



SERVICE MANUAL



4544

VCE10F SHOWN ON STAND

ELECTRIC COMBI OVENS

<u>MODEL</u>	<u>ML</u>
VCE6H	126177
VCE10H	126178
VCE10F	126179
VCE20H	126172
VCE20F	126173

- NOTICE -

This Manual is prepared for the use of trained Vulcan Service Technicians and should not be used by those not properly qualified. If you have attended a Vulcan Service School for this product, you may be qualified to perform all the procedures described in this manual.

This manual is not intended to be all encompassing. If you have not attended a Vulcan Service School for this product, you should read, in its entirety, the repair procedure you wish to perform to determine if you have the necessary tools, instruments and skills required to perform the procedure. Procedures for which you do not have the necessary tools, instruments and skills should be performed by a trained Vulcan Service Technician.

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GENERAL

INTRODUCTION

General

The procedures in this manual apply to all models unless otherwise specified. All of the information, illustrations and specifications contained in this manual are based on the latest product information available at the time of printing.

Combi Ovens

The Electric Combi ovens provide convection heat, steam heat or a combination of both in a single compartment cooking chamber. Humidification is provided from the internal steam generator or by water injection into the oven cavity. When the water is injected by means of an internal spray nozzle, it vaporizes on contact with the hot interior surfaces.

The ovens are available in two depths, Half and Full (half on 6 level only) and in three sizes (6H, 10H/F and 20H/F).

OPERATION

Refer to the Installation & Operation Manual for specific operating instructions.

CLEANING

Refer to the Installation & Operation Manual for specific cleaning instructions.

STACKING KIT INSTRUCTIONS

When servicing stacked ovens and disassembly is required, refer to the Stacking Kit Instructions for specific assembly procedures.

SPECIFICATIONS

Water Supply

The fact that a water supply is potable is no guarantee that it is suitable for steam generation. The supply connection to the steam generator should be "treated" water and must be within the guidelines listed below. For drain water cooling only, an "untreated" water supply connection should be used.

Supply Pressure (treated and untreated water)	20-80 psig
Supply Connections (treated and untreated water)	cold
Water Hardness *	2-4 grains per gallon (gpg)
Chloride	less than 30 ppm
PH factor (range)	7 to 8
(*17.1 ppm = 1 grain of hardness)	

Electrical

MODEL	POWER (KW)	MACHINE AMPERAGE (3 PHASE/ 60HZ) ¹					
		PER LINE ²			RECOMMENDED CIRCUIT PROTECTION ³		
		208V	240V	480V	208V	240V	480V
VCE6H	9	25	22	11	35	30	15
VCE10H	18	50	43	22	70	60	30
VCE10F	18	50	43	22	70	60	30
VCE20H	24	67	58	29	90	80	40
VCE20F	36	100	87	43	125	110	60

NOTES:

1. Amperage values in the table are nominal. Tolerance is +5/-10%.
2. Line currents must be measured in full power convection heat mode.
3. Complied in accordance with National Electric Code, ANSI/NFPA 70, latest edition.

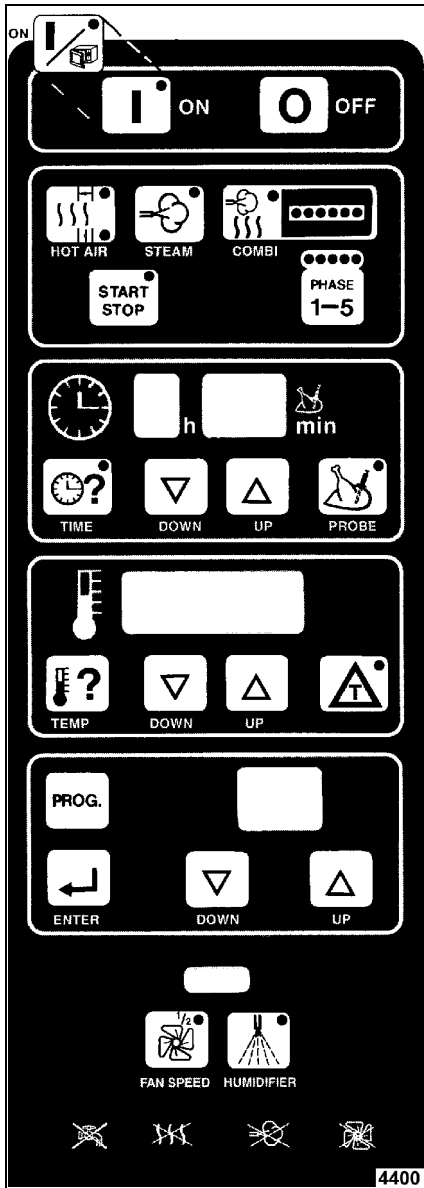
MODEL	INDIVIDUAL AMPERAGE (3 PHASE/ 60HZ) ¹									
	CONVECTION HEAT ²					STEAM GENERATOR HEAT ³				
	ELEMENTS		208V	240V	480V	ELEMENTS		208V	240V	480V
	KW	NO.				KW	NO.			
VCE6H	9	1	25	22	11	8	1	22	19	10
VCE10H	9	2	50	43	22	8	2	45	39	19
VCE10F	9	2	50	43	22	8	2	45	39	19
VCE20H	6	4	67	58	29	8	3	67	58	29
VCE20F	9	4	100	87	43	8	4	89	77	39

NOTES:

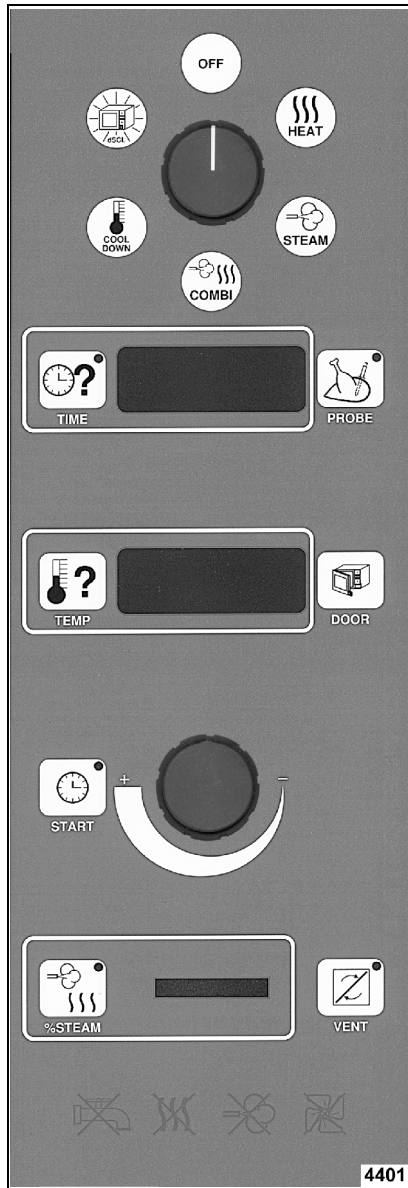
1. Amperage values in the table are nominal. Tolerance is +5/-10%.
2. Convection heater currents must be measured in full power convection heat mode.
3. Steam generator heater currents must be measured in full power steam mode.

OVEN CONTROLS

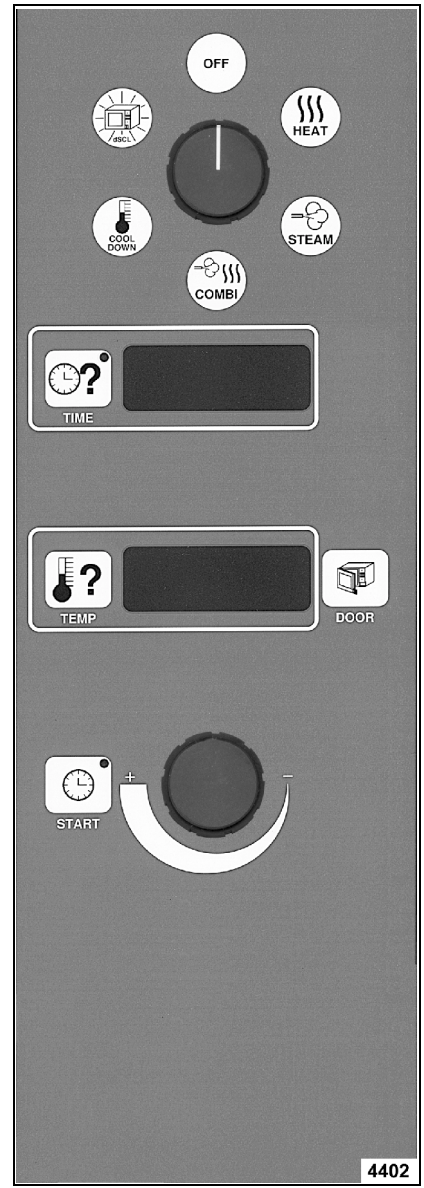
PROGRAMMABLE



DELUXE MANUAL



STANDARD MANUAL



WATER CONDITIONING

Furnishing the steam generator with treated water to reduce scale formation is important. Scale formation will reduce steam output, cause premature component failure, and shorten equipment life. Most water supplies contain scale producing minerals such as Calcium and Magnesium. As steam is generated, the minerals remain and dissolve into the water. As the concentration of these minerals increases past a certain point, they precipitate from the water and coat the inside of the steam generator, heating elements, and water level sensors. Because of the high temperature of these surfaces, the precipitated minerals bake onto them and become very difficult to remove.

This may cause several problems:

1. Reduced heat transfer efficiency.
2. Premature heating element failures.
3. False readings from water level sensors.

These problems are common to any manufacturer's steamer regardless of design, but they can all be minimized by furnishing the steam generator with treated water.

Other factors affecting steam generation are iron content, amount of chloridation and dissolved gases.

The desired water properties can best be achieved by using a **properly maintained water treatment system.**

The water level probes in the steam generator use ions in the water to detect the water level. **Do not use fully demineralized or de-ionized water since it is "non conductive" and the water level can not be detected.**

The use of strainers, or filters will not remove minerals from the water.

Water supplies vary from state to state and from locations within a state. Therefore, Vulcan recommends that a local water treatment specialist be consulted before the installation of any steam generating equipment.

Steamers that operate over a long period of time without the benefit of a water treatment system, which have developed a heavy scale build up, should be cleaned before using the system.

LUBRICATION

- Cavity fan motor has sealed bearings and requires no additional lubrication.
- Cavity fan motor shaft seal requires lubrication at replacement (White silicone grease 544268).

TOOLS

Standard

- Standard set of hand tools.
- Metric set of hand tools.
- VOM with AC current tester (any quality VOM with a sensitivity of at least 20,000 ohms can be used).
- Gear puller to remove cavity fan.
- Temperature meter with thermocouple.

Special

- Red High Temperature RTV for door seal and probes (P/N 544313 or 542949).
- Grounding kit to protect control board(s) if handled (P/N TL-84919).
- Motor Shaft Centering Tool (P/N 359450).
- 28 pin EPROM extraction tool and 28 pin EPROM insertion tool (purchase locally).
- Scalekleen deliming chemical or the recommended chemical for the water treatment system in use for deliming of the steam generator. (Scalekleen is available through the Service Parts Distribution Center or locally through an Everpure dealer)

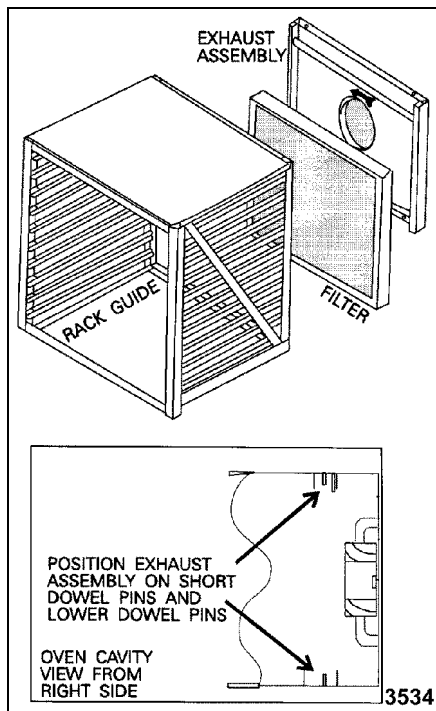
REMOVAL AND REPLACEMENT OF PARTS

RACK GUIDE/FILTER/EXHAUST ASSEMBLY

1. Turn the oven off.
2. Remove the racks (if equipped).
3. Push the rack guide to rear of oven to remove the rack guide tabs from slots in the exhaust assembly (10 level).
4. Lift the rear of the rack guide up and pull the guide out of the oven cavity.
5. Lift the filter up, then pull forward to remove the filter (2 filters on 20 level).

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

6. Lift up on exhaust assembly then pull forward at bottom to clear the dowel pins.
7. After lower dowel pins have been cleared, remove assembly from top pins and remove from oven.



8. Reverse procedure to install.

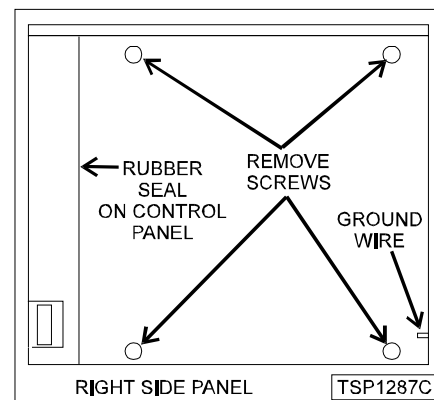
NOTE: Be sure the bottom of the exhaust assembly is seated on the dowel pins and fan direction arrow is pointing to left (facing oven).

COVERS AND PANELS

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

Side Panels

1. Remove the screws from the side panel for the side in need of access. Hold the panel in place before removing the last screw.
2. Access the inside edge of the panel at the bottom rear corner and disconnect the ground wire (if present).



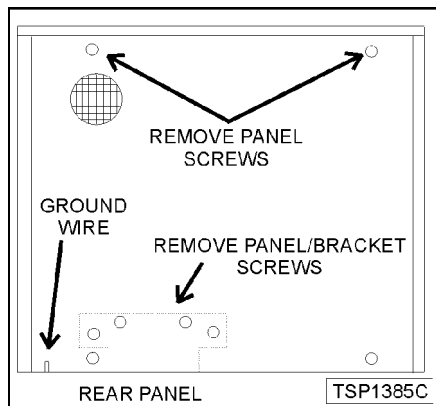
3. Remove the panel.

NOTE: When re-installing the right side panel, ensure the gasket at the rear of the control panel seals properly against the front edge of the right side panel.

4. Reverse procedure to install.

Rear Panel

1. Remove the screws from the rear oven panel. Hold the panel in place before removing the last panel screw.
2. Access the inside edge of the panel at the bottom left and disconnect the ground wire (if present).



3. Lower the panel to remove from oven.
4. Reverse procedure to install.

Control Panel

1. Remove the right side panel as outlined.
2. Disconnect the ribbon cable, thermocouple connector, ground leads and door switch connector from the oven control board.
3. Remove the nuts at the top and bottom of control panel that secure it to the frame.

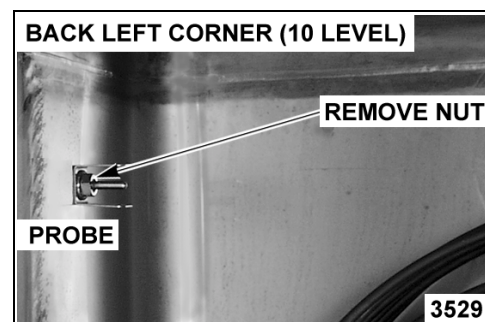
CAUTION: Hold control panel during removal or damage may result to the oven control if dropped.

4. Reverse procedure to install.

OVEN TEMPERATURE PROBE

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

1. Remove the rack guide, filter and exhaust assembly as outlined under "RACK GUIDE/FILTER/EXHAUST ASSEMBLY".
2. Remove both side panels as outlined under "COVERS AND PANELS".
3. Remove the retaining nut from the probe inside the oven (2 probes on 20 level) and lift bracket off.



4. Remove probe(s) through the left side of the oven cavity.

NOTE: When replacing, use high temperature silicone between the probe and the hole in the oven cavity wall.

NOTE: Be sure to replace bracket around probe and position as shown.

5. Disconnect the probe leads from the control board connector.
6. Reverse procedure to install.

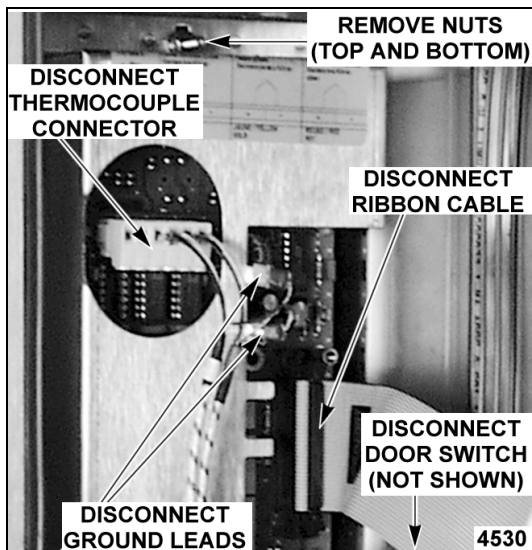
NOTE: When tightening retaining nut, probe will rotate unless secured. Do not clamp down on probe or damage may result.

