

# SERVICE MANUAL

## IMPINGER COUNTERTOP OVEN

### MODEL 1300 SERIES



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# SERVICE AND PARTS MANUAL

## 1300 SERIES

### IMPINGER COUNTERTOP OVEN

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# SEQUENCE OF OPERATIONS

## MODEL CTI

1300	200 VAC	60 HZ	1 PHASE
1301	208 VAC	60 HZ <sup>1</sup>	1 PHASE
1302	240 VAC	60 HZ	1 PHASE
1303	220 VAC	50 HZ	1 PHASE
1304	240 VAC	50 HZ	1 PHASE
1305	380/220 VAC	50 HZ	1 PHASE
1306	415/240 VAC	50 HZ	1 PHASE
1307	200 VAC	60 HZ	3 PHASE
1308	380/220 VAC	50 HZ	3 PHASE
1309	415/240 VAC	50 HZ	3 PHASE
1310	220 VAC	60 HZ	1 PHASE
1311	380/220 VAC	60 HZ	3 PHASE
1312-000-E	400/230 VAC	50 HZ	3 PHASE
1313-000-E	400/230 VAC	50 HZ	2 PHASE
1314-F24-E	240 VAC	50 HZ	1 PHASE

## POWER SUPPLY

(Electrical power supplied to the oven:)

1300/1301/1302	1303/1304/1314-F24-E	1305/1306
Black – Hot Red – Hot Green - Ground	Brown - Hot Blue – Neutral Green/Yellow-Ground	Brown – Hot Black – Hot Blue – Neutral Green/Yellow-Ground
1307	1308/1309/1311	1310
Red – Hot Black - Hot Orange – Hot Green - Ground	Brown – Hot Black (2) – Hot Blue – Neutral Green/Yellow – Ground	Brown – Hot Black – Hot Green/Yellow-Ground
1312-000-E	1313-000-E	
Black (3) – Hot Blue – Neutral Green/Yellow – Ground	Black (2) – Hot Blue – Neutral Green/Yellow - Ground	

## **MAIN FAN CIRCUIT**

Electrical power is permanently supplied through the Control Box Hi-Limit to terminal one (1) of the 20-Minute Timer. When the DPST Fan Switch is closed, the timer is enabled. This energizes terminal two (2) of timer, which supplies power to the Coil of the Fan Relay and the Cooling Fan Motor. The normally open contacts of the Fan Relay now close energizing the Main Fan Motor. Closing the Main Fan Switch also supplies power to the Conveyor, Control Transformer, and the Electronic Temperature Control Board.

## **TEMPERATURE CONTROL CIRCUIT**

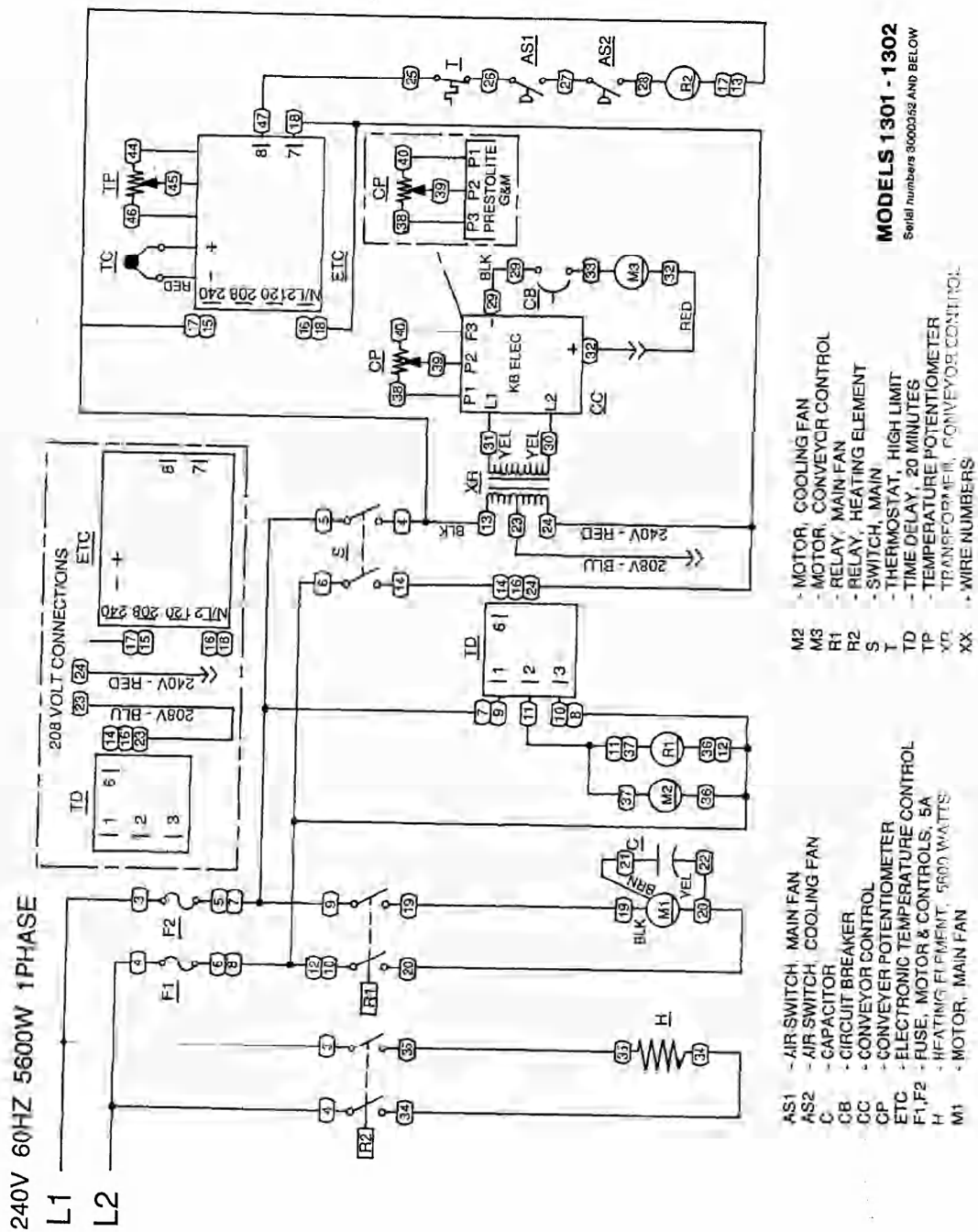
Closing the Main Fan Switch supplies power to the Temperature Control Board. The Temperature Control Potentiometer is adjusted to the desired temperature. Power is then supplied through the normally closed High Limit Thermostat and the Main Fan Air Switch to the Coil of heating element relay. When the contacts of the heating element relay are closed, power is then applied to the 5600W Heating Element. The Thermocouple provides varying millivolts to the Temperature Control Board. The temperature control board supplies voltage to the Coil of the heating element relay at intermittent intervals to maintain desired temperature.

## **CONVEYOR DRIVE**

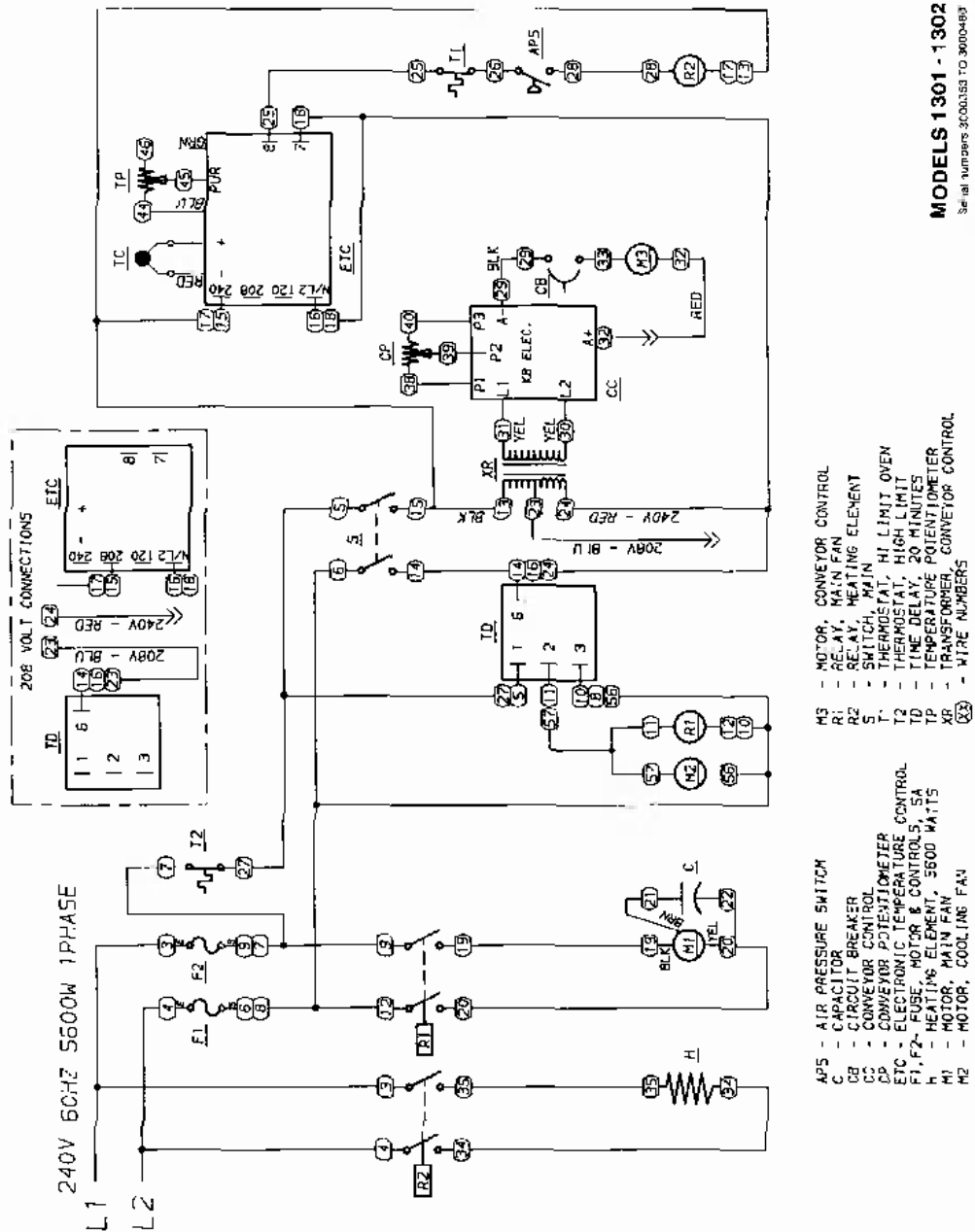
Closing the Main Fan Switch supplies voltage to the primary of the Transformer, the secondary of the Transformer then supplies 24 VAC to the Conveyor Control Board. AC voltage is converted to DC voltage and is supplied to the Drive Motor at terminals J3(-) and J2(+). Adjustment of the Speed Control Potentiometer will change resistance at terminals P1, P2, and P3 varying the DC voltage to the motor. The speed of the conveyor motor will increase or decrease as the DC voltage from the board increases or decreases respectively.

NOTE: The conveyor control uses a sensor and magnet mounted on the conveyor motor that senses the motor speed. Any change in motor load ( $\pm$  RPM) is detected by the sensor and the voltage to the motor is adjusted accordingly.

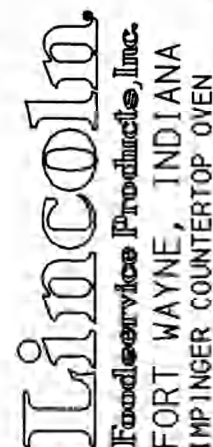
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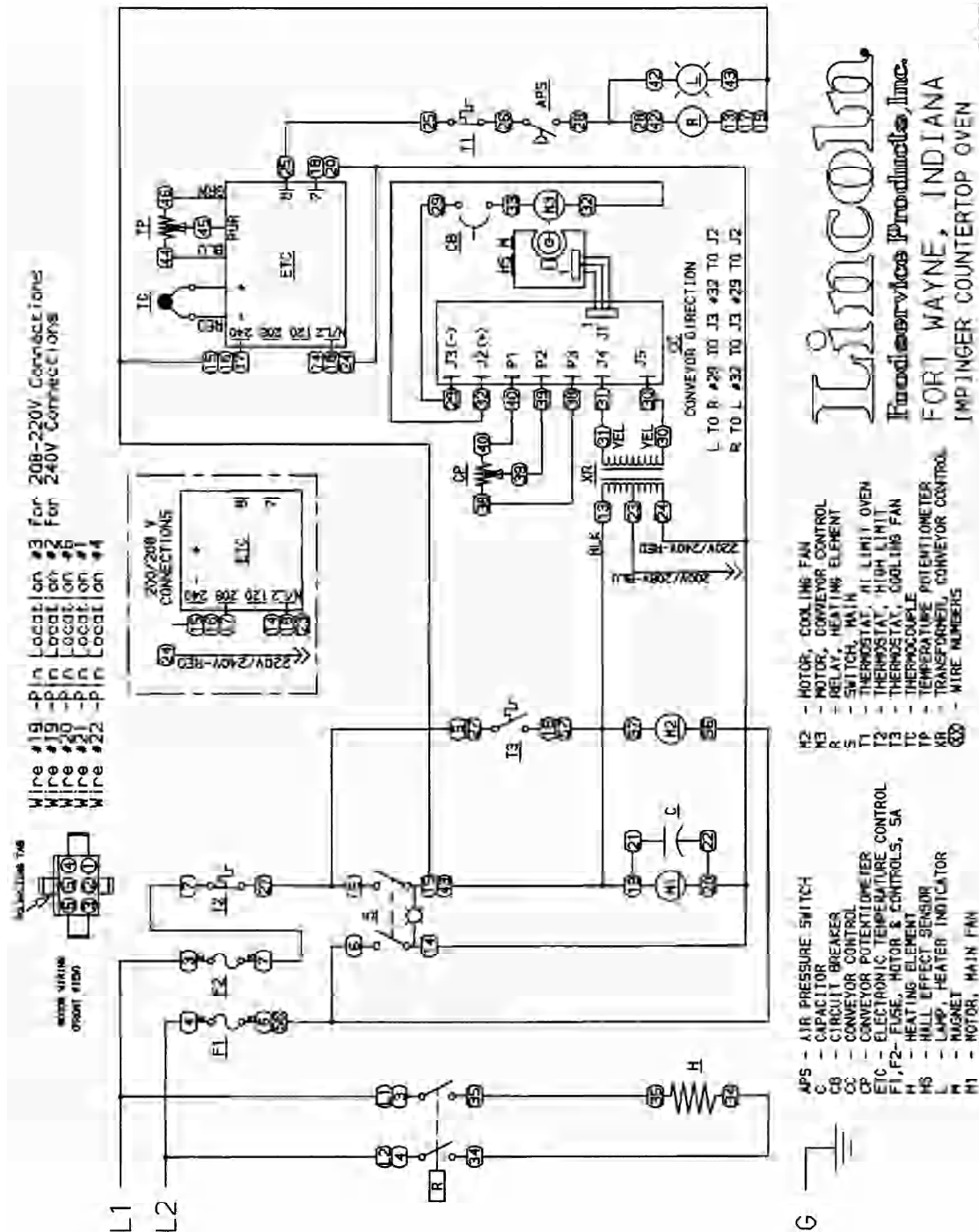


**SCHEMATIC 1301, 1302 S/N 3000353 TO 3000480**



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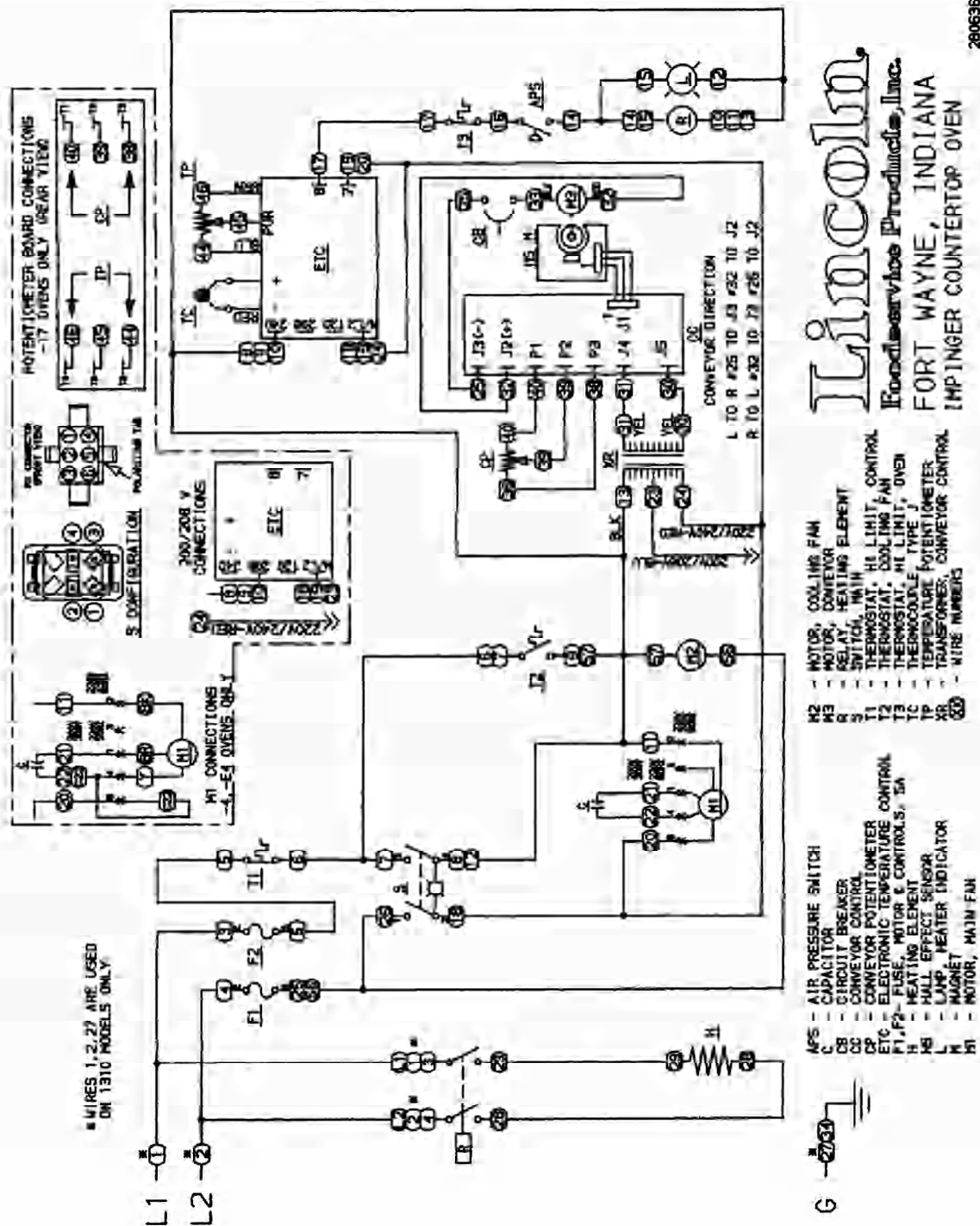




