

INSTALLATION and OPERATING INSTRUCTIONS for

Self-Contained Freezers

FSC Series



Zero Zone, Inc. • 110 N. Oakridge Dr. • North Prairie, WI 53153-9792
1-800-247-4496 • FAX: 1-414-392-6450 • <http://www.zero-zone.com>

CRMA
Certified





TABLE OF CONTENTS

Subject	Page
GENERAL INFORMATION	1
INTRODUCTION	1
INSPECTION	1
LOCATION	1
INSTALLATION	1
ELECTRICAL	1
START-UP	1
USER INFORMATION	1
CLEANING	1
SHELF LOCATION	1
TEMPERATURE CONTROL	3
LOADING THE FREEZER	3
LIGHT SWITCH	3
DEFROSTING	3
GENERAL	3
DEFROST TIME CLOCK	3
LIMIT THERMOSTAT	3
DEFROST RELAY	3
SERVICE	3
EVAPORATOR	4
EXPANSION VALVE	4
ELECTRIC DEFROST ELEMENT	4
LIMIT THERMOSTAT	4
EVAPORATOR FANS	4
LIGHTS	4
ALTERNATE LIGHTING-T8	4
COMPRESSOR ACCESS PANEL (GRILL)	5
COMPRESSOR	5
DEFROST TIME CLOCK ADJUSTMENT	5
LIGHT BALLAST	5
DEFROST RELAY	5
PRESSURE CONTROL; DEFROST TIME CLOCK	5
CONDENSATE DRAIN PAN HEATER	5
DOORS	SEE ADDENDUM
PREVENTIVE MAINTENANCE	5
SPECIFICATIONS	6
WIRING DIAGRAMS	7-8
PARTS LIST	9
WARRANTY	10



GENERAL INFORMATION

Introduction

The information contained in this manual pertains to ZERO ZONE 2- and 3-door self-contained freezers used for frozen food or ice cream merchandising. ZERO ZONE has made every effort to produce refrigeration equipment of the highest quality using state-of-the-art components and modern manufacturing techniques. Read these instructions carefully and completely before attempting to install ZERO ZONE equipment. Refer to all National, State and Local electrical, health and HVACR code requirements before installation. These display freezers are designed to operate in an air conditioned environment where the air temperature is maintained at 75°F or lower and the relative humidity does not exceed 55%.

Inspection

These display freezers were factory tested, inspected and properly packed to ensure delivery in the best possible condition. The equipment should be uncrated and checked for damage before and after unloading immediately upon delivery. ALL CLAIMS FOR DAMAGES MUST BE FILED WITH THE TRANSPORTATION COMPANY - NOT WITH ZERO ZONE. The carrier will supply necessary report and claim forms.

Location

The freezer MUST NOT be installed in the direct rays of the sun or near a source of radiant heat. It must be located on a floor with sufficient strength. The freezer must be level and plumb for proper operation.

A minimum of a 4" space between the back of the freezer and the building wall or shelving must be maintained for proper air flow.

INSTALLATION

Electrical

The freezer lights, fans, and door heaters operate on 115 volt, 1 phase, 60 Hz. The compressor and defrost heater operate on 208/230 volt, 1 phase, 60 Hz.

All internal wiring has been completed at the factory. The 115-208/230 volt power connections are made to the leads in the back of the ballast box located in the right side of the compressor compartment.

A cord connection is optional. When a cord is supplied, a NFMA 14-20R four prong 20 amp twist lock receptacle must be provided in your store. The cord length is approximately 6 feet.

A four wire 115-208/230 volt single phase circuit is required. Wiring should be sized according to the amperage rating stamped on the serial plate. Standard case is rated at 20 amps.

Note: All wiring must comply with the National Electrical Code and all local codes.

Start-Up

Before starting the unit, remove all blocking from compressor and condenser fan area. Make sure the compressor floats free on the mounting springs. The case is shipped with the valves back seated (open).

Energizing the electric circuit will start the case. On cord connected units, the on/off switch must be switched on after the cord is connected. The on/off switch is mounted on the electric box located in the front of the case behind the grill. After the case is in operation, set the Time/Pressure Clock to the proper time of day so defrost will occur during the desired time of day. (See Figure 2.)

Note: When the freezer is started from an ambient condition the lights and fans will not immediately turn on and will turn on and off until the coil temperature reaches a stable 5°F or lower. The limit control regulates the operation of the fans and lights. Refer to Defrosting section for complete details.

