

**HUSSmann®/CHINO**

**CRFD, CRFD 1/2**

**FLORAL CASE**

Installation  
& Operation  
Manual

**REV. 0909**

**HUSSmann®**

**CRFD**  
**FLORAL CASE**



**P/N IGFL-CRFD/CRFD 1/2-0909**

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**INSTALLATION & OPERATION GUIDE**

## General Instructions

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### This Booklet Contains Information on:

**CRFD and CRFD 1/2** are refrigerated service floral merchandisers.

### Shipping Damage

All equipment should be thoroughly examined for shipping damage before and during unloading.

This equipment has been carefully inspected at our factory and the carrier has assumed responsibility for safe arrival. If damaged, either apparent or concealed, claim must be made to the carrier.

### Apparent Loss or Damage

If there is an *obvious loss or damage*, it must be noted on the freight bill or express receipt and signed by the carrier's agent; otherwise, carrier may refuse claim. The carrier will supply necessary claim forms.

### Concealed Loss or Damage

When loss or damage *is not apparent until after equipment is uncrated*, a claim for concealed damage is made. Make request in writing to carrier for inspection within 15 days, and retain all packaging. The carrier will supply inspection report and required claim forms.

### Shortages

Check your shipment for any possible shortages of material. If a shortage should exist and is found to be the responsibility of Hussmann Chino, *notify Hussmann Chino*. If such a shortage involves the carrier, *notify the carrier immediately*, and request an inspection. Hussmann Chino will acknowledge shortages within ten days from receipt of equipment.

### Hussmann Chino Product Control

The serial number and shipping date of all equipment has been recorded in Hussmann's files for warranty and replacement part purposes. All correspondence pertaining to warranty or parts ordering must include the serial number of each piece of equipment involved, in order to provide the customer with the correct parts.

Keep this booklet with the case at all times for future reference.

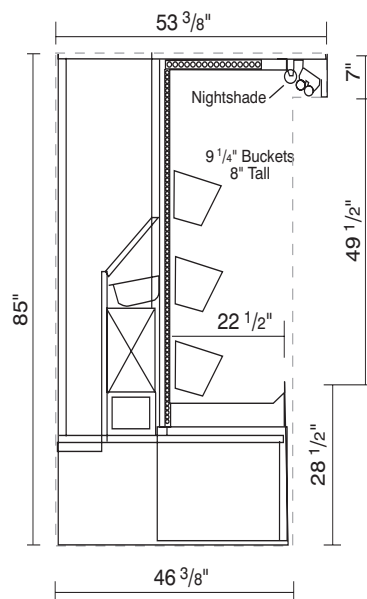
## HUSSmann®/CHINO

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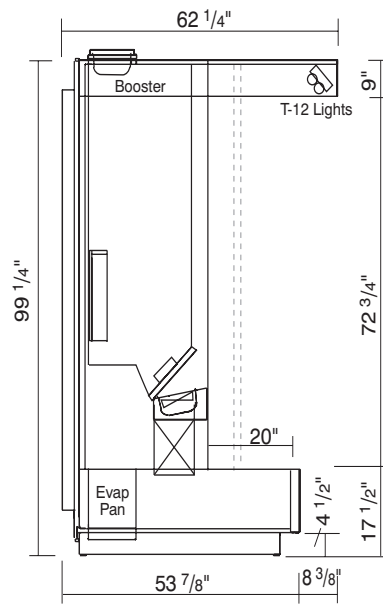


This equipment is to be installed to comply with the applicable NEC, Federal, State, and Local Plumbing and Construction Code having jurisdiction.

Cut and Plan Views

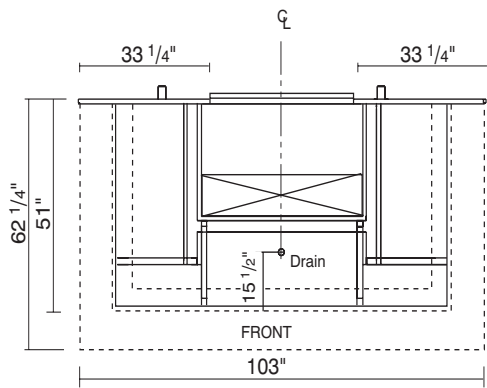


**CRFD 1/2**  
Side View  
Scale = 1/4"

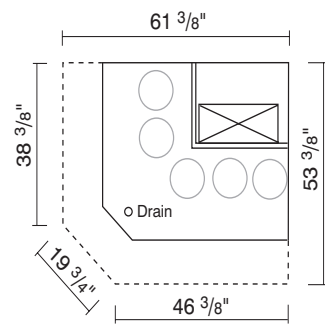


**CRFD**  
Side View  
Scale = 1/4"

CRFD  
PLAN VIEWS



**CRFD**  
Plan View  
Scale = 1/4"



**CRFD 1/2**  
Self Contained Plan View  
Scale = 1/4"

## Installation

### Location

The refrigerated merchandisers have been designed for use only in air conditioned stores where temperature and humidity are maintained at or below 75°F and 55% relative humidity. DO NOT allow air conditioning, electric fans, ovens, open doors or windows (etc.) to create air currents around the merchandiser, as this will impair its correct operation.

Product temperature should always be maintained at a constant and proper temperature. This means that from the time the product is received, through storage, preparation and display, the temperature of the product must be controlled to maximize life of the product.

### Uncrating the Stand

Place the fixture as close to its permanent position as possible. Remove the top of the crate. Detach the walls from each other and remove from the skid. Unbolt the case from the skid. The fixture can now be lifted off the crate skid. **Lift only at base of stand!**

### Exterior Loading

These models have **not** been structurally designed to support excessive external loading. **Do not walk on their tops;** This could cause serious personal injury and damage to the fixture.

### Leveling

**IMPORTANT! IT IS IMPERATIVE THAT CASES BE LEVELED FROM FRONT TO BACK AND SIDE TO SIDE. A LEVEL CASE IS NECESSARY TO INSURE PROPER OPERATION, AND WATER DRAINAGE.**



**It is the contractor's responsibility to install case(s) according to local construction and health codes**

**DO NOT SEAL JOINT TRIM TO FLOOR!**

## Refrigeration

### Refrigerant Type

The standard refrigerant will be R-22 unless otherwise specified on the customer order. Check the serial plate on the case for information.

### Refrigeration Lines

<u>Liquid</u>	<u>Suction</u>
3/8" O.D.	5/8" O.D.

### Control Settings

See CRFD technical data sheet for the appropriate settings for your merchandiser. Maintain these parameters to achieve near constant product temperatures. Product temperature should be measured first thing in the morning, after having been refrigerated overnight. Defrost times should be as directed in the CRFD technical data sheet. The number of defrosts per day should never change. The duration of the defrost cycle may be adjusted to meet conditions present at your location.

### Access to TX Valves and Drain Lines

**Mechanical** - Remove product from end of case. Remove refrigeration and drain access panels (labeled), TX valve.

### Electronic Expansion Valve (Optional)

A wide variety of electronic expansion valves and case controllers can be utilized. Please refer to EEV and controller manufacturers information sheet. Sensors for electronic expansion valves will be installed on the coil inlet, coil outlet, and in the discharge air. (Some supermarkets require a 4th sensor in the return air). Case controllers will be located in the electrical raceway or under the case.

### Thermostatic Expansion Valve Location

This device is located on the same side as the refrigeration stub. A Sporlan balanced port expansion valve model is furnished as standard equipment, unless otherwise specified by customer.

### Expansion Valve Adjustment

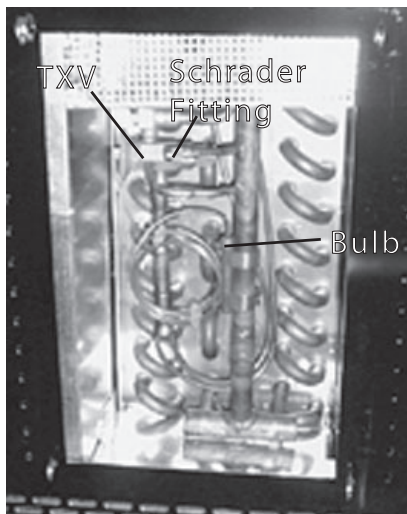
Expansion valves must be adjusted to fully feed the evaporator. Before attempting any adjustments, make sure the evaporator is either clear or very lightly covered with frost, and that the fixture is within 10°F of its expected operating temperature.

### Measuring the Operating Superheat

1. Determine the suction pressure with an accurate pressure gauge at the evaporator outlet.
2. From a refrigerant pressure temperature chart, determine the saturation temperature at the observed suction pressure.
3. Measure the temperature of the suction gas at the thermostatic remote bulb location.
4. Subtract the saturation temperature obtained in step No. 2 from the temperature measured in step No. 3.
5. The difference is superheat.
6. Set the superheat for 5°F - 7°F.

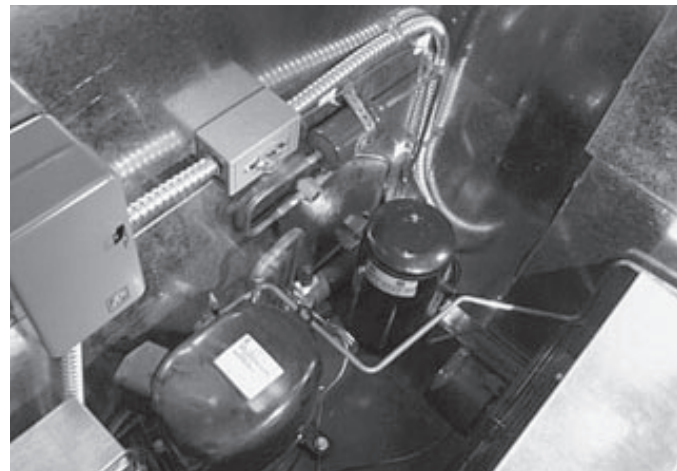
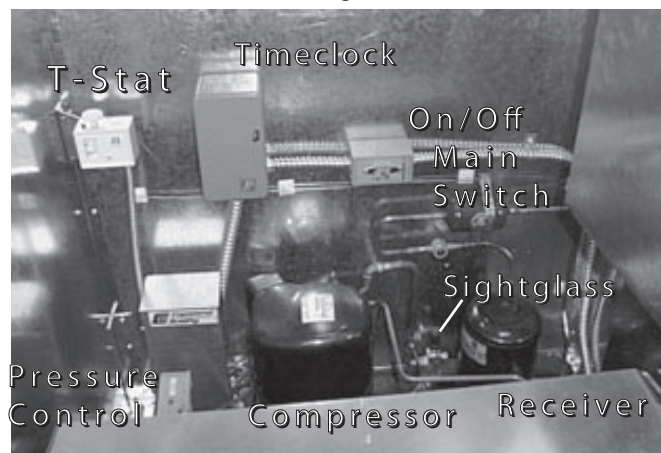


## Refrigeration (Cont'd)



### T-STAT Location

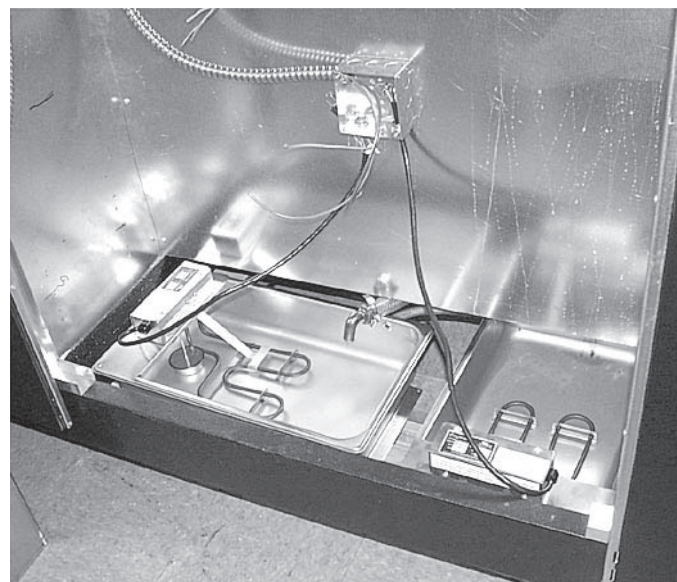
T-STATS are indicated in diagram below.