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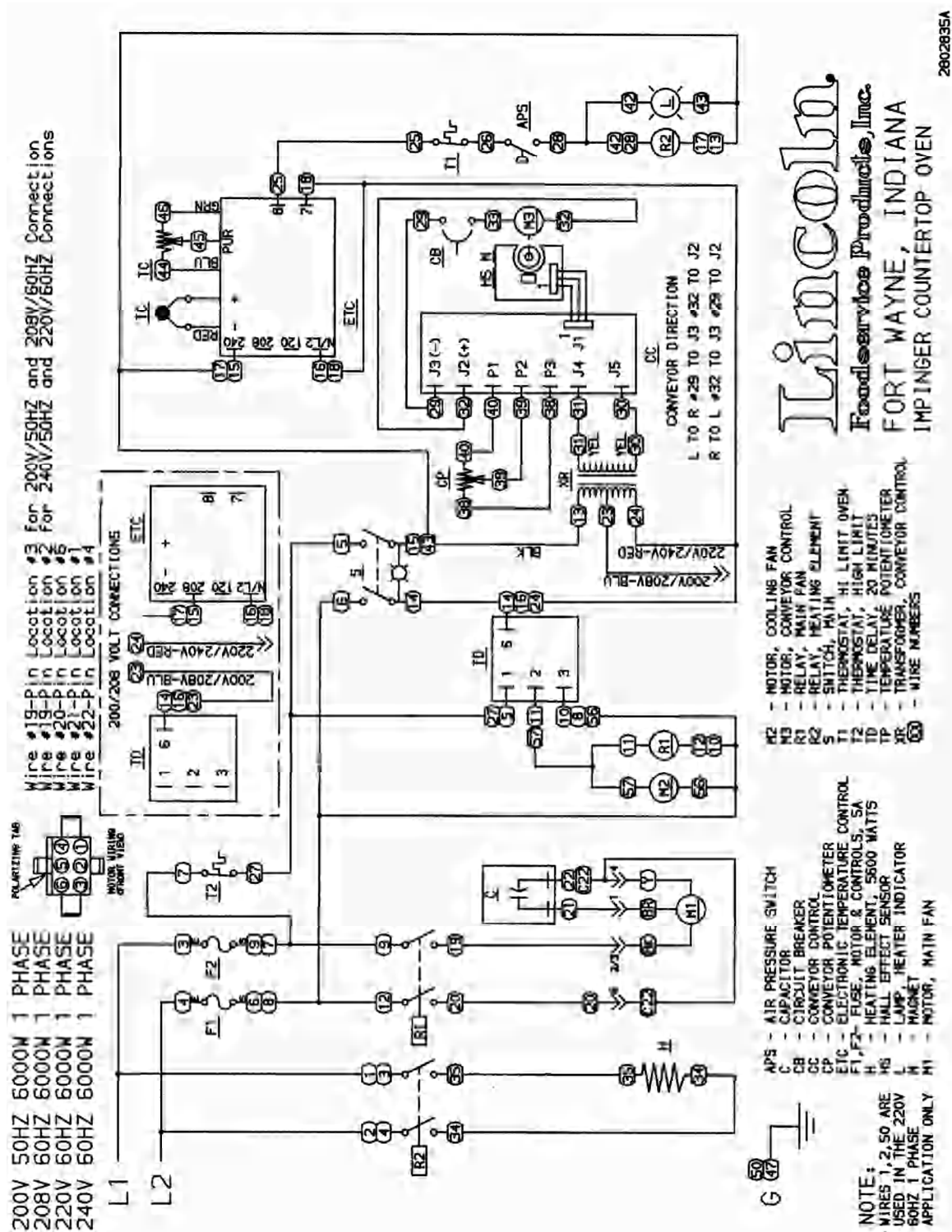
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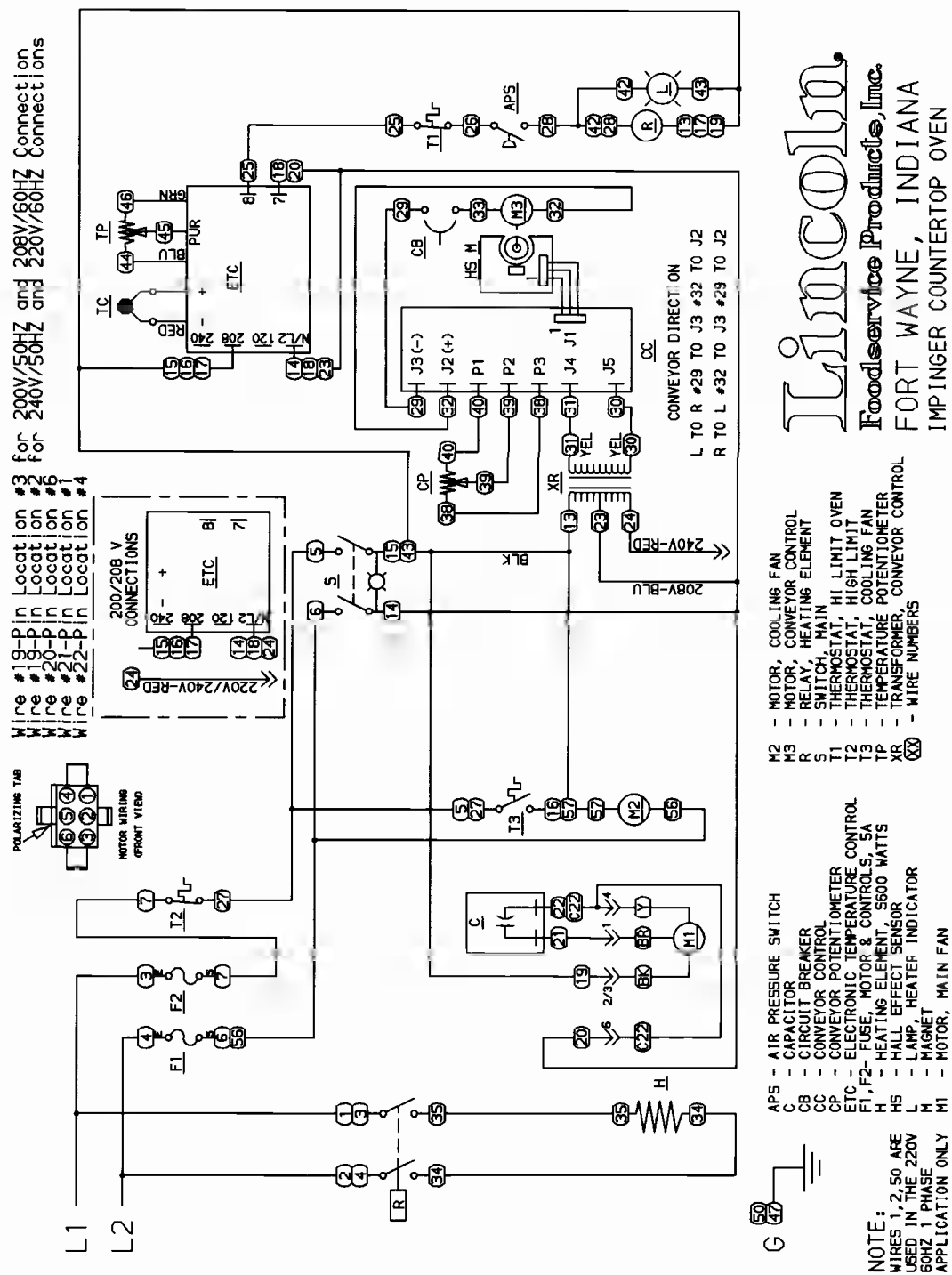
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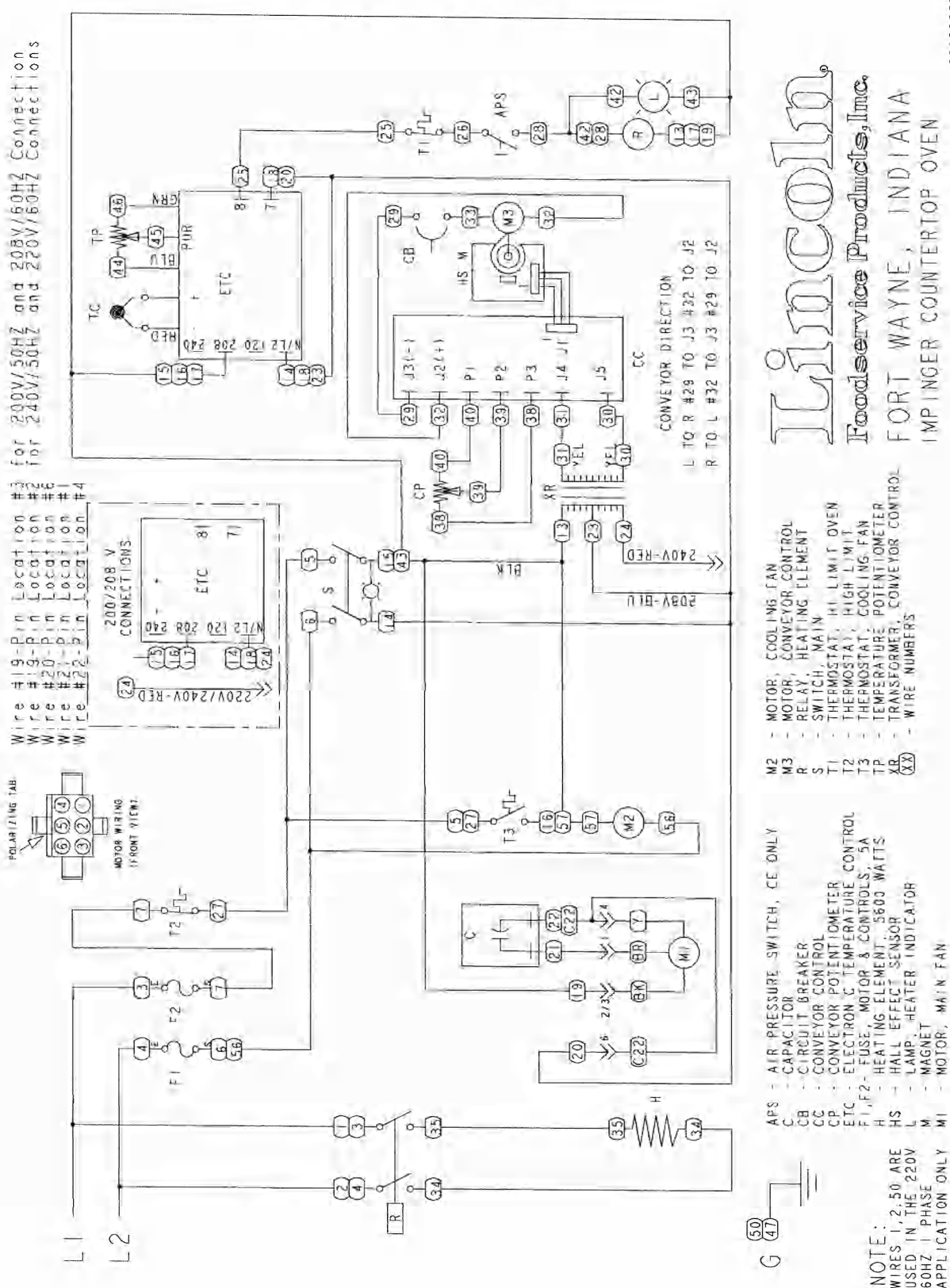
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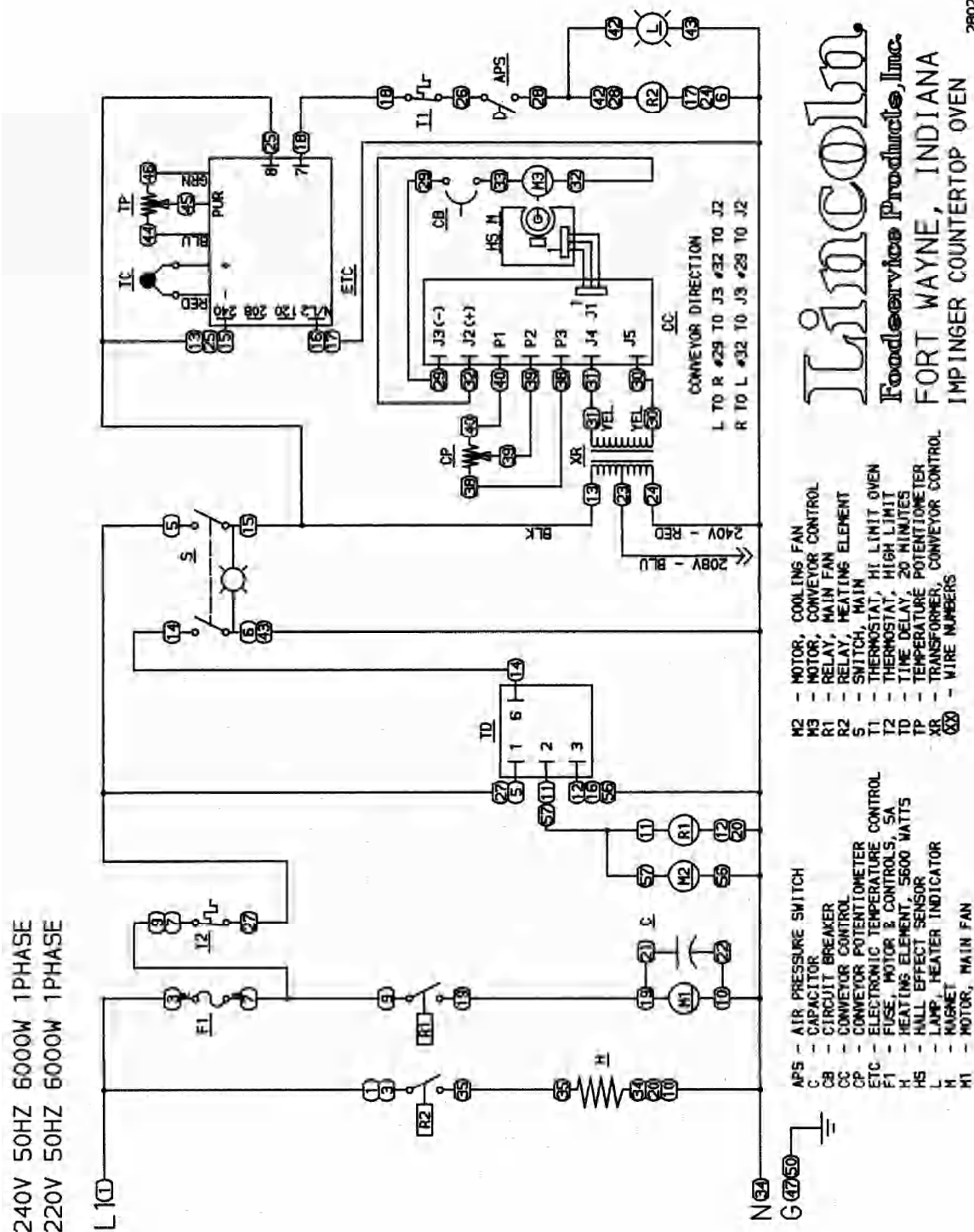
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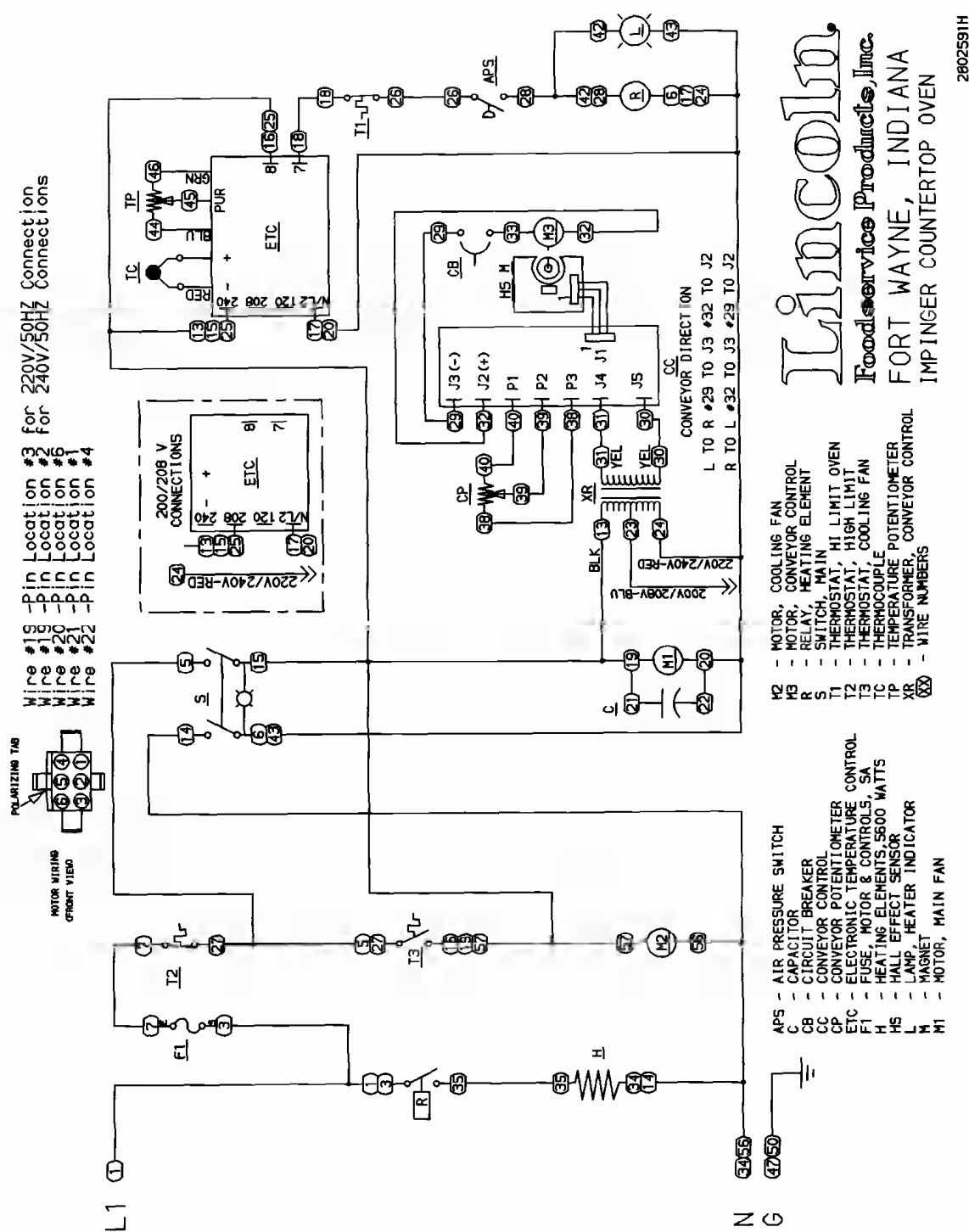
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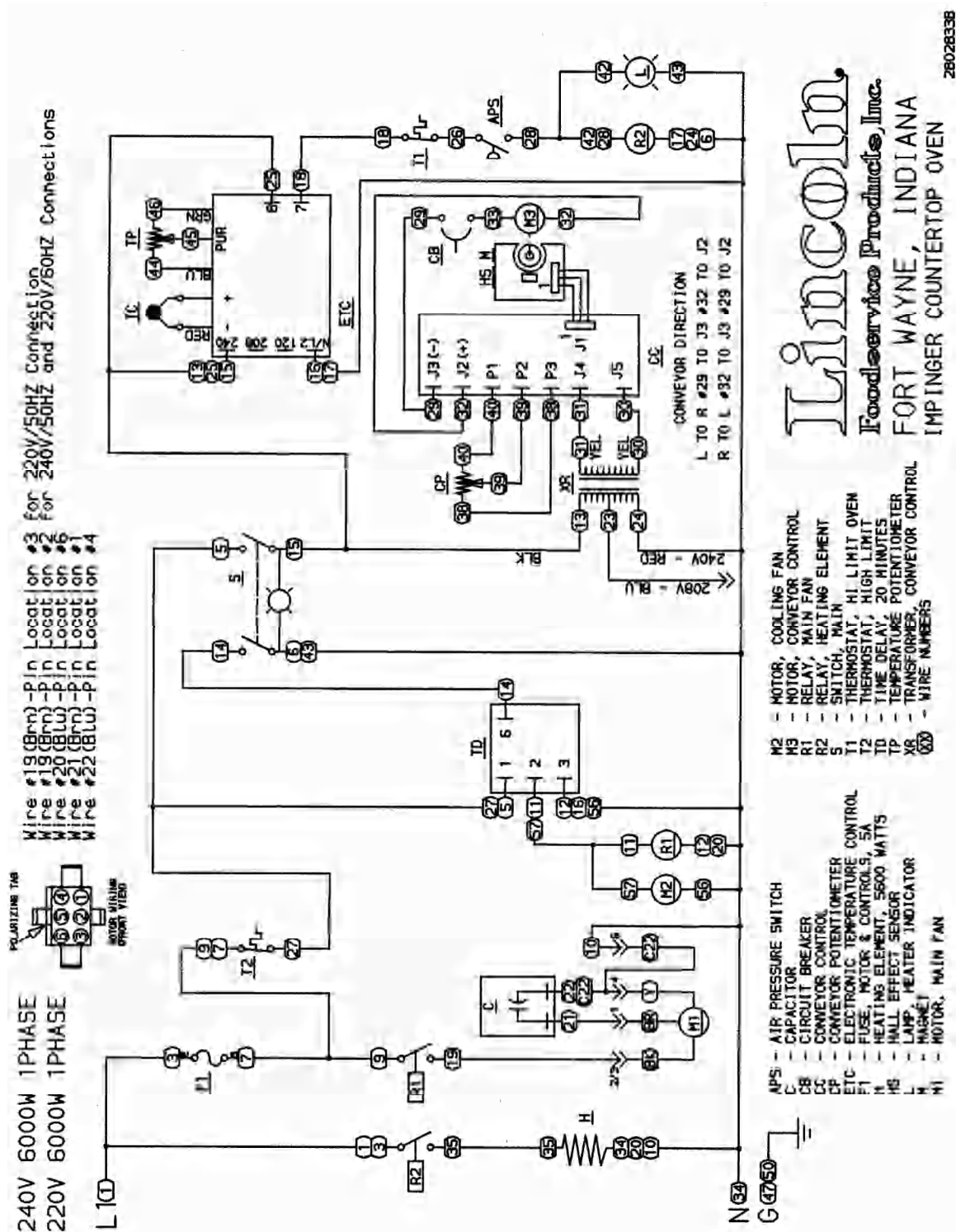


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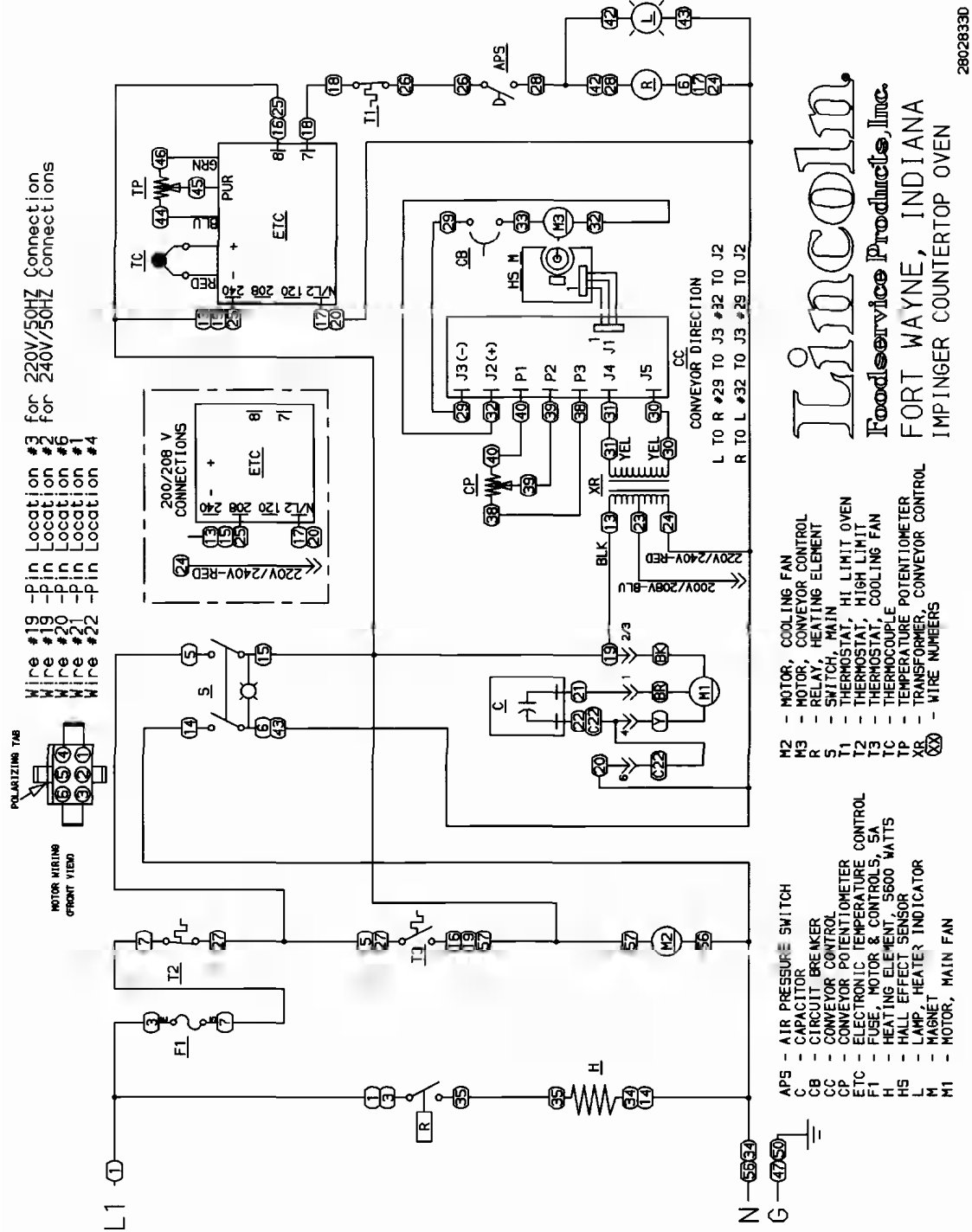




