FOR SERVICE TECHNICIAN'S USE ONLY

NOTE: This sheet contains important Technical Service Data

Tech Sheet **Do Not Remove Or Destroy**

⚠ DANGER



Electrical Shock Hazard

Only authorized technicians should perform diagnostic voltage measurements.

After performing voltage measurements, disconnect power before servicing.

Failure to follow these instructions can result in death or electrical shock.

⚠ WARNING



Electrical Shock Hazard

Disconnect power before servicing.

Replace all parts and panels before operating.

Failure to do so can result in death or electrical shock.

Voltage Measurement Safety Information

When performing live voltage measurements, you must do the following:

- **Verify the controls are in the off position so that the appliance does not start when energized.**
- **Allow enough space to perform the voltage measurements without obstructions.**
- **Keep other people a safe distance away from the appliance to prevent potential injury.**
- **Always use the proper testing equipment.**
- **After voltage measurements, always disconnect power before servicing.**

No-Load Performance, Controls in Normal Position

	Kw/24 hr/± 0.4			Percent Run Time ± 10%			Cycles/24 hr/± 10			Refrigerator Compartment Average Food Temperature ± 4°F			Freezer Compartment Average Food Temperature ± 4°F		
Ambient °F	70°	90°	110°	70°	90°	110°	70°	90°	110°	70°	90°	110°	70°	90°	110°
	1.0	1.50	2.1	35	50	70	30	30	30	38	38	38	0	0	0

Temperature Relationship Test Chart

	Evaporator Outlet ± 3°F		Evaporator Inlet ± 3°F		Suction Line ± 10°F		Average Total Wattage ± 20%		Suction Pressure ± 3 PSIG		Head Pressure ± 5 PSIG	
Ambient °F	70°	90°	70°	90°	70°	90°	70°	90°	70°	90°	70°	90°
	-18	-15	-18	-15	75	95	110	120	-2	0	100	140

Component Specifications

Component	Specifications all parts 115 VAC/60Hz unless noted	
Compressor	BTUH	700 / EMBRACO EM3Z60HLT
	Watt	60 Hz/99 W
	Current lock rotor	11.7 A
	Current full load	0.9 A ± 7%
	Resistance run windings	4.7 Ω ± 15%
	Resistance start windings	4.7 Ω ± 15%@77°F
Relay		5sP/TSD2
Compressor Run Capacitor	Volt	180 VAC
	Capacitance	12 µfd ± 10%
Electric Damper Control	Maximum closing time	8 seconds
	Temperature rating	20°F - 110°F
	RPM	5
Thermistor	Temperature	Resistance
	77°F	2,700 Ω ± 5%
	36°F	7,964 Ω ± 1.0%
	0°F	23,345 Ω ± 2%
Condenser Motor	Rotation (facing end opposite shaft)	Clockwise
	RPM	1120 RPM
	Watt	3.4 ± 15% W @ 115 VAC
	Current	0.085 A ± @ 115 VAC
Evaporator Fan Motor	Rotation (facing end opposite shaft)	Clockwise
	RPM	2800 RPM
	Watt	6.0 or 3.7 ± 15%
	Note: Fan blade must be fully seated on shaft to achieve proper airflow.	W @ 115 VAC
Overload/Relay	Overload/Relay	3.06 A ± 15%
	Ult. trip A @ 158°F (70°C)	142°F ± 16°F
	Close temperature	221°F ± 9°F
	Open temperature	10 seconds ± 5
	Short time trip (seconds)	14.3 A ± 2 A
	Short time trip (A @77°F (25°C))	
Thermostat (Defrost)	Volt	120/240 VAC
	Watt	495 W
	Current	5.8/3.8 A
	Resistance across terminals:	56k Ω
	Above 42°F ± 5°	Open
	Below 12°F ± 7°	Closed
Evaporator Heater	Volt	115 VAC
	Wattage	435 ± 5% W @ 115 VAC (22 cu. ft. models) 470 ± 5% W @ 115 VAC (25 cu. ft. models)
	Resistance	30 ± 5% Ω (22 cu. ft. models) 28 ± 5% Ω (25 cu. ft. models)
Control Board	Volt	120 VAC, 60Hz
	See control board for diagnostics.	
Water Valve,	Wattage	Brown Side 35w Yellow Side 20w
Light Switch	Type	SPDT NC
	Volt	125/250 VAC
	Current	8/4 A
Light Switch/Interlock	Type	SPDT NO/NC
	Volt	125/250 VAC