### Condensate Evaporator

The condensate evaporator is a 5000 watt heater unit located on the lower back of the unit, inside the condensate pan. It is designed to evaporate water that comes from the coil when the unit is defrosting. The unit is temperature self regulating and should be constantly connected to power in order to operate as required. Should the unit be disconnected case flooding will occur.

The CRFD 1/2 is supplied with a 1500 watt, 208 volt Evapoway condensate with float switch.



## Refrigeration (Cont'd)

### Refrigeration Data

**Note:** This data is based on store temperature and humidity that does not exceed 75F and 55% R.H.

**Discharge Air (F) 35**

**Evaporator (F) 25**

**Note:** Not recommended to control temp by regulating coil temp allow T-STAT to cycle and control temp.

**½ Case**

**Btu/hr/total\***

**Parallel 10,500**

**Conventional 12,025**

**Full Case**

**Btu/hr/total\***

**Parallel 21,000**

**Conventional 24150**

\*For all refrigeration equipment other than Hussmann use conventional Btu values.

### Defrost Data

**Frequency Hrs 4**

**OFFTIME**

**Temp Term °F 54**

**Failsafe Minutes 24**

**ELECTRIC or GAS Not Recommended**

### Physical Data

Merchandiser Drip Pipe (in.) 1 ½\*

Merchandiser Liquid Line (in.) 3/8\*

Merchandiser Suction Line (in.) 5/8\*

Estimated Charge (lb)\*\*\*

4ft 1.2

5ft 1.5

6ft 1.8

\*Dependent on case length and refrigerant type.

\*\*\* This is an average for all refrigerants types. Actual refrigerant charge may vary by approximately half a pound.

### Glycol Requirements

**GPM PSI**

**N/A N/A**

**N/A N/A**

**N/A N/A**

## Electrical

### Wiring Color Code

STANDARD CASE WIRE COLOR CODE CODIGO DE COLORES DE LOS ALAMBRES PARA LAS VITRINAS ESTANDAR CODE COULEUR POUR FILS DE BOITIER NORMALISE		
COLOR DESCRIPTION	DESCRIPCION	DESCRIPTION
GROUND	TIERRA MASA	MASSE
ANTI-SWEAT	ANTICONDENSACION	ANTI-SUITEMENT
LIGHTS	LUCES	ECLAIRAGE
RECEPTACLES	ENCHUFES	PRISE DE COURANT
T-STAT/SOLENOID 230VAC	TERMOSTATO/SOLENOIDE (230VAC)	SOUPAPE A SOLENOID (230 VAC)
T-STAT/SOLENOID 115VAC	TERMOSTATO/SOLENOIDE (115VAC)	SOUPAPE A SOLENOID (115 VAC)
T-STAT/SOLENOID 24VAC	TERMOSTATO/SOLENOIDE (24VAC)	SOUPAPE A SOLENOID (24 VAC)
FAN MOTORS	VENTILADORES	VENTILATEUR
BLUE CONDENSING UNIT	UNIDAD DE CONDENSACION	UNITE DE CONDENSATION

USE COPPER CONDUCTORS ONLY  
UTILISEZ LES CONDUCTEURS DE CUIVRE SEULEMENT  
UTILICE LOS CONDUCTORES DE COBRE SOLAMENTE  
430-01-0338 R101003

### CASE MUST BE GROUNDED

**NOTE:** Refer to label illustrated above that is affixed to case to determine the actual configuration as checked in the "TYPE INSTALLED" boxes.

### Electrical Circuit Identification

Standard lighting for all models will be full length fluorescent lamps located within the case at the top.

The switch controlling the lights is located on the light fixture.



**DANGER**

**BEFORE SERVICING  
ALWAYS DISCONNECT ELECTRICAL  
POWER AT THE MAIN DISCONNECT  
WHEN SERVICING OR REPLACING ANY  
ELECTRICAL COMPONENT.**

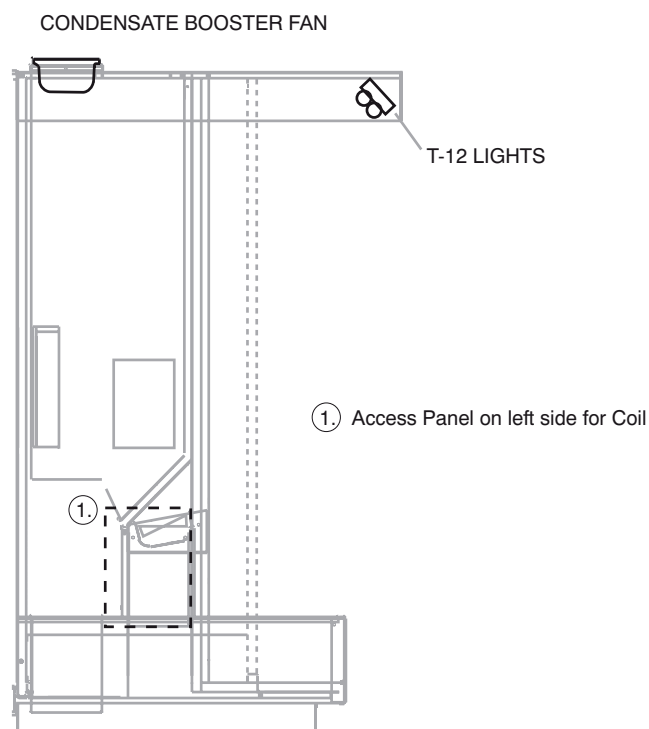
**This includes (but not limited to) Fans, Heaters  
Thermostats, and Lights.**

### Field Wiring and Serial Plate Amperage

Field Wiring must be sized for component amperes printed on the serial plate. Actual ampere draw may be less than specified. Case amperes are listed on the wiring diagram, but always check the serial plate.

### Ballast Location

Ballasts are located within the light fixture. Refer to diagram below.



## User Information

### Stocking

Improper temperature and lighting will cause serious product loss. Discoloration, dehydration and spoilage can be controlled with proper use of the equipment and handling of product. Product temperature should always be maintained at a constant and proper temperature. This means that from the time the product is received, through storage, preparation and display, the temperature of the product must be controlled to maximize life of the product. Hussmann cases were not designed to "heat up" or "cool down" product-but rather to maintain an item's proper temperature for maximum shelf life. To achieve the protection required always:

1. Minimize processing time to avoid damaging temperature rise to the product. Product should be at proper temperature.
2. Keep the air in and around the case area free of foreign gasses and fumes or flowers will rapidly deteriorate.
3. Maintain the display merchandisers temperature controls as outlined in the refrigerator section of this manual.
4. Do not place any product into these refrigerators until all controls have been adjusted and they are operating at the proper temperature. Allow merchandiser to operate a minimum of 6 hours before stocking with any product.

## User Information (Cont'd)

5. When stocking, never allow the product to extend beyond the recommended load limit. **Air discharge and return air flue must be unobstructed at all times to provide proper refrigeration.**
6. **Do not place any signs or other restrictive objects on the front of the refrigerator that will block the air intake vents.**
7. Avoid the use of supplemental flood or spot lighting. Display light intensity has been designed for maximum visibility and product life at the factory. The use of higher output fluorescent lamps (H.O. and V.H.O.), will shorten the shelf life of the product.
8. Cold coils remove heat and moisture from the case and deposit this as frost onto the coil. Thus, a defrost is required.

### Important Steps

1. Do not set temperature too cold, as this causes product dehydration.

### Case Cleaning

Long life and satisfactory performance of any equipment are dependent upon the care given to it. To insure long life, proper sanitation and minimum maintenance costs, the refrigerator should be thoroughly cleaned frequently. SHUT OFF FAN DURING CLEANING PROCESS. It can be unplugged within the case, or shut off case at the source. The interior bottom may be cleaned with any domestic soap or detergent based cleaners. Sanitizing solutions will not harm the interior bottom, however, these solutions should always be used according to the manufacturer's directions. It is essential to establish and regulate cleaning procedures. This will minimize bacteria causing discoloration which leads to degraded product appearance and significantly shortening product shelf life.

*Soap and hot water are not enough to kill this bacteria. A sanitizing solution must be included with each cleaning process to eliminate this bacteria.*

1. Scrub thoroughly, cleaning all surfaces, with soap and hot water.
2. Rinse with hot water, but do not flood.
3. Apply the sanitizing solution according to the manufacturer's directions.
4. Rinse thoroughly.
5. Dry completely before resuming operation.

