

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.

SAFESERVICING 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

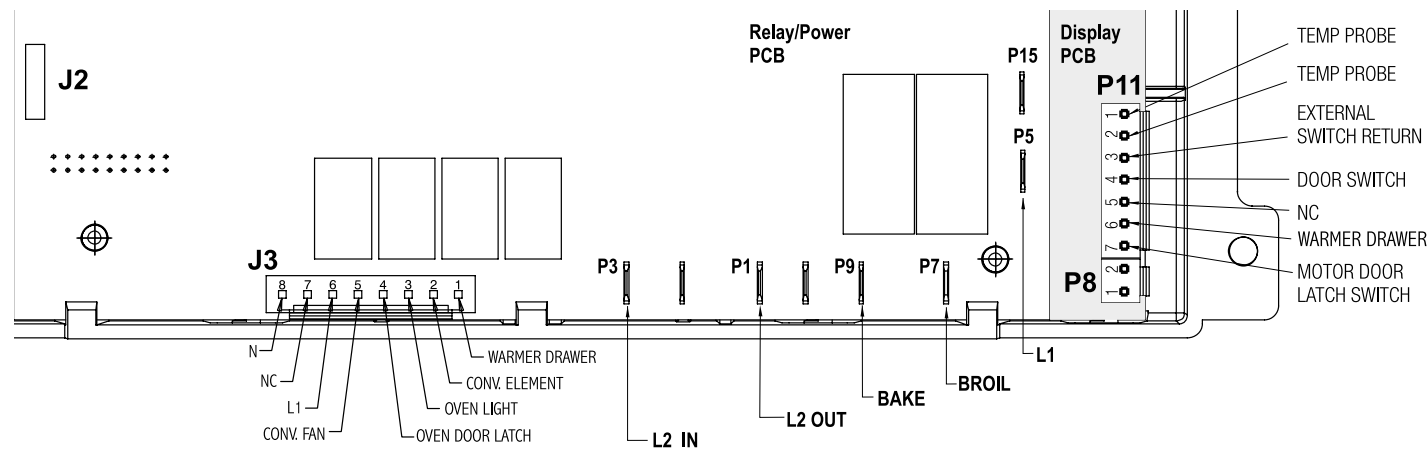
Set the electronic oven control for normal baking at 350°F. Obtain an average oven temperature after a minimum of 5 cycles. Press **Stop** keypad to end Bake mode.

Temperature Adjustment

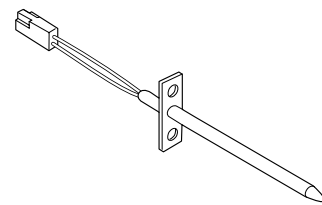
- While in a non-cooking mode, press and hold the **Bake** key pad for 6 seconds.
- The current calibration offset (temperature adjustment) should appear in the temperature display.
- Use the number key pads (0-9) to enter the desired amount of adjustment (up to 35°F).
- Press the **Self Clean** keypad 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)



Resistance Temperature Detector (RTD)



Resistance Temperature Detector Scale

RTD SCALE	
Temperature (°F)	Resistance (ohms)
32 ± 1.9	1000 ± 4.0
75 ± 2.5	1091 ± 5.3
250 ± 4.4	1453 ± 8.9
350 ± 5.4	1654 ± 10.8
450 ± 6.9	1852 ± 13.5
550 ± 8.2	2047 ± 15.8
650 ± 9.6	2237 ± 18.5
900 ± 13.6	2697 ± 24.4

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 is 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/reset ribbon harness connections between touch panel and EOC. 3. Test keyboard circuits. Replace touch panel if defective. 4. If keyboard circuits check good replace the EOC.
F12 F13	EOC Internal software error or failure.	Disconnect power, wait 30 seconds and reapply power. If fault returns upon power-up, replace EOC.
F14	Membrane switch tail missing or not connected	1. Check/reseat connections between membrane switch, display boards and EOC. 2. Replace the membrane control panel assembly. 3. Replace the EOC.
F20	Communication failure between EOC & ESEC system	1. Test harness/connections between P6 (EOC) and P7 (UIB). 2. If harness checks O.K., failure can be caused by faulty UIB or EOC
F30	Open 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.
F31	Shorted oven sensor probe circuit.	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.
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.

