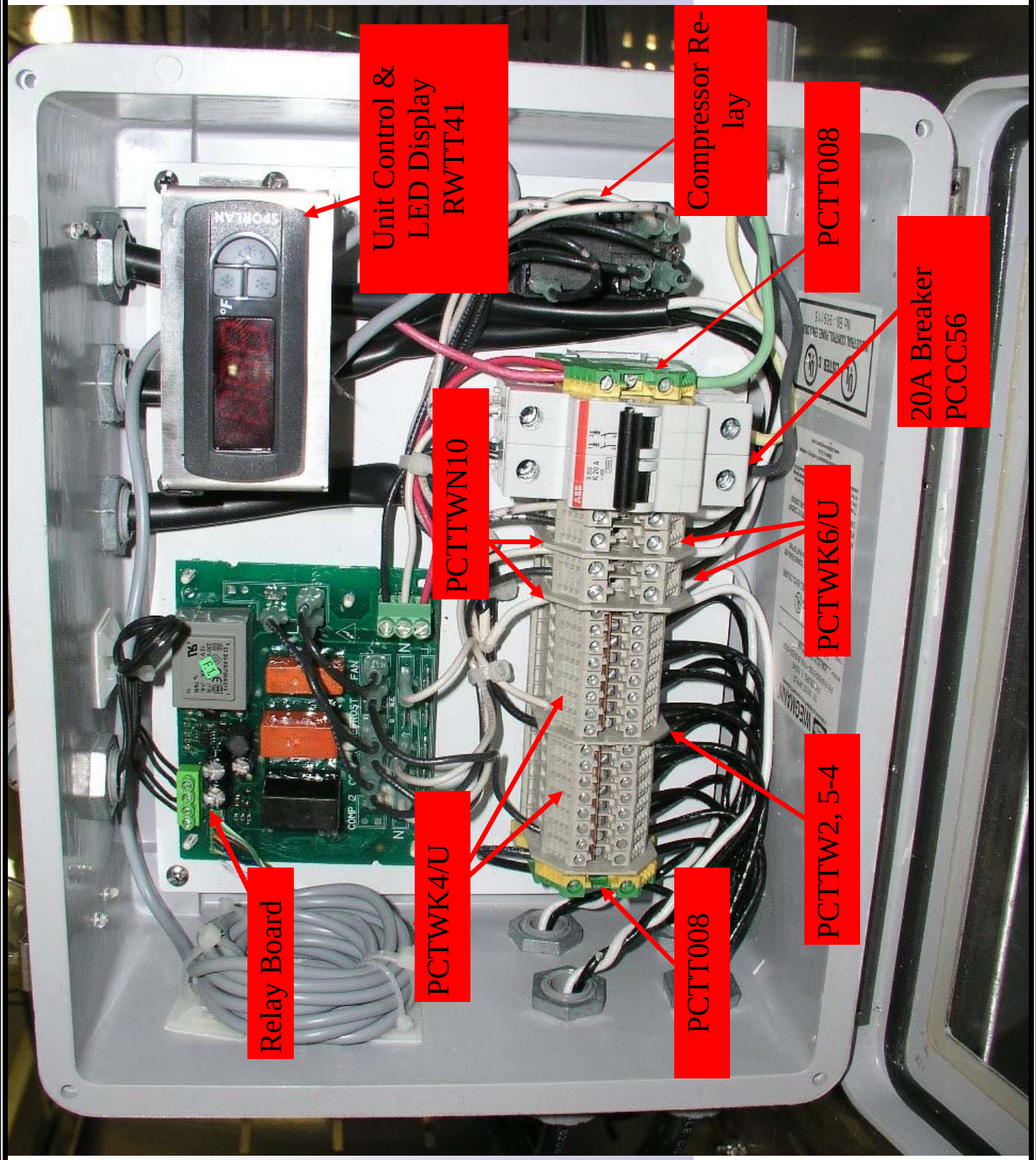


Illustration 4 — Condensing Unit & Control