## CAUTION

### CLEANING PRECAUTIONS

When cleaning:

- Do not use high pressure water hoses
- Do not introduce water faster than waste outlet can drain
- NEVER INTRODUCE WATER ON SELF CONTAINED UNIT WITH AN EVAPORATOR PAN
- NEVER USE A CLEANING OR SANITIZING SOLUTION THAT HAS AN OIL BASE (these will dissolve the butyl sealants) or an AMMONIA BASE (this will corrode the copper components of the case)
- TO PRESERVE THE ATTRACTIVE FINISH:
- DO USE WATER AND A MILD DETERGENT FOR THE EXTERIOR ONLY
- DO NOT USE A CHLORANITED CLEANER ON ANY SURFACE
- DO NOT USE ABRASIVES OR STEEL WOOL SCOURING PADS (these will mar the finish)

## Maintenance



**DANGER**

**BEFORE SERVICING  
ALWAYS DISCONNECT ELECTRICAL  
POWER AT THE MAIN DISCONNECT  
WHEN SERVICING OR REPLACING ANY  
ELECTRICAL COMPONENT.**

**This includes (but not limited to) Fans, Heaters  
Thermostats, and Lights.**

This lamp has been treated to resist breakage and must be replaced with a similarly treated lamp in order to maintain compliance with NSF Standards. NSF CODE 4.28.1

Contact HUSSMANN Chino for replacement  
1-800-395-9229 x 2131

### Evaporator Fans

The evaporator fans are located at the center front of these merchandisers directly behind the front wall at the center of the display. *Should fans or blades need servicing, always replace fan blades with the raised embossed side of the blade TOWARD THE MOTOR.*

### Copper Coils

The copper coils used in Hussmann merchandisers may be repaired in the field. Materials are available from local refrigeration wholesalers.

Hussmann recommends using #15 Sil-Fos for repairs.

### Replacing Fluorescent Lamps

Fluorescent lamps are furnished with a shatterproof protective coating. The same type of lamp with protective coating must be used if replaced.



## Maintenance (Cont'd)

### Tips and Troubleshooting

#### Before calling for service, check the following:

1. Check electrical power supply to the equipment for connection.
2. Check fixture loading. Overstocking case will affect its proper operation.
3. If frost is collecting on fixture and/or product, check temperature settings, be sure that no outside doors or windows are open allowing moisture to enter store.



#### IMPORTANT INFORMATION

**FOR PROMPT SERVICE**  
**When contacting the factory,**  
**be sure to have the Case Model and Serial**  
**Number handy. This information is on a plate**  
**located on the case itself.**

### Stainless Steel Cleaning and Care

There are three basic things, which can break down your stainless steel's passivity layer and allow corrosion.

#### 1. Mechanical Abrasion

Mechanical Abrasion means those things that will scratch the steel's surface. Steel Pads, wire Brushes, and Scrapers are prime examples.

#### 2. Water

Water comes out of our tap in varying degrees of hardness. Depending on what part of the country you live in, you may have hard or soft water. Hard water may leave spots. Also, when heated, hard water leaves deposits behind that if left to sit, will break down the passive layer and rust your stainless steel. Other deposits from food preparation and service must be properly removed.

#### 3. Chlorides

Chlorides are found nearly everywhere. They are in water, food and table salt. One of the worst perpetrators of chlorides can come from household and industrial cleaners.

Don't Despair! Here are a few steps that can help prevent stainless steel rust.

#### 1. Use the Proper Tools

When cleaning your stainless steel products, take care to use non-abrasive tools. Soft Clothes and plastic scouring pads will NOT harm the steel's passive layer. Stainless steel pads can also be used but the scrubbing motion must be in the same direction of the manufacturer's polishing marks.

#### 2. Clean With the Polish Lines

Some stainless steels come with visible polishing lines or "grain". When visible lines are present, you should ALWAYS scrub in a motion that is parallel to them. When the grain cannot be seen, play it safe and use a soft cloth or plastic scouring pad.

#### 3. Use Alkaline, Alkaline Chlorinated or Non-chloride Containing Cleaners

While many traditional cleaners are loaded with chlorides, the industry is providing an ever increasing choice of non-chloride cleaners. If you are not sure of your cleaner's chloride content contact your cleaner supplier. If they tell you that your present cleaner contains chlorides, ask for an alternative. Also, avoid cleaners containing quaternary salts as they also can attack stainless steel & cause pitting and rusting.

#### 4. Treat your Water

Though this is not always practical, softening hard water can do much to reduce deposits. There are certain filters that can be installed to remove distasteful and corrosive elements. Salts in a properly maintained water softener are your friends. If you are not sure of the proper water treatment, call a treatment specialist.

#### 5. Keep your Food Equipment Clean

Use alkaline, alkaline chlorinated or non-chlorinated cleaners at recommended strength. Clean frequently to avoid build-up of hard, stubborn stains. If you boil water in your stainless steel equipment, remember the single most likely cause of damage is chlorides in the water. Heating cleaners that contain chlorides has a similar effect.

#### 6. RINSE, RINSE, RINSE

If chlorinated cleaners are used you must rinse, rinse, rinse and wipe dry immediately. The sooner you wipe off standing water, especially when it contains cleaning agents, the better. After wiping the equipment down, allow it to air dry for the oxygen helps maintain the stainless steel's passivity film.

#### 7. Never Use Hydrochloric Acid (Muriatic Acid) on Stainless Steel

#### 8. Regularly Restore/Passivate Stainless Steel

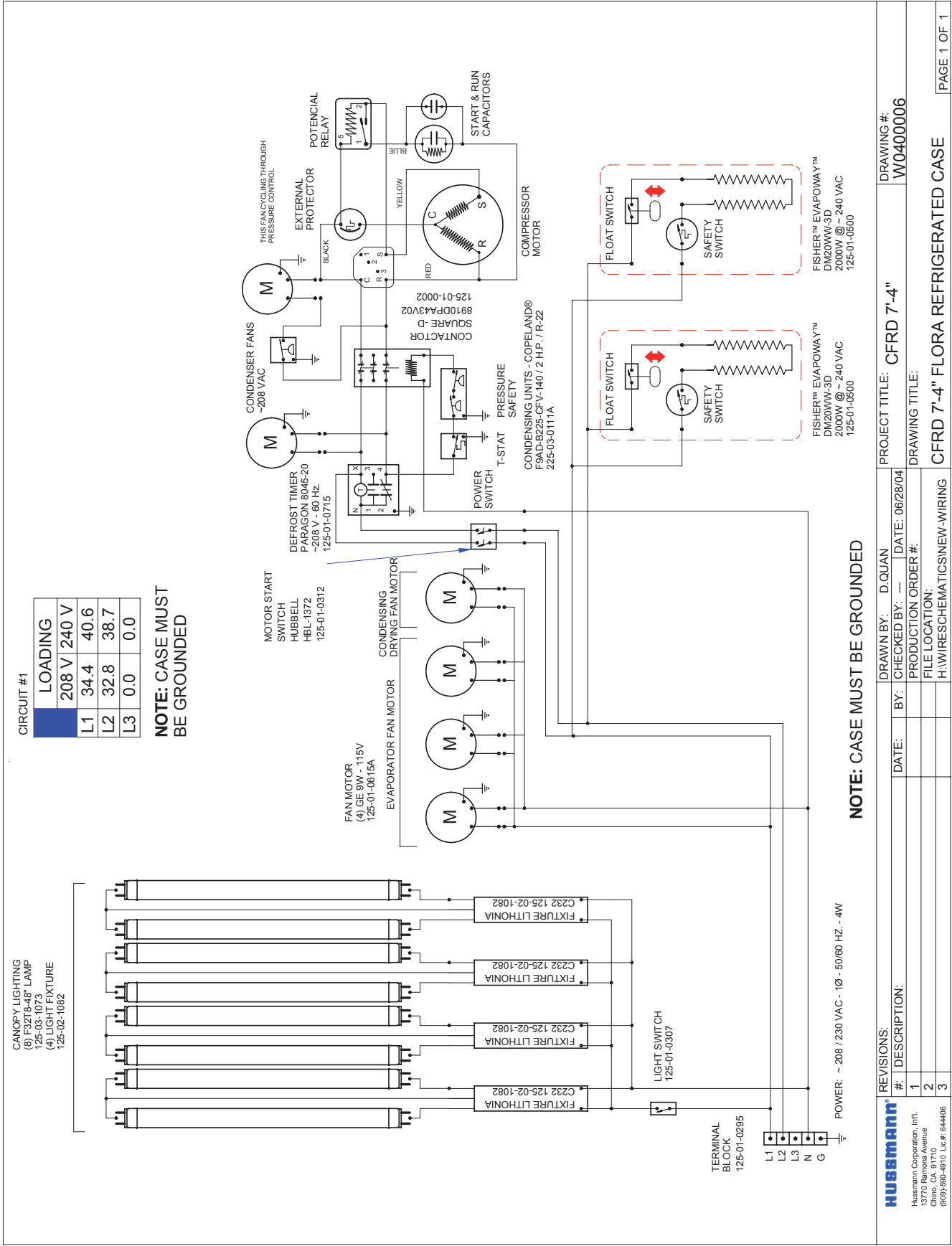
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**Electrical Wiring Diagrams**

