SERVICE DATA SHEET

Electric Range with ES 540 Electronic Oven Control with Hybrid 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

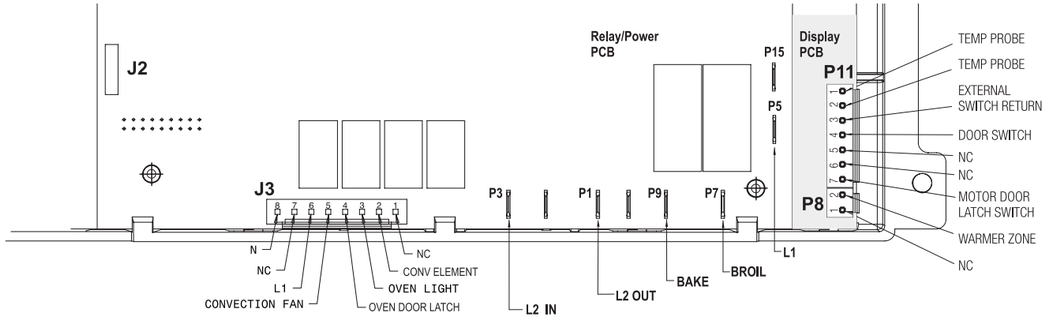
Set the electronic oven control for normal baking at 350°F. Obtain an average oven temperature after a minimum of 5 cycles. Press **Stop/Clear or Cancel** keypad to end Bake mode.

Temperature Adjustment

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

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

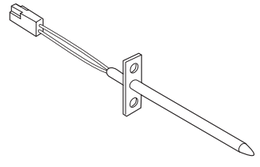
Electronic Oven Control & Jumper Connections (EOC Rear View)



Resistance Temperature Detector 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

Resistance Temperature Detector (RTD)



IMPORTANT

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WIRING DIAGRAMS AND SERVICE INFORMATION ENCLOSED

REPLACE CONTENTS IN BAG

p/n 316904423 (1001)

