

SERVICE DATA SHEET

Electric Range with ES 540 Electronic Oven Control

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.

- Before servicing or moving an appliance remove power cord from electrical outlet, trip circuit breaker to OFF, or remove fuse.
- Never interfere with the proper installation of any safety device.
- 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.**
- 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

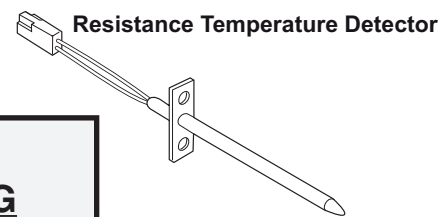
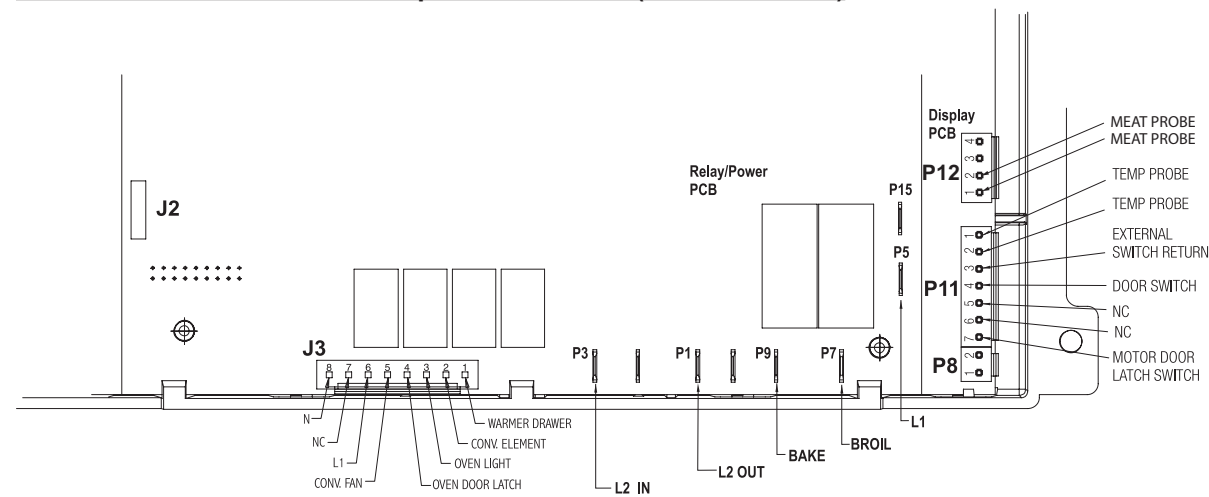
Set the electronic oven control for normal baking at 350°F. Obtain an average oven temperature after a minimum of 5 cycles. Press **Stop** keypad to end Bake mode.

Temperature Adjustment

- While in a non-cooking mode, press and hold the **Bake** key pad for 6 seconds.
- The current calibration offset (temperature adjustment) should appear in the temperature display.
- Use the number key pads (0-9) to enter the desired amount of adjustment (up to 35°F).
- Press the **Self Clean** keypad to change the sign of the adjustment to a (-) if necessary. A positive adjustment will not display a sign.
- Once the desired adjustment (-35° to 35° F) has been entered, press the **Start** keypad to accept the change or the **Cancel** keypad to reject the change.

Note: Changing calibration affects all Baking modes. The adjustments made will not change the self-cleaning temperature.

Electronic Oven Control & Jumper Connections (EOC Rear View)



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

Electronic Oven Control Fault Descriptions		
Fault Code	Likely Failure Condition/Cause	Suggested Corrective Action
F10	Runaway temperature. Oven heats when no cook cycle is programmed.	<p>If Oven is cold:</p> <ol style="list-style-type: none"> If fault code is present with cold oven test oven temperature sensor probe circuit resistance. Use RTD scale found in the tech sheet. Replace probe or repair wiring connections if defective. If temperature sensor probe circuit is good but fault code remains when oven is cold replace the EOC. <p>If Oven is overheating:</p> <ol style="list-style-type: none"> 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 is properly installed in the oven cavity. 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.	<ol style="list-style-type: none"> Reset power supply to range - Disconnect power, wait 30 seconds and reapply power. Check/reseat ribbon harness connections between touch panel and EOC. Test keyboard circuits. Replace touch panel if defective. If keyboard circuits check good replace the EOC.
F12	EOC Internal software error or failure.	Disconnect power, wait 30 seconds and reapply power. If fault returns upon power-up, replace EOC.
F13		
F14	Membrane switch tail missing or not connected	<ol style="list-style-type: none"> Check/reseat connections between membrane switch, display boards and EOC. Replace the membrane control panel assembly. Replace the EOC.
F20	Communication failure between EOC & ESEC system	<ol style="list-style-type: none"> Test harness/connections between P6 (EOC) and P7 (UIB). If harness checks O.K., failure can be caused by faulty UIB or EOC
F30	Open oven sensor probe circuit.	<ol style="list-style-type: none"> (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.
F31	Shorted oven sensor probe circuit.	<ol style="list-style-type: none"> (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.
F90-F95	Door lock motor or latch circuit failure.	<p>If lock motor runs:</p> <ol style="list-style-type: none"> Test continuity of wiring between EOC and lock switch on lock motor assy. Repair if needed. Advance motor until cam depresses the plunger on lock motor switch. Test continuity of switch contacts. If switch is open replace lock motor assembly. If motor runs and switch contacts and wiring harness test good, replace the EOC. <p>If lock motor does not run:</p> <ol style="list-style-type: none"> Test continuity of lock motor windings. Replace lock motor assembly if windings are open. Test lock motor operation by using a test cord to apply voltage. If motor does not operate replace lock motor assy. If motor runs with test cord check continuity of wire harness to lock motor terminals. If harness is good replace the EOC.

