

SERVICE DATA SHEET - Electric Ranges with ES 630A Electronic Oven Control and Induction Cooktop

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.**

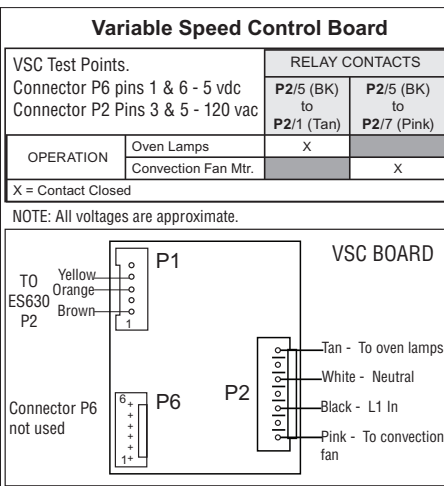
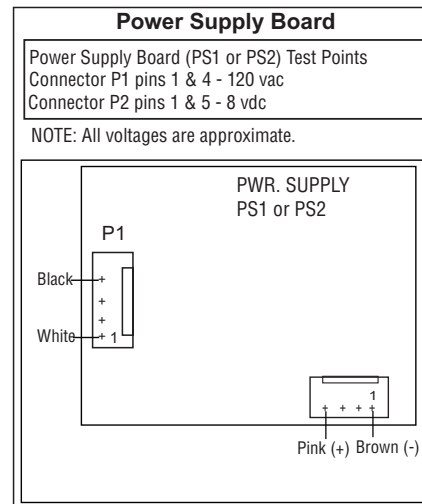
4. Prior to returning the product to service, ensure that:
 - All electric connections are correct and secure.
 - All electrical leads are properly dressed and secured away from sharp edges, high-temperature components, and moving parts.
 - All uninsulated electrical terminals, connectors, heaters, etc. are adequately spaced away from all metal parts and panels.
 - All safety grounds (both internal and external) are correctly and securely reassembled.

Oven Calibration/ Temperature adjustment - See Use & Care Guide.

Note: Changing calibration affects normal Bake mode. The adjustments made will not change the Self-Cleaning cycle temperature.

ES 610/615 Oven Relay Board Circuit Analysis Matrix						
Relay Contacts	P4 (R) to P2 (O)	P6 (BK) to P10 (Y)	P6 (BK) to P8 (BL)	P6 (BK) to P12 (Y/BK)	J4/3 (BK) to J4/5 (V)	J4/3 (BK) to J4/6 (BR)
Component	L2 Out Relay	Bake Element	Broil Element	Lower Oven Element	Convection Element	Door Lock Motor
Bake / Time Bake	X	X			P	
Convection Bake/Roast	X	X			X	
Broil			X			
Dehydrate	X	X			X	
Bread Proof					X	
Slow Cook	X	X				
Keep Warm (Upper Oven)	X	X				
Keep Warm (Lower Oven)				X		
Bake (Lower Oven) *				X		
Door Lock Motor Locking/Unlocking						X
Clean	X	X				

X = Contact Closed P = Contact closed during Pre-Heat only
*Some Models



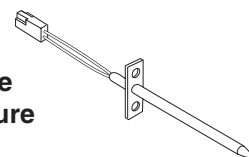
EOC Signal Voltage Test Matrix		
Test for 3.3 VDC (+/- .5 volts) between GND on EOC circuit board and the indicated connector pin when the specified function is activated.		
FREESTANDING ELECTRIC and DUAL FUEL MODELS		
FUNCTION / RELAY	EOC CONNECTOR / PIN#	RELAY BOARD CONNECTOR / PIN #
Lower Oven or Warmer Drawer / K3	P9 / Pin 7	J5 / Pin 7
L2 Out / K2	P11 / Pin 4	J7 / Pin 4
Broil / K4	P11 / Pin 1	J7 / Pin 1
Bake / K6	P11 / Pin 2	J7 / Pin 2
Convection Element / K10	P11 / Pin 5	J7 / Pin 5
Lock Motor / K12	P11 / Pin 6	J7 / Pin 6

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

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p/n 316904419 (1008)