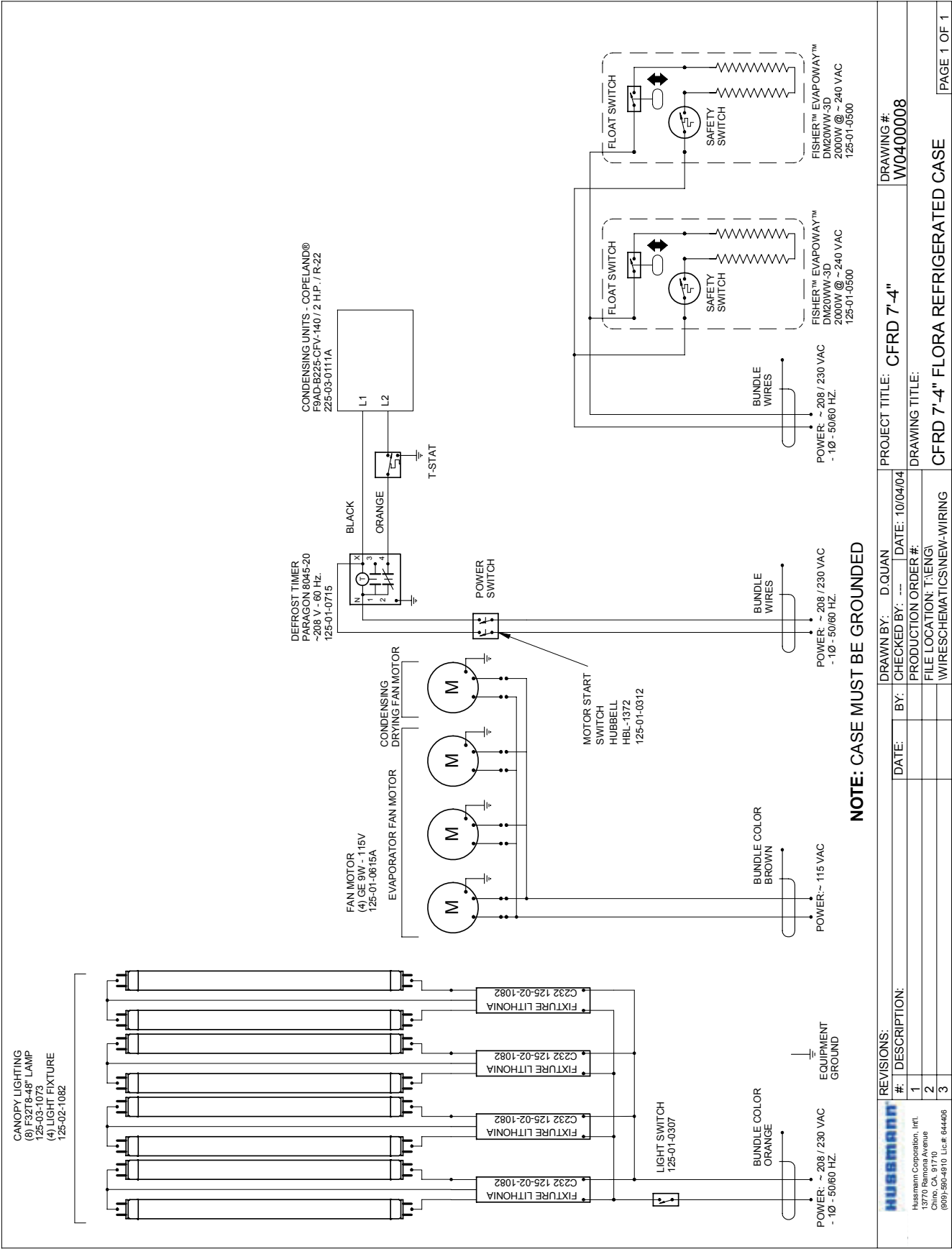

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<b>CRFD</b>	Standard Floral R-22	7'	W0400006
Floral Display	Standard Floral (separate circuits)	7'	W0400008
	Standard Costco	7'	W0400009
	CRFD 360 Back To Back	7'	W0400010
Lights	Standard Floral Remote	7'	W0400011
Lights	Standard Floral Remote	7'	W0400013
	Remote with EEPR	7'	W0400014
	Standard Floral Remote with 120VAC cord	7'	W0400016
	Costco Floral R507	7'	W0400017
	Costco Floral Back to Back R507	7'	W0400019
	CRFD-1/2 Self Contained		1H15779

Wiring Diagrams



Wiring Diagrams (Cont'd)