USER INFORMATION

Cleaning

The freezer should be thoroughly cleaned before start-up and routinely thereafter to maintain a clean appearance. Use a mild detergent and warm water (never an abrasive cleaner) to wipe out the inside of the freezer. Wash down all glass doors with a good glass cleaner. The freezer will remain bright and sparkling with just a few minutes of cleaning each week.

Note: Do not use high pressure water or steam to clean the interior. Remove any debris to prevent clogging of the drain tube.

Shelf Location (See Specifications)

The shelves are adjustable in 1/2 inch increments and may be located in any position for best display advantage due to the air discharge arrangement. It is suggested that the uppermost shelf be placed 10 to 11 inches down from the ceiling and the remaining shelves approximately 10-1/2 inches apart at the front of the freezer.

The rear of each shelf may be set lower than the front on each successive shelf so the shelf slants downward at the rear.

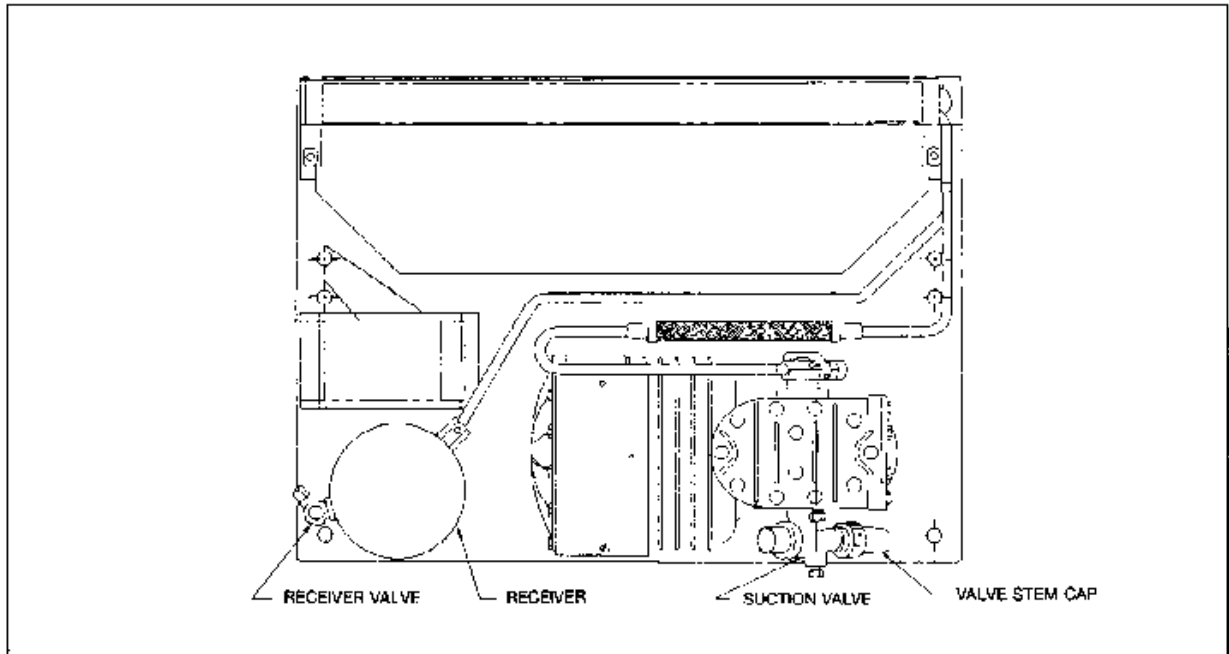


Figure 1. Refrigerant Valve Location

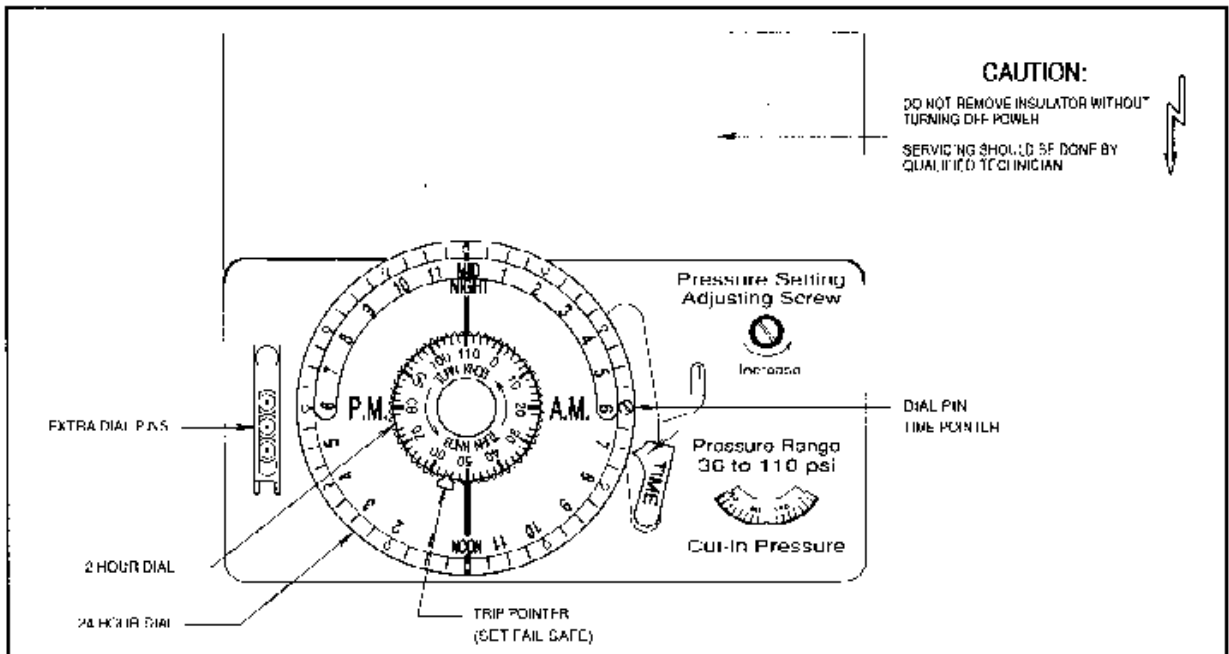


Figure 2. Time/Pressure Clock



Temperature Control

A low pressure control is used to regulate temperatures in the freezer. The control is factory set to maintain a freezer air temperature of -8°F to 16°F. The pressure control is mounted in the control panel box located at the right front of the compressor compartment. To raise the case temperature, turn the adjusting knob to a higher number. To lower the case temperature, turn the knob to a lower number. The factory set position is at "5". Maximum cold is "1".

Loading the Freezer

The freezer may be loaded with merchandise after it has been operating for at least 12 hours with correct case temperature and proper control operation. While loading the shelves, leave at least 1 1/2" between the top of the merchandise and the shelf immediately above it so the customer can reach to select the merchandise. This space also helps in maintaining proper air flow in the freezer.

