SERVICE DATA SHEET 318047490 (1108) Rev. A

Appliance with 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.

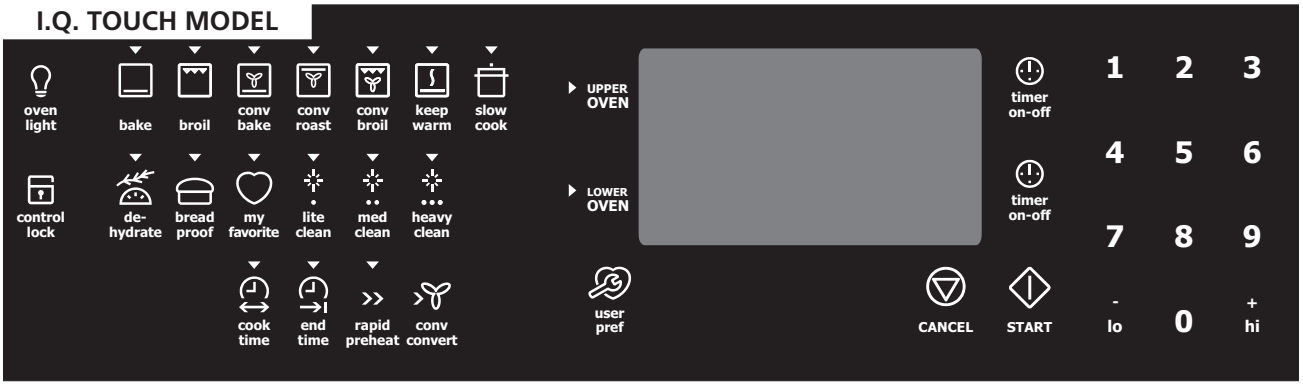
1. Do not attempt a product repair if you have any doubts as to your ability to complete it in a safe and satisfactory manner.
2. Before servicing or moving an appliance, remove power cord from electric outlet, trip circuit breaker to OFF, or remove fuse and turn off gas supply.
3. Never interfere with the proper installation of any safety device.
4. USE ONLY REPLACEMENT PARTS CATALOGED FOR THIS APPLIANCE. SUBSTITUTIONS MAY DEFEAT COMPLIANCE WITH SAFETY STANDARDS SET FOR HOME APPLIANCES.
5. 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 HAZARD.
6. 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 non-insulated 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.
- All panels are properly and securely reassembled.

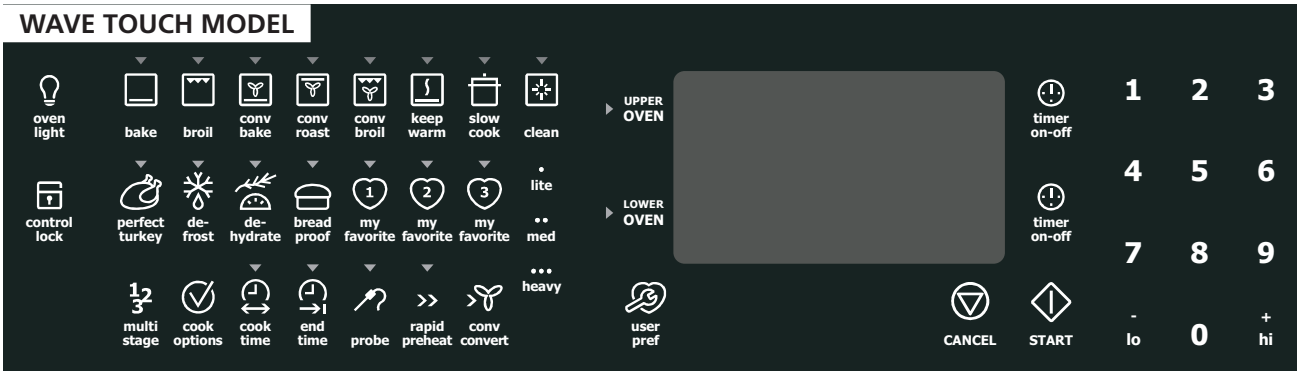
ELECTRONIC OVEN CONTROL (DOUBLE WALL OVEN)

1. This self-cleaning controller offers Bake, Broil, Convection Bake, Convection Roasting and Convection Broil modes, Dehydrating, Bread Proof, Keep Warm and Cleaning functions.
2. Convection operates with an element and a fan dedicated to convection.
3. This controller includes a display board, a relay board and oven light control board.

