

# SERVICE DATA SHEET

## Electric Ranges with ES1040 and Induction Smoothtop

**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 electrical 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.

### 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 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 oven control display to signify that the surface heating elements are locked out.

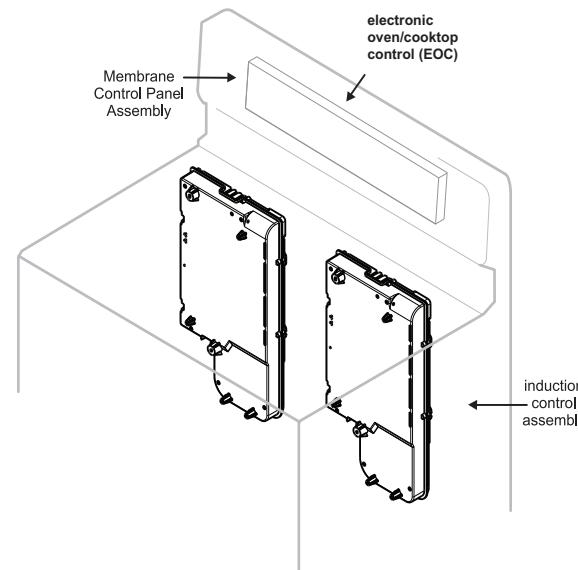
### ESEC system components

The ESEC system consists of the following components:

**ES1040 oven/cooktop control (EOC)** - circuit board mounted in backguard.

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

**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	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.

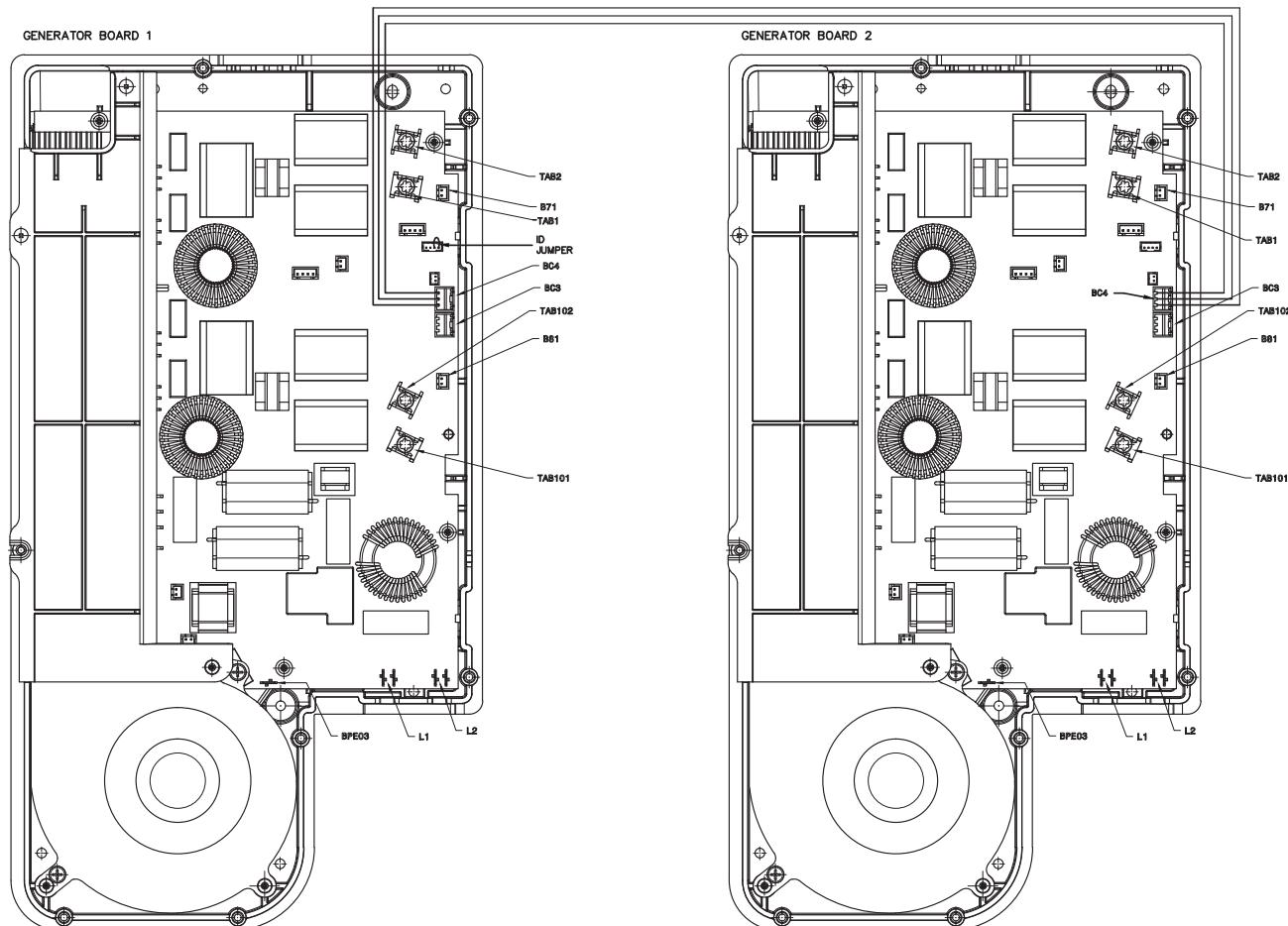
**Replacing the membrane control panel assembly** - The membrane control panel assembly includes several parts and must be replaced as an assembly.