Programming Mode:

NOTE: The Program Code is located on the Serial Plate on this unit after the word Code.

1. Press and hold the Door Alarm Keypad.
2. Press and hold Freezer Temperature DOWN /- Keypad within 3 seconds.
3. Release the Door Alarm Keypad and wait 3 seconds.
4. The control will display **PE** to indicate the programming mode.
5. Entry is confirmed by pressing the Freezer Temperature DOWN /- Keypad once more.
6. The control will display the current Program CODE. This value should be validated with the Program CODE printed on the unit serial plate.
   NOTE: If the Program CODE is correct, the Programming Mode is exited by pressing Door Alarm Keypad for 3 seconds.
7. Press the Refrigerator Temperature UP /+ Keypad or Refrigerator Temperature DOWN /- Keypad to change the digit value with each key press.
8. The decimal point indicates the selected digit. Press the Freezer Temperature UP /+ Keypad to select the next digit.
9. Once the desired Program CODE is entered, press and hold the Freezer Temperature DOWN /- Keypad until the Program CODE begins flashing indicating it has been saved.

NOTE: If you attempt to enter an invalid Program CODE the control will not save the new code, but will beep. (The unit will NOT run with a Program CODE of 0000). Once the Program CODE has been saved the Programming Mode is exited by pressing any key. If the new code is incorrect this process should be repeated.

The Programming mode can be exited at any time by pressing Door Alarm key for 3 seconds or will exit if unattended for four minutes.

Defrost Operation:

The Control Board adapts the compressor run time between defrosts to achieve optimum defrost intervals by monitoring the length of time the defrost heater is on. After initial power up, defrost interval is 4 hours compressor run time. Defrost occurs immediately after the 4 hours.

Forced Defrost Mode:

The forced defrost function is performed using the Freezer display and Refrigerator keypad. Enter the Forced Defrost Mode by performing the following sequence of events:

1. Press and hold the Door Alarm Keypad.
2. Press and hold Refrigerator Temperature DOWN /- Keypad.
3. Release the Door Alarm Keypad and wait 3 seconds. **Fd** appears in Freezer display.
4. Press the Refrigerator Temperature DOWN /- Keypad again. **Sh** appears in right display.
5. Press again to force defrost **Fd** and **Sh** will flash in display indicating unit is in defrost.

Service Test Mode:

The service test functions are performed using the refrigerator display and keypad. Enter the Service Test Mode by performing the following sequence of events:

1. Press and hold the Door Alarm Keypad.
2. Press and hold Refrigerator Temperature UP / + Keypad.
3. Release the Door Alarm Keypad and wait 3 seconds.
4. The Freezer display will display SE confirming entry in the Service Mode.
5. Press the Refrigerator Temperature UP /+ Keypad again to confirm entry in the Service Mode.
6. Display will show 101 in left display and numeric or dashes in right display.
7. Press Freezer Refrigerator Temperature UP / + Keypad and Freezer DOWN /- Keypad to toggle through Service Test numbers.
8. To exit service test mode, open and close refrigerator door or hold door alarm for 3 seconds.

Service Test - 101 Defrost Heater & Defrost Circuit

Press the Refrigerator Temperature UP /+ keypad and Refrigerator DOWN /- keypad to energize or de-energize the Defrost circuit. The display will read OFF when de-energized, OP when energized with open defrost thermostat and CL when energized with closed defrost thermostat.

