

Traulsen



**For All Full Size Undercounter, G-Series and R&A
Refrigerator, Freezer, Dual-Temp and Hot Food
Units**

Traulsen
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Introduction

Traulsen provides this manual as an aid to the service technician in installation, operation and maintenance of Traulsen units from year 2010 to present. When used properly. This service manual can help the service technician maintain, troubleshoot and diagnose most of the problems and malfunctions that may occur with the controllers. While we believe that most aspects of the controllers are covered in this manual should you encounter a condition not addressed, or require a wiring diagram please contact.

ITW Refrigeration
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To improve your service communication experience be sure to have the following available when contacting technical support:

- ✓ Serial number
- ✓ Model number
- ✓ A detailed explanation of the problem.

How to Read a Traulsen Serial Number

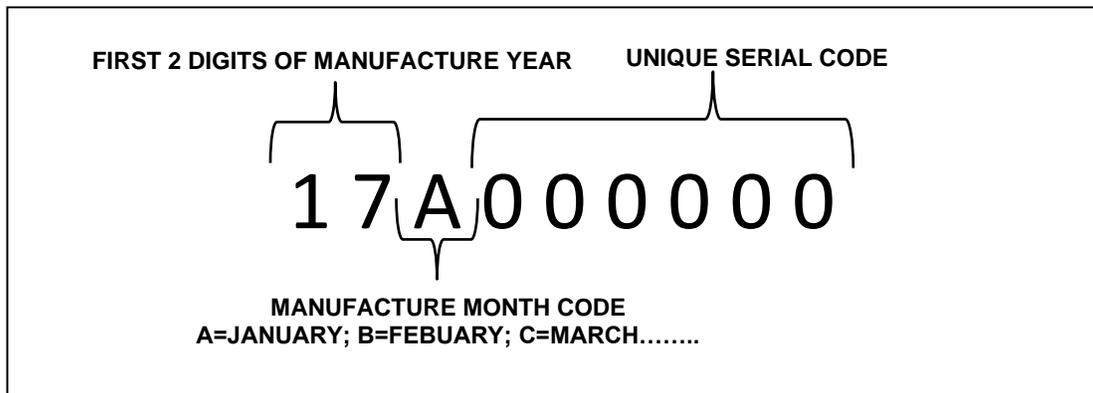
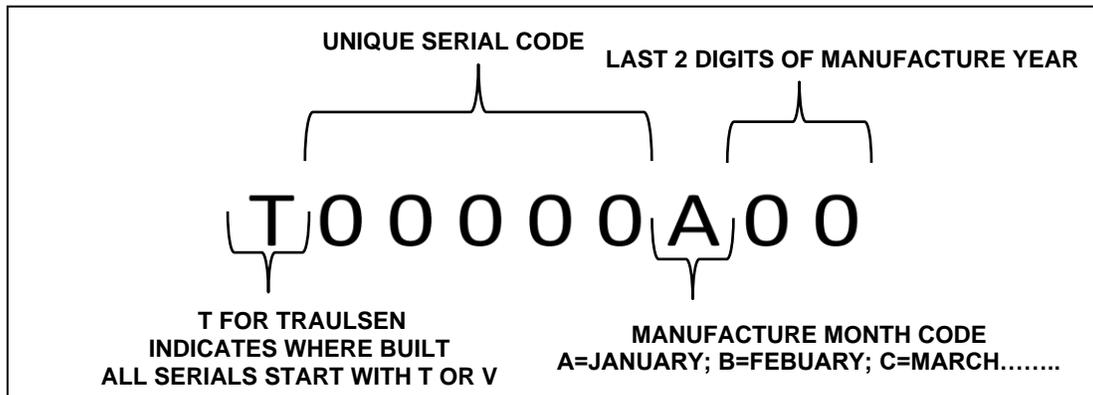


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Section I
Intela-Traul Control System

I. a – Inteltra-Traul Control System Overview

Inteltra-Traul Components:

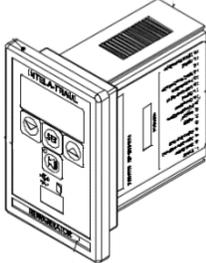
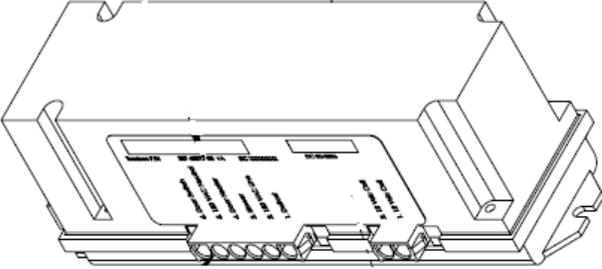
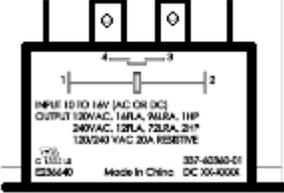
Component	Description
	<p>Control Head</p> <ul style="list-style-type: none"> • Microprocessor Control • User Interface
	<p>Relay Module</p> <ul style="list-style-type: none"> • DC Power Supply • Blower Relay • Defrost Heater Relay • Door Frame Heater Relay • Supplies 12VDC to Compressor Relay
	<p>Hybrid Relay</p> <ul style="list-style-type: none"> • Hybrid Solid State Relay • Compressor/Condenser Relay • 12VDC Coil Voltage
	<p>Sensors</p> <ul style="list-style-type: none"> • Green – Cabinet Air • Blue – Evaporator Coil • Yellow – Liquid Line

Table 1

Basic Control Function:

Function	Component	Trigger
Cycles Door Frame Heaters	Door Frame Heaters	Based on Control Settings (will vary)
Cycles Evaporator Blower Motor	Evaporator Blower	Based on Control Settings (will vary)
Controls Defrost Cycle	Defrost Heater	Time Initiated, Terminated by Blue Evap Coil Sensor Temp
Cycles Refrigeration System	Refrigeration System	Green Cabinet Air Sensor Temp
Triggers Alarm/Trouble Code	Alarms	Based on Control Settings

Table 2

I. b - Intela-Traul Alarm Codes from 2010 to present

<u>Alarm</u>	<u>Description</u>	<u>Clear Alarm</u>
CAL SER	Refrigeration System Low Charge	Repair Refrigeration System
LO CAB	Low Cabinet Temperature Alarm	Return Cabinet Temperature to Normal Range
H I CAB	High Cabinet Temperature Alarm	Return Cabinet Temperature to Normal Range
door OPn	Door Open Alarm	Close Door
ELE LOS	Power Loss Alarm	Press Alarm Cancel
CLnFIL	Clean Condenser Alarm	Clear/Clean Condenser Coil
CoL Snc	Coil Sensor Open or Shorted	Replace Coil Sensor
CAB Snc	Cab Sensor Open or Shorted	Replace Cabinet Sensor
d IS Snc	Discharge Line Sensor open or shorted	Replace Discharge Line Sensor
def Err	Defrost Terminates by Time, Not Temperature, for 72 hours.	Troubleshoot Defrost Cycle
Snc1	Cab Sensor Open or Shorted	Replace Cabinet Sensor
Snc2	Coil Sensor Open or Shorted	Replace Coil Sensor
Snc3	Liquid Line Sensor Open or Shorted	Replace Liquid Line Sensor
cLO	Low Cabinet Temperature Alarm	Return Cabinet Temperature to Normal Range
cHI	High Cabinet Temperature Alarm	Return Cabinet Temperature to Normal Range

Table 3

I. c – Intela-Traul Control Access & Parameters

To access the engineering/service menu follow the instruction below. As seen in Figures 1 & 2.

INTELA-TRAUL Access		
<u>Press</u>	<u>Display</u>	<u>Press</u>
	0.15	
	6.75	
	0.00	
	9.00	
	9.90	
	9.9E	
	FOC	
If control does not have 		
	FOC	

Figure 1

INTELA-TRAUL Key Parameters	
<u>Parameter</u>	<u>Description</u>
SP	Set Point
SPd	Set Point Differential
SPH	Set Point High (Equip Prior to 2010 only)
SPL	Set Point Low (Equip Prior to 2010 only)
EL	Evaporator Coil Sensor Temp
Cb	Cabinet Air Sensor Temp
LL	Liquid Line Sensor Temp
Sd	Start Manual Defrost
lbd	Intervals Between Defrost (In hours)
CdE	Defrost Termination Temperature
ddE	Drip Time After Defrost
ddC	Length of Defrost (In Minutes)
CEP	Reset to Factory Defaults

Figure 2

I. d - Troubleshooting Traulsen Intela-Traul Sensors

Sensor Function:

- **Cabinet Sensor (Green):** The Cabinet sensor reads the temperature of the return air and relays that value back to the control head. The control head either cycles the compressor on or off depending on the temperature set points. If cabinet sensor reads 60°F (15 °C) or higher the unit will not go into defrost and you can't put into manual defrost.
- **Coil Sensor (Blue):** The Coil sensor reads the evaporator coil core temperature and returns that value back to the control head. The control head uses this input to terminate the defrost cycle at 45°F (7.2°C) evaporator core temperature. In addition the control head uses the evaporator coil core temperature to control evaporator fan delay.
- **Liquid Line Sensor (Yellow):** The Liquid Line sensor reads the temperature of the liquid line and returns that value back to the control head. The control head uses the liquid line temperature to trigger a clean coil alarm at 140°F (60°C) (R&A series only) & cycles the compressor off on high temp limit at 160°F (71.1°C) liquid line temperature.

Basic Troubleshooting:

All sensors (cabinet, coil, liquid line) can be tested for accuracy using a Volt Ohm Meter.

- When checking a sensor value through the control a reading of **-40°F (-40°C)** indicates an **open** in the sensor or sensor circuit and a reading of **266°F (130°C)** indicates a **short** in the sensor or sensor circuit. See **Table 4** for control head sensor parameters.
- An ice & water solution consisting of mostly ice with just enough water to submerge the sensor should be used to create a controlled environment of approximately 32°F (0°C). This solution likely needs to be agitated or stirred to maintain a consistent temperature throughout. At **32°F (0°C)** all sensors should return an Ohm reading of **32,000 Ohms +/- 10%**. See **Table 5** below for temperature & Ohms relationship of all Intela-Traul sensors.