For proper display, the products should be placed on edge and slanted to the back so the customer sees the face of the packages. Rotate inventory on a regular basis.

Do not load product so as to totally block discharge air holes in the back wall of the freezer.

Light Switch

The light switch is located inside the freezer in the upper right corner of the frame. Turn the light switch off during the initial freezer temperature pull-down to prevent the freezer lights from cycling off and on. Always turn the lights off when replacing bulbs.

DEFROSTING

General

Periodic defrosting to keep the coil free of excessive frost for top efficiency is accomplished automatically by a time clock used in conjunction with an automatic electric defrost system.

Defrost Time Clock

A time/pressure clock is used to defrost the freezer coil at predetermined intervals. (See Figure 2.) The clock is mounted on the right side of the compressor compartment in the electric box.

The defrost sequence of operation is as follows. When the pin in the 24 hour dial reaches the time arrow, it will trip, initiating the defrost cycle. When this happens, the compressor and the holding coil of the defrost relay are de-energized, turning off the lights, evaporator fans, and door heaters.

The defrost heater is energized and defrosting begins. As the ice on the coil melts, the temperature and pressure in the coil rises to the set point pressure. The defrost timer de-energizes the defrost heater, turns on the compressor and energizes the defrost relay. If the coil pressure fails to reach the factory set pressure before the pre-set fail safe time has elapsed, the defrost clock will terminate the defrost.

DEFROST FACTORY SET POINTS

NUMBER/DAY	1
TERMINATION	100 to 105 psi
FAIL SAFE	50 to 55 Min.
DEFROST TIME	6:00 AM

If service load and store conditions dictate an additional defrost be added, see Figure 2 and Defrost Time Clock adjustment.

Limit Thermostat

Each freezer has two factory set limit thermostats attached to the return bends of the coil on the right end of the freezer to regulate the operation of the evaporator fans, freezer lights, and door heaters.