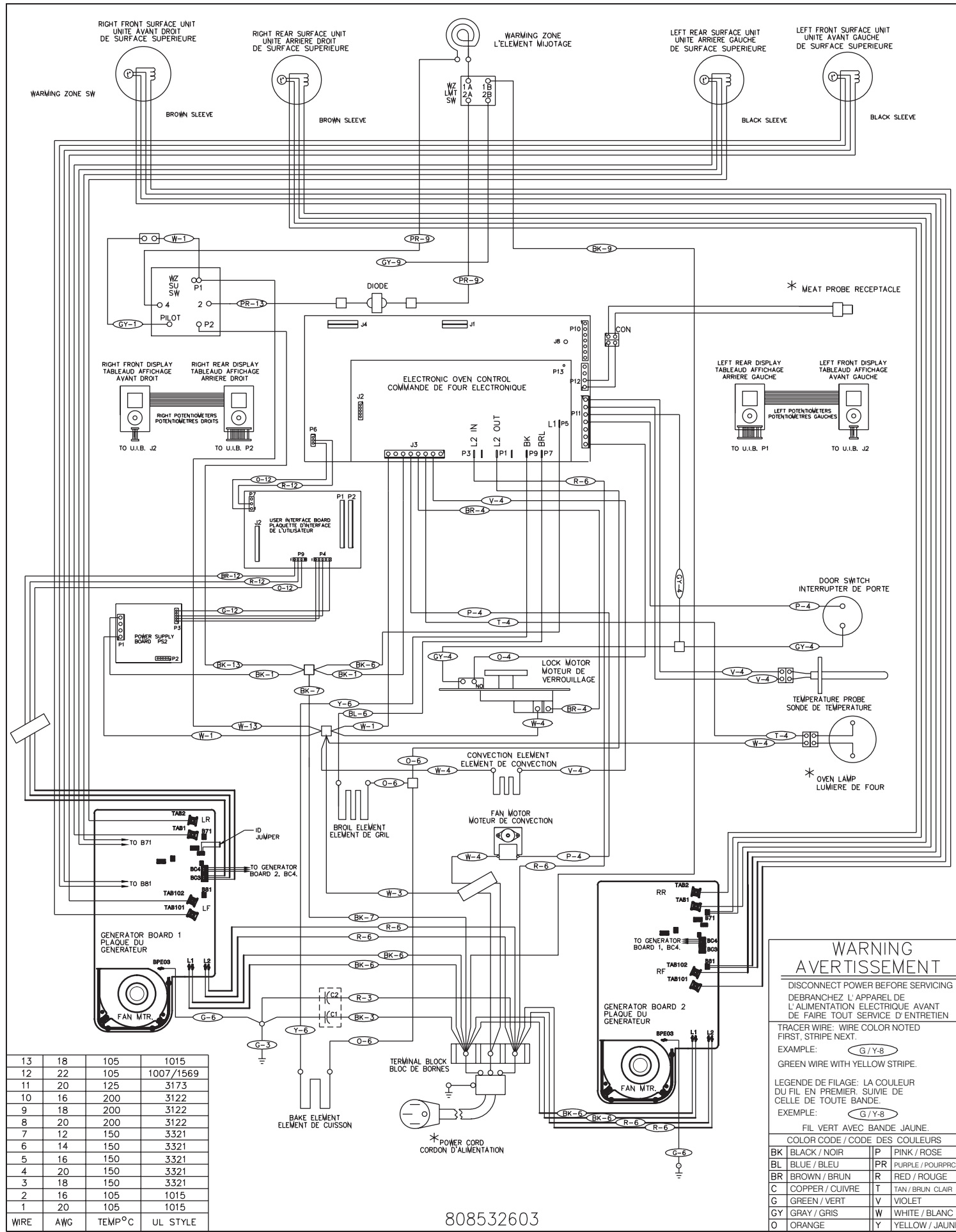
Circuit Analysis Matrix

	EOC Relays - ES535-540							
	L1 to Bake	L1 to Broil	L1 to Motor Door Latch	L1 to Convec Bake Fan	L1 to Convec Heating Element	L2 In to L2 Out	L1 to Oven Lamps	Door Switch Contacts COM-NO
Bake/Time Bake	X♦	X*		X†	X†	X		
Convec Bake	X♦	X*		X	X	X		
Broil		X				X		
Clean	X♦	X*				X		
Unlocked								
Locking			X					
Locked								
Unlocking			X					
Door Open							X	O
Door Closed							O	X
Oven Lamps ON							X	

NOTE: X=Circuit Contacts Closed O=Circuit Contacts Open *=Alternates with Bake Element †=During Preheat ♦=Cycles as Needed

IMPORTANT
DO NOT REMOVE THIS BAG