I.Q. TOUCH MODEL

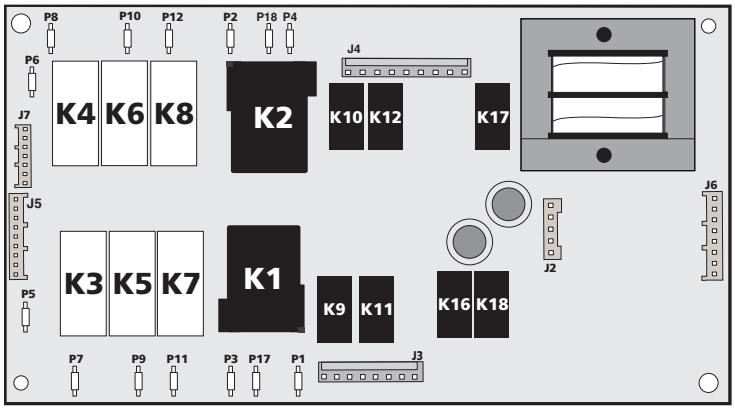


WAVE TOUCH MODEL



NOTE: The controllers are not field repairable. Only temperature settings can be changed. See oven calibration.

ELECTRONIC OVEN CONTROL RELAY BOARD



This relay board serves to energize the upper and lower oven heating elements, door lock motor and cooling fan.

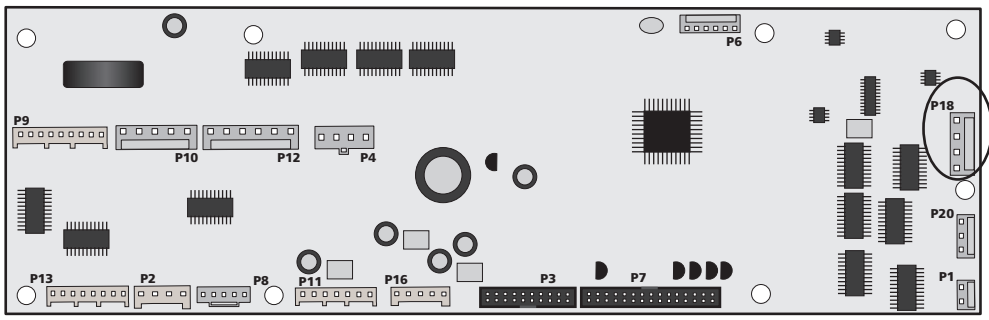
Relay Board Legend:

K1. Double Line Break - Upper Oven
K2. Double Line Break - Lower Oven
K3. Broil Relay - Upper Oven
K4. Broil Relay - Lower Oven
K5. Bake Relay - Upper Oven
K6. Bake Relay - Lower Oven
K7. Convection Element Relay - Upper Oven
K8. Convection Element Relay - Lower Oven
K9. Convection Fan High Speed - Upper Oven
K10. Convection Fan High Speed - Lower Oven
K11. Motor Door Latch - Upper Oven
K12. Motor Door Latch Relay - Lower Oven
K16. Cooling Fan Relay
K17. Convection Fan Low Speed - Lower Oven
K18. Convection Fan Low Speed - Upper Oven

P1 L2 Out, Upper Oven
P2 L2 Out, Lower Oven
P3 L2 In, Upper Oven
P4 L2 In, Lower Oven
P5 L1, Upper Oven
P6 L1, Lower Oven
P7 Broil, Upper Oven
P8 Broil, Lower Oven
P9 Bake, Upper Oven
P10 Bake, Lower Oven
P11 Convection Element, Upper Oven
P12 Convection Element, Lower Oven
P17 Not Used
P18 Not Used