PROGRAMABLE OVEN CONTROL

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

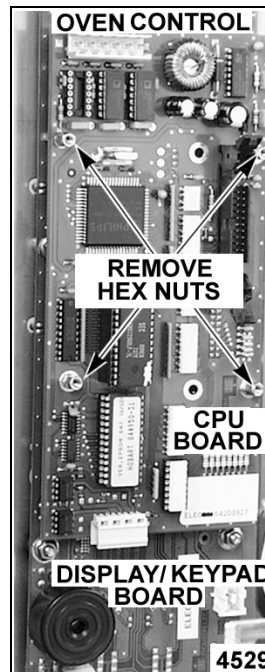
CAUTION: Certain components in this system are subject to damage by electrostatic discharge during field repairs. A field service ground kit is available to prevent damage. The field service grounding kit must be used anytime the control board is handled.

1. Remove the right side panel as outlined under "COVERS AND PANELS".
2. Disconnect the ribbon cable, connectors and ground leads from the oven control board.

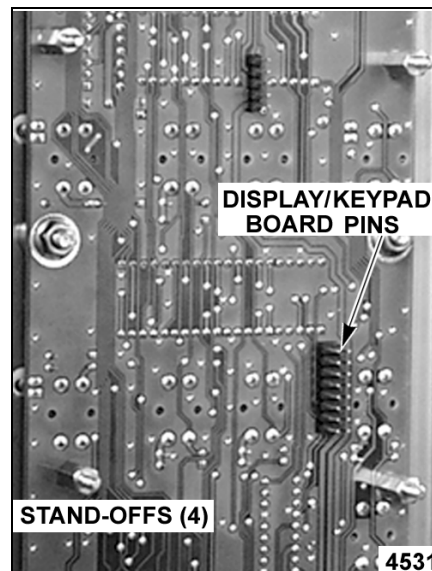


3. Remove the cover from the oven control by removing the mounting nuts at the top and bottom.

4. Remove the hex nuts securing the CPU board to the display/keypad board.



5. Pull outwards on the CPU board and lift it off from the display/keypad board pin connections.



NOTE: When installing the control board onto the keypad board, make sure that the pins on the keypad board are aligned with the plug on the control board.

- Remove the display/keypad board from the control panel by removing the mounting nuts.



- Remove the oven control board from the control panel by removing the mounting nuts.



- Reverse procedure to install.

- Reverse procedure to install.

MANUAL OVEN CONTROLS

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

CAUTION: Certain components in this system are subject to damage by electrostatic discharge during field repairs. A field service ground kit is available to prevent damage. The field service grounding kit must be used anytime the control board is handled.

- Remove the right side panel as outlined under "COVERS AND PANELS".
- Disconnect the ribbon cable, thermocouple connector, ground leads and door switch connector from the oven control board.
- Remove the cover from the oven control board by removing the mounting nuts at the top and bottom.

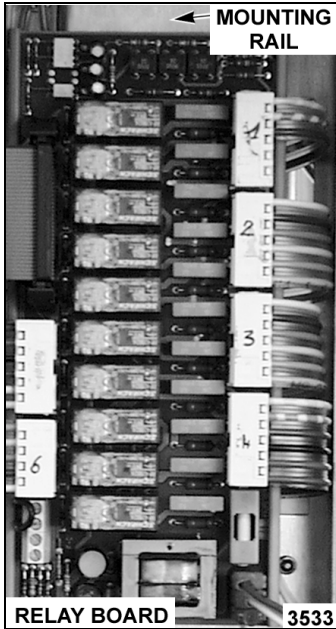
RELAY BOARD

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

CAUTION: Certain components in this system are subject to damage by electrostatic discharge during field repairs. A field service ground kit is available to prevent damage. The field service grounding kit must be used anytime the control board is handled.

- Remove the right side panel as outlined under "COVERS AND PANELS".
- Disconnect lead wires from the relay board.

- Release the clips on the back of the mounting rail.



- Reverse procedure to install.

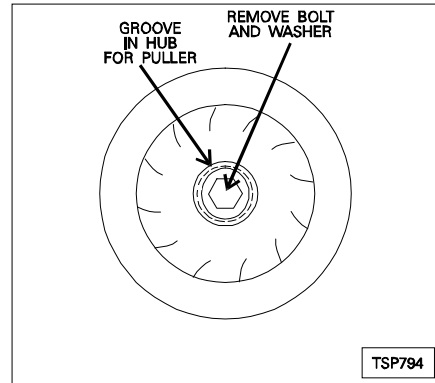
BLOWER AND MOTOR

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

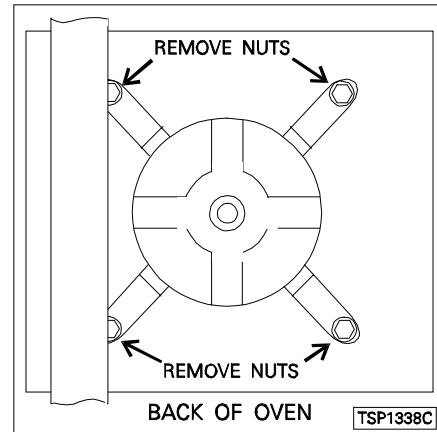
Removal

- Remove the rack guide, filter and exhaust assembly as outlined under "RACK GUIDE/FILTER/EXHAUST ASSEMBLY".
- Loosen bolt (one turn) that secures the blower and install puller.
- Tighten the puller, then tap the puller with a hammer to loosen the blower from the motor shaft.
- Remove the puller, bolt, washer and blower from the motor shaft.

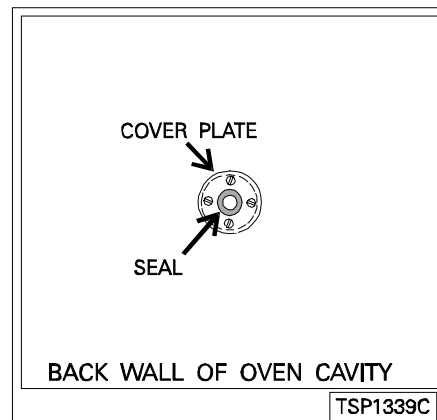
NOTE: If only the blower is being removed, reverse the procedure at this point to install.



- Remove the rear panel as outlined under "COVERS AND PANELS".
- Disconnect the lead wires from the motor.
- Remove the motor from the back of the oven by removing the mounting nuts.



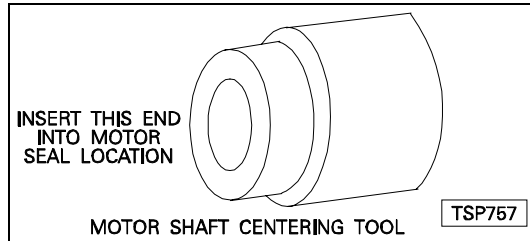
- Remove the cover plate and seal from inside the oven cavity.



NOTE: You may have to drive the seal out from the back of the oven.

Installation

1. Mount the motor to the back of the oven.
Tighten the bolts enough to hold the motor in place, but allow some movement.
2. Ensure that the motor shaft is centered (use shaft centering tool) in the motor shaft hole and tighten mounting bolts.



3. Remove the shaft centering tool.
4. Connect the lead wires to the motor.
5. Install seal and cover as outlined under "BLOWER MOTOR SHAFT SEAL".

NOTE: Remove all traces of motor seal grease from the motor shaft.

6. Install the blower wheel.
7. Install exhaust assembly, filter, and rack guide as outlined under "RACK GUIDE/FILTER/EXHAUST ASSEMBLY".
8. Install rear panel as outlined under "COVERS AND PANELS".

BLOWER MOTOR SHAFT SEAL

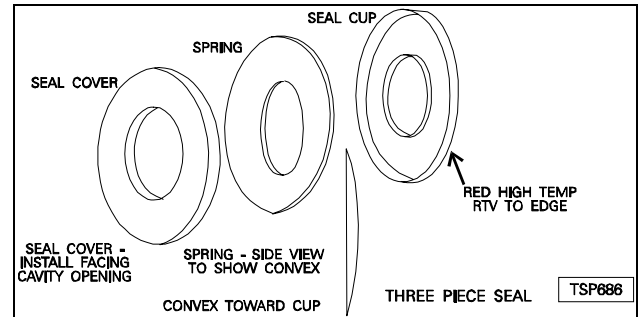
WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

1. Remove blower as outlined under "BLOWER AND MOTOR".
2. Remove motor seal cover plate.
3. Remove the seal from the recess in the rear oven wall.

NOTE: You may have to drive the seal out from the back of the oven.

4. Fill replacement seal cover with white silicone grease.
5. Assemble the motor seal with the convex part of the spring toward the motor.
6. Apply red high temperature RTV to the outer edge of the seal to help hold it in the recess and install the seal with the seal cover toward the front of the oven cavity.

NOTE: Remove all traces of motor seal grease from the motor shaft.



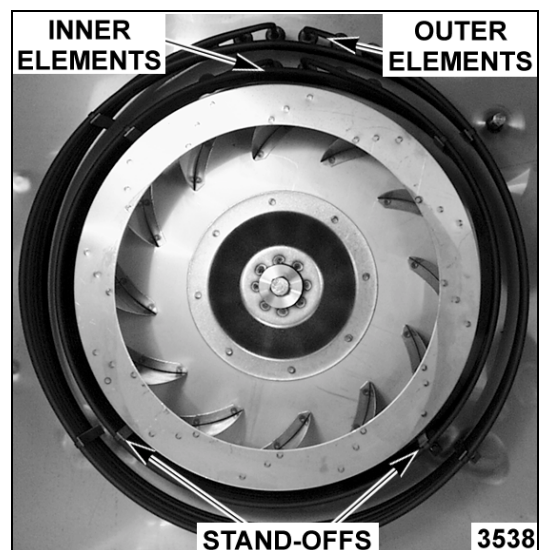
7. Install the seal cover plate and then the blower.

HEATING ELEMENTS

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Oven Cavity

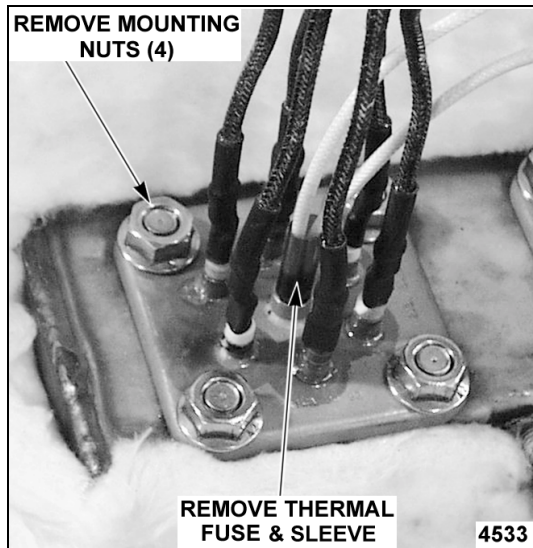
1. Remove the rack guide, filter and exhaust assembly as outlined under "RACK GUIDE/FILTER/EXHAUST ASSEMBLY".
2. From inside the oven cavity, remove the nuts from the heating element stand-offs for the element being replaced.
3. Remove the rear panel as outlined under "COVERS AND PANELS".
4. Disconnect the lead wires from the elements at the rear of the oven.
5. Remove the nuts and washers from the element being replaced then remove the element.



6. Reverse procedure to install.

Steam Generator

1. Turn off the water supply to the steam generator.
2. Remove the right side panel as outlined under "COVERS AND PANELS".
3. Remove the thermal fuse and protective sleeve from the heater thermowell.



4. Disconnect the heating element lead wire connections.
5. Remove the heating element from the steam generator by removing the mounting nuts.

NOTE: When installing a new heater, use the supplied gasket and ensure the mating surfaces are clean.

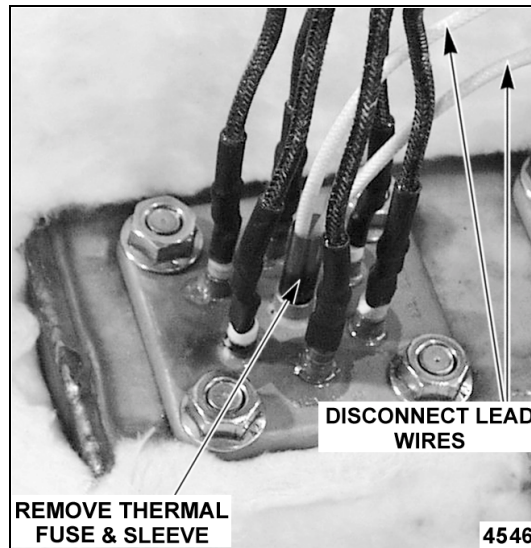
6. Reverse procedure to install.

THERMAL FUSE(S)

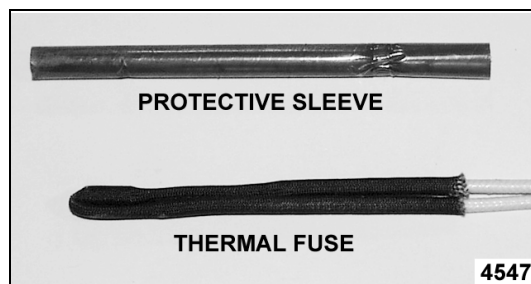
WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

1. Remove the right side panel as outlined under "COVERS AND PANELS".

2. Disconnect the thermal fuse(s) lead wire connections.



3. Remove the thermal fuse and protective sleeve from the heater thermowell.



4. Reverse procedure to install.

NOTE: When replacing thermal fuse, be sure to insert the protective sleeve and thermal fuse together. The protective sleeve must be inserted into the heater thermowell with the fuse to avoid chafing of the fuse leads.

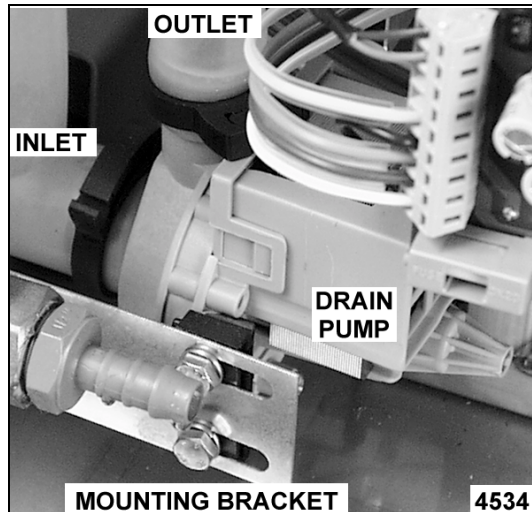
NOTE: When replacing thermal fuse do **not** pull the lead wires apart. This may break the contact junction or damage the connections.

STEAM GENERATOR DRAIN PUMP

1. Turn off the oven and allow the steam generator to drain.

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

2. Turn off the water supply.
3. Remove the right side panel as outlined under "COVERS AND PANELS".
4. Disconnect lead wires and hoses connected to the drain pump.
5. Remove the bolts from the mounting bracket that secure the pump.

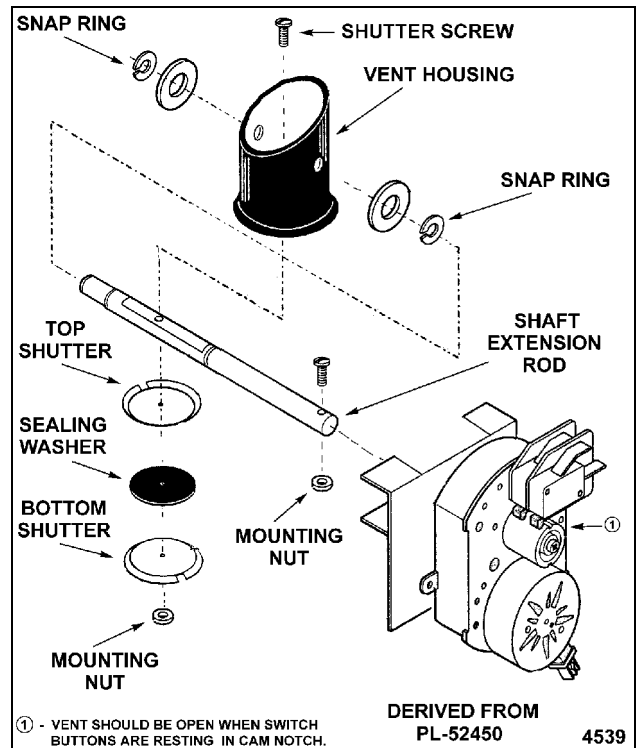


6. Reverse procedure to install.

VENT DAMPER ASSEMBLY

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

VENT DAMPER ASSEMBLY DIAGRAM



Vent Motor

1. Remove the right side panel as outlined under "COVERS AND PANELS".
2. Disconnect the lead wires from the switch and motor.
3. Remove the screw and nut behind the motor assembly that connects motor to shaft extension rod.
4. Remove the motor and switch assembly from the oven by sliding the mounting bracket out from the oven frame.
5. Reverse procedure to install.

Sealing Washer

1. Remove the right side panel as outlined under "COVERS AND PANELS".
2. Open the oven door and remove the rack guide, filter and exhaust assembly as outlined under "RACK GUIDE/FILTER/EXHAUST ASSEMBLY".