Service Test - 102 Compressor / Condenser Fan

Press the Refrigerator Temperature UP /+ keypad and Refrigerator DOWN /- keypad to toggle Compressor/Condenser fan On and Off.

Service Test – 112 Freezer Fan
Press the Refrigerator Temperature UP /+ keypad and Refrigerator DOWN /- keypad to toggle Freezer Fan On High speed, Low speed and Off.
NOTE: Display will show state 0.0 for OFF, **11.0-14.0** volts for High speed or **7.75- 8.25** volts for Low speed.

Service Test – 113 Ice Compartment Fan
Press the Refrigerator Temperature UP /+ keypad and Refrigerator DOWN /- keypad to toggle Ice compartment Fan On High speed, Low speed and Off.
NOTE: Display will show state 0.0 for OFF, **11.0-14.0** volts for High speed or **7.75- 8.25** volts for Low speed.

Service Test – 121 Damper Operation
Press the Refrigerator Temperature UP/+ keypad and DOWN /- keypad to toggle Damper **OP** open and **CL** closed.
NOTE: If damper is opening or closing it will not allow you to toggle damper and beep. Display will show state **–CL** or **–OP** if Damper is in the process of closing or opening.

Service Test – 131 Mullion Heater
Press the Refrigerator Temperature UP/+ keypad and DOWN /- Keypad to toggle Mullion Heater Off and On.

Service Test – 141 Fresh Food Thermistor
Will Show Fresh Food Temperature, **OP** for open thermistor, or **SH** for shorted thermistor.

Service Test – 142 Freezer Thermistor
Will Show Freezer Temperature, **OP** for open thermistor, or **SH** for shorted thermistor.

Service Test – 144 Ambient Thermistor
Will Show Ambient Temperature, **OP** open thermistor, or **SH** shorted thermistor.

Service Test – 145 Ice Box Thermistor
Will Show Ice Box Temperature, **OP** open thermistor, or **SH** shorted thermistor.

Service Test – 151 Fresh Food Door State
Will show state of Fresh Food Door: **OP** (open) or **CL** (closed).
NOTE: By pushing either Fresh Food Door switches you can toggle state from **OP** (open) to **CL** (closed).

Service Test – 152 Freezer Food Door State
Will show state of Freezer Door: **OP** (open) or **CL** (closed).
NOTE: By pushing Freezer Door Switch you can toggle state from OP (open) to CL (closed).

Service Test – 153 Disable Internal Lights
Press the Refrigerator Temperature UP/+ keypad and DOWN /- keypad to toggle Enable **En** and Disable **dIS** internal lights.

Service Test - 163 Water Dispenser
Display shows the state of the Water Dispenser Valve (ON or OFF).
NOTE: By pushing Actuator pad or Front Fill you can control state of Water Dispenser Valve.

Service Test - 164 External Ice Chute Door
Display shows the state of the External Ice Chute Door: **CL** (closed) or **OP** (open).
NOTE: By pushing Actuator pad you can control state of External Ice Chute Door.

Service Test - 165 Dispenser Lamp
Display shows the state of the Dispenser Lamp (ON or OFF).
NOTE: By pushing Actuator pad or Front Fill you can control state of dispenser lamp.

Service Test - 167 Cavity Heater Test (On some models)
Toggles the state of the Cavity Heater ON or OFF.
NOTE: Pushing Refrigerator Temperature UP/+ keypad and DOWN /- keypad toggles the cavity heaters state to ON or OFF.

Service Test - 168 Cube Dispenser and Internal Ice Chute Door Operation
Display shows the state of the ice auger motor and the internal ice chute door. (ON or OFF)
NOTE: By pushing actuator pad you can control state of the Ice auger motor and the internal ice chute door.

Service Test - 171 Actuator Pad
Display shows the state of the Actuator Pad (ON or OFF).

Service Test - 172 Front Fill (On some models)
Display shows the state of the Front Fill (ON or OFF).