**Replacing the ES1040 control\*** - When replacing the oven/cooktop control in the backguard, DO NOT over tighten the screws that secure it. To secure the board use **NO MORE THAN 20 in. - lbs.** Over tightening these screws can possibly damage the board.

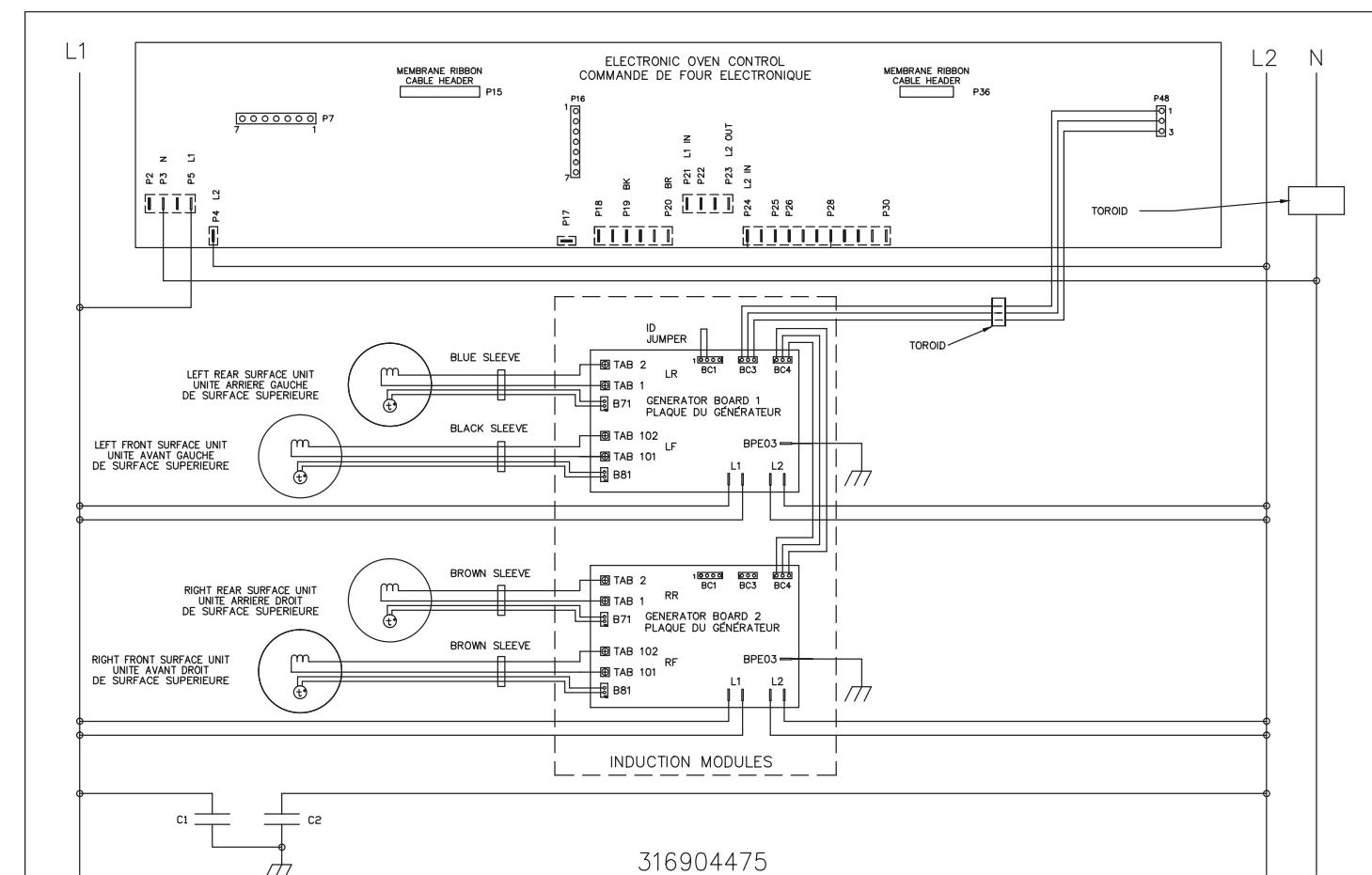
\* **Please note:** Electronic boards are very sensitive to static electricity. Static electricity can permanently damage electronic boards. Before handling these parts, be sure to drain static electricity from your body by properly grounding yourself.