OR DESTROY THE CONTENTS
WIRING DIAGRAMS AND SERVICE
INFORMATION ENCLOSED
REPLACE CONTENTS IN BAG

General Troubleshooting Diagram



WIRE	AWG	TEMP °C	UL STYLE
13	18	105	1015
12	22	105	1007/1569
11	20	125	3173
10	16	200	3122
9	18	200	3122
8	20	200	3122
7	12	150	3321
6	14	150	3321
5	16	150	3321
4	20	150	3321
3	18	150	3321
2	16	105	1015
1	20	105	1015

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**WARNING
AVERTISSEMENT**

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

TRACER WIRE: WIRE COLOR NOTED FIRST, STRIPE NEXT.
EXAMPLE: (G/Y-B)

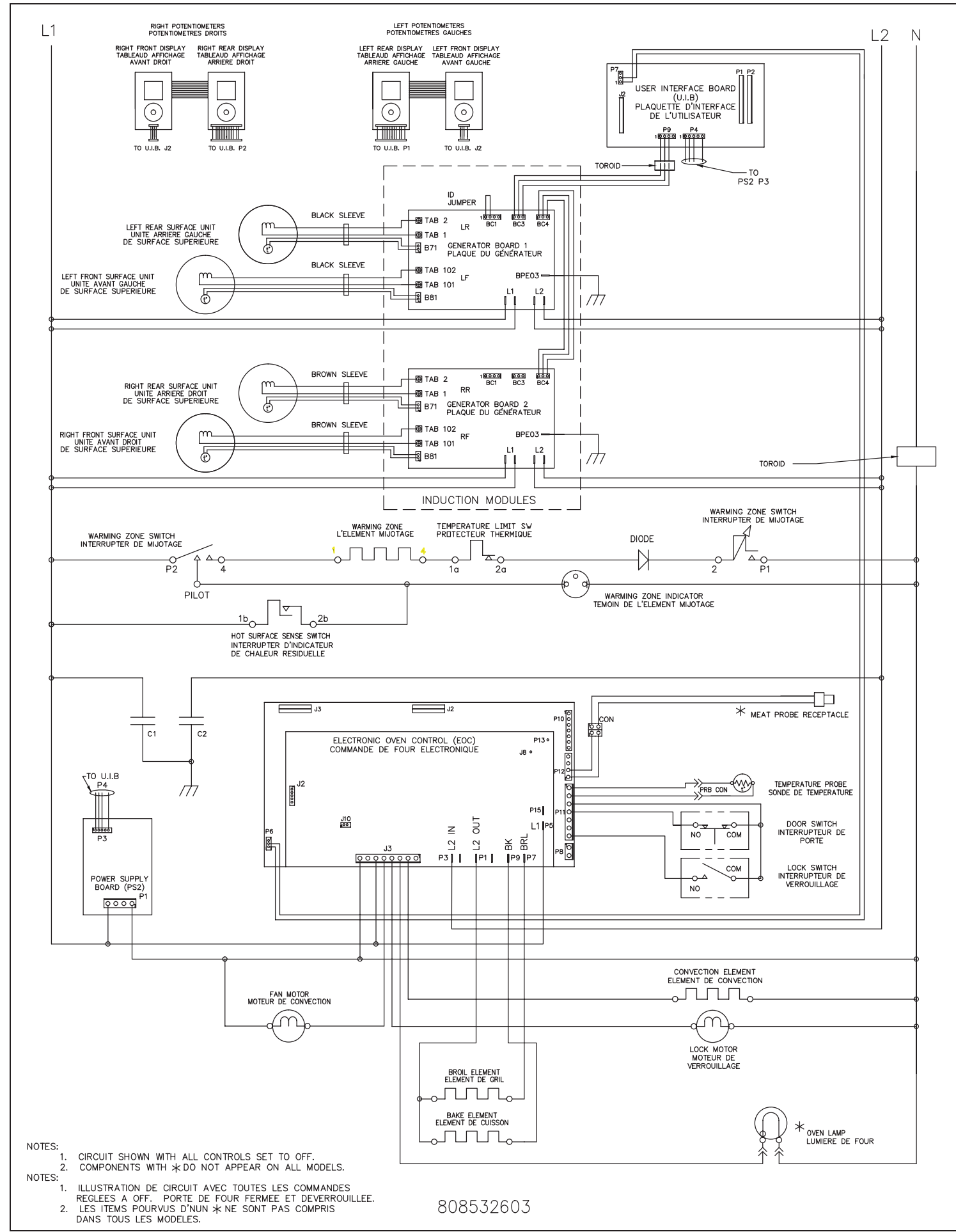
GREEN WIRE WITH YELLOW STRIPE.