WARNING: THE FOLLOWING STEPS REQUIRE POWER TO BE APPLIED TO THE UNIT DURING THE ADJUSTMENT. USE EXTREME CAUTION AT ALL TIMES.

3. Reconnect the electrical power to the machine at the main circuit box.
4. Close the door, turn the oven ON and press the Start/Stop button.
5. Observe the rotation of the vent motor cam. When the cam stops turning then the vent should be closed.

NOTE: When the oven is turned OFF or the door is opened, the vent should open automatically.

6. Disconnect the electrical power to the machine at the main circuit box. Place a tag on the circuit box indicating the circuit is being serviced.

NOTE: Power to the oven must be removed in this manner. If the oven is turned OFF or the door is opened, the vent will re-open automatically.

7. Open the oven door and examine the vent from inside the cavity.
 - A. If the mounting nut is visible, proceed to step 8.
 - B. If the mounting nut is not visible, then the vent needs to rotate 180 degrees. Reconnect power to the machine and repeat steps 3 through 7A.
8. Remove the nut securing both shutters and the sealing washer to the shaft extension rod then remove the shutters and sealing washer.
9. Install new sealing washer and re-assemble.

Shaft Extension

1. Remove the left, right and rear panels as outlined under "COVERS AND PANELS".
2. Open the oven door and remove the rack guide, filter and exhaust assembly as outlined under "RACK GUIDE/FILTER/EXHAUST ASSEMBLY".
3. Remove the screw and nut behind the motor assembly that connects motor to shaft extension rod.

4. Rotate the extension rod approximately 90 degrees by hand.
5. Examine the vent from inside the cavity.
 - A. If the mounting nut is visible, proceed to step 6.
 - B. If the mounting nut is not visible, then the extension rod needs to rotate approximately 90 degrees more.
6. Remove the nut securing both shutters and the sealing washer to the extension rod then remove the shutters and sealing washer.
7. Remove the shutter screw from the extension rod.
8. Release the snap ring on the left end of the shaft (if facing oven) and pull shaft extension out.

NOTE: If the washers on the exterior of the vent housing come loose, red silicone must be re-applied to prevent steam leakage above the oven cavity.

9. Reverse procedure to install.

WATER LEVEL SENSORS AND WATER EQUALIZATION TUBE

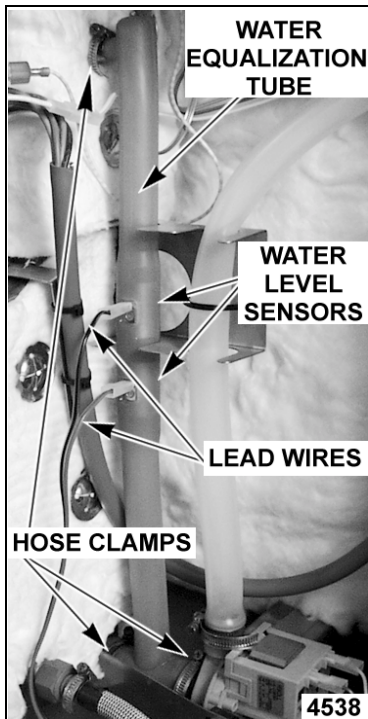
1. Turn the oven off and allow steam generator tank to drain.

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

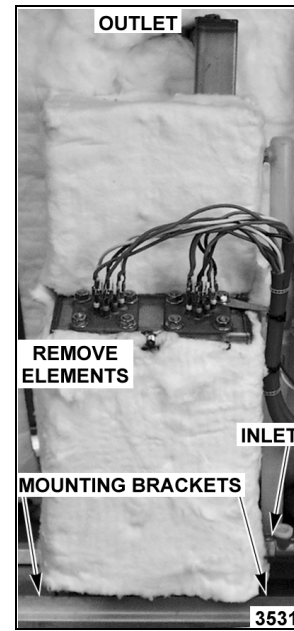
2. Turn off the water supply.
3. Remove the right side panel as outlined under "COVERS AND PANELS".
4. Disconnect lead wires and hose clamps from the water equalization tube.

NOTE: Some water will continue to drain out.

- Remove the water equalization tube.



- Disconnect water and steam equalization tube from the steam generator. If necessary, loosen or remove drain pump mounting nuts to remove tube.



10 LEVEL SHOWN

- Reverse procedure to install.

STEAM GENERATOR TANK

- Turn the oven off and allow the steam generator tank to drain.

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

- Turn off the water supply to the steam generator
- Remove the right side and rear panels as outlined under "COVERS AND PANELS".

- Remove heating elements from steam generator tank and place to the side.

NOTE: Unless replacing the heating element(s), it not necessary to remove the heating element lead wires.

- On 6 and 10 levels, remove clamp from the steam exhaust hose at the top of steam generator and disconnect hose. On 20 levels, remove the nuts securing the steam exhaust pipe to the outside of the cavity.

NOTE: When replacing tank on 20 levels, be sure to seal the mating surface between the exhaust pipe and cavity wall with RTV.

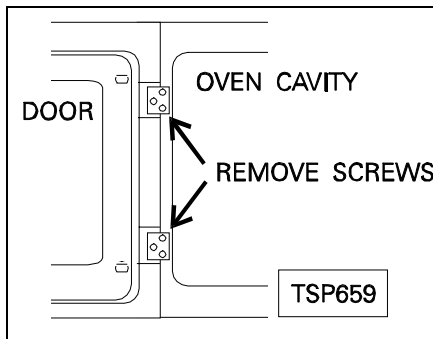
- Remove the nuts from the tank mounting studs and bracket (at bottom) then remove the steam generator from the oven.
- Remove insulation from the old steam generator and use on the replacement steam generator.
- Reverse procedure to install.

OVEN DOOR

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

Removal

1. Remove the left and right side panels as outlined under "COVERS AND PANELS".
2. Disconnect the lead wires to the lamp on the power supply board terminal block and route them so they can be pulled through the hole in the frame when the door is removed.
3. Support the door, remove the screws from each hinge block on the oven and remove door.

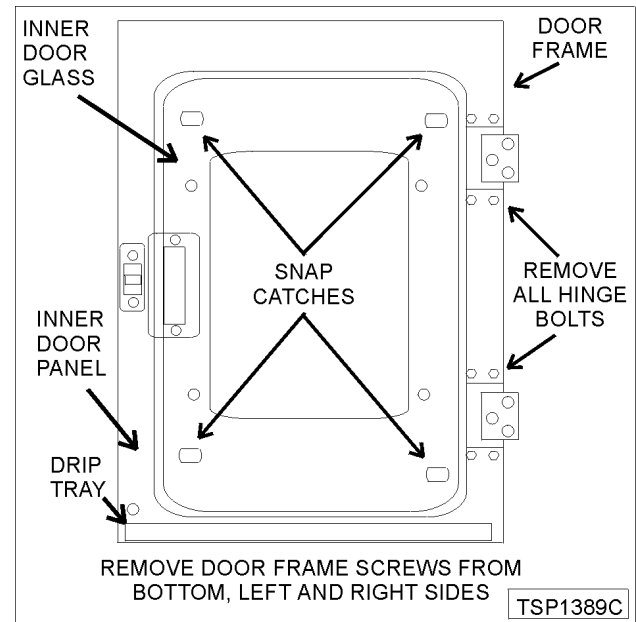


4. Reverse procedure to install.

Disassembly

1. Remove the door from the oven as outlined above in "REMOVAL".
2. Lay the door on a flat surface with the inside of the door facing up.
3. Lift up along the inner door glass edge near the door latch and unsnap the glass from the "snap catches" in the oven door.

4. Open the inner door glass and remove the c-ring clamps from the rear snap catches, unsnap at the rear then lift off.



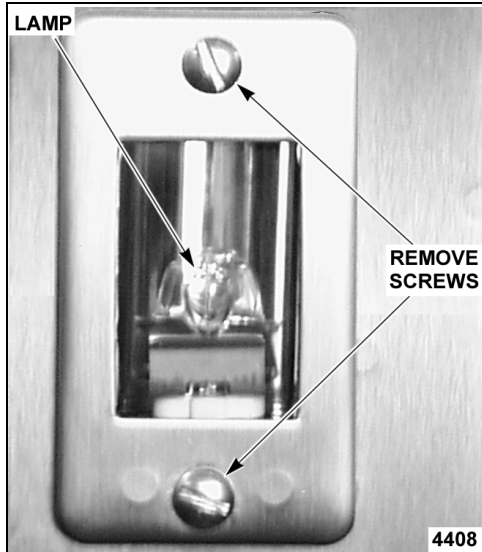
CAUTION: When replacing the inner door glass, it must be installed with the conductive side toward the front of the oven. Use an ohmmeter to verify the conductive side. Set the meter to read ohms and touch glass with the meter leads. A resistance will be measured but will vary depending on the distance between the meter leads, grease and/or other substances on the glass.

5. Remove the bolts securing the top and bottom hinges to the door.
6. Remove the drip tray, remaining screws from the inner door panel, the screws at the left, right and bottom of the door and remove the door handle.
7. Lift the inner door panel from the outer door frame.
8. Remove the outer door glass.
9. Reverse procedure to install.
10. Adjust the door as outlined under "OVEN DOOR ADJUSTMENT" in "SERVICE PROCEDURES AND ADJUSTMENTS".

DOOR LAMP

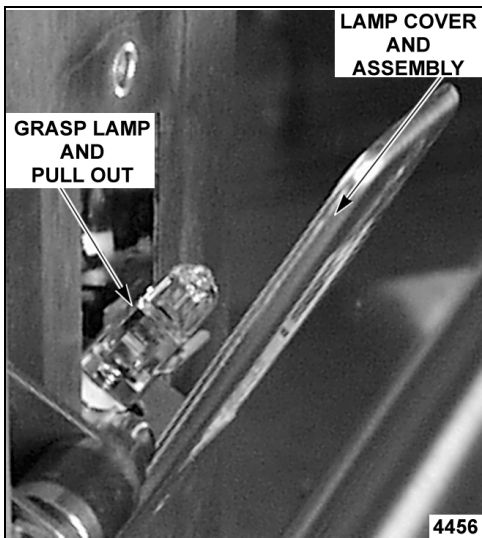
WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

1. Remove the screws holding the cover and gasket.



2. Pull the lamp and socket assembly out from the door.
3. Hold the lamp assembly and grasp the bulb using a cloth.

NOTE: Do not touch the Halogen lamp with bare hands. If lamp is exposed to oil from the skin, the life will be reduced. Ensure lamp is free from oil and dirt before replacing.



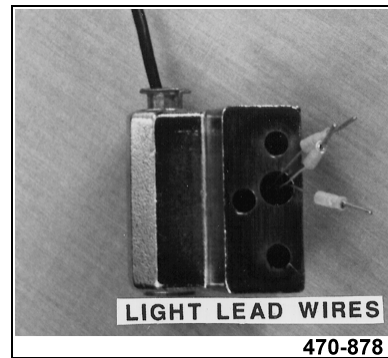
4. Pull up on light bulb to remove it from socket.
5. Reverse procedure to install.

OVEN DOOR HINGES

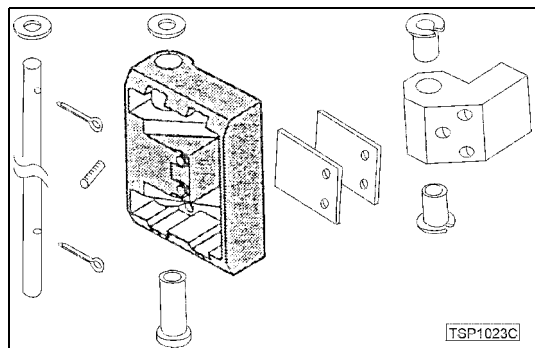
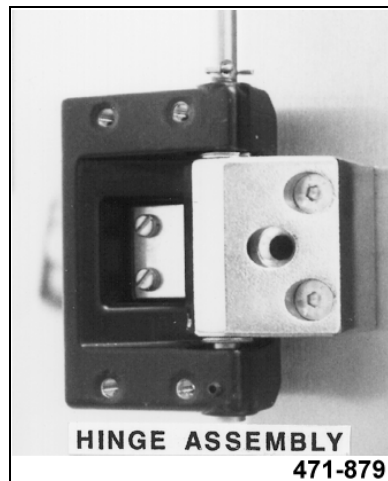
WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

1. Remove and disassemble the door as outlined under "OVEN DOOR".
2. Remove the light lead wire from the hinge.

NOTE: Strip 3 inches of the shielding away from the wires at the terminal end to allow the terminals to be fed through the hinge one at a time.



3. Remove the cotter pins from the shaft and remove the shaft from the hinges.



4. Reverse procedure to install.

DOOR MAGNETIC REED SWITCH

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

1. Remove the right side panel as outlined under "COVERS AND PANELS".
2. Remove the nuts that secure the door switch mounting bracket to the bottom of the control panel. On 20 levels, the switch is mounted to the underside of the channel for the door handle (no bracket required).
3. Disconnect the switch lead wires.
4. Remove the switch from the oven.



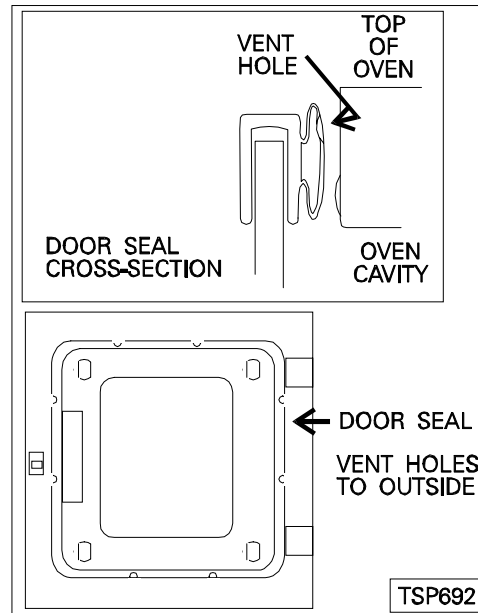
6 AND 10 LEVELS

5. Reverse procedure to install and check for proper operation.

DOOR SEAL

1. Turn the oven off.
2. Open the oven door.
3. Remove seal from the edge of the inside glass.
4. Clean the edge of the glass, remove the old adhesive.

5. Apply red silicone to the replacement seal and install the seal to the glass edge. The vent holes must be installed to the outside to allow the seal to contract when the door is closed.



6. Adjust door closure, if necessary, as outlined under "OVEN DOOR AND DOOR LOCK ADJUSTMENT" in "SERVICE PROCEDURES AND ADJUSTMENTS".

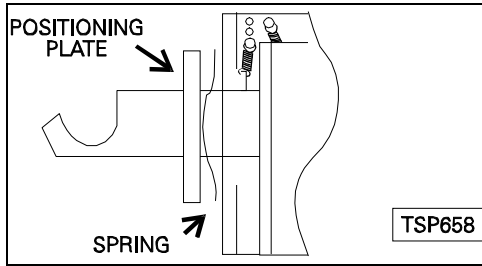
DOOR LOCKING MECHANISM

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

Replacement

1. Remove the right side panel as outlined under "COVERS AND PANELS".
2. Disconnect the lead wires to the motor and switches.
3. Remove the nuts from the mounting studs and remove the assembly from the oven.

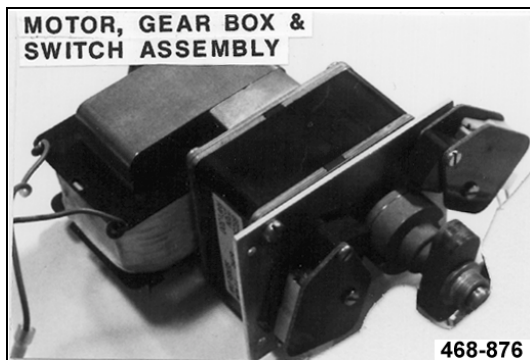
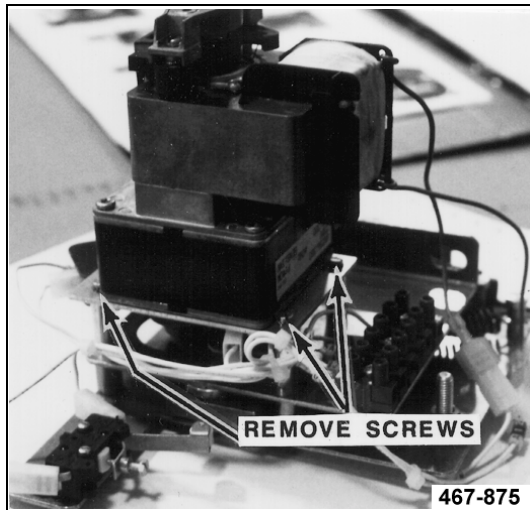
- Remove the spring and positioning plate from the locking arm.



- Reverse procedure to install and adjust as outlined under "OVEN DOOR ADJUSTMENT" in "SERVICE PROCEDURES AND ADJUSTMENTS".