Circuit Analysis Matrix

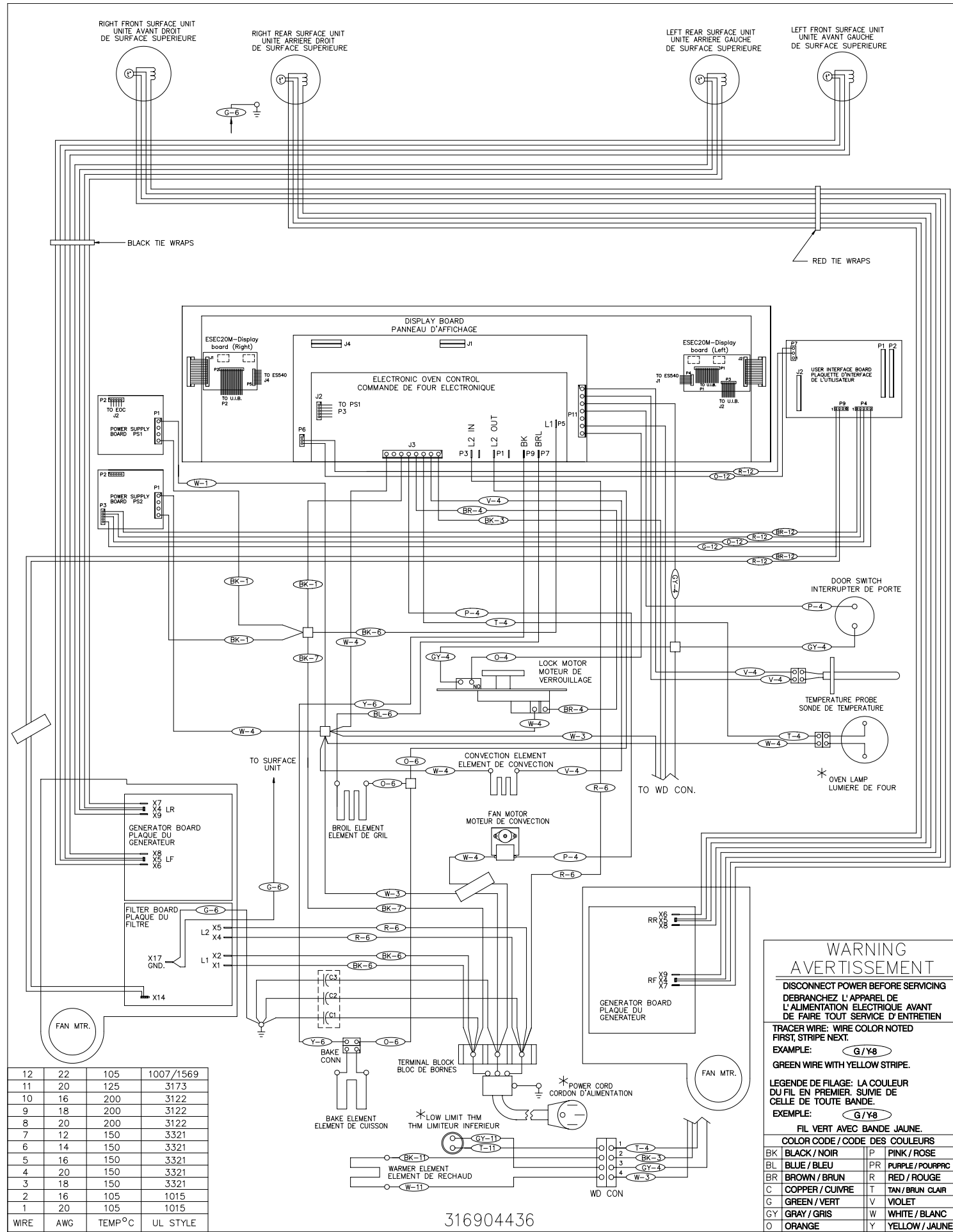
EOC Relays - ES535-540

	L1 to Bake	L1 to Broil	L1 to Motor Door Latch	L1 to Conv/Speed Bake Fan	L1 to Conv Heating Element	L2 In to L2 Out	L1 to Warming Drawer	L1 to Oven Lamps	Door Switch Contacts COM-NO
Bake/Time Bake	X ⁰	X*		X [†]	X [†]	X			
Conv/Speed Bake	X ⁰	X*		X	X	X			
Broil		X				X			
Clean	X ⁰	X*				X			
Unlocked									
Locking			X						
Locked									
Unlocking			X						
Door Open								X	O
Door Closed								O	X
Oven Lamps ON								X	
Warming Drawer							X ⁰		