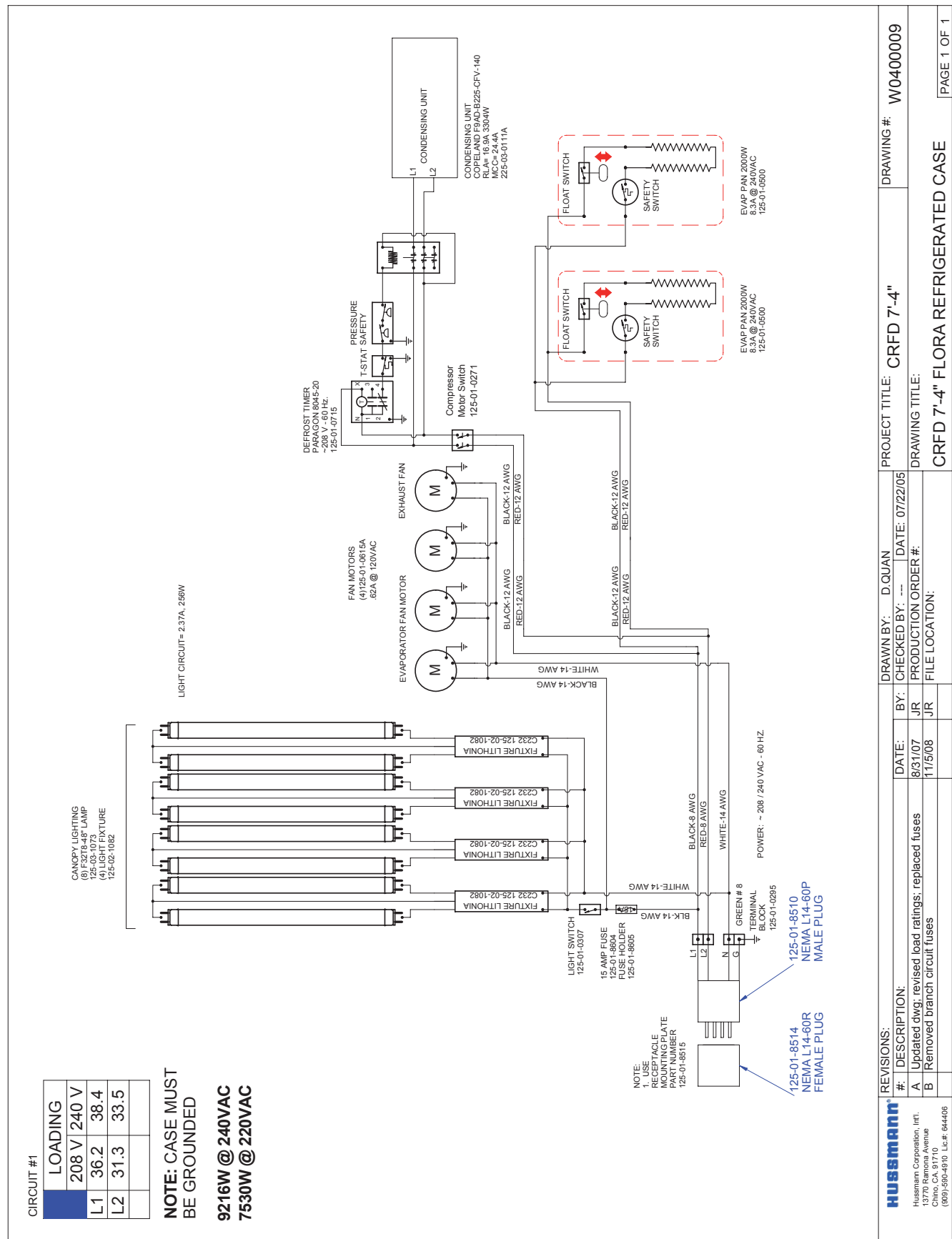


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2						FILE LOCATION: T.ENG		
3						WIRESCHEMATICS-NEW-WIRING		

CFRD 7'-4" FLORA REFRIGERATED CASE

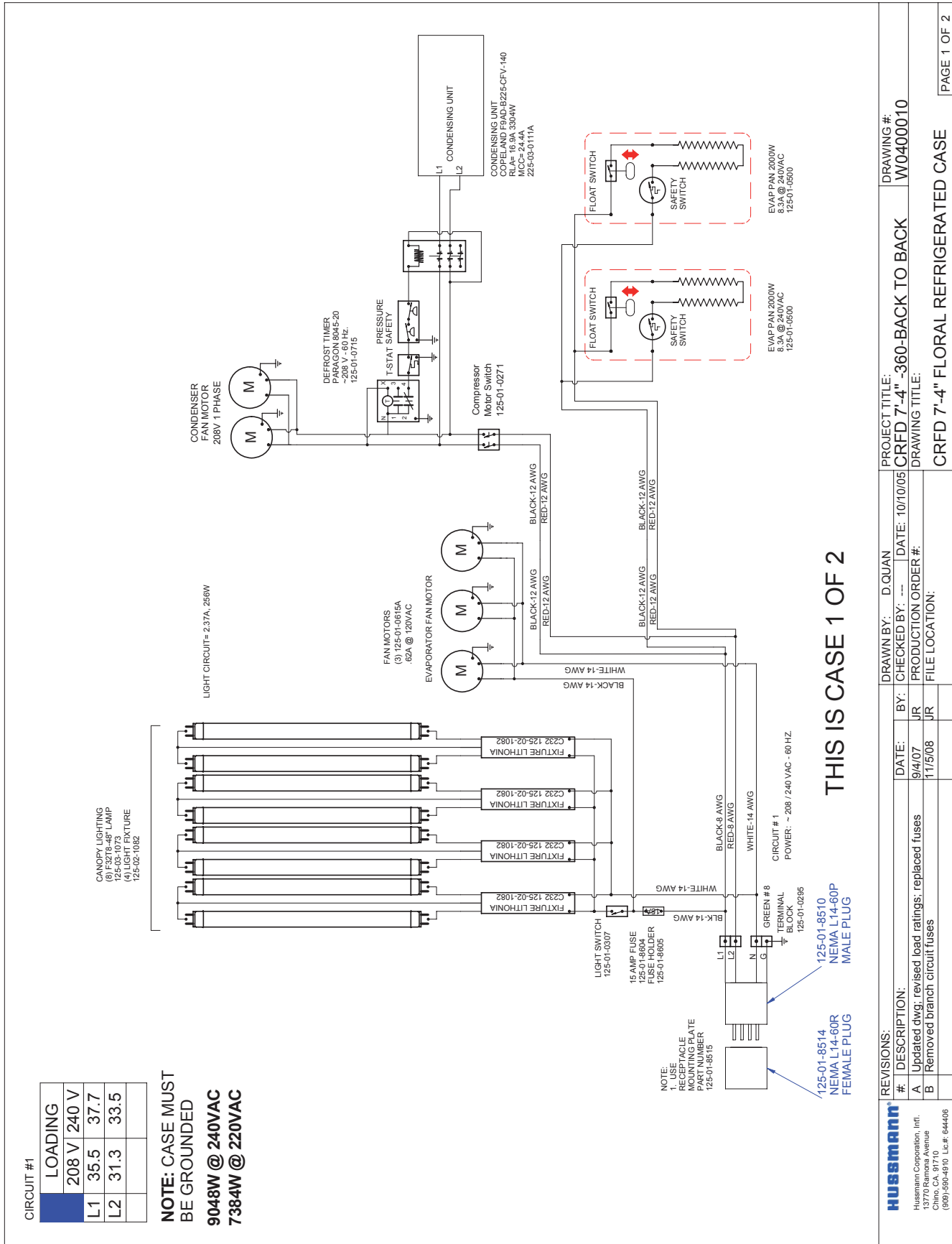
PAGE 1 OF 1

## Wiring Diagrams (Cont'd)

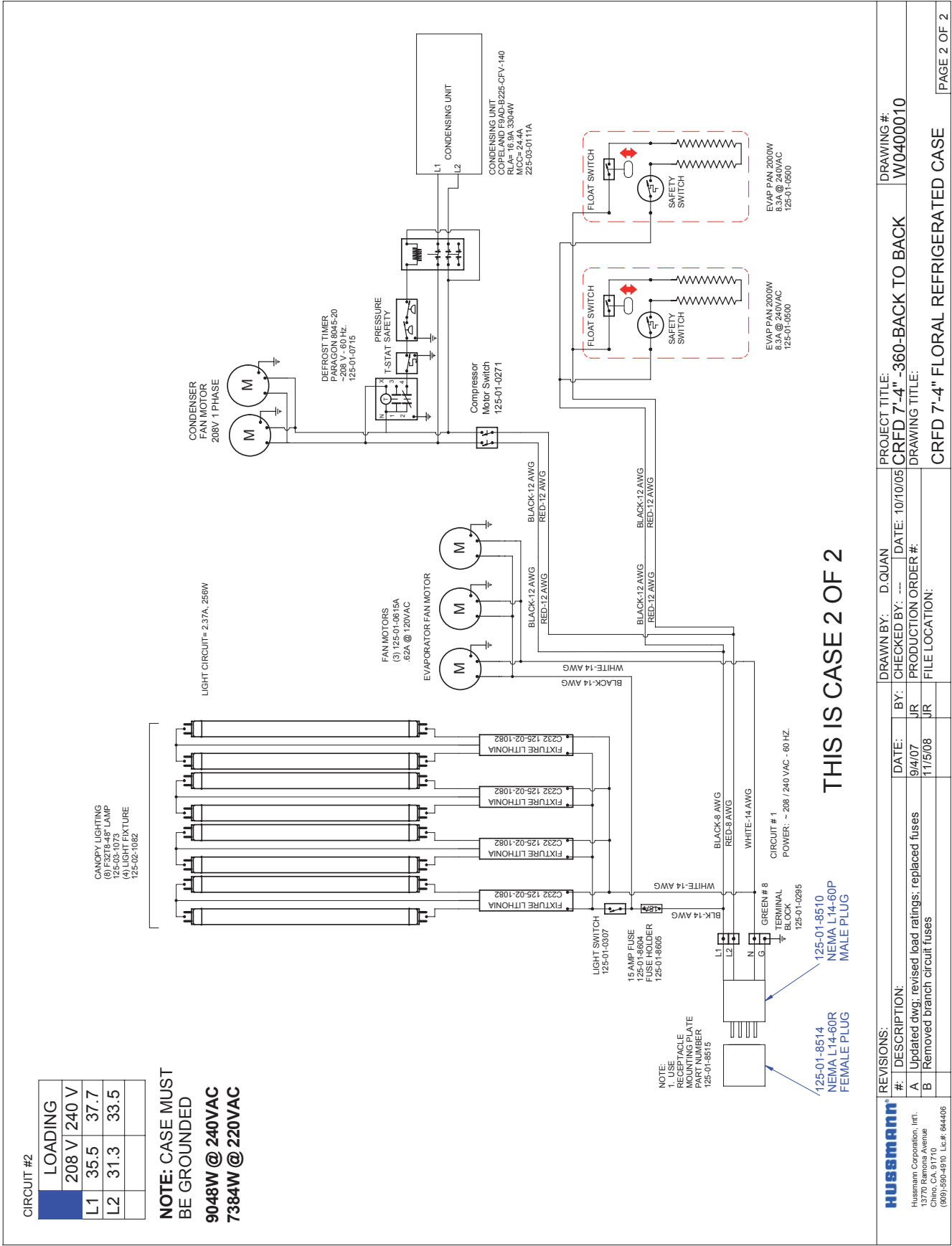




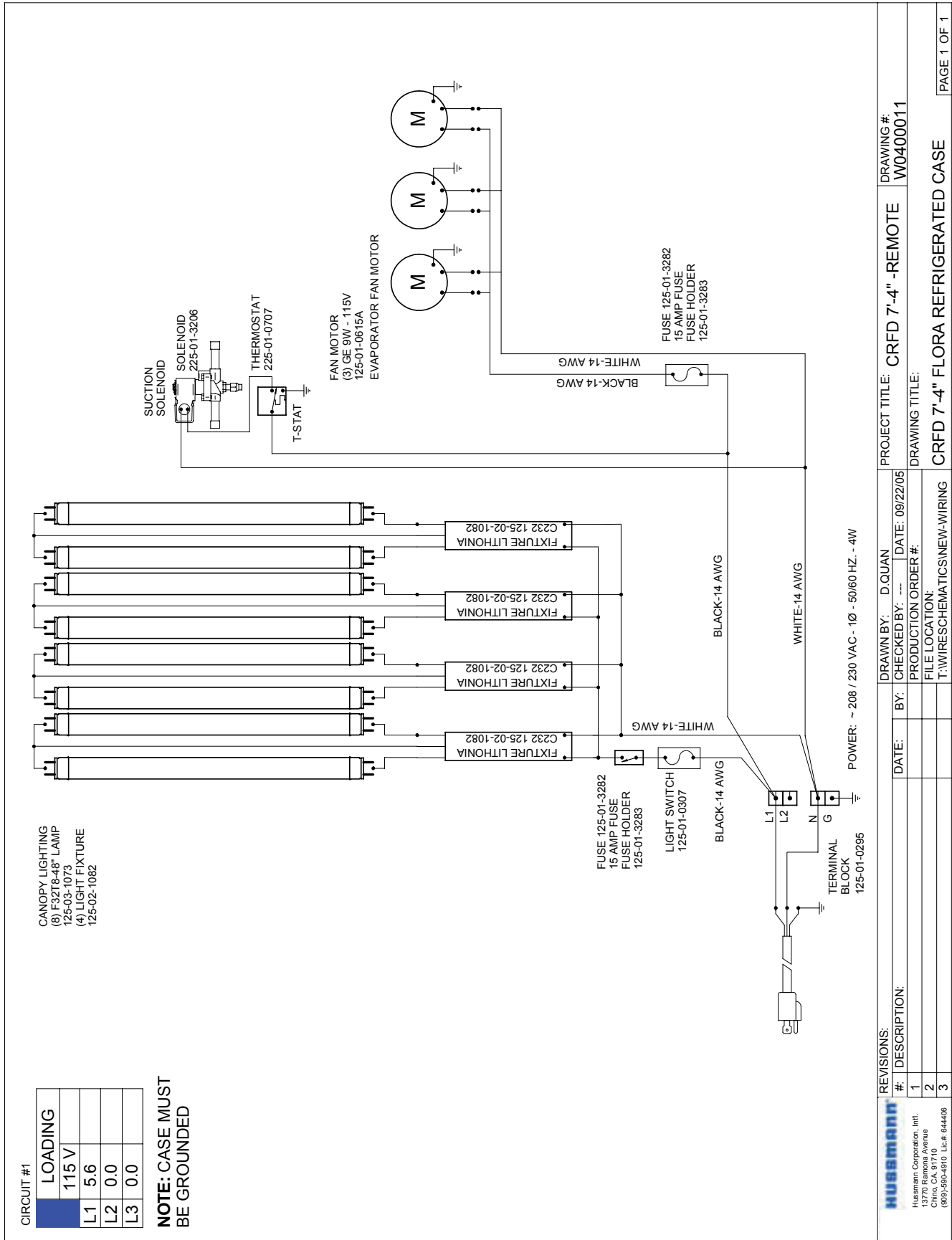
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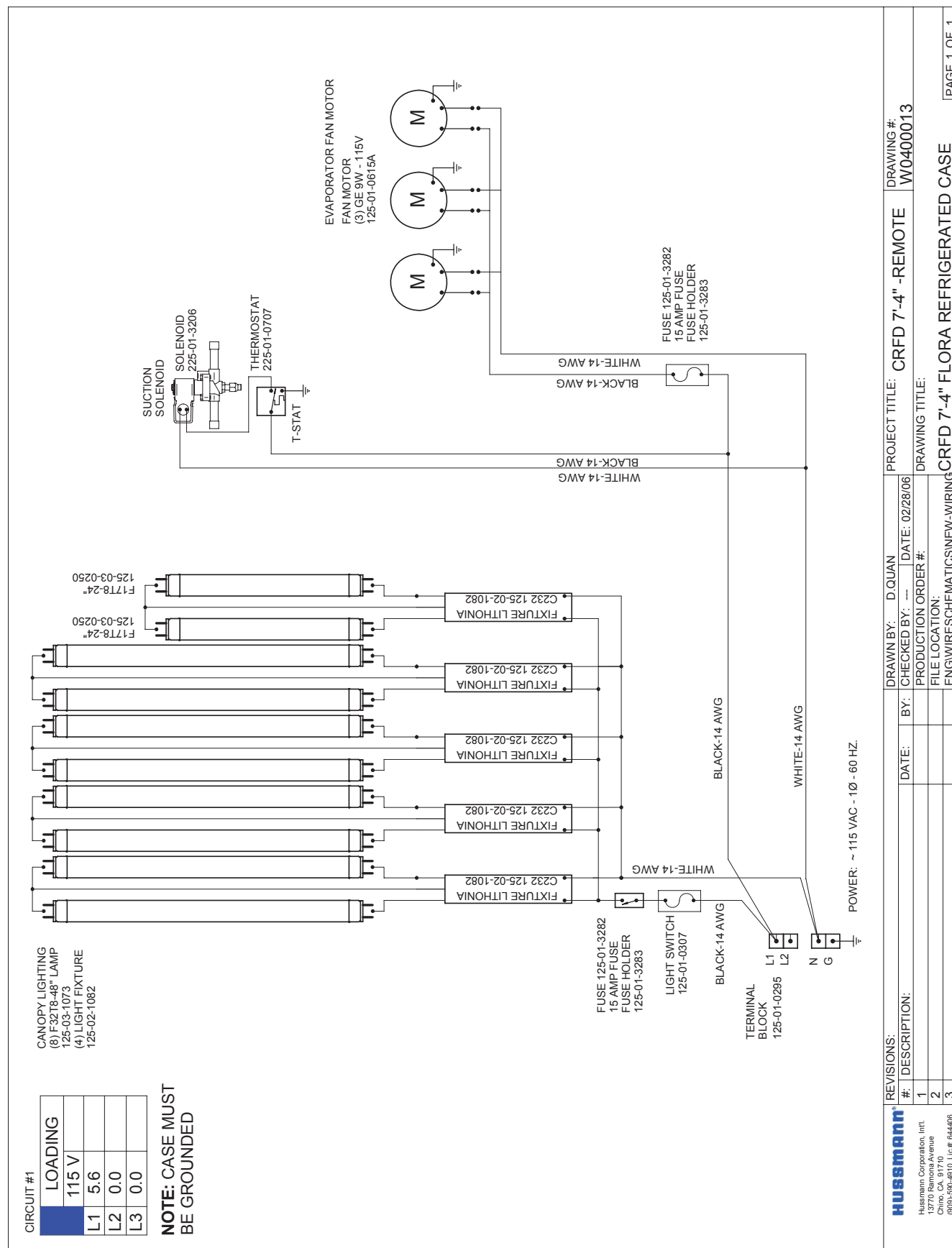


