SERVICE DATA SHEET
Electric Range with ES 330/330i Electronic Oven Controls

NOTICE - This service data sheet is intended for use by persons having electrical and mechanical training and a level of knowledge of these subjects generally considered acceptable in the appliance repair trade. The manufacturer cannot be responsible, nor assume any liability for injury or damage of any kind arising from the use of this data sheet.

SAFE SERVICING PRACTICES
To avoid the possibility of personal injury and/or property damage, it is important that safe servicing practices be observed. The following are examples, but without limitation, of such practices.

1. Before servicing or moving an appliance remove power cord from electrical outlet, trip circuit breaker to OFF, or remove fuse.
2. Never interfere with the proper installation of any safety device.
3. GROUNDING: The standard color coding for safety ground wires is *GREEN* or *GREEN WITH YELLOW STRIPES*. Ground leads are not to be used as current carrying conductors. **It is extremely important that the service technician reestablish all safety grounds prior to completion of service. Failure to do so will create a potential safety hazard.**
4. Prior to returning the product to service, ensure that:
   • All electric connections are correct and secure.
   • All electrical leads are properly dressed and secured away from sharp edges, high-temperature components, and moving parts.
   • All uninsulated electrical terminals, connectors, heaters, etc. are adequately spaced away from all metal parts and panels.
   • All safety grounds (both internal and external) are correctly and securely reassembled.

Oven Calibration
Set the electronic oven control for normal baking at 350°F. Obtain an average oven temperature after a minimum of 5 cycles. Press **Stop, Clear, Off or Cancel** to end Bake mode.
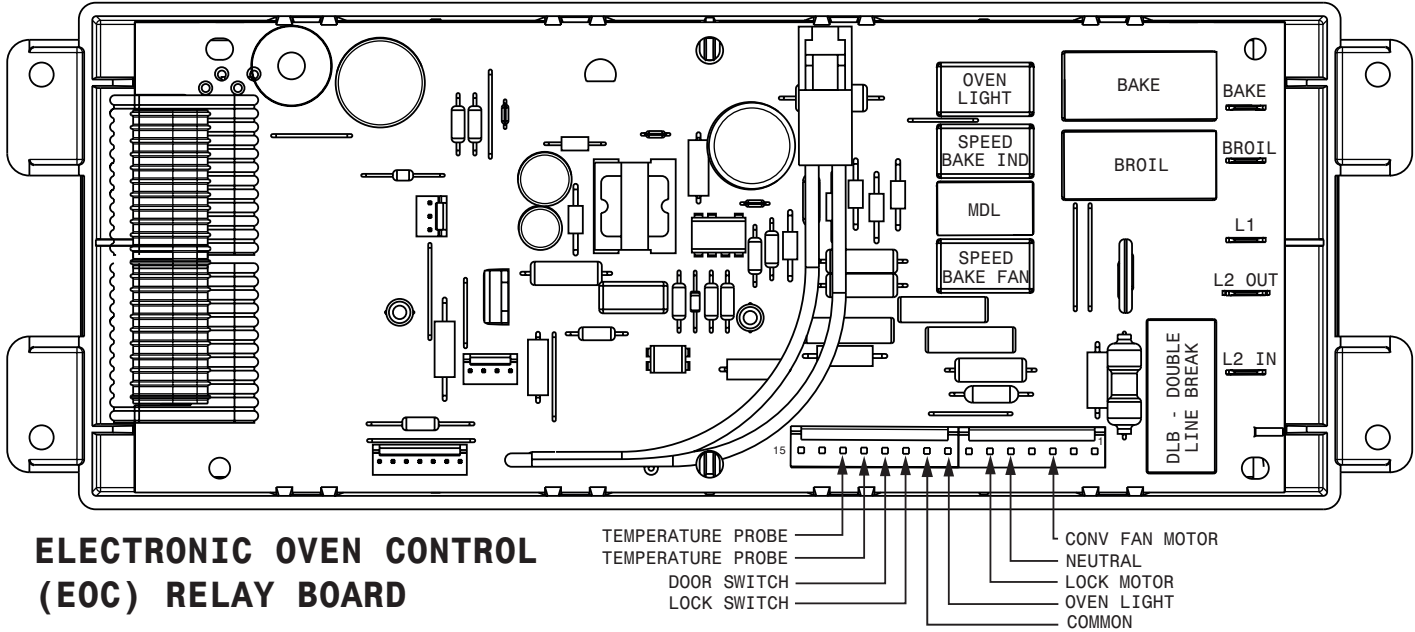
Temperature Adjustment
1. Set EOC to bake at 550°F.
2. Within 5 seconds of setting 550°F, press and hold the bake pad for approximately 15 seconds until a single beep sounds (longer may cause **F11** shorted keypad alarm).
3. Calibration offset should appear in the display.
4. Use the slew keys to adjust the oven temperature up or down 35°F in 5°F increments.
5. Once the desired (-35° to 35°) offset has been applied, Press **Stop, Clear, Off or Cancel**.