Sensor	Parameter
Cabinet Air	CB
Evaporator Coil	EL
Liquid Line	LL

Table 4

TEMP (°F)	R (OHMS)	TEMP (°C)
20	46.2K Ω	-6.7
25	39.9K Ω	-3.9
30	34.6K Ω	-1.1
32	32.7K Ω	0.0
35	30.1K Ω	1.7
40	26.1K Ω	4.4

Table 5

I. d - Troubleshooting Traulsen Intela-Traul Sensors

Quick Reference Table 6

Item	Details
Cabinet Sensor	<ul style="list-style-type: none"> • Green • Control parameter $\square b$ • Reads return air • Compressor cycles off of cabinet sensor value • If cabinet sensor reads 60°F (15 °C) or higher the unit will not go into defrost and you can't put into manual defrost.
Coil Sensor	<ul style="list-style-type: none"> • Blue • Control parameter $\square c$ • Reads evaporator coil temperature • Terminates defrost • Temperature fan delay after defrost & start up
Liquid Line Sensor	<ul style="list-style-type: none"> • Yellow • Control parameter $\square d$ • Reads liquid line temperature • Triggers clean filter alarm @ 140°F (60°C) (R&A Series Only) • Compressor safety; Cycles compressor off @ 160°F (7.1°C)
Sensor Open	<ul style="list-style-type: none"> • -40°F (-40°C)
Sensor Short	<ul style="list-style-type: none"> • 266°F (130°C)
Sensor can fail anywhere	<ul style="list-style-type: none"> • Between -40 & + 266 (-40°F & (130°C)
Sensor Test	<ul style="list-style-type: none"> • 32K Ω @ 32°F (0°C)
Alarm Codes (R&A Series Only)	<ul style="list-style-type: none"> • $\square Ab Snd$ Open or shorted cabinet sensor • $\square b Snd$ Open or shorted cabinet sensor • $\square c Snd$ Open or shorted evaporator coil sensor • $\square d Snd$ Open or shorted evaporator coil sensor • $\square e Snd$ Open or shorted liquid line sensor • $\square f Snd$ Open or shorted liquid line sensor

Table 6

I. d - Troubleshooting Traulsen Inteltra-Traul Sensors

Advanced Trouble Shooting Tips

There are a variety of reasons for the symptoms listed in **Table 7**. This troubleshooting table is intended to address the most common reasons associated with the Inteltra-Traul sensors only. Further troubleshooting outside the scope of this document may be required.

Symptom	Possible Causes
Cabinet temperature display reads lower temperature than actual cabinet temperature	<ul style="list-style-type: none"> • Evaporator coil is frozen up • Defective cabinet sensor • Cabinet sensor not in proper location
Cabinet temperature display reads higher temperature than actual cabinet temperature	<ul style="list-style-type: none"> • Defective cabinet sensor • Air flow obstruction • Cabinet sensor not in proper location
Evaporator coil is frozen up	<ul style="list-style-type: none"> • Evaporator coil sensor is out of tolerance and terminating defrost to soon • Cabinet air sensor is out of tolerance causing cabinet air temp to run too low
Display temperature reads -40°F (-40°C)	<ul style="list-style-type: none"> • Cabinet sensor is open • Cabinet sensor is disconnected • Cabinet sensor wire harness is open • Cabinet sensor pin connector is loose or has a weak connection
Compressor cycles off before cabinet temperature is satisfied	<ul style="list-style-type: none"> • Liquid line sensor is out of tolerance and return to high of a temperature causing the compressor to cycle off • Liquid line is reaching 160°F (71.1°C) and cycling the compressor off on high temp limit

Table 7

I. e - Troubleshooting Traulsen Inteltra-Traul MIT II Relay Module

Relay Module Function:

The Traulsen Relay Module is a long black rectangular box approximately 2 x 2 x 7 inches (5.08 X 5.08 X 17.08 centimeters) located behind the controller (front panel display) that contains several switching relays. The relays inside the module are used to send line voltage to the compressor (or heaters if a Hot Food box) fan motor(s), or defrost heaters or defrost solenoids, as needed. The actuation of these relays is controlled by low voltage DC signals sent from the Inteltra-Traul™ Control.

Relay Module Architecture:

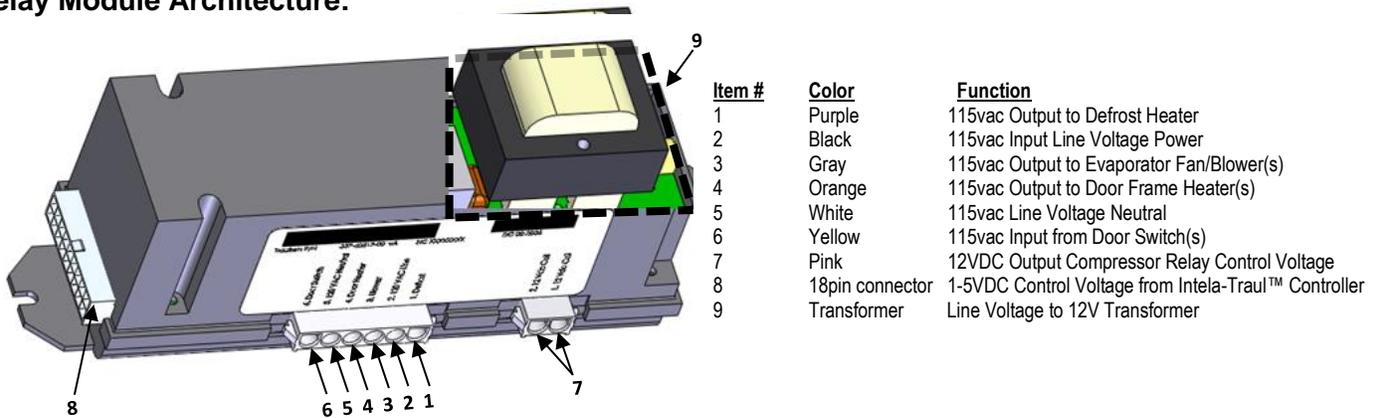


Figure 3

Note: Items 1, 3, & 4 are equipped with snubber circuits to reduce arcing and increase relay life. As result Line Voltage will always be measured at the relay output regardless of relay state, open/closed.

Relay Module Control Voltage:

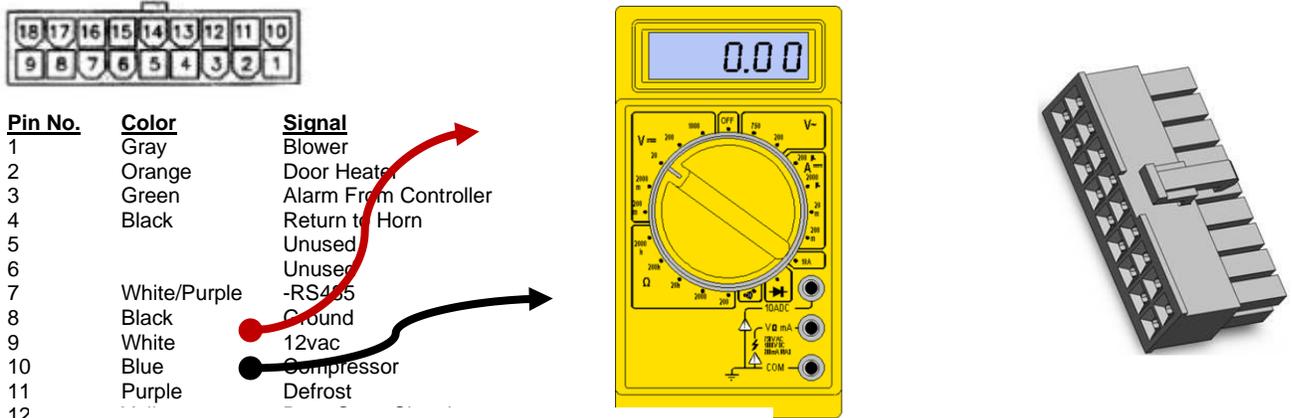


WARNING Certain procedures in this section require electrical test or measurements while power is applied to the machine. Exercise extreme caution at all times. If test points are not easily accessible, disconnect power and follow lockout / tagout procedures, attach test equipment and reapply power to test.

Relay control voltage is checked at the 18pin connector which delivers a range of 1-5VDC to the relay module when the control is calling for a relay to be energized. **When checking for relay control voltage the 18pin connector MUST remain connected.**

I. e - Troubleshooting Traulsen Inteltra-Traul MIT II Relay Module

Relay Module Control Voltage (Cont):



13 Check control voltage by inserting meter leads into the
 14 back of the 18pin connector at the appropriate points.
 15
 16 **18pin connector must be connected to the relay**
 17 **module.**
 18

Figure 4

Relay Module Output Voltage:



WARNING Certain procedures in this section require electrical test or measurements while power is applied to the machine. Exercise extreme caution at all times. If test points are not easily accessible, disconnect power and follow lockout / tagout procedures, attach test equipment and reapply power to test.

If the 1-5VDC control voltage from the Inteltra-Traul™ has been confirmed but the corresponding component is not energized output voltage from the relay module needs to be confirmed. The simplest way to confirm whether or not the relay inside the relay module has failed is to jump out the relay contacts. You can do this by unplugging the six pin connector and jump pin 2 (Black, 115vac input) to the corresponding output pin. If the component energizes then the relay module likely needs to be replaced. If the component still does not energize then further troubleshooting of the component is needed.

I. f - RH Sensor Module

The Intela-Traul RH module (Relative Humidity Sensor) is found on the Traulsen Energy Star rated units, from October 2014 to the present. This technical bulletin may not cover all the situations that may arise in the field and final diagnosis of field based equipment is the sole responsibility of the technician contracted to perform any work required.

Functionality:

The RH module senses the ambient temperature and relative humidity and communicates the information to the MIT II control. The MIT II control uses this data to perform the following tasks. As seen in **Table 8**.

- Cycle the door heater based on ambient temperature and humidity conditions.
- Increase/decrease the intervals between defrosts based on the number of door open/close events and the ambient temperature conditions. + or -75%.

Parameters Table:

Displayed	Parameter Name	Sample Value	Description
	Relative Humidity (Ambient)	55.0	Relative humidity of the room.
	Dry Bulb Temperature	75.0	Ambient temperature of the room.
	Dew Point Temperature	65.0	Calculated dew point temperature.

Table 8

Troubleshooting Table:

Symptom	Possible cause	Solution
Excessive condensation on the door.	Inaccurate reading from the RH module.	Unplug RH sensor. Replace the RH sensor module.
Coil freezes up.	The RH module extends the interval between defrost based on ambient conditions.	Unplug RH sensor. Put unit into manual defrost. Replace RH sensor.

Table 9

Note: You can disconnect the RH Sensor and the unit will run with its default settings.

Section II
Refrigeration System

II. a - Troubleshooting Traulsen Refrigeration System

Introduction:

This is to inform the field how to trouble shoots the refrigeration system with the use of a thermometer. As seen in **Figure 5**.

Trouble Shooting Refrigeration System by Temperature:

Use **Table 10** and corresponding chart (**Figure 5**) to aid in troubleshooting a Traulsen refrigeration system with the use of thermometers.

ITEM	FORMULA	TRAULSEN SPEC
Condenser Split	$(A + B)/2 - \text{Ambient Temperature}$	30°F (-1.1°C)
Sub-cooling	$(A + B)/2 - B$	4°F to 12°F (-15.5°C -11.1°C)
Evaporator Superheat	D-C	5°F to 7°F (-15°C to 13.9°C)

Table 10

Note: Unit must be running for at least 5-10 minutes before checking temperatures and insulate sensing bulb of thermometer for most accurate readings.