J2 DC Power Output To Display Board
J3 AC Power Output (motor door latch, cooling fan, convection fan) - Upper Oven
J4 AC Power Output (motor door latch, cooling fan, convection fan) - for Lower Oven and Power Input (L1, Neutral)
J5 Relay Control Inputs (bake and broil elements, motor door latch, DLB, convection fan high speed) - for Upper Oven
J6 Relay Control Inputs (cooling fan, conv element, convection fan low speed) - for Both Ovens
J7 Relay Control Inputs (bake and broil elements, motor door latch, DLB, convection fan high speed) - for Lower Oven

ELECTRONIC OVEN DISPLAY BOARD

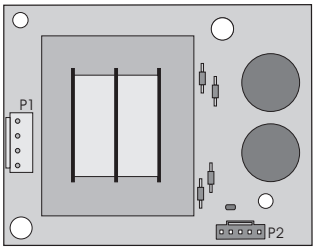


Connector present on wave touch model only.

Connector Legend:

P1 - Upper Oven Probe Input
P2 - Communication with Oven Light Control Board
P3 - Keyboard (touch panel)
P4 - Supply for cooling fan sensor
P6 - Microprocessor Programming (not used)
P7 - Touch Panel LEDs
P8 - DC Power Supply Input
P9 - Relay Control Output (heating elements, DLB, motor door latch, convection fan high speed) for Upper Oven
P10 - Switches Input (motor door latch switch, door switch, rack switch) for Upper Oven
P11 - Relay Control Output (heating elements, DLB, motor door latch, convection fan high speed) for Lower Oven
P12 - Switches Input (motor door latch switch, door switch, rack switch) for Lower Oven and cooling fan speed sensor input.
P13 - Relay Control Output (cooling fan, convection fan low speed) for Upper and Lower Ovens
P16 - DC Power Supply Input
P18 - Upper and lower oven meat probe (Wave touch model only)
P20 - Lower Oven Probe Input

POWER SUPPLY BOARD

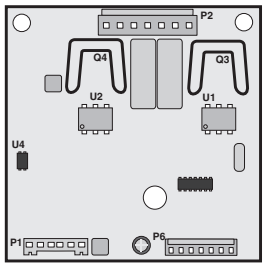


This board provides power to the oven control display.

P1 - AC Power Input (L1 and Neutral)

P2 - DC Power Output

OVEN LIGHTS CONTROL BOARD



This board controls the oven lights of the 2 cavities.

P1 - Communication with display board and power supply input

P2 - AC power output for oven lights, power inputs (L1, neutral)

P3 - Microprocessor programming (not used)

CONVECTION MODE

The convection oven uses the addition of a fan and an element to heat and to move the air already in the oven. Moving the heated air helps to de-stratify the heat and cause uniform heat distribution. The air is drawn in through a fan shroud and the element located on the rear wall of the oven. It is then discharged around the outer edges of this shroud. The air circulates around the food and then enters the shroud again. As with conventional electric wall ovens, there is still an oven vent which discharges above the door. In preheat of non-convection cooking modes, the convection fan will be operating until the oven has reached the target temperature.

To set the control in convection mode, follow these steps:

1. On a double wall oven: Select oven by pressing either **UPPER OVEN** UPPER OVEN or **LOWER OVEN** LOWER OVEN.
2. Press **CONVECTION BAKE** or **CONVECTION ROAST** or **CONVECTION BROIL**.
3. Press **START**. The oven will automatically start and the fan will begin to run.
4. Press **CANCEL** to stop or cancel the Convection feature at any time.

NOTE: The fan runs continuously while in the convection mode. The fan will stop if the door is opened while convection baking/roasting/broiling. The convection element will stop operating if the door is opened. The speed of the convection fan will vary depending on which cooking function is used. Convection Roast uses a fast fan speed, while convection bake uses a slower fan speed after preheat.

CONVECTION FAN MOTOR

The 120V fan motor is located on the outside of the rear of the oven.

The fan motor runs continuously while in convection mode unless the door is opened.

It is normal to see the fan speed changing depending on the cooking function that is used. This appliance uses the optimum fan speed for each convection function. There are 2 speeds (High and Low) controlled by relays.

OVEN CALIBRATION

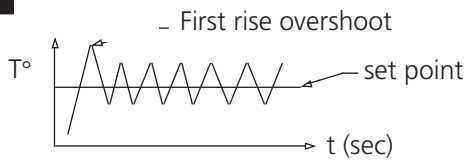
Set the electronic oven control for normal baking at 350°F. Obtain an average oven temperature after a minimum of 5 cycles.

