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.

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, Off or Cancel** to end Bake mode.

Temperature Adjustment
1. Set EOC to bake at 550°F.
2. Within 5 seconds of setting 550°F, press and hold the bake pad for approximately 15 seconds until a single beep sounds (longer may cause **F11** shorted keypad alarm).
3. Calibration offset should appear in the display.
4. Use the slew keys to adjust the oven temperature up or down 35°F in 5°F increments.
5. Once the desired (-35° to 35°) offset has been applied, Press **Stop, Clear, Off or Cancel**.

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

Modular Control Systems
This appliance is equipped with a modular system of controls. The modular system consists of various boards which communicate with one another to drive cooking functions. Oven functions, if available, operate through an oven user interface (UI or UIB) and an oven relay board. Cooktop functions, if available, operate through a cooktop UI/UIB and a cooktop relay board. There may be additional boards which work within the system to drive specific functions (refer to the schematics and diagrams and this sheet). Low voltage operating and communications power for the modular boards is provided through the wiring schemes. The boards that generate low voltage operating and communications power depend upon the individual control system (refer to the schematics and diagrams on this sheet). These voltages are only the operational voltages. Do not use these voltages as confirmation of communication between the boards. Communication occurs through software programming on each board. This communication is not detectable by volt ohmmeters. The programming is self-monitored and the UI displays will show error codes based on detected failures. The individual boards are not field repairable. See the schematics and diagrams included on this sheet for more unit-specific details.

ELECTRONIC OVEN CONTROL (EOC) RELAY BOARD
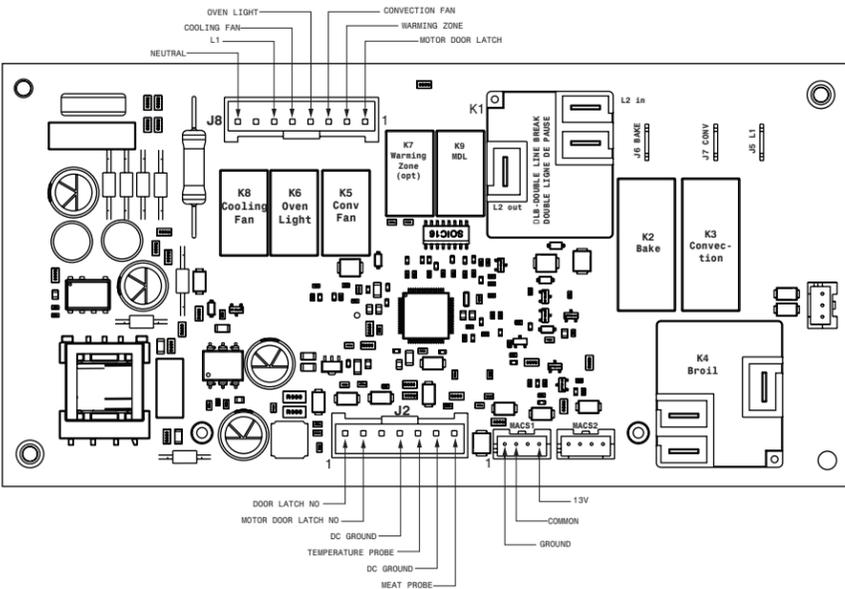
RTD SCALE