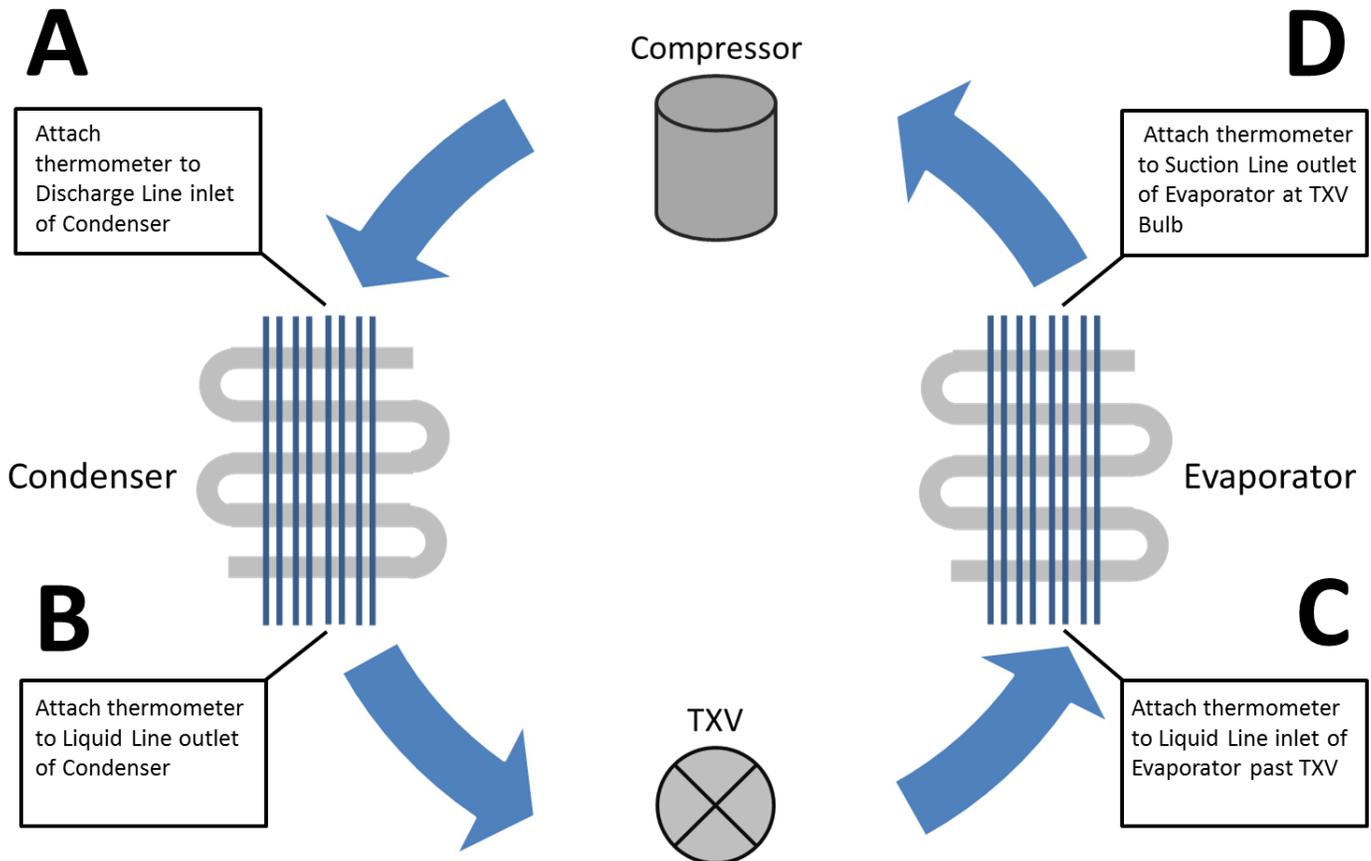


Figure 5

II. b - TXV Troubleshooting

Standard Operating Parameters: (As measured in Figure 5, Page 14)

- Superheat – 7°F (-13.9°C)
- Subcooling – 4°F-12°F (-15.5°C TO -11.1°C)

Troubleshooting:

⚠ WARNING This procedure requires the use of refrigerants. Be certain the work area is well ventilated. Safety goggles and gloves shall be worn since refrigerants may cause burns to the skin

Superheat	Subcooling	Diagnosis
Above 7F	Below 4F	Refrigerant Charge is Low
Below 5F	Above 12F	System Overcharged
Above 7F	Above 12F	Restriction in High Side or Metering Device

Table 11

Moisture Contamination:

A restriction caused by moisture will thaw when the TXV is warmed and the system will begin to function properly until the moisture finds its way back to the TXV and freezes at the orifice again. See **Table 11**.

II. c - Troubleshooting a Frozen Evaporator Coil

Table 12 is intended to aid in diagnosing the root cause of a frozen evaporator coil on a Traulsen upright reach-in refrigerator or freezer. This may not cover all situations that may arise in the field and final diagnosis of field based equipment is the sole responsibility of the technician contracted to perform any work required.

Frozen Evaporator Troubleshooting Table

Potential Causes	Details
Cabinet Sensor out of tolerance (See TTB006 Sensors for sensor troubleshooting)	<ul style="list-style-type: none"> • Color: Green • Control parameter $\square\text{E}$ • Reads return air • Compressor cycles off of cabinet sensor value
Coil Sensor out of tolerance (See TTB006 Sensors for sensor troubleshooting)	<ul style="list-style-type: none"> • Color: Blue • Control parameter $\text{E}\square$ • Reads evaporator coil temperature • Terminates defrost @ 45°F (7.2°C) • Fan delay
Ambient Air Infiltration	<ul style="list-style-type: none"> • Door(s) not closing properly • Gasket(s) not sealing properly • Door(s) left open for extended periods of time • Evaporator hump cover not sealed properly
Compressor relay stuck closed	<ul style="list-style-type: none"> • Coil voltage 12VDC • Coil wires: Pink • Contacts <ul style="list-style-type: none"> ○ Common: Black wire ○ N/O: Blue wire
Lack of Air Flow	<ul style="list-style-type: none"> • Evaporator fan motor not functioning • Obstruction in air duct or at evaporator coil
Refrigeration System (Traulsen recommends the refrigeration system be tested using the methods outlined in TTB009)	<ul style="list-style-type: none"> • Low charge • Restricted metering device • Moisture/contaminates in the system
Defrost Heater	<ul style="list-style-type: none"> • Defrost heater open • Defrost heater circuit or relay open
Control Settings	<ul style="list-style-type: none"> • Set point to low (refrigerator only) <ul style="list-style-type: none"> ○ Control parameters: SP or SPH & SPL (depending on the age of control system) • Defrost lockouts set to frequently <ul style="list-style-type: none"> ○ Control parameters: dL1, dL2, dL3, dL4

Table 12

II. d - Compressor Troubleshooting



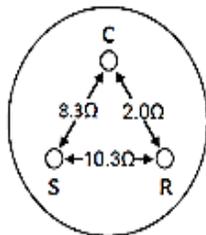
⚠ WARNING Certain procedures in this section require electrical test or measurements while power is applied to the machine. Exercise extreme caution at all times. If test points are not easily accessible, disconnect power and follow lockout / tagout procedures, attach test equipment and reapply power to test.

Tools Required:

- Basic hand tools
- Clamp around amp meter
- Volt Ohm meter
- Basic 3 in 1 (1/2 HP)

Terminology:

- **OEM** – Original Equipment Manufacturer – Refers to the manufacturer of a piece of equipment or component.
- **RLA** – Rated Load Amps – The OEM test conditions amperage rating (does not necessarily indicate the normal running amperage as conditions and applications can vary from OEM test conditions)
- **LRA** – Locked Rotor Amps – The OEM test condition lock rotor amperage rating indicating the expected amperage at which a motor does not turn when power is applied.
- **Start Components** – The capacitor and relay combinations used to start and/or run a compressor motor consist of a start capacitor and start relay if IAA is shown on the serial number of the compressor. If CAA is listed then there will be a potential relay along with a start capacitor and a run capacitor.



Ω= OHM= Unit Resistance
R= Run
S= Start
C= Common

Figure 6 shows the readings of the resistance through the compressor motor windings. (C-S C-R). If the windings are good the start winding resistance (C-S) will always be higher than the run winding resistance (C-R).

Note: This example shows one set of possible combinations that can be seen in the field. Resistance values will vary between different compressors.

II. d - Compressor Troubleshooting

Basic Troubleshooting:

- What is my amp draw and voltage when the compressor is starting?
- What is the resistance of the windings?
- What is the RLA (Rated Load Amps) of the compressor?
- What is the LRA (Locked Rotor Amps) of the compressor?
- Check the start components?

Symptom	Reason	Possible Resolution
0 amps	Check for voltage between C & R terminals.	No: Check external overload & find where power loss is. Yes: open winding or the internal overload is open
Amps lower than RLA	Lower head & high suction.	Weak valves, busted crankshaft or connecting rod.
Slightly higher amps than RLA	Overload opens after compressor runs for a time.	Bad run capacitor, tight bearings, or winding issues.
Very high amps but not LRA	Issue with compressor windings.	Ohm windings and compare with manufacturer's resistances.
Reading LRA	Compressor not starting, reading 5 to 6 times RLA.	Check start capacitor, start relay & wires for burning, try 3 in 1. Check voltage drop (+/-10%) and for resistance.

Table 13

Section III
Compact & Milk Cooler Controls

III. a - Danfoss Control Parameters

See corresponding tables below for Danfoss Control Parameters

Danfoss control parameters:

COMPACT FREEZER (ULT)

SET POINT RANGE:	-10F(-23C) to +5F(-15)
SET POINT:	-3F(-3C)
DEFROST TYPE:	ELECTRIC
DEFROST TERM:	35F(1C)
MIN DEF INTERVAL:	3.0 HOURS
MAX DEF INTERVAL:	4.0 HOURS
DEFROST TIME:	15 MIN MINIMUM 35 MIN MIAXIMUM
COMPRESSOR ON:	
FAN ON DELAY;	30 SEC
COMPRESSOR OFF:	
FAN OFF DELAY:	0.0 SEC
FAN ON:	5 SEC
FAN OFF:	55 SEC
DEFROST:	EVAP FAN OFF
DRIP OFF TIME:	1 MIN
FAN DELAY AFTER DEF:	3 MIN

Table 13

MILK COOLER

SET POINT RANGE:	30F(-1C) to 38F(3C)
SET POINT:	32.0 F
DEFROST TYPE:	OFF CYCLE
DEFROST TERM:	39F(3C)
MIN DEF INTERVAL:	2 HOURS
MAX DEF INTERVAL:	3 HOURS
DEFROST TIME:	20 MIN MINIMUM 45 MIN MAXIMUM
COMPRESSOR ON:	
FAN ON DELAY;	30 SEC
COMPRESSOR OFF:	
FAN OFF DELAY:	45 SEC
FAN ON:	5 SEC
FAN OFF:	55 SEC
DEFROST:	EVAP FAN ON
DRIP OFF TIME:	0.0 SEC
FAN DELAY AFTER DEF:	0.0 SEC

Table 15

COMPACT REFRIGERATOR (UHT)