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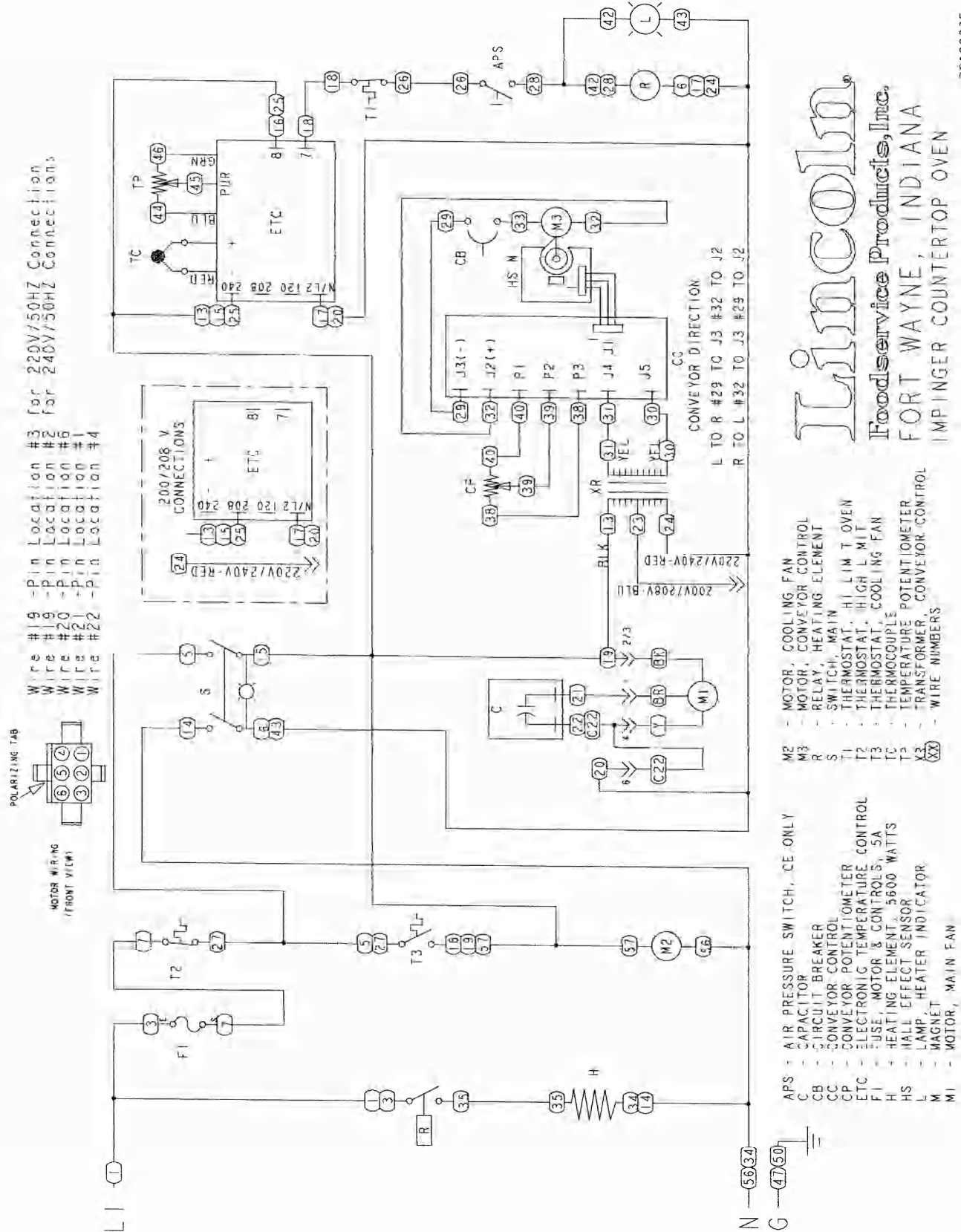
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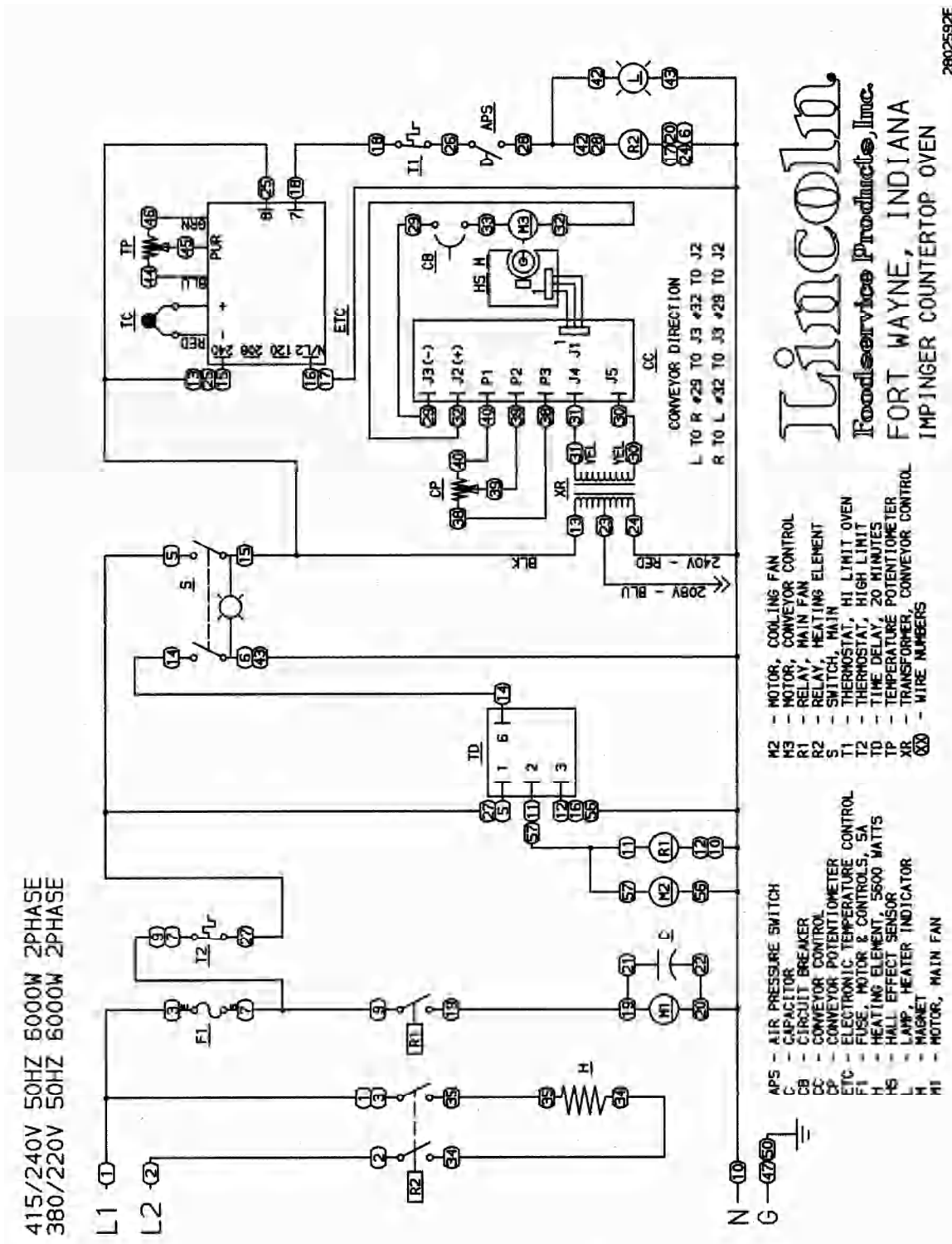
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## SCHEMATIC 1304-4 S/N 3043631 & ABOVE

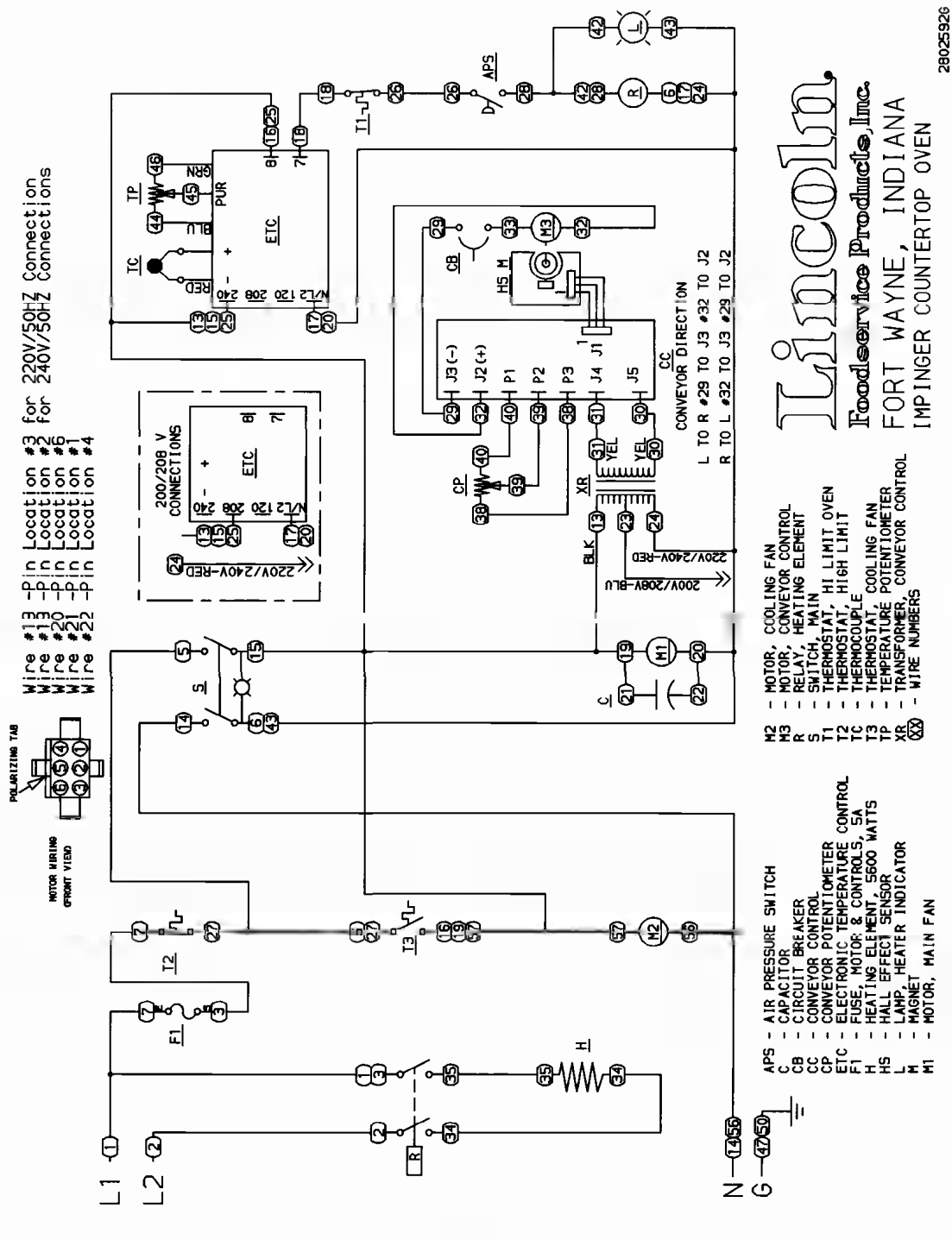


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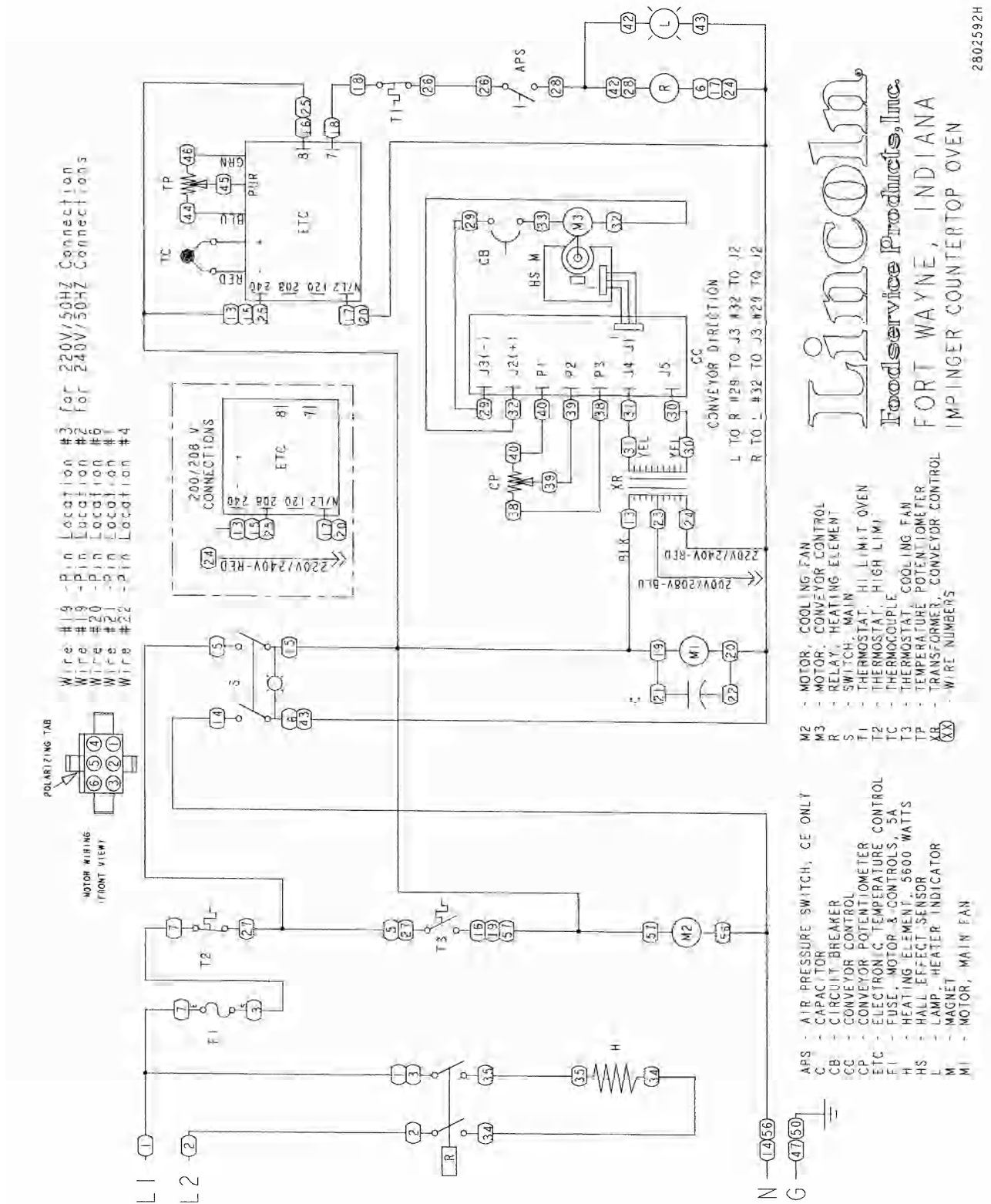


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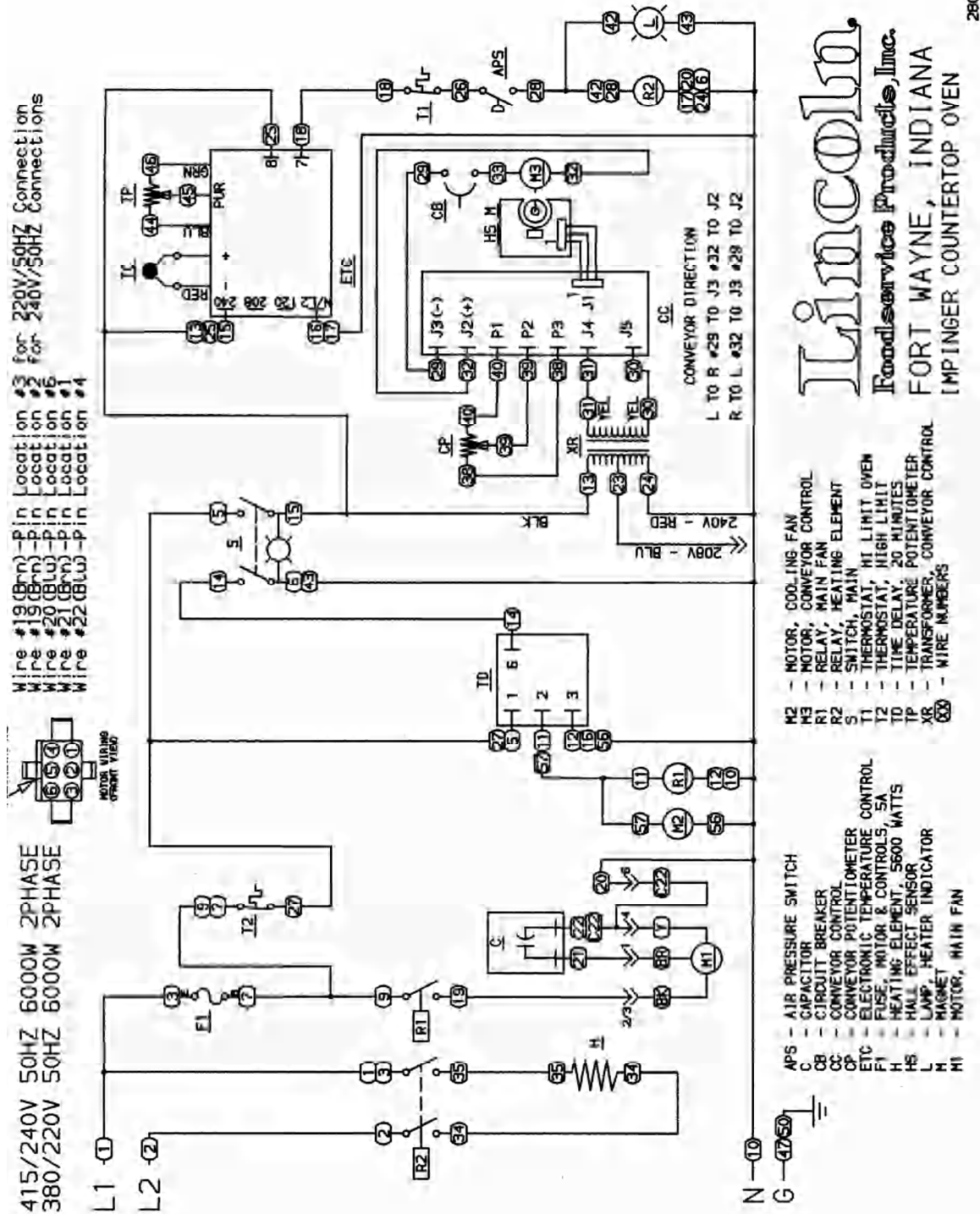
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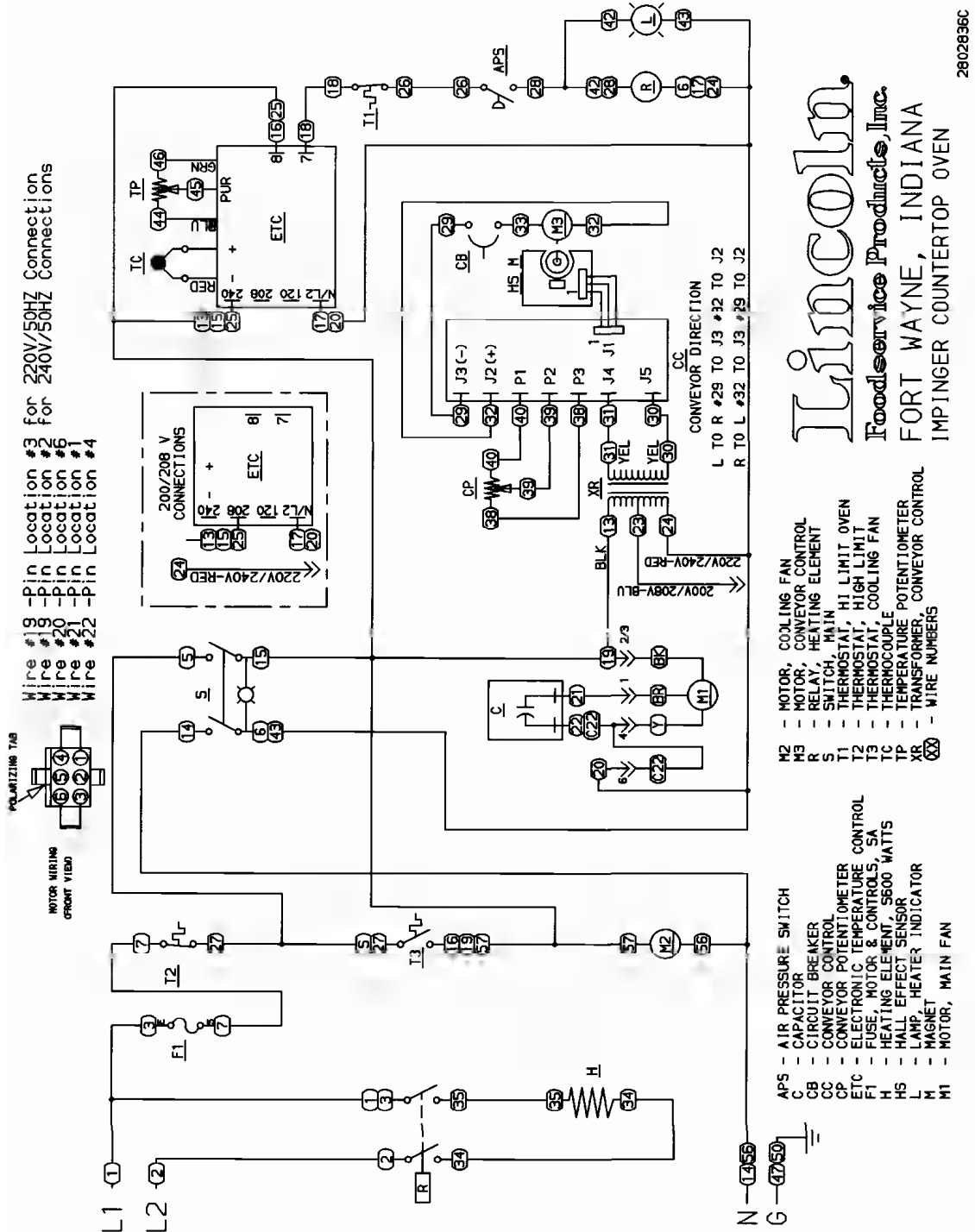


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# SCHEMATIC 1305-4 S/N 3018980 & BELOW