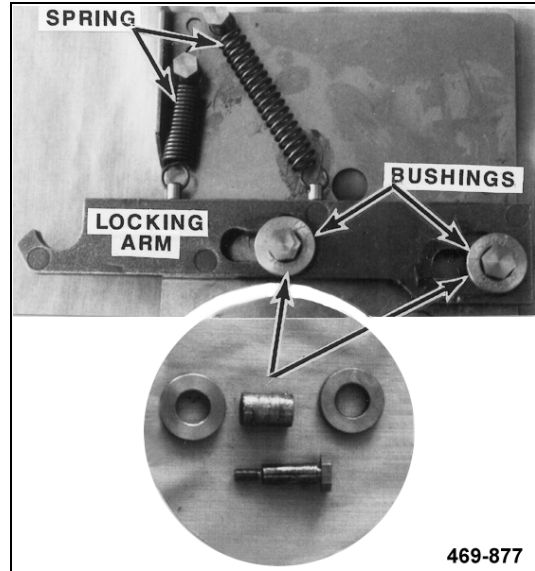
Disassembly

- Remove the three screws that secure the motor and switch assembly.
- Remove the motor, gear box and switch assembly from the locking mechanism. Remove the two bolts from the locking mechanism. The springs, locking arm and bushings can be removed.



- Remove the two bolts from the locking mechanism.

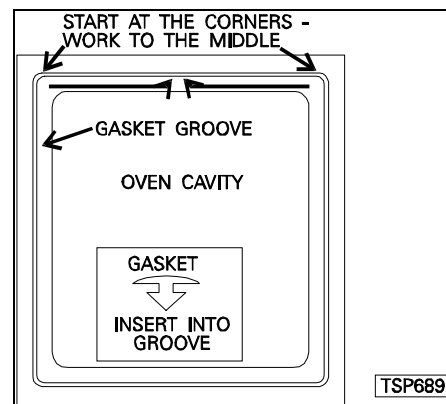
- The springs, locking arm and bushings can be removed.



- Reverse procedure to install.

OVEN CAVITY SEAL

- Open the door.
- Pull the seal from the groove around the oven cavity.
- Push the arrow head tip of the gasket into the groove. Install the four corners first.
- Start at the corners and work to the middle of each side, being careful not to stretch the replacement gasket.

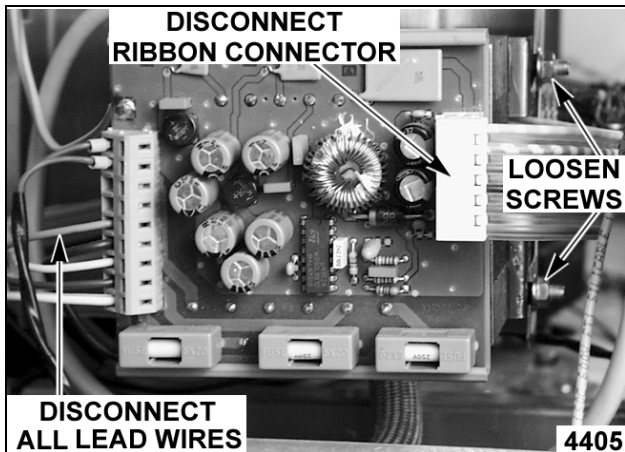


- Check the door for proper operation and adjust if necessary, as outlined under "OVEN DOOR AND DOOR LOCK ADJUSTMENT" in "SERVICE PROCEDURES AND ADJUSTMENTS".

POWER SUPPLY BOARD AND TRANSFORMER

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

1. Remove the right side panel as outlined under "COVERS AND PANELS".
2. Disconnect lead wire connections and ribbon cable from the board.



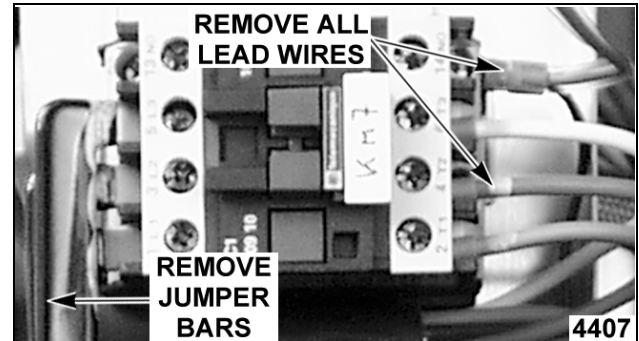
3. Loosen the two nuts securing the assembly to the mounting bracket and lift the assembly off the bracket.
4. Reverse procedure to install.

NOTE: Ensure transformer tap wire is in the position that corresponds to the machine data plate voltage. Refer to the "power supply board and transformer (1T)" component on the wiring diagram for proper connection of the individual lead wires.

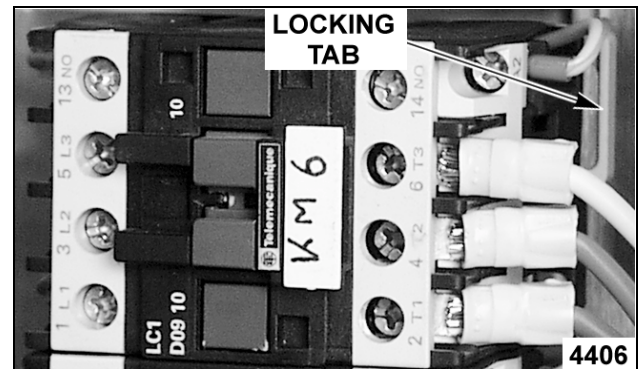
CONTACTORS

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

1. Remove the right side panel as outlined under "COVERS AND PANELS".
2. Disconnect lead wires for the contactor being replaced.



3. Remove the jumper bars from the contactors.
4. Pull the locking tab out at the contactor base to release the catch and remove contactor from mounting bracket.

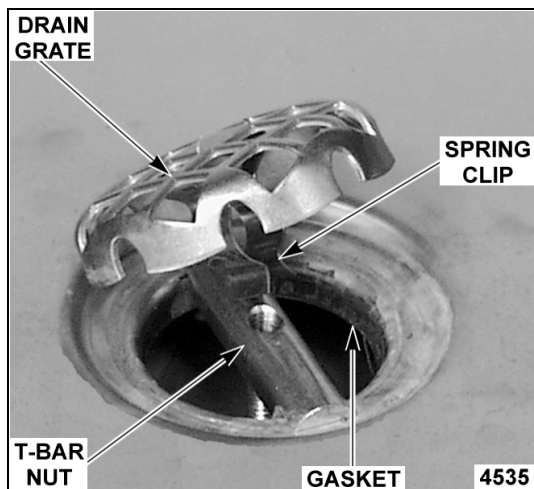


5. Reverse procedure to install.

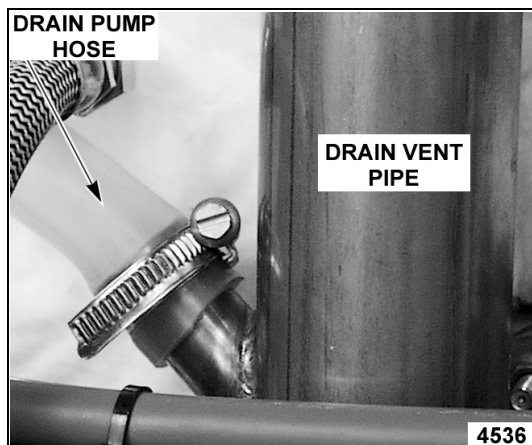
OVEN CAVITY DRAIN

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

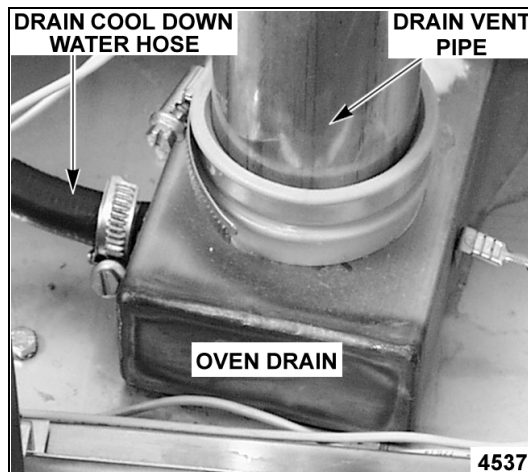
1. Open the oven cavity door.
2. Lift up the oven cavity drain grate to remove.



3. Unscrew t-bar nut to release drain at the front.
4. Remove rear panel as outlined under "COVERS AND PANELS".
5. Disconnect the drain pump discharge hose from the drain vent pipe.



6. Remove the drain vent pipe from the drain.



7. Disconnect the drain cool down water hose from the drain nipple extension.
8. Unscrew the drain line piping from the bottom of the oven then remove the oven drain.
9. Reverse procedure to install.

SERVICE PROCEDURES AND ADJUSTMENTS

WARNING: CERTAIN PROCEDURES IN THIS SECTION REQUIRE ELECTRICAL TEST OR MEASUREMENTS WHILE POWER IS APPLIED TO THE MACHINE. EXERCISE EXTREME CAUTION AT ALL TIMES. IF TEST POINTS ARE NOT EASILY ACCESSIBLE, DISCONNECT POWER, ATTACH TEST EQUIPMENT AND REAPPLY POWER TO TEST.

CONFIGURATION MODE - PROGRAMABLE CONTROL

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

1. Remove the rear panel as outlined under "COVERS AND PANELS".
2. Identify the type of convection fan motor(s) on the oven before setting the motor values in step 9 and 10.
3. Reverse procedure to install.
4. Re-connect power to the oven.

The configuration mode can be entered only when the oven is **OFF**. Returning to the normal operating mode can be done at any time by pressing the **OFF** key to save the configuration settings and exit the configuration mode.

To Perform:

1. To enter the configuration mode press the **TIME**, **TIME UP** and **TIME DOWN** keys simultaneously for 3 seconds. In the time display, C and F will be displayed. In the temperature display, "Conf" will be displayed.
2. Press the **TIME UP** key for Fahrenheit or **TIME DOWN** key for Celsius. The blinking letter indicates the temperature scale selected. The control will automatically advance to the next step, approximately three seconds after the selection is made. To manually advance to the next step, press the **START/STOP** key.
3. dSC is displayed in the time display and the number of clean cycles completed (delimiting of steam generator) is displayed in the temperature display. **The number cannot be changed or modified.** Press the **START/STOP** key to advance to the next step.

4. The EPROM revision level is displayed in the time display and "Conf" is displayed in the temperature display. To verify the EPROM is at the current revision level, refer to the [Technical Service Bulletins](#). Press the **START/STOP** key to advance to the next step.
5. HHH is displayed in the time display and the total cooking hours of the oven is displayed in the temperature display. Press the **TEMP UP** key to increase number of hours or the **TEMP DOWN** key to decrease the number of hours. If the current number of hours is acceptable, press **START/STOP** key to advance to the next step.

NOTE: If a configuration parameter is selected and not changed within 3 seconds, the control will automatically advance to the next step without pressing the **START/STOP** key.

6. bbb flashes and is displayed in the time display, the frequency number is displayed in the temperature display and the buzzer should be sounding. Press the **TEMP UP** or **TEMP DOWN** keys to set the buzzer frequency (000 = continuous and 255 = very slow intervals) number. A good setting to start with is 050 or any number that is preferable to the customer. If the setting is acceptable, press the **START/STOP** key to advance to the next step.
7. uuu is displayed in the time display and the steam temperature setting is displayed in the temperature display. The steam temperature setting is the boiling point adjustment for elevation and must be set to achieve optimum results. Press the **TEMP UP** key to increase number or **TEMP DOWN** key to decrease number. Set the temperature according to the table below. Press the **START/STOP** key to advance to the next step.

NOTE: The temperature selected in the table below will also be the highest starting point temperature available, when the steam mode is selected.

ELEVATION (FT)	TEMPERATURE (°F)
Sea level to 500	212
500 to 1000	211
1,000 to 2,000	209
2,000 to 3,000	207
3,000 to 4,000	205
4,000 to 5,000	204
5,000 to 6,000	202
6,000 to 7,000	200
7,000 to 8,000	198
8,000 to 9,000	196
9,000 to 10,000	195
Above 10,000	194

8. CCC is displayed in the time display and the convection temperature limit is displayed in the temperature display. Press the **TEMP UP** key to increase number (482°F to 518°F) and **TEMP DOWN** key to decrease number. Set the temperature to read 518°F. Press the **START/STOP** key to advance to the next step.
9. 1 - - is displayed in the time display and the minimum value for the convection fan motor is displayed in the temperature display. Press the **TEMP UP** key to increase number and **TEMP DOWN** key to decrease number. Set according to Position 1 (minimum) in the table below. If the value is correct, press the **START/STOP** key to advance to the next step.
10. 2 - - is displayed in the time display and a maximum value for the convection fan motor is displayed in the temperature display. Press the **TEMP UP** key to increase number and the **TEMP DOWN** key to decrease number. Set according to Position 2 (maximum) in the table below. If the value is correct, press the **START/STOP** key to advance to the next step.

CONVECTION FAN MOTOR TYPE	CONVECTION FAN MOTOR VALUE	
	POSITION 1 (MINIMUM)	POSITION 2 (MAXIMUM)
1 motor Leroy-Somer (Hanning)	8	55
1 motor Brook-Crompton *	8	60
2 motors Leroy-Somer (Hanning)	46	120
2 motors Brook-Crompton	30	90
1 motor Leroy-Somer (Hanning) and 1 motor Brook-Crompton	38	105
NOTE: (*) Ovens are shipped from the factory with this motor and the oven control is configured accordingly. The values correspond to the current limits only and are not the actual current draw of the motor.		

11. If all the values have been entered correctly, press the **OFF** key to save the configuration settings and exit the configuration mode. To review or change a configuration value press the **START/STOP** key to return to step 1.

DIAGNOSTIC TEST MODE - PROGRAMABLE CONTROL

The test mode can be entered only when the oven is **OFF**. The five tests are run in sequence (1 - 5) and are indicated by the position of the illuminated LED in the bar graph of the combi mode key.

The test are performed in a fixed sequence of:

1. ROM (automatically)
2. RAM (automatically)
3. Displays and LED's
4. Relays (relay on for max. of 2 seconds)
5. Keypad

To Perform:

1. To enter the test mode press the **TEMP**, **TEMP UP** and **TEMP DOWN** keys simultaneously for 3 seconds. The word "test" will be displayed in the temperature display.
2. If a ROM or RAM error is detected, a error code (01 = ROM and 02 = RAM) will be displayed on the temperature display and will repeat until a key is pushed to exit this test. If no errors are detected, the control advances to the next test and runs it automatically.

3. The DISPLAY and LED test consists of flashing all displays and LED's. The word "test" will flash intermittently as the temperature display is tested. Verify all the DISPLAYS and LED's are flashing. This test will continue until a key is pressed to advance to the next step.
4. The RELAY test consists of selecting a particular relay by its code number (01 to 11) with the **TEMP UP** and **TEMP DOWN** keys. The initial code displayed in the temperature display is 01 for relay K1. Press the **TEMP** key to energize the selected relay for a maximum of 2 seconds. Verify that each selected relay (K1 to K10) is functioning. See table below. To exit this test and proceed to the next, press the **OFF** key.

CODE	RELAY	COMPONENT
01	K1	door motor
02	K2	cavity vent motor
03*	K6	contactor KM1 (half power, full speed)
04	K3	cooling fan(s) and door light only
05	K3, K4	water injection solenoid (humidifier)
06	K5	drain pump
07	K3, K5	water fill solenoid
08*	K7	contactor KM2 (half power, half speed); on 20 levels only, contactor KM3 and drain cool down solenoid.
09*	K8	contactor KM3 and drain cool down solenoid on 6 & 10 levels; contactor KM5 on 20 levels only (steam generator heating elements)
10*	K10	contactor KM7 (convection heating elements)
11*	K9	contactor KM6 (convection heating elements)
NOTE: Asterisk (*) indicates relay is checked but contactor not engaged. No noticeable external component operates.		

5. The keypad test consists of pressing each key to check its functionality. Initially, 02 is displayed in the time display and "test" is displayed in the temperature display. With each successful key press, the number of the key is displayed in the time display. Each key is numbered, starting with number 01 (ON) in the upper left corner of the control and ends at 21 (humidifier) on the lower right corner. See table below. Verify that all keypad buttons are functioning properly.

KEY	NO.	KEY	NO.
ON	01	TEMP	12
OFF	02	TEMP DOWN	13
HOT AIR	03	TEMP UP	14
STEAM	04	DELTA T	15
COMBI	05	PROG	16
START/STOP	06	ENTER	17
PHASE	07	ENTER DOWN	18
TIME	08	ENTER UP	19
TIME DOWN	09	FAN SPEED	20
TIME UP	10	HUMIDIFIER	21
PROBE	11		

6. To exit the diagnostic test mode, press and hold the **OFF** key for approximately 3 seconds.

CONFIGURATION MODE - MANUAL CONTROLS

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

1. Remove the rear panel as outlined under "COVERS AND PANELS".
2. Identify the type of convection fan motor(s) on the oven before setting the motor values in step 9 and 10.
3. Reverse procedure to install.
4. Re-connect power to the oven.

The configuration mode can be entered only when the oven is **OFF**. Returning to the normal operating mode can be done at any time by pressing the **START** key to save the configuration settings and exit the configuration mode.