Note: Changing calibration affects normal Bake mode. The adjustments made will not change the Self-Cleaning cycle temperature.
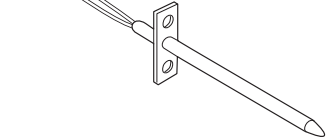
Modular Control Systems
This appliance is equipped with a modular system of controls. The modular system consists of various boards which communicate with one another to drive cooking functions. Oven functions, if available, operate through an oven user interface (UI or UIB) and an oven relay board. Cooktop functions, if available, operate through a cooktop UI/UIB and a cooktop relay board. There may be additional boards which work within the system to drive specific functions (refer to the schematics and diagrams and this sheet). Low voltage operating and communications power for the modular boards is provided through the wiring schemes. The boards that generate low voltage operating and communications power depend upon the individual control system (refer to the schematics and diagrams on this sheet). These voltages are only the operational voltages. Do not use these voltages as confirmation of communication between the boards. Communication occurs through software programming on each board. This communication is not detectable by volt ohmmeters. The programming is self-monitored and the UI displays will show error codes based on detected failures. The individual boards are not field repairable. See the schematics and diagrams included on this sheet for more unit-specific details.

Electronic Oven Control Fault Code Descriptions

Fault Code	Likely Failure Condition/Cause	Suggested Corrective Action
F10	Runaway Temperature. Oven heats when no cook cycle is programmed.	**If Oven is cold:** 1. If fault code is present with cold oven test oven temperature sensor probe circuit resistance. Use RTD scale found in the tech sheet. 2. Replace probe or repair wiring connections if defective. 3. If temperature sensor probe circuit is good but fault code remains when oven is cold replace the EOC. **If Oven is overheating:** 1. If oven is severely overheating/heating when no cook cycle is programmed test oven temperature sensor probe circuit resistance using the RTD scale found in the service tech sheet. Also verify that the temperature sensor probe in properly installed in the oven cavity. 2. Disconnect power from the range, wait 30 seconds and reapply power. If oven continues to heat when the power is reapplied, replace the EOC. **NOTE:** Severe overheating may require the entire oven to be replaced should damage be extensive.
F11	Shorted Keypad or selector switch.	1. Reset power supply to range - Disconnect power, wait 30 seconds and reapply power. 2. Check/reseat ribbon harness connections between touch panel and EOC. 3. Test keyboard circuits. Replace touch panel if defective. 4. If keyboard ciruits check good replace the EOC.
F12 F13	EOC Internal software error or failure.	1. Disconnect power, wait 30 seconds and reapply power. If fault returns upon power-up, replace EOC.
F20	Communication failure between oven and cooktop control boards	1. Reset power supply to range – Disconnect power, wait 30 seconds and reapply power. 2. Check/reseat communication between oven (MACS BUS) and cooktop controller (MACS2) 3. If problem persists, replace each board individually then retest until problem clears
F30 F31	Open oven sensor probe circuit. Shorted oven sensor probe circuit.	1. (F30) Check resistance at room temperature & compare to RTD Sensor resistance chart. If resistance is correct replace the EOC. If resistance does not match the RTD chart replace RTD Sensor Probe. Check Sensor wiring harness between EOC & Sensor Probe connector. 2. (F31) Check resistance at room temperature, if less than 500 ohms, replace RTD Sensor Probe. Check for shorted Sensor Probe harness between EOC & Probe connector. If resistance is correct replace the EOC.
F40	Communication failure between oven and cooktop control boards	1. Reset power supply to range – Disconnect power, wait 30 seconds and reapply power. 2. Check/reseat communication between oven (MACS BUS) and cooktop controller (MACS2) 3. If problem persists, replace each board individually then retest until problem clears
F90 F91 F92 F93 F94 F95	Door lock motor or latch circuit failure.	**If lock motor runs:** 1. Test continuity of wiring between EOC and lock switch on lock motor assy. Repair if needed. 2. Advance motor until cam depresses the plunger on lock motor switch. Test continuity of switch contacts. If switch is open replace lock motor assembly. 3. If motor runs and switch contacts and wiring harness test good, replace the EOC. **If lock motor does not run:** 1. Test continuity of lock motor windings. Replace lock motor assembly if windings are open. 2. Test lock motor operation by using a test cord to apply voltage. If motor does not operate replace lock motor assy. 3. If motor runs with test cord check continuity of wire harness to lock motor terminals. If harness is good replace the EOC.