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

### SCHEMATIC DIAGRAM - Induction Controls Wiring/Connections



### SCHEMATIC DIAGRAM - ESEC with Induction Cooktop



316904475

## 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 "CO" 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 membrane control panels. Disconnect Power, wait 30 seconds and repower. If fault returns: 2. Check/reseat membrane tails between the membrane panel and EOC; 3. Replace EOC; 4. Replace membrane panel.
14	Membrane panel connector tail	1. Disconnect Power, wait 30 seconds and repower. If fault returns: 2. Check/reseat membrane tails between EOC and the membrane panel; 3. Replace EOC; 4. Replace membrane control panel.
20/27	Communication failure between generator board and EOC - 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 EOC; 5. Replace the left side generator board.
21/28	Communication failure between generator board and EOC - 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 EOC; 5. Replace the right side generator board.
23	Communication failure between both generator boards and EOC	1. Verify AC power supply to the appliance is 240V; 2. Verify communication harness between the EOC and the left side generator board is not damaged and is properly installed; 3. Replace the EOC; 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 EOC; 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.	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 and connections. 2. Membrane control panel defective. 3. EOC defective. 4. Replace EOC.	1. Follow instructions for proper use of controls. 2. Verify membrane tail connections between EOC and membrane panel. Replace if defective or damaged. 3. Replace membrane control panel assembly. 4. Replace EOC.
		Cooking power too low or shuts down prematurely.	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.		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.	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. EOC not powered. Verify installation and harness connections to EOC. Defective EOC. Replace EOC.

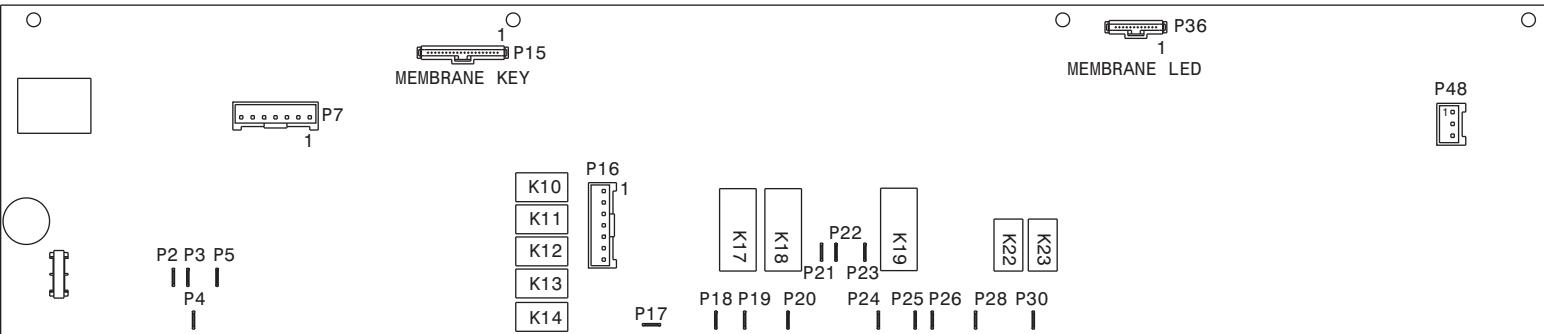
# SERVICE DATA SHEET - Electric Range with ES 1040 Electronic Oven Control