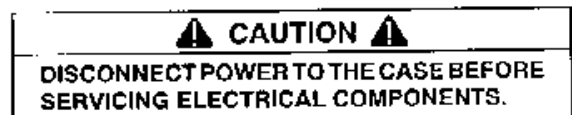
BECAUSE OF THE LIMIT THERMOSTAT, THE EVAPORATOR FANS, FREEZER LIGHTS, AND DOOR HEATERS WILL REMAIN OFF UNTIL THE COMPRESSOR IS OPERATING AND THE COIL TEMPERATURE IS BROUGHT BELOW THE THERMOSTAT CUT-IN SETTING (+5°F).

When the freezer first operates due to temperature fluctuations, the fans and lights may cycle off and on a few times until coil temperature is below +5°F.

Defrost Relay

The relay is located on the right side of the compressor compartment in the electric box. The normally open relay holding coil is actuated by the time clock. The 115 volt power is supplied to the evaporator fans, lights and door heater circuit when the relay is energized. The limit thermostats are wired in series with 115 volt power from the relay.

SERVICE





Evaporator

The evaporator coil, located at the rear bottom of the freezer, is factory assembled with distributor, expansion valve, and heat exchanger. To inspect the coil, the coil cover can be raised by removing the sheet metal screws from the cover and back wall.

Expansion Valve

A thermostatic expansion valve with pressure limiting ZP charge, adjustable super-heat and thermal bulb, is mounted to the evaporator coil. Under certain conditions, it may be necessary to adjust the super-heat setting for maximum coil effectiveness. To adjust the expansion valve, remove the right end coil cover from the top end of the coil. Remove the cap from the bottom of the valve. When looking up the valve stem, turn the valve stem counterclockwise to open the valve. Turn the valve stem clockwise to close the valve. Measure the suction line temperature at the expansion valve sensing bulb and compare it to the corrected suction temperature corresponding to the saturated pressure.

Turn the valve stem only 1/4 turn at a time and allow sufficient time for the valve to settle before making any further adjustments. Replace the valve stem cap after the valve super-heat has been adjusted. **BE CERTAIN THE VALVE STEM CAP IS WIPED DRY FIRST.**

Electric Defrost Element

The defrost element is located under the coil. The electric wire leads are connected in the right junction box below the right end coil cover at the front of the freezer. To remove the defrost element, remove the coil covers. Take out the two sheet metal screws located at the front of the bottom flange. Then slide out the complete heater pan assembly from under the coil and under the fan housing. Slowly lift the heater pan assembly between coil and fan housing, turning it on edge while lifting.

Limit Thermostat

The limit thermostats are attached to the return bend of the coil on the right side. To replace a thermostat, disconnect the 115-208/230 volt power to the case and remove the right side coil cover to gain access to wiring junction box and thermostat.

Evaporator Fans

Air is circulated throughout the freezer with shaft up, 115 volt low temperature fan motors. These motors must be operating at all times except during defrost. To service the fan:

1. **Disconnect all power.**
2. Remove wire fan guard and mounting bracket screws.
3. Unplug fan from fan power supply plug located under fan housing.

Lights

High output 1500 milliamp bulbs are standard with these freezers. To ensure maximum component life, always replace with 1500 milliamp bulbs. Use retainer clips and lamp shields.

To change a light bulb, turn off the light switch and remove the retainer clip located between the socket and end cap. Carefully force the lamp up into the spring-loaded lamp socket to allow the bulb to be removed from the bottom socket. (See Figure 3.) Remove the end caps and lamp shield.