Service Test - 173 Ambient Light
Display shows light sensor measurement (Hi or Lo). Night light will turn on when light sensor measures Lo. By changing the sensor's exposure to ambient light you can control the sensor measurement.

Service Test - 175 Dispenser Line
Display shows the state of the Dispenser Line (ON or OFF).
NOTE: By pushing Actuator pad or Front Fill you can change state of Dispenser Line.

Service Test - 182 LED Indicator Operation
Press the Refrigerator Temperature UP/+ keypad and DOWN /- Keypad to show operation of LED Indicators. All LED Indicators will flash. Press again and LED will stop flashing.

Service Test - 183 Keypad Operation
Display shows a numeric or letter display indicating the last key pressed.
NOTE: Refrigerator Temperature UP/DOWN keypads have no effect when pressed and Freezer Temperature UP/DOWN keypads remain operational.

Service Test - 192 Ice Maker State Test

- Display shows **dr** if left fresh food door switch is in the door open position.
- Display shows **OFF** if ice maker power switch is in the off position and door closed.
- Display shows **On** if the ice maker power switch is in the on position and the door closed and heater is off.
- Display shows **OnH** if icemaker power switch is in the on position and harvest heater is on and door closed.

Service Test - 193 Ice Maker Relay

Press the Refrigerator Temperature UP/ + Keypad or Refrigerator DOWN /- Keypad to toggle the ice maker relay ON and OFF.
NOTE: Service tests **201-213** modifies factory settings to suit customers needs.

Service Test - 201 Mullion Heater Override
Press the Refrigerator Temperature UP /+ Keypad or Refrigerator DOWN /- Keypad to change Mullion Heater from cycling on with compressor (OFF position) to 100% operation (On Position).
NOTE: If present, the Humidity Control Button toggles between the selected Mullion Heater Function and 0% operation.

Service Test - 202 Default Defrost Operation
Press the Refrigerator Temperature UP /+ Keypad or Refrigerator DOWN /- Keypad to change Defrost Operation from normal adaptive defrost (Off position) to minimum time between defrosts (On position).

Service Test - 203 Show Temperature Set points
Press the Refrigerator Temperature UP /+ Keypad or Refrigerator DOWN /- Keypad to change from showing actual temperature (Off position) to show temperature set points only (On position).

Service Test - 211 Fresh Food Temperature Adjustment
Press the Refrigerator Temperature UP /+ Keypad or Refrigerator DOWN /- Keypad to change calibration of Fresh Food Temperature plus or minus in 1°F increments up to 6°F.
NOTE: Temperature will read in Fahrenheit regardless of what current temperature scale is being used.

Service Test - 212 Freezer Temperature Adjustment
Press the Refrigerator Temperature UP /+ Keypad or Refrigerator DOWN /- Keypad to change calibration of Freezer Temperature plus or minus 1°F in increments up to 6°F.
NOTE: Temperature will read in Fahrenheit regardless of what current temperature scale is being used.

Service Test - 213 Ice Compartment Temperature Adjustment
Press the Refrigerator Temperature UP /+ Keypad or Refrigerator DOWN /- Keypad to change calibration of Ice Compartment Temperature plus or minus 1°F in increments up to + 0 / + 8°F.
NOTE: Temperature will read in Fahrenheit regardless of what current temperature scale is being used.

Service Test - 221 Reset Default Settings
Press the Refrigerator Temperature UP /+ Keypad or Refrigerator DOWN /- Keypad to reset to factory default settings (dEF).

Service Test - 231 Water Filter Usage
Display shows the percent water filter consumption since water filter was reset. 100% indicates the filter should be replaced.

Service Test - 232 Water Filter Days In Use
Display shows the number of days since the water filter was reset.

Service Test - 241 Software Revision Main Control Board
Display shows the Software revision of the Main Control Board.

Service Test - 244 Software Revision Display Board
Display shows the Software revision of the Display Board.
NOTE: Service tests 3XX and above are reserved for Engineering Use Only.