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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



CONNECTOR-PIN #	P15-1	P15-2	P15-3	P15-4	P15-5	P15-6	P15-8	P15-9	P15-10	P15-18	P15-19	P36-1	P36-2	P36-3	P36-4	P36-5	P36-6	P36-7	P36-8
P15-7	CONNECT LOOP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P15-11	1	BAKE	CONV CONVERT	COOK TIME	CONTROL LOCK	9	-	WZ ON/OFF	-	-	-	-	-	-	-	-	-	-	-
P15-12	4	BROIL	MY FAVORITES	END TIME	COOKTOP LOCK	6	-	WZ SELECT	-	-	-	-	-	-	-	-	-	-	-
P15-13	7	SLOW COOK	CONV ROAST	SET CLOCK	OVEN LIGHT	3	-	WD ON/OFF	LF SIZE	-	-	-	-	-	-	-	-	-	-
P15-14	START	CONV BAKE	KEEP WARM	TIMER ON/OFF	0	2	-	WD SELECT	RR SIZE	-	-	-	-	-	-	-	-	-	-
P15-15	CANCEL	CONV BROIL	RAPID PREHEAT	SELF CLEAN	8	5	CONNECT LOOP	RF SIZE	-	-	-	-	-	-	-	-	-	-	-
P15-16	LF ON/OFF	LF LOW	LF MED	LF HIGH	LR ON/OFF	LR LOW	-	LR MED	LR HIGH	-	CONNECT LOOP	-	-	-	-	-	-	-	-
P15-17	RF ON/OFF	RF LOW	RF MED	RF HIGH	RR ON/OFF	RR LOW	-	RR MED	RR HIGH	CONNECT LOOP	-	-	-	-	-	-	-	-	-
P15-20	-	-	-	-	CONNECT LOOP	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P36-9	-	-	-	-	-	-	-	-	-	WZ ON (BOTTOM)	WZ LOW (LOWEST)	WZ MED (MEDIUM)	WD ON BOTTOM	LF1 SIZE (BOTTOM)	LF2 SIZE (TOP)	RR1 SIZE (BOTTOM)	RR2 SIZE (TOP)	WD MED	
P36-10	-	-	-	-	-	-	-	-	-	WZ MED	WZ HIGH (HIGHEST)	WZ HIGH (HIGH)	WD LOW LOWEST	RR2 SIZE (TOP)	RF1 SIZE (BOTTOM)	RF2 SIZE (TOP)	WD HIGH		
P36-11 (UNUSED)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P36-12	-	-	-	-	-	-	-	-	-	CONNECT LOOP	-	-	-	-	-	-	-	-	-

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To test keypad function, check for continuity between indicated pin locations while pressing the keypad. EXAMPLE: test the BAKE key on connector P15 with the P2 and P11; test the Warmer Zone Medium on connector P36 with P1 and P10.

## Tech Sheet Abbreviations and Terminology

EOC = Electronic Oven Control	RTD = Resistance temperature device (Temp. probe/sensor)
VSC = Variable Speed Control	TCO = Thermal cut out, also "thermo disc" or "thermal limiter"
PS = Power Supply board (PS1, PS2, etc.)	PS = Power Supply board (PS1, PS2, etc.)