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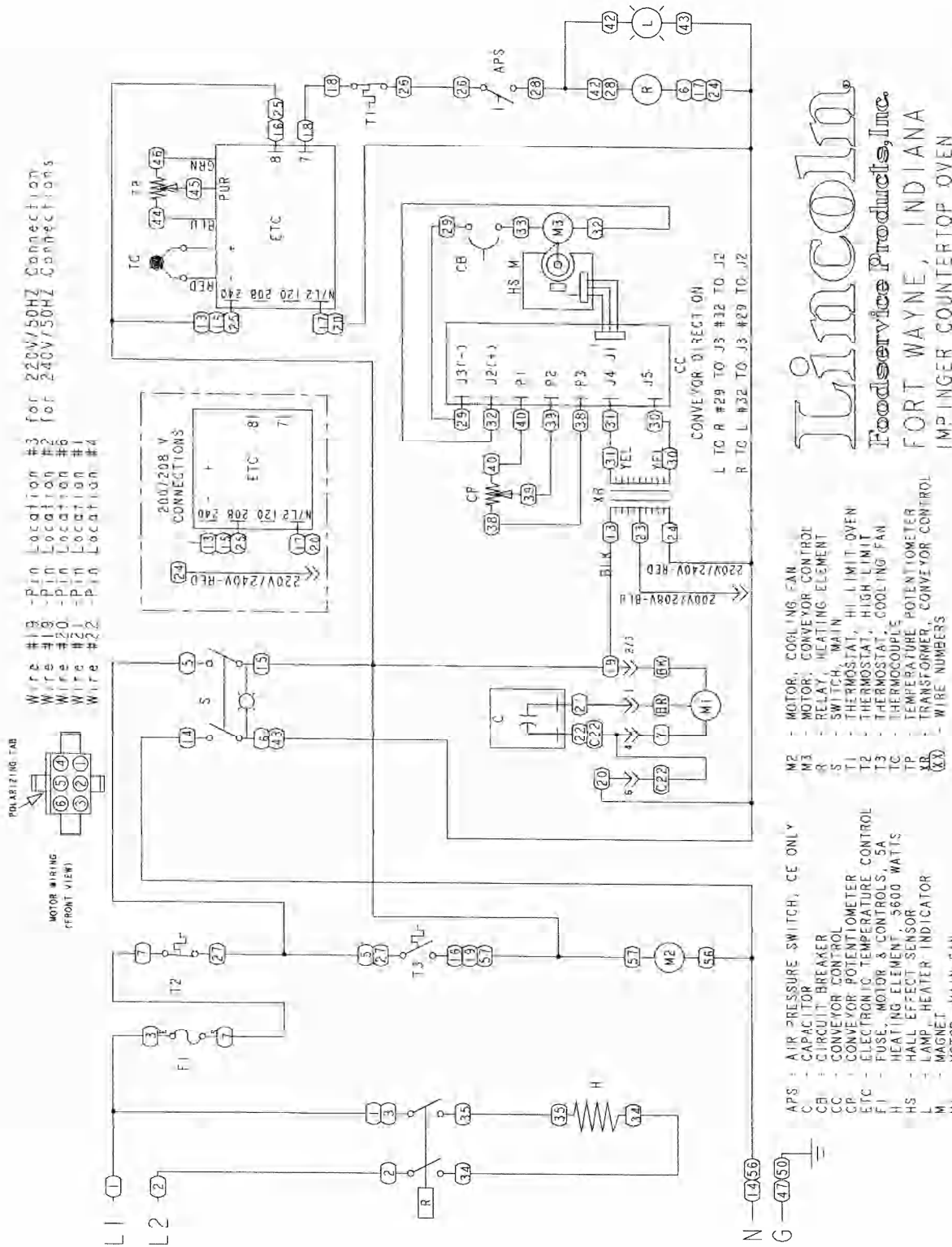


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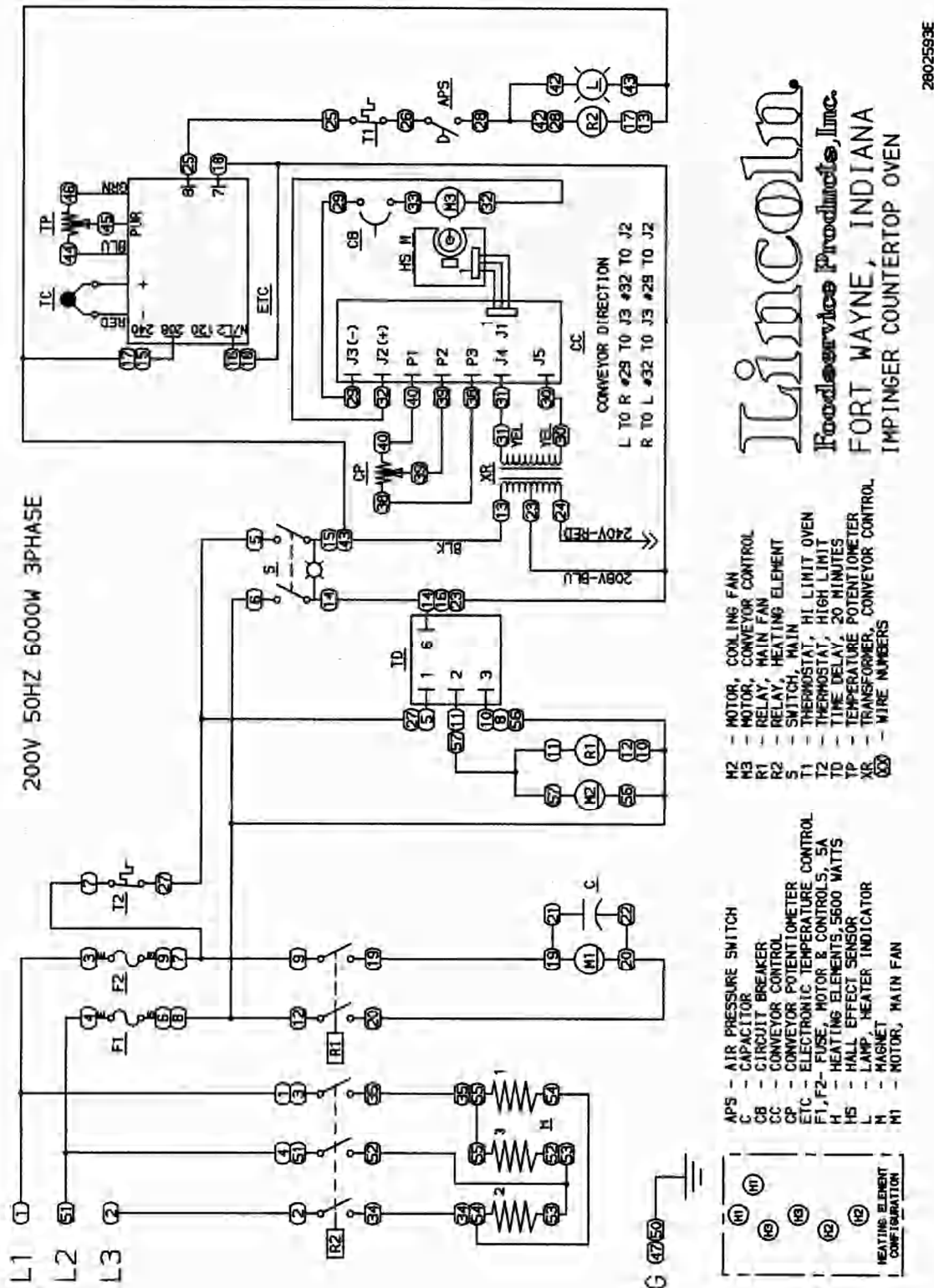


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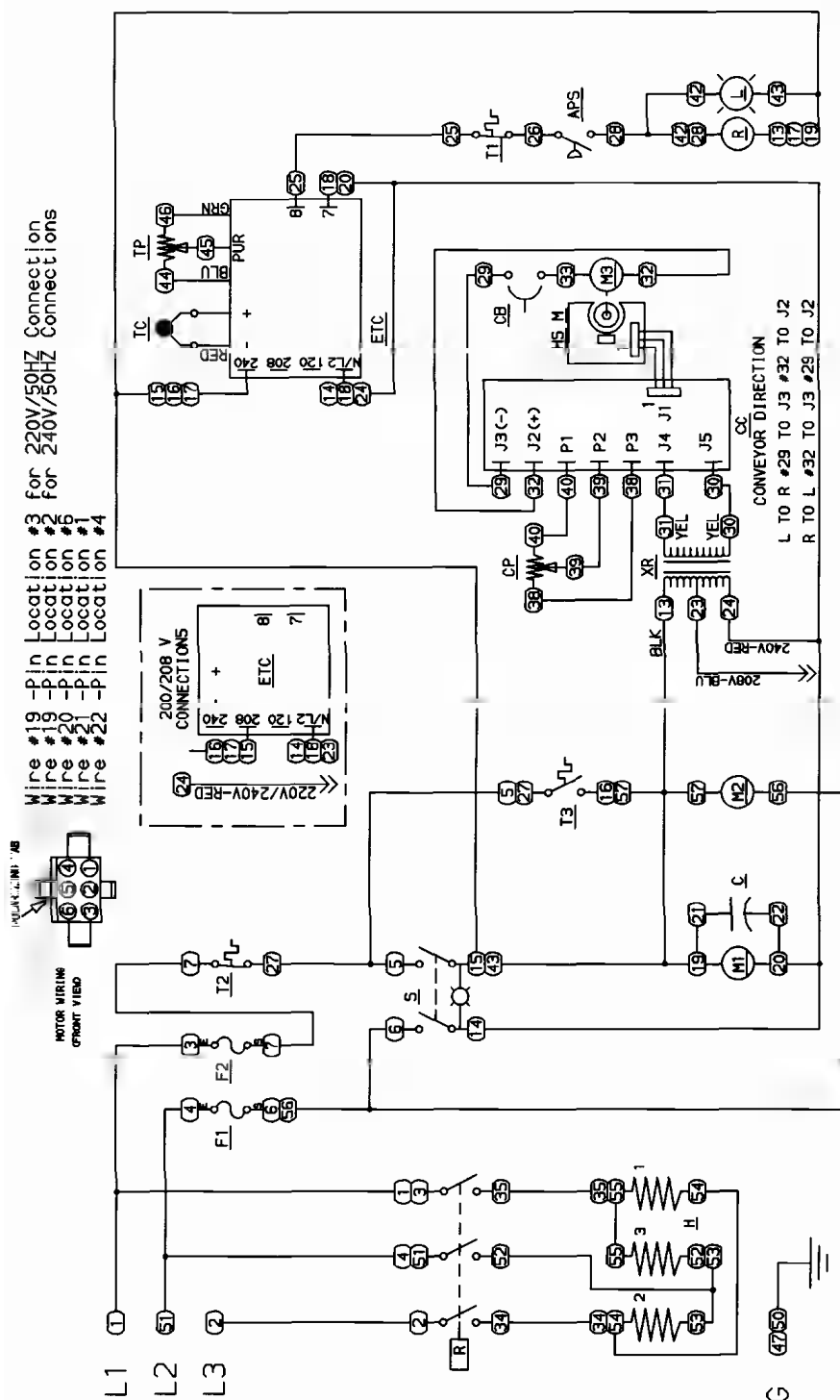
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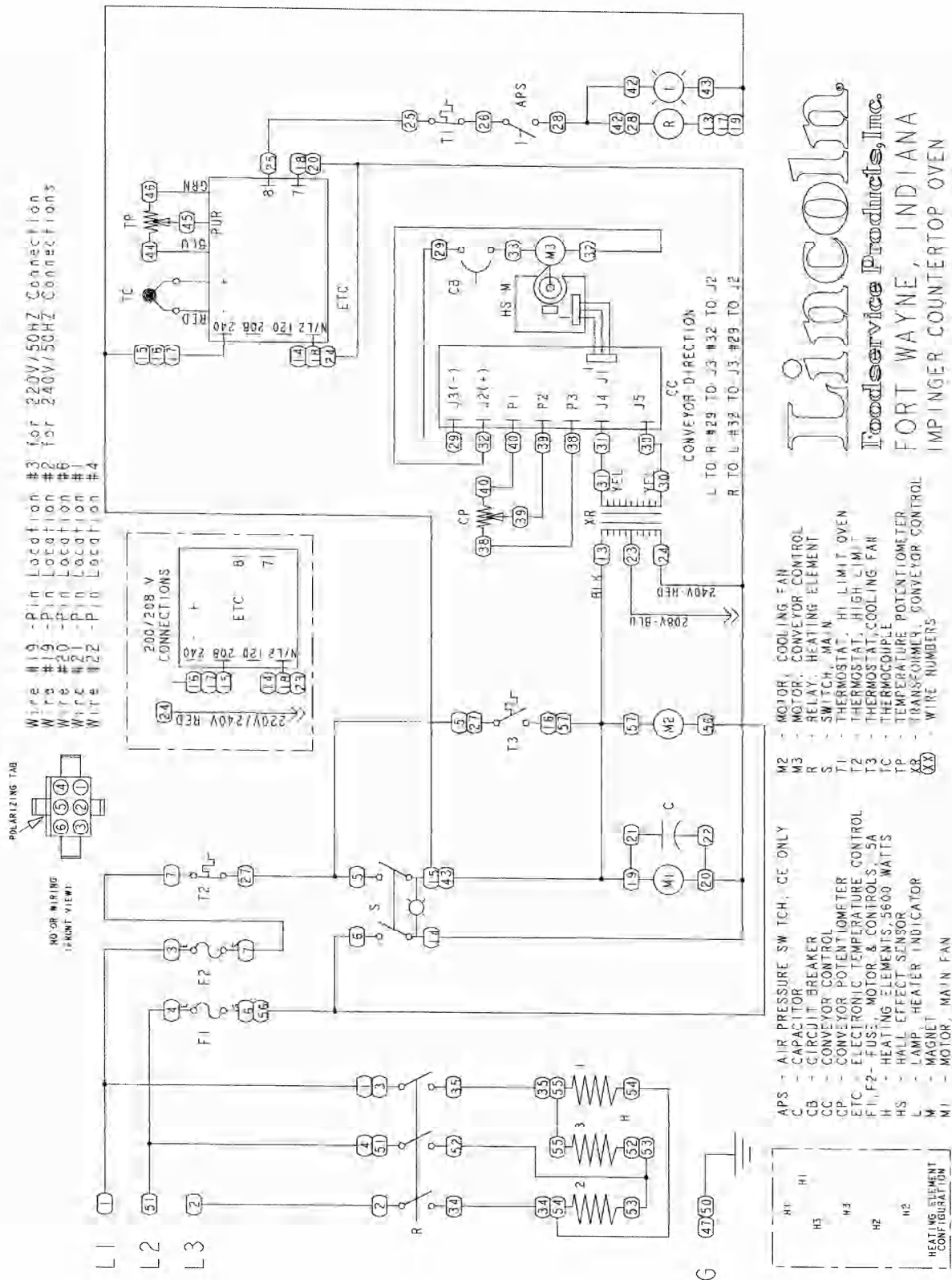


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APS	- AIR PRESSURE SWITCH	M2	- MOTOR, COOLING FAN
C	- CAPACITOR	M3	- MOTOR, CONVEYOR CONTROL
CB	- CIRCUIT BREAKER	R	- RELAY, HEATING ELEMENT
CCC	- CONVEYOR CONTROL	S	- SWITCH, MAIN
CCP	- CONVEYOR POTENTIOMETER	T1	- THERMOSTAT, HI LIMIT OVEN
CF	- ELECTRONIC TEMPERATURE CONTROL	T2	- THERMOSTAT, HIGH LIMIT
F1, F2	- FUSE, MOTOR & CONTROLS	T3	- THERMOSTAT, COOLING FAN
H	- HEATING ELEMENTS, 5000 WATTS	TC	- THERMOCOUPLE
HS	- HALL EFFECT SENSOR	TP	- TEMPERATURE POTENTIOMETER
L	- LAMP, HEATER INDICATOR	TR	- TRANSFORMER, CONVEYOR CONTROL
M	- MAGNET	XX	- WIRE NUMBERS
M1	- MAIN FAN		

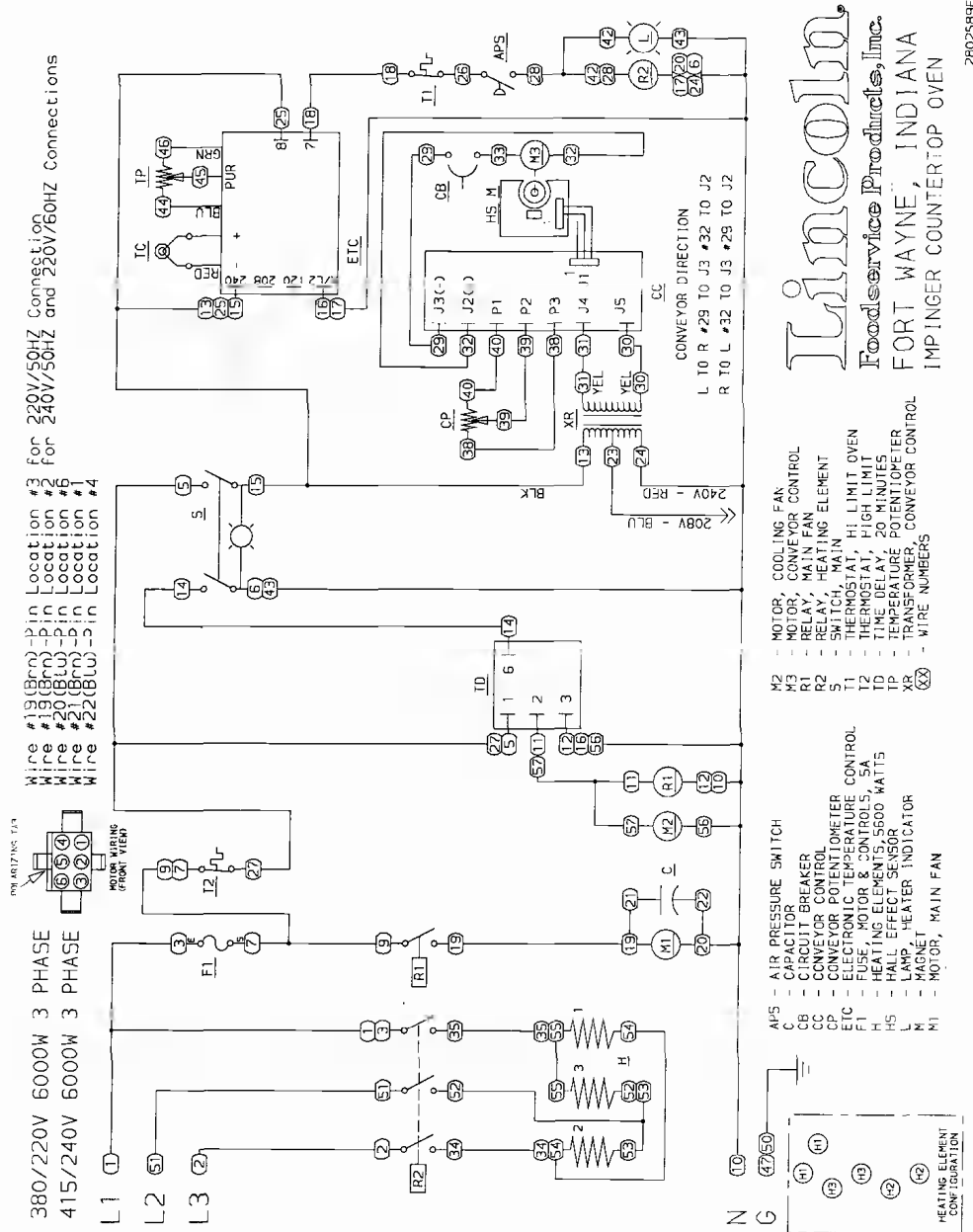


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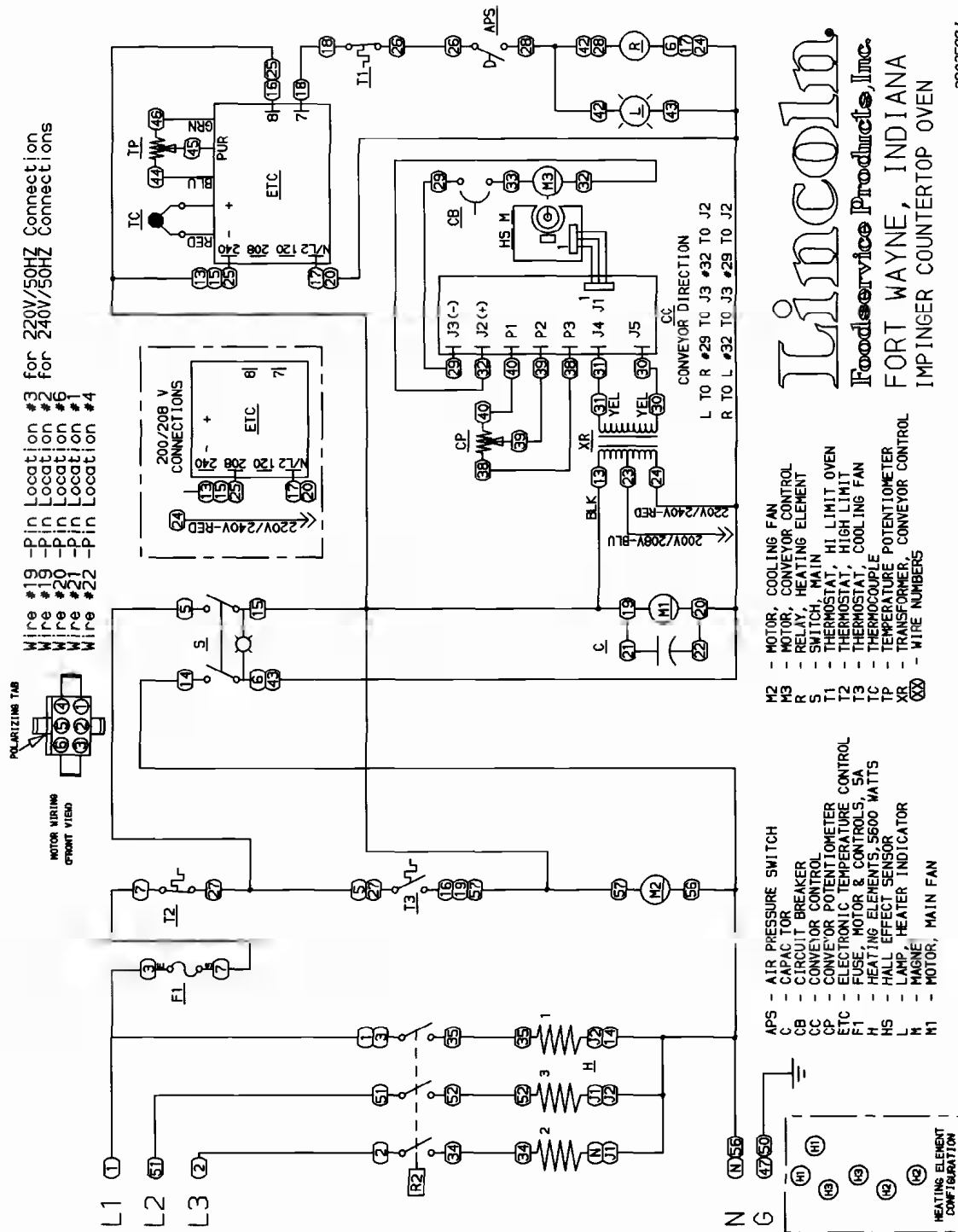
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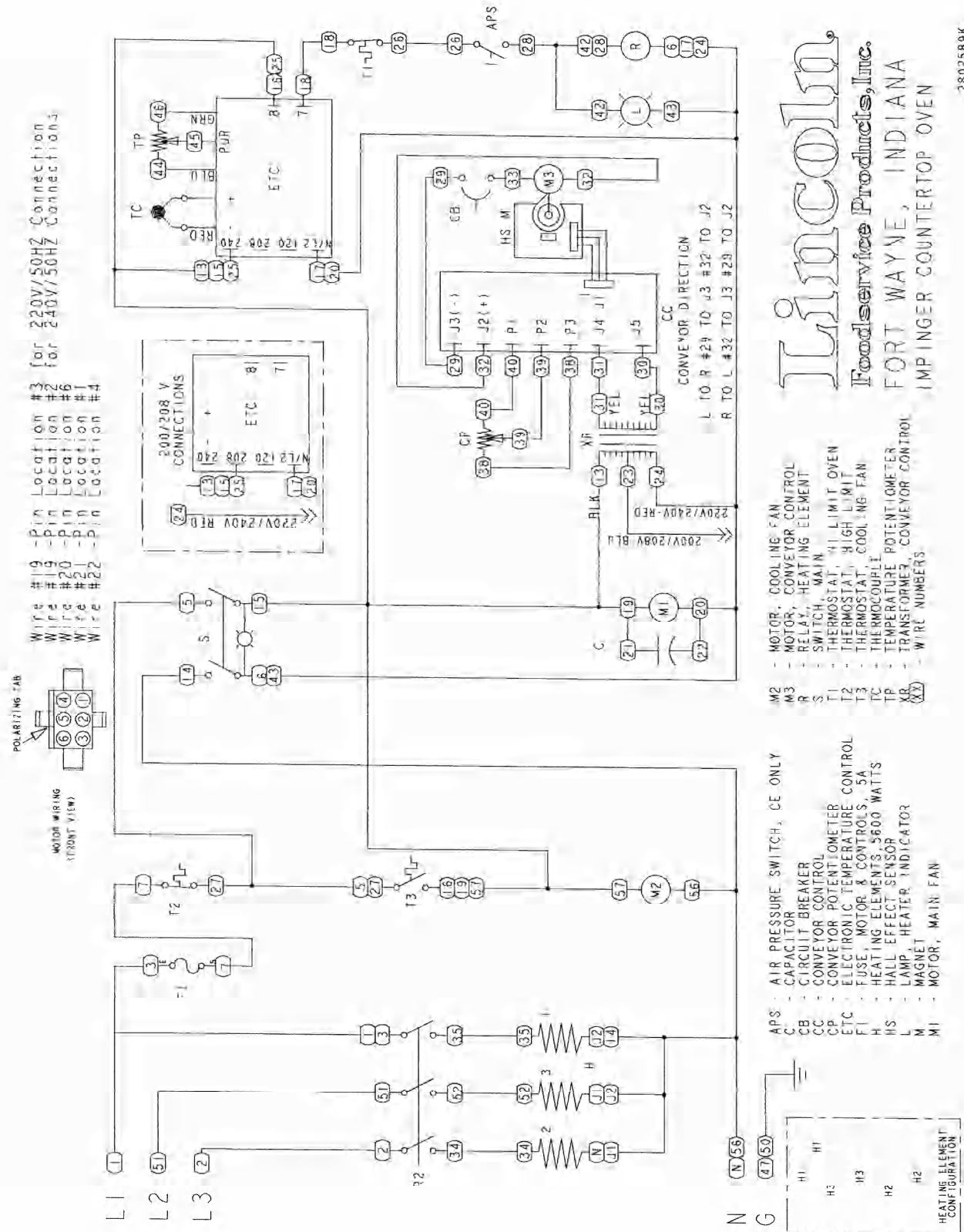
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SCHEMATIC 1308,1309,1311 S/N 3018981 TO 3043630