The oven calibration can be modified using the oven control display. Please refer to the Owner's Guide manual.

Note: Changing calibration affects all the cooking modes but not the clean and the broil modes.

FIRST RISE

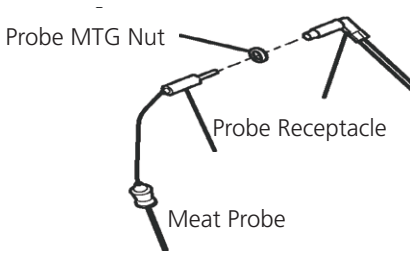
It is normal to see a temperature overshoot in the first rise of all modes when you monitor the temperature.



MEAT PROBE RESISTANCE (Wave Touch Model Only)

Meat Probe Temperature VS Resistance Table

Temp. Celsius	Temp. Fahrenheit	Probe Resistance
25°C	77°F	49.478 Kohm +/- 7%
50°C	122°F	17.737 Kohm +/- 4.9%
80°C	176°F	6.107 Kohm +/- 3.3%
100°C	212°F	3.264 Kohm +/- 4.6%



ELECTRONIC OVEN CONTROL (EOC) FAULT CODE DESCRIPTIONS

Note: Generally speaking "F1X" implies a control failure, "F3X" an oven probe problem, and "F9X" a latch motor problem.

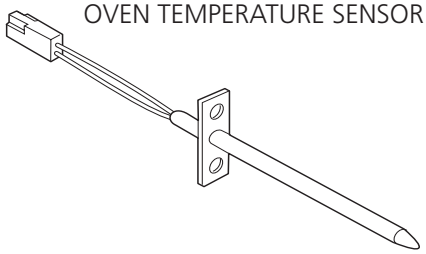
Failure Code/ Condition/Cause	Suggested Corrective Action
F10 Control has sensed a potential runaway oven condition. Control may have shorted relay, RTD sensor probe may have a gone bad.	Check RTD sensor probe and replace if necessary. If oven is overheating, disconnect power. If oven continues to overheat when power is reapplied, replace relay board and/or display board.
F11 Shorted Key: a key has been detected as pressed for a long period and will be considered a shorted key alarm and will terminate all oven activity.	Press any key to clear the error.
	If fault returns, replace the keyboard (touch panel).
	If the problem persists, replace the display board.
F13 Control's internal checksum may have become corrupted.	Press any key to clear the error.
	Disconnect power, wait 30 seconds and reapply power. If fault returns upon power-up, replace display board.
F14 Misconnected keyboard cable	Verify connection between display board and touch panel (2 ribbon cables). Make sure the cables are well connected at both ends.
	If the cables are good, replace the touch panel.
	If the problem persists, replace the display board.
F15 Controller self check failed.	Verify if relay board receives 120VAC between J4 pin 1 and 3.
	Verify the wiring between J2 on the relay board and P16 on the display board.
	If wiring and 120VAC supply is good replace the display board.
	If problem persists replace the relay board.
F23 The controller failed to communicate with the oven lights control board.	Verify wiring between P2 on the display board and P2 on the oven lights control board.
	If wiring is good, replace oven lights board.
	If the problem persists, replace the display board.
F30 Open RTD sensor probe/ wiring problem.	Check wiring in probe circuit for possible open condition.
Note: EOC may initially display an "F10", thinking a runaway condition exists.	Check RTD resistance at room temperature (compare to probe resistance chart). If resistance does not match the chart, replace the RTD sensor probe.
F31 Shorted RTD sensor probe / wiring problem.	Let the oven cool down and restart the function.
	If the problem persists, replace the display board.
Note: **F30** or **F31** is displayed when oven is in active mode or an attempt to enter an active mode is made.	
F43 The cooling fan speed, as read by the tachometer input of the EOC-display board, is abnormally too slow.	Determine first if the problem appears to be caused by a cooling fan not turning or turning slowly or by a problem with the sensing of the fan speed. Start a Bake and check during the first 15 seconds if the fan is turning (should feel air flowing through the vent above the upper oven door).
	If the fan does not appear to be turning or turn slowly check the 120VAC at the fan. If 120VAC is present at the fan motor but the fan does not turn replace the fan motor. If 120VAC is not present at the fan motor when a Bake is started check the connection to the relay board (J3 pin 7) and Neutral: is there 120VAC on J3 pin 7? Does it reach the fan motor? Is the other terminal of the fan motor connected to Neutral? If the harness or relay board are faulty replace them.
	If the fan appears to be normally turning but an F43 error code is generated, it means there is a problem with the reading of the fan speed sensor. Make sure the connection of the fan speed sensor is properly made (refer to wiring diagram), between the sensor on the fan and the EOC- display board.
	For trouble-shooting purposes, it is possible to enter a test mode that will indicate on the display the reading of the fan speed in RPM: to enter the test mode, power-up the unit and within 30 seconds press and hold the upper oven Bake and Broil keys for 3 seconds (until you see all segments in the screen illuminated). Once in the test mode, pressing the upper oven Light key once will display the fan speed in RPM. In normal client mode the F43 error is generated for a fan speed below approximately 700 RPM.