## 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.	<b>If Oven is cold:</b> <ol style="list-style-type: none"> <li>1. If fault code is present with cold oven, test oven temperature sensor probe circuit resistance. Use RTD scale found in the tech sheet.</li> <li>2. Replace probe or repair wiring connections if defective.</li> <li>3. If temperature sensor probe circuit is good but fault code remains when oven is cold replace the EOC.</li> </ol> <b>If Oven is overheating:</b> <ol style="list-style-type: none"> <li>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.</li> <li>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. <b>NOTE:</b> Severe overheating may require the entire oven to be replaced should damage be extensive.</li> </ol>
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 using test matrix. Replace touch panel if defective. 4. If keyboard circuits check correctly, 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	Keyboard tail failure.	1. Check/reseat ribbon harness connections between keyboard touch panel and EOC. 2. Test keyboard circuits using test matrix (below). Replace touch panel if defective. 3. If keyboard circuits check correctly, replace EOC.
F17	EOC Internal hardware error of failure.	Disconnect power, wait 30 seconds and reapply power. If fault returns upon power-up, replace EOC.
F18		
F30	Open oven sensor probe circuit.	Check resistance at room temperature and 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 and sensor probe connector.
F31	Shorted oven sensor probe circuit.	Check resistance at room temperature. If less than 500 ohms, replace RTD sensor probe. Check for shorted sensor probe harness between EOC and probe connector. If resistance is correct, replace the EOC.
F42	EOC internal software configuration error.	Usually this failure code would only appear if the EOC has been replaced with an incorrect version. Verify that the correct replacement part number is being used.
F50	Internal signal voltage error.	Disconnect power, wait 30 seconds and reapply power. If fault returns when power is reapplied, replace EOC.
F51	Display communication error.	
F60	EOC oven temperature. Higher than normal temperature detected on the EOC board.	1. Verify proper assembly of backguard panel. Check for damaged or loose panels, brackets, endcaps, etc. 2. Check for blocked ventilation slots in control panel rear cover. 3. Inspect oven vent for proper assembly and air flow. 4. Verify operation of cooling fan (if present).
F64	Time Base failure. The EOC cannot determine if connected to 50Hz or 60Hz power supply.	Confirm that range is connected to proper power source (50Hz or 60Hz). Generators or other portable power supplies and solar grids, etc., may not provide proper power supply. If power source is correct, replace the EOC.
F65	Keyboard short circuit or internal EOC failure.	1. Test keyboard circuits using test matrix. Replace touch panel if defective. 2. If keyboard circuits check correctly, replace the EOC.
F66	EOC internal power supply failure.	Disconnect power, wait 30 seconds and reapply power. If fault returns upon power-up, replace EOC.
F68	High voltage condition. L1 or L2 may be crossed with Neutral on incoming PS.	1. Verify proper incoming line voltage and polarity of L1, L2 and Neutral power supply connections at range terminal block. 2. If power supply voltage and polarity are correct, replace EOC.
F90	Door lock motor or latch circuit failure.	<b>If lock motor runs:</b> <ol style="list-style-type: none"> <li>1. Test continuity of wiring between EOC and lock switch on lock motor assy. Repair if needed.</li> <li>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.</li> <li>3. If motor runs and switch contacts and wiring harness test correctly, replace the EOC.</li> </ol> <b>If lock motor does not run:</b> <ol style="list-style-type: none"> <li>1. Test continuity of lock motor windings. Replace lock motor assembly if windings are open.</li> <li>2. Test lock motor operation by using a test cord to apply voltage. If motor does not operate, replace lock motor assy.</li> <li>3. If motor runs with test cord, check continuity of wire harness to lock motor terminals. If harness is good replace the EOC.</li> </ol>
F91		
F95		