LEGENDE DE FILAGE: LA COULEUR DU FIL EN PREMIER, SUIVIE DE CELLE DE TOUTE BANDE.
EXAMPLE: (G/Y-B)

FIL VERT AVEC BANDE JAUNE.

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

General Troubleshooting Schematic



- 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'UN * NE SONT PAS COMPRIS DANS TOUS LES MODELES.

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SERVICE DATA SHEET

Electric Ranges with ESEC20 and Induction Smoothtop

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 - All safety grounds (both internal and external) are correctly and securely reassembled.

Electronic Surface Element Control (ESEC)

This range is equipped with an Electronic Surface Element Control (ESEC), which precisely controls the smoothtop elements at multiple settings. The warmer zone is not controlled by the ESEC. For the user, the elements are operated by pushing in and turning the knobs to the desired settings. The control settings are shown in 2-digit displays above each knob.

Hot Surface display message (HE) - If any of the induction elements are hot, the hot surface message "HE" will display and remain ON until the cooktop cools.

ESEC lockout feature (-) - The electronic oven control's self-clean and Cooktop Lockout features will not operate when a surface element is ON. Conversely, the surface elements controlled by the ESEC will not operate when an oven control self-clean or Cooktop Lockout mode is active. When the oven control is in a self-clean or Cooktop Lockout mode, "--" will appear in the ESEC displays to signify that the surface heating elements are locked out.

ESEC system components

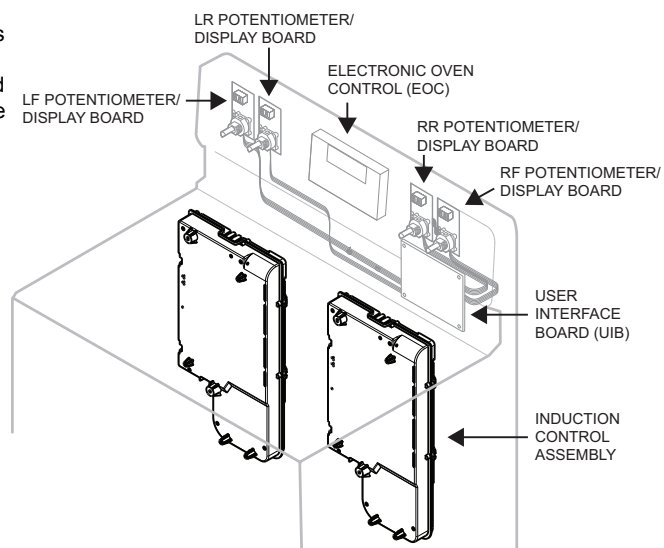
The ESEC system consists of the following components:

UIB or User Interface Board - this circuit board is mounted with screws and stand-offs in the backguard.

Potentiometer display boards - push-to-turn controls and cooktop displays for each element and connections to the UIB.

ESEC harness connects the ESEC system components and communicates with the EOC (Electronic Oven Control).

Induction control assembly - circuit boards in plastic housings mounted on the range back side, on two brackets with four screws.



Displayed Power Level	Power Level %
Lo	3.0
1.5	4.25
2.0	5.5
2.5	7.5
3.0	10.5
3.5	13.0
4.0	15.5
4.5	18.0
5.0	21.0
5.5	25.0
6.0	31.0
6.5	38.0
7.0	45.0
7.5	50.0
8.0	54.0
8.5	59.0
9.0	64.0
9.5	80.0
Hi	100
Pb	125-141

Notes on replacing parts

Replacing an induction control assembly*

When replacing an induction control assembly on the back of the range, do not over-tighten the 2 screws that secure each Control Assembly to the range or the screws that secure the rear wire shield to the Control Assembly. Over-tightening the screws can damage the plastic housings holding the circuit boards.