ELECTRONIC OVEN CONTROL (EOC) RELAY BOARD

Board labels: OVEN LIGHT, SPEED BAKE IND, MDL, SPEED BAKE FAN, BAKE, BROIL, BAKE, BROIL, L1, L2 OUT, L2 IN, DLB - DOUBLE LINE BREAK

TEMPERATURE PROBE / TEMPERATURE PROBE / DOOR SWITCH / LOCK SWITCH — CONV FAN MOTOR / NEUTRAL / LOCK MOTOR / OVEN LIGHT / COMMON

Resistance Temperature Detector

RTD SCALE

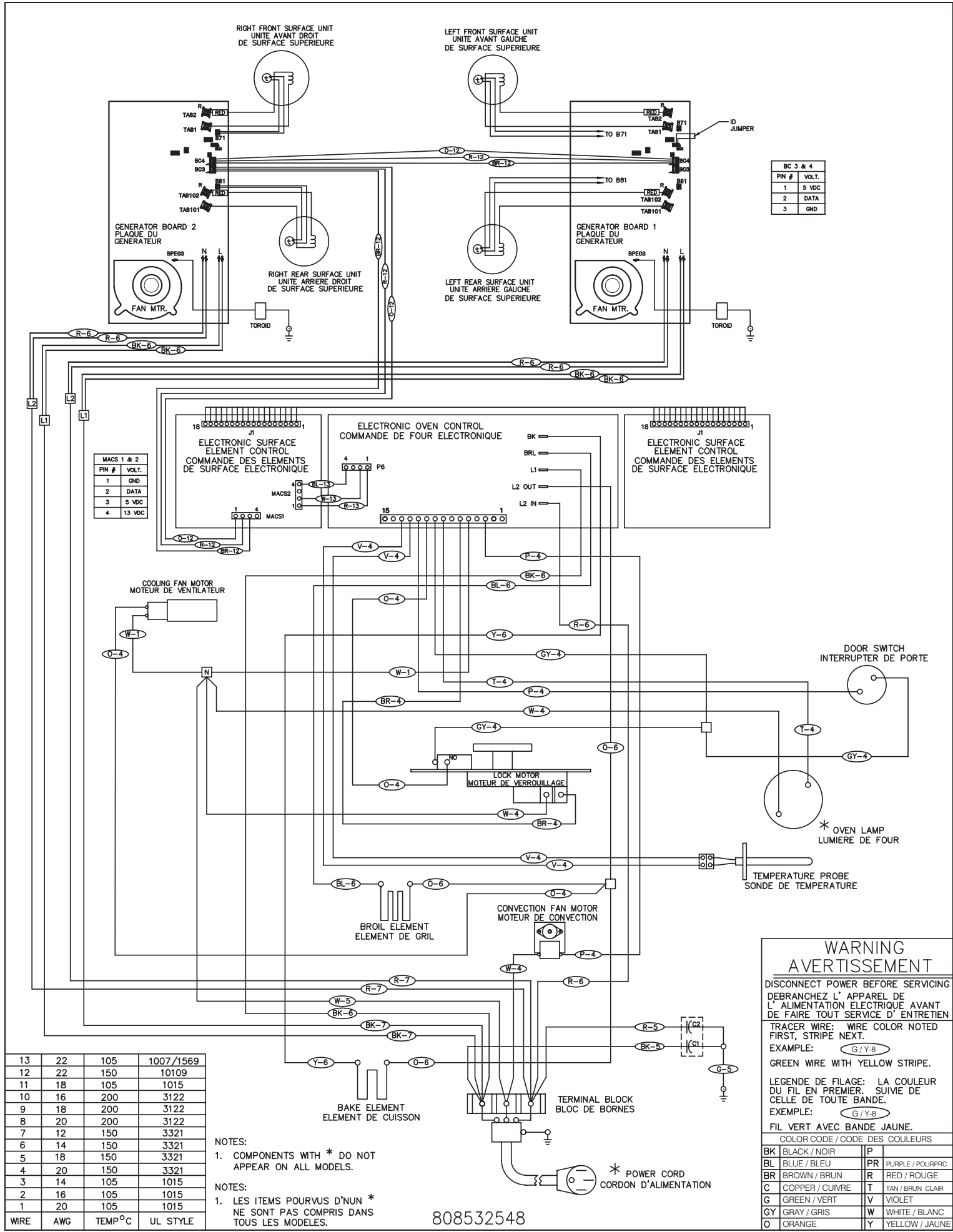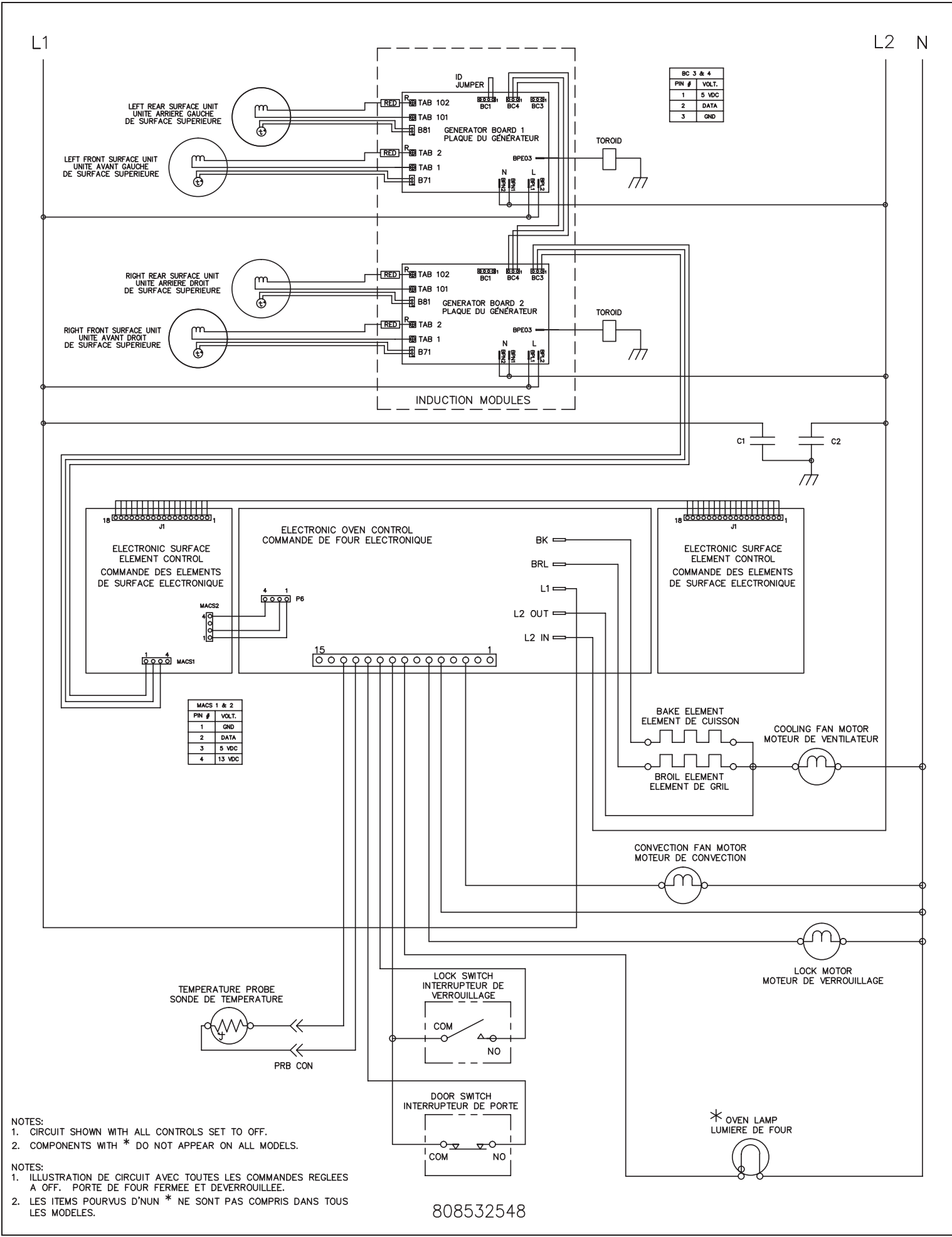| Temperature °F (°C)	Resistance (ohms)
32 ± 1.9 (0 ± 1.0)	1000 ± 4.0
75 ± 2.5 (24 ± 1.3)	1091 ± 5.3
250 ± 4.4 (121 ± 2.4)	1453 ± 8.9
350 ± 5.4 (177 ± 3.0)	1654 ± 10.8
450 ± 6.9 (232 ± 3.8)	1852 ± 13.5
550 ± 8.2 (288 ± 4.5)	2047 ± 15.8
650 ± 9.6 (343 ± 5.3)	2237 ± 18.5
900 ± 13.6 (482 ±7.5)	2697 ± 24.4
Probe circuit to case ground	Open circuit/infinite resistance