ELECTRONIC OVEN CONTROL (EOC) FAULT CODE DESCRIPTIONS		
F44	The cooling fan speed, as read by the tachometer input of the EOC-display board, is abnormally too fast.	Inspect the cooling fan. Does it appear to be turning normally (air flow, noise)? Verify the fan blade is well assembled.
		Verify there is nothing blocking the air flow of the fan (that could make the fan turn faster).
		Check the 120VAC voltage on the fan. A voltage higher than 120VAC + 10% could make it go too fast.
		Make sure the connection of the fan speed sensor is properly made (refer to wiring diagram), between the sensor on the fan and the EOC- display board.
		For trouble-shooting purposes, it is possible to enter a test mode that will indicate on the display the reading of the fan speed in RPM: to enter the test mode, power-up the unit and within 30 seconds press and hold the upper oven Bake and Broil keys for 3 seconds (until you see all segments in the screen illuminated). Once in the test mode, pressing the upper oven Light key once will display the fan speed in RPM. In normal client mode the F44 error is generated for a fan speed above approximately 2500 RPM.
		If problem persists replace both the fan+sensor assembly and the EOC- display board.
F90	Door motor mechanism failure.	Press any key to clear the error.
		If it does not eliminate the problem, turn off power for 30 seconds, then turn on power.
		Check wiring of Lock Motor, Lock Switch and Door Switch circuits.
		Unplug the lock motor from the board and apply power (L1) directly to the Lock Motor. If the motor does not rotate, replace Lock Motor Assembly.
		Check Lock Switch for proper operation (do they open and close, check with ohmmeter). The Lock Motor may be powered as in above step to open and close Lock Switch. If the Lock Switch is defective, replace Motor Lock Assembly.
		If all above steps fail to correct situation, replace the display board and/or the relay board in the event of a motor that does not rotate.
		If all the above steps fail to correct the situation, replace the display board in the event of a motor that rotates endlessly.

RTD SCALE		
Temp. °F	Temp. °C	Resistance (ohms)
32 ± 1.9	0.0 ± 1.1	1000 ± 4.0
75 ± 2.5	23.9 ± 1.4	1091 ± 5.3
250 ± 4.4	121.1 ± 2.4	1453 ± 8.9
350 ± 5.4	176.7 ± 3.0	1654 ± 10.8
450 ± 6.9	232.2 ± 3.8	1852 ± 13.5
550 ± 8.2	287.8 ± 4.6	2047 ± 15.8
650 ± 9.6	343.3 ± 5.3	2237 ± 18.5
900 ± 13.6	482.2 ± 7.6	2697 ± 24.4

ELECTRICAL RATING			
Kw Rating 240/208V	See Nameplate	Bake Element Wattage	27" Models 1450W/1089W 30" Models 2200W/1653W
Broil Element Wattage	27" Models 3400W/2554W 30" Models 4000W/3004W	Convection Element Wattage	2500W/1879W