To Perform:

1. To enter the configuration mode press the **TIME** and **TEMP** keys simultaneously for 3 seconds. In the temperature display, "Conf" will be displayed. Press the **TIME** key to advance to the next step.
2. C and F will be displayed in the time display. Rotate the adjustment knob counterclockwise for Celsius and clockwise for Fahrenheit. The blinking letter indicates the temperature scale selected. Accept the selection by pressing the **TIME** key to advance to the next step.

3. dSCL is displayed in the time display and the number of clean cycles completed (delimiting of steam generator) is displayed in the temperature display. **The number cannot be changed or modified.** Press the **TIME** key to advance to the next step.
4. The EPROM revision level is displayed in the time display and "Conf" is displayed in the temperature display. To verify the EPROM is at the current revision level, refer to the latest Technical Service Bulletins. Press the **TIME** key to advance to the next step.
5. HHHH is displayed in the time display and the total cooking hours of the oven is displayed in the temperature display. Rotate the adjustment knob counterclockwise to decrease number of hours and clockwise to increase number of hours. If the current number of hours is acceptable, press the **TIME** key to advance to the next step.
6. bbbb flashes and is displayed in the **TIME** display, the frequency number is displayed in the temperature display and the buzzer should be sounding. Rotate the adjustment knob counterclockwise to decrease buzzer frequency and clockwise to increase buzzer frequency (000 = continuous and 255 = very slow intervals) number. A good setting to start with is 050 or any number that is preferable to the customer. If the setting is acceptable, press the **TIME** key to advance to the next step.
7. uuuu is displayed in the time display and the steam temperature setting is displayed in the temperature display. The steam temperature setting is the boiling point adjustment for elevation and must be set to achieve optimum results. Rotate the adjustment knob counterclockwise to decrease and clockwise to increase. Set the temperature according to the table below. Press the **TIME** key to advance to the next step.

ELEVATION (FT)	TEMPERATURE (°F)
Sea level to 500	212
500 to 1000	211
1,000 to 2,000	209
2,000 to 3,000	207
3,000 to 4,000	205
4,000 to 5,000	204
5,000 to 6,000	202
6,000 to 7,000	200
7,000 to 8,000	198
8,000 to 9,000	196
9,000 to 10,000	195
Above 10,000	194

8. CCCC is displayed in the time display and the convection temperature limit is displayed in the temperature display. Rotate the adjustment knob counterclockwise to decrease (482°F to 518°F) and clockwise to increase number. Set the temperature to read 518°F. Press the **TIME** key to advance to the next step.
9. 1 - - is displayed in the time display and the minimum value for the convection fan motor is displayed in the temperature display. Rotate the adjustment knob counterclockwise to decrease and clockwise to increase number. Set according to Position 1 (minimum) in the table below. If the value is correct, press the **TIME** key to advance to the next step.
10. 2 - - is displayed in the time display and a maximum value for the convection fan motor is displayed in the temperature display. Rotate the adjustment knob counterclockwise to decrease and clockwise to increase number. Set according to Position 2 (maximum) in the table below. If the value is correct, press the **TIME** key to advance to the next step.

NOTE: The steam temperature setting will also be the initial cavity set point temperature and the maximum cavity temperature that can be set, when the steam mode is selected.

CONVECTION FAN MOTOR TYPE	CONVECTION FAN MOTOR VALUE	
	POSITION 1 (MINIMUM)	POSITION 2 (MAXIMUM)
1 motor Leroy-Somer (Hanning)	8	55
1 motor Brook-Crompton *	8	60
2 motors Leroy-Somer (Hanning)	46	120
2 motors Brook-Crompton	30	90
1 motor Leroy-Somer (Hanning) and 1 motor Brook-Crompton	38	105
NOTE: (*) Ovens are shipped from the factory with this motor and the oven control is configured accordingly. The values correspond to the current limits only and are not the actual current draw of the motor.		

- If all the values have been entered correctly, press the **START** key to save the configuration settings and exit the configuration mode. To review or change a configuration value press the **TIME** key to return to step 1.

DIAGNOSTIC TEST MODE - MANUAL CONTROLS

The test mode can be entered only when the oven is **OFF**.

The test are performed in a fixed sequence of:

- Displays and LED's
- Selector switch, keypad and adjustment knob.
- Relays (relay on for max. of 2 seconds).

To Perform:

- To enter the test mode press the **START** and **TEMP** keys simultaneously for 4 seconds.
- The DISPLAY and LED test consists of flashing all displays and LED's while the buzzer sounds. In the temperature display, all the individual display segments and the word "test" will flash intermittently. Verify all the displays and LED's are flashing. This test will continue until the **START** key is pressed and held for 1 second to advance to the next step.
- The word "test" is displayed in the temperature display and 10 (start button keypad no.) is displayed in the "time" display. The **KEYPAD** test consists of rotating the selector switch clockwise through each position, pressing each button on the keypad and rotating the adjustment knob clockwise then counterclockwise to check the functionality of each.

With each successful selection, the corresponding number is displayed in the temperature display. For the adjustment knob, an upper or lower dash line will be displayed (depending on rotation). See table below.

Verify that all knob positions and keypad buttons are functioning properly. When satisfied, press and hold the **START** key for 4 seconds to advance to the next step.

SWITCH/ KEYPAD/KNOB	POSITION	NO./DASH LINE
SELECTOR SWITCH	OFF	0
SELECTOR SWITCH	HOT AIR	1
SELECTOR SWITCH	STEAM	2
SELECTOR SWITCH	COMBI	3
SELECTOR SWITCH	COOL DOWN	4
SELECTOR SWITCH	DE-SCALE	5
KEYPAD BUTTON	TIME	6
KEYPAD BUTTON	PROBE	7*
KEYPAD BUTTON	TEMP	8
KEYPAD BUTTON	DOOR	9
KEYPAD BUTTON	START	10
KEYPAD BUTTON	COMBI	12*
KEYPAD BUTTON	VENT	13*
ADJUSTMENT KNOB	ROTATE CW	"_"
ADJUSTMENT KNOB	ROTATE CCW	"_"
NOTE: Asterisk (*) indicates not available on standard manual controls.		

- The word "test" will still be displayed in the temperature display. The RELAY test consist of selecting a particular relay by its code number (01 to 11) with the adjustment knob and pressing the **TEMP** key to energize the relay for a maximum of 2 seconds. See table below. Verify that each selected relay (K1 to K10) is functioning. The status of the relay output (0 or 1) will be displayed in the left side of the temperature display. When satisfied, press and hold the **START** key for 1 second to advance to the next step.

CODE	RELAY	COMPONENT	TEST	CONDITION
01	K1	door motor	Door magnetic reed switch. Result will be displayed automatically. Rotate the door handle to change the condition. Press and hold the TEMP key to close the door; release to open.	0 = open; 1 = closed
02	K2	cavity vent motor	Cavity vent micro switch. Result will be displayed automatically. Press and hold the TEMP key to change condition.	0 = open; 1 = closed
03	K3, K6	contactor KM1 (half power, full speed)	Convection fan motor value - press and hold the TEMP key for 30 sec. to test the fan motor configuration settings. The test result will be displayed .	0 = incorrect; 1 = correct.
04	K3	cooling fan(s) and door light only	Cavity Hi Limits and steam generator thermal fuse(s). Press and hold the TEMP key for result.	0 = open; 1 = closed
05	K3, K4	water injection solenoid (humidifier)	Visual - water injection into cavity.	
06	K5	drain pump	Water level sensors (water level in steam generator)	0 = unsatisfied; 1 = satisfied
07	K3, K5	water fill solenoid	Water level sensors (water level in steam generator)	
08	K3, K7	contactor KM2 (half power, half speed); on 20 levels only, contactor KM3 and drain cool down solenoid.		
09	K3, K8	contactor KM3 and drain cool down solenoid on 6 & 10 levels; contactor KM5 on 20 levels only. (steam generator heating elements)		
10	K3, K10	contactor KM7 (convection heating elements on 10 & 20 levels)		
11	K3, K9	contactor KM6 (convection heating elements)		

- t1 is displayed in the time display and the actual cavity temperature is displayed in the temperature display. Verify the probes are sensing temperature correctly. Rotate the adjustment knob and select the probe temperature to display (T1 = cavity probe (top on 20 levels); T2 = bottom cavity probe (20 levels only); T3 = cooking probe).
- To exit the diagnostic test mode, press and hold the **START** key for approximately 3 seconds.

SERVICE ERROR LIGHTS

- There are four lights at the bottom of the control. When lit, they tell the operator that the oven needs service related to the component that the light(s) represent. Refer to "TROUBLESHOOTING" for display error codes.



The lights are, from left to right.

- Water supply.
- Convection heat.
- Steam generator heat.
- Cavity fan.

NOTE: If the steam generator thermal fuse(s) or the cavity high limits open, the steam generator heat and the convection heat error lights will come on.

- Turn the oven off and reset the oven control.
 - Programmable control - press the off key.
 - Manual controls - rotate the selector switch to the off position.
- Correct the problem related to the service error light. See "TROUBLESHOOTING" section.
- Turn the oven on and check operation.
 - Programmable control - press the on key, select a heating mode and press start key to begin.
 - Manual controls - rotate the selector switch to one of the three heating modes.

NOTE: On water supply errors, monitor the oven for at least 5 minutes to pass the "time out" period for the steam generator fill.

HEATING ELEMENTS

WARNING: THE FOLLOWING STEPS REQUIRE POWER TO BE APPLIED TO THE UNIT DURING THE TEST. USE EXTREME CAUTION AT ALL TIMES.

- Measure the voltage at the heating element terminals and verify it against the data plate voltage.
 - If voltage is incorrect, find the source of the problem.
- If voltage is correct, check current draw (amps) through the heating element lead wires. If current draw is correct then heating element is ok. **See table below for proper values.**
 - If current draw is not correct then, replace heating element.
- Check for proper operation.

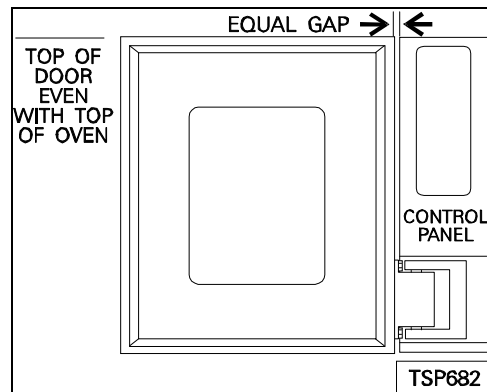
CONVECTION HEAT				
MODEL	VOLTAGE	KW PER ELEMENT	AMPS PER ELEMENT LEAD (3 PH)	OHMS PER ELEMENT
VCE6H	208	9	15	14
VCE10H	240	9	13	19
VCE20F	480	9	11	26
VCE20H	208	6	10	22
	240	6	8	29
	480	6	7	38
NOTE:	Values in the table are nominal. Tolerance is +5/-10 %.			

STEAM GENERATOR HEAT				
MODEL	VOLTAGE	KW PER ELEMENT	AMPS PER ELEMENT LEAD (3 PH)	OHMS PER ELEMENT
VCE6H	208	8	13	16
VCE10H	240	8	11	22
VCE20F	480	8	10	29
NOTE:	Values in the table are nominal. Tolerance is +5/-10 %.			

OVEN DOOR ADJUSTMENT

NOTE: Follow the steps in the order outlined below for proper door adjustment.

- Turn the oven off.
- Check the level of the oven from left to right and front to back, in the exact location where the oven is to be positioned.
 - If the oven is not level, make the necessary adjustments before proceeding to the next step.
 - If the oven is level, then proceed to step 3.
- Loosen the hinge screws just enough to adjust the door position but so the door stays when not being moved or supported.
- Position the door square with the oven as shown below.

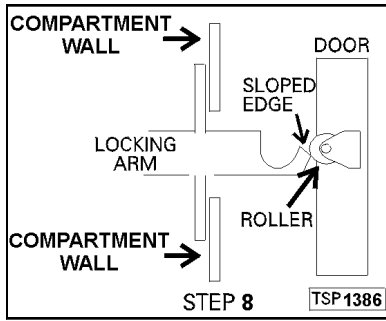


- Tighten the hinge screws after adjusting.

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

- Remove the right side panel and the control panel as outlined under "COVERS AND PANELS".
- Loosen the screws on the door roller (striker) just enough to adjust its position but stays when not being moved.

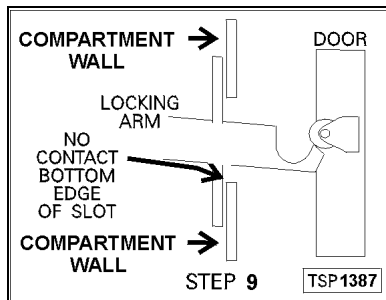
8. Position the door roller against the “striking” edge of the locking arm but do not close the door.



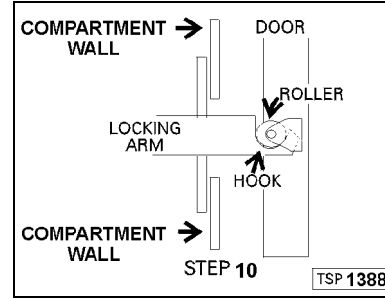
- A. Observe the position of the door roller to the locking arm.
- B. Adjust the door roller so it mates at the “striking edge” (bottom of the sloped edge) of the locking arm. The exact distance of the “striking” edge to the bottom of the roller is stated to be 1 mm (0.040 inches). This position allows the locking arm to be pushed down during closing, and after closing the roller will be positioned in the hook.

- 1) If the door roller mates against the locking arm as described, then tighten the door roller screws and proceed to step 9.
- 2) If the roller does not mate against the locking arm as described and there is no more adjustment in the door roller, then loosen the bolts securing the door motor assembly and adjust the locking arm position as described.
- 3) The door roller should now mate against the locking arm properly. Tighten the bolts securing the door motor assembly and proceed to step 9.

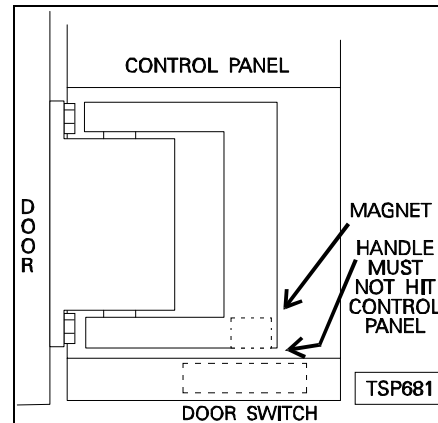
9. Push the door closed and observe the locking arm. It must not contact the bottom edge of the slot that the locking arm travels in while the door is closing.



10. With the door in the closed position the roller should be cradled in the locking arm hook.



11. Replace the control panel.
12. Close the door handle. The handle is centered in the cut-out of the control panel so the magnet in the handle will operate the magnetic reed switch.



NOTE: The magnetic reed switch position is adjustable if necessary. Remove the bracket from the bottom of the control panel. Loosen the hex nuts securing the switch to the bracket and position the switch (left to right) where desired. Tighten hex nuts and replace bracket. Check switch for proper operation.

WARNING: THE FOLLOWING STEPS REQUIRE POWER TO BE APPLIED TO THE UNIT DURING THE ADJUSTMENT. USE EXTREME CAUTION AT ALL TIMES.

13. Turn the oven on.
14. The door should automatically pull shut and lock into position to seal the oven opening.
15. The space between the top inner edge of the door and the oven should be equal along its length.
16. This space can be adjusted by adding or removing shims from the door hinges or the door locking mechanism.

NOTE: Extra shims are provided under the door motor assembly mounting bolts.

- A. If the space is larger at the hinge end, remove shim(s) from behind the hinges or from in front of the door locking mechanism.
- B. If the space is smaller at the hinge end, add shim(s) behind the hinges or in front of the door locking mechanism.

NOTE: If shims are removed from the top hinge, also remove them from the top hinge.

17. If the space is equal, but the oven does not seal. Remove shims from the hinges and in front of the door locking mechanism.
18. Once the necessary adjustments have been made and the door is closing properly, replace the right side panel and turn the oven off.

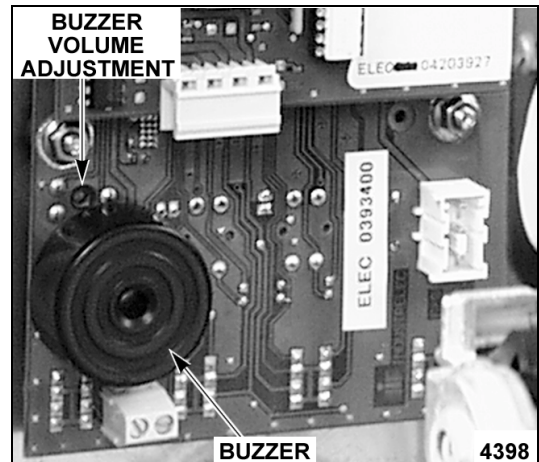
BUZZER ADJUSTMENT - PROGRAMABLE CONTROL

To properly set the buzzer, both the frequency and volume must be adjusted to obtain the best audible results. These adjustments are independent of each other and require a configuration mode change and a manual adjustment of the trim pot.

WARNING: THE FOLLOWING STEPS REQUIRE POWER TO BE APPLIED TO THE UNIT DURING THE ADJUSTMENT. USE EXTREME CAUTION AT ALL TIMES.