Wiring Diagrams (Cont'd)

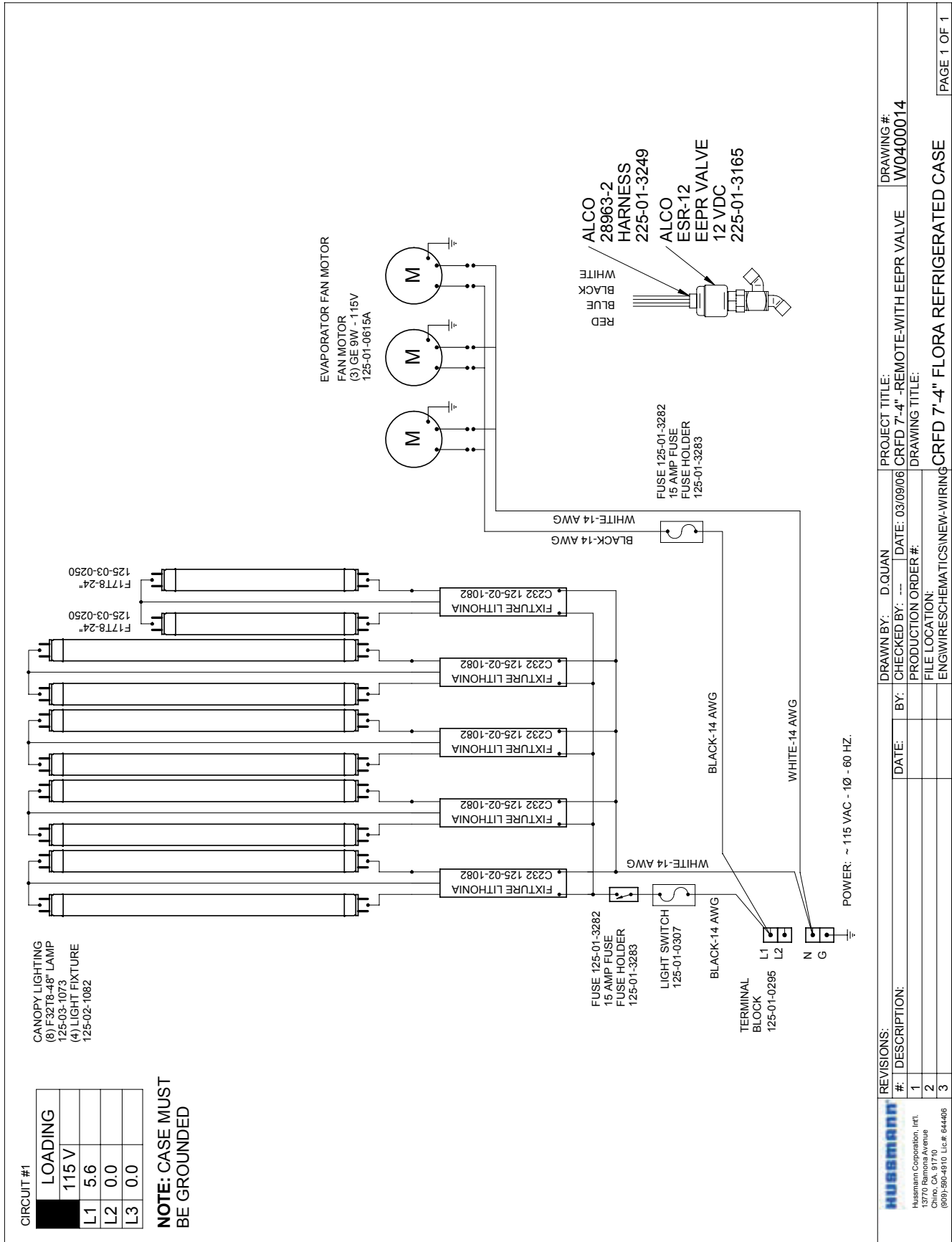


## Wiring Diagrams (Cont'd)



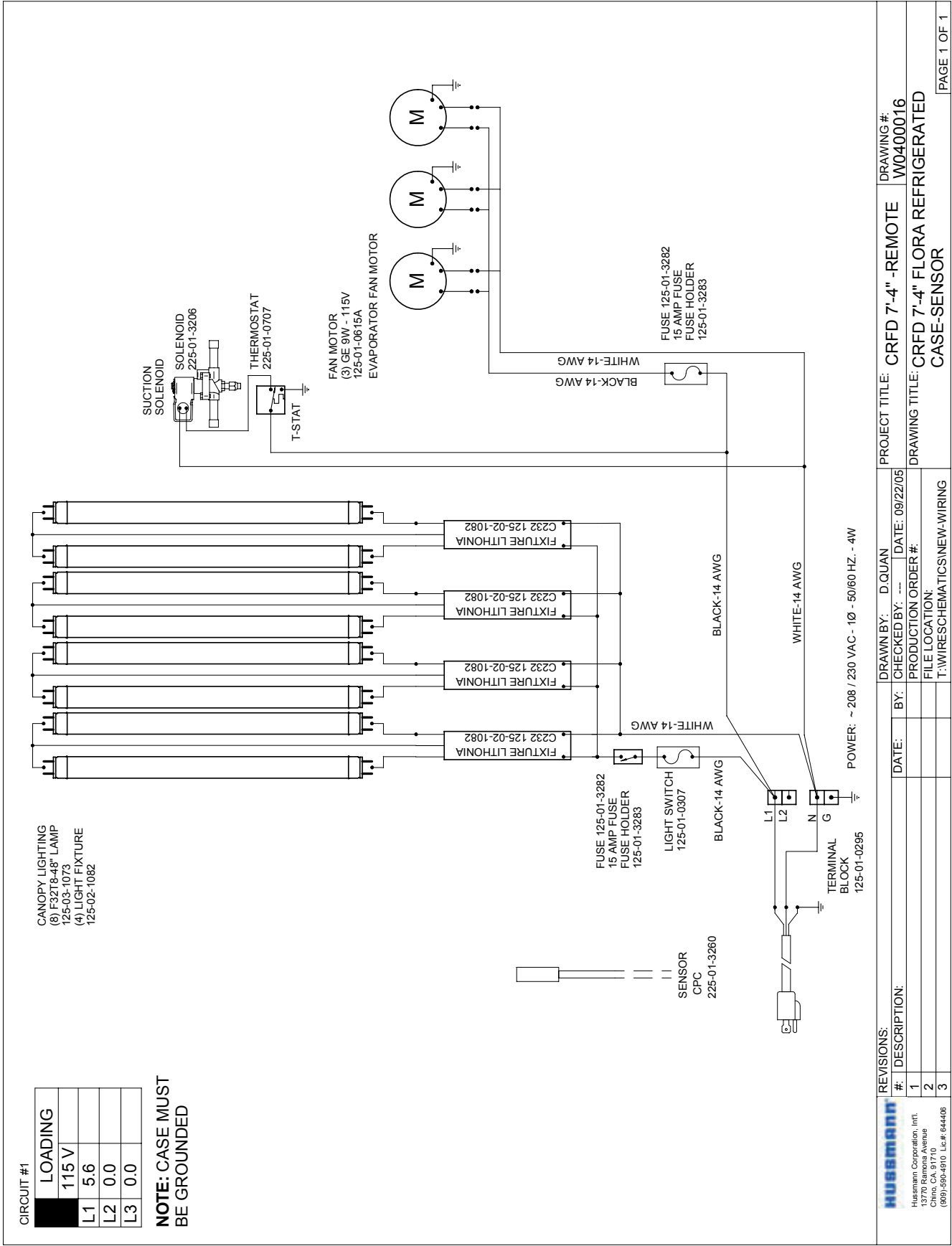


## Wiring Diagrams (Cont'd)

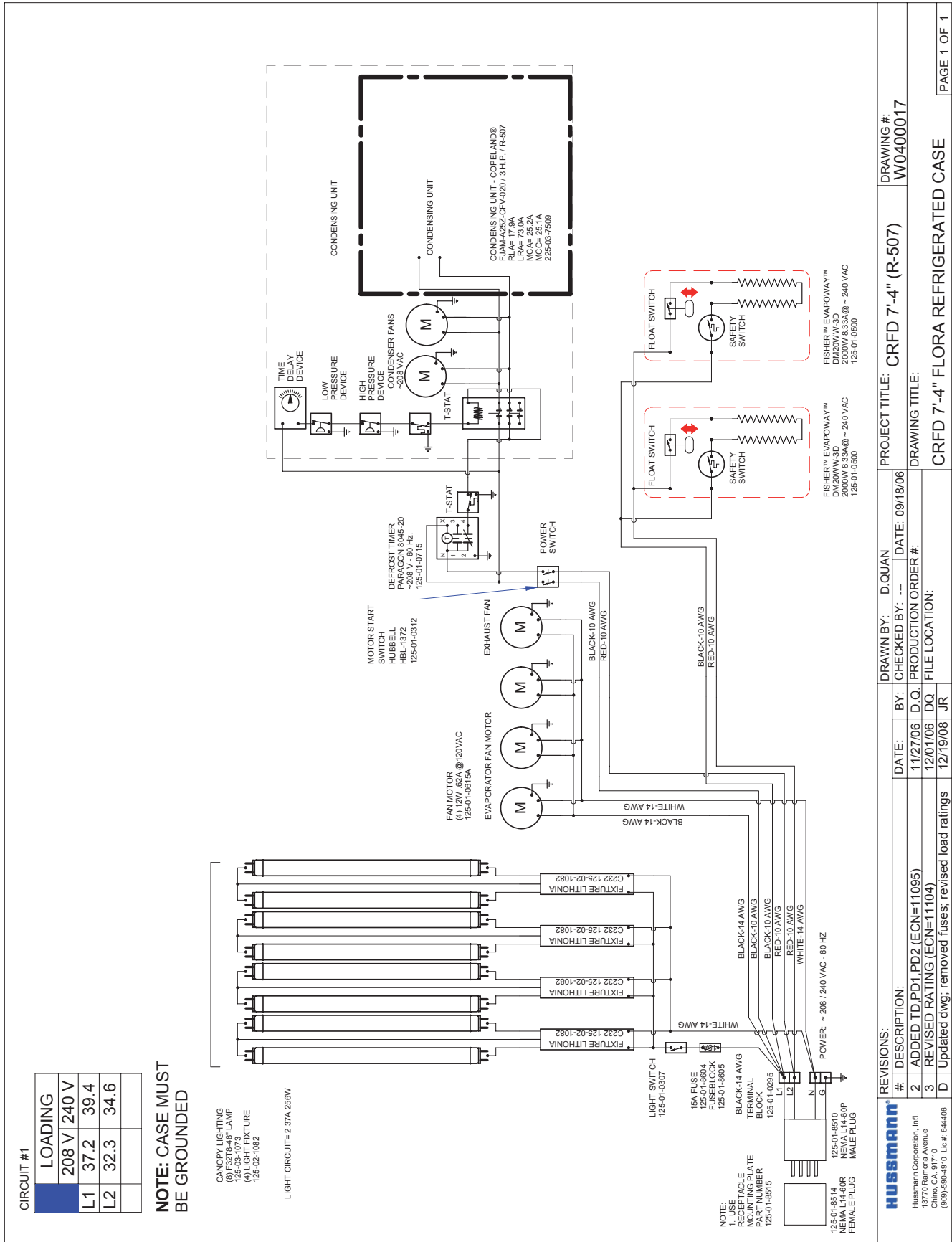