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

GENERATOR BOARD 1 / PLAQUE DU GENERATEUR 1
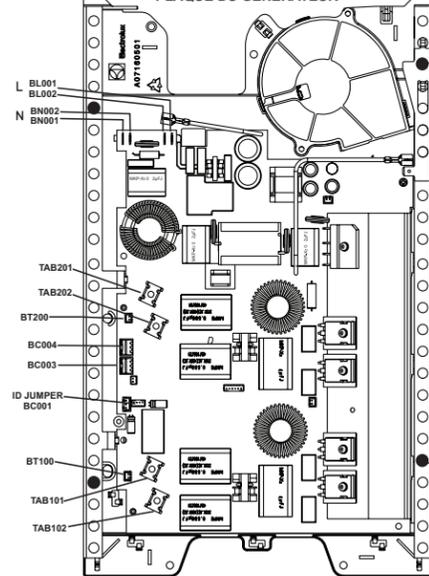
GENERATOR BOARD 2 / PLAQUE DU GENERATEUR 2
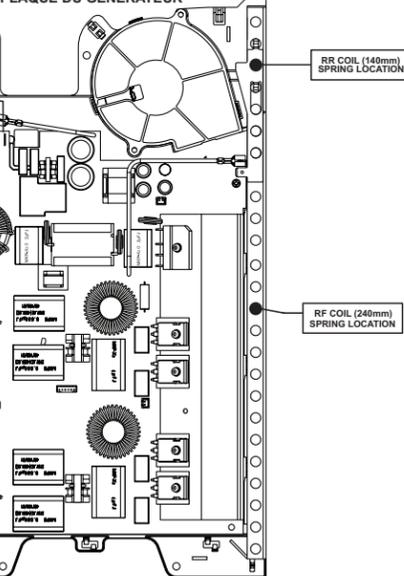
RESISTANCE TEMPERATURE DETECTOR

Power Level Table

Displayed Power Level / Niveau de puissance affiché	Power Level % / Niveau d'énergie
L	4.0
2	12.0
3	17.0
4	19.0
5	21.0
6	31.0
7	45.0
8	54.0
9	64.0
H	100.0
P	156

CIRCUIT ANALYSIS MATRIX
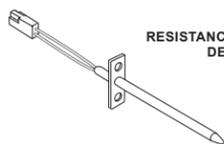
CIRCUIT ANALYSIS MATRIX	EOC RELAYS								
	L1 TO BAKE	L1 TO BROIL	L1 TO CONV	L1 TO MDL	L1 TO CONV FAN	L1 TO CONV INDICATOR LIGHT	DOOR SWITCH COM-NO	MDL (certain models)	COOKTOP LOCKOUT (some models)
BAKE	X	X*	X						
CONVECTION	X	X*	X		X	X			
BROIL		X	X						
CLEAN	X	X	X						
UNLOCKED									
LOCKING				X					X
LOCKED									X
UNLOCKING				X					
DOOR OPEN									
DOOR CLOSED							X		
COOKTOP ACTIVE									X