1. Remove the right side panel as outlined under "COVERS AND PANELS" in "REMOVAL AND REPLACEMENT OF PARTS".
2. Place the control into configuration mode as outlined under "PROGRAMABLE CONTROL - CONFIGURATION MODE".
 - A. Press the **START/STOP** key to cycle through the configuration parameters until reaching the step for setting the buzzer frequency.
 - B. To adjust the buzzer frequency, follow the procedure as outlined in step 6 under "PROGRAMABLE CONTROL - CONFIGURATION MODE".
3. After the buzzer frequency is set to the desired level, press the **START/STOP** key to cycle through the configuration parameters again, until reaching the step for setting the buzzer frequency.

4. To adjust the buzzer volume, turn the buzzer volume adjustment screw until the desired volume is obtained.



5. Once the buzzer frequency and volume are set to the desired levels, press the **OFF** key to save the setting and exit the configuration mode.

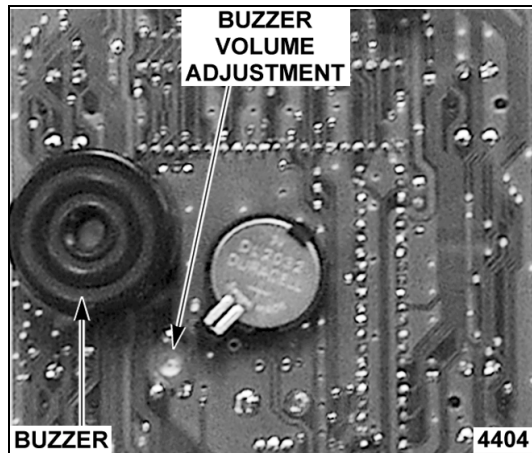
BUZZER ADJUSTMENT - MANUAL CONTROLS

To properly set the buzzer, both the frequency and volume must be adjusted to obtain the best audible results. These adjustments are independent of each other and require a configuration mode change and a manual adjustment of the trim pot.

WARNING: THE FOLLOWING STEPS REQUIRE POWER TO BE APPLIED TO THE UNIT DURING THE ADJUSTMENT. USE EXTREME CAUTION AT ALL TIMES.

1. Remove the right side panel as outlined under "COVERS AND PANELS" in "REMOVAL AND REPLACEMENT OF PARTS".
2. Place the control into configuration mode as outlined under "MANUAL CONTROLS - CONFIGURATION MODE".
 - A. Press the **TIME** key to cycle through the configuration parameters until reaching the step for setting the buzzer frequency.
 - B. To adjust the buzzer frequency, follow the procedure as outlined in step 6 under "MANUAL CONTROLS - CONFIGURATION MODE".
3. After the buzzer frequency is set to the desired level, press the **TIME** key to cycle through the configuration parameters again, until reaching the step for setting the buzzer frequency.

4. To adjust the buzzer volume, turn the buzzer volume adjustment screw until the desired volume is obtained.



5. Once the buzzer frequency and volume are set to the desired levels, press the **START** key to save the setting and exit the configuration mode.

CLEAN CYCLE MODE - STEAM GENERATOR DELIMING

WARNING: THE OVEN AND ITS PARTS ARE HOT. USE CARE WHEN OPERATING, CLEANING OR SERVICING THE OVEN. THE COOKING COMPARTMENT CONTAINS LIVE STEAM. STAY CLEAR WHEN OPENING DOOR.

Steam generator deliming should be done on a scheduled basis. The frequency depends on the quality of the local water supply and whether or not a water treatment system is used. Even with the use of a water treatment system, periodic deliming of the steam generator is still required.

On combi ovens using a water treatment system, follow the instructions for that system to delime the steam generator. Only use the type of chemical recommended or described in the deliming instructions for the system in use. If the Kleensteam water treatment system is used, Scaleklean is the recommended chemical.

If a water treatment system is not used, follow the instructions for deliming the steam generator using vinegar, as outlined in the steps below. See "WATER CONDITIONING" under "GENERAL".

1. Programmable oven control - Press the **ON** key to turn the oven on and press the **PROG** key to enter the programmed cooking mode. Program number "00" is displayed in the program display. Press the down key once, to select the clean cycle program or if at program 98 press the up key once to select the clean cycle program. Press and hold for automatic scrolling. "CC" is displayed in the program number display and "dSCL" is displayed in the temperature display. Press the **START/STOP** key to start the clean cycle and the start/stop LED turns on.

Manual oven controls - Turn the oven on and select the descale mode by rotating the selector knob to dSCL. "dSCL" is displayed in the temperature display and the clean cycle starts automatically.

2. The steam generator begins a normal drain cycle.
 - A. At the end of the drain cycle, oven beeps for 10 seconds. On the programmable oven control, the start/stop LED turns off.
 - B. "40" minutes is displayed in the time display and "dSCL" is displayed in the temperature display.
 3. Add the deliming chemical.
 - A. If a water treatment system is installed in the water line to the steam generator.
 - 1) Turn the water supply off.
 - 2) Press the relief valve at the top of the feeder bowl head to relieve system pressure.
 - 3) Unscrew the feeder bowl (clear) from the head and remove cartridge from the bowl.
 - 4) Remove the dip from its holding clip and insert the dip tube (o-ring first) in to the center port.
 - 5) Add the appropriate amount of deliming chemical to the feeder bowl for the combi model and mix the contents of the bowl with water. See table below.
- NOTE:** Do not exceed the chemical amounts listed in the table below or provided with the deliming chemical for the water treatment system in use.
- 6) Replace the feeder bowl.
 - 7) Turn the water supply on.

- B. If there is no water treatment system installed in the water line to the steam generator, then add an amount of vinegar equal to the tank volume for the combi model. See table below.
- 1) Add the vinegar to the steam generator through the opening in the oven cavity. Use the funnel and flexible tube provided with the oven.

MODEL	TANK VOLUME		AMOUNT OF SCALEKLEEN ADDED TO FEEDER BOWL (7 OZ. PACKET SIZE) ^{1, 2}
	(GAL)	(QT)	
VCE6H	0.8	3.2	1.0 Packet or 7.0 oz.
VCE10H	1.6	6.3	1.5 Packets or 10.5 oz.
VCE10F	1.6	6.3	1.5 Packets or 10.5 oz.
VCE20H	2.6	10.5	2.5 Packets or 17.5 oz.
VCE20F	3.4	13.7	3.5 Packets or 24.5 oz.
NOTES:	<ol style="list-style-type: none"> 1. Scalekleen is also available in a 2.2 lb packet size. If the 2.2 lb. size is used, do not add the entire packet. Measure the appropriate amount in ounces then add. 2. Do not exceed the amounts listed in the table above. 		

4. Press the START button on the oven control (programmable or manual) to begin the clean cycle.
 - A. The door closes and locks and the buttons/knobs on keypad lock out to prevent interruption until the clean cycle is completed. No other operations can be performed for approximately 45 minutes.

NOTE: Pressing the off key will not discontinue the clean cycle or turn the oven off. If a power interruption or other malfunction occurs, the clean cycle will resume from step 5B when power is restored.
 - B. If deliming through a water treatment system, the steam generator begins a normal fill cycle.
 - 1) When the proper water level is reached, the steam generator heating elements and cavity fans turn on.
 - C. If deliming using vinegar, the amount added to the steam generator is already at the proper level.
 - 1) The steam generator heating elements and cavity fans turn on.
 - 2) As the vinegar level lowers, the steam generator will then fill with water as required.

NOTE: If the cavity temperature is above the steam temperature set point, automatic cooling will occur. See "WATER INJECTION (HUMIDIFIER) under SEQUENCE OF OPERATION".

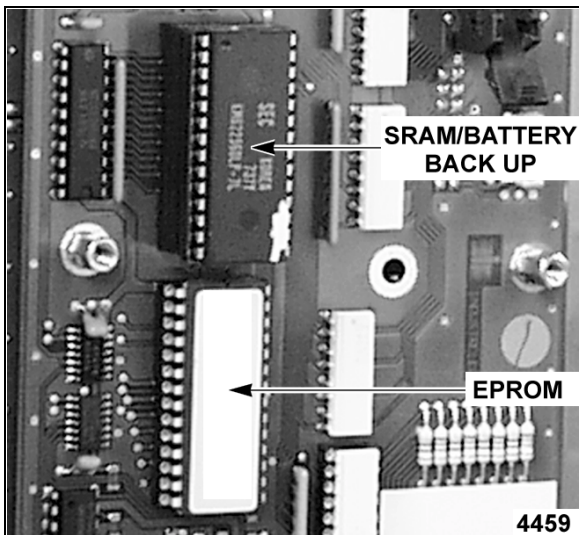
- D. The timer starts counting down and the oven will steam for 30 minutes.
5. At the end of 30 minutes.
 - A. Heating elements and cavity fans turn off.

NOTE: Heating elements and cavity fans remain off during "timed" drain and fill cycles.
 - B. Time display shows 10 minutes but does not continue counting down.
 - C. Steam generator drains (45 seconds on 6 & 10 levels; 60 seconds on 20 levels).
 - D. Steam generator fills (37 seconds on 6 & 10 levels; 75 seconds on 20 levels).
6. The steam generator drains twice more and fills once (both timed) to rinse out any remaining chemicals.
7. The steam generator begins a normal fill cycle.
 - A. When the proper water level is reached, the heating elements and cavity fans turn on.
 - B. The timer starts counting down and the oven will steam for 10 minutes.
8. When time expires, the steam generator drains a final time.
9. At the end of the clean cycle procedure.
 - A. The oven will beep for 10 seconds and the temperature display will show "dOnE" indicating the cycle is complete.
 - B. The door unlocks and opens (slightly) and the buttons/knobs on keypad unlock.

NOTE: If an error occurs during the clean cycle, "FAIL" will display in the temperature display instead of "dOnE".
 - C. If a deliming chemical was added to the water treatment system.
 - 1) Turn the water supply off.
 - 2) Press the relief valve at the top of the feeder bowl head to relieve system pressure.
 - 3) Unscrew the feeder bowl from the head, remove the dip tube and re-install the cartridge.
 - 4) Replace the feeder bowl.
 - 5) Turn the water supply on.
 - D. If vinegar was added to the steam generator, then procedure is complete.
10. Combi oven is ready for normal use.

BATTERY BACKUP - PROGRAMABLE CONTROL

The battery backup module allows the SRAM (static ram) to retain the configuration and program information in memory if there is a power loss. The battery backup may come in a two piece configuration of an SRAM chip mounted onto a battery module or a one piece SRAM and battery module combination. The 28 pin non-volatile SRAM/Battery module is located on the CPU board. Unless power to the oven is interrupted and then restored, a low voltage battery condition would otherwise not be detected.



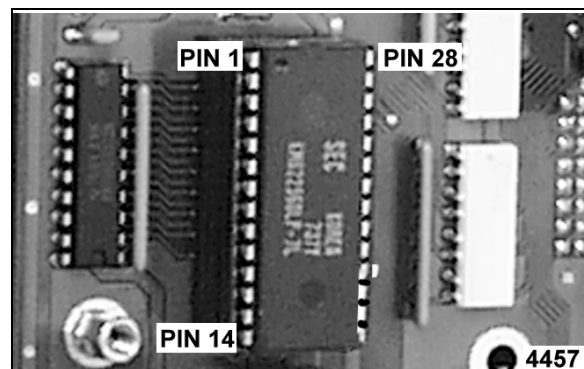
Battery Test

1. Disconnect power from the oven, then turn the power back on.
2. The control board will perform a power up diagnostic test, sound the buzzer and turn the displays and lights on then off.
 - A. If the displays go blank and lights turn off on the control, then the battery backup is functioning properly.
 - B. If oven or control will not power up, see "TROUBLESHOOTING" section for a list of possible causes.
 - C. If code numbers appear in the time and temperature display or the control operation is erratic, the battery backup may be malfunctioning.

- 1) Press the keypad **ON** button. If dashes "- -" are displayed in the **time** display and **888c** is displayed in the temperature display, then battery module voltage may be low.

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

- 2) Remove the right side panel as outlined under "COVERS AND PANELS"
- 3) **With the power disconnected from the oven**, check the battery module voltage while mounted on the CPU board. Measure the voltage between pins 14 and 28 on the SRAM chip. If voltage is less than 3VDC, then replace the SRAM/Battery module combination (one or two piece) as outlined below in "BATTERY REPLACEMENT" and repeat battery test.



NOTE: SRAM/Battery backup module voltage can not be measured without first being mounted on the CPU board and powered at least once.

NOTE: Do not use a battery backup labeled **ISSI** on the top. This type of battery backup quickly drains the SRAM resulting in an 888c display error.

3. The oven should now operate properly.

Battery Replacement

WARNING: DISCONNECT THE ELECTRICAL POWER TO THE MACHINE AT THE MAIN CIRCUIT BOX. PLACE A TAG ON THE CIRCUIT BOX INDICATING THE CIRCUIT IS BEING SERVICED.

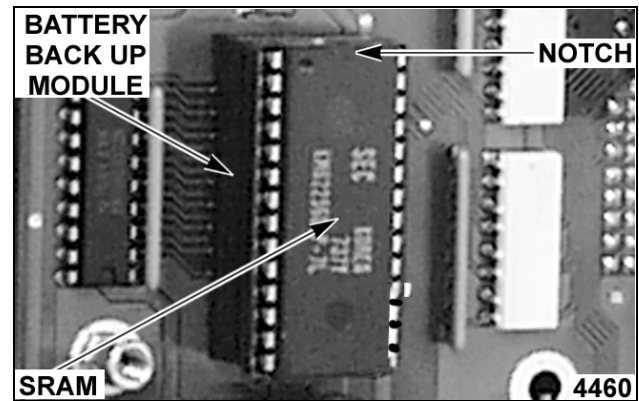
NOTE: When removing and replacing the SRAM/Battery module, it is recommended that a 28 pin EPROM extraction tool and a 28 pin EPROM insertion tool be used.

If installing the two piece SRAM and battery backup configuration, the SRAM and battery module must be assembled before installing on the board.

Caution: Do not place the battery backup module with the pins down on a metallic or conductive surface. This may result in component malfunction.

On the two-piece configuration, it is critical that the notch on the SRAM and the battery module match up on the same end. Carefully line up the SRAM pins and insert them into the battery module. Ensure that all SRAM pins are inserted properly.

Install the SRAM and battery module assembly onto the CPU board with the notches pointing up. Carefully line up the battery module pins and insert them into the socket on the CPU board. Ensure that all pins are inserted properly.



TWO PIECE CONFIGURATION SHOWN

For the one piece SRAM and battery module combination, position the module with the corner dot/notch pointing up. Carefully line up the battery module pins and insert them into the socket on the CPU board. Ensure that all pins are inserted properly.

Turn the power to the machine back on. Wait while the control performs a power up diagnostic test, sounds the buzzer and turns the displays and lights on then off. If the display and lights turn off, then the battery backup is functioning properly. If the control or oven does not come back on, turn the power off, re-check the mounting of the assembly, then turn the power back on. If this does not solve the problem then refer to steps 2B and 2C above as outlined in "BATTERY TEST".

ELECTRICAL OPERATION

COMPONENT FUNCTION

1A Relay Board	Takes the inputs from oven control board to operate relays that control power to the components.
2A Oven Control	Manages all functions of oven operation, takes input signals and performs outputs as required. Referred to as the CPU board on the Programable control and the Display/Keypad/CPU board on the manual controls.
3A Display/Keypad Board	Sends signal to the oven control from keypads and door switch. Displays oven and cooking information (programmable control only).
F1 Fuse	5A/250V - Protects power supply board/transformer primary "L1 side" (in series with F8 Fuse).
F2 Fuse	5A/250V - Protects power supply board/1T transformer primary "L2 side" (in series with F9).
F3 Fuse	2A/250V - Protects the 1T transformer secondary (230VAC) control circuits to all contactors, fans, motors and solenoids.
F7 Fuse	5A/600V - Protects cavity fan motor(s) control circuit.
F8 Fuse	FLQ5 - Protects L2 power from terminal block and power supply board/1T transformer primary (in series with F1 Fuse).
F9 Fuse	FLQ5 - Protects L1 power from terminal block and power supply board/1T transformer primary (in series with F2 Fuse).
1LT Oven Light	Illuminates oven cavity.
1MTR Cavity Vent Motor	Opens and closes oven cavity exhaust port.
2MTR Drain Pump Motor	Empties water from steam generator.
3MTR Cooling Fan	Exhausts hot air from right side control compartment to cool components.
4MTR Door Motor	Pulls door into and out of lock position.
5MTR Cavity Fan Motor	Circulates air through the oven cavity.
6MTR Cavity Fan Motor	Circulates air through the oven cavity (20 level only).
7MTR Cooling Fan	Exhausts hot air from right side control compartment to cool components (20 level only).
8MTR Door Motor	Pulls door into and out of lock position (20 level only).
1TC Cavity Probe	Senses the oven cavity temperature and signals the control.
2TC Cooking Probe	Senses the internal product temperature and signals control.
3TC Cavity Probe	Senses the lower oven cavity temperature and signals the control (20 level only).
1SOL Water Injection Solenoid Valve	Admits water to the injection nozzle in the cavity that sprays onto the convection heating elements when requested by the oven control or manually by the operator. This cools the oven temperature or adds a burst of steam to the cavity in convection mode.