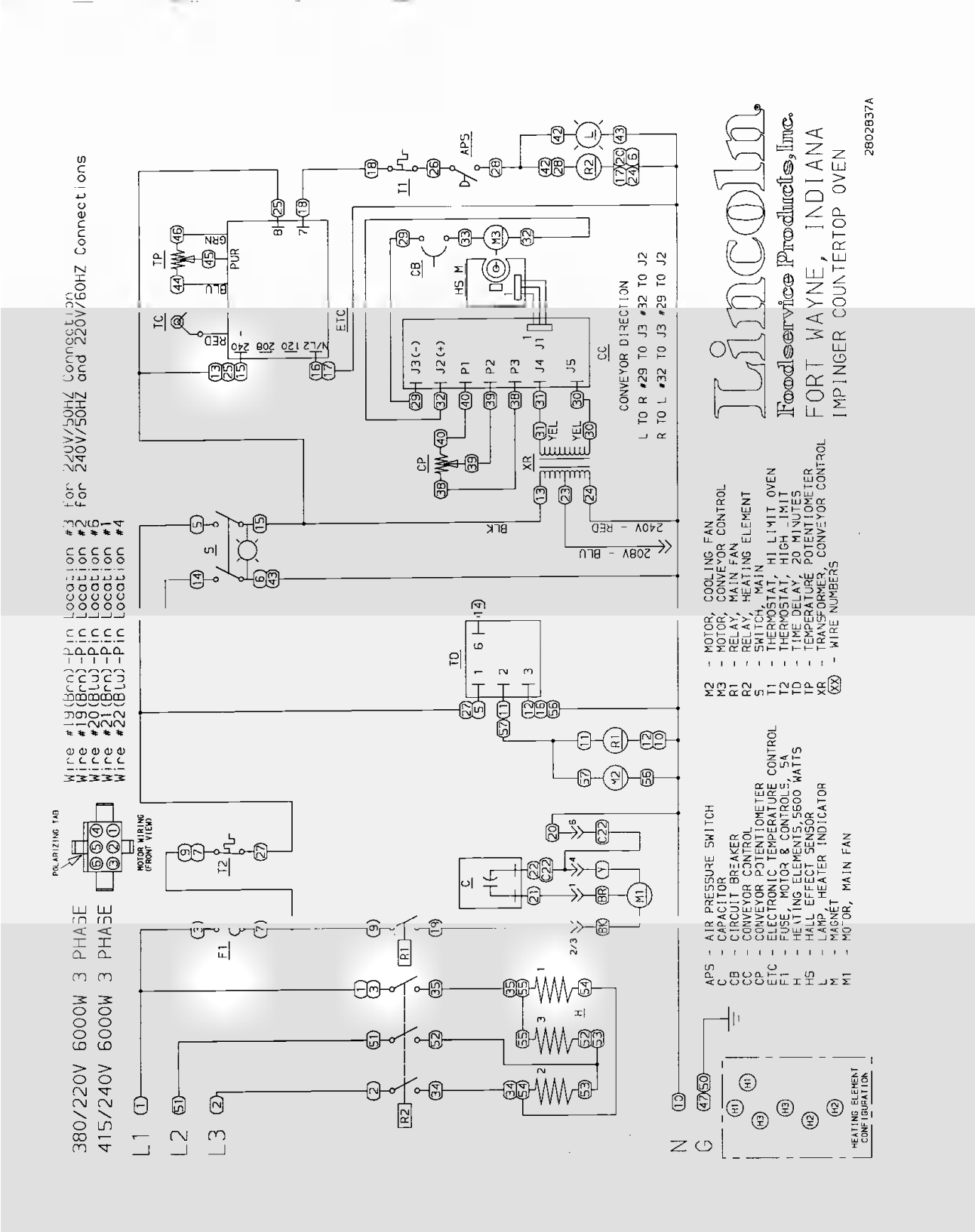
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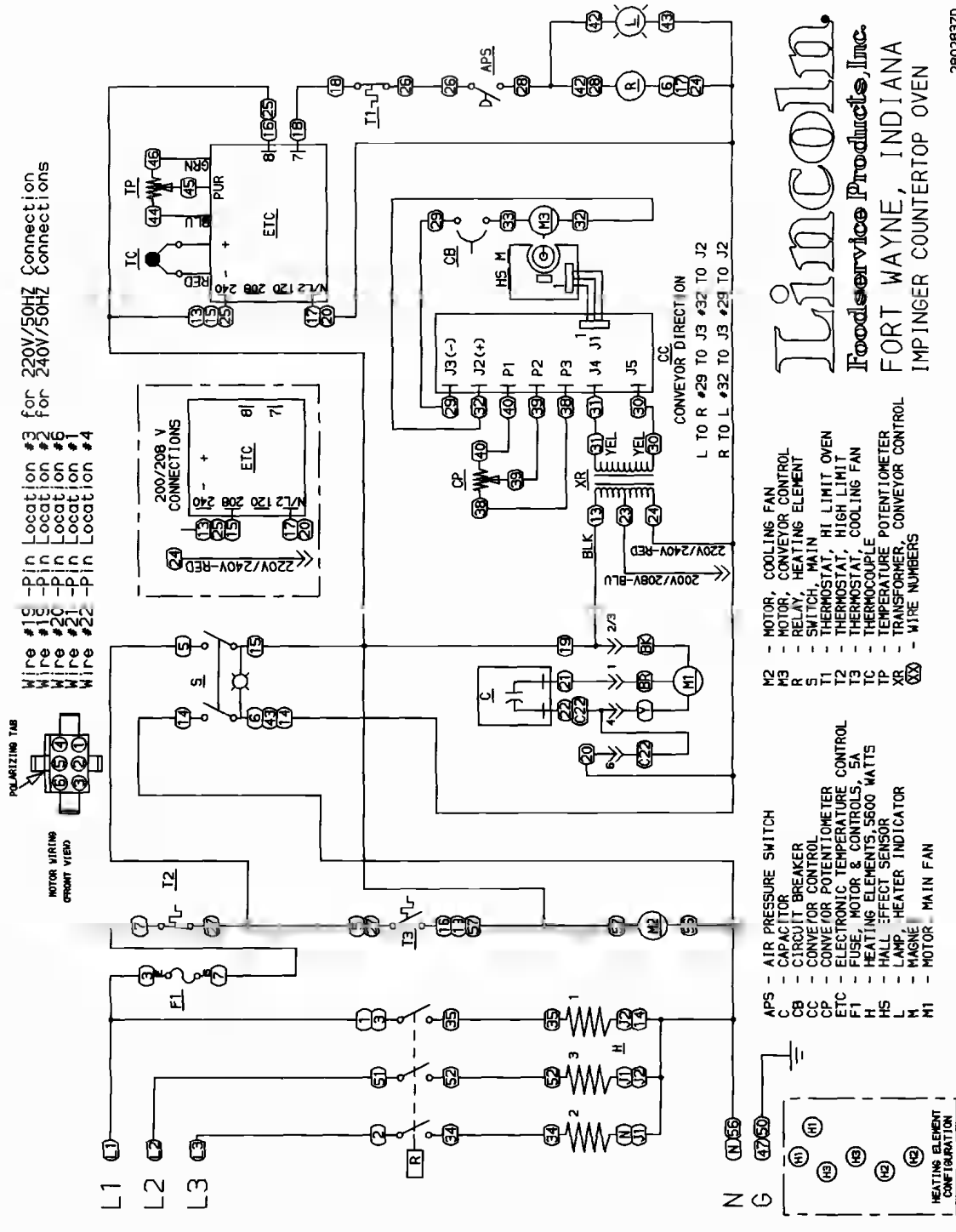
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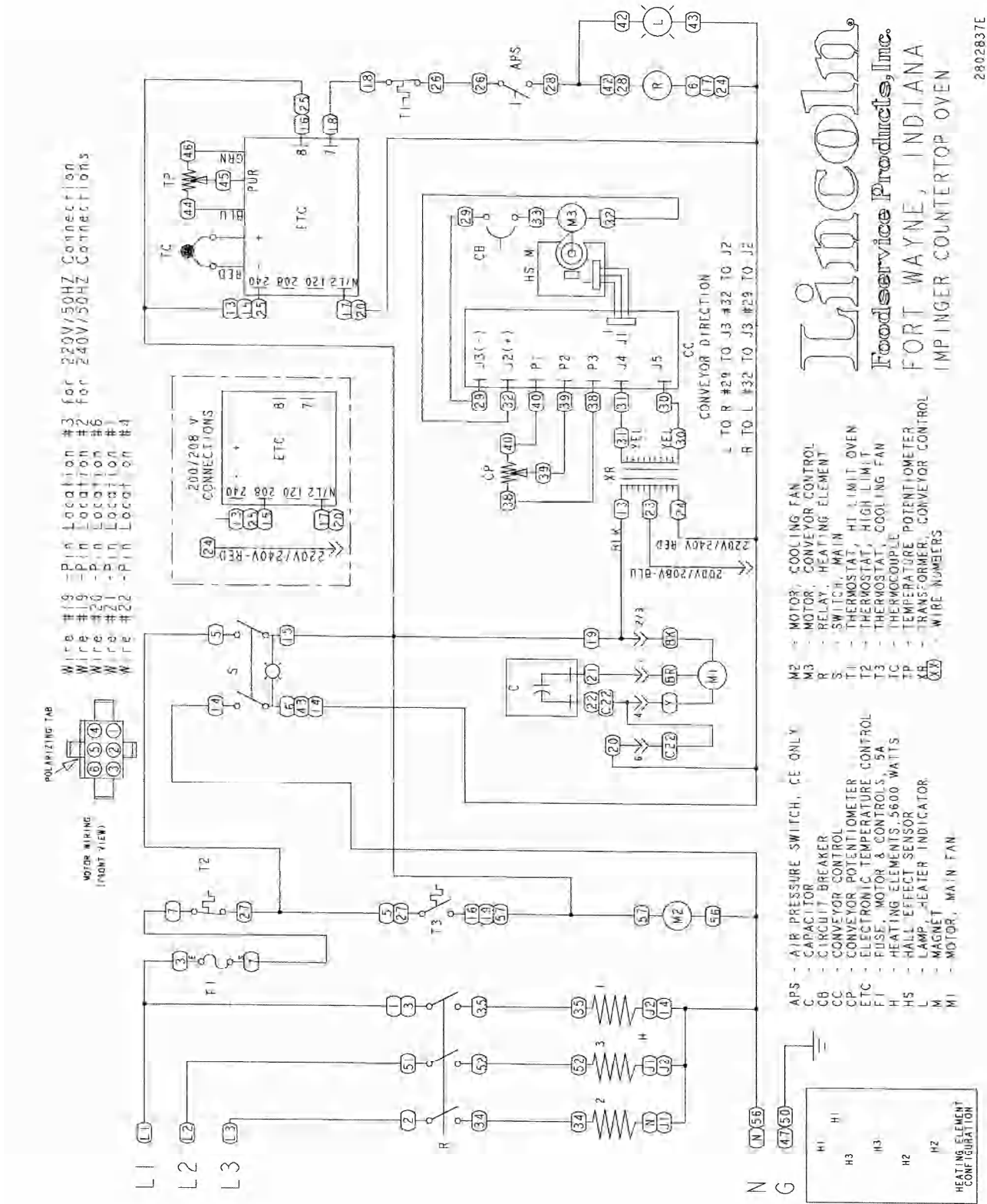




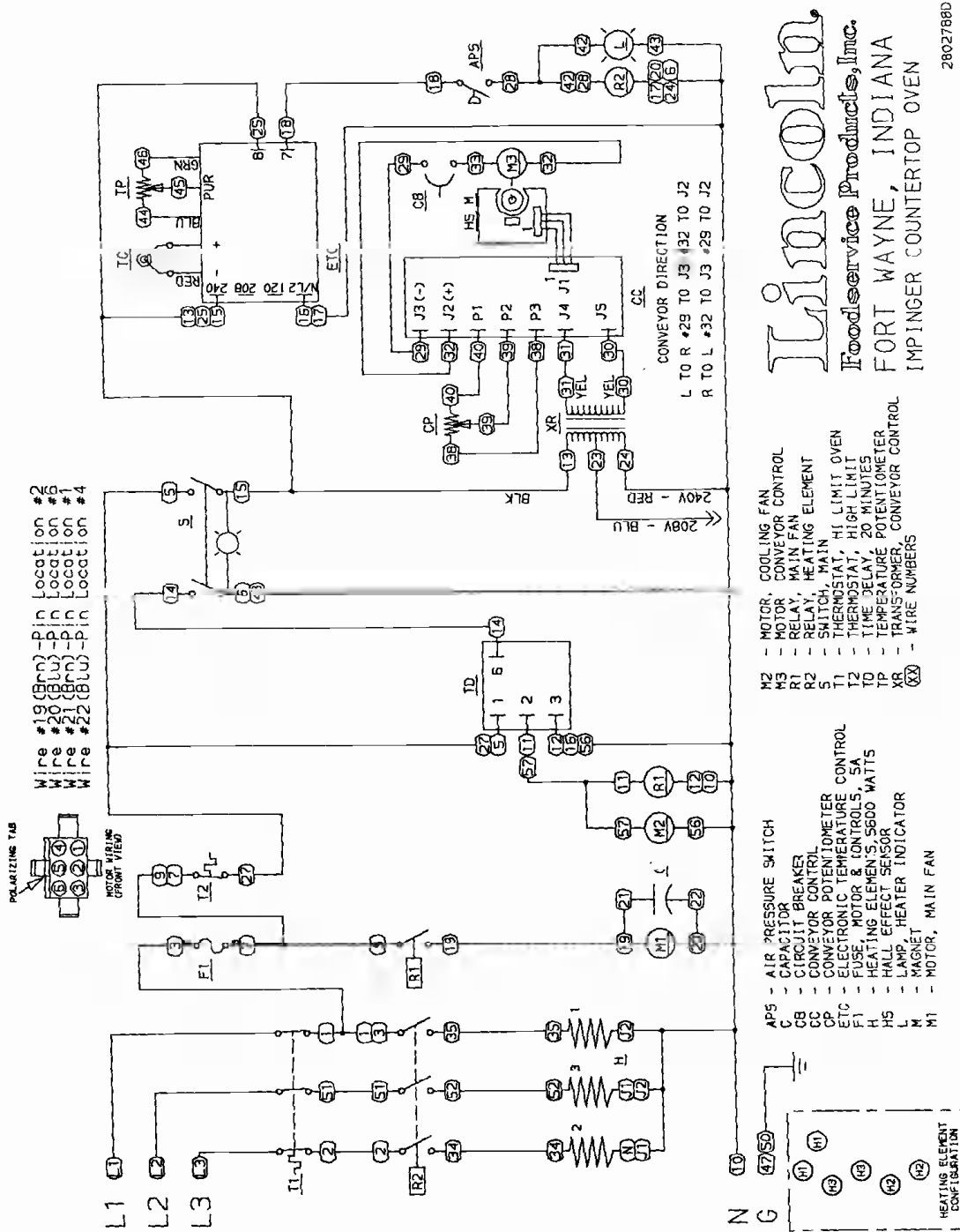
**SCHEMATIC 1308-4 S/N 3018981 TO 3043630**



## SCHEMATIC 1308-4 S/N 3043631 & ABOVE



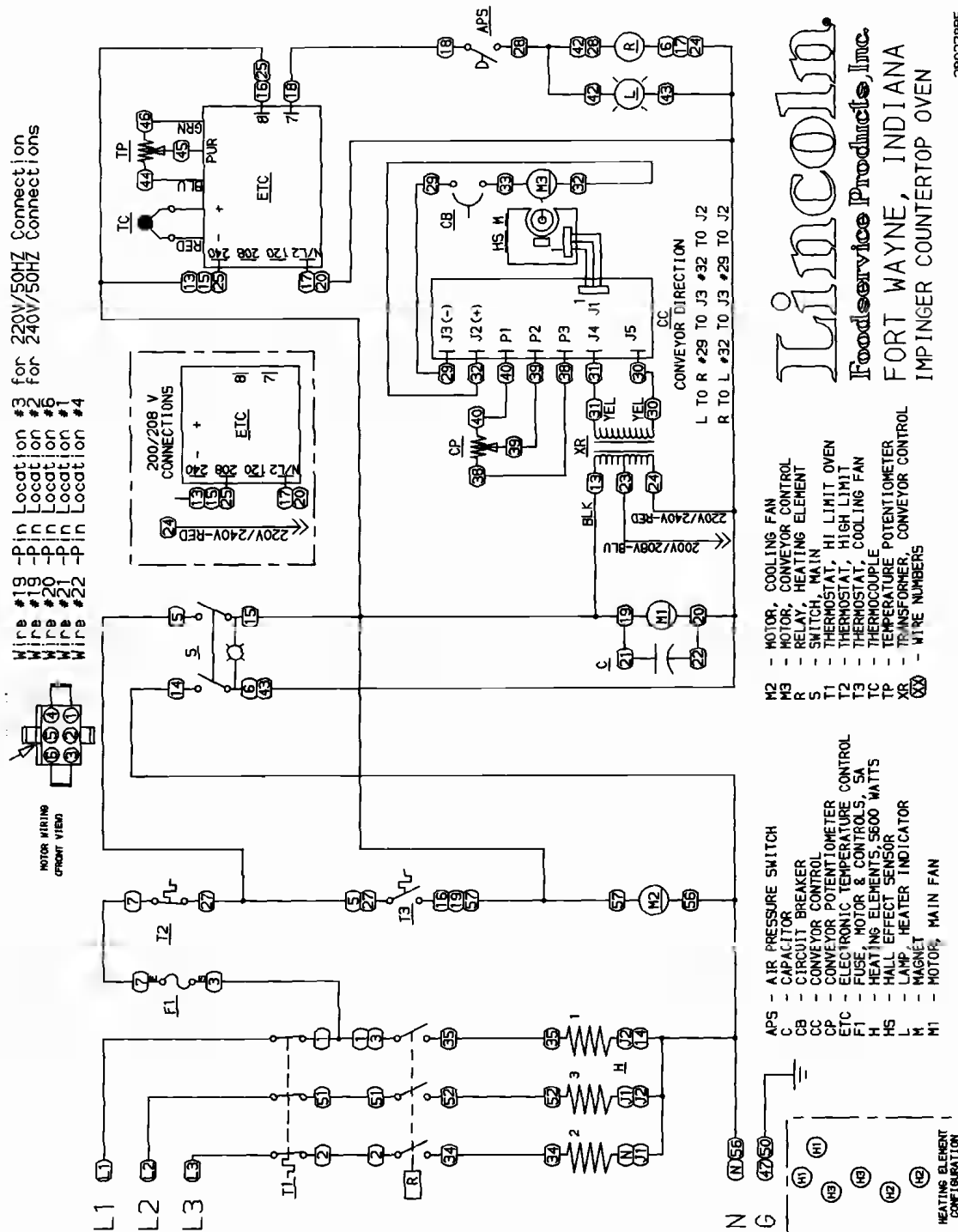
SCHEMATIC 1312-000-E S/N 3018980 & BELOW