Replacing an induction element

Whenever replacing any induction element use only the screws supplied with the range to secure the element to the mounting panel. Never use any other type of screw to attach the induction element.

Replacing the potentiometer/display boards*

Each of the four push-to-turn controls (potentiometer/display boards) are mounted to the control panel with a hex nut and lockwasher. When replacing a potentiometer, do not over-tighten the hex nut - a torque of only 8 in-lb is required to properly mount the potentiometer.

NOTE: Both potentiometer/display boards must be replaced in pairs (LH or RH sides) at the same time.

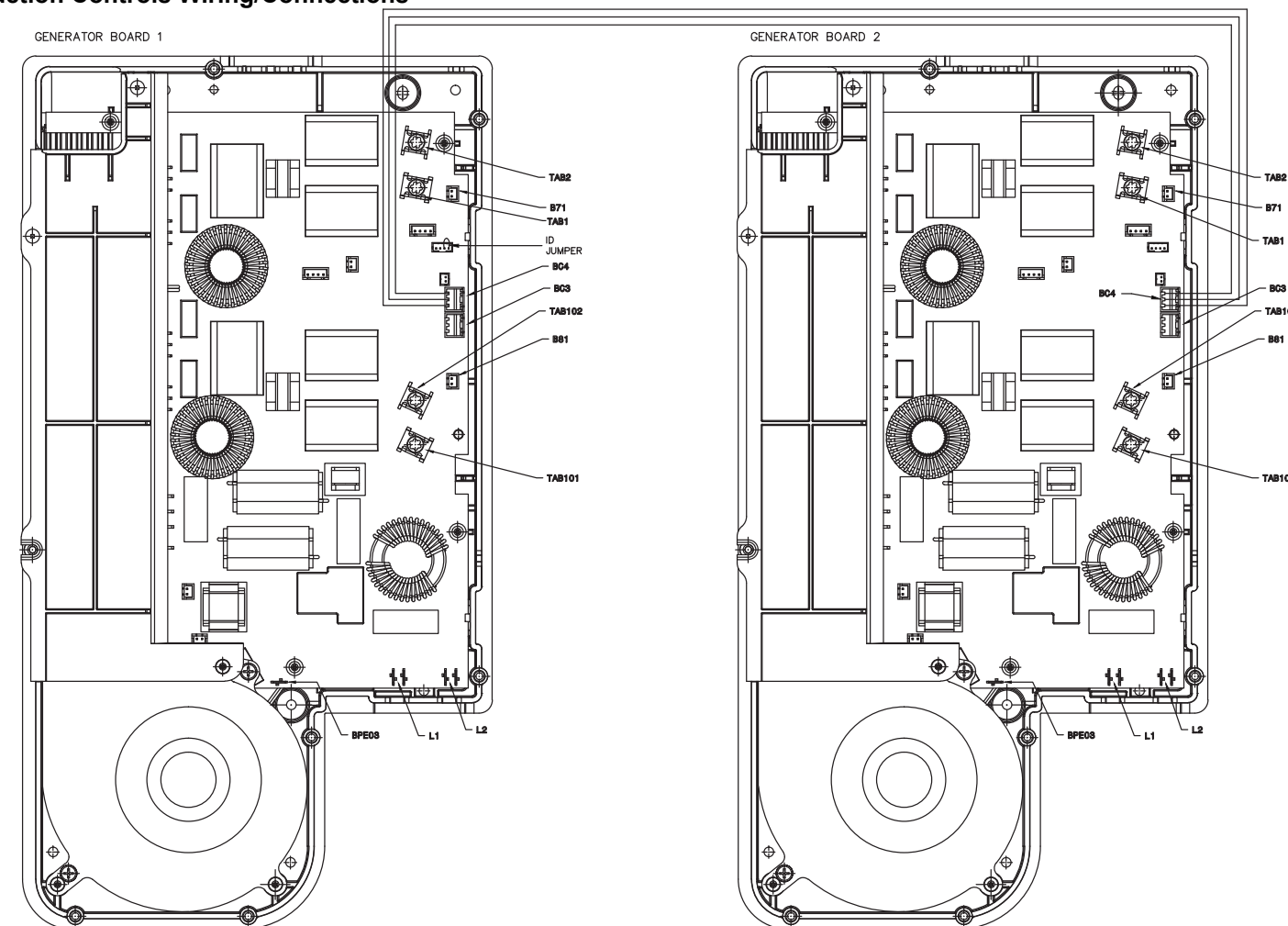
Replacing the UIB*

When replacing the UIB in the backguard, DO NOT over tighten the screws that UIB. To secure the UIB use **NO MORE THAN 20 in. - lbs.** Over tightening these screws can possibly damage the UIB board.