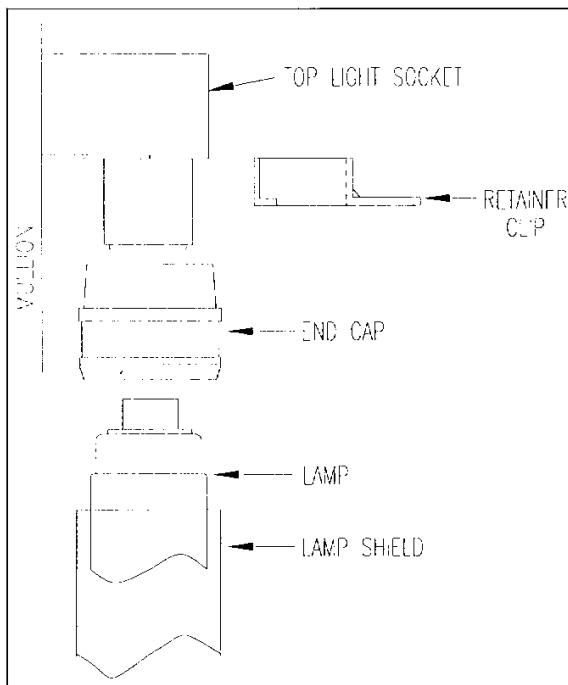


Figure 3. Removing Lamp

Alternate Lighting - T8

These systems use a lens to direct light output evenly across the shelves. The bulb used is a Osram FO32W/41K (4ft). The lens must be removed to access the bulb. The bulb may be removed by turning it 90 degrees and sliding the lamp pins out of the lamp socket slot. A lamp shield must be installed over the bulb. Detailed information is contained in the door instruction booklet.

FSC
04975



Compressor Access Panel (Grill)

The compressor access panel located at the front bottom of the freezer can be removed by removing the screws at the bottom ends of the panel. Drop the panel down and pull out. The panel must be removed before any service work can be done to the compressor, defrost time clock, light ballasts, defrost relay, pressure control or condensate drain pan heater.

Compressor

A 208/230V, 1 phase, 60 Hz, R404A/R507 (prior to 1/95 R502) compressor is mounted in the compressor compartment located below the freezer. The condensing unit is equipped with liquid line, discharge, and suction service valves for refrigeration technician service.

R404A is the standard refrigerant. Check your name plate to determine if R507 was supplied as a special order.

Defrost Time Clock Adjustment (See Figure 2)

After power has been connected to the freezer, the correct time of day should be set on the time/pressure clock. Grasp the knob in the center of the inner (2 Hr.) dial and rotate it in a COUNTERCLOCKWISE direction. This will revolve the outer dial. Line up the correct time of day on the outer dial with the time pointer. **DO NOT TRY TO SET THE TIME CONTROL BY GRASPING THE OUTER DIAL.**

To add an additional defrost, place defrost pin 12 hours after the factory set pin.

To change "Fail Safe", push down on the copper colored pointer of the 2 hour dial until it is opposite the desired time.

Light Ballast

The 3 door freezer has two (2) two-lamp ballasts. They are located in the galvanized electric box on the right side of the compressor compartment.

The 2 door freezer has one (1) three lamp ballast. It is located in the galvanized electric box located on the right side of the compressor compartment.

Defrost Relay

To remove the electric box cover, remove the sheet metal screws from the bottom of the electric box and slide the cover upwards to disengage the top flange. The cover can then be removed for ballast inspection or replacement.

To service the defrost relay, disconnect all power supplied to the case. Remove the access panel. The relay is secured to the electric box located on the right side of the compressor compartment with two Phillips head sheet metal screws.

Pressure Control; Defrost Time Clock

The pressure control and defrost time clock, located in the electric box, are connected to the suction side of the refrigeration system. To replace either, "pump-down" the system and isolate refrigerant in the receiver. Close the suction and discharge service valves on the compressor. Disconnect the power supply to the case. The pressure control or defrost time clock can be removed from the system and replaced. After new component(s) have been installed, the low side should be pressurized and the flare connections checked for leaks. Evacuate the low side to remove moisture and non-condensibles that may have been introduced during the service process. After leak check and evacuation, all of the service valves should be opened to put the system into operation. This work must be done by a certified refrigerant technician.