SET POINT RANGE:	29F(-1C) to 37F(2C)
SET POINT:	32F(0C)
DEFROST TYPE:	OFF CYCLE
DEFROST TERM:	39F(3C)
MIN DEF INTERVAL:	2 HOURS
MAX DEF INTERVAL:	3 HOURS
DEFROST TIME:	20 MIN MINIMUM 45 MIN MAXIMUM
COMPRESSOR ON:	
FAN ON DELAY;	30 SEC
COMPRESSOR OFF:	
FAN OFF DELAY:	45 SEC
FAN ON:	5 SEC
FAN OFF:	55 SEC
DEFROST:	EVAP FAN ON
DRIP OFF TIME:	0.0 SEC
FAN DELAY AFTER DEF:	0.0 SEC

Table 14

PREP TABLE (UPT & UST)

SET POINT RANGE:	29F(-1C) to 37F(2C)
SET POINT:	32F(0C)
DEFROST TYPE:	OFF CYCLE
DEFROST TERM:	39F(0C)
MIN DEF INTERVAL:	2 HOURS
MAX DEF INTERVAL:	3 HOURS
DEFROST TIME:	20 MIN MINIMUM 45 MIN MAXIMUM
COMPRESSOR ON:	
FAN ON DELAY;	EVAP FAN ALWAYS ON
COMPRESSOR OFF:	
FAN OFF DELAY:	EVAP FAN ALWAYS ON
FAN ON:	EVAP FAN ALWAYS ON
FAN OFF:	EVAP FAN ALWAYS ON
DEFROST:	EVAP FAN ALWAYS ON
DRIP OFF TIME:	EVAP FAN ALWAYS ON
FAN DELAY AFTER DEF:	EVAP FAN ALWAYS ON

Table 16

III. b - Danfoss Control Troubleshooting

DANFOSS SENSOR OHM VALUES

Sensor	Temperature	Ohm value
Cabinet sensor (S1)	32°F (0°C)	16.00 Ω
Coil Sensor (S2)	32°F (0°C)	16.00 Ω
Spindle (S3)	N/A	4-26 Ω (slight tolerance)

Table 17

Note: If the red light starts flashing this indicates a sensor failure.

To start manual defrost:

1. Turn unit off and make sure the spindle is all the way in the left position.
2. Turn unit on and wait for the blower to come on.
3. Turn spindle all the way to the right position for 3 seconds.
4. Turn spindle all the way to the left position for 3 seconds.
5. Turn to the middle position and wait for unit to go into manual defrost.



⚠ WARNING Certain procedures in this section require electrical test or measurements while power is applied to the machine. Exercise extreme caution at all times. If test points are not easily accessible, disconnect power and follow lockout / tagout procedures, attach test equipment and reapply power to test.

Troubleshooting Table:

Potential Causes	Possible Solutions
Faulty Danfoss control	<ul style="list-style-type: none"> • See page 18 for Danfoss parameters.
Faulty defrost termination	<ul style="list-style-type: none"> • Check to make sure the defrost termination is not stuck open.
Faulty coil sensor	<ul style="list-style-type: none"> • If the coil sensor is faulty the unit will not go into its manual defrost. If either cabinet or coil sensors faulty the indicator light on top of the controller will be blinking red. Place the sensor in a glass of 32°F (0°C) ice water. Ohm sensor and you should get 16 K ohms.

Table 18

III. c - Milk Cooler Temperature Checklist

This is to inform the field of basic operational check points related to temperature maintenance concerns to understand prior to troubleshooting the refrigeration system function.

Troubleshooting checklist

- ✓ What is the walk-in cooler/milk storage cooler temp?



33F (1C) 36F (2C) 39F (4C) 41F (5C)

- ✓ What is the temperature of the milk before it is put into the milk cooler for serving ?



33F (1C) 36F (2C) 39F (4C) 41F (5C)

- ✓ How long is the serving period?



(Recommend Doors Closed for at Least 15min for Every 2 hours of Operation.)

- ✓ What is the ambient air temperature around the unit?



70F (21C) 80F (26C) 90F (32C) 100F (37C)

- ✓ Are there any significant sources of heat around the unit?

- ✓ Is there HVAC ventilation directly above the unit or other sources of forced air circulation that may be disrupting the air flow of the milk cooler?

- ✓ With door closed how fast does unit pull down to temperature?

(Depending on the Milk Cooler footprint & loading, it will typically take 15-20 min for the unit to pull down and cycle.)

- ✓ Is the milk rotated? If so how often?

(Recommend product is rotated every 2 hours.)

Section IV
Preventive Maintenance

IV. a - Preventative Maintenance

Introduction:

This is to inform field of recommended preventative maintenance procedures. Depending on application PM schedule may vary.

INSPECT AND CLEAN

Why	Sanitation and prolong cabinet life	
Frequency	Daily	
Time required	5 minutes to prepare	10 minutes to complete
Preparation	Have a Soft Cloth. Baking soda and water mixed to a 1 TBSP (15mL) baking soda to 1 pint (473.2mL) water ratio.	
Cleaning	Apply with a dampened cloth and wipe in the direction of the metal grain. (Avoid the use of strong detergents and gritty, abrasive cleaners as they may tend to mar and scratch the surface. Do NOT use cleansers containing chlorine; this may promote corrosion of the stainless steel.)	
Inspection	Visually inspect the unit for signs of wear that may require repair.	

Table 19

INSPECT DOOR GASKET

Why	Long reliable service life	
Frequency	Every 3 Months	
Time required	10 minutes to complete	
Inspection	Open cabinet door (s) to inspect gasket. Pull gasket with hand and visually inspect gasket (s) for tear, dirt, mold or worn gasket. Replace as needed. The model and serial number is required when placing a parts order call the Traulsen Parts Department at 800-825-8220.	

Table 20

IV. a - Preventative Maintenance

CLEAN CONDENSER COIL

⚠ WARNING Disconnect electrical power supply before cleaning any parts of the unit.

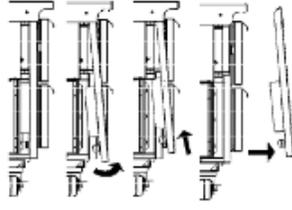
Why	Long reliable service life	
Frequency	Every 3 Months	
Time required	5 minutes to prepare	15 minutes to complete
Preparation	<p>For All Upright Cabinets, remove the two bottom screws securing the louver panel, and then pivot this upwards allowing full access to the front facing condenser. For all TE Series, TU Series & TS Series, place hands under the louver panel and pull out and up to get louver panel off bracket of the unit.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>R & A Series/G Series Louver</p>  <p>Screw Location</p> </div> <div style="text-align: center;"> <p>TE/TU/TS Series Louver</p>  </div> </div>	
Cleaning	<p>Vacuum or brush any dirt, lint or dust from the finned condenser coil, around the compressor and other cooling system parts as indicated. If significant dirt is clogging the condenser fins, use compressed air to blow this clear. When finished reverse the louver removal process as instructed above.</p>	

Table 21

Section V

Door Frame Heater installation

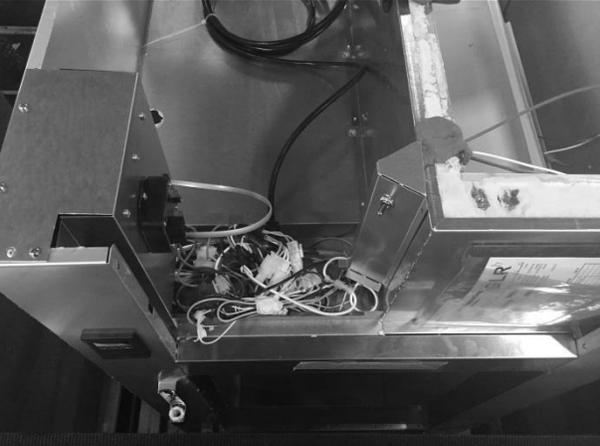
V. a - Door Frame Heater Replacement



⚠ WARNING Certain procedures in this section require electrical test or measurements while power is applied to the machine. Exercise extreme caution at all times. If test points are not easily accessible, disconnect power and follow lockout / tagout procedures, attach test equipment and reapply power to test.

Installation process:

Note: *The original heater wire will be abandoned in the foam.*

<ul style="list-style-type: none">● Unplug unit.● Remove screws and breaker strips around the perimeter of the door opening. As seen in Figure 6.	 <p>Figure 6</p>
<ul style="list-style-type: none">● Find the orange and white power supply wires to the door heaters on top of the unit in the wire chase. As seen in Figure 7.	 <p>Figure 7</p>

- Use a long probe or screw driver to create a hole through the foam in the top center mullion area up to the wire chase hole. As seen In Figure 8.



Figure 8

- In the wire chase check for the white and orange wires coming from the relay module. Connect the new heater wires to the power wires. As seen in Figure 9.

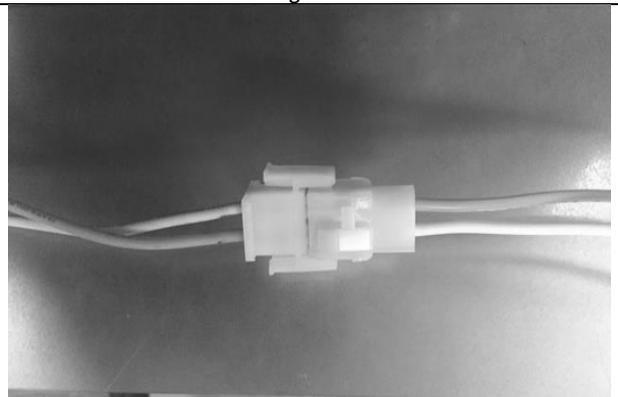


Figure 9

- Stick new foil heater wires around the perimeter of the unit to the right of the breaker strip screws closest to the outer skin of the unit as seen in Figure 10. Dig some foam out of each corner so the heater forms to the corner, to avoid pinching when reinstalling breaker strips.
- Re-foam.

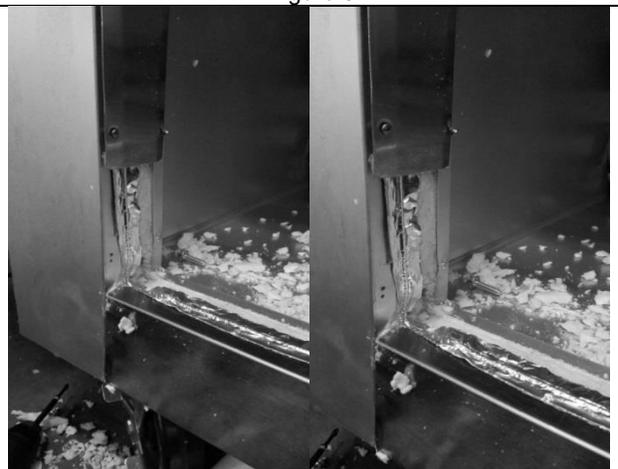


Figure 10

- When finished reinstall breakers strips. As seen in Figure 11.



Figure 11

- Plug in unit.