CIRCUIT ANALYSIS MATRIX

CIRCUIT ANALYSIS MATRIX	EOC RELAYS					DOOR SWITCH COM-NO	WARMER DRAWER LOCK SWITCH MDL (some models)	COOKTOP LOCKOUT (some models)
	L1 TO BAKE	L1 TO BROIL	L1 TO MOTOR DOOR LATCH	L1 TO CONV/ SPEED BAKE FAN	L1 TO CONV/ SPEED BAKE INDICATOR LIGHT			
BAKE/TIME BAKE	X	X*					X	
CONV/SPEED BAKE	X	X*		X	X		X	
BROIL		X					X	
CLEAN	X							
UNLOCKED							X	
LOCKING			X				X	
LOCKED								
UNLOCKING			X				X	
DOOR OPEN								
DOOR CLOSED						X		
COOKTOP ACTIVE								X
NOTE: X= Check active circuits *=Alternates with bake element								

Left Diagram

L1   L2   N

LEFT REAR SURFACE UNIT
UNITE ARRIERE GAUCHE
DE SURFACE SUPERIEURE

LEFT FRONT SURFACE UNIT
UNITE AVANT GAUCHE
DE SURFACE SUPERIEURE

RIGHT REAR SURFACE UNIT
UNITE ARRIERE DROIT
DE SURFACE SUPERIEURE

RIGHT FRONT SURFACE UNIT
UNITE AVANT DROIT
DE SURFACE SUPERIEURE

ID JUMPER

GENERATOR BOARD 1
PLAQUE DU GÉNÉRATEUR

GENERATOR BOARD 2
PLAQUE DU GÉNÉRATEUR

TOROID

INDUCTION MODULES

BC 3 & 4	
PIN #	VOLT.
1	5 VDC
2	DATA
3	GND

C1   C2

ELECTRONIC SURFACE
ELEMENT CONTROL
COMMANDE DES ELEMENTS
DE SURFACE ELECTRONIQUE

ELECTRONIC OVEN CONTROL
COMMANDE DE FOUR ELECTRONIQUE

ELECTRONIC SURFACE
ELEMENT CONTROL
COMMANDE DES ELEMENTS
DE SURFACE ELECTRONIQUE

BK
BRL
L1
L2 OUT
L2 IN

MACS 1 & 2	
PIN #	VOLT.
1	GND
2	DATA
3	5 VDC
4	13 VDC

BAKE ELEMENT
ELEMENT DE CUISSON

BROIL ELEMENT
ELEMENT DE GRIL

COOLING FAN MOTOR
MOTEUR DE VENTILATEUR

CONVECTION FAN MOTOR
MOTEUR DE CONVECTION

LOCK MOTOR
MOTEUR DE VERROUILLAGE

TEMPERATURE PROBE
SONDE DE TEMPERATURE

PRB CON

LOCK SWITCH
INTERRUPTEUR DE
VERROUILLAGE

COM
NO

DOOR SWITCH
INTERRUPTEUR DE PORTE

COM
NO

* OVEN LAMP
LUMIERE DE FOUR

NOTES:
1. CIRCUIT SHOWN WITH ALL CONTROLS SET TO OFF.
2. COMPONENTS WITH * DO NOT APPEAR ON ALL MODELS.