NOTE: X = Circuit Contacts Closed O = Circuit Contacts Open * = Alternates with Bake Element † = During Preheat 0 = Cycles As Needed

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WIRING DIAGRAMS AND SERVICE
INFORMATION ENCLOSED
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General Troubleshooting Diagram



**WARNING
AVERTISSEMENT**

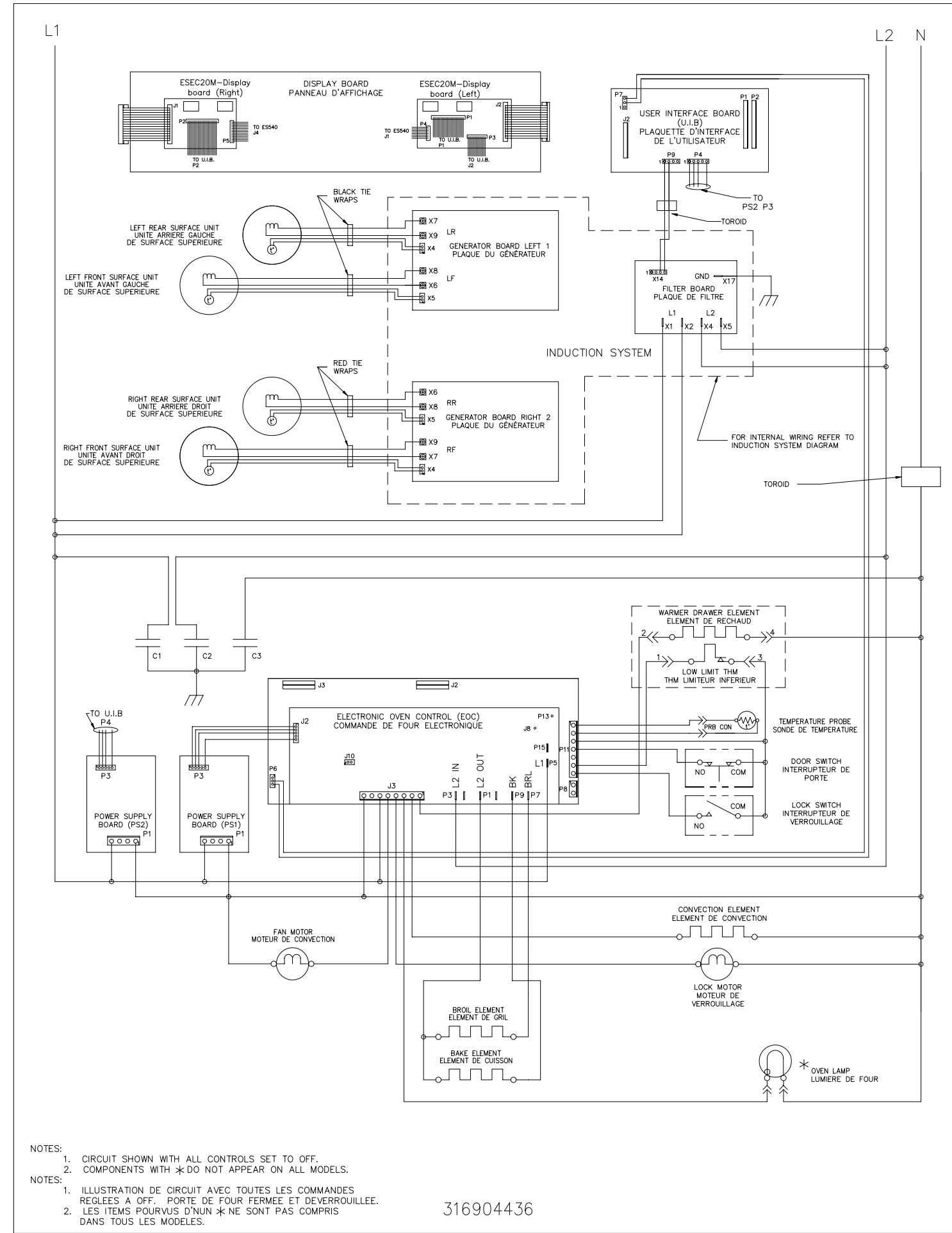
DISCONNECT POWER BEFORE SERVICING
DEBRANCHEZ L'APPAREIL DE L'ALIMENTATION ELECTRIQUE AVANT DE FAIRE TOUT SERVICE D'ENTRETIEN

TRACER WIRE: WIRE COLOR NOTED FIRST, STRIPE NEXT.
EXAMPLE: G/Y8
GREEN WIRE WITH YELLOW STRIPE.