Resistance Temperature Detector



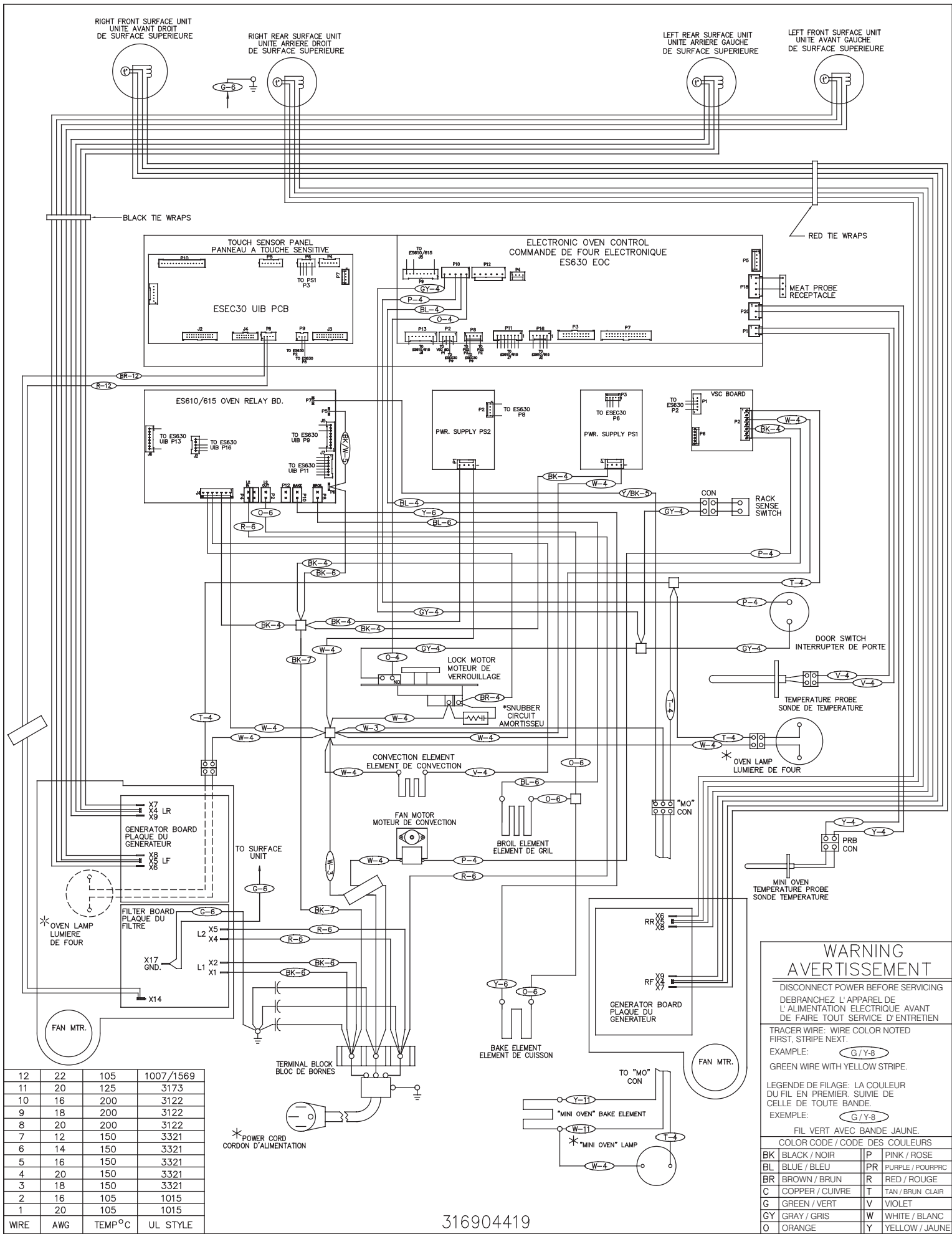
Tech Sheet Abbreviations and Terminology

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"