NOTE: X= Check active circuits *=Alternates with bake element

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 Fault Code Descriptions

Fault Code	Likely Failure /Condition/Cause	Suggested Corrective Action
F001, F002, F004, F005	Touch failure	1. Disconnect power, wait 30 seconds and reapply power. If fault returns upon power-up replace the Oven User Interface board.
F003	The oven user interface board is incorrectly configured.	1. Replace the oven user interface board. Make sure you install the latest revision available for this model.
F010	Oven temperature runaway: the cavity temperature has been detected in excess of the maximum safe operating temperature.	1. If oven is overheating, disconnect power. Check oven temperature probe (RTD) and replace if necessary. 2. If the oven temperature probe is good and if oven continues to overheat when power is reapplied, replace the oven relay board.
F011	Stuck key: a key has been detected has pressed continuously for 30 seconds or more.	1. If a key was pressed inadvertently for a long time this error code will be displayed. Make sure there is nothing (water, utensils) in contact with the keyboard. The fault code should go away once the key is released and the Stop key is pressed. If the F011 error comes back when a key is pressed it means the error condition is still there. If the F011 error does not come back it means the error condition is gone and the oven can be used. 2. If the fault code cannot be cleared, the board/springs alignment within the mechanical enclose maybe affected. Reinstalling the board. 3. If reinstalling the board did not fix the problem replace the oven user interface board.
F012	Keyboard configuration alarm: the oven user interface board received from the touch micro a key code that does not match the key map.	1. Verify the unit has the proper configuration is loaded, based on the model number and parts catalog. 2. Replace the oven user interface board if the problem persists.
F013	Data written to non-volatile memory has failed verification	1. Disconnect power, wait 30 seconds and reapply power. If fault returns upon power-up replace the oven user interface.
F015	Keyboard Error	1. Disconnect power, wait 30 seconds and reapply power. If fault returns upon power-up replace the oven user interface board.
F017	The oven user interface board is unable to configure the touch.	1. Disconnect power to the unit, wait 30 seconds, then reapply power. 2. Verify the unit has the proper oven user interface board and configuration, based on the model number and parts catalog. 3. If fault persists, replace the oven user interface.
F018	Oven relay board failure (wiggler)	1. Replace the oven relay board.
F019	The oven user interface board is unable to configure the oven relay board	1. Disconnect power to the unit, wait 30 seconds, then reapply power. 2. If fault returns, verify connection between the oven user interface board and the oven relay board (MACS1 or MACS2 connector). 3. Verify the oven has the proper oven user interface board and oven relay board, based on the model number and parts catalog. 4. If fault persists, replace the oven user interface. 5. If fault persists, replace the relay board.
F020	Communication failure between the oven user interface board and the Hob user Interface	1. Disconnect power, wait 30 seconds and reapply power. Check if error condition is still there. 2. Test wiring harness between oven user interface board and Hob user Interface (connector MACS1 or MACS2). 3. If wiring harness is good replace oven relay board. 4. If the problem persists replace the oven user interface.
F022	Communication failure between the oven user interface board and the oven relay board	1. Disconnect power, wait 30 seconds and reapply power. Check if error condition is still there. 2. Test wiring harness between oven user interface board and oven relay board (connector MACS1 or MACS2). 3. If wiring harness is good replace oven relay board. 4. If the problem persists replace the oven user interface.
F023	Communication failure between the oven user interface micro and the touch micro	1. Disconnect power, wait 30 seconds and reapply power. Check if error condition is still there. 2. If the problem persists replace the oven user interface.
F025, F027	The communication between the oven user interface and the oven relay board cannot be initiated.	1. Disconnect power to the unit, wait 30 seconds, then reapply power. 2. If fault returns, verify connection between the oven user interface board and the oven relay board (MACS1 or MACS2 connector). 3. Verify the unit has the proper oven user interface board and oven relay board, based on the model number and parts catalog. 4. If fault persists, replace the oven user interface board. 5. If fault persists, replace the oven relay board.
F028, F029	The communication between the oven user interface micro and the touch micro cannot be initiated.	1. Disconnect power to the unit, wait 30 seconds, then reapply power. 2. Verify the unit has the proper oven user interface board and configuration, based on the model number and parts catalog. 3. If fault persists, replace the oven user interface.
F030	Open oven temperature sensor (RTD)	1. Check probe circuit wiring for possible open or short condition. 2. Verify RTD resistance at room temperature (compare to probe resistance chart). If resistance does not match the chart, replace the RTD probe. 3. If the problem persists replace the oven relay board.
F031	Shorted oven temperature probe (RTD)	
F033	Meat probe temperature sensor shorted or too hot	1. The error is triggered if the meat probe sees a temperature in excess of 392°F. Make sure the meat probe was not placed in such way that it could have seen such temperature. If the tip of the probe is not inserted in the meat it will see the cavity temperature, which can be higher than 392°F (depending on the setpoint) and trigger the alarm. 2. When the meat probe is connected to the socket inside the oven cavity, if the meat probe is not fully inserted into the socket it may short the contacts and cause the error. Make sure the probe is inserted as much as it can. 3. Verify meat probe resistance at room temperature. Compare to meat probe resistance chart. If the meat probe does not match the chart, replace it. 4. If the above steps failed to correct the problem, replace the oven relay board.
F050	A/D Out of Range: the oven relay board is unable to read the status of the switches (door, MDL)	1. Clear error, cycle Power a couple of times and check if error is back, if so replace Power board. 2. Else replace Door switch plunger/s and reseat harness. 3. If error persists check MDL & Harness.
F090	Motor Door Lock mechanism failure. The oven control does not see the Motor Door Lock running.	1. Disconnect power to the unit, wait 30 seconds, then reapply power. Try again to make the door lock or unlock (ex: initiate a Lockout or a Clean cycle). 2. Check if the Lock Motor is running or not. If it is not running, test the wiring between the Lock Motor and the oven relay board. If the wiring is good, check if there is 120VAC at the motor when it is expected to run to see if the failure originates from a bad motor (120VAC present but not turning) or a problem with the relay board (J20 pin 10 on the oven relay board is the output to the Lock Motor). The Lock Motor can also be tested by applying 120VAC directly to the motor (unplug it from the relay board first). If the Lock Motor does not run when 120VAC is applied replace the Lock Motor Assembly. If it is the relay board that does not provide 120VAC to the Lock Motor replace the oven relay board. 3. If the Lock Motor is running but the oven control cannot find the locked or unlocked position (ex: motor turns continuously until F90 fault code is generated) the Lock Switch needs to be verified. Check wiring between Lock Switch and oven relay board. Verify with ohmmeter if the switch makes contact properly (verify continuity with ohmmeter when the switch is pressed). If the Lock Switch is defective replace the Lock Motor Assembly. 4. If all above steps failed to correct the situation, replace the oven relay board.
F095	Motor Door Lock mechanism failure. The Motor Door Lock does not stop running or the Lock Switch sends an invalid signal.	1. The problem can be caused by a faulty Lock Switch or by a defective oven relay board. If the Motor Door Lock is always running (as if the relay controlling it is stuck closed) replace the oven relay board. 2. If the motor is not always running replace the Motor Lock Assembly.
F096	The oven door has been detected open during a Self-Clean cycle.	1. This error occurs if the door switch has lost its contact during a Self-Clean cycle. Make sure door closes well and fully presses on the door switch plunger when the door is locked, and no one attempted to pull on the oven door during the Self Clean cycle. 2. Test continuity of wiring between the door switch and the oven relay board, make sure the door switch is well connected. With an ohmmeter, verify the switch is closed when the plunger is pressed. If the door switch is found to be defective replace the door switch. 3. If the switch and wiring are good and the problem persists, replace the oven relay board.