LEGENDE DE FILAGE: LA COULEUR DU FIL EN PREMIER, SUIVIE DE CELLE DE TOUTE BANDE.
EXAMPLE: G/Y8
FIL VERT AVEC BANDE JAUNE.

COLOR CODE / CODE DES COULEURS			
BK	BLACK / NOIR	P	PINK / ROSE
BL	BLUE / BLEU	PR	PURPLE / POURPRE
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

General Troubleshooting Schematic



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 cooking elements at multiple settings. For the user, the elements are operated by pressing the touch pads located on the control panel for the desired settings. The control settings are shown in 2-digit displays.

Hot Surface indicator lights - If any of the surface elements are hot, the "Hot Surface" indicator lights will glow and remain ON until the cooktop becomes sufficiently cool.

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, **L** will appear in the oven control display to signify that the surface heating elements are locked out.

ESEC system components

The ESEC system consists of the following components:

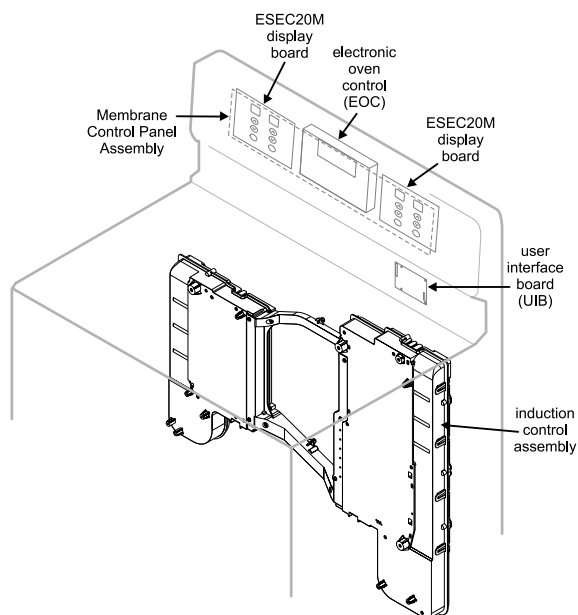
UIB or User Interface Board. This circuit board is mounted with screws and stand-offs in the backguard.

Membrane control panel assembly - User interface that include keypads and LEDs.

ESEC20M display boards - cooktop displays and connections between membrane control panel assembly, UIB & EOC (Electronic Oven Control).

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
1.2	3.5
1.4	4.0
1.6	4.5
1.8	5.0
2.0	5.5
2.2	6.0
2.4	7.0
2.6	8.0
2.8	9.0
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	49.0
8.0	54.0
8.5	59.0
9.0	64.0
9.5	70.0
Hi	100
PB	123-133

Notes on replacing parts

Replacing the induction control assembly - When replacing the induction control assembly on the back of the range, do not over-tighten the 4 screws that secure the 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