ELECTRONIC OVEN CONTROL (EOC) FAULT CODE DESCRIPTIONS

Fault Code	Symptom	Suggested Corrective Action
F10	Runaway temperature. Oven heats when no cook cycle is programmed.	1. Check RTD Sensor Probe using the RTD scale found in the tech sheet. Replace if defective. 2. If oven is overheating disconnect power from the range and unplug connector P1 from power supply board. Reapply power to the range. If oven continues to heat when the power is reapplied, replace the oven relay board. 3. Replace the EOC. NOTE: Severe overheating may require the entire oven to be replaced should damage be extensive.
F11	Shorted keypad.	1. Reset power supply to range to see if failure code will clear. 2. Test ribbon harness and connectors between the TST panel and EOC. Replace if defective. 3. Replace the TST panel. 4. Replace the EOC.
F13	Internal software error in EOC.	Disconnect power, wait 30 seconds and reapply power. If fault returns upon power-up, replace EOC.
F14	TST Display tail missing or not connected.	1. Test ribbon harness and connections between TST panel and EOC. Replace if defective 2. Replace the TST panel. 3. Replace the EOC.
F15	Signal loss between oven relay board & EOC.	1. Test the harness and connections from EOC connector P16 to oven relay board J2. 2. Replace the oven relay board. 3. Replace the EOC.
F20	Communication failure between EOC & ESEC. (Electric models only)	1. Test wiring harness and connections between EOC connector P2 and ESEC 30 UIB P9. 2. Test wiring harness and connections between PS board 1 (P3) and ESEC 30 UIB connector P6. 3. Test for approximately 9 volts DC output from PS board 1 at ESEC 30 UIB connector P6, pins 1 & 2. If output voltage is incorrect test incoming power supply to PS board 1 at harness connector P1 pins 1 & 4. If incoming power is correct (120 VAC), replace PS board 1. If output voltage is correct replace ESEC 30 UIB. 4. Replace EOC.
F23 F25	Communication failure between VSC board and EOC.	1. Check harness and connections between VSC board and EOC. 2. Test for approximately 5 volts DC to VSC board at P6 connector pins 1 & 6. If voltage is correct replace VSC board. If voltage is incorrect replace EOC.
F30 F31	Open probe connection. Shorted Probe connection	1. (F30 or F31) Check resistance at room temperature & compare to RTD Sensor resistance chart. If resistance does not match the RTD chart replace RTD Sensor Probe. Check Sensor wiring harness between EOC & Sensor Probe connector. 2. (F30 or 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.
F90	Door lock motor latch failure	If latch motor does not run when clean cycle is selected: 1. Check to see if latch motor coil is open. If open, replace latch motor assembly. 2. Test for 120 volts to the terminals of the latch motor. If voltage is correct and motor does not run replace latch motor assembly. If voltage is not correct replace EOC. If latch motor runs when clean cycle is selected: 1. Check the wiring harness between EOC & latch motor switch. Repair or replace harness as needed. 2. Test operation of the switch contacts. Replace latch motor assembly if defective. 3. Check for binding of the latch cam, latch motor rod & latch motor cam. 4. If all situations above do not solve problem, replace EOC.