Electronic Oven Control Fault Code Descriptions

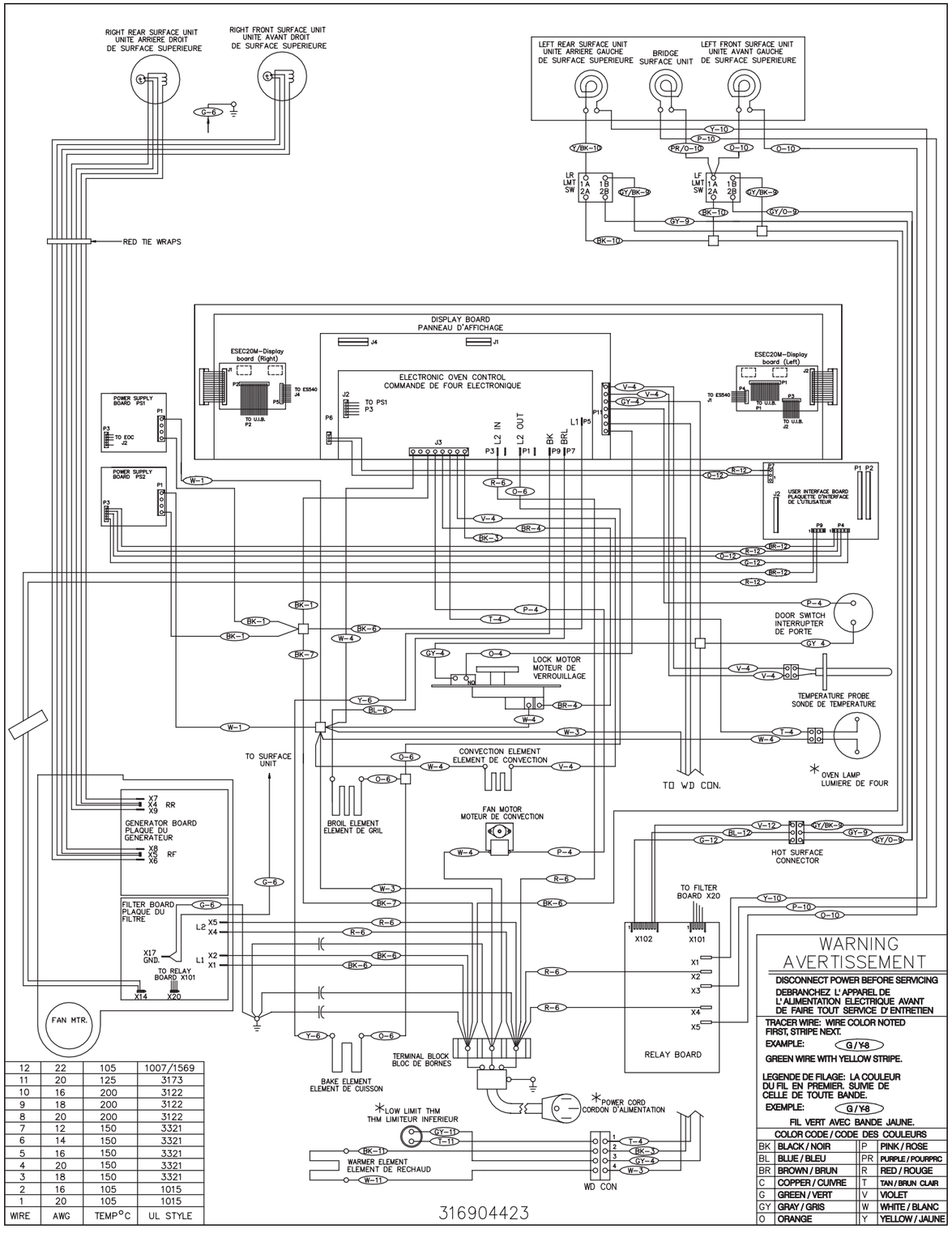
Fault Code	Likely failure condition/cause	Suggested Corrective Action
F10	Runaway temperature. Oven heats when no cook cycle is programmed.	**If Oven is cold:** 1. If fault code is present with cold oven test oven temperature sensor probe circuit resistance. Use RTD scale found in the tech sheet. 2. 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 RED 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.	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 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.
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 assemblyy. 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							
	L1 to Bake	L1 to Broil	L1 to Motor Door Latch	L1 to Conv/Speed Bake Fan (some models)	L1 to Conv/Speed Bake Indicator Light (some models)	Door Switch COM-NO	Warmer Drawer Lock Switch (Motor Door Latch) (some models)	Cooktop Lockout (some models)
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 listed circuits. *=Alternates with Bake element.