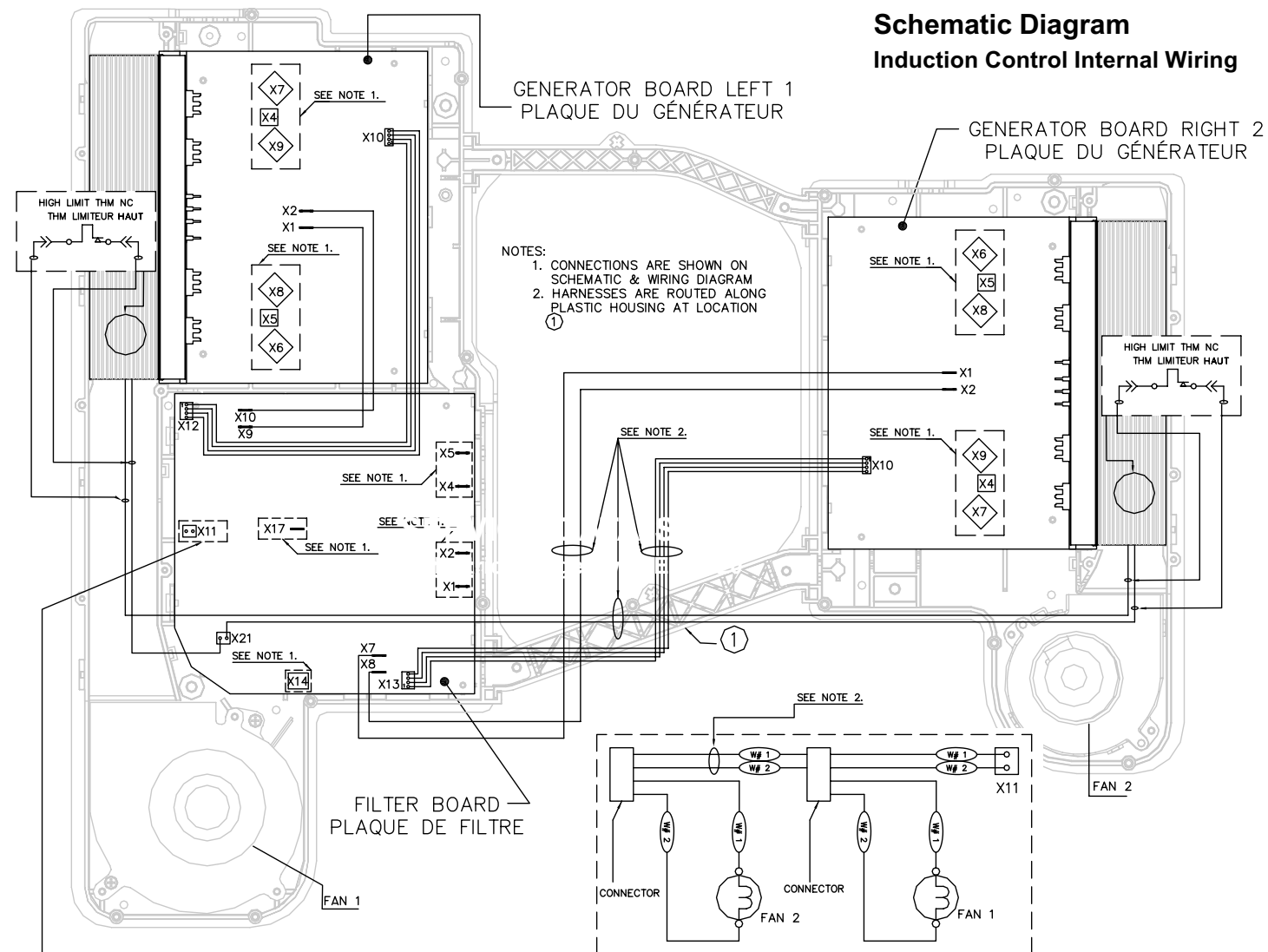
Whenever replacing any induction element use only the nonmagnetic shoulder screws supplied with the range to secure the element to the mounting panel. Never use any other type of screw to attach the induction element or damage will occur.

Replacing the membrane control panel assembly - The membrane control panel assembly includes several parts and must be replaced as an assembly.