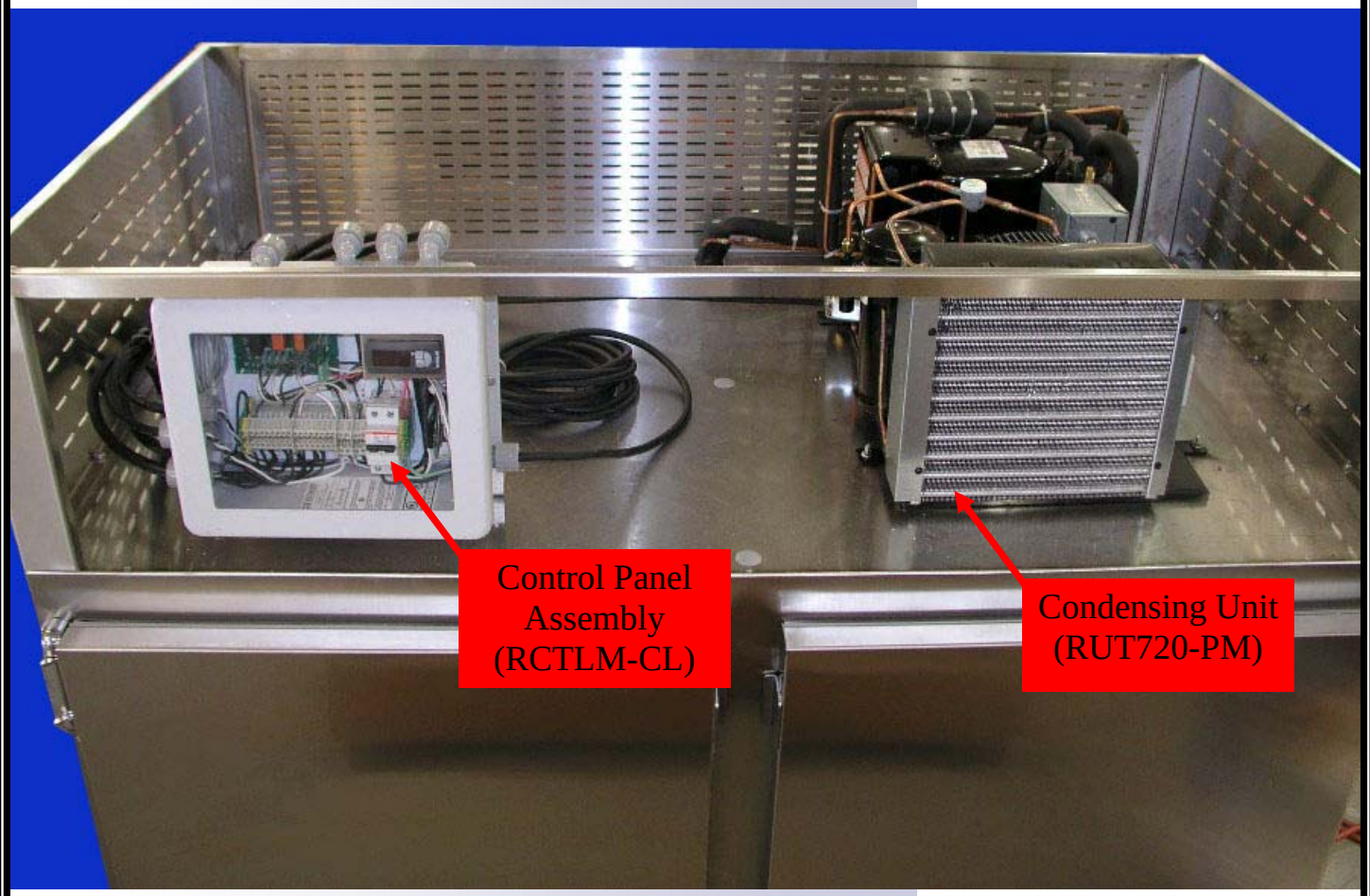
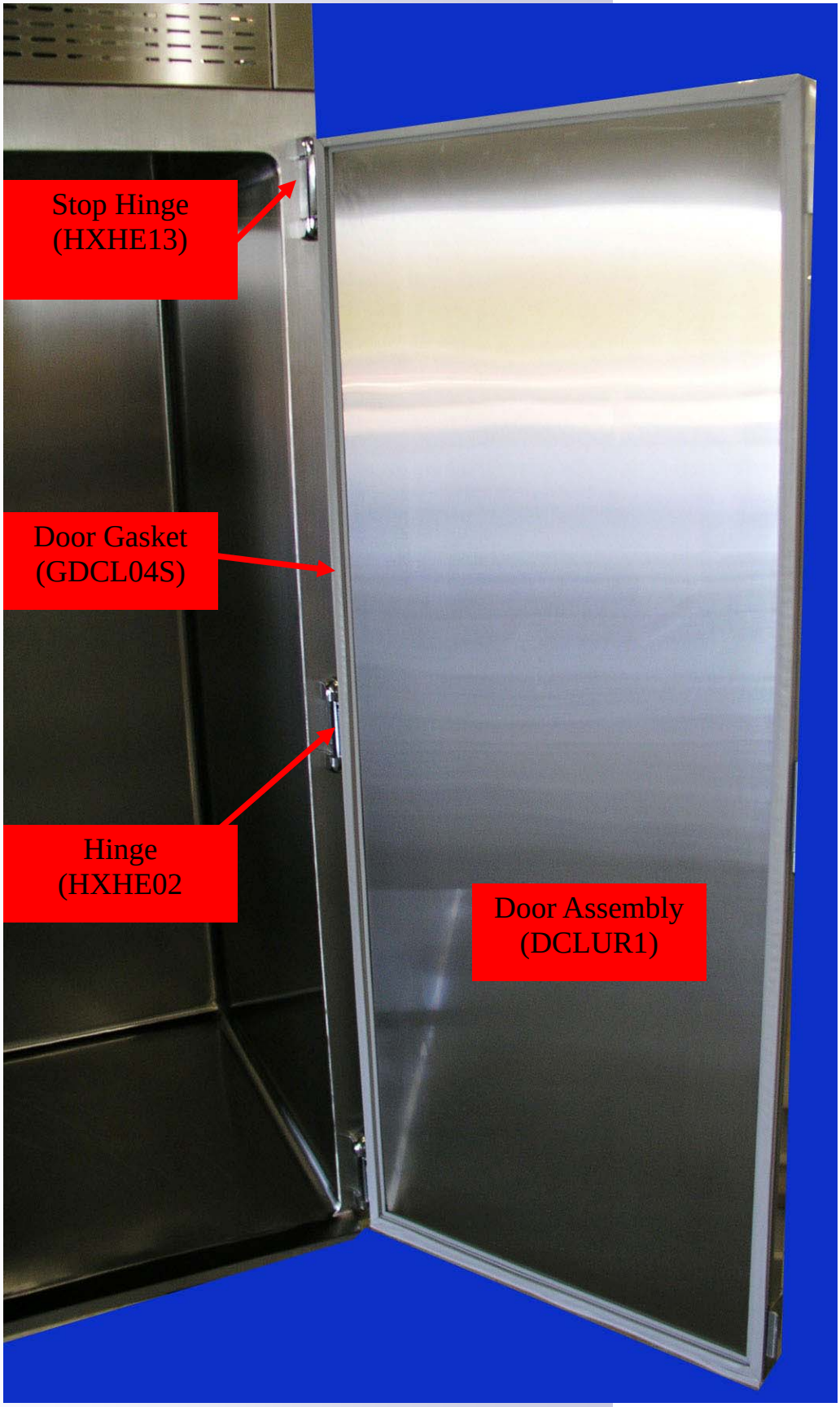


Illustration 5 — Door with Gasket