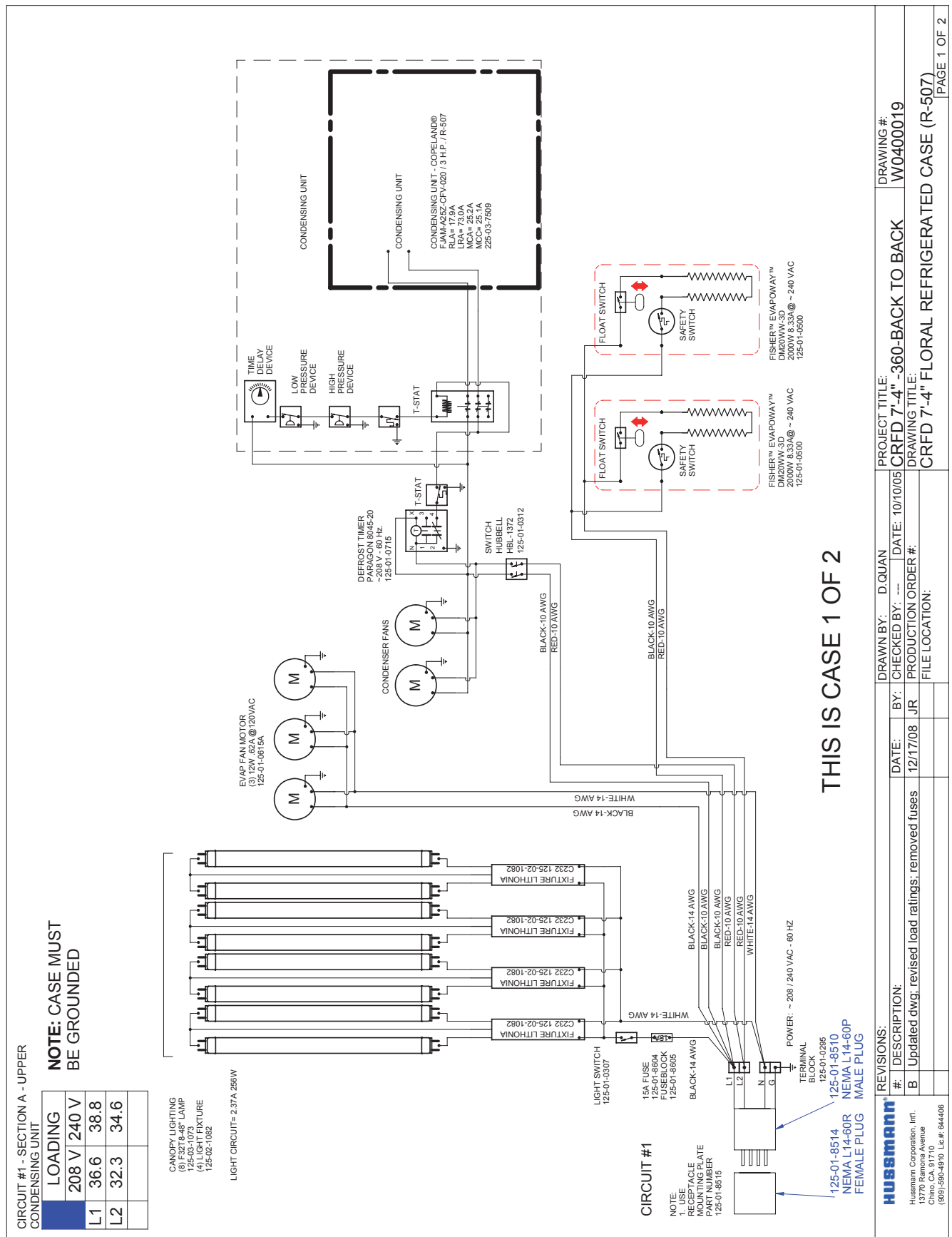
Wiring Diagrams (Cont'd)



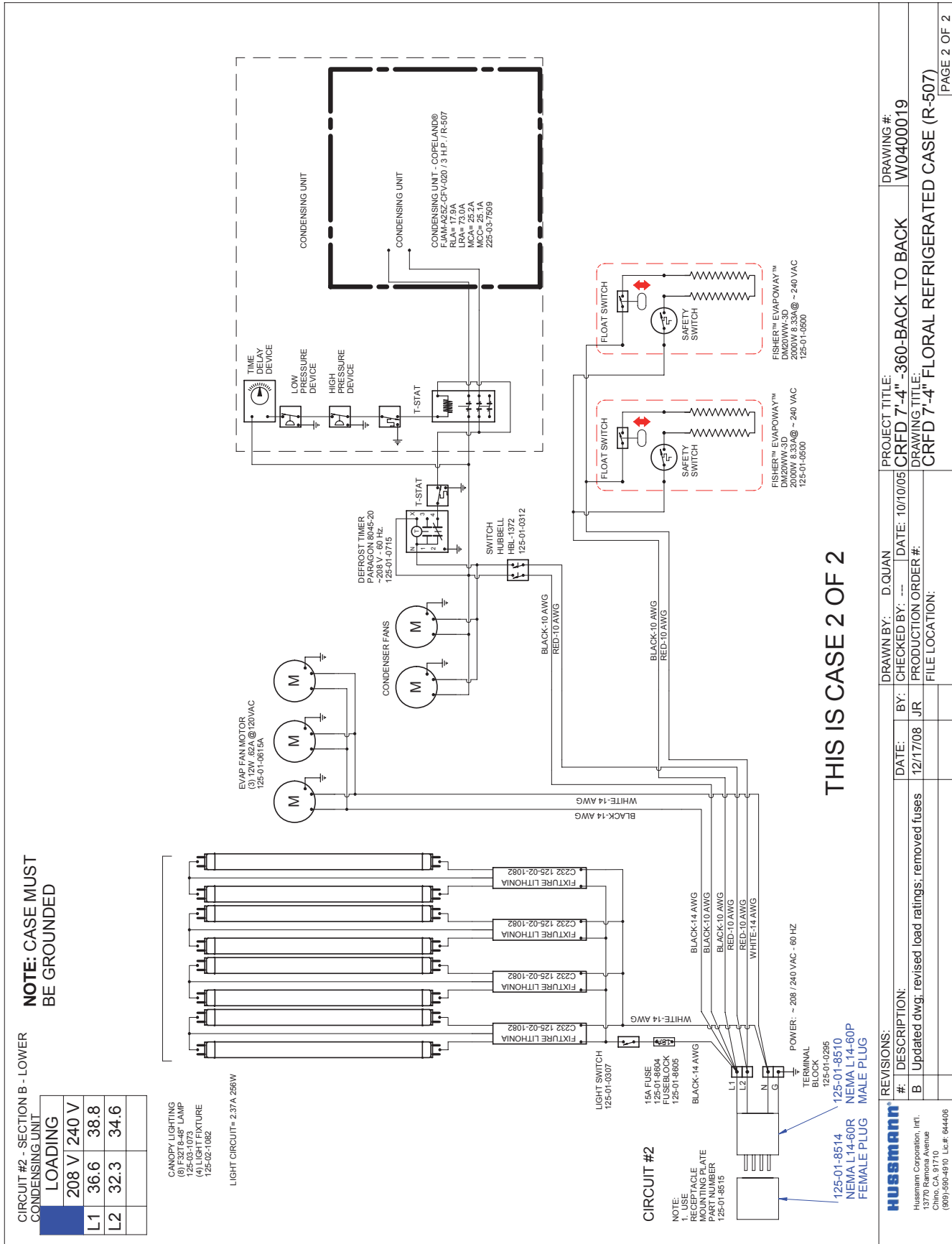
## Wiring Diagrams (Cont'd)



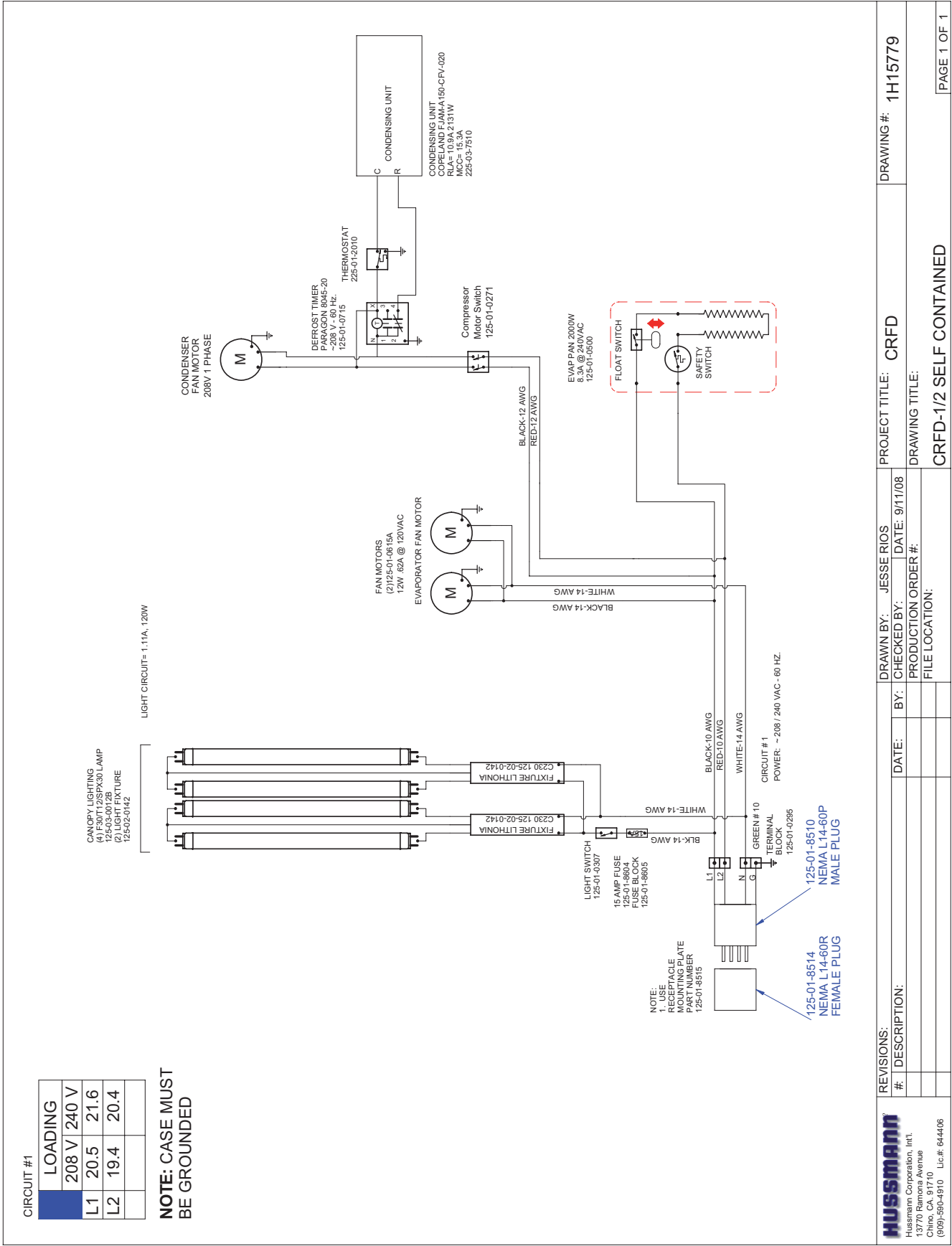
## Wiring Diagrams (Cont'd)