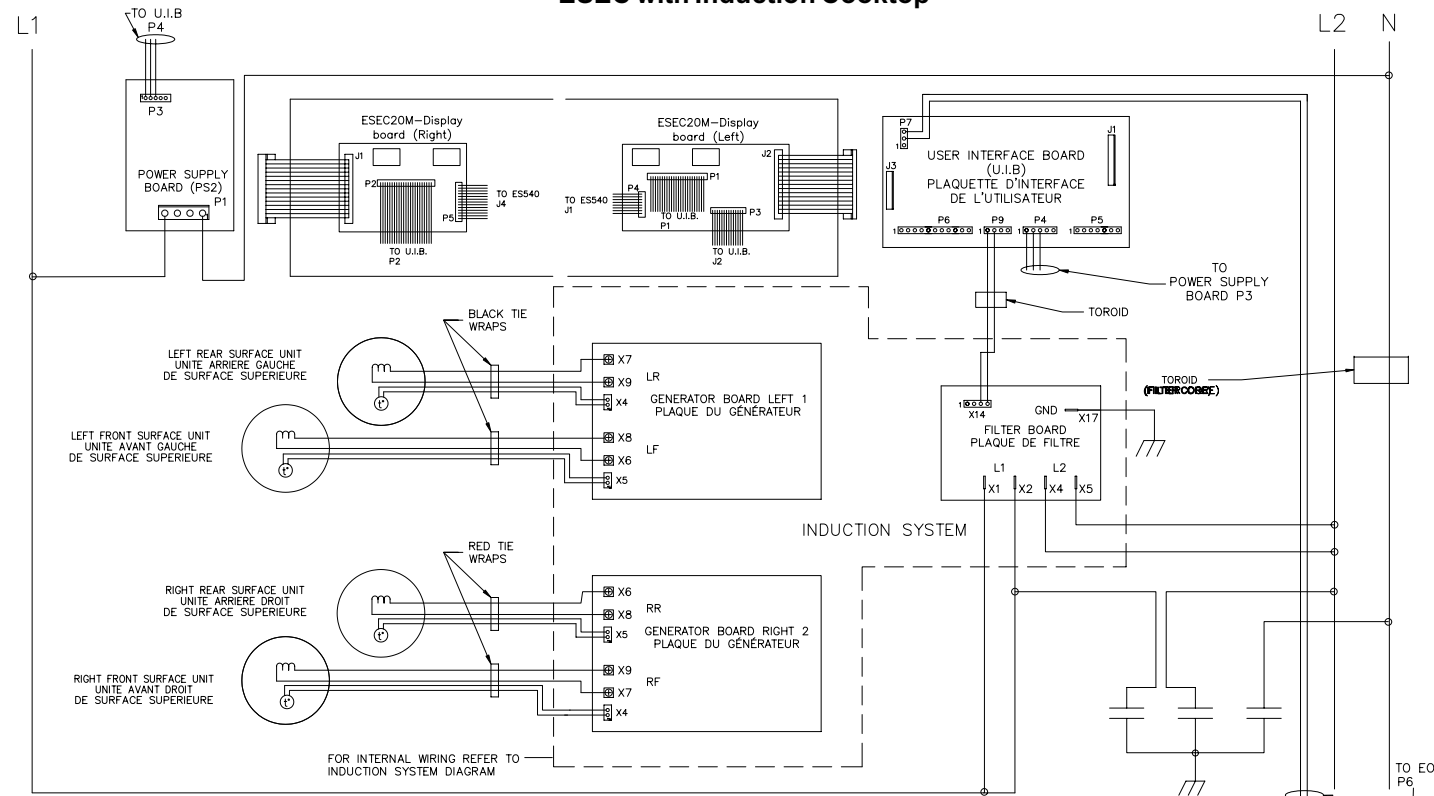
Replacing the UIB* - When replacing the UIB in the backguard, DO NOT over tighten the screws that secure the UIB. To secure the UIB use **NO MORE THAN 20 in. - lbs.** Over tightening these screws can possibly damage the UIB board.

* **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.