Condensate Drain Pan Heater

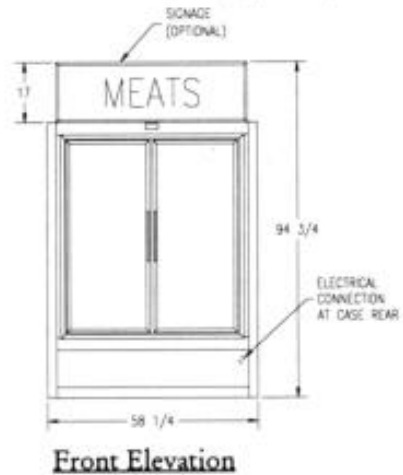
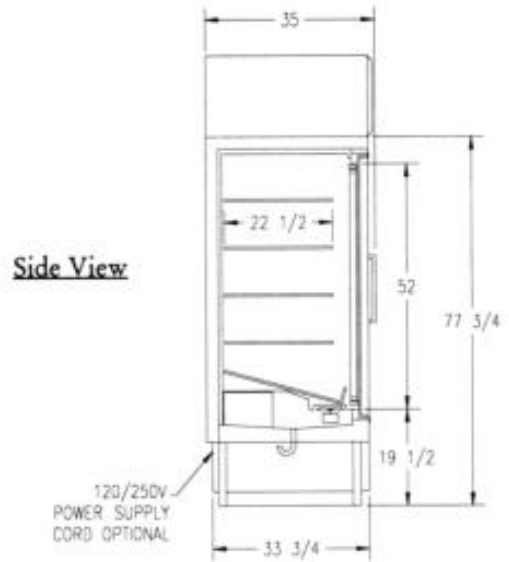
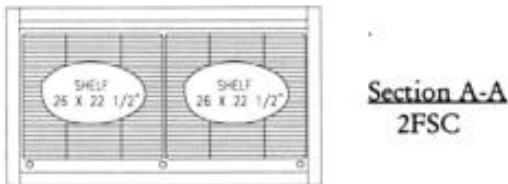
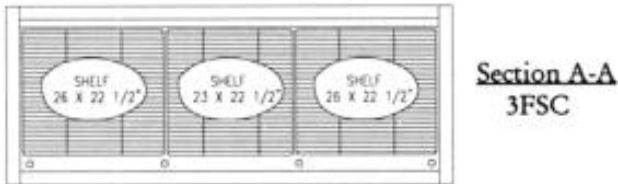
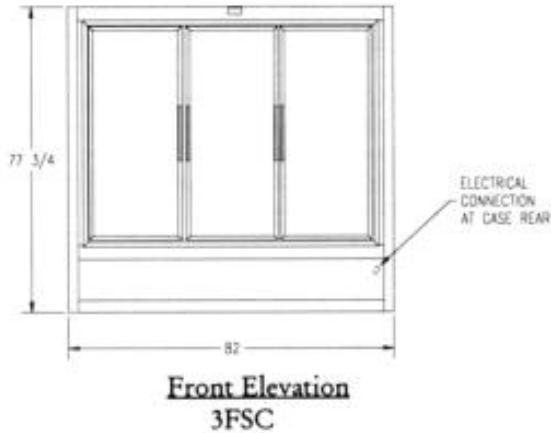
To replace the pan heater, disconnect the 115 volt power supply to case. Remove the compressor access panel. Heater wire connections are in the handy box mounted to the top of the pan.

PREVENTIVE MAINTENANCE

1. Clean condenser fins at least once every 6 months, more often if freezer is in a dusty location.
2. Keep floor drain pan and drain tube clear of debris.
3. Clean condensate drain pan periodically.



FSC SPECIFICATIONS



MODEL	WEIGHT (w/shelves)	OUTSIDE DIMENSIONS (INCHES)			INSIDE DIMENSIONS (INCHES)			CUBIC FEET CAPACITY	NET SHELF AREA SQ. FT.
		W	H	D	W	H	D		
2FSC	837	58 1/4	77 3/4	33 3/4	53	52	25 3/4	35.9	40.6
3FSC	1037	82	77 3/4	33 3/4	76 3/4	52	25 3/4	52	58.6