## Wiring Diagrams (Cont'd)



Wiring Diagrams (Cont'd)



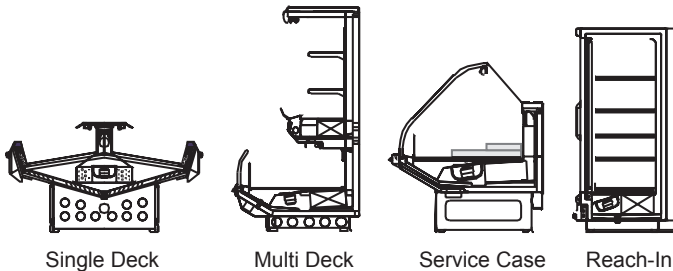


## Appendices

### Appendix A. - Temperature Guidelines - Refrigerated

The refrigerators should be operated according to the manufacturer's published engineering specifications for entering air temperatures for specific equipment applications. Table 1 shows the typical temperature of the air entering the food zone one hour before the start of defrost and one hour after defrost for various categories of refrigerators. Refer to Appendix C for Field Evaluation Guidelines.

Table	
Type of Refrigerator	Typical Entering Air Temperature
<b>I. OPEN DISPLAY</b>	
A. Non frozen:	
1) Meat	28°F
2) Dairy/Deli	32°F
3) Produce	
a. Processed	36°F
b. Unprocessed	45°F
B. Frozen	0°F
C. Ice Cream	-5°F
<b>II. CLOSED DISPLAY</b>	
A. Non frozen:	
1) Meat	34°F
2) Dairy/Deli	34°F
3) Produce	
a. Processed	36°F
b. Unprocessed	45°F
B. Frozen	0°F
C. Ice Cream	-5°F



Single Deck

Multi Deck

Service Case

Reach-In

#### I. Open Display Styles

#### II. Closed Display Styles

### Appendix B. - Application Recommendations - Refrigerated

- 1.0 Temperature performance is critical for controlling bacteria growth. Therefore, the following recommendations are included in the standard. They are based on confirmed field experience over many years.
- 1.1 The installer is responsible for following the installation instructions and recommendations provided by Hussmann for the installation of each individual type refrigerator.
- 1.2 Refrigeration piping should be sized according to the equipment manufacturer's recommendations and installed in accordance with normal refrigeration practices. Refrigeration piping should be insulated according to Hussmann's recommendations.

- 1.3 A clogged waste outlet blocks refrigeration. The installer is responsible for the proper installation of the system which dispenses condensate waste through an air gap into the building indirect waste system.
- 1.4 The installer should perform a complete start-up evaluation prior to the loading of food into the refrigerator, which includes such items as:
  - a) Initial temperature performance, Coils should be properly fed with a refrigerant according to manufacturer's recommendations.
  - b) Observation of outside influences such as drafts, radiant heating from the ceiling and from lamps. Such influence should be properly corrected or compensated for.
  - c) At the same time, checks should be made of the store dry-bulb and wet-bulb temperatures to ascertain that they are within the limits prescribed by Hussmann.
  - d) Complete start-up procedures should include checking through a defrost to make certain of its adequate frequency and length without substantially exceeding the actual needs. This should include checking the electrical or refrigerant circuits to make sure that defrosts are correctly programmed for all the refrigerators connected to each refrigeration system.
  - e) Recording instruments should be used to check performance.

### Appendix C. - Field Recommendations - Refrigerated

#### Recommendations for field evaluating the performance of retail food refrigerators

- 1.0 The most consistent indicator of display refrigerator performance is temperature of the air entering the product zone (see Appendix A). In practical use, the precise determination of return air temperature is extremely difficult. Readings of return air temperatures will be variable and results will be inconsistent. The product temperature alone is not an indicator of refrigerator performance.

**NOTE:** Public Health will use the temperature of the product in determining if the refrigerator will be allowed to display potentially hazardous food. For the purpose of this evaluation, product temperature above the FDA Food Code 1993 temperature for potentially hazardous food will be the first indication that an evaluation should be performed. It is expected that all refrigerators will keep food at the FDA Food Code 1993 temperature for potentially hazardous food.

## Appendices (Cont'd)

- 1.1 The following recommendations are made for the purpose of arriving at easily taken and understood data which, coupled with other observations, may be used to determine whether a display refrigerator is working as intended:
- a) **INSTRUMENT** - A stainless steel stem-type thermometer is recommended and it should have a dial a minimum of 1 inch internal diameter. A test thermometer scaled only in Celsius or dually scaled in Celsius and Fahrenheit shall be accurate to 1°C (1.8°F). Temperature measuring devices that are scaled only in Fahrenheit shall be accurate to 2°F. The thermometer should be checked for proper calibration. (It should read 32°F when the stem is immersed in an ice water bath).
  - b) **LOCATION** - The probe or sensing element of the thermometer should be located in the airstream where the air first enters the display or storage area, and not more than 1 inch away from the surface and in the center of the discharge opening.
  - c) **READING** - It should first be determined that the refrigerator is refrigerating and has operated at least one hour since the end of the last defrost period. The thermometer reading should be made only after it has been allowed to stabilize, i.e., maintain a constant reading.
  - d) **OTHER OBSERVATIONS** - Other observations should be made which may indicate operating problems, such as unsatisfactory product, feel/appearance.
  - e) **CONCLUSIONS** - In the absence of any apparent undesirable conditions, the refrigerator should be judged to be operating properly. If it is determined that such condition is undesirable, i.e., the product is above proper temperature, checks should be made for the following:
    1. Has the refrigerator been loaded with warm product?
    2. Is the product loaded beyond the "Safe Load Line" markers?
    3. Are the return air ducts blocked?
    4. Are the entering air ducts blocked?
    5. Is a dumped display causing turbulent air flow and mixing with room air?
    6. Are spotlights or other high intensity lighting directed onto the product?
    7. Are there unusual draft conditions (from heating/air-conditioning ducts, open doors, etc.)?
    8. Is there exposure to direct sunlight?
    9. Are display signs blocking or diverting airflow?
    10. Are the coils of the refrigerator iced up?
    11. Is the store ambient over 75°F, 55% RH as set forth in ASHRAE Standard 72 and ASHRAE Standard 117?
    12. Are the shelf positions, number, and size other than recommended by Hussmann?
    13. Is there an improper application or control system?
    14. Is the evaporator fan motor/blade inoperative?
    15. Is the defrost time excessive?
    16. Is the defrost termination, thermostat (if used) set too high?
    17. Are the refrigerant controls incorrectly adjusted?
    18. Is the air entering the condenser above design conditions? Are the condenser fins clear of dirt, dust, etc.?
    19. Is there a shortage of refrigerant?
    20. Has the equipment been modified to use replacements for CFC-12, CFC-502 or other refrigerant? If so, have the modifications been made in accordance with the recommendations of the equipment manufacturer? Is the refrigerator charged with the proper refrigerant and lubricant? Does the system use the recommended compressor?

### Appendix D. - Recommendations to User - Refrigerated

- 1.0 Hussmann Corporation provides instructions and recommendations for proper periodic cleaning. The user will be responsible for such cleaning, including the cleaning of low temperature equipment within the compartment and the cooling coil area(s). Cleaning practices, particularly with respect to proper refrigerator unloading and warm-up, must be in accordance with applicable recommendations.

## Appendices (Cont'd)

- 1.1 Cleaning of non frozen food equipment should include a weekly cleaning of the food compartment as a minimum to prevent bacteria growth from accumulating. Actual use and products may dictate more frequent cleaning. Circumstances of use and equipment design must also dictate the frequency of cleaning the display areas. Weekly washing down of the storage compartment is also recommended, especially for equipment subject to drippage of milk or other liquids, or the collection of vegetable, meat, crumbs, etc. or other debris or litter. Daily cleaning of the external areas surrounding the storage or display compartments with detergent and water will keep the equipment presentable and prevent grime buildup.
- 1.2 Load levels as defined by the manufacturer must be observed.
- 1.3 The best preservation is achieved by following these rules:
  - a) Buy quality products.
  - b) Receive perishables from transit equipment at the ideal temperature for the particular product.
  - c) Expedite perishables to the store's storage equipment to avoid unnecessary warm-up and prolonged temperature recovery. Food store refrigerators are not food chillers nor can they reclaim quality lost through previous mishandling.
  - d) Care must be taken when cross merchandising products to ensure that potentially hazardous vegetable products are not placed in non refrigerated areas.
  - e) Display and storage equipment doors should be kept closed during periods of inactivity.
  - f) Minimize the transfer time of perishables from storage to display.
  - g) Keep meat under refrigeration in meat cutting and processing area except for the few moments it is being handled in processing. When a cut or tray of meat is not to be worked on immediately, the procedure should call for returning it to refrigeration.
  - h) Keep tools clean and sanitized. Since mechanical equipment is used for fresh meat processing, all such equipment should be cleaned at least daily and each time a different kind of meat product comes in contact with the tool or equipment.
  - i) Make sure that all refrigeration equipment is installed and adjusted in strict accordance with the manufacturer's recommendations.
  - j) See that all storage and refrigeration equipment is kept in proper working order by routine maintenance.

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**Service Record**

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