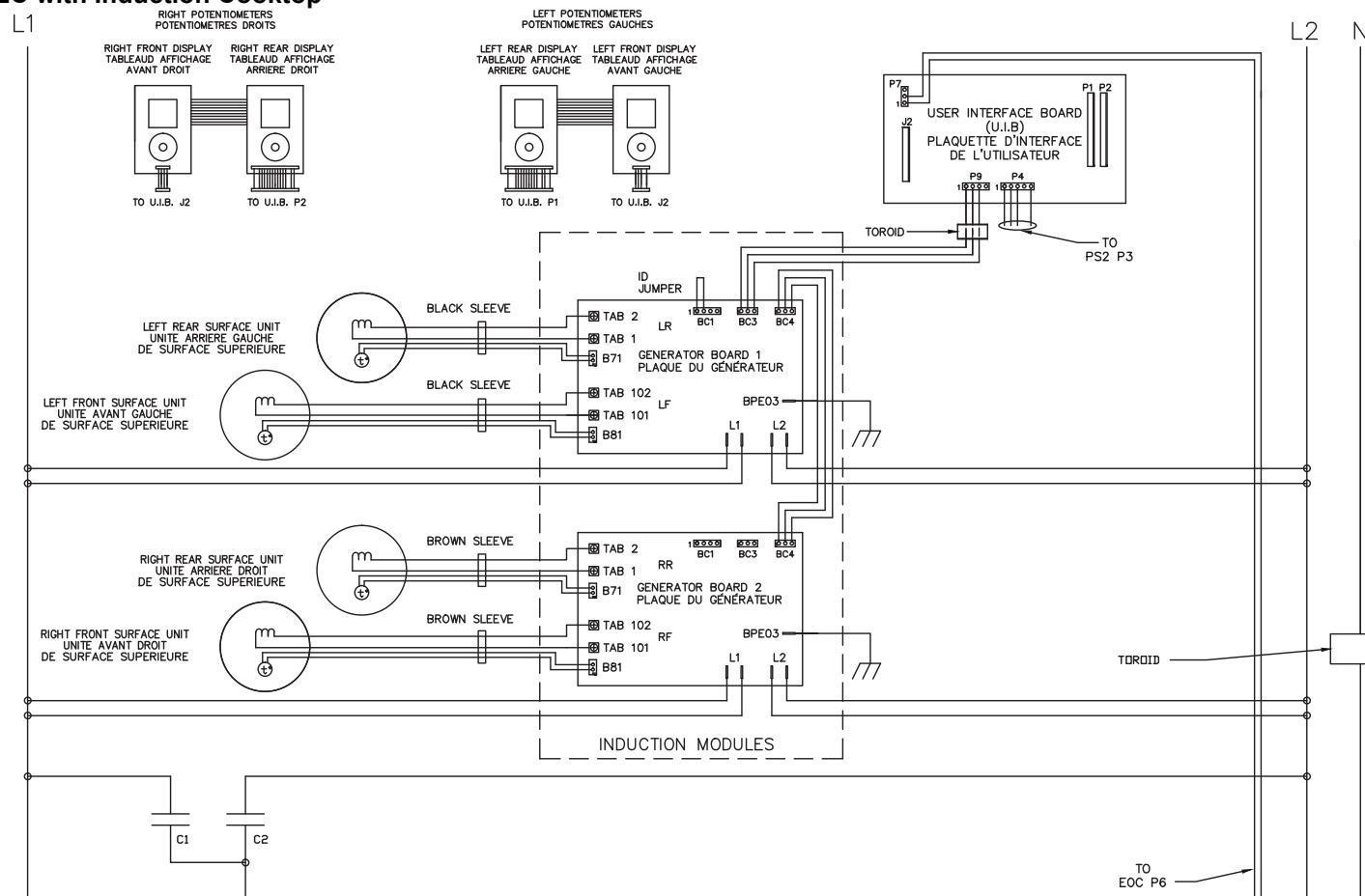
* **Please note:** Electronic boards are very sensitive to static electricity. Static electricity can permanently damage electronic boards. Before handling these parts, be sure to drain static electricity from your body by properly grounding yourself.