V. b - Door Frame Heaters in Roll-In Units

In **Figure 12** How door frame heaters should be run in a two section Roll-in unit.

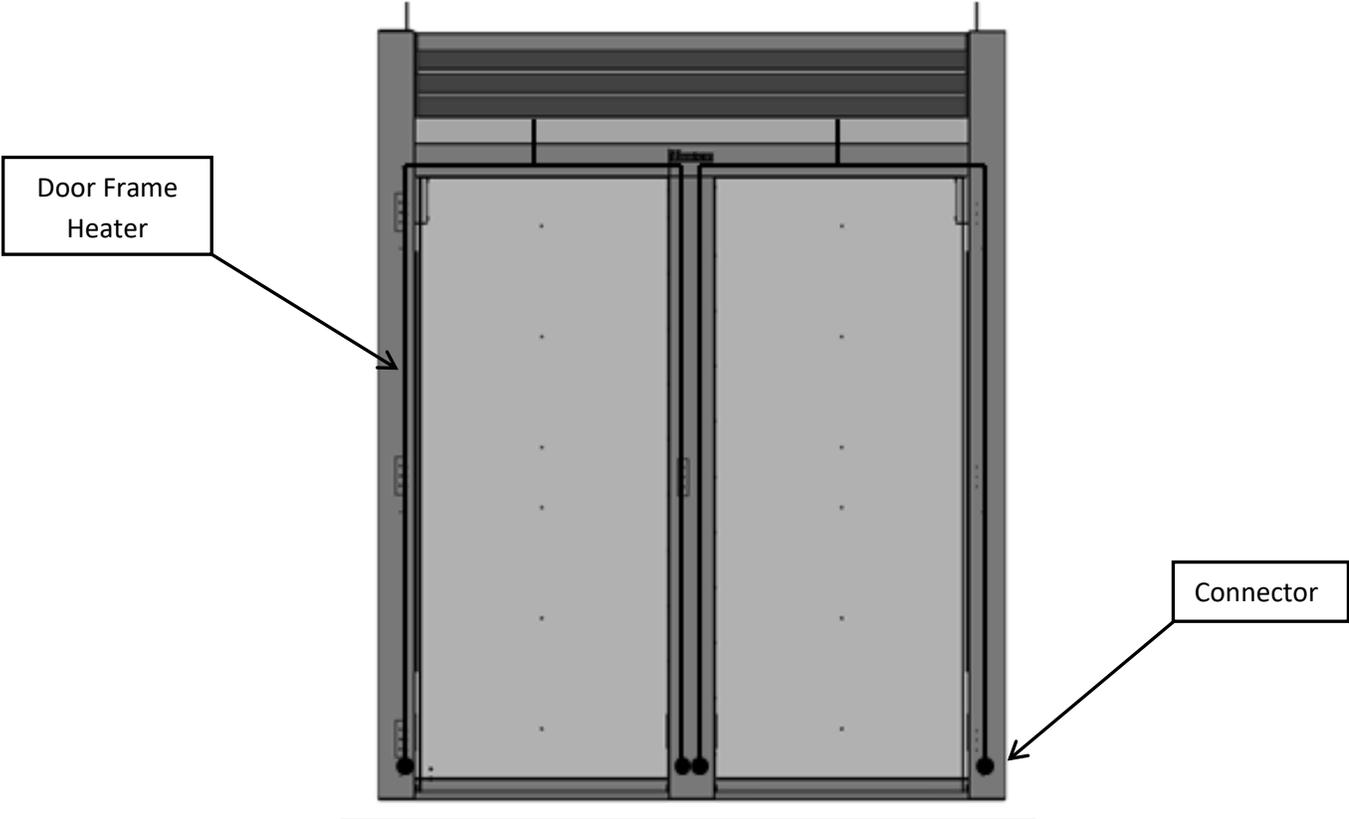


Figure 12

V. c - Door Frame Heaters in Half Height Units

In **Figure 13** How door frame heaters should be run in a Half Height unit.

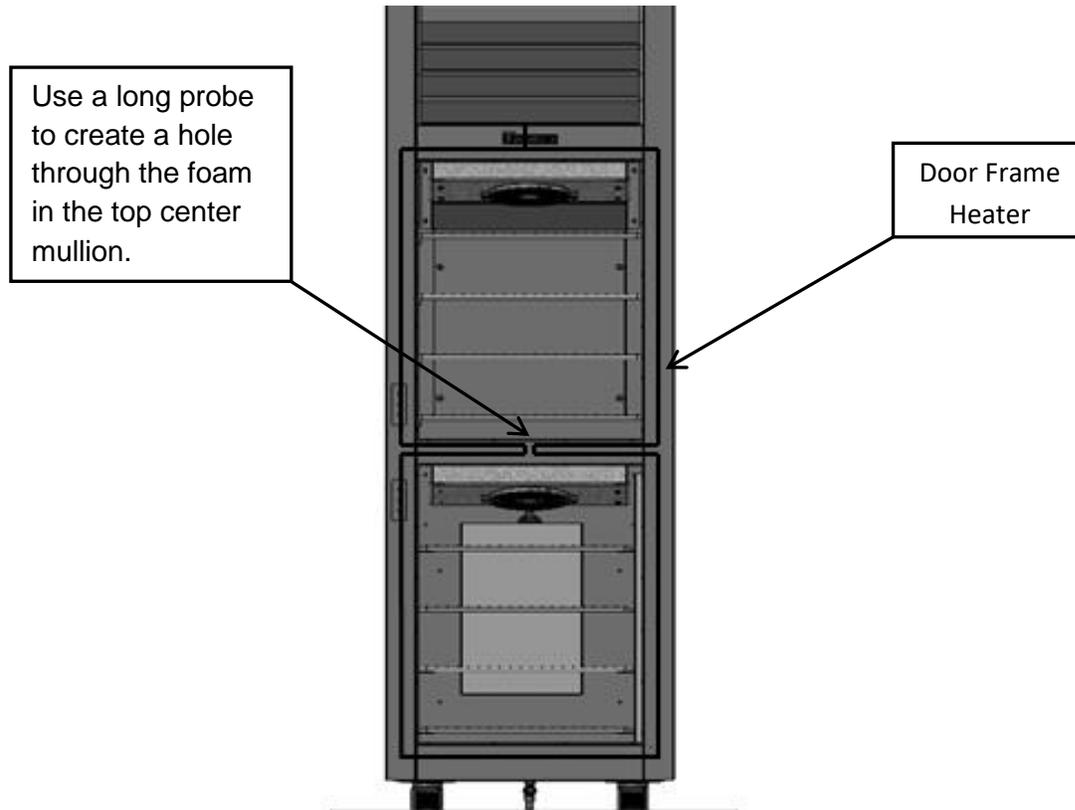
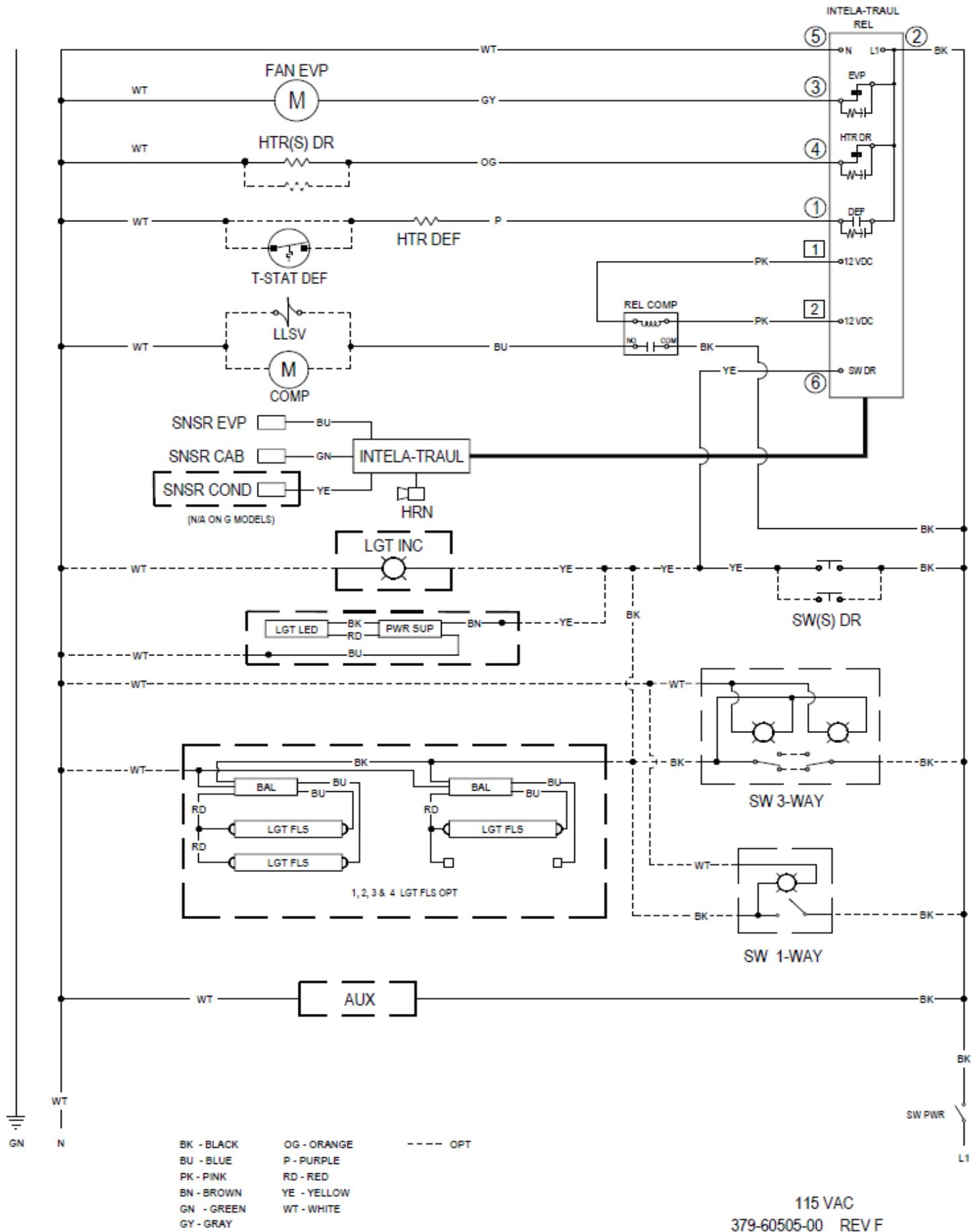