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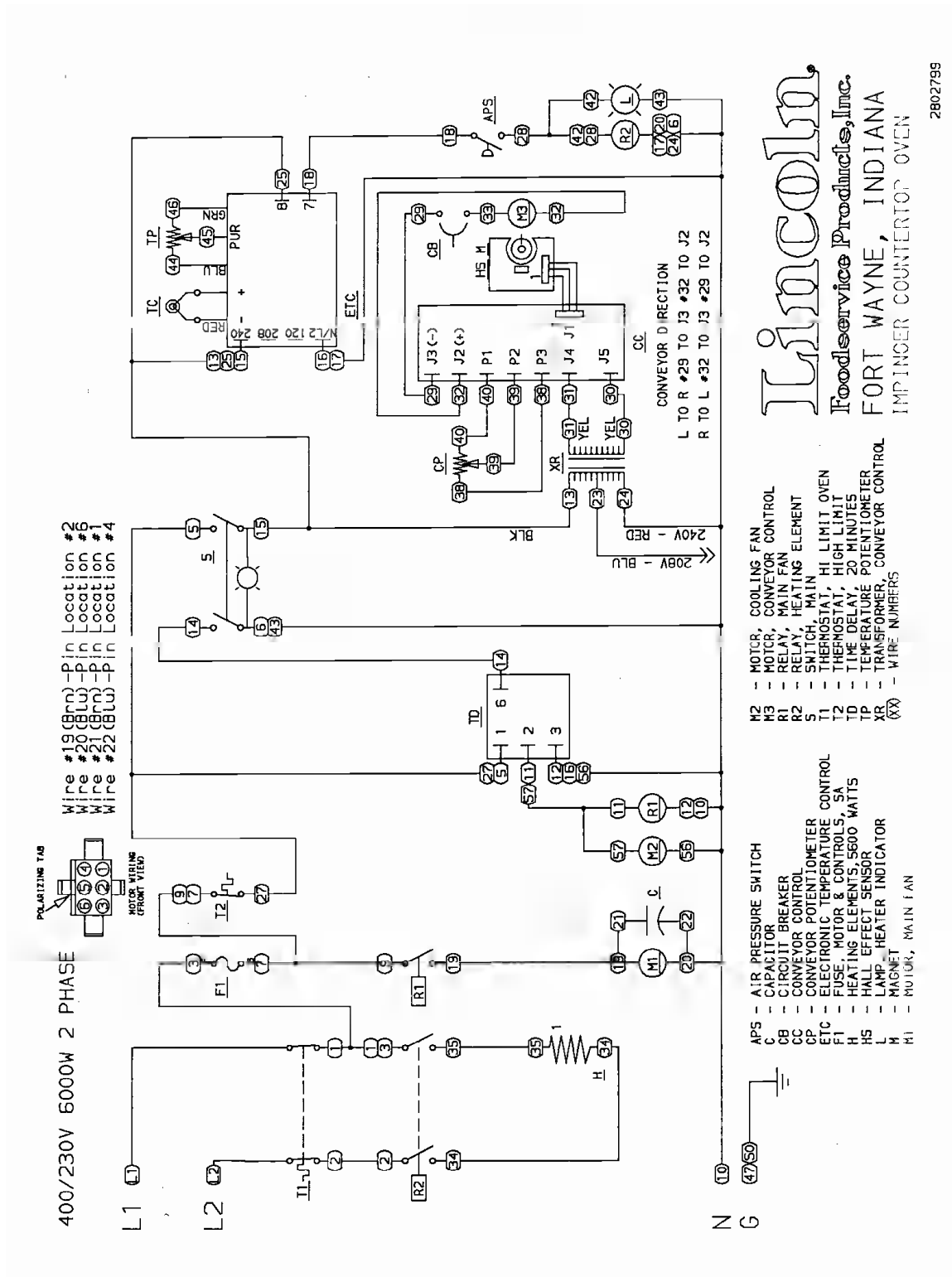
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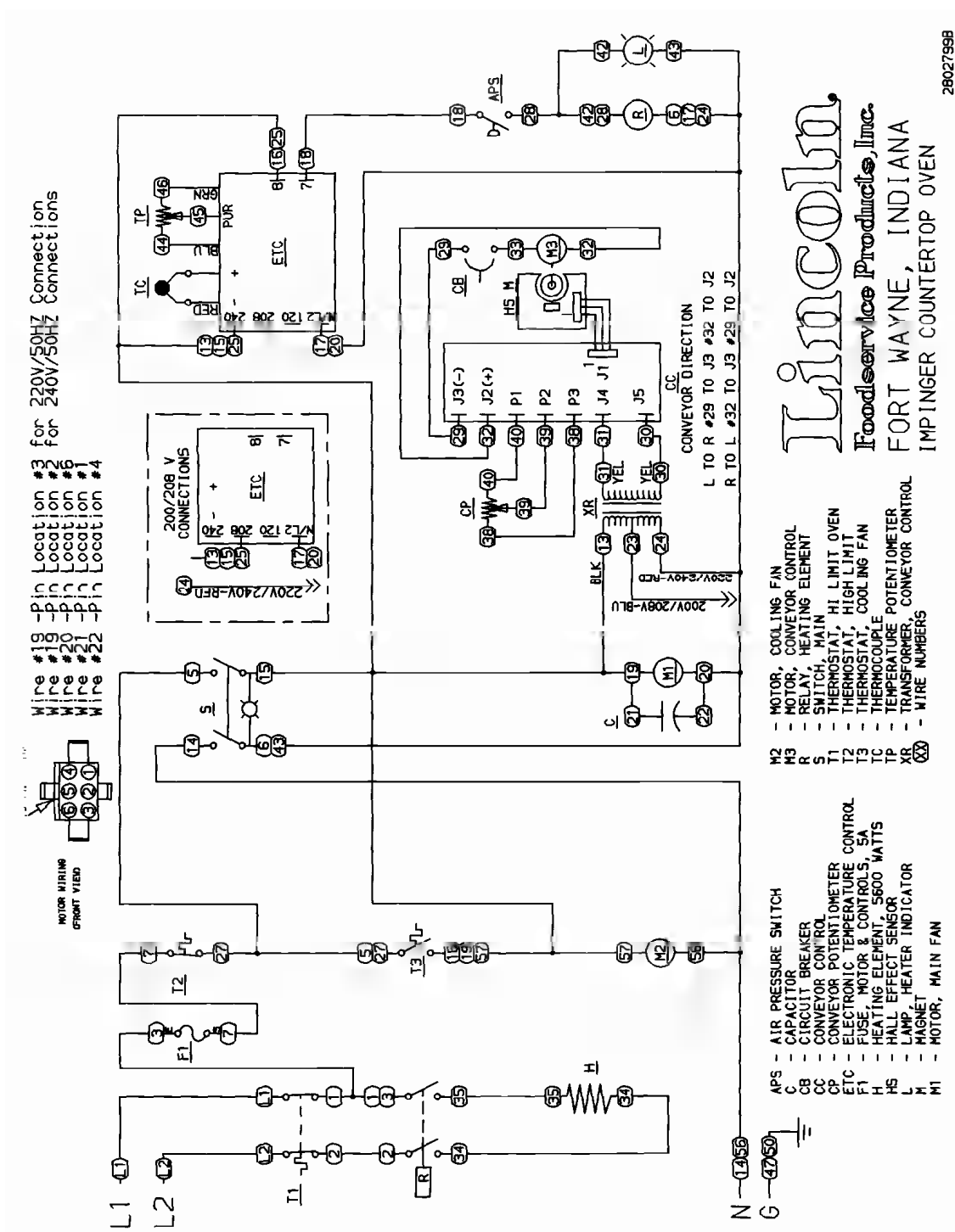


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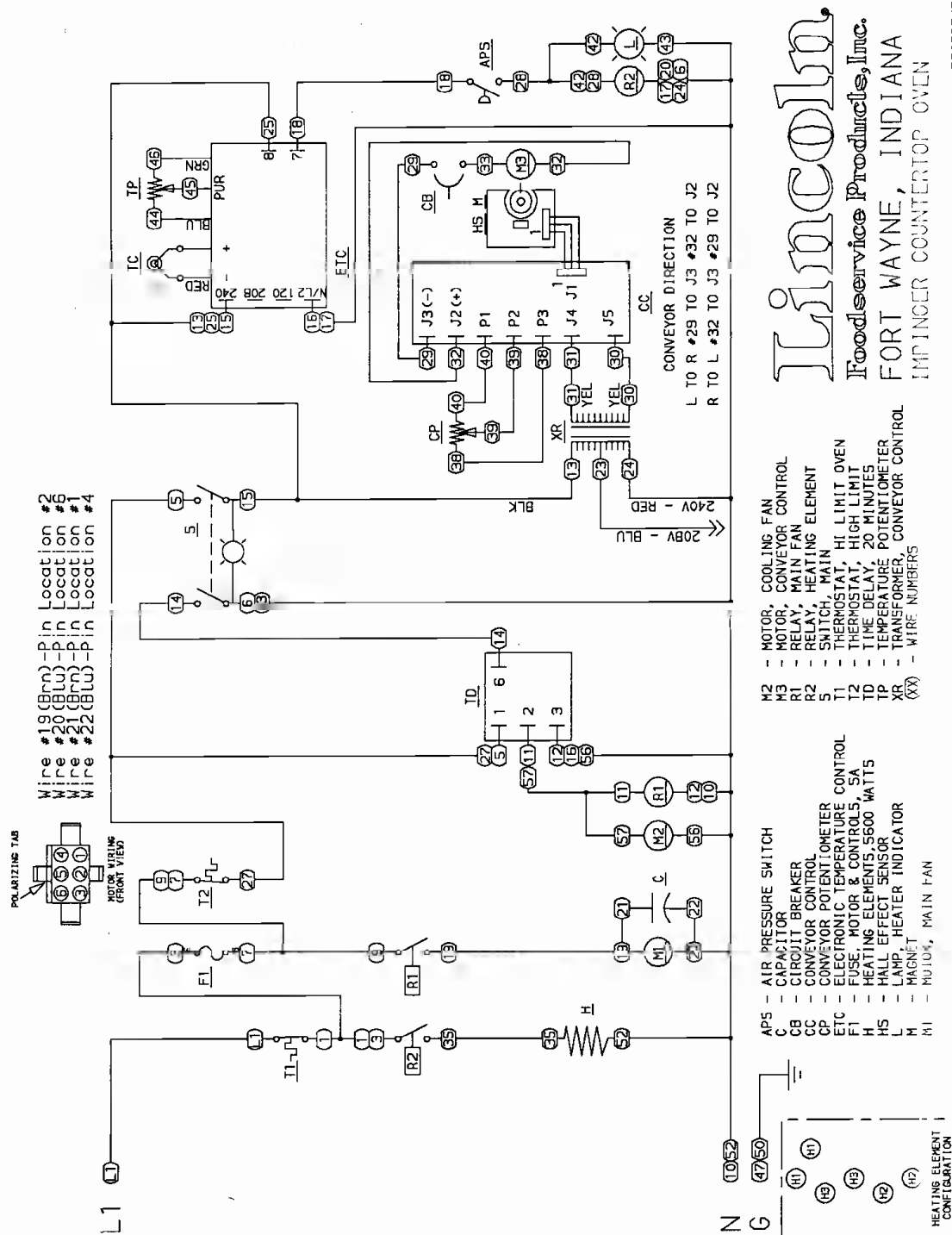
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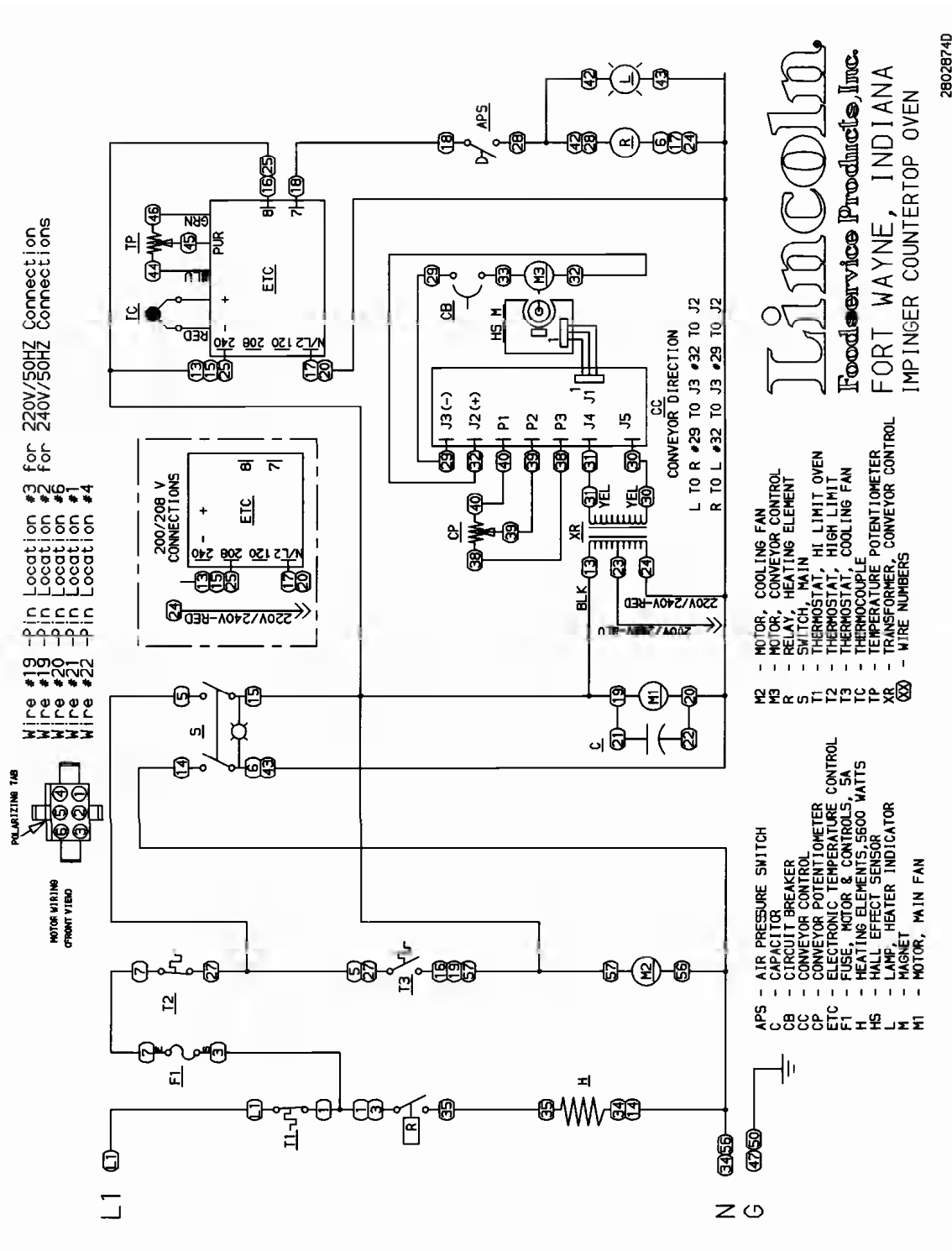


# SCHEMATIC 1314-F24-E S/N 3018980 & BELOW



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# TROUBLESHOOTING GUIDE

## IMPINGER CTI

SYMPTOM	POSSIBLE CAUSE	EVALUATION
<b>Oven fan will not run</b>	Incoming Power Supply	Check breakers, reset if required Check power plug to be sure it is firmly in the receptacle (if applicable). Measure the incoming power, call Power Co., if needed
	Oven Fan Fuses, 5 Amp	Check and/or replace
	Fuse Holder	Check and/or replace
	High Limit Thermostat Control Box ( <b>Note:</b> High Limit not used in ovens S/N 3000352)	Check for voltage on both sides of the switch. Terminals are normally closed. If open, reset and test oven for proper operation. If thermostat and below.) will not hold and control box temperature is not exceeding 140°F (60°C), replace thermostat.
	Fan Switch	Check continuity between switch terminals. Check and insure good wire connections
	20 Minute Time Delay	Check for supply voltage at terminal #1 to ground on the 20-minute timer. If no voltage is present, trace wiring back to power supply. If voltage is present at terminal #1, check for supply voltage at terminal #2 to ground. If no voltage is present, and the oven fan switch is closed, replace the 20-minute timer.
	Main Fan Relay	Check continuity of coil. Check for power to relay coil. Visually check for contact pull in and contact condition. Check for voltage across relay terminals.
	Fan Motor	Check for opens, shorts, or grounds. <b>WITH POWER OFF:</b> Turn fan blade to check for locked rotor.
	Capacitor	Check for opens, shorts, or grounds. <b>WARNING</b> Capacitor has a stored charge, discharge before testing.
<b>No main fan cool down</b>	20-Minute Timer	Check for supply voltage at terminal #2 and #3 while main fan is running. Turn off fan switch and supply voltage should continue to be present for 20 min. at terminal #2. Replace as needed.
<b>Main fan continues to run after cool down</b>	20 Minute Timer	<b>NOTE:</b> On/Off operation of fan switch will reset timer to 20 minutes. If timer is accidentally reset, turn off main breaker to cancel. If voltage continues to be present at terminals 2 and 3 after 20 minutes, verify fan switch contacts have opened, replace timer as needed.
<b>No control box cooling</b>	Fan Switch	<b>WITH POWER OFF:</b> Close switch and check for continuity across switch terminals.
	20 Minute Timer	See "Main Fan Motor will not run."
	Cooling Fan	Check for voltages at the fan motor, if present, replace defective fan motor.

<b>Oven will not heat</b>	Main Oven Fan	Check if main oven fan is working. If not, refer to "Oven Fan Will Not Run".
	Temperature Control Board	Check for voltage input at the board. Turn the temperature adjustment knob to the maximum temperature position and check for voltage at the load terminal. If present, and unit is not heating, refer to "Air pressure switch" for next check. If no voltage is present, proceed.
	Thermocouple Sensor	Check terminals, wiring, and proper location of the sensor bulb. It must be in its spring holder located in the inside, rear, lower right hand corner (viewed from front) behind Finger #4. The thermocouple is a type J and has one red lead (Neg.) and one white lead (Pos.). WITH POWER ON AND THERMOCOUPLE LEADS ATTACHED TO THE TEMPERATURE CONTROL BOARD: Measure the D.C. millivolt output of these leads. Refer to thermocouple chart in Section D for proper readings. If these readings are not achieved, replace the thermocouple.
	Temperature Set Potentiometer	Disconnect the potentiometer leads from the board. Place ohm meter test leads on the blue and green pot. leads. Reading should be 1 K ohms. Place meter leads across the blue and purple pot. leads and rotate knob from high to low. Repeat on green and purple leads. Check for even rise and fall of ohms reading to insure that there are no open or dead spots in the potentiometer. Check each lead to ground for shorts. Replace Pot. if it does not meet the above test.
	Hi Limit Thermostat-Oven Cavity	Terminals are normally closed, open at 660°F (350°C). If open, push in reset button and retest. If thermostat will not hold for maximum oven temperature, and oven is not exceeding temperature dial setting, check for proper location of capillary bulb in its spring holder. If above checks okay, replace hi-limit thermostat.
	Air Pressure Switch (S/N 3043630 and below)	Check for voltage on both sides of the switch, if voltage is present on one side only, check for air tube blockage, adjust air switch, if above fails, replace switch.
	Heating Element Relay	Check for voltage to the Relay coil and contacts. If voltage is present and contactor will not activate, replace the contactor. Check for voltage across relay terminals.
	Heater Element	Check the amperage draw on each hot leg for proper load. Check the rating plate for rating information. If amp draw is low or high, check element for opens and shorts.

<b>Conveyor will not run S/N 3000480 and Below</b>	Fan Switch	Check continuity between switch terminals. Replace as needed.
	Conveyor Control Transformer	Check for supply voltage at primary of transformer. If no voltage is present, trace wiring back to fan switch. Check for 24VAC at transformer secondary. If no voltage is present, replace transformer.
	Speed Adjustment Potentiometer	This is a 5K ohm potentiometer. WITH POWER OFF: Remove the leads from the motor control board at terminals P1, P2, P3. With a digital meter, check the ohm reading across the red and black leads. This reading should be 5K ohms ( $\pm 10\%$ ) as the pot. is rotated from low to high. Place meter leads on red and white lead. Rotating the pot. slowly from low to high, the meter reading should show an even transition from 0 to 5K ohms ( $\pm 10\%$ ). There should be no dead or open spots throughout the rotation of the pot. Check all three (3) leads to ground. There should be no continuity to ground. If any of the above checks fail, replace the pot.
	Conveyor Control Board	Check for 24 VAC input to conveyor control. If no voltage is present, trace wiring back to transformer. If voltage is present at L1 and L2, check for D.C. output at terminals A+ and A-. If there is AC voltage input, but no D.C. voltage output, replace conveyor control board.
	Conveyor Gear Motor	If there is D.C. voltage output from the conveyor control, but the motor does not run, check the mini-breaker (0.7 Amp). Check motor leads for opens, shorts or continuity to ground. If motor fails above test, replace motor.
	Conveyor	Check conveyor drive coupling to be sure that it is tight. Also check to see that coupling is engaged with conveyor drive shaft. Check for any mechanical misalignment or improper adjustment, also check for worn bearings. A conveyor belt that is too tight will cause excessive bearing wear and sometimes-irregular speed.
<b>Conveyor speed varying or intermittent</b>	Power Supply	Check for steady supply voltage to oven. If voltage is unsteady, contact power company.
	Transformer	Check for steady A.C. voltage output from transformer and replace as needed.
	Conveyor Control	Check for steady D.C. voltage output from conveyor control. If D.C. voltage output is unsteady, check conveyor potentiometer (see "Speed Adjustment Potentiometer" under Conveyor will not run). If the potentiometer checks good, and the D.C. voltage is unsteady, replace conveyor control.
	D.C. Gearmotor	Check motor brushes for excessive arching and/or unusual wear. Replace brushes or gearmotor as needed.

<b>Conveyor will not run (S/N 3000481 &amp; Above)</b>	Fan Switch	WITH POWER OFF: Check continuity between switch terminals. Check and insure good wire connections.
	Conveyor Control Transformer	With the fan switch on, check for supply voltage at the primary of the transformer. Check for voltage on the secondary side of transformer (24 VAC) at J4 and J5 on the conveyor control board. Replace as needed.
	Speed Adjustment Pot	This is a 50 K ohm potentiometer. WITH POWER OFF: Remove the leads from the motor control board at terminals P1, P2, P3. With a digital meter, check the ohm reading across the red and black leads. This reading should be 50K ohms ( $\pm 10\%$ ) as the pot. is rotated from low to high. Place meter leads on red and white lead. Rotating the pot. slowly from low to high, the meter reading should show an even transition from 0 to 50 K ohms ( $\pm 10\%$ ). There should be no dead or opens spots throughout the rotation of the pot. Check all three (3) leads to ground. There should be no continuity to ground. If any of the above checks fail, replace the pot.
	Conveyor Control Board	Check for 24 VAC input to the control board at terminals J4 and J5. If not present, check wiring back to control transformer, if voltage is present at J4 and J5, check the VDC output at terminals J2 (+) & J3 (-) (0-18 VDC). If 24 VAC is present at J4 and J5, but VDC is not present at J2(+) & J3(-) replace board.
	Conveyor Gear Motor	If D.C. voltage is present at J2(+) and J3(-) and the motor does not run, first check the mini breaker (.7Amp). Check the leads to the motor for evidence of any shorts or opens, and each lead to ground. If the motor fails the above tests, replace motor.
	Conveyor	Check for any mechanical misalignment or improper adjustment, also check for worn bearings. A conveyor belt that is too tight will cause excessive bearing wear and sometimes, irregular speed.
<b>Conveyor speed varying or intermittent</b>	Power Supply	Check for steady supply voltage to oven. If voltage is unsteady, contact Power Company.
	Transformer	Check for steady AC voltage output from transformer and replace as needed.
	Conveyor Control	Check for steady D.C. voltage output from conveyor control. If D.C. voltage output is unsteady, check conveyor potentiometer (See Speed Adjustment Potentiometer" under Conveyor will not run). If the potentiometer checks good, and the D.C. voltage is unsteady, replace conveyor control.
	D.C. Gearmotor	Check motor brushes for excessive arching and/or unusual wear. Replace brushes or gearmotor as needed
	Magnet	Check to insure that the magnet (cemented to shaft of conveyor drive motor) has not been damaged, or come loose from motor shaft. Replace as needed.
	Hall Effect Sensor	Check for any physical damage to Hall Effect Sensor (mounted on conveyor motor). Check all wiring and connections or damage. Check all connections for tightness or proper location and check all wiring or visible damage. Replace as needed.