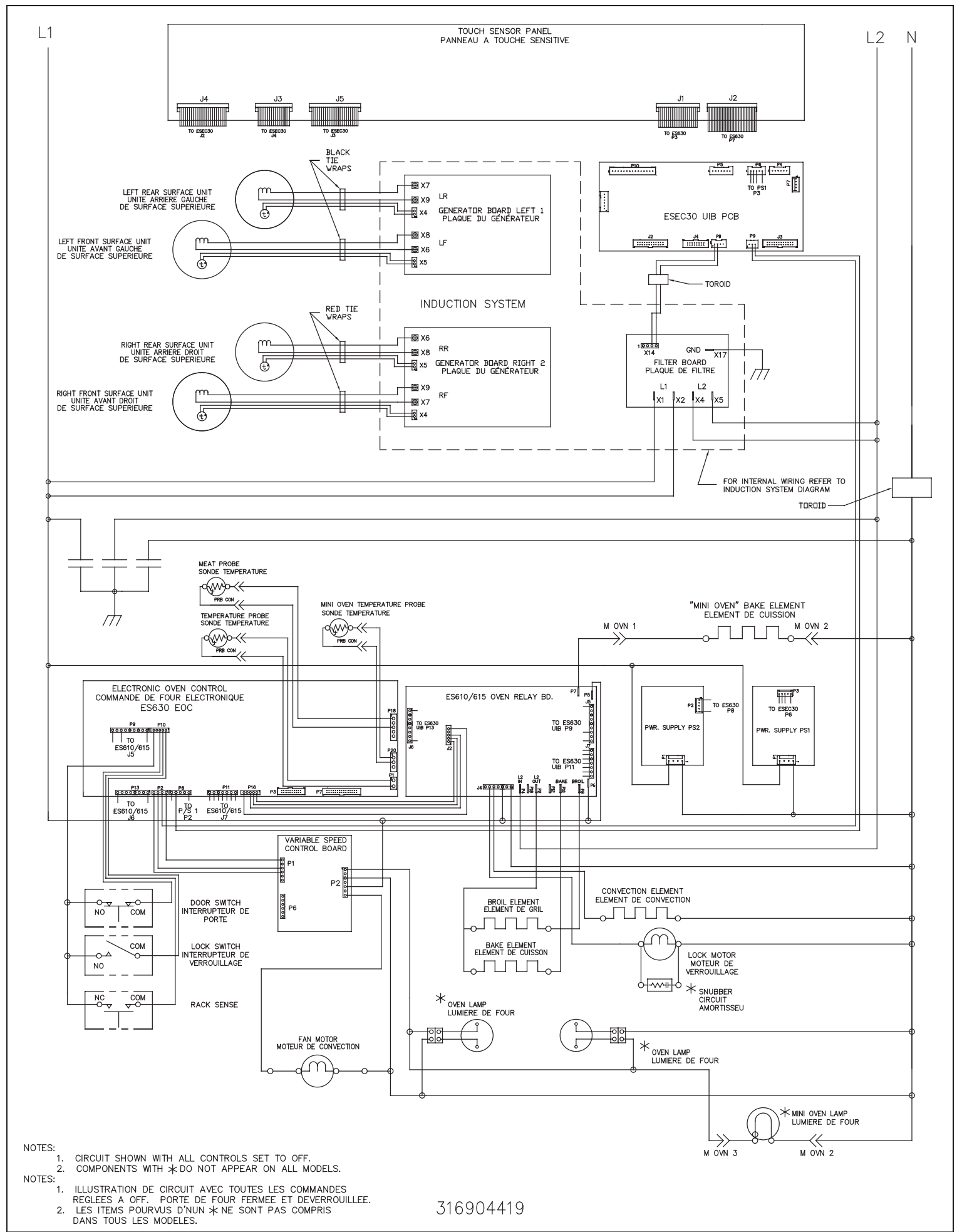
GENERAL TROUBLESHOOTING DIAGRAM



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
WIRE	AWG	TEMP°C	UL STYLE

316904419

GENERAL TROUBLESHOOTING SCHEMATIC



SERVICE DATA SHEET

Electric Ranges with ESEC30 and Induction Smoothtop

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- Prior to returning the product to service, ensure that:
 - All electric connections are correct and secure.
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 - 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.

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.

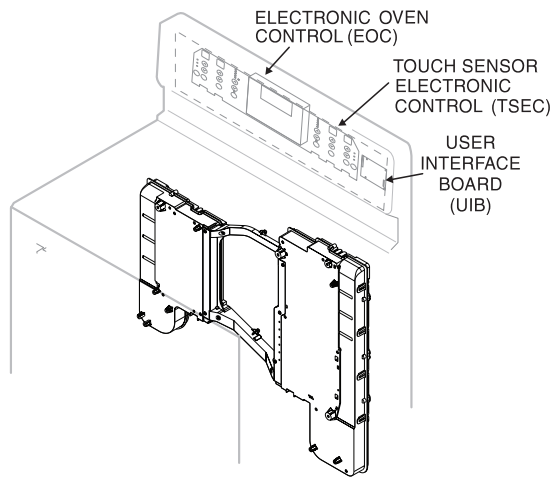
Hot surface window message - If any of the surface elements are hot, "HE" (the Hot Element window message) will turn on and remain ON until the cooktop becomes sufficiently cool.