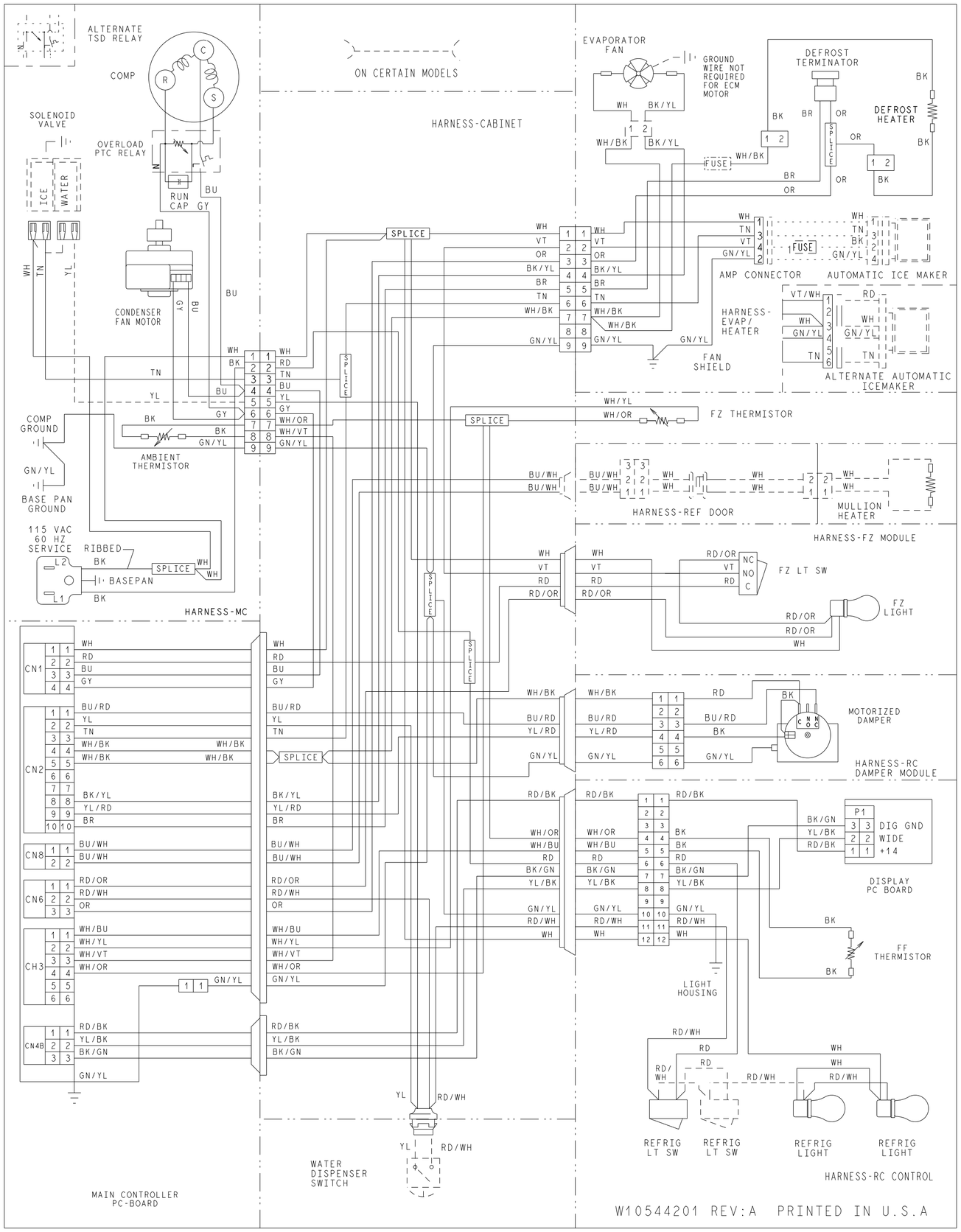
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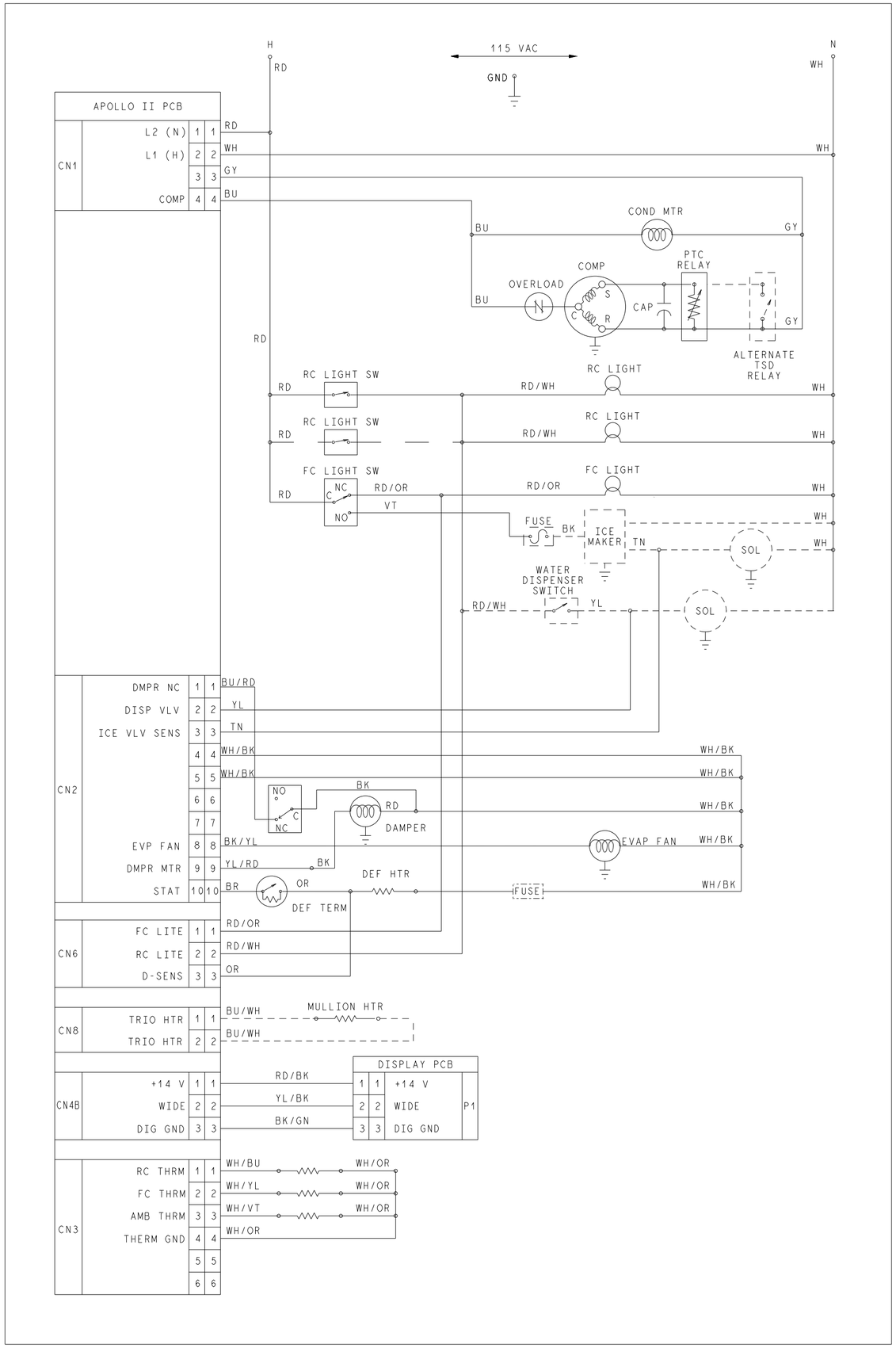
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Wiring Diagram



Schematic



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