# REMOVAL, INSTALLATION, AND ADJUSTMENT

## MODEL SERIES 1300

### CAUTION!

BEFORE REMOVING OR INSTALLING ANY COMPONENT IN THE IMPINGER  
OVEN BE SURE TO DISCONNECT ELECTRICAL POWER SUPPLY

#### SWITCH, ON-OFF

1. Remove conveyor and oven side panels.
2. Remove two (2) screws from ends of control panel and remove panel.
3. Disconnect four (4) wires from switch assembly. Mark wires for reinstallation.
4. Depress clips on side of switch and remove from panel.
5. Reassemble in reverse order and check operation.

#### POTENTIOMETER, CONVEYOR CONTROL

1. Remove conveyor and oven side panels.
2. Remove two (2) screws from ends of control panel and remove panel.
3. Unplug potentiometer at the wire harness (push on connectors).
4. Loosen set screws on control knob and remove knob.
5. Remove retaining nut from potentiometer shaft and remove pot.
6. Reassemble in reverse order and check operation, recalibrate if needed.

#### POTENTIOMETER, TEMPERATURE CONTROL

1. Remove conveyor and oven side panels.
2. Remove two (2) screws from ends of control panel and remove panel.
3. Unplug potentiometer at the wire harness (push on connectors).
4. Loosen set screws on control knob and remove knob.
5. Remove retaining nut from potentiometer shaft and remove pot.
6. Reassemble in reverse order and check operation, recalibrate if needed.

#### CIRCUIT BREAKER, 0.7 AMP

1. Remove control box cover.
2. Remove two (2) wires from mini-breaker.
3. Remove knurled nut and remove breaker.
4. Reassemble in reverse order and check operation.

#### FUSE HOLDER

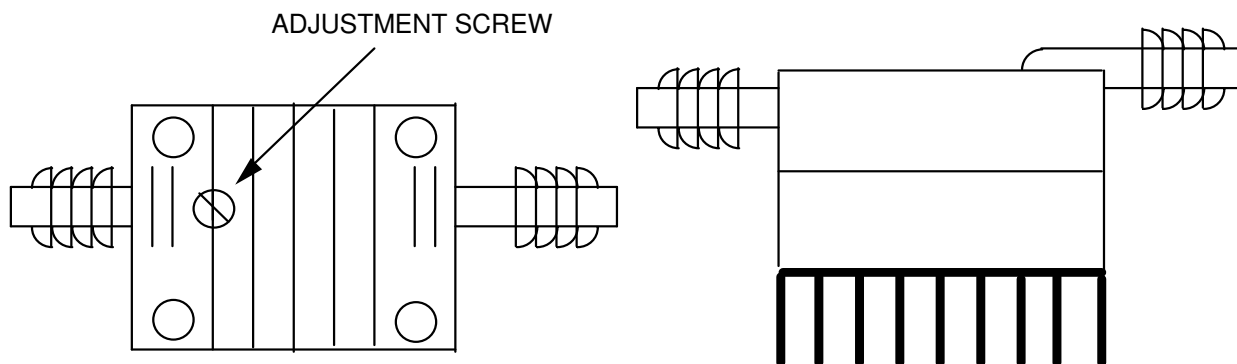
1. Remove control box cover.
2. Remove two (2) wires from fuse holder.
3. Remove two (2) screws and remove holder.
4. Reassemble in reverse order and check operation.

## THERMOSTAT, OVEN CAVITY HI-LIMIT

1. Remove control box cover.
2. Remove oven back assembly. (See OVEN BACK)
3. Remove two (2) wires from thermostat.
4. Remove retaining nut from the front of thermostat and remove thermostat.
5. Remove capillary tube from wire form in back of oven and remove assembly out through control box side.
6. Reassemble in reverse order. Check for proper routing through insulation. Be sure capillary tube is held securely in the wire form and the reset button has been pushed in and set.  
**NOTE:** All excess capillary tubing should be brought back into control box area. Be certain to replace insulation seal when oven back is re-installed.
7. Check operation.

## AIR PRESSURE SWITCH – REPLACEMENT (S/N 3043630 and below)

1. Remove control box cover.
2. Remove two (2) wires.
3. Remove air tube (note location).
4. Remove four (4) screws and replace air switch.
5. Reassemble in reverse order and check operation.  
**NOTE:** Make sure to use rubber grommets when installing air switch.



## AIR PRESSURE SWITCH – ADJUSTMENT (S/N 3043630 and below)

1. Apply power to oven, turn temperature control potentiometer to max. and allow 30-minutes preheat for temperatures to stabilize.
2. Remove air tube and with a volt meter verify that contactor for heater elements opens.
3. WITH POWER ON: Re-connect tube and check voltage across the air switch making sure that there is no voltage drop and it remains steady. Adjust as needed. (See Picture, verify adjustment screw has not vibrated out).  
**NOTE:** Allow 30 minutes preheat.

## THERMOSTAT, CONTROL BOX HI-LIMIT

1. Remove control box cover.
2. Remove two (2) wires.
3. Remove two (2) screws and replace
4. Reassemble in reverse order and check operation.  
**NOTE:** Make sure reset button has been pushed and set.

## MAIN FAN RELAY

1. Remove control box cover
2. Remove wires from relay and mark wires for reinstallation.
3. Remove two (2) screws and replace relay.
4. Reassemble in reverse order and check operation.

## TIME DELAY RELAY

1. Remove control box cover.
  2. Remove wires from relay and mark wires for reinstallation. CAUTION: Resistor should be jumpered across terminals #2 and #3 on some of the early models (SN 3000352 and below) this jumper was installed across terminals #1 and #3 which may cause failure of the timer. Correct when replacing timer.
  3. Remove screw and replace relay.
  4. Reassemble in reverse order and check operation.
- NOTE:** Do not overtighten mounting screw as this could damage timer.

## RELAY CONTACTOR

1. Remove control box cover.
2. Remove wires and mark wires for reinstallation.
3. Remove four (4) mounting screws and replace contactor.
4. Reassemble in reverse order and check operation.

## TRANSFORMER - CONVEYOR

1. Remove control box cover.
  2. Disconnect wires from primary and secondary of transformer. Mark wires for reinstallation (#23-blue-208V connection/#24-red-240V connection).
- NOTE:** Wire nut one not being used.
3. Remove two (2) mounting screws and replace.
  4. Reassemble in reverse order and check operation.

## CONVEYOR DRIVE MOTOR

1. Remove conveyor (see Installation and Operations Manual).
  2. Remove screw from center of coupling sleeve assembly. and slide coupling assembly off motor shaft.
  3. Remove control box cover.
  4. Disconnect motor leads and mark wires for reinstallation and conveyor direction.
  5. Remove four (4) motor mounting screws and replace motor.
  6. Reassemble in reverse order and check operation.
- NOTE:** Check to insure coupling and conveyor shaft are aligned.
- NOTE:** Starting with SN 3000481 all conveyor drives will be a closed loop system. The drive motor assembly will include a hall effect sensor board and magnet. No calibration required.

**S/N 3000480 and Below**--Check calibration of conveyor control board (See "Conveyor control board calibration")

**S/N 3000481 and Above**--Attach correct magnet to conveyor motor assembly.

## ASSEMBLY OF MAGNET TO MOTOR

### FOR OVENS WITH 1-12 MINUTE CONVEYOR DRIVE SYSTEM

1. Apply 1 or 2 drops of adhesive (supplied) to magnet. Mount magnet on motor shaft. Be sure to keep adhesive away from motor bearings.

**NOTE:** Use magnet marked "8"

### FOR OVENS WITH 1-24 MINUTE CONVEYOR DRIVE SYSTEM

1. Apply 1 or 2 drops of adhesive (supplied) to magnet. Mount magnet on motor shaft. Be sure to keep adhesive away from motor bearing.

**NOTE:** Use magnet marked "16"

## CONVEYOR CONTROL BOARD - REPLACEMENT

1. Remove control box cover.
2. Disconnect and mark all wires from the control board.
3. Remove two (2) screws from mounting bracket at rear wall and remove assembly.
4. Depress nylon clips and remove circuit board from mounting bracket.
5. Reassemble in reverse order and check operation.

## CONVEYOR CONTROL BOARD CALIBRATION (S/N 3000480 AND BELOW)

(NOTE: S/N 3000481 & ABOVE, NO CALIBRATION REQUIRED)

1. Remove control box cover.
2. Connect digital meter to A+ & A-.
3. With conveyor running at maximum speed, adjust max pot on board to 21.5 to 22 VDC.
4. With conveyor running at minimum speed, adjust min pot on board to 3 to 4 VDC.
5. Check conveyor belt timing (leading edge in to leading edge out) at 5 min. and adjust, potentiometer knob if necessary to compensate (S/N 3000481 & above, no calibration required).

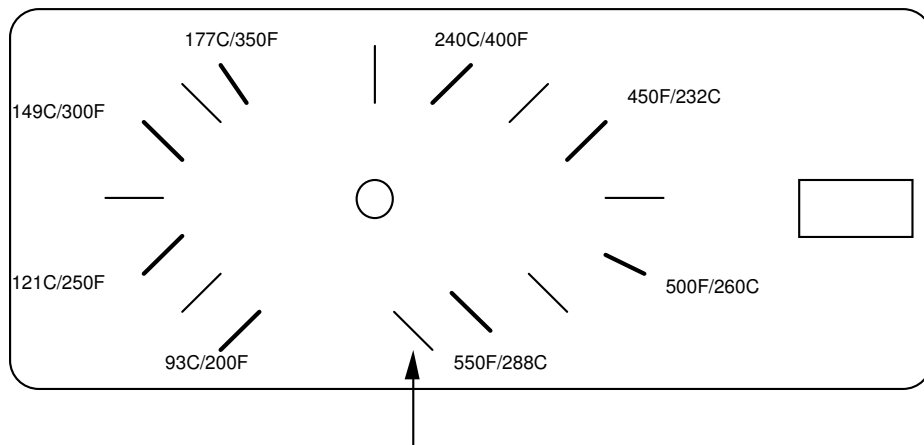
## ELECTRONIC TEMPERATURE CONTROL BOARD - REPLACEMENT

1. Remove control box cover.
2. Disconnect wires and molded connector and mark wires for reinstallation.
3. Remove two (2) screws from mounting bracket and remove assembly.
4. Depress nylon clips and remove circuit board from mounting bracket.
5. Reassemble in reverse order and check operation.

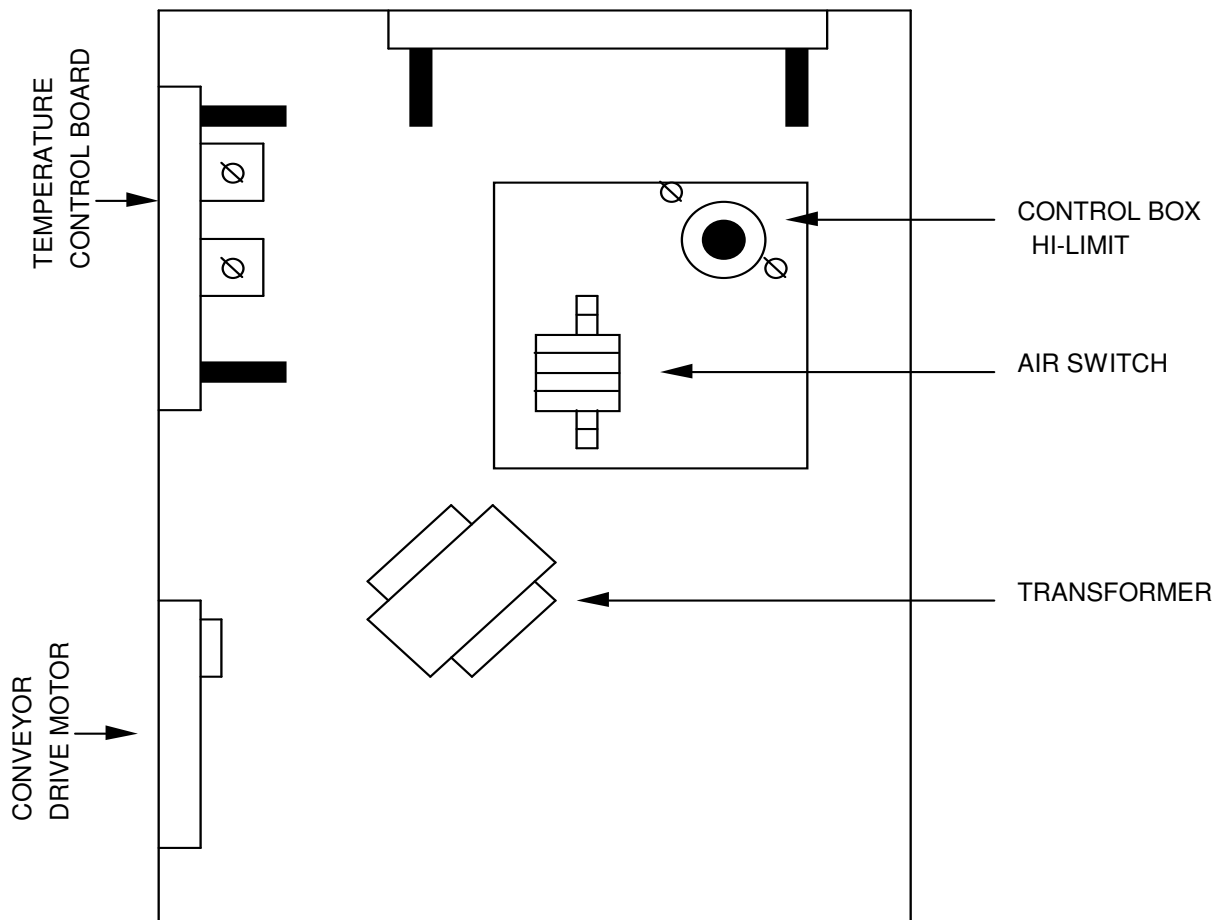
## ELECTRONIC TEMPERATURE CONTROL - CALIBRATION

1. Turn oven on, allow 30 minutes preheat for temperatures to stabilize in oven cavity.
2. Remove control box cover.
3. Place temperature probe in bottom finger #4 (lower right), 3rd row from outside edge, 3rd hole from the rear.  
**NOTE:** Make sure probe is not touching any metal surfaces. (Measure air temperature only)
4. Turn temperature control knob fully clockwise and adjust so the knob indicator is aligned with the mark past 550°F (288°C) on the dial. (See diagram Pg. 13)





5. Turn the temperature control knob to 500°F (260°C) and calibrate the temperature control board. Adjust the top potentiometer only (see diagram Pg. D5) so the unit cycles at 500°F ± 10°F (490°F - 510°F).
6. Turn the temperature control knob to 550°F and verify that the oven will cycle at 550°F (288°C) ± 10°F.
7. Replace the control box cover and check operation.



## COOLING FAN, CONTROL BOX

1. Remove control box cover.
2. Remove four (4) screws.
3. Lift off fan guard and finger guard.
4. Disconnect two wires and replace fan.
5. Reassemble in reverse order and check operation.

**NOTE:** Check to insure that control box high limit switch is not tripped. Reset if needed.

## CAPACITOR, MOTOR

1. Remove six (6) acorn nuts from motor cover and remove.  
**CAUTION: DISCHARGE CAPACITOR BEFORE REMOVING.**
2. Remove wires from capacitor and mark wires for reinstallation.
3. Loosen clamp around capacitor and remove.
4. Reinstall in reverse order and check operation.

## OVEN BACK ASSEMBLY

1. Remove six (6) acorn nuts and remove motor cover.
2. Disconnect all wiring from motor and heating element.
3. Remove four (4) nuts holding oven back and remove oven back.
4. Reassemble in reverse order. **NOTE:** Be certain to replace insulation seal each time oven back is removed.

## MAIN FAN

1. Remove six (6) acorn nuts holding motor cover and remove.
2. Remove four (4) acorn nuts holding oven back assembly and remove.
3. Loosen two (2) screws on fan hub and slide fan off of motor shaft. (Note location of hub on motor shaft for reinstallation. Approximately 3/16" from back wall.)
4. Reinstall in reverse order and check system operation. Allow 30 minute preheat and verify that fan is not rubbing.

**NOTE:** Be certain to replace insulation seal each time oven back is removed.

## THERMOCOUPLE

1. Remove control box cover.
2. Remove six (6) acorn nuts holding motor cover and remove.
3. Remove four (4) acorn nuts holding oven back assembly and remove oven back.
4. Remove thermocouple bulb from wire form in rear of oven cavity.
5. Disconnect and mark wires from temperature control board (red=neg., white=pos.) and remove thermocouple.
6. Reassemble in reverse order and check operation. NOTE: Be certain to replace insulation seal each time oven back is removed.

### INFORMATION:

When two wires composed of dissimilar metals are joined together and one of the ends is heated, a continuous current flow is generated. We use an iron constant (Type J) thermocouple. The iron wire increases the number of dissimilar junctions in the circuit.

It is possible to check a thermocouple with a properly calibrated D.C. millivolt meter. At 32°F, the millivolt reading should be 0.00. This can be checked by inserting the thermocouple into an ice bath. The millivolt reading at 72°F should be 1.134.

When using the following chart, the temperature at the terminal connections must be noted. This temperature is called the Junction Temperature.

The following chart lists the thermocouple millivolt readings from 200°F to 600°F.

OVEN TEMPERATURE												
JUNCTION TEMPERATURE		200°F	250°F	300°F	325°F	350°F	400°F	425°F	450°F	500°F	550°F	600°F
	90°F	3.26	4.77	6.30	7.06	7.83	9.37	10.14	10.91	12.46	14.00	15.53
	88°F	3.32	4.83	6.36	7.12	7.89	9.43	10.20	10.97	12.51	14.05	15.59
	86°F	3.37	4.88	6.41	7.17	7.94	9.49	10.26	11.03	12.57	14.11	15.65
	84°F	3.43	4.94	6.47	7.23	8.00	9.54	10.31	11.09	12.63	14.19	15.71
	82°F	3.49	5.00	6.53	7.29	8.06	9.60	10.37	11.14	12.69	14.23	15.76
	80°F	3.55	5.06	6.59	7.35	8.12	9.66	10.43	11.20	12.74	14.28	15.82
	78°F	3.60	5.11	6.64	7.40	8.17	9.72	10.49	11.26	12.80	14.34	15.86
	76°F	3.66	5.17	6.70	7.46	8.23	9.77	10.55	11.32	12.86	14.40	15.94
	75°F	3.69	5.20	6.73	7.49	8.26	9.80	10.57	11.35	12.89	14.43	15.97
	74°F	3.72	5.23	6.76	7.52	8.29	9.83	10.60	11.37	12.92	14.46	15.99
	72°F	3.78	5.29	6.82	7.58	8.35	9.89	10.66	11.43	12.97	14.51	16.05
	70°F	3.83	5.34	6.87	7.63	8.40	9.95	10.72	11.49	13.03	14.57	16.11
	68°F	3.89	5.40	6.93	7.69	8.46	10.00	10.78	11.55	13.09	14.63	16.17
	66°F	3.95	5.46	6.99	7.75	8.52	10.06	10.83	11.61	13.15	14.69	16.23
	64°F	4.01	5.52	7.05	7.81	8.58	10.12	10.89	11.66	13.20	14.74	16.28
	62°F	4.06	5.57	7.10	7.86	8.63	10.18	10.95	11.72	13.26	14.80	16.34
	60°F	4.12	5.63	7.16	7.92	8.69	10.24	11.01	11.78	13.32	14.86	16.40

## HEATING ELEMENT (Color Coded on the Cold Zone)

<b>PART# 369418</b>	Heating Element 208V	Red
<b>PART# 369419</b>	Heating Element 240V	Blue
<b>PART# 369450</b>	Heating Element 220V	Yellow
<b>PART# 369455</b>	Heating Element 200V	Orange
<b>PART# 369456</b>	Heating Element 380V	Violet
<b>PART# 369457</b>	Heating Element 415V	Green
<b>PART# 369475</b>	Heating Element 200V 3 PH	Orange
<b>PART# 369476</b>	Heating Element 380V 3 PH	Violet
<b>PART# 369477</b>	Heating Element 415V 3 PH	Green
<b>PART# 370104</b>	Heating Element 400V 3 PH	Brown
<b>PART# 370105</b>	Heating Element 400V 1 PH	Brown

1. Remove six (6) acorn nuts holding motor cover and remove
2. Remove connectors from element.
3. Remove four (4) acorn nuts holding oven back assembly and remove.
4. Remove three (3) screws from heating element brackets and slide element out of back assembly.
5. Reassemble in reverse order. Verify by color code, dot or band on element that correct element is being installed. Refer to chart above:

**NOTE:** Be certain to replace insulation seal each time oven back is removed.

## AIR PUMP

1. Remove six (6) acorn nuts holding motor cover and remove.
2. Disconnect motor, capacitor, and element leads and mark wires for reinstallation.
3. Remove four (4) acorn nuts holding oven back assembly and remove.
4. Remove main fan. (Note location, approximately 3/16" from back wall on motor shaft.)
5. Remove heating element.
6. Remove five (5) screws from inner back assembly and lift off.
7. Loosen two screws on air pump hub and slide off shaft. (Note location for reinstallation (approximately 3/64" clearance from back wall).
8. Reinstall in reverse order and check operation. Allow 30 minute preheat and verify that fan is not rubbing.

**NOTE:** Be certain to replace insulation seal each time oven back is removed.

## MAIN FAN MOTOR

1. Remove six (6) acorn nuts holding motor cover and remove.
2. Disconnect motor, capacitor, and heating element and mark wires for reassembly.
3. Remove four (4) acorn nuts holding oven back assembly and remove.
4. Remove heating element (See "heating element removal").
5. Remove main fan, NOTE position ("See fan removal").
6. Remove five (5) screws from inner back and separate.
7. Remove air pump assembly  
**NOTE** location.
8. Remove four (4) screws from motor mount pedestal and lift motor and pedestal off outer back assembly.
9. Remove four (4) nuts from front motor studs and remove mounting pedestal.
10. Reassemble in reverse order and check operation.