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

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-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	PINK / ROSE
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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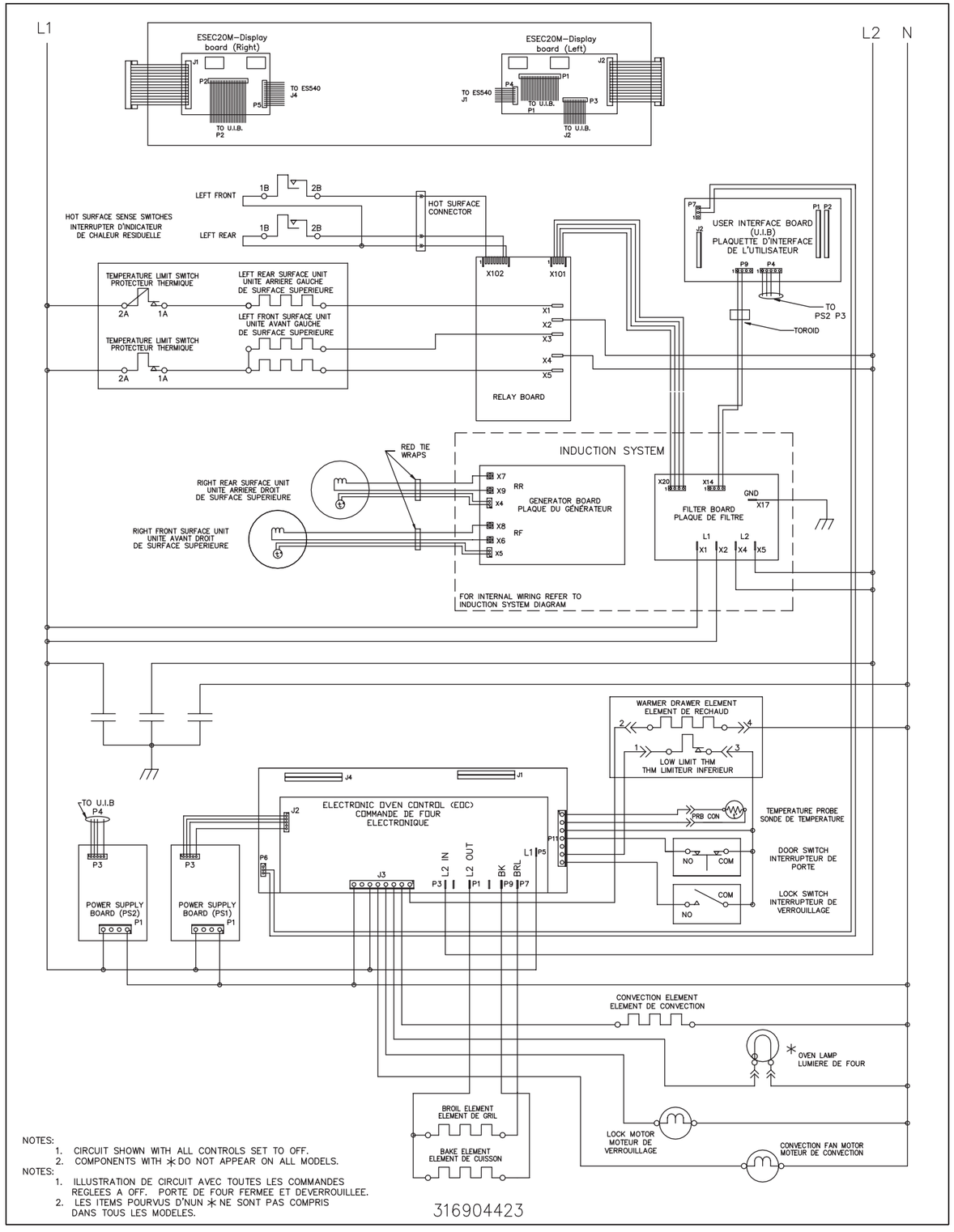
General Troubleshooting Schematic



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'NUN ✳ NE SONT PAS COMPRIS DANS TOUS LES MODELES.

316904423

SERVICE DATA SHEET

Electric range with ESEC20M and Hybrid Induction Cooktop

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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 display message - If any of the surface elements are hot, the hot surface message (**HE**) will display and remain ON until the cooktop becomes sufficiently cool.

Lockout feature -The self-clean and lockout features will not operate when a surface element is ON. Conversely, the surface elements controlled by the ESEC will not operate when the self-clean or lockout mode is active. When the oven control is set for self-clean or lockout mode, 🔒 will appear in the oven control display 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 screws and stand-offs in the backguard.

ESEC harness connects the ESEC system components and communicates with the EOC (electronic oven control).

Hybrid induction control assembly - circuit boards in plastic housing mounted on the back side on a bracket with two screws.

Radiant relay board - circuit board mounted on back side of range on stand-offs. This board controls the bridge radiant elements on the left side of cooktop.