Schematic Diagram Induction Control Internal Wiring



ESEC with Induction Cooktop



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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 UIB = User Interface Board VSC = Variable Speed Control	ESEC = Electronic Surface Element Control TSEC = Touch Sensor Electronic Control PS = Power Supply board (PS1 , PS2, etc.)	TST = Touch Sensor Technology (touch control glass panel) RTD = Resistance Temperature Device. (Temp Probe or Temp Sensor) TCO = Thermal Cut Out also "Thermo Disc" or "Thermal Limiter"
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Error Code	Likely Cause or Failure Condition	Suggested Corrective Action
11	Stuck keypad	1. Verify that glass touch panel (TST) is dry and nothing is touching panel. 2. Check / reseal the ribbon harness connectors between the TST panel and UIB. 3. Replace the UIB. 4. Replace the TST panel.
13	UIB internal failure	1. Replace UIB.
14	Touch panel ribbon connector tail	1. Check / reseal the ribbon harness connectors between the TST panel and UIB. 2. Replace the UIB. 3. Replace the TST panel.
15	ESEC self test failure	1. Check continuity / reseal the harness connections to the UIB. 2. Replace the UIB.
21	Communication failure between the filter board and UIB	1. Test the harness between UIB connector P9 and filter board connector X14. 2. Replace the UIB. 3. Replace the filter board.
30 or 70 35 or 75	AC Input voltage too high AC Input voltage too high	1. Verify chassis ground wire connection to terminal X17 on filter board & to chassis ground. 2. Test for approximately 240 volts AC at filter board terminals X1 - X4 & X2 - X5. 3. If voltage is correct (240 volts AC ± 10%) replace filter board.
31	Synchronization failure in left side cook zones generator board	1. Verify all cable and harness connections to the left side cook zones generator board. 2. Replace the generator board.
32 or 33	Power supply defect - left side cook zones	1. Test all cables & connections on filter board. 2. Replace the filter board. 3. Replace the generator board for the left side cook zones.
34	Internal communication failure - generator board left side cook zones	1. Check cable between filter board X12 connector and X10 connector on left side cook zones. 2. Replace left side cook zones generator board. 3. Replace filter board.
36	Communication error (left cook zones)	1. Test / reseal communication harness between UIB connector P9 and filter board X14 connector. Replace if defective. 2. Test / reseal communication harness between filter board connector X12 & left side cook zones generator board connector X10. Replace if defective. 3. Replace filter board. 4. Replace left side cook zones generator board. 5. Replace UIB.
37	Heat sink temp sensor break (left cook zones)	1. Replace left side cook zones generator board.
39	Configuration mismatch between the UIB and the filter board. (Can occur when a filter board is replaced).	1. Make sure the UIB is connected correctly. 2. Press and hold both the right front and right rear UP arrow keys until the ESEC displays change to "88". Then press and hold the left front and left rear UP arrow keys until the beep sounds and the configuration starts. The display segments will scroll top to bottom until the configuration is complete. 3. Replace filter board.
51 52 54 55	<u>Surface unit temp sensor break</u> Left front Left rear Right rear Right front	1. Verify surface unit temperature sensor is correctly connected to the appropriate generator board connector (refer to wiring diagram). 2. Replace surface unit if temperature sensor resistor value is not approximately 1000 ohms (blue wires) at room temperature. 3. Replace associated generator board.
61 62 64 65	<u>Surface unit sensor too hot</u> Left front Left rear Right rear Right front	1. Verify cooktop ventilation is correct (airway & fans). 2. Verify integrity of the white insulation material on induction element. 3. Verify surface unit temperature sensor is correctly connected to the appropriate generator board connector (refer to wiring diagram). 4. Replace surface unit if temperature sensor resistor value is not approximately 1000 ohms (blue wires) at room temperature. 5. Replace associated generator board.

Error Code	Likely Cause or Failure Condition	Suggested Corrective Action
71	Synchronization failure - Right side cooking zones generator board	1. Verify all cable and harness connections to the right side cook zones Generator Board. 2. Replace the generator board.
72 or 73	Power supply defect - right side cooking zones	1. Test all cables & connections on filter board. 2. Replace the filter board. 3. Replace the generator board for the right side cook zones.
74	Internal communication failure - right side cooking zones	1. Check cable between the filter board X12 connector and the X10 connector on right side cook zones generator board. 2. Replace right side cook zones generator board. 3. Replace filter board.
76	Communication error (right cooking zones)	1. Test / reseal communication harness between UIB connector P9 and filter board X14 connector. Replace if defective. 2. Test / reseal communication harness between filter board connector X12 & right side cook zones generator board connector X10. Replace if defective. 3. Replace filter board. 4. Replace right side cook zones generator board. 5. Replace UIB.
77	Heat sink temp sensor break (right cooking zones)	1. Replace right side cook zones generator 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 buttons cannot be used or cannot always be used.	None	1. Test cables & connections. 2. Touch control defective. 3. UIB defective.	1. Follow instructions for proper use of touch controls. 2. Verify harness going between UIB J1 connector and touch panel J1 connector (14 pins). Replace if defective or damaged. 3. Verify there is no mechanical interference close to the touch panel (wires, utensils, etc.). 4. Replace touch panel. 5. Replace UIB.
		Fluids spilled or object lying on control panel keypads.	Clean up spills or remove objects. Restart cooktop in normal manner.
Cooking power too low or shuts down prematurely.	None	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 fans run 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 filter board.
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 generator board.
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.