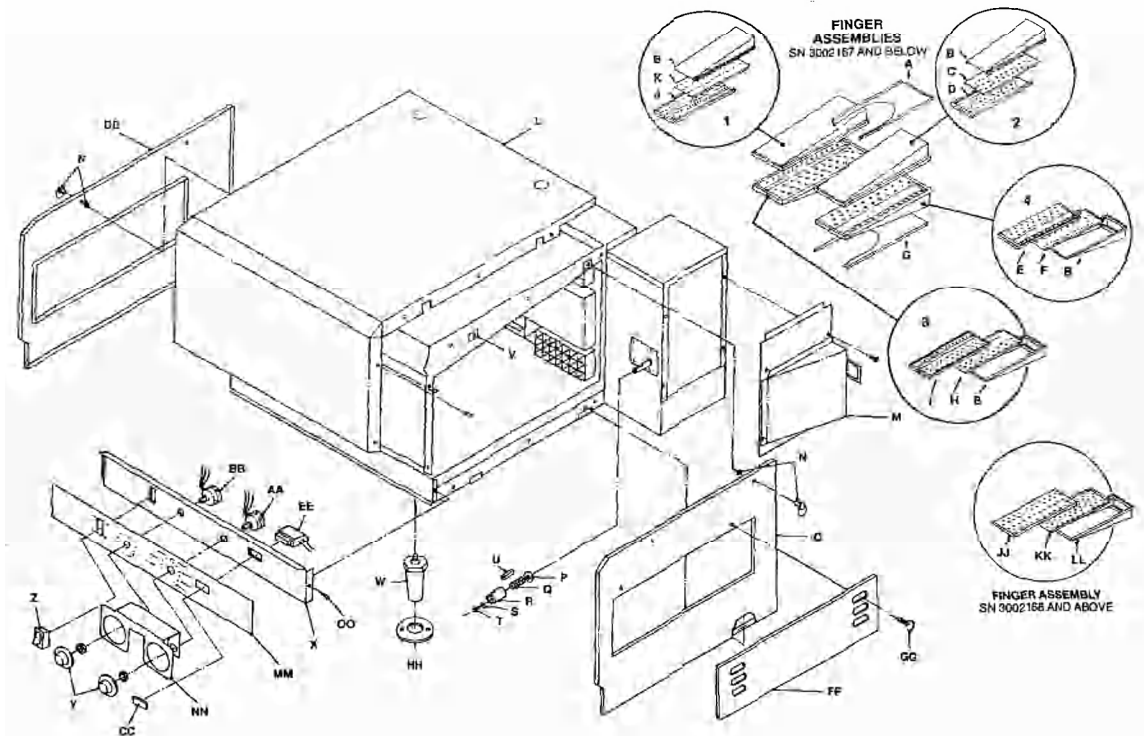
**NOTE:** Be certain to replace insulation seal each time oven back is removed

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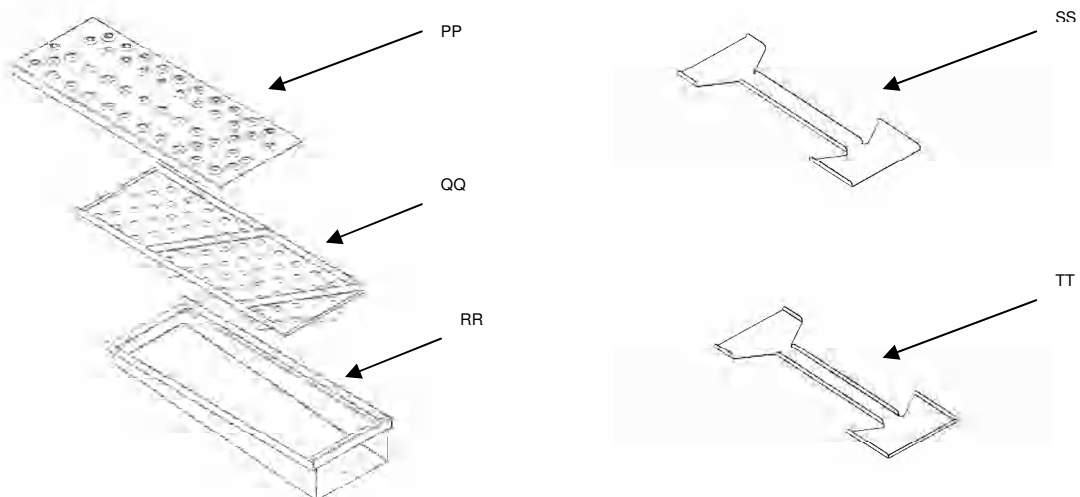
# GENERAL – 1300 SERIES

LETTER	P/N	DESCRIPTION
A	369434	Air Duct Panel, Upper
B	369442	Finger Housing S/N 3002167 & Below
C	369436	Columnating Plate #2 (UR) – S/N 3002167 & Below
D	369445	Finger Cover, Upper Right – S/N 3002167 & Below
E	369441	Finger Cover, Lower Right – S/N 3002167 & Below
F	369439	Columnating Plate #4 (LR) – S/N 3002167 & Below
G	369435	Air Duct Panel, Lower
H	369438	Columnating Plate #3 (LL) – S/N 3002167 & Below
I	369444	Finger Cover, Lower Left – S/N 3002167 & Below
J	369446	Finger Cover, Upper Left – S/N 3002167 & Below
K	369437	Columnating Plate #1 (UL) – S/N 3002167 & Below
L	369916	Top / Front Cover Panel
M	369484	Cover Panel Assy
N	369407	Fastener & Split Ring Retainer (S/N 3046209 & Below)
	369211	Thumb Screw (S/N 3046210 & Above)
O	369447	Cover Panel Assembly, Right
P	369953	Flat Washer, S/S
Q	369460	Compression Spring
R	369410	Coupling Sleeve
S	370106	Flat Washer, .156 x .430
T	350259	Screw, THMS 6-32 x 3/8
U	369413	Drive Key
V	369373	Receptacle, Snap-In
W	369461	Leg, 4"
X	369945	Control Panel
Y	369429	Knob, Control
Z	369432	Switch, On – Off
AA	369449	Temperature Control Pot. Assembly
BB	369433	Potentiometer Control, Conveyor S/N 3000480 & Below
	369468	Potentiometer Control, Conveyor S/N 3000481 & Above
CC	350224	Lens, Yellow
DD	369448	Cover Panel Assembly, Left
EE	369467	Pilot Light & Harness – S/N 3000481 & Above
FF	369495	Conveyor Baffle
GG	369211	Thumb Screw
HH	369451	Mounting Ring Assy.
JJ	369491	Finger Cover – S/N 3002168 & Above (4 required)
KK	369490	Columnating Plate – S/n 3002168 & Above (4 required)
LL	369488	Finger housing – S/n 3002168 & Above (4 required)
MM	369932	Facia 1-12 Minute Bake Time
	370096	Facia 2-24 Minute Bake Time
	370018	Facia 1-24 Minute Bake Time
NN	370095	Control Guard
OO	370097	Screw 10-32 x 1/4"
PP	370657	Finger Cover (S/N 3045308 & Above)
QQ	370658	Columnating Plate (S/N 3045308 & Above)
RR	369442	Finger Housing (S/N 3045308 & Above)
SS	370656	Lower Air Duct Panel (S/N 3045308 & Above)
TT	370655	Upper Air Duct Panel (S/N 3045308 & Above)

## GENERAL – 1300 SERIES PARTS BLOW-UP



### NEW FINGER ASSEMBLY (S/N 3045308 & ABOVE)

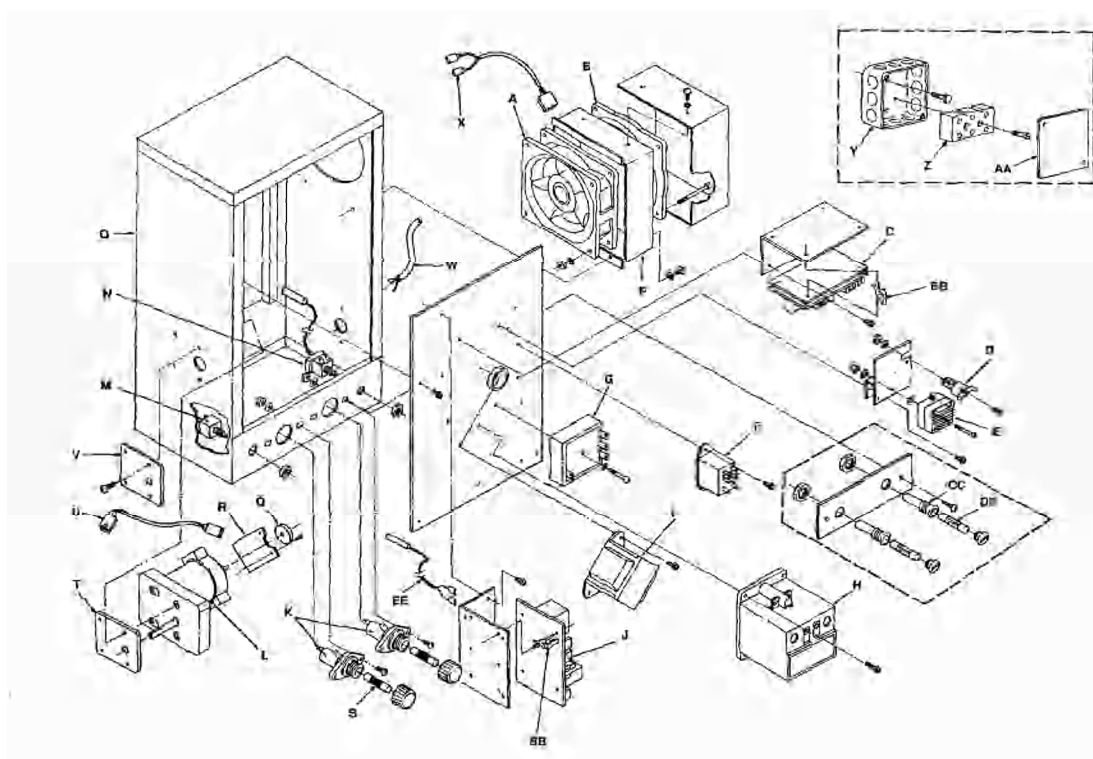


# CONTROL COMPARTMENT – 1300 SERIES

LETTER	P/N	DESCRIPTION
A	369426	Cooling Fan – S/N 3000399 & Below
	369378	Cooling Fan – S/N 3000400 & Above
B	369428	Finger Guard – S/N 3000399 & Below
	369331	Finger Guard – S/N 3000400 & Above
C	369415	Conveyor Control S/N 3000480 & Below
	369464	Conveyor Control – S/N 3000481 to 3007663
		Except Models 1301-5, 1302-5, 1304-5, 1308-5
	370017	Conveyor Control S/N 3007664 and Above and All S/N for Models 1301-5, 1302-5, 1304-5, 1308-5
D	369431	Thermostat, Control Box Hi-Limit S/n 3000352 & Above
E	369430	Air Switch – S/N 3043630 & Below
F	369422	Relay SPST, 240V
G	369417	Time Delay Relay
H	369425	Relay Contactor Single Phase
	369479	Relay Contactor 3 Pole 3 Phase
I	369427	Transformer, Conveyor Control
	370241	Transformer, Conveyor Control Models 1312,1313,1314
J	369416	Electronic Temperature Control S/N 3000480 & Below
	369465	Electronic Temperature Control S/N 3000481 & Above
K	369129	Fuse Holder, Model 1300,1301,1302,1307
L	369424	Conveyor Drive Motor S/N 3000480 & Below
	369923	Conveyor Motor Assy. Models 1301-5,1302-5,1304-5,1308-5
	369466	Conveyor Motor Assy (Assy. Includes Q,R)
		S/N 3000481 & Above Except 1301-5,1302-5,1304-5,1308-5
	369841	Brushes (For 369466 Motor)
M	369154	Circuit Breaker - .7Amp
N	357067	Thermostat, Capillary
O	369483	Housing Assy.
P	369482	Fan Housing
Q	369822	Magnet, 8 Pole (For 1-12 Minute Conveyor System)
	370065	Magnet, 16 Pole (For 1-24 Minute Conveyor System)
R	369823	Hall Effect Sensor
S	369421	Fuse 5A, Model 1300,1301,1302,1307
T	370100	Conveyor Motor Plate, Inner
U	370040	Hall Effect Cable
V	370099	Conveyor Motor Plate, Outer
W	369414	Power Cord 30A S/n 3007818 & Below (Model 1301,1302)
	370019	Power Cord 50A S/N 3007819 & Above (Model 1301,1302)
X	369536	Cooling Fan Cordset
Y	369085	Junction Box
Z	369376	Terminal Block 3 Pole
	369584	Terminal Block 4 Pole
AA	369698	Cover, Junction Box
BB	369856	Stand-off, Support
CC	357107	Fuseholder
DD	369492	Fuse 5A
EE	369131	Thermocouple



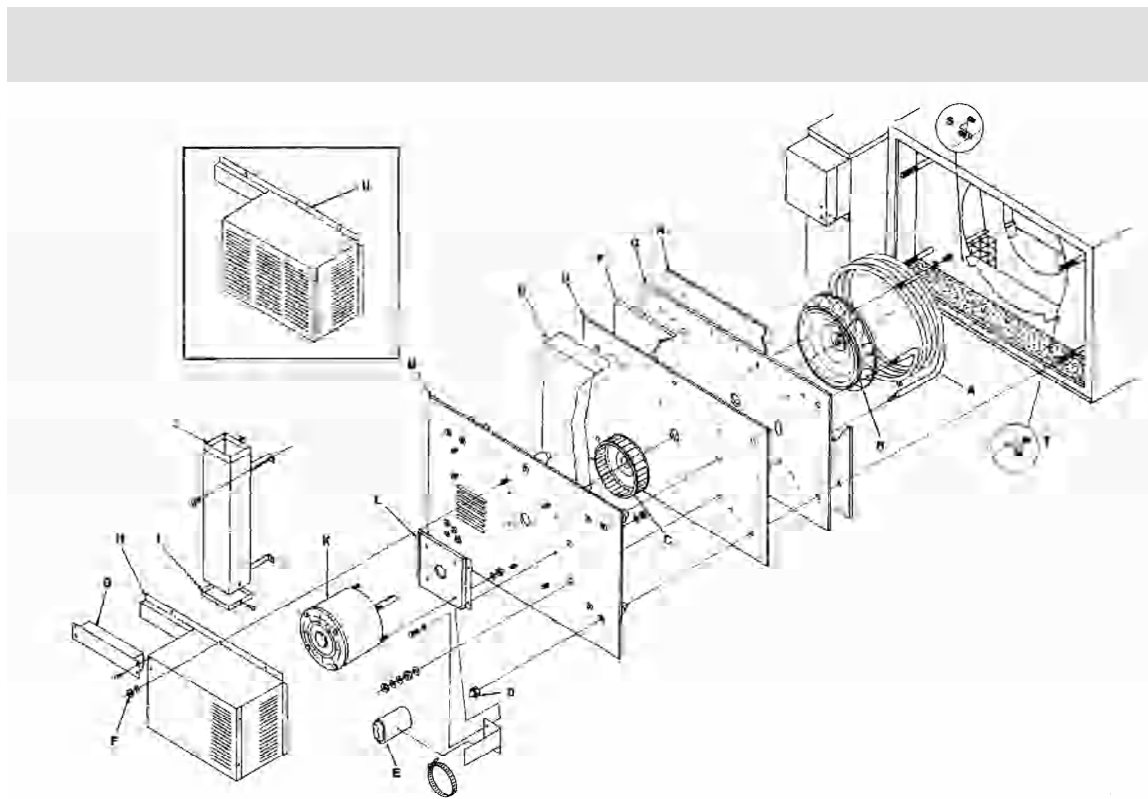
## CONTROL COMPARTMENT – 1300 SERIES BLOW - UP



# BACK – 1300 SERIES

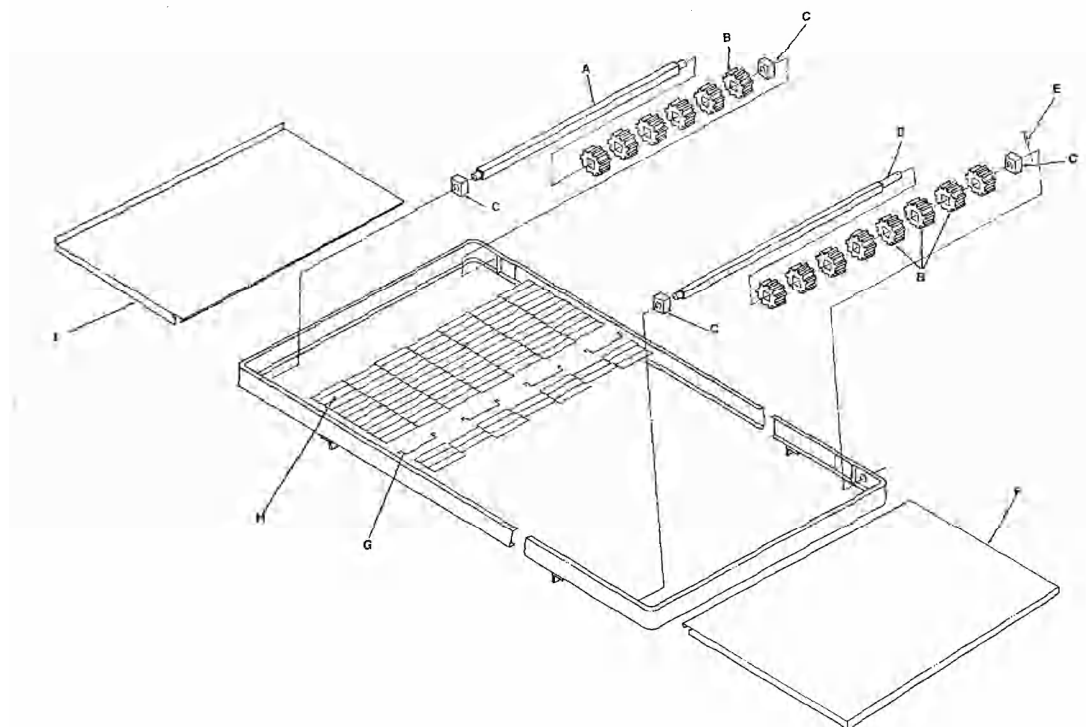
LETTER	P/N	DESCRIPTION	
			Color Coded on The Cold Zone
A	369418	Heating Element - 208V	Red
	369419	Heating Element - 240V	Blue
	369450	Heating Element - 220V	Yellow
	369455	Heating Element - 200V	Orange
	369456	Heating Element - 380V	Violet
	370105	Heating Element - 400V 1 PH	Brown
	369457	Heating Element - 415V	Green
	369475	Heating Element - 200V 3 PH	Orange
	369476	Heating Element - 380V 3 PH	Violet
	370104	Heating Element - 400V 3 PH	Brown
	369477	Heating Element - 415V 3 PH	Green
B	369409	Main Fan	
C	369408	Air Pump	
D	369440	Nut, S/S ¼ - 20	
E	369192	Capacitor	
F	369458	Nut, 10-32	
G	370041	Duct Assy	
H	370020	Motor Cover Assy	
I	370102	Bottom Cap, Flue Duct	
J	369453	Flue Duct Assembly	
K	369423	Motor, Main Fan S/N 3002137 & Below – All 1301-4,1302-4	
	369485	Motor, Main Fan 60 Hz S/N 3002168 & Above	
	370179	Motor, Main Fan 50 Hz – Models 1304-4,1305-4,1308-4	
	369480	Motor, Main Fan 50 Hz S/n 3002168 & Above	
L	369940	Motor Mount	
M	370093	Motor Plate Assy	
N	369474	Insulation, Air Pump Panel	
O	369936	Plenum Barrier Panel	
P	369473	Insulation, Plenum Panel	
Q	369935	Cover Plate, Plenum	
R	369470	Insulation Seal	
S	369497	Bracket, Thermostat, Left Side	
T	369496	Bracket, Thermostat, Right Side	
U	369459	Motor Cover Assy	

## BACK – 1300 SERIES BLOW - UP



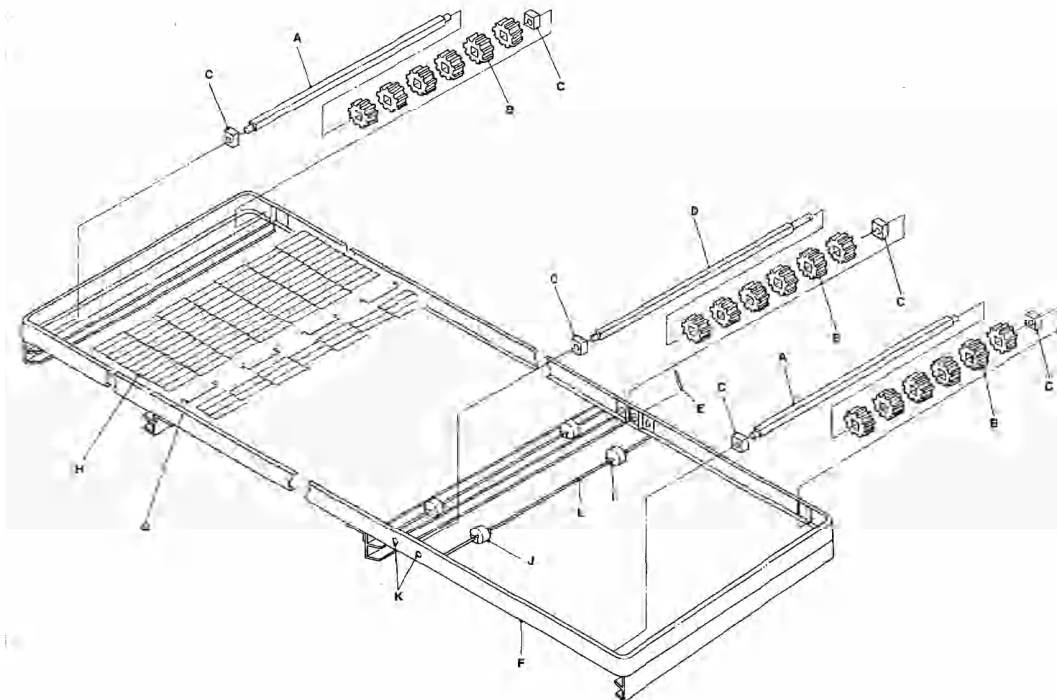
# STANDARD CONVEYOR – 1300 SERIES

LETTER	P/N	DESCRIPTION
	369443	Standard Complete Conveyor Assy. (31" Length)
A	369462	Idler Axle
B	369515	Drive Sprocket
C	369516	Conveyor Bearing
D	369463	Drive Axle
E	369471	Roll Pin, 5/32 x 7/8"
F	1343	Entry Shelf – 12"
	1344	Entry Shelf – 4"
G	369412	Conveyor Splice Clip
H	369411	Conveyor Belting
	370185	Conveyor Belting (1 foot section)
I	1341	Exit Shelf – 12"
	1342	Exit Shelf – 4"
J	370094	Conveyor Frame Assembly



# EXTENDED CONVEYOR – 1300 SERIES

LETTER	P/N	DESCRIPTION
	369909	Extended Conveyor Assy. (49 3/4" Length)
A	369462	Idler Axle
B	369515	Drive Sprocket
C	369516	Conveyor Bearing
D	369463	Drive Axle
E	369471	Roll Pin, 5/32 x 7/8"
F	369943	Conveyor Frame, Extended
G	369412	Conveyor Splice Clip
H	369481	Conveyor Belting – Extended Conveyor
	370185	Conveyor Belting (1 Foot Section)
I	369920	Retainer
J	369921	Roller, Slider Bed
K	369954	Pop Rivet S/S
L	369922	Support Rod
M	1345	Pan Stop
N	369489	Crumb Pan Assembly



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