Appendix B— List of Drawings

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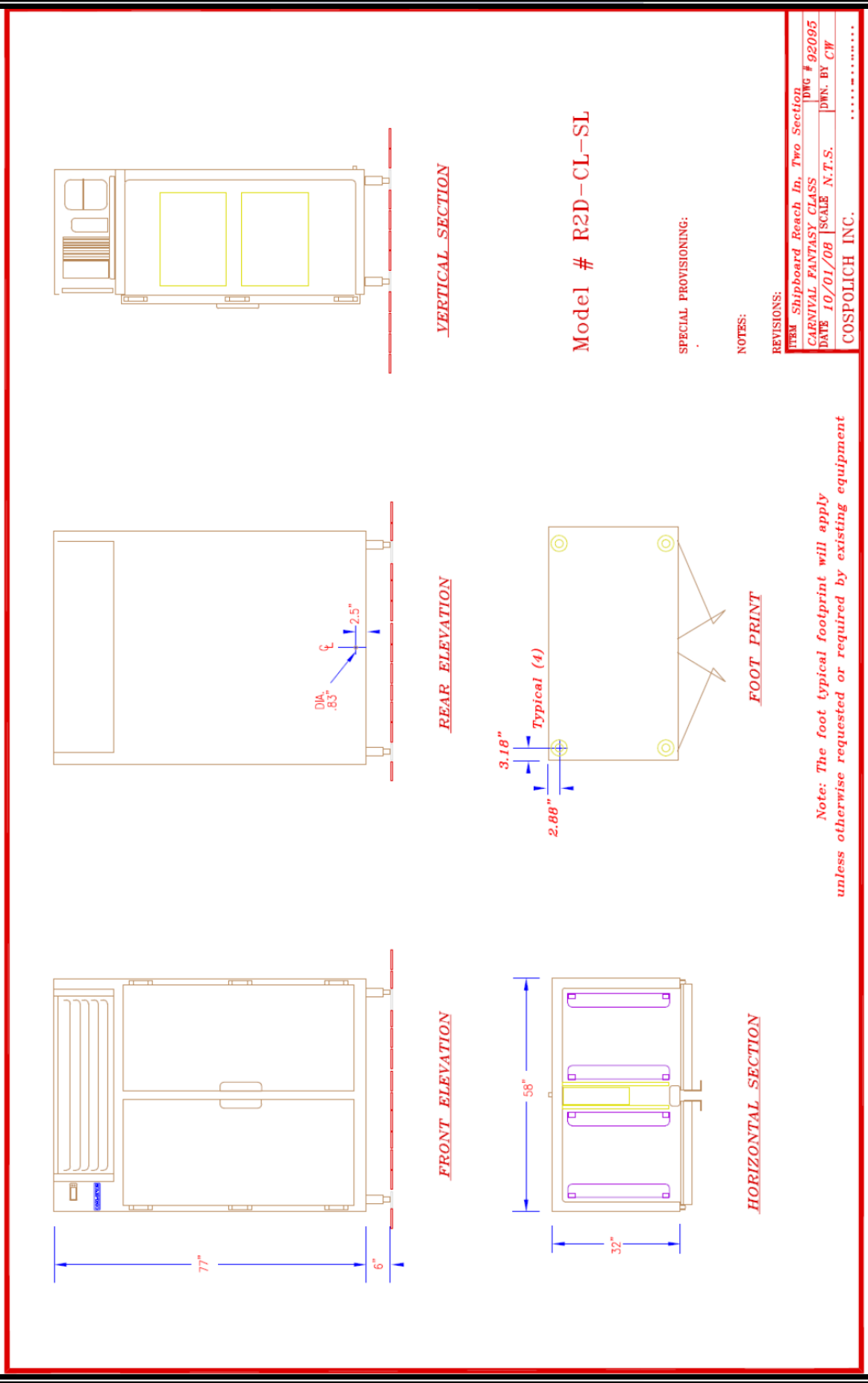
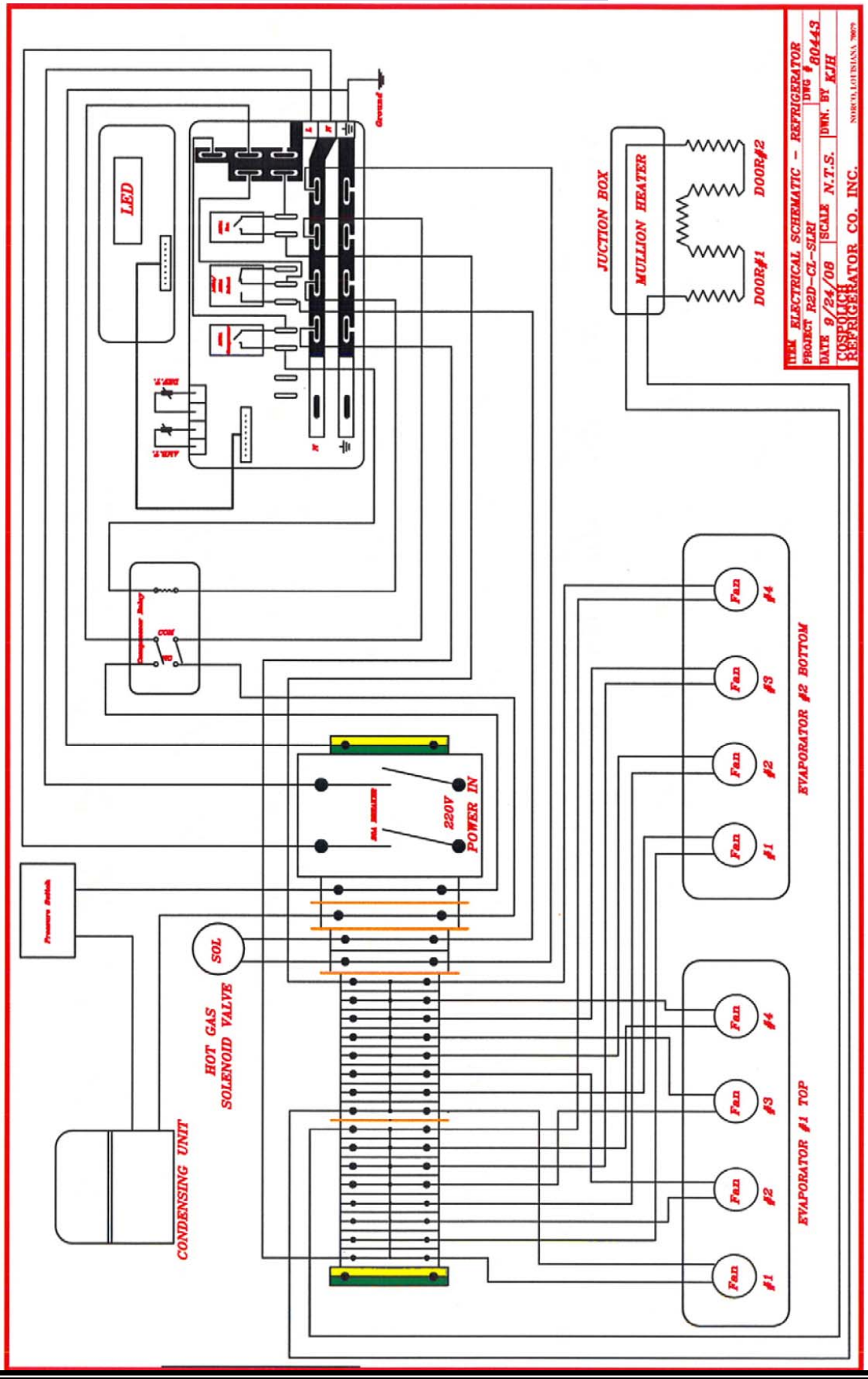
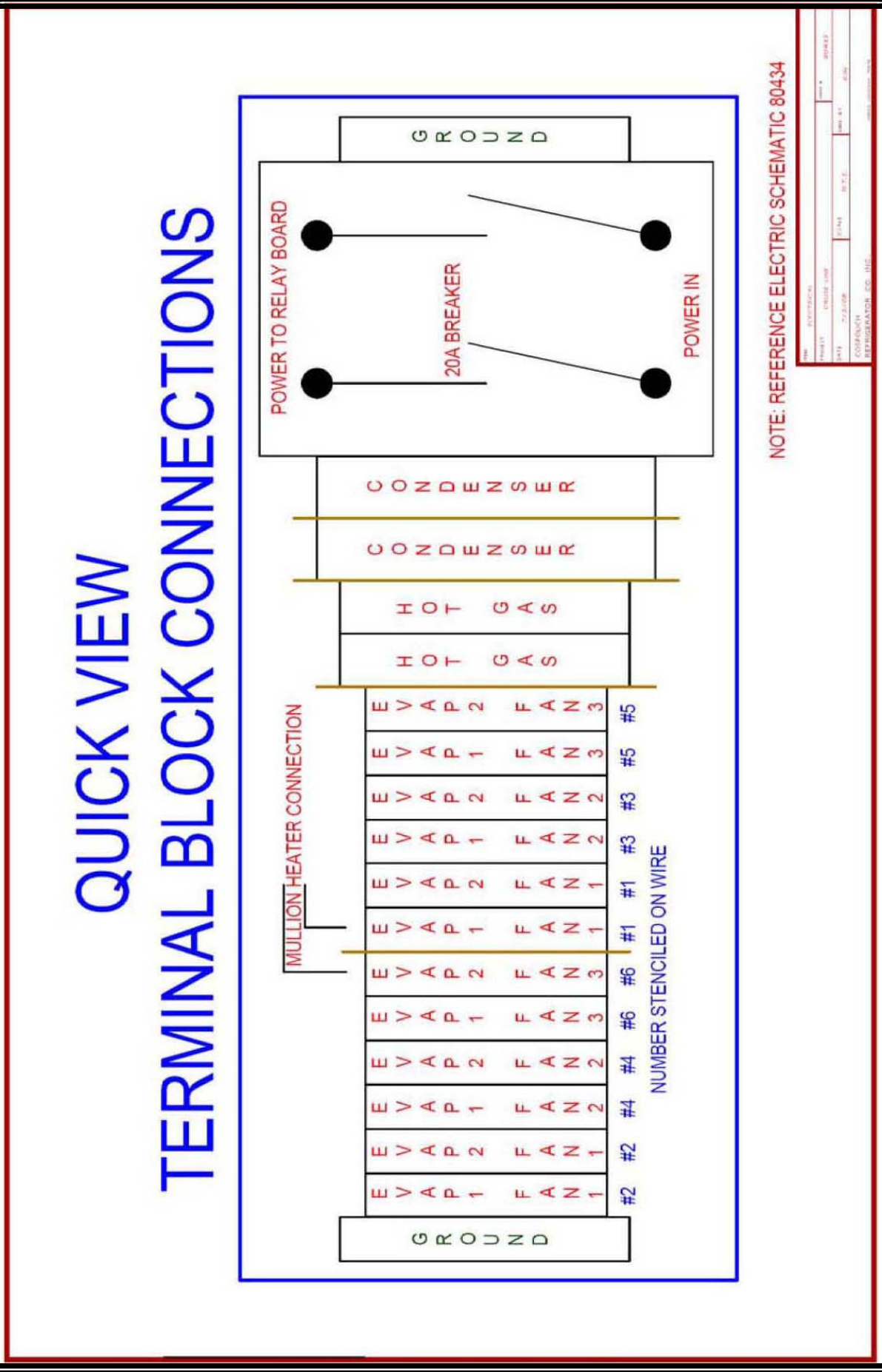
1	R2D-CL-SL	46
2	Electrical Schematic	47
3	Quick View Terminal Blcok	48

Drawing 1 — R2D-CL-SL



Drawing 2 — Electrical Schematic



Drawing 3 — Quick View Terminal Block Connection