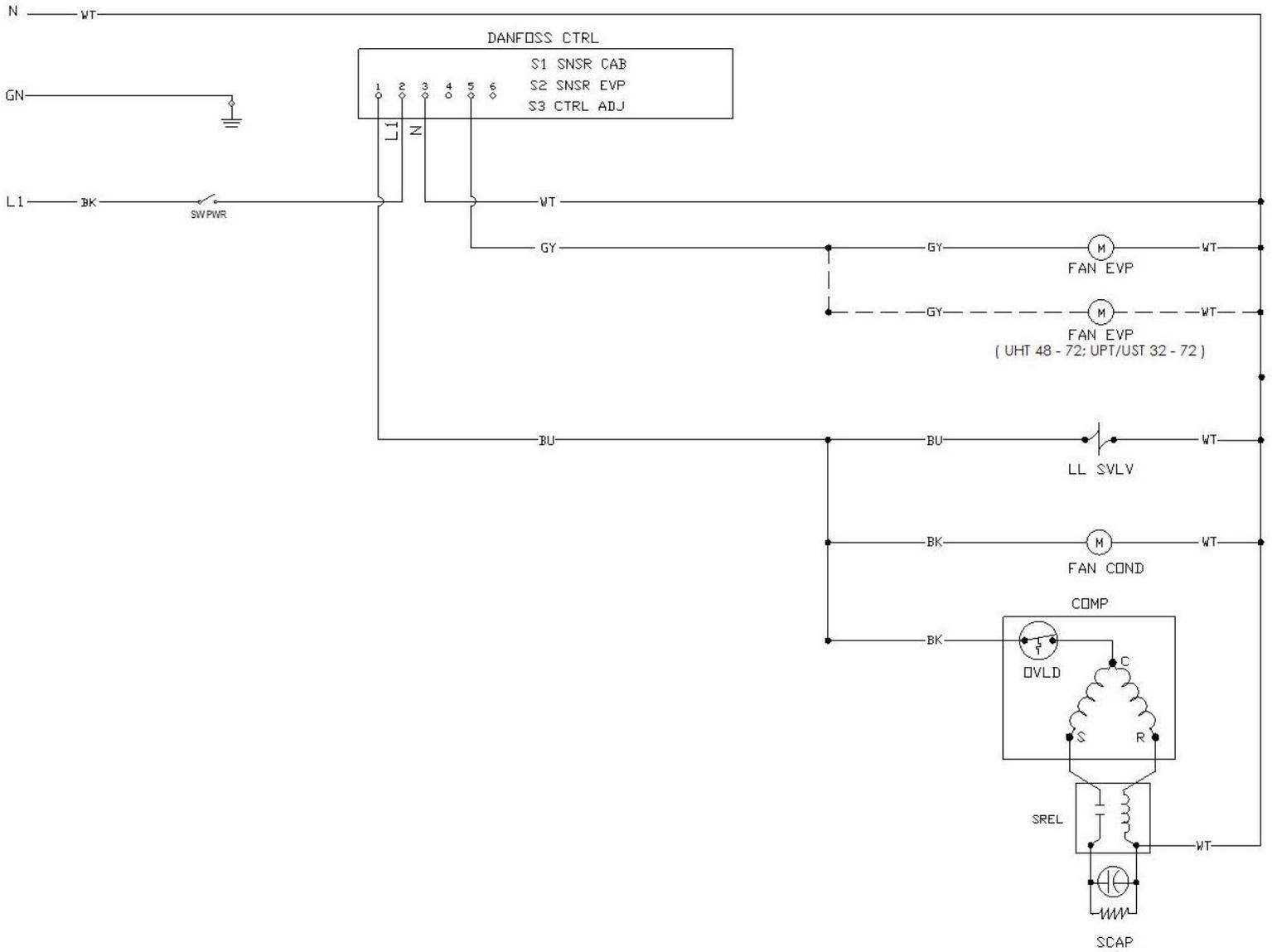
Figure 13

Section VI
General Wiring Diagrams

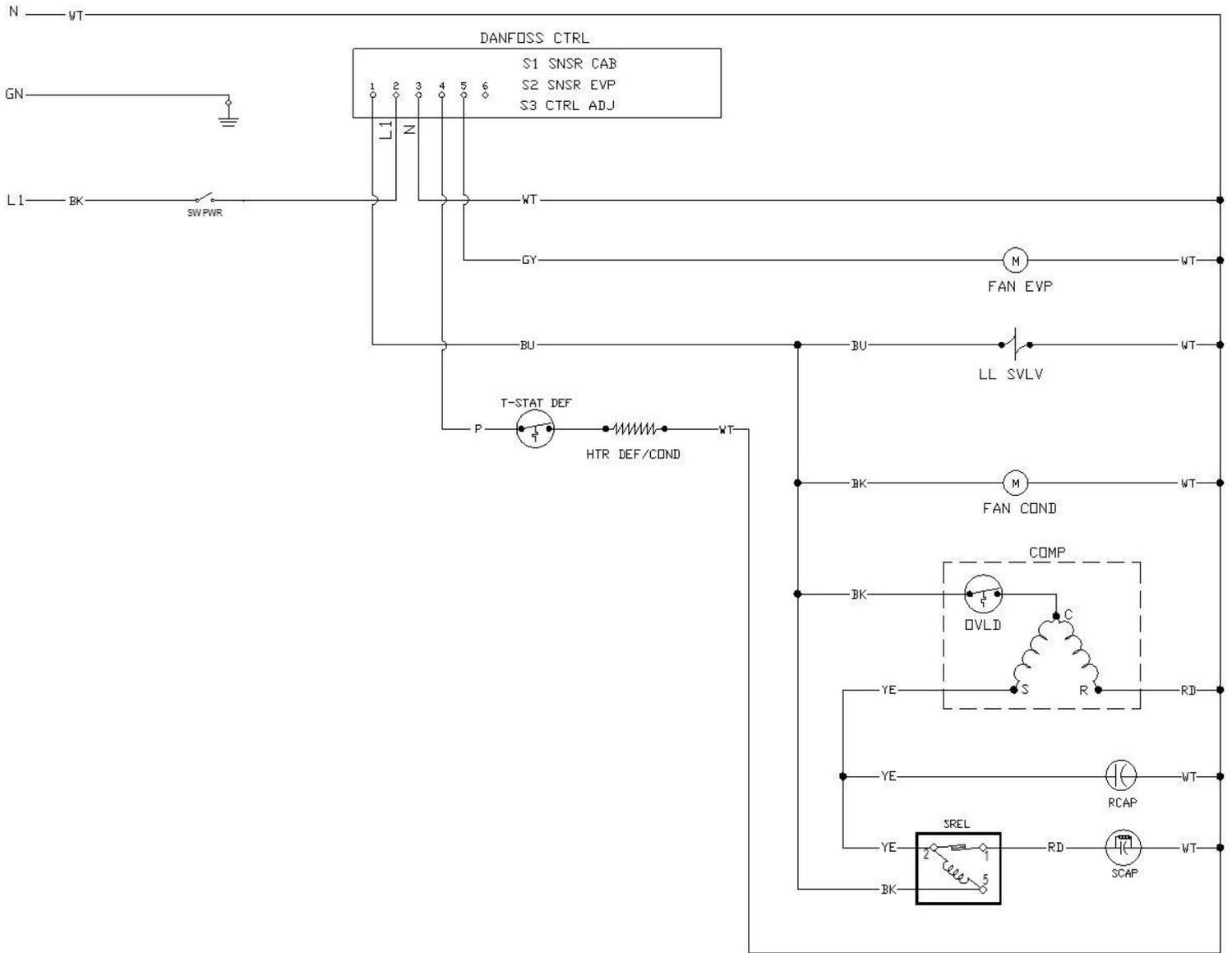
VI. a – G/R/A Series Reach-In



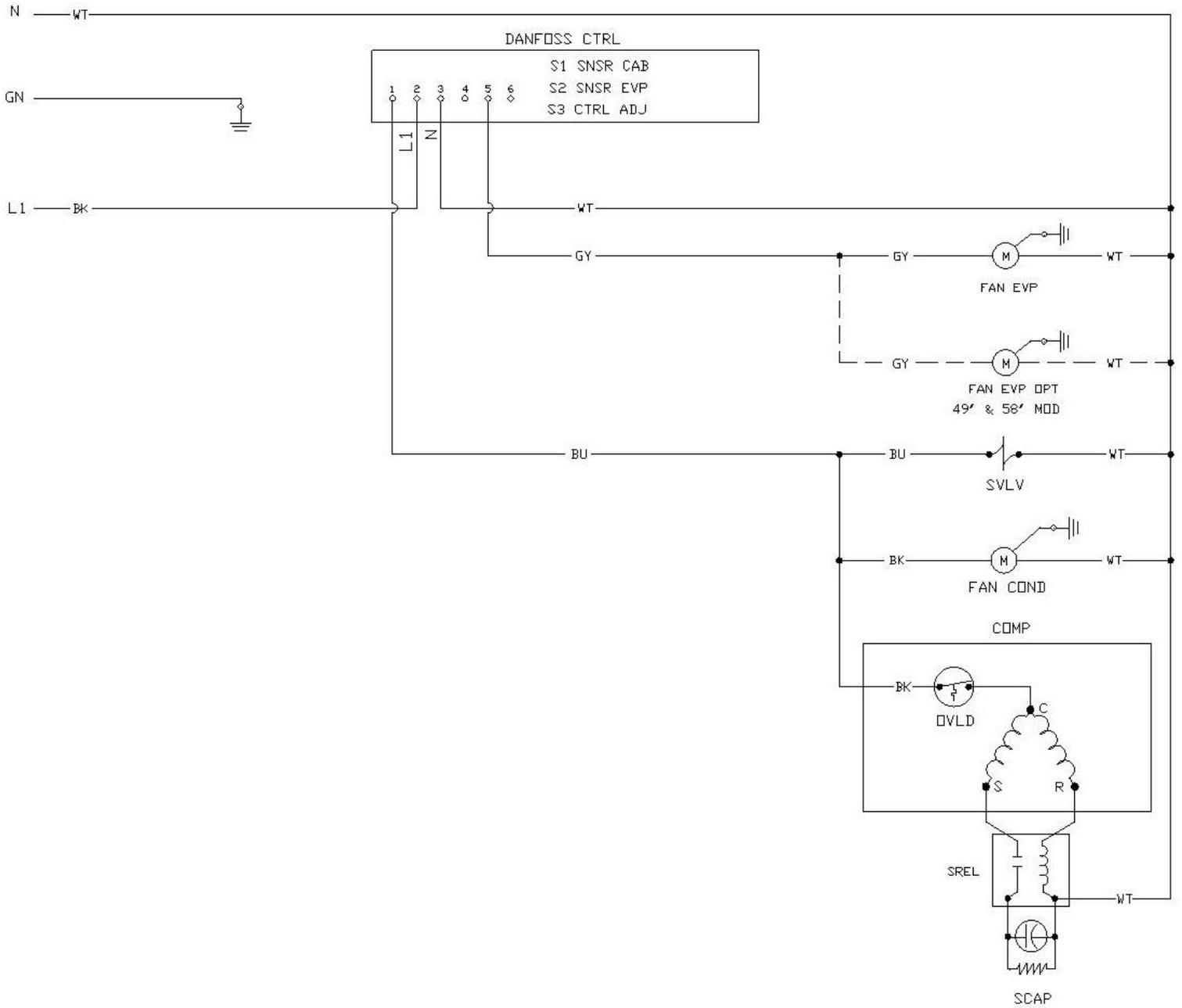
VI. b - UHT Danfoss Series



VI. c - ULT Danfoss Series



VI. d - Milk Cooler Danfoss Series



Section VII

G-Series Control (Blue Display)