Induction Controls Wiring/Connections

SCHEMATIC DIAGRAM



ESEC with Induction Cooktop



IMPORTANT
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Electronic Surface Element Control System (ESEC) Error Code Descriptions

When a specific error condition occurs in the ESEC system a code will be displayed in the electronic control panel. The error codes are displayed as "EO" in the left display followed by the code number in the right display. For each Error Code there is a listing of the likely cause or failure condition, as well as suggested corrective actions to be taken. Always reset the power by disconnecting or turning off the power supply for 30 seconds to see if the failure condition will clear. If the error code returns perform the steps one at a time in the order listed below to correct the specific failure condition. **NOTE: If multiple changing error codes are displayed check for disconnected wires or cables.**

Tech Sheet Abbreviations and Terminology

EOC = Electronic Oven Control	ESEC = Electronic Surface Element Control	TST = Touch Sensor Technology (touch control glass panel)
UIB = User Interface Board	TSEC = Touch Sensor Electronic Control	RTD = Resistance Temperature Device. (Temp Probe or Temp Sensor)
VSC = Variable Speed Control	PS = Power Supply board (PS1, PS2, etc.)	TCO = Thermal Cut Out also "Thermo Disc" or "Thermal Limiter"

Error Code	Likely Cause or Failure Condition	Suggested Corrective Action
11	Stuck key	1. Verify nothing is touching the potentiometer/display boards. Disconnect Power, wait 30 seconds and repower. If fault returns: 2. Check/reseat connectors and harnesses between ESEC-UIB and potentiometer/display boards; 3. Replace ESEC-UIB; 4. Replace potentiometer/display boards.
13	UIB Internal Failure	1. Replace UIB.
14	Potentiometer/display boards connector	1. Disconnect Power, wait 30 seconds and repower. If fault returns: 2. Check/reseat connectors and harnesses between ESEC-UIB and the potentiometer/display boards; 3. Replace ESEC-UIB; 4. Replace potentiometer/display boards.
15	ESEC self-test failure	1. Verify cables and connections on the ESEC UIB are not damaged and are properly installed. If fault returns: 2. Check/reseat harnesses between ESEC-UIB and the potentiometer/display boards; 3. Replace ESEC-UIB; 4. Replace ESEC power supply board.
20/27	Communication failure between generator board and UIB - left cooking zones	1. Verify communication harness between left and right side generator circuit board is not damaged and is properly installed; 2. Verify AC power harness is not damaged and is properly installed; 3. Verify ID1 jumper is properly installed; 4. Replace the UIB; 5. Replace the left side generator board.
21/28	Communication failure between generator board and UIB - right cooking zones	1. Verify communication harness between left and right side generator circuit board is not damaged and is properly installed; 2. Verify AC power harness is not damaged and is properly installed; 3. Verify ID1 jumper is properly installed; 4. Replace the UIB; 5. Replace the right side generator board.
23	Communication failure between both generator boards and UIB	1. Verify AC power supply to the appliance is 240V; 2. Verify communication harness between the ESEC UIB and the left side generator board is not damaged and is properly installed; 3. Replace the UIB; 4. Replace both communication harnesses; 5. Replace the left side generator board.
30, 35	AC input too high AC input too low	1. Verify AC power supply to the appliance is 240V; 2. Verify cables and connections on the left side generator circuit board are not damaged and are properly installed; 3. Replace the left side generator circuit board.
31, 32, 34, 36, 37, 40	Internal generator error	1. Verify cables and connections on the left side of the generator circuit board are not damaged and are properly installed; 2. Replace the left side generator circuit board.
33	Cooling fan blocked	1. Verify cables and connections on the left side generator circuit board are not damaged and are properly installed; 2. Verify there is nothing touching or interfering with the fan on the left side generator circuit board; 3. Replace the left side generator circuit board.
38	Cooling fan not connected	1. Verify fan is properly connected; 2. Replace the left side generator circuit board.
39	Configuration error	1. Replace the ESEC UIB; 2. Replace both generator circuit boards.
41	Induction sensor (coils) defect	1. Verify if the left side inductor (coils) are connected properly (measure approx. 0 Ohm); 2. Replace left side generator circuit board if 0 Ohm, otherwise replace the inductor (coil).
42, 43	General pot detection Pot detection sensor failure	1. Verify pans are the proper material (magnet sticks to bottom of pan); 2. Verify pan is in the proper condition (not warped, rusty); 3. Verify the pan is the proper size and placed correctly on the cooking zone. 4. Replace left side generator circuit board.
44	Generator circuit board temperature warning	1. Ensure cooktop is not being used with a dry pan at a high temperature setting; 2. Verify that installation follows the installation instructions, check ventilation; 3. Allow zone to cool before continuing to cook.
45	Generator circuit board temperature alarm	1. Ensure cooktop is not being used with a dry pan at a high temperature setting; 2. Verify that installation follows the installation instructions, check ventilation; 3. Replace left side generator circuit board.
51 52 55 56	LF temp sensor failure LR temp sensor failure RF temp sensor failure RR temp sensor failure	1. Verify induction temperature sensor is properly connected (see wiring diagram); 2. Verify the inductor temperature sensor is properly installed and not damaged (measure approx. 100K Ohm at room temperature); 3. Replace applicable generator circuit board, left or right (see wiring diagram).
63 64 67 68	LF temp sensor too hot LR temp sensor too hot RF temp sensor too hot RR temp sensor too hot	1. Ensure cooktop is not being used with a dry pan at a high temperature setting; 2. Verify the inductor temperature sensor is properly installed and not damaged (measure approx. 100K Ohm at room temperature); 3. Replace applicable generator circuit board, left or right (see wiring diagram).
70 75	AC input too high AC input too low	1. Verify AC power supply to the appliance is 240V; 2. Verify cables and connections on right side generator circuit board are not damaged and are properly installed; 3. Replace the right side generator circuit board.