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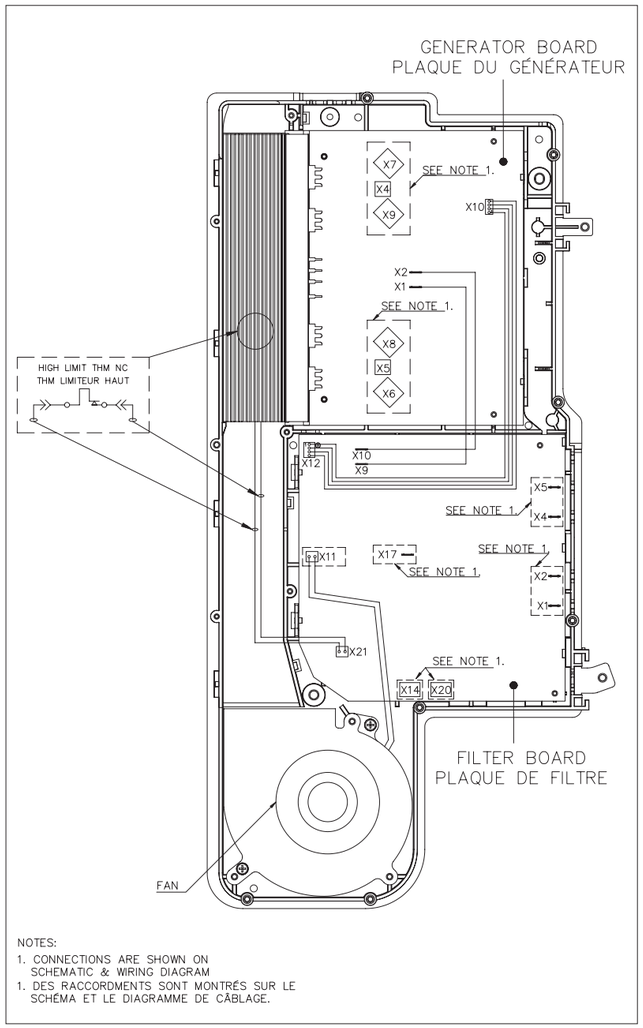
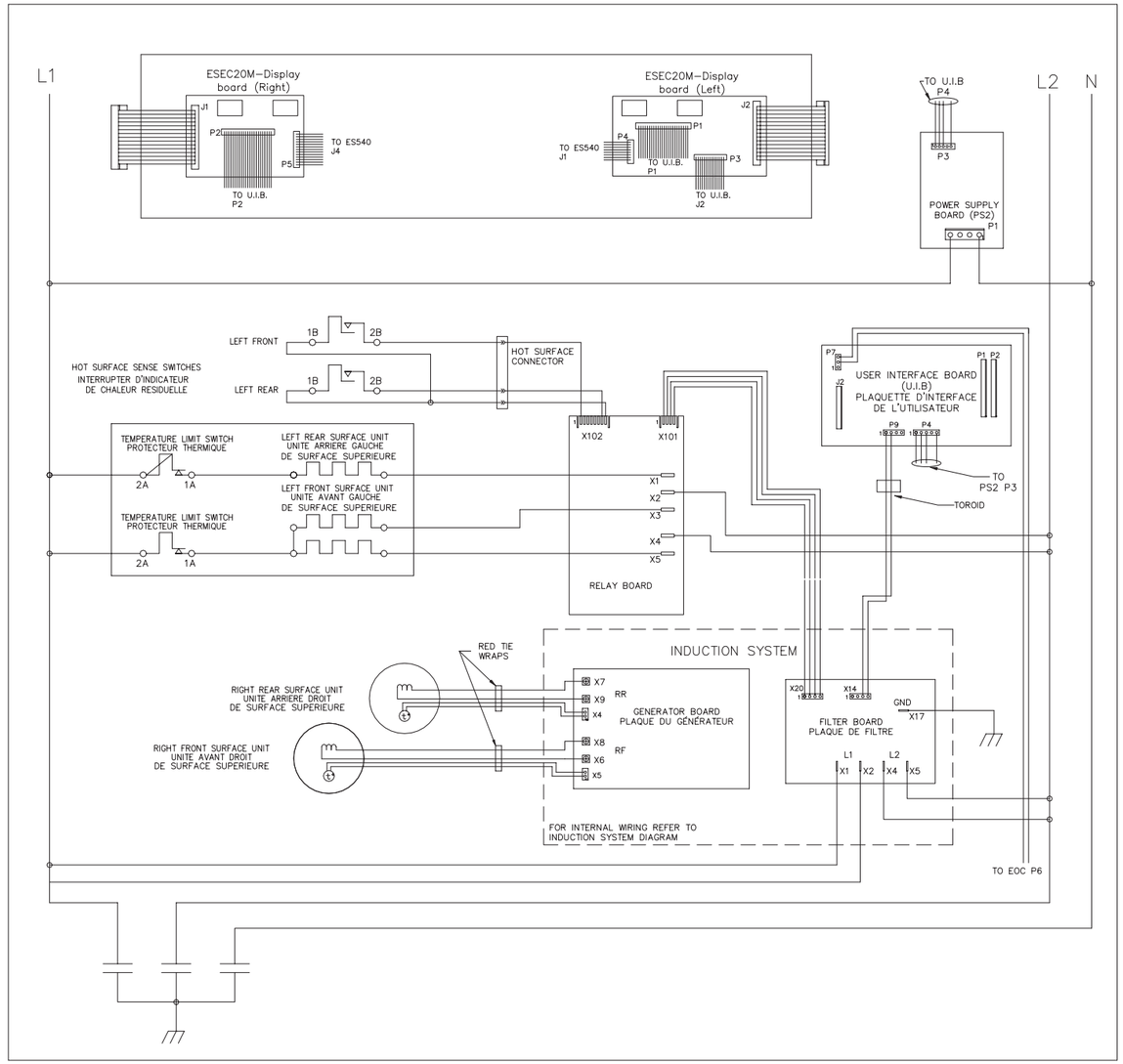
Hybrid induction control internal wiring