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 1-digit displays.

Hot Surface indication - If any of the induction elements are hot, a hot surface light will remain ON until the cooktop cools.

ESEC lockout feature - The electronic oven control's self-clean and Control 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 Control Lockout mode is active. When the oven control is in a self-clean or Control 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:
ES502I oven/cooktop control (EOC) - circuit boards mounted in plastic chassis.
Induction control assembly - circuit boards in plastic housings mounted under the cooktop on a metal tray with four screws.

Notes on replacing parts
Replacing an induction generator board – When replacing an induction generator board under the cooktop, do not over-tighten the 2 screws that secure each board to the range. Over-tightening the screws can damage the plastic housings holding the circuit boards.
Replacing an induction element
Ensure correct coil location.

Error notification in an induction system
Induction related alarms are displayed using all 4 displays of the user interface. The Rear Left display is used to notify the user that the message being displayed is an error and is represented with an "E" in the display. The Front Left display is used to show which induction generator board is generating the error.

1. The Front Left display showing "1" above indicates that the left generator board is producing the error. If display shows a "2", this indicates that the right generator board is producing the error. If display shows a "0", this indicates that the issue was generated by the cooktop control and not the induction generator.
2. The Front Right and Rear Right displays display the actual error. An example of a stuck cooling fan on the left induction generator board (E164) is shown above.
Replacing the ES502I control – When replacing the oven/cooktop control in the backguard, DO NOT over tighten the screws that secure it. Upper and lower support brackets should be reinstalled.
* 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.

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 as shown in the error notification in an induction system section. 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.**