ESEC Lockout Feature "-" - The electronic oven control's Clean and Lock 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 Clean or Control Lockout mode is active. When the oven control is in a Clean or Control Lockout mode, "-" will appear in the surface element displays to signify that the surface 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 4 screws in the backguard.
- TSEC** or Touch Sensor Electronic Control. The TSEC controls the touch pads for all surface element controls.
- 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 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
8.0	54.0
9.0	64.0
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

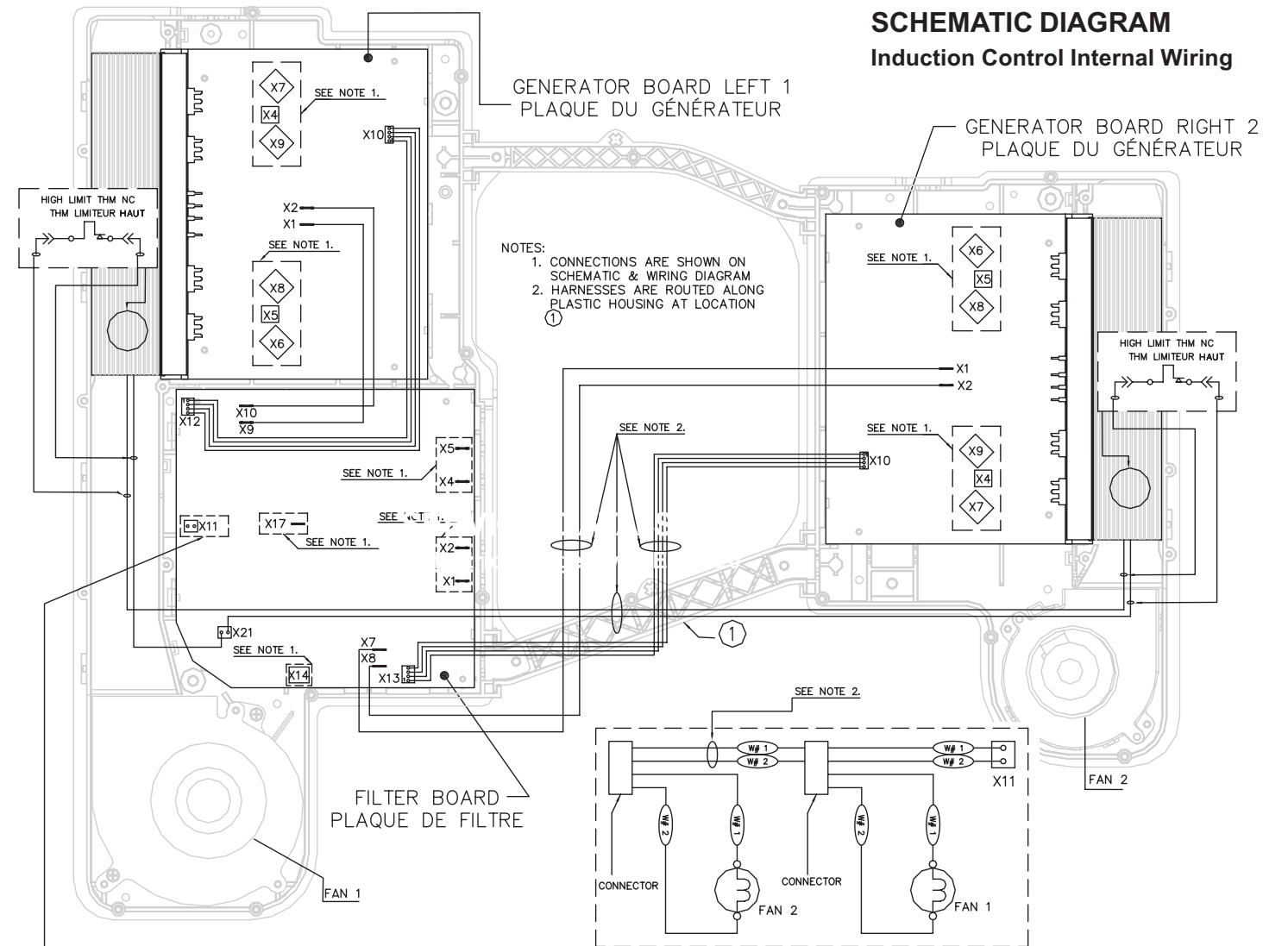
Whenever replacing any induction element use only the nonmagnetic shoulder screws supplied with the range to secure the element to the mounting panel. Never use any other type of screw to attach the induction element or damage will occur.

Replacing the TSEC – The Touch Sensor Electronic Control includes several parts and must be replaced as an assembly.