Schematic Diagram - ESEC with Hybrid Induction Cooktop



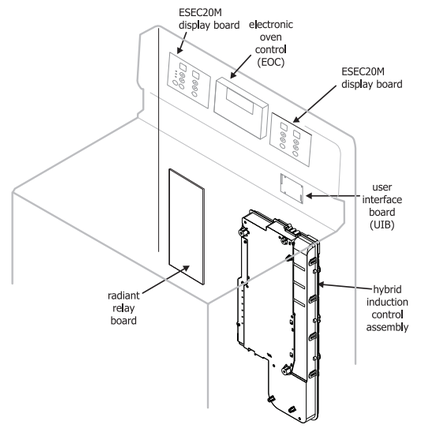
Important notes on replacing parts

Replacing the hybrid induction control assembly – When replacing the hybrid induction control assembly on the back of the range, do not overtighten the two screws that secure the control assembly to the range or the screws that secure the rear wire shield to the control assembly. Overtightening these screws can damage the plastic housing holding the circuit boards.

Replacing 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 UIB* – When replacing the user interface board located in the backguard, do not overtighten the screws that secure the UIB. To secure the UIB use **NO MORE THAN 20 in. - lbs.** Overtightening these screws can possibly damage the UIB board.

***IMPORTANT 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.



Electronic Surface Element Control System (ESEC) Error CodeDescriptions

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	HW/SW = Hardware/Software
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 keypad	1. Verify that nothing is touching the membrane control panel. 2. Check / reseat the harness connectors between the membrane panel, display boards and UIB. 3. Replace the UIB. 4. Replace the membrane control panel assembly.
13	UIB internal failure	1. Replace UIB.
14	Membrane panel connector tail	1. Check / reseat the harness connectors between the membrane panel, display boards and UIB. 2. Replace the UIB. 3. Replace the membrane control panel assembly.
15	ESEC self test failure	1. Check continuity / reseat 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.
32	IPower supply defect - relay board	1. Check all cables and connections between filter board X20 and relay board X101. 2. Replace the relay board. 3. Replace filter board.
36	Communication error - relay board	1. Test / reseat communication harness between UIB connector P9 and filter board X14 connector. Replace if defective. 2. Test / reseat communication harness between filter board connector X20 and relay board connector X101. Replace if defective. 3. Replace relay board. 4. Replace filter board.
37	Relay board voltage error	1. Replace relay board.
38 or 81	General HW/SW error - relay board	1. Replace relay 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.
54 55	Surface unit temp sensor break 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 generator board.
64 65	Surface unit sensor too hot 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 generator board.
80 or 98	General HW/SW error-induction module	1. Replace induction module.
90 or 95	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.
91	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.
92 or 93	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.
94	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.
96	Communication error (right cooking zones)	1. Test / reseat communication harness between UIB connector P9 and filter board X14 connector. Replace if defective. 2. Test / reseat 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.
97	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. (Induction zones only)	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. Membrane control panel defective. 3. UIB defective.	1. Follow instructions for proper use of touch controls. 2. Verify harness going between UIB, display boards and membrane control panel. Replace if defective or damaged. 3. Replace membrane control panel assembly. 4. Replace UIB. 5. Replace display boards.
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 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.