VII. a – Control Overview

Display overview

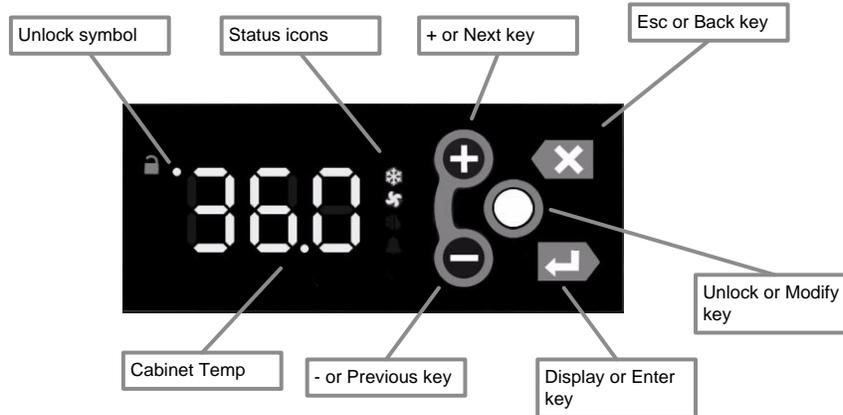


Figure 1

Control button legend:

	UNLOCK OR MODIFY KEY
	PLUS/NEXT KEY
	MINUS/PREVIOUS KEY
	EXIT/BACK KEY
	DISPLAY/ENTER KEY

Unlocking the Keypad:

<u>Press</u>		<u>Display</u>		<u>Press</u>
Tap two times				

Turning the Display On and Off:

<u>Press</u>		<u>Display</u>	<u>Display State</u>
Hold 5 sec			NO DISPLAY
		38.5	NORMAL DISPLAY

Adjusting Temperature Set Point:

1. Unlock Keypad
2. Use  or  to adjust Set Point
3. Press 

Initiate Manual Defrost:

<u>Press</u>	<u>Display</u>
 &  X	
Hold for 5 Seconds	

VII. b – Service Parameters

Service Menu:

The Service Menu contains 3 sub menus:

- **SEN** (Sensor) – Enables a technician to view various control & sensor statuses.
- **SET** (Set) – Allows a technician to change various control parameters.
- **AL** (Alarm) – Enables a technician to view various alarm states.

ACCESS CODE 555		
<u>Press</u>	<u>Display</u>	<u>Press</u>
Tap two times 		
	SEN	
	500	
	550	
	555	
	H	
See Table 1 for a list of SEN parameters		
To navigate to the SET		
<u>Press</u>	<u>Display</u>	<u>Press</u>
	SEN	
	SET	
See Table 2 for a list of SET parameters		
To navigate to the AL		
<u>Press</u>	<u>Display</u>	<u>Press</u>
	SET	
	AL	
See Table 3 for a list of AL parameters		

Parameter Tables:

		
<p>1. To view Parameter press </p> <p>2. Press  to return to Parameter list</p>		
Mnemonic	Parameter	Description
tl	Time Set	Local Time Set
rct	RH Snr Reset	Reset Count RH Sensor
lc	Light Status	Cabinet Light Off/On
Aide	Aux. Device Status	Auxiliary Device Status
LG	Light	Status Of Lights
doc	Door Open Count	Number Of Times Door Is Opened Since Defrost
door	Door Switch	Closed/Open
dhc	DH Duty Cycle	Door Heater Duty Cycle
dhc	Door Heater Cmd	Door Heater Status
dFc	Def. Device Status	Defrost Device Status
tdE	Cab. Tmp At Def.	Cabinet Temperature At Time Of Defrost
cFc	Cond. Fan Status	Condenser Fan Status
Fnc	Cab Fan Status	Evap Fan/Blower Off/On
cc	Compd cmd	Compressor Off/On
cur	Total Amps	Total Amps
rHG	RH Snr Status	Relative Humidity Status
dP	Dew Point	Dew Point
rh	Relative Humidity	Relative Humidity
db	Dry Bulb/Rm Temp	Dry Bulb
tAu	Aux Temp	Auxiliary Temperature
tl	Liquid Line Temp	Liquid Line Temperature
tE	Evap Coil Temp	Evaporator Line Temperature
tc	Temp Cab Average	Average Cabinet Temperature

Table 1

Parameter Tables (Cont):

<p>1. To access Parameter press </p> <p>2. Press to unlock parameter</p> <p>3. Use or to adjust Parameter</p> <p>4. Press to save settings</p> <p>5. Press to return to Parameter list</p>		
Mnemonic	Parameter	Description
	Temp Cab SP	Temp Set point
	Daylight Savings	Daylight Savings time
	Time Zone	Time Zone
	Temp Units	Temperature Units
	Software Version	Software Version
	Serial Number	Serial Number
	Door Heater Relay	Door Heater Delay In Optimize Mode
	Door Heater Mode	Door Heater Control Mode
	Defrost Time 6	Defrost Time 6
	Defrost Time 5	Defrost Time 5
	Defrost Time 4	Defrost Time 4
	Defrost Time 3	Defrost Time 3
	Defrost Time 2	Defrost Time 2
	Defrost Time 1	Defrost Time 1
	Defrost Interval	Interval Between Defrost
	Defrost Mode	Defrost Mode
	Defrost Setpoint	Defrost Set Point
	Fan Op. Door Open	Cabinet Fan Action When Door Opened
	Cab Fan Mode	Fan Mode
	Aux. SP Diff	Auxiliary Set Point Differential
	Aux. Set Point	Auxiliary Set Point
	Temp Cab SP Diff	Cabinet Temperature Differential

Table 2

Parameter Tables (Cont):

		
<p>1. To view Parameter press </p> <p>2. Press  to return to Parameter list</p>		
Mnemonic	Parameter	Description
	Temp Cab At Power Up	Cabinet Temp at power up
	Temp Cab Alarm	Cabinet Temp Alarm Status
	Temp Liq Line Alarm	Liq Line Temp Alarm Status
	Liq Line SD Alarm	Liq Line Shutdown Status

Table 3

VII. c – Display Errors

Error Codes:

Communication Error



Corrective Actions

- Press the reset button on the Main Board or power cycle the unit
- Replace the cable between the Main Board and the Display
- Replace the Display
- Replace the Main Board

Error 1



Corrective Actions

- Replace Main Board

Error 2



Corrective Actions

- Press the reset button on the Main Board or power cycle the unit
- If it continues, replace the Main Board

VII. d – Control Board Detail

Control board overview:

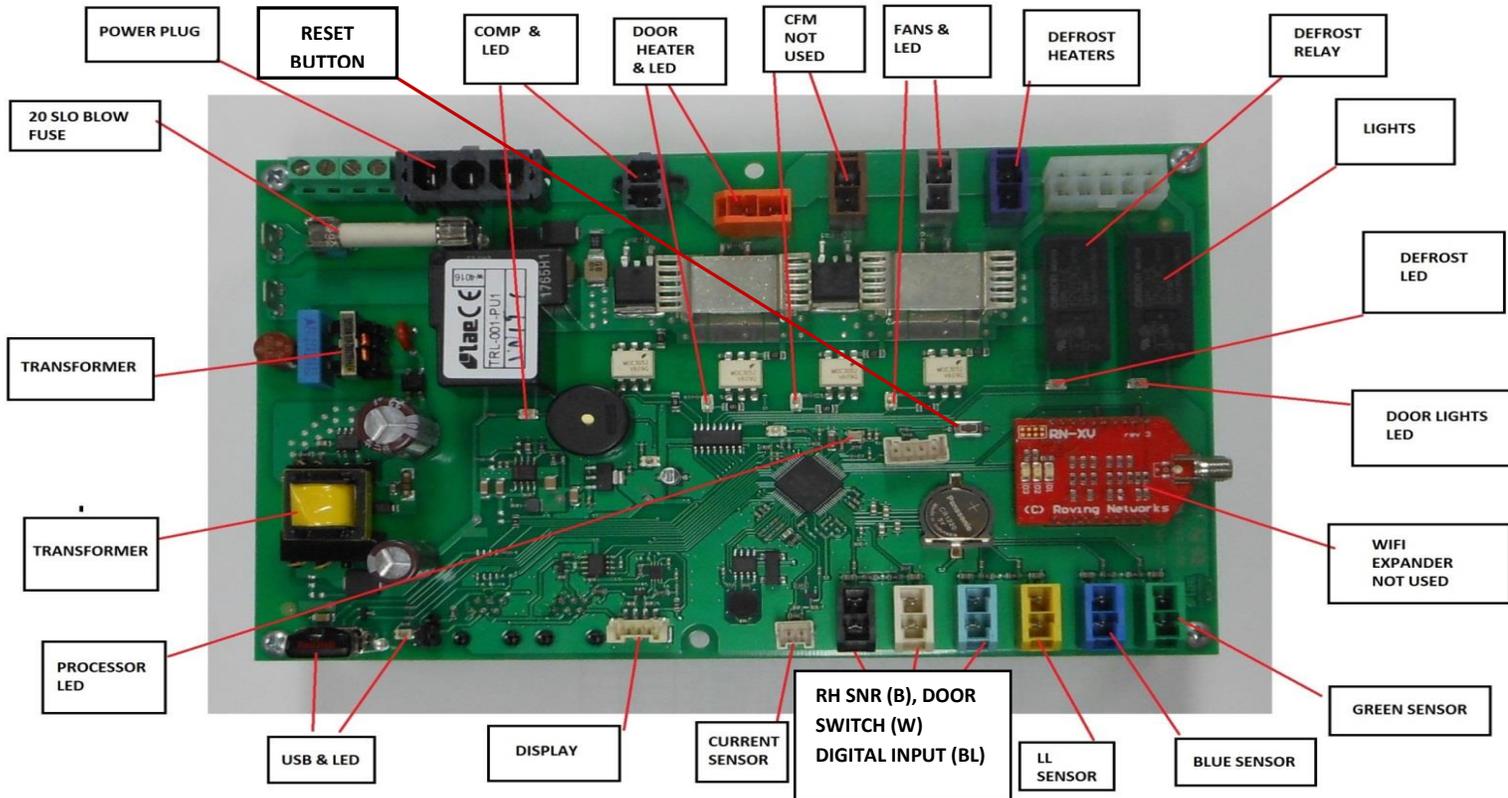


Figure 2

Control board Troubleshooting:

Note: All components may be tested with direct power ONLY when disconnected from the board. DO NOT jumper power at the board.