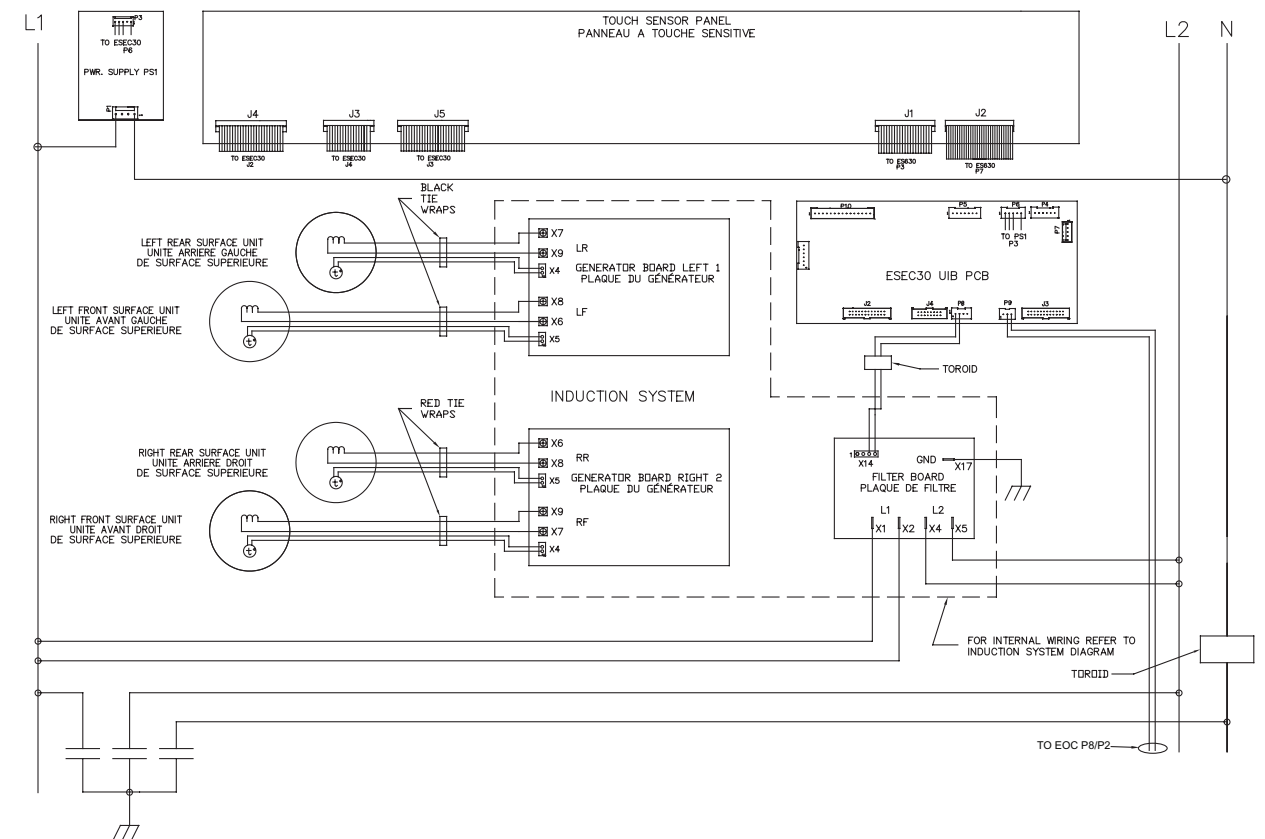
Replacing the UIB* – When replacing the User Interface Board located in the backguard, do not over-tighten the screws that secure the UIB. To secure the UIB use **NO MORE THAN 20 in. - lbs.** Over-tightening these screws can possibly damage the UIB board.

* 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 30 with Induction Cooktop



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ELECTRONIC SURFACE ELEMENT CONTROL SYSTEM (ESEC 30) ERROR CODE DESCRIPTIONS

When a specific error condition occurs in the ESEC system, the control will beep and usually display an error code. These error codes will appear in the two front element displays with "E" in the left display and the code number in the right display. For each Error Code or symptom 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.**