2SOL Drain Cool

Down Solenoid Valve Admits cold water to the cavity drain and mixes with the hot to condense steam and cool the drain water before entering the floor drain. This solenoid valve is energized whenever the steam generator heating elements are energized. Does not operate during a drain cycle.

3SOL Water Fill

Solenoid Valve Admits water to the steam generator when requested by to oven control, to fill or replenish the steam generator water level.

1SW Door Magnetic

Reed Switch Signals the oven control that door is closed and can be locked.

2SW Door Mech Switch Allows door motor to operate to unlock door.

3SW Door Mech Switch Allows door motor to operate to lock door.

5SW Door Mech Switch Allows door motor to operate to lock door (20 Level only).

6SW Door Mech Switch Allows door motor to operate to unlock door (20 Level only).

4SW Cavity Vent Switch Signals the oven control, that the vent is opened or closed.

1TAS & 2TAS

High Limit Thermostats Removes power from board relays K6, K7, K8, K9 & K10 if oven cavity temperature rises above 650°F. Must be reset manually.

1TF & 2TF Thermal Fuses Removes power from KM1, KM2, KM3 & KM6 (6 level); KM1, KM2, KM3, KM6 & KM7 (10 level) and KM1, KM2, KM3, KM5, KM6 & KM7 (20 level half and full) if steam generator temperature rises above 243°F.

3TF Thermal Fuse Removes power from KM1, KM2, KM3, KM5, KM6 & KM7 (20 level half only) if steam generator temperature rises above 243°F.

4TF Thermal Fuse Removes power from KM1, KM2, KM3, KM5, KM6 & KM7 (20 level full only) if steam generator temperature rises above 243°F.

1TB Terminal Block Incoming voltage supply connection.

1T Power Supply Board

& Transformer Supplies 12VAC for cavity light; 24VAC to relay board and oven control board; 230VAC or 90VAC to cavity fan motor(s) at full or half speed; and 230VAC to all other electrical controls except heaters.

Water Level Sensors Senses the water level in the steam generator and signals the oven control to energize or de-energize the fill solenoid valve. The water fills until the circuit between the two sensors is completed plus an additional 0.5 seconds. With the water at the proper level, if a call for heat is made from the oven control, the steam generator heating elements turn on until the cavity temperature is satisfied then turn off. When the water level falls, the circuit opens and the fill cycle repeats. If the circuit remains open longer that three seconds, the heating elements are de-energized until the level rises to complete the circuit.

KM1 (1CON) Contactor for half power full speed (1500 RPM) cavity fan motor(s). When energized along with KM2, provides full power and full speed (contactors KM1 + KM2 energized). When half power half speed mode is selected, contactor KM1 is energized only.

KM2 (2CON) Contactor for half power half speed (800 RPM) cavity fan motor(s). When energized along with KM1, provides full power and full speed (contactors KM1 + KM2 energized). When half power half speed mode is selected, contactor KM2 is not energized.

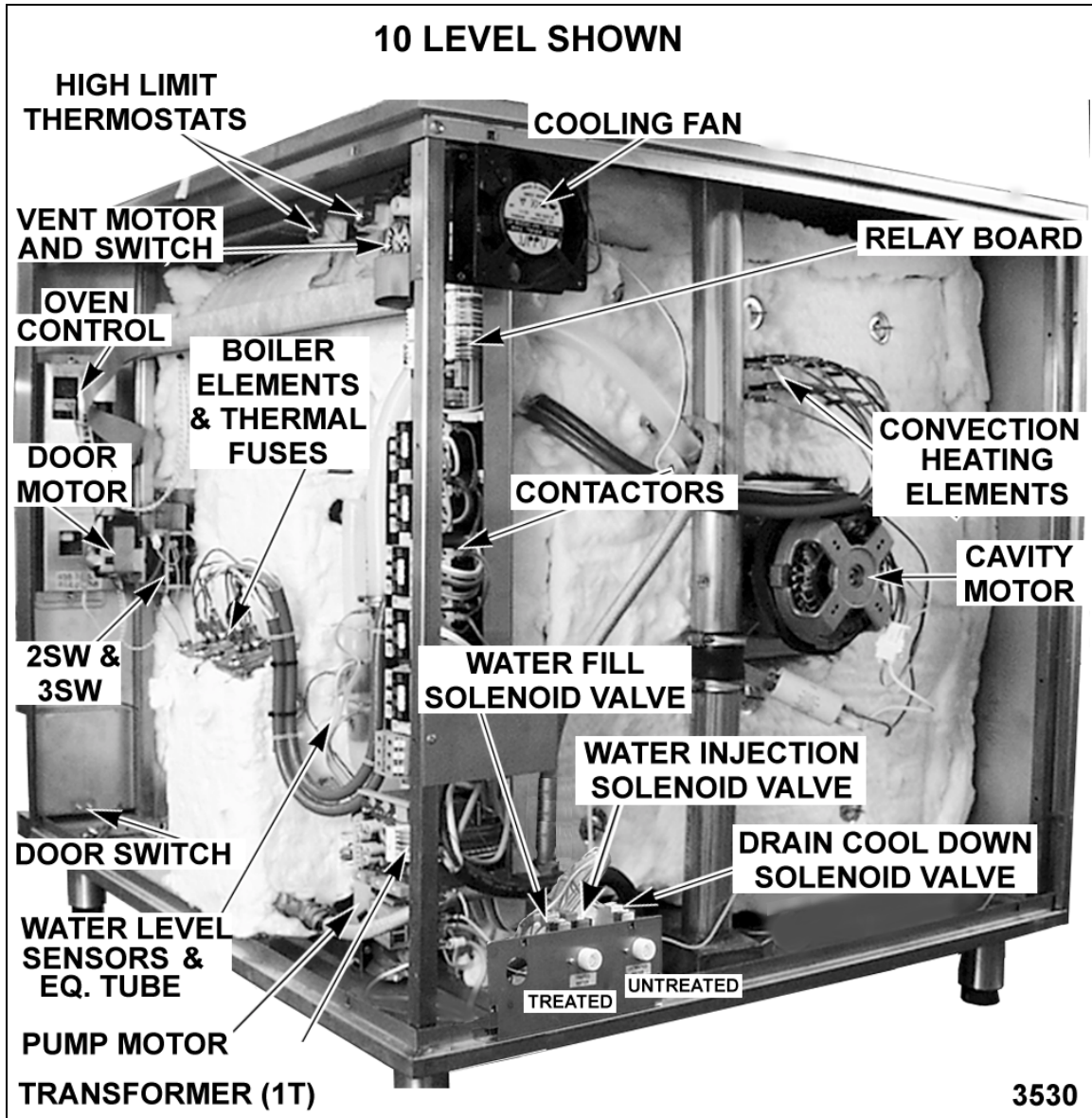
KM3 (3CON) Contactor for steam generator heating elements; (2HTR) on 6 level; (2HTR) and (4HTR) on 10 level; (2HTR) and (4HTR) on 20 level half.

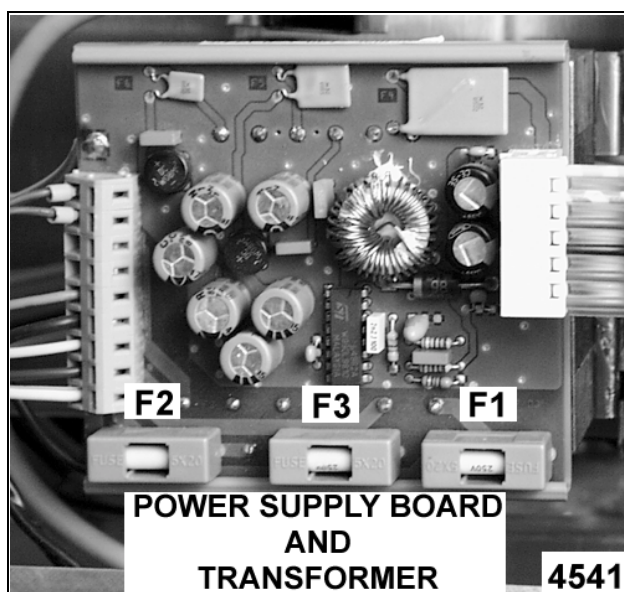
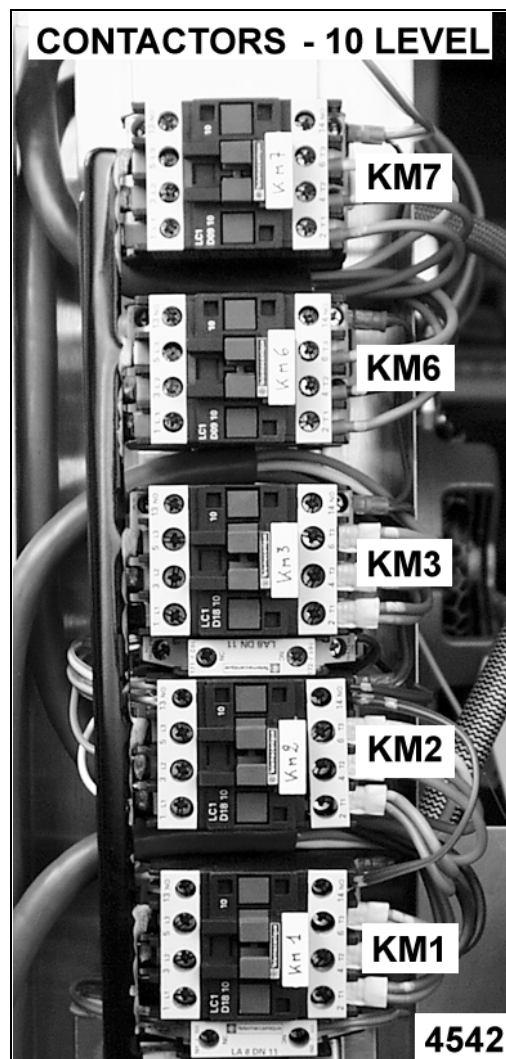
KM5 (5CON)	Contactors for steam generator heating elements; (7HTR) on 20 level half and (8HTR) on 20 level full only.
KM6 (6CON)	Contactors for convection heating elements; (1HTR) on 6 level; (1HTR) inner on 10 level; (1HTR) Inner top and (5HTR) inner bottom on 20 level.
KM7 (7CON)	Contactors for convection heating elements; (3HTR) outer on 10 level; (3HTR) outer top and (6HTR) outer bottom on 20 level.
1HTR Heating Element	Single convection heating elements on 6 level; Inner on 10 level and 20 level (top).
2HTR Heating Element	Steam generator heating elements on 6, 10 and 20 level.
3HTR Heating Element	Outer convection heating elements on 10 level and 20 level (top).
4HTR Heating Element	Steam generator heating elements on 10 and 20 level.
5HTR Heating Element	Inner convection heating elements on 20 level (bottom).
6HTR Heating Element	Outer convection heating elements on 20 level (bottom).
7HTR Heating Element	Steam generator heating elements on 20 level 1/2 size.
8HTR Heating Element	Steam generator heating elements on 20 level full size.

NOTE: The relay's below are mounted on the relay board and are not individually replaceable.

K1 Door Relay	Controls power to door motor(s).
K2 Vent Relay	Controls power to cavity vent motor.
K3 On-Off Relay	Controls power to component cooling fan(s) and supplies power to one side of K4, K5, and K6, K7, K8, K9 and K10 through the thermal fuses and high limit thermostats.
K4 Water Injection Relay	Controls power to water injection solenoid valve (humidifier) and door light when K3 is ON.
K5 Water Fill Relay	Controls power to water fill solenoid valve (when K3 is ON) and drain pump motor (when K3 is OFF).
K6 Half Power Full Speed Relay	Controls power to contactor KM1. This relay is energized along with K7 for full power full speed operation, and is also energized in half power speed half mode. When half power half speed mode is selected, relay K6 is energized.
K7 Half Power Half Speed Relay	Controls power to contactor KM2. This relay is energized along with K6 for full power full speed operation. When half power half speed mode is selected, relay K7 is <u>not</u> energized. On 20 level models only, controls power to contactor KM3 for steam generator heating elements, and powers 2SOL drain cool down solenoid.
K8 Steam Regulation Relay	Controls power to KM3 for steam generator heating elements, and powers 2SOL drain cool down solenoid valve on 6 & 10 levels. On 20 level models only, controls power to contactor KM5.
K9 Convection Heat Relay	Controls power to KM6 for convection heating elements; (1HTR) single on 6 level ;(1HTR) inner on 10 level; (1HTR) inner top and (5HTR) inner bottom on 20 level.
K10 Convection Heat Relay	Controls power to KM7 for convection heating elements ; (3HTR) outer on 10 level; (3HTR) outer top and (6HTR) outer bottom on 20 level.

COMPONENT LOCATION





SEQUENCE OF OPERATION

The convection and steam heating theory outlined below, covers the programable and manual oven controls unless otherwise stated.

Heating Mode and Cavity Fan Speeds

KM1 = 1/2 power and full speed cavity fan(s).

KM2 = 1/2 power and half speed cavity fan(s).

KM1 + KM2 = Full power and full speed cavity fan(s).

KM3 and KM5 = Steam mode regulation (KM5 on 20 level only).

KM6 and KM7 = Convection mode regulation.

Convection mode, full power and full speed cavity fan(s) = KM1 + KM2 + KM6 (6 level)
 KM1 + KM2 + KM6 + KM7 (10 & 20 level)

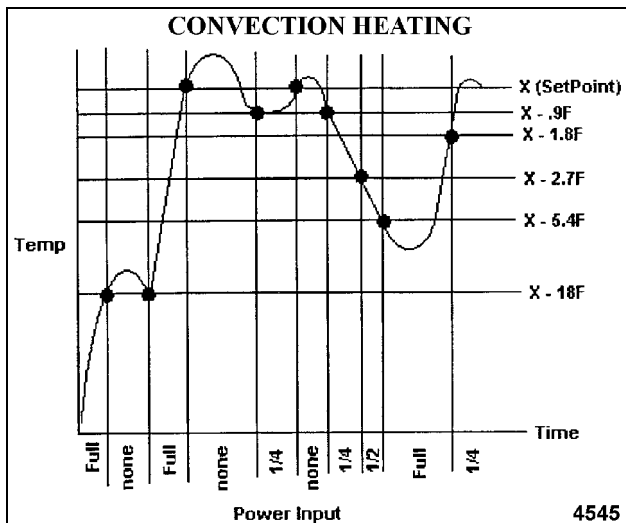
Convection mode, half power and half speed cavity fan(s) = KM1 + KM6 (6 level)
 KM1 + KM7 (10 level)
 KM1 + KM6 + KM7 (20 level)

Steam mode, full power and full speed cavity fan(s) = KM1 + KM2 + KM3 (6 & 10 level)
 KM1 + KM2 + KM3 + KM5 (20 level)

Steam mode, half power and half speed cavity fan(s) = KM1 + KM3 (6 & 10 level)
 KM1 + KM5 (20 level)

Heating Regulation

When the oven begins heating, the convection elements are on at full power until the cavity temperature reaches 18°F below set point temperature. If the cavity temperature is rising at 3.6°F per second or greater, the heating elements will turn off. If the cavity temperature does not reach set point or drops more than 18°F below set point, the heating elements turn back on at full power until reaching the actual cavity set point temperature then turn off. When the cavity temperature drops 0.9°F below set point, the heating elements turn on at 1/4 power (one element - 3 sec on, 4 sec off) until cavity temperature returns to the actual set point then turn off. The oven continues to operate (cycle) at 1/4 power as long as the set point temperature can be maintained. If the cavity temperature drops 2.7°F below the set point, the heating elements turn on at 1/2 power (one element on) until cavity temperature returns to the actual set point then turn off. If the cavity temperature drops more than 5.4°F below the set point, the heating elements turn back on at full power until cavity temperature reaches 1.8°F below set point. At 1.8°F below set point, the heating elements turn on at 1/4 power (one element - 3 sec on, 4 sec off) until cavity temperature returns to the actual set point then turn off.



On 20 level machines (half and full size) the heating mode regulation is the same but with these additional points to remember:

- Top and bottom heating elements operate independently and correspond to the top and bottom cavity temperature probes.
- Display always shows the lowest temperature.
- If the cavity temperature exceeds the set point temperature, the heating elements will not turn on until both cavity temperature probes sense a temperature below the set point.

Steam Pre-Heat

When the oven is turned on and the heating mode (convection or combi) is selected, the steam generator fills with water until the proper level is reached. On the programable oven control, press the Start/Stop key to begin oven heating. On the standard and deluxe manual controls, the water pre-heat begins after the heat selector knob is turned to either convection or combi mode. On initial start up only, after the cavity temperature reaches 1.8°F below set point temperature (convection = 1/4 power) the steam generator pre-heat begins. The steam generator heating elements then turn on for a total time of 1.5 minutes on 6 and 10 levels and 2.5 minutes on 20 level ovens, if they are on at full power only. When the convection heating elements turn back on (at half power) to maintain cavity set point temperature, the steam generator heating elements will also turn on (at half power), for a pre-heat time value that is automatically calculated. No additional heating of the steam generator takes place until either a steam or combi mode selection is made.

Steam Regulation

Before cooking in steam mode, it is recommended that the oven be pre-heated in convection mode at 200°F to bring the oven cavity up to temperature for immediate steam cooking.