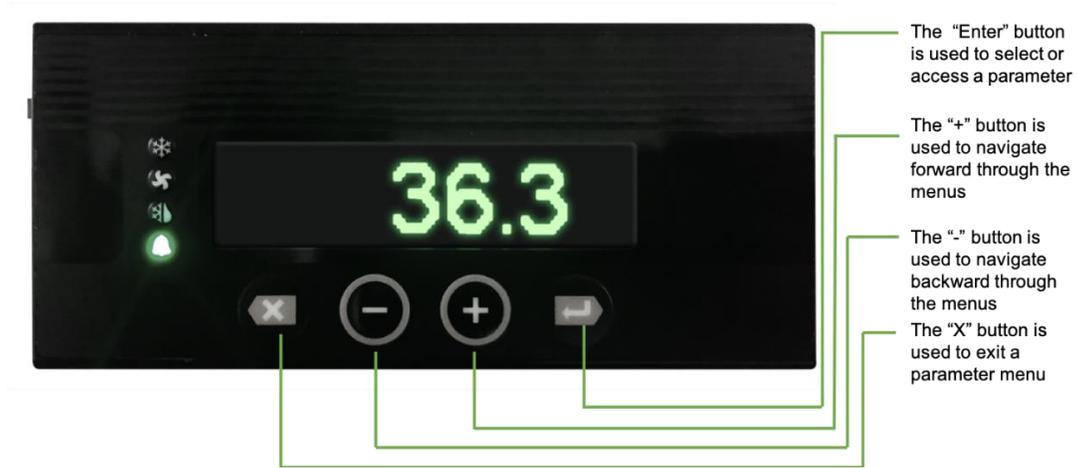
LED indicators will illuminate when the control is calling for an output to be energized. See Figure 2.

Section VIII

R/A-Series Control (Green Display)

VIII. a – Control Overview

Display overview



STATUS SYMBOL	DESCRIPTION	BUTTON SYMBOL	DESCRIPTION
	Compressor Status / Heater Status (On Hot Food cabinets only)		Escape /Back /Cancel Key
	Fan Status		Minus (-) / Previous Key
	Defrost Status		Plus (+) / Next Key
	Alarm/Door Open		Enter / Modify Key

VIII. b – Control Programing

Changing the Setpoint:

<u>Press</u>	<u>Display</u>	<u>Press</u>	<u>Display</u>
	Submenu 1/5 Sensor Readings		Submenu 2/5 Settings
	Enter Password 0		Enter Password 5
	5 		Enter Password 55
	55 		Enter Password 555
	555 		TempCabSp
	Press enter to modify the setpoint.	 or 	Use the plus and minus keys to navigate to your desired setpoint then press enter.

Start Manual Defrost:

<u>Press</u>	<u>Display</u>	<u>Press</u>
	Submenu 1/5 Sensor Readings.	
	Submenu 3/5 Start Defrost.	
	Press enter to confirm defrost.	

Submenu 1/5 Parameters:

Parameter Name	Password Level	Description
TempCab	N/A	Cabinet Temp
TempEvap	N/A	Evaporator Coil Temp
TempLiqLine	N/A	Liquid Line Temp
DoorSwitch	N/A	Door Switch
LightSwitch	N/A	Light Switch
ControlTime	555	Unit Time
TempAux	555	Auxillary Temp
TempRoom	555	Ambient Temp
HumidityRoom	555	Humidity Temp
DewpointRoom	555	Dewpoint Temp
RhSensorStatus	555	Rh Sensor Status
Current	555	Current Reading
CompCmd	555	Compressor Command
CompRunCnt	555	Compressor Run Count
CabFanCmd	555	Evap Fan Command
CondFanCmd	555	Condenser Fan Command
TempCabDefrost	555	Cabinet Temp During Defrost
DefrostCmd	555	Defrost Heater Command
DoorHeaterCmd	555	Door Heater Command
DHDutyCycle	555	Door Heater Duty Cycle
DoorOpenCount	555	Number Of Door Openings
AuxDeviceCmd	555	Auxillary Device Command
HeaterCmd	555	Heater Command
LightCmd	555	Light Command

Submenu 2/5 Parameters:

Parameter Name	Password Level	Description
TempCabSp	555	Temp Setpoint
TempCabSPDiff	555	Cabinet Temp Differential
TempAuxSp	555	Aux Temp Setpoint
TempAuxSPDiff	555	Aux Temp Setpoint Dif
CabFanMode	555	Fan Mode
CabFanDoorAction	555	Evap Fan When Door Open
DefrostSP	555	Defrost Setpoint
DefrostMode	555	Defrost Mode
DefrostInterval	555	Interval Between Defrosts
DefrostTime1	555	Defrost Time 1
DefrostTime2	555	Defrost Time 2
DefrostTime3	555	Defrost Time 3
DefrostTime4	555	Defrost Time 4
DefrostTime5	555	Defrost Time 5
DefrostTime6	555	Defrost Time 6
DoorHeaterMode	555	Door Heater Control Mode
DoorHeaterDelay	555	Door Heater Delay
SerialNumber	555	EOL: Serial Number
SoftwareVersion	555	EOL: Software Version
TempUnits	555	Temperature Units
TimeZone	555	Time Zone
DSTFlag	555	Daylight Savings
SabbathControl	555	Sabbath Unit
SabbathOn	555	Sabbath start time
SabbathOff	555	Sabbath end time

Submenu 3/5:

Parameter Name	Password Level	Description
Start Defrost	N/A	Start Defrost

Submenu 4/5:

Parameter Name	Password Level	Description
Door Alarm	555	Door Switch Alarm
TempCabAtPowerUp	555	Cabinet Temp at power up
TimeOfPowerDown	555	Time of power down
TimeOfPowerUp	555	Time of power up
PFDuration	555	Duration of Power Failure
PowerFailAlarm	555	Power Fail Alarm
TempCabAlarm	555	Cabinet Temp Alarm Status
TempEvapAlarm	555	Evap Temp Alarm Status
TempLiqLineAlarm	555	Liq Line Temp Alarm Status
LiqLineSDAlarm	555	Liq Line Shutdown Status
EvapSDAlarm	555	Evap Shutdown Status

Submenu 5/5:

Parameter Name	Password Level	Description
CompRelay	555	Compressor Relay
CabFanRelay	555	Evaporator Fan Relay
CondFanRelay	555	Condenser Fan Relay
DefrostHeaterRelay	555	Defrost Heater Relay
DoorHeaterRelay	555	Door Heater Relay
LightRelay	555	Light Relay
AuxDeviceRelay	555	Auxillary Device Relay

VIII. c – Control Board Detail

Control board overview:

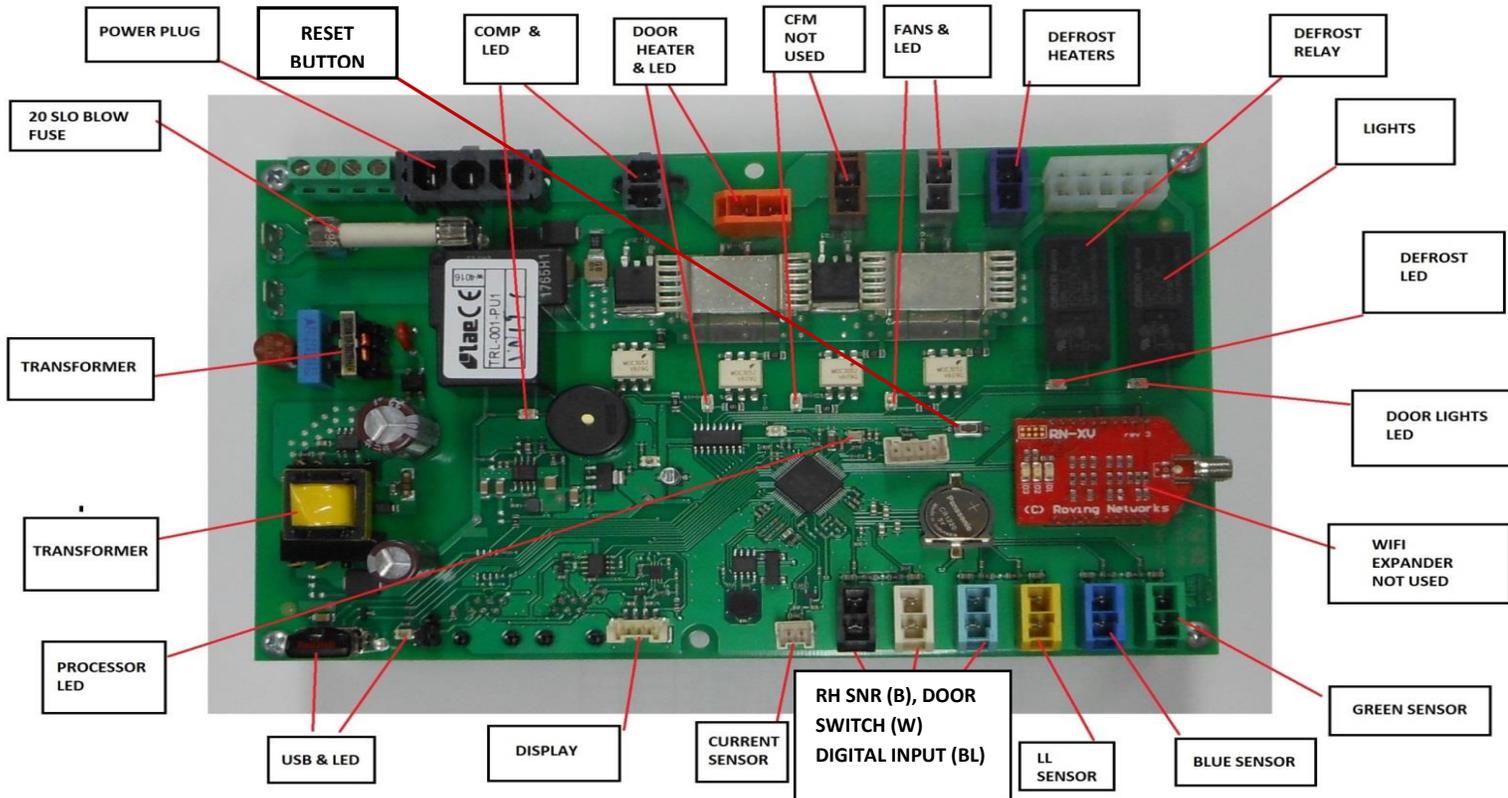


Figure 2

Control board Troubleshooting:

Note: All components may be tested with direct power ONLY when disconnected from the board. DO NOT jumper power at the board.

LED indicators will illuminate when the control is calling for an output to be energized. See Figure 2.

Control Board Specifications:

Fuse	325/326 Series Lead-Free 3AB, Slo-Blo 20A fuse
Reset	To reboot the board press the reset button (See Figure 2) for 5 seconds or until all the LED lights flash, shut off and then come back on again.
Toggle Switch	Toggle switch disconnects power to all controls and components. When you turn on toggle switch there is a 5 second time delay before start up.
Door Switch	12VDC to Door Switch. When you open door there is a 1 second delay before the light comes on.
Data Logging	8 GB SanDisk USB drive logs data every 10 secs for up to 10 years
High Voltage Outputs	All high voltage component outputs can be isolated from the rest of the circuit by disconnecting their respective 2 pin connector from the board. <i>All components may be tested with direct power ONLY when disconnected from the board. DO NOT jumper power at the board.</i>