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Error Code/ Symptom	Likely Cause or Failure Condition	Suggested Corrective Action
Control Beeping No Error Codes	ESEC key display ribbon cable is disconnected or defective	<ol style="list-style-type: none"> 1. Check/reseat ribbon connection J3 on the ESEC 30 UIB to J5 on TST panel. 2. Test continuity of ribbon harness. Replace if defective. 3. Replace UIB. 4. Replace TST panel.
"E " Only	ESEC key display ribbon cable is disconnected or defective.	<ol style="list-style-type: none"> 1. Check/reseat ribbon connection J2 on the ESEC30 UIB to J4 on TST panel. 2. Test continuity of ribbon harness. Replace if defective. 3. Replace UIB. 4. Replace TST panel.
11	Shorted keypad.	<ol style="list-style-type: none"> 1. Reset power supply to range to see if failure code will clear. 2. Check/reseat ribbon harness and connectors between the TST panel and ESEC 30 UIB. Replace if defective. 3. Replace the TST panel. 4. Replace the UIB.
14	ESEC key read ribbon cable is disconnected or defective.	<ol style="list-style-type: none"> 1. Check/reseat ribbon connection J4 on the ESEC 30 UIB to J3 on TST panel. 2. Test continuity of ribbon harness. Replace if defective. 3. Replace UIB. 4. Replace TST panel.
21	Communication failure between the filter board and UIB	<ol style="list-style-type: none"> 1. Test the harness between UIB connector P8 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	<ol style="list-style-type: none"> 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 - left side cooking zones generator board	<ol style="list-style-type: none"> 1. Verify all cable and harness connections to the left side cooking zones generator board. 2. Replace the generator board.
32 or 33	Power supply defect - left side cooking zones	<ol style="list-style-type: none"> 1. Test all cables & connections on filter board. 2. Replace the filter board. 3. Replace the generator board for the left side cooking zones.
34	Internal communication failure - generator board, left side cooking zones	<ol style="list-style-type: none"> 1. Check cable between filter board X12 connector and X10 connector on left side cooking zones. 2. Replace left side cooking zones generator board. 3. Replace filter board.
36	Communication error (left cooking zones)	<ol style="list-style-type: none"> 1. Test / reseat communication harness between UIB connector P8 and filter board X14 connector. Replace if defective. 2. Test / reseat communication harness between filter board connector X12 & left side cooking zones generator board connector X10. Replace if defective. 3. Replace filter board. 4. Replace left side cooking zones generator board. 5. Replace UIB.
37	Heat sink temp sensor break (left cooking zones)	<ol style="list-style-type: none"> 1. Replace left side cooking zones generator board.
39	Configuration mismatch between the UIB and the filter board. (Can occur when a filter board is replaced).	<ol style="list-style-type: none"> 1. Make sure the UIB is connected correctly. 2. Press and hold both the right front and right rear ON/OFF keys until the ESEC displays change to "88". Then press and hold the left front and left rear ON/OFF 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	<ol style="list-style-type: none"> 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 (blue wires) at room temperature.	<ol style="list-style-type: none"> 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 5. Replace associated generator board.

Error Code	Likely Cause or Failure Condition	Suggested Corrective Action
71	Synchronization failure - Right side cooking zones generator board	<ol style="list-style-type: none"> 1. Verify all cable and harness connections to the right side cooking zones Generator Board. 2. Replace the generator board.
72 or 73	Power supply defect - right side cooking zones	<ol style="list-style-type: none"> 1. Test all cables & connections on filter board. 2. Replace the filter board. 3. Replace the generator board for the right side cooking zones.
74	Internal communication failure - generator board, right side cooking zones	<ol style="list-style-type: none"> 1. Check cable between the filter board X12 connector and the X10 connector on right side cooking zones generator board. 2. Replace right side cooking zones generator board. 3. Replace filter board.
76	Communication error (right cooking zones)	<ol style="list-style-type: none"> 1. Test / reseat communication harness between UIB connector P8 and filter board X14 connector. Replace if defective. 2. Test / reseat communication harness between filter board connector X12 & right side cooking zones generator board connector X10. Replace if defective. 3. Replace filter board. 4. Replace right side cooking zones generator board. 5. Replace UIB.
77	Heat sink temp sensor break (right cooking zones)	<ol style="list-style-type: none"> 1. Replace right side cooking 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	<ol style="list-style-type: none"> 1. Follow instructions for proper use of touch controls. 2. Verify harness going between UIB ribbon connectors and touch panel connectors. 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.
			1. Test cables & connections. 2. Touch control defective. 3. UIB defective.	
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.	
		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.	<ol style="list-style-type: none"> 1. With two surface units 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. <ol style="list-style-type: none"> 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 (PS1).	<ol style="list-style-type: none"> 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.	