Error Code	Likely Cause or Failure Condition	Suggested Corrective Action
E01	Internal error	1. Disconnect power, wait 30 seconds and reapply power. If fault returns upon power-up replace the hob user interface corresponding to the error.
E02	Data flash error	1. Disconnect power, wait 30 seconds and reapply power. If fault returns upon power-up replace the hob user interface corresponding to the error.
E03	Configuration error	1. Disconnect power, wait 30 seconds and reapply power. If fault returns upon power-up replace the hob user interface corresponding to the error.
E04	Keyboard tuning configuration error	1. Disconnect power, wait 30 seconds and reapply power. If fault returns upon power-up replace the hob user interface corresponding to the error.
E05	Keyboard safety error	1. Disconnect power, wait 30 seconds and reapply power. If fault returns upon power-up replace the hob user interface corresponding to the error.
E06	HMICOMM_Q_ERROR	1. Disconnect power, wait 30 seconds and reapply power. If fault returns upon power-up replace the hob user interface corresponding to the error.
E11	Stuck Key	1. If a key was pressed inadvertently for a long time this error code will be displayed. Make sure there is nothing (water, utensils) in contact with the keyboard. The fault code should go away once the key is released and the Stop key is pressed. If the error comes back when a key is pressed it means the error condition is still there. If the error does not come back it means the error condition is gone and the cooktop can be used. 2. If the fault code cannot be cleared, replace hob UI board corresponding to the error.
E12	Keyboard configuration error	1. Verify the unit has the proper cooktop user interface board based on the model number and parts catalog. 2. Replace the cooktop user interface board corresponding to the error if the UI is incorrect or the issue persists.
E13	Non-volatile memory alarm	1. Disconnect power, wait 30 seconds and reapply power. If fault returns upon power-up replace the hob user interface corresponding to the error.
E15	FMEA error	1. Disconnect power, wait 30 seconds and reapply power. If fault returns upon power-up replace the hob user interface corresponding to the error.
E19	Unable to configure the power board	1. Check the MACS connection (communication harness) between user interface board and induction power boards. 2. If problem persists, check continuity of MACS harness between each control board. Replace harness if defective. 3. If harness is good and problem persists, replace the induction board indicated by the error code. 4. If problem persists replace the hob user interface board corresponding to the error.
E20	Loss of communication between cooktop UI and oven UI	1. Disconnect power, wait 30 seconds and reapply power. Check if error condition is still there. 2. Test wiring harness between oven user interface board (MACS Bus) and cooktop UI (MACS2 or MACS1). 3. If wiring harness is good replace oven UI. 4. If the problem persists replace the cooktop user interface corresponding to the error.
E22	Loss of communication between power board and user interface board	1. Check the MACS connection (communication harness) between user interface board and induction power boards. 2. If problem persists, check continuity of MACS harness between each control board. Replace harness if defective. 3. If harness is good and problem persists, replace the induction board indicated by the error code. 4. If problem persists replace the hob user interface board corresponding to the error.
E24	Loss of communication between the hob user interfaces	1. Check the MACS connection (communication harness) between hob user interface board and oven user interface. 2. If problem persists, check continuity of MACS harness between each control board. Replace harness if defective. 3. If harness is good and problem persists, replace the hob user interface board indicated by the error code. 4. If problem persists, replace the oven user interface board.
E25	Loss of communication between the power boards	1. Verify the unit has the proper cooktop user interface board based on the model number and parts catalog. 2. Replace the cooktop user interface board if the UI is incorrect or the issue persists.
E27	MACS configuration communication loss	1. Check the MACS connection (communication harness) between user interface board and induction power boards. 2. If problem persists, check continuity of MACS harness between each control board. Replace harness if defective. 3. If harness is good and problem persists, replace the induction board indicated by the error code. 4. If problem persists replace the hob user interface board corresponding to the error.
E50	ADC read error	1. Disconnect power, wait 30 seconds and reapply power. If fault returns upon power-up replace the hob user interface corresponding to the error.
E61	15v supply out of window on induction power board	1. Cycle power to the appliance, wait 30 seconds before reconnecting power. 2. If problem persists, replace the induction board indicated by the error code.
E64	Cooling fan on the induction power board is blocked or otherwise unable to turn.	1. Check for interference, blockages, debris, dust, or anything else that would physically prevent the fan from moving. 2. If problem persists, replace the induction board indicated by the error code.
E81	Cooling fan not connected on induction power board	1. Check cooling fan connections on the induction board indicated by the error code. 2. If problem persists, replace the induction board indicated by the error

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 and connections. 2. Membrane control panel defective. 3. EOC defective.	1. Follow instructions for proper use of controls. 2. Verify membrane tail connections between EOC and ESEC. Replace if defective or damaged. 3. Replace EOC.
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 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 "Hot surface" indicator light when cooking zone is cold and switched off.	"Hot surface" indicator light	Induction coil temperature sensor failure	1.Test surface unit RTD approx. 100Kohms at room temperature. Replace surface unit if resistance is not correct. 2. Replace induction generator board.
Cooktop does not initialize/operate.	Blank No display No beep	EOC not powered.	Verify installation and harness connections to EOC.
		Defective EOC.	Replace EOC.