NOTES:
1. ILLUSTRATION DE CIRCUIT AVEC TOUTES LES COMMANDES REGLEES A OFF. PORTE DE FOUR FERMEE ET DEVERROUILLEE.
2. LES ITEMS POURVUS D'NUN * NE SONT PAS COMPRIS DANS TOUS LES MODELES.

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Right Diagram

RIGHT FRONT SURFACE UNIT
UNITE AVANT DROIT
DE SURFACE SUPERIEURE

LEFT FRONT SURFACE UNIT
UNITE AVANT GAUCHE
DE SURFACE SUPERIEURE

ID JUMPER

RIGHT REAR SURFACE UNIT
UNITE ARRIERE DROIT
DE SURFACE SUPERIEURE

LEFT REAR SURFACE UNIT
UNITE ARRIERE GAUCHE
DE SURFACE SUPERIEURE

GENERATOR BOARD 2
PLAQUE DU
GÉNÉRATEUR

GENERATOR BOARD 1
PLAQUE DU GÉNÉRATEUR

FAN MTR.

TOROID

BC 3 & 4	
PIN #	VOLT.
1	5 VDC
2	DATA
3	GND

ELECTRONIC SURFACE
ELEMENT CONTROL
COMMANDE DES ELEMENTS
DE SURFACE ELECTRONIQUE

ELECTRONIC OVEN CONTROL
COMMANDE DE FOUR ELECTRONIQUE

ELECTRONIC SURFACE
ELEMENT CONTROL
COMMANDE DES ELEMENTS
DE SURFACE ELECTRONIQUE

BK
BRL
L1
L2 OUT
L2 IN

MACS 1 & 2	
PIN #	VOLT.
1	GND
2	DATA
3	5 VDC
4	13 VDC

COOLING FAN MOTOR
MOTEUR DE VENTILATEUR

DOOR SWITCH
INTERRUPTER DE PORTE

LOCK MOTOR
MOTEUR DE VERROUILLAGE

* OVEN LAMP
LUMIERE DE FOUR

TEMPERATURE PROBE
SONDE DE TEMPERATURE

BROIL ELEMENT
ELEMENT DE GRIL

CONVECTION FAN MOTOR
MOTEUR DE CONVECTION

BAKE ELEMENT
ELEMENT DE CUISSON

TERMINAL BLOCK
BLOC DE BORNES

* POWER CORD
CORDON D'ALIMENTATION

WIRE	AWG	TEMP°C	UL STYLE
13	22	105	1007/1569
12	22	150	10109
11	18	105	1015
10	16	200	3122
9	18	200	3122
8	20	200	3122
7	12	150	3321
6	14	150	3321
5	18	150	3321
4	20	150	3321
3	14	105	1015
2	16	105	1015
1	20	105	1015

NOTES:
1. COMPONENTS WITH * DO NOT APPEAR ON ALL MODELS.

NOTES:
1. LES ITEMS POURVUS D'NUN * NE SONT PAS COMPRIS DANS TOUS LES MODELES.

WARNING / AVERTISSEMENT

DISCONNECT POWER BEFORE SERVICING
DEBRANCHEZ L' APPAREL DE
L' ALIMENTATION ELECTRIQUE AVANT
DE FAIRE TOUT SERVICE D' ENTRETIEN

TRACER WIRE: WIRE COLOR NOTED FIRST, STRIPE NEXT.
EXAMPLE: G/Y-8
GREEN WIRE WITH YELLOW STRIPE.

LEGENDE DE FILAGE: LA COULEUR DU FIL EN PREMIER. SUIVIE DE CELLE DE TOUTE BANDE.
EXEMPLE: G/Y-8
FIL VERT AVEC BANDE JAUNE.

COLOR CODE / CODE DES COULEURS			
BK	BLACK / NOIR	P	
BL	BLUE / BLEU	PR	PURPLE / POURPRC
BR	BROWN / BRUN	R	RED / ROUGE
C	COPPER / CUIVRE	T	TAN / BRUN CLAIR
G	GREEN / VERT	V	VIOLET
GY	GRAY / GRIS	W	WHITE / BLANC
O	ORANGE	Y	YELLOW / JAUNE

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