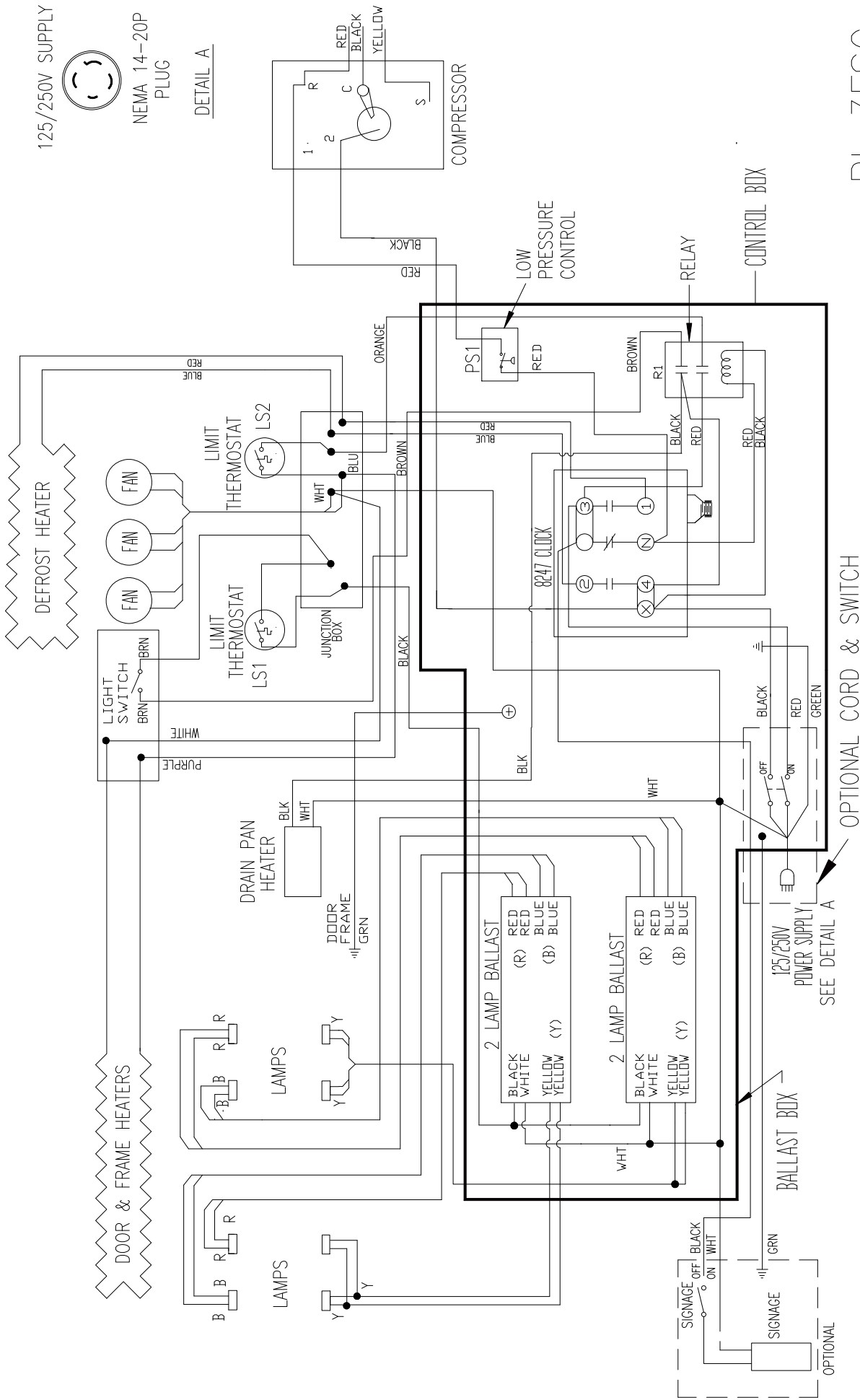
MODEL	ELECTRICAL				CHARGE (LBS.)	
	INCOMING SUPPLY		AMPS RLA	H.P.		REF.
2FSC	115-208/230V-1 PHASE-60 HZ.		13	1	R404A	4 1/4
3FSC	115-208/230V-1 PHASE-60 HZ.		16	1 1/2	R404A	5 1/2