Error Code	Likely Cause or Failure Condition	Suggested Corrective Action
71, 72, 74, 76, 77, 80	Internal generator error	1. Verify cables and connections on the right side generator circuit board are not damaged and are properly installed; 2. Replace the right side generator circuit board.
73	Cooling fan blocked	1. Verify cables and connections on the right side generator circuit board are not damaged and are properly installed; 2. Verify there is nothing touching or interfering with the fan on the right side generator circuit board; 3. Replace the right side generator circuit board.
78	Cooling fan not connected	1. Verify fan is properly connected; 2. Replace the right side generator circuit board.
81	Induction sensor (coils) defect	1. Verify if the right side inductor (coils) are connected properly (measure approx. 0 Ohm); 2. Replace right side generator circuit board if 0 Ohm, otherwise replace the inductor (coil).
82 83	General pot detection Pot detection sensor failure	1. Verify pans are the proper material (magnet sticks to bottom of pan); 2. Verify pan is in the proper condition (not warped, rusty); 3. Verify the pan is the proper size and placed correctly on the cooking zone. 4. Replace right side generator circuit board.
84	Generator circuit board temperature warning	1. Ensure cooktop is not being used with a dry pan at a high temperature setting; 2. Verify installation follows the installation instructions, check ventilation; 3. Allow zone to cool before continuing to cook.
85	Generator circuit board temperature alarm	1. Ensure cooktop is not being used with a dry pan at a high temperature setting; 2. Verify installation follows the installation instructions, check ventilation; 3. Replace right side generator circuit board.

Additional Failure Conditions

Symptom or Failure	Control Display	Possible Cause or Condition	Suggested Corrective Action		
Pan does not heat up.	Normal operation	Pan too small for proper pan detection and only works with low power.	Use larger pan or this pan on a smaller cooking zone. Refer to owners guide for proper pan selection.		
	Flashing power level Display and pan does not heat.	Pan not detected.	Check whether the pots or pans are suitable for induction. Refer to owners guide for proper pan selection.		
		Induction surface unit not correctly connected or surface unit open.	Check the surface unit wire terminal connections. Ensure that they are properly connected and tightened. Test continuity of element (should be less than 1 ohm).		
		Distance between surface unit and glass ceramic too large.	Check whether the surface unit is properly positioned and touching the glass cooktop surface.		
		Individual knobs/controls cannot be used or cannot always be used.	None	1. Test cables and connections. 2. Potentiometer/display boards defective. 3. UIB defective.	1. Follow instructions for proper use of controls. 2. Verify harness connections between UIB, and potentiometer/display boards. Replace if defective or damaged. 3. Replace potentiometer/display boards 4. Replace UIB.
		Cooking power too low or shuts down prematurely.	None	Fluids spilled or object lying on control panel keypads.	Clean up spills or remove objects. Restart cooktop in normal manner.
Normal Operation	Ventilation slots obstructed.		Clear vent openings.		
	Unsuitable pots (bottom bent).		Follow owner's guide for proper pan selection.		
		Distance between surface unit and glass ceramic too large.	Check whether the surface unit is properly positioned and touching the glass cooktop surface.		
		Fan does not start.	1. With two cook zones operating, verify that the fan runs at a slow speed. If fans do not run, check for foreign objects or stuck fan motor. 2. Test continuity of motor windings. Replace motor if open. 3. Replace induction control assembly.		
Steady "HE" in display when cooking zone is cold and switched off.	"HE"	Temperature sensor defect.	1. Test surface unit RTD approx. 1K ohms at room temperature. Replace surface unit if resistance is not correct. 2. Replace induction control assembly.		
Cooktop does not initialize/operate.	Blank No display No beep	UIB not powered.	Verify installation and harness connections to UIB.		
		Defective UIB power supply (PS2).	1. Check for 120 volts AC at the power supply board connector P1 between pins 1 and 4. Test harness if voltage is not present. 2. Test for 8 volts DC output at the power supply board connector P3 between Pins 1 and 2. Replace power supply board if voltage is not correct. 3. Test for 16 volts DC at output at power supply board connector P3 between Pins 1 and 3. Replace power supply board if voltage is not correct.		
		Defective UIB.	Replace UIB.		