OVEN TEMPERATURE SENSOR



SINGLE WALL OVEN / UPPER OVEN ON DOUBLE WALL OVEN CIRCUIT ANALYSIS MATRIX

	On Relay Board						On Oven lights control board	On Display Board		On Relay Board	
	ELEMENTS				Convection Fan						
	Bake P9	Broil P7	Conv. P13	Door Motor J3-5	Low speed J3-8	High speed J3-4	Light P2-1	Door Switch P10-3/ P10-5	Rack Sense Switch P10-2/ P10-5	DLB L2 out P1	Cooling Fan J3-7
Bake	X	X	X*		X*					X	X
Keep Warm	X									X	X
Broil		X								X	X
Conv. Bake	X	X	X		X**	X				X	X
Conv. Roast	X	X	X			X				X	X
Conv. Broil		X				X				X	X
Clean	X	X								X	X
Locking				X							
Locked											
Unlocking				X							
Unlocked											
Light							X				
Door Open							X				
Door Closed								X			
Bread Proof	X				X					X	X
Rack Supports not installed									X		

LOWER OVEN ON DOUBLE WALL OVEN CIRCUIT ANALYSIS MATRIX

	On Relay Board						On Oven lights control board	On Display Board		On Relay Board	
	ELEMENTS				Convection Fan						
	Bake P10	Broil P8	Conv. P16	Door Motor J4-6	Low speed J4-9	High speed J4-5	Light P2-7	Door Switch P12-3 / P12-6	Rack Sense Switch P12-2 / P12-6	DLB L2 out P2	Cooling Fan J3-7
Bake	X	X	X*		X*					X	X
Keep Warm	X									X	X
Broil		X								X	X
Conv. Bake	X	X	X		X**	X				X	X
Conv. Roast	X	X	X			X				X	X
Conv. Broil		X				X				X	X
Clean	X	X								X	X
Locking				X							
Locked											
Unlocking				X							
Unlocked											
Light											
Door Open											
Door Closed								X			
Bread Proof	X				X					X	X
Rack Supports not installed									X		

Relay will operate in this condition only.

* Convection element and fan are used for the first rise of temperature.

** Convection Bake uses convection fan high speed during preheat and low speed after preheat.

COOLING FAN & FAN SPEED SENSOR

This double wall oven is equipped with a cooling fan located on top of the upper cavity. The fan is controlled by the EOC. The cooling fan is activated anytime the oven is used for cooking or cleaning. It may also remain ON for some time after the oven has been used, until the oven cavity has cooled down enough. The fan motor is energized using relay K16 on the EOC- relay board.

The oven is equipped with a sensor that monitors the speed of the cooling fan. The sensor is connected to the EOC - display board, where the speed is read. Anytime the cooling fan is supposed to be active, the EOC checks the speed against a "speed too low" and a "speed too high" threshold. If the speed falls out of range, the EOC will generate an F43 error code (detecting fan is turning too slowly or not turning) or F44 error code (detecting fan is turning too fast).

OVEN LIGHT

This appliance is equipped with electronics that control the intensity of the oven lights. This is done with the Oven Lights Control Board that modulates the AC voltage going to the 120V halogen lamps. When the light key is pressed or when the oven door is opened the display board communicates with the Oven Lights Control Board to specify the required light intensity. The Oven Lights Control Board also add a “theater-like” effect on the light: the light intensity is gradually ramp-up or ramp-down as the light is turned on or off.

The upper and lower cavity lights will turn ON and OFF at the same time. That is, if the light key is pressed, the light of both ovens will turn ON.

If the oven lights do not operate, check the following:

- If you are getting an F23 error code it means the display board is not able to communicate with the Oven Lights Control Board, thus the oven light will not operate. Check connections between the display board and the Oven Lights Control Board. Refer to the fault code section for corrective actions.
- If the lights are always ON (even with the door closed), it could be because the control mistakenly thinks the door is opened. Verify door switch and its wiring.
- Check connections on the Oven Lights Control Board. On connector P2: pin 3 should be Neutral, pin 5 should be L1 (120VAC) pin 1 should go to the oven lights of the upper oven, pin 7 should go to the oven lights of the lower oven. The other terminal of the light should be connected to Neutral.
- Verify is light bulbs need to be replaced.
- If there is no error code, the wiring is good and still the oven lights are not working then replace the Oven Lights Control Board.

BLOCK DIAGRAM AND SYSTEM INTERCONNECTIONS