125/250V SUPPLY



NEMA 14-20P
PLUG

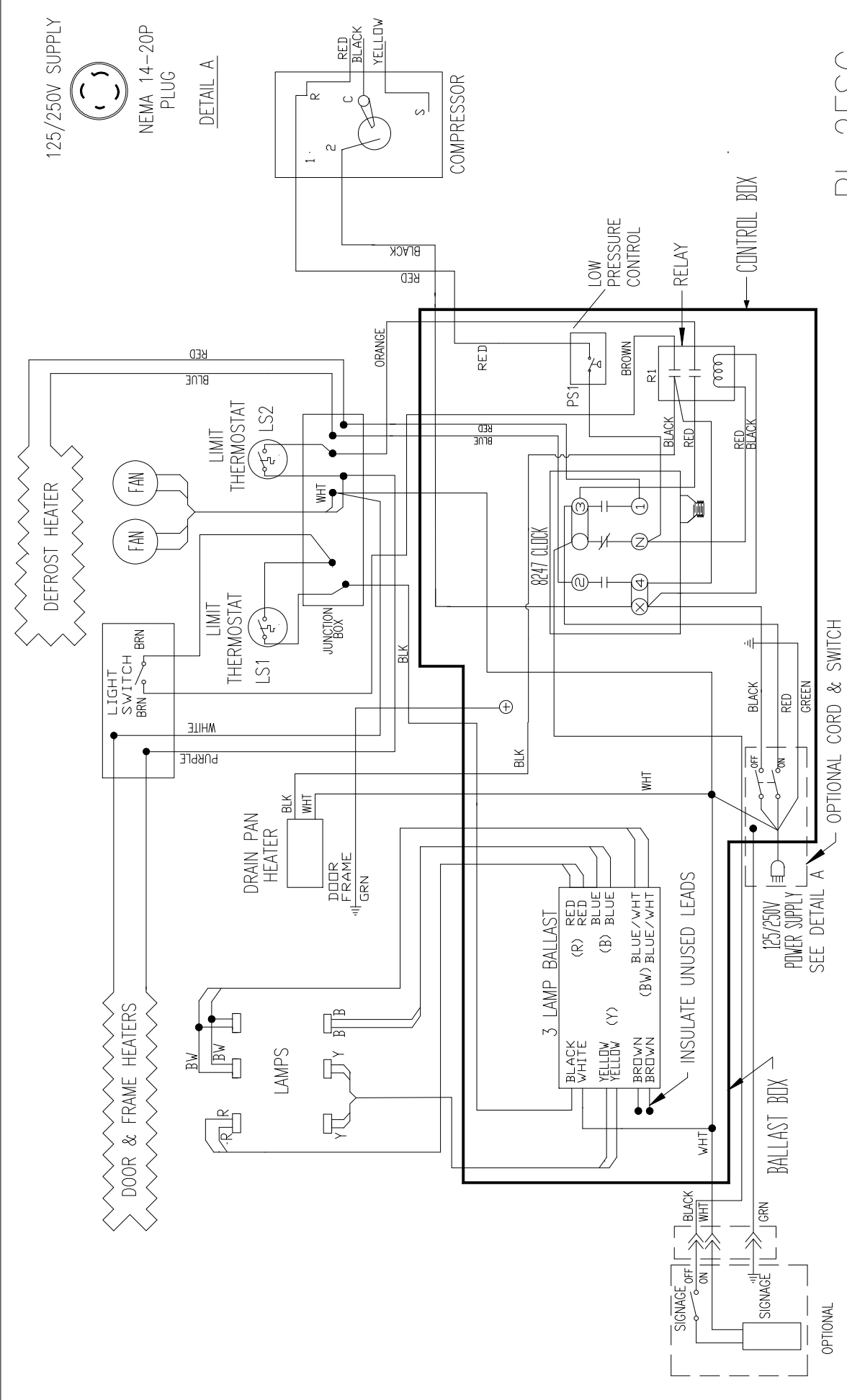
DETAIL A



RI-3FSC

PART NO. 65-0082 REV. B

Vintage wiring diagram may vary in specification according to revision levels at time of equipment manufacture.



PART NO. 65-0083 REV. B

RI-2FSC

Vintage wiring diagram may vary in specification according to revision levels at time of equipment manufacture.



PARTS LIST

Part No.	Description	Quantity	
		RI-2-FSC	RI-3-FSC
	Ballast*		
63-0033	2 Lamp	—	2
63-0037	3 Lamp	1	—
	Defrost Heater Element		
60-0001	1200 Watt	1	—
60-0004	1750 Watt	—	1
	Lamp		
63-0047	F48T10CW	3	4
	Lamp Assembly (Lamp, Jacket and 2 End Grommets)		
63-0048	F48T10J/CW	3	4
63-0045	Lamp End Grommet (2)		
75-0119	Top Lampholder		
75-0120	Bottom Lampholder		
63-0042	Lamp Jacket		
63-0027	Klixon (Fan, Light and Door Heater Delay)	2	2
63-0001	Fan Motor	2	3
63-0006	Fan Blade	2	3
55-Clip	Shelf Clip	As Req'd.	As Req'd.
63-0021	Contactora	1	1
69-0047	Pressure Control	1	1
63-0014	Defrost Timer	1	1
69-0179-3	Expansion Valve**	1	—
69-0198-3	Expansion Valve**	—	1
60-0011	Condensate Pan Heater	1	1
	Ballast*		
63-0033	2 Lamp (Prior to 6-93)	1	—
63-0041	1 Lamp (Prior to 12-92)	1	4
Expansion Valve ** (Prior to 1/95)			
69-0006	Expansion Valve	1	—
69-0014	Expansion Valve	—	1