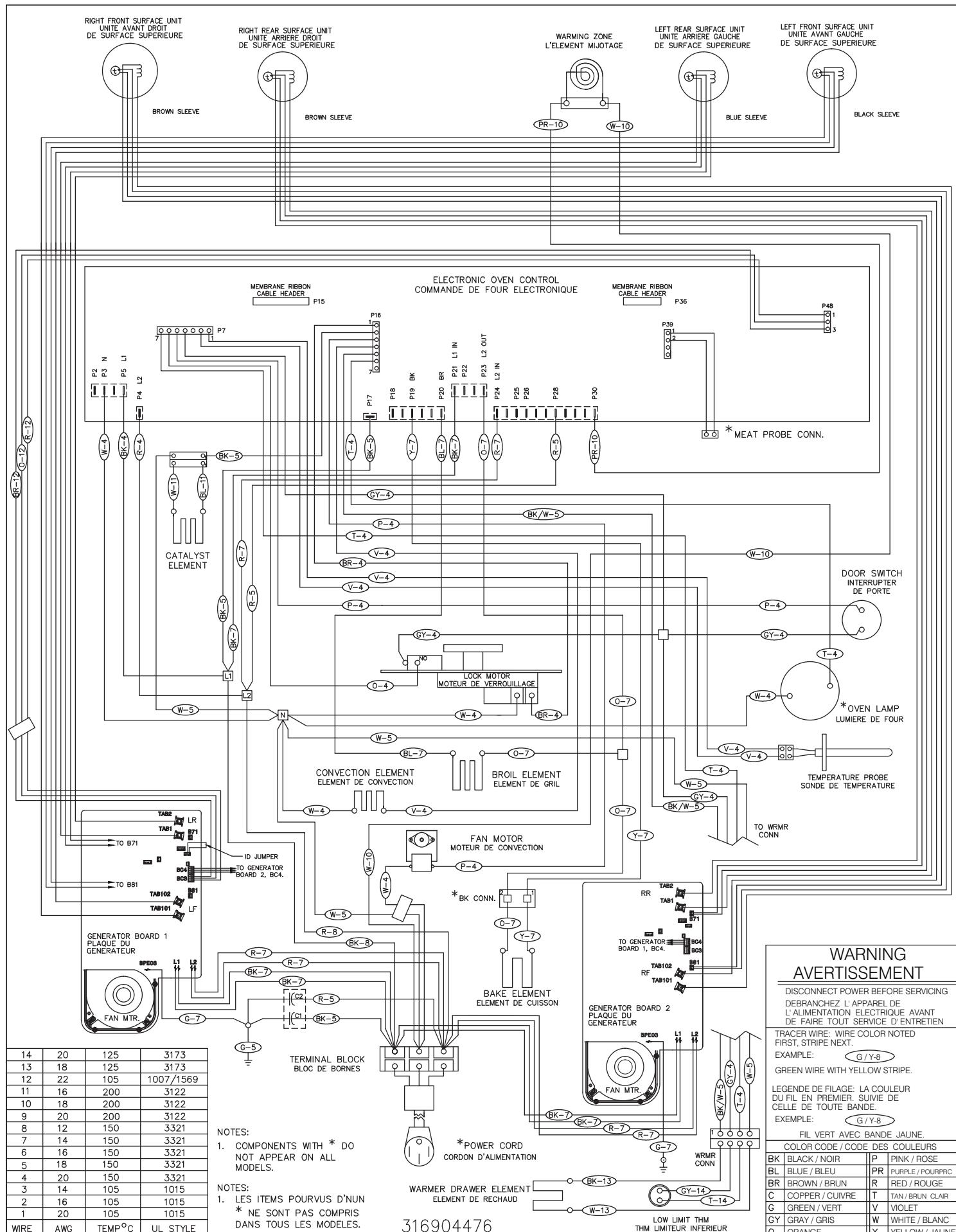
## RTD SCALE

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

EOC Relays - ES1030 Oven Control (Electric)										
	L1 to Bake	L1 to Broil	L1 to Motor	L1 to Conv. Door Latch	L1 to Conv. Heating Element	L2 In to Fan	L1 to Warming Drawer	L1 to Catalyst Element	L1 to Oven Lamps	Door Switch Contacts COM-NO
Bake/Time Bake	X0	X*		X†	X†	X	X			
Conv Bake	X0	X*		X	X	X				
Broil			X				X			
Clean	X0	X*					X		X	
Unlocked										
Locking						X				
Locked										
Unlocking						X				
Door Open									X	O
Door Closed									O	X
Oven Lamps ON									X	
Warming Drawer									X0	

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

## General Troubleshooting Diagram



## General Troubleshooting Schematic