Steam Mode - When the oven is turned on and the steam mode is selected, the steam generator fills with water until the proper level is reached. On the programable oven control, press the Start/Stop key to begin steam generator heating. The steam generator heating elements turn on (always at full power) until the actual set point temperature is reached then turn off. If the steam mode is selected after convection or combi mode heating, the steam generator pre-heat is complete and the oven is ready for steam mode cooking.

At this time, if the cavity temperature is lower than the set point, the steam generator heating elements turn back on until reaching the actual set point temperature then turn off. If the cavity temperature is higher than the set point, the steam generator heating elements remain off and the oven will go into cool down mode until reaching the set point temperature. When the cavity temperature falls 1°F or more below set point temperature, the heating elements turn on until the cavity returns to the actual set point temperature then turn off.

Combi Mode - On the programable and deluxe manual controls, the steam generator heating elements operate on a portion of the convection bake time to provide the oven with steam heat. The amount of steam introduced depends on the combi steam factor setting (1-6 LED's lit) on the control. The default steam factor setting is 5 (1 LED lit). On the standard manual control, a fixed steam factor of 20 is used. When the steam generator elements are on at full power, the convection elements are off. If the convection heating elements are on at half power, the steam generator heat elements can also be on at half power. The toggling of the heating element power allows the current draw of the oven to remain at lower levels. If the oven set point temperature is less than the steam temperature setting (195°F to 212°F), the steam factor is limited to 10 regardless of the number of LED's lit.

NOTE: The steam temperature setting (boiling point adjustment) for elevation is pre-selected in the configuration mode.

Indicator Lights (on front panel)	Steam Factor	Seconds ON	Seconds OFF
●○○○○○ ¹	5	5	85
●●○○○○	10	5	70
●●●○○○ ²	20	5	55
●●●●○○	30	5	40
●●●●●○	40	5	25
●●●●●●	50	5	10

NOTES: 1. Default on Programmable and Deluxe manual controls.
2. Default on Standard manual control and is non-adjustable.

Water Injection (Humidifier)

Water can be injection onto the convection heating elements in the oven cavity and is used in these three ways:

1. Automatic Cooling (Programable & Manual Controls) - If the steam mode is selected after cooking in convection or combi mode and the cavity temperature is above 302°F, water is injected intermittently to cool the oven cavity. Below 302°F, water injection is continuous until the cavity reaches the steam temperature set point. The cavity vent will open to assist in cooling but close when the steam set point temperature is reached. The humidifier LED turns on or cycles on and off when water is being injected.
2. Manual Cooling/Humidification (Programable Control Only) - Press and release the humidifier key to provide several seconds of water injection (steam burst), if the oven cavity temperature is above 302°F. Press and hold the humidifier key to provide continuous water injection, if the oven cavity temperature is below 302°F. When the humidifier key is pressed, the LED turns on.
3. Cool Down Mode (Programable Control) - Cools the oven cavity to the desired set point temperature before starting a different cooking cycle, cooking mode or shutting the oven off. This mode can also be included as one of the five phases in a cooking program. The humidifier LED turns on or cycles on and off when water is being injected.
 - A. Press the time down key.
 - 1) Display shows " - - - " then "11 11 11" indicating the oven is in cool down mode. The default temperature is 158°F and can be adjusted if desired.
 - a. If the oven cavity temperature is above 302°F, water will be injected for one second every three seconds until the cavity temperature reaches 302°F.
 - b. After the oven cavity temperature reaches 302°F, water is injected continuously until the cavity temperature is within 9°F of set point temperature then stops.
 - c. Buzzer sounds when the set point temperature is reached.
 - d. Press Start/Stop key to silence buzzer and turn cavity fans off.

- 2) Oven cavity vent opens to assist in cooling but will close when the set point temperature is reached.

- B. Press the up key to exit cool down mode.

Cool Down Mode (Manual Controls)

Cools the oven cavity to the desired set point temperature before starting a different cooking cycle, cooking mode or shutting the oven off.

1. Rotate the selector knob to the **COOL DOWN** position.
 - A. Time display shows "- . - ." indicating the oven is in cool down mode.
 - B. Temperature display flashes 60°F (default) or the last cool down temperature that was set.
 - C. Oven door opens (slightly).
 - D. Cavity vent opens.
 - E. Cavity fan(s) turn on.

WARNING: CAVITY FAN(S) REMAIN OPERATIVE WHILE DOOR IS OPEN. USE EXTREME CAUTION AT ALL TIMES.
2. Oven begins cooling down.
3. When the cool down temperature is reached.
 - A. Buzzer will sound for 10 seconds then turn off.
 - B. Cavity fan(s) turn off.

NOTE: If the cool down temperature is lowered after the initial cool down temperature is reached, the cavity fans will automatically restart to resume cooling.
4. Rotate the selector knob to a different position to exit **COOL DOWN** mode.

Programable Oven Control

This sequence of operation is written for the combi oven models that use the programable oven control. The three heating modes outlined below (convection, steam and combi) are for manual operation of the oven. The automatic cooking methods (timed, temperature probe and delta t) are then outlined.

Powering Control

1. Conditions.
 - A. Oven connected to correct voltage supply and properly grounded.
 - B. Oven control (CPU/display board) are powered but not on; displays and LED's are off.

NOTE: When oven is initially powered, the buzzer sounds and the displays, LED's and service error lights come on for several seconds then turn off.

- C. Oven control configured properly. See "CONFIGURATION MODE - PROGRAMMABLE CONTROL" outlined under "SERVICE PROCEDURES AND ADJUSTMENTS".
- D. Voltage tap wire on power supply board set to the proper machine voltage.
- E. Door is properly closed but not locked and the door handle position is closed.
 - 1) Door handle magnet is positioned over magnetic door reed switch (N.O.) and is closed.
- F. High limit thermostats closed (manual reset).
- G. Thermal fuses closed.
- H. Cavity vent open.
- I. 240VAC supplied to relay board.
- J. Steam generator empty.
- K. Water supply on.

2. Press the On key.
 - A. Oven control runs a self diagnostic test.
 - 1) "HHH" is displayed in the time display.
 - 2) Total cooking hours is displayed in the temperature display.
3. Control passes self diagnostic test.
 - A. Cavity temperature is displayed.
 - B. Time displays "- h - - min".

- C. Oven cavity lamp energized.
- D. Cooling fan(s) energized.
- E. Cavity vent motor energized.
 - 1) Cavity vent closes.

NOTE: When the oven is turned on, the default condition of the cavity vent is closed. Pressing the Hot Air key selects the Hot Air mode and the Hot Air/Vent closed LED is on. Press the Hot Air key a second time to open the vent. The Hot air mode is still selected but the vent closed LED goes out and vent open (lower) LED turns on. Press the Hot Air/Vent key a third time to return to initial power on conditions.

- F. Door motor energized.
 - 1) Door opens (slightly) for several seconds then closes and locks.

NOTE: Pressing the ON key automatically unlatches and opens the door (slightly) for 3 seconds. If door is not disengaged manually (door handle pulled out), it will automatically close. While open, all heating stops and the cavity vent opens.

- a. When the door is locked, switch 2SW closes and door motor is de-energized. On 20 levels only, switch 6SW also closes.
 - b. Switch 3SW opens. On 20 levels only, switch 5SW also opens.
4. Proceed to the appropriate heating mode (convection, combi or steam) for the continuation of the sequence.

Convection Mode

1. Conditions exist as described in "POWERING CONTROL".
2. Hot air key is pressed.
 - A. Hot Air/Vent closed LED on.
 - B. Time LED turns on and "- h - - min" is displayed in the time display.
 - C. Cavity set point temperature (default) is displayed in the temperature display then reverts to the actual cavity temperature.
 - D. Steam generator fill solenoid is energized until proper water level is reached then turns off. See "WATER LEVEL SENSORS" under "COMPONENT FUNCTION".
 - E. First LED for the cooking program phase flashes.

3. Press the temp key to set the operating temperature (default setting is 302°F; adjustable range is 35 to 518°F).
 - A. Press the temperature up or down keys to adjust the setting.
4. Start/Stop key is pressed to begin the cooking cycle.
 - A. Start/Stop LED on.
 - B. Convection heating elements energized and cycle as described under "HEATING REGULATION".
 - C. Steam generator pre-heats (initial start up only) as described under "STEAM PRE-HEAT".

NOTE: When degree symbol shows in the temperature display, convection and/or steam generator heating elements are energized.

 - 1) Drain cool down solenoid energized.

NOTE: Whenever steam generator heating elements are on, the drain cool down solenoid is energized.
 - D. Cavity fan motor(s) energized.
5. Oven control monitors cavity temperature and cycles the convection heating elements as necessary, to maintain set point temperature.
6. Start/Stop key is pressed to end cooking cycle.
 - A. Start/Stop LED off.
 - B. Convection heating elements de-energized.
 - C. Cavity fan motor(s) de-energized.
 - D. Convection mode remains selected with LED on.
 - E. Cavity vent remains closed.
 - F. The operating temperature remains as entered unless the heating mode or operating temperature setting is changed or the oven is turned off.

Steam Mode

1. Conditions exist as described in "POWERING CONTROL".
2. Steam key is pressed.
 - A. Steam LED turns on and "-_h - -_{min}" is displayed in the time display.
 - B. Cavity set point temperature (default) is displayed in the temperature display then reverts to the actual cavity temperature.

- C. Steam generator fill solenoid is energized until proper water level is reached then turns off. See "WATER LEVEL SENSORS" under "COMPONENT FUNCTION".
- D. First LED for the cooking program phase flashes.
3. Press the temp key to set the operating temperature. The default temperature displayed (195 to 212°F) is pre-selected in the configuration mode and is the steam temperature setting (boiling point adjustment) for elevation. The adjustable operating range is 35 to 212°F. See "CONFIGURATION MODE - PROGRAMMABLE CONTROL" under "SEQUENCE OF OPERATION".
 - A. Press the temperature up or down keys to adjust the setting.
4. Start/Stop key is pressed to begin the cooking cycle.
 - A. Start/Stop LED on.
 - B. Steam generator heating elements energized and cycle as described in "STEAM MODE" under "STEAM REGULATION".

NOTE: When degree symbol shows in the temperature display, steam generator heating elements are energized.

- 1) If oven cavity temperature is below set point temperature, the steam generator heating elements turn on at full power until steam temperature is reached, then turn off.
 - a. Drain cool down solenoid energized.

NOTE: Whenever steam generator heating elements are on, the drain cool down solenoid is energized.
- 2) If oven cavity temperature is above set point temperature, the oven performs an automatic cool down as described under "WATER INJECTION (HUMIDIFIER)", then the steam generator heating elements turn on.

- C. Cavity fan motor(s) energized.
5. Oven control monitors cavity temperature and cycles the steam generator heating elements as necessary, to maintain set point temperature.
6. Start/Stop key is pressed to end the cooking cycle.

- A. Start/Stop LED off.
- B. Steam generator heating elements de-energized.
- C. Cavity fan motor(s) de-energized.
- D. Steam mode remains selected with LED on.
- E. Cavity vent remains closed.
- F. The operating temperature remains as entered unless the heating mode or operating temperature setting is changed or the oven is turned off.

Combi Mode

1. Conditions exist as described in "POWERING CONTROL".
2. Combi key is pressed.
 - A. Combi LED is on and "- h - - min" is displayed in the time display.
 - B. Cavity set point temperature (default) is displayed in the temperature display then reverts to the actual cavity temperature.
 - C. Press combi key an additional 1 to 5 times to increase the steam factor setting from 10 to 50. With each successive key press, an additional LED illuminates to indicate the setting. The default steam factor setting is 5 (one LED on).
 - D. Steam generator fill solenoid is energized until proper water level is reached then turns off. See "WATER LEVEL SENSORS" under "COMPONENT FUNCTION".
 - E. First LED for the cooking program phase flashes.
3. Press the temp key to set the operating temperature (default setting is 302°F; adjustable range is 35 to 518°F).
 - A. Press the temperature up or down keys to adjust the setting.
4. Start/Stop key is pressed to begin the cooking cycle.
 - A. Start/Stop LED on.
 - B. Convection heating elements energized and cycle as described under HEATING REGULATION".
 - C. Steam generator pre-heats (initial start up only) as described under "STEAM PRE-HEAT".

NOTE: When degree symbol shows in the temperature display, convection and/or steam generator heating elements are energized.

- 1) Drain cool down solenoid energized.

NOTE: Whenever steam generator heating elements are on, the drain cool down solenoid is energized.

- D. Cavity fan motor(s) energized.
5. Oven control monitors cavity temperature and cycles the convection heating elements as necessary, to maintain set point temperature. Steam generator heating elements cycle as described in "COMBI MODE" under "STEAM REGULATION".
 6. Start/Stop key is pressed to end the cooking cycle.
 - A. Start/Stop LED off.
 - B. Convection and steam generator heating elements de-energized.
 - C. Cavity fan motor(s) de-energized.
 - D. Combi mode remains selected with LED on.
 - E. Cavity vent remains closed.
 - F. The operating temperature remains as entered unless the heating mode or operating temperature is changed or the oven is turned off.

Automatic Operation

Add the steps outlined in the three cooking methods (time, temperature probe or Delta T) below to the heating mode sequence (convection, steam or combi) for automatic oven operation.

TIME METHOD

NOTE: Assume heating mode and operational temperature already selected.

1. Press the time key before pressing the Start/Stop key.
 - A. Time LED turns on and "- h - - min" is displayed in the time display.
2. Press the time up or down keys to adjust the desired cooking time.
3. Press the Start/Stop key to begin the cooking cycle.
 - A. Start/Stop LED on.
 - B. Convection and/or steam generator heating elements energized.
 - C. Cavity fan motor(s) energized.
 - D. Timer counts down.

NOTE: Time can be adjusted throughout the cooking cycle by pressing the up or down time keys. The adjusted time is retained in memory and is displayed when the time key is pressed.

4. Cooking time expires.
 - A. Buzzer sounds for approximately 10 seconds on and 45 seconds off. The buzzer continues to cycle at these times until the Start/Stop key is pressed.
 - B. Convection and/or steam generator heating elements de-energized.
 - C. Cavity fan motor(s) remain energized.
5. Press the Start/Stop key to end the cooking cycle.
 - A. Start/Stop LED off.
 - B. Buzzer off.
 - C. Cavity fan motor(s) de-energized.
 - D. Time method remains selected with time LED on.
 - E. The cooking time remains as entered unless the heating mode or cooking time is changed or the oven is turned off.

TEMPERATURE PROBE METHOD

Refer to the Installation & Operation Manual for an explanation of temperature probe cooking.

NOTE: Assume heating mode already selected.

NOTE: Temperature probe method can be used in conjunction with the Delta T method to co-ordinate the oven cavity and probe temperatures.

1. Press the probe key before pressing the Start/Stop key.
 - A. Probe LED on.
 - B. Probe set point temperature is displayed in the time display for 5 seconds, before reverting to actual probe temperature (default is 140°F; range is 70-210°F).

NOTE: Probe temperature will display a maximum of 210°F or 2°F lower than the cavity temperature.

NOTE: If the probe temperature is not displayed, see "TROUBLESHOOTING" section for details.

2. Press the temp up or down keys to set the final product temperature.
3. Press Start/Stop key to begin the cooking cycle.

NOTE: The probe temperature can be adjusted throughout the cooking cycle by pressing the up or down time keys. The adjusted temperature is retained in memory and is displayed when the time key is pressed.

- A. Start/Stop LED on.
4. Internal product temperature reaches probe set point temperature.

- A. Buzzer sounds for approximately 10 seconds on and 45 seconds off. The buzzer continues to cycle at these times until the Start/Stop key is pressed.
- B. Probe temperature flashes in the time display.
- C. Convection and/or steam generator heating elements de-energized.
- D. Cavity fan motor(s) remain energized.
5. Press the Start/Stop key to end the cooking cycle.
 - A. Start/Stop LED off.
 - B. Buzzer off.
 - C. Cavity fan motor(s) de-energized.
 - D. Probe method remains selected with probe Led on.
 - E. Probe temperature remains as entered unless the heating mode or operating temperature is changed or the oven is turned off.

DELTA T METHOD

Refer to the Installation & Operation Manual for an explanation of Delta T cooking.

NOTE: Assume heating mode already selected.

NOTE: Delta T method is used in conjunction with temperature probe to co-ordinate the oven cavity and probe temperatures. Oven cavity temperature will always lead probe temperature by the Delta T differential setting.

1. Press Delta T key (differential) before pressing the Start/Stop key.
 - A. Delta T and probe LED's on.
 - B. Probe set point temperature is displayed in the time display for 5 seconds, before reverting to actual probe temperature (default is 140°F; range is 70-210°F).

NOTE: Probe temperature will display a maximum of 210°F or 2°F lower than the cavity temperature.

NOTE: If the probe temperature is not displayed, see "TROUBLESHOOTING" section for details.

- C. Delta T differential setting is displayed in the temperature display for 5 seconds, before reverting to actual cavity temperature (default is 60t; range is 20t to 240t for hot air/combi and 20t to 180t for steam).
2. Press Delta T key.

- A. Press the temp up or down keys to set the Delta T differential.
- 3. Press probe key.
 - A. Press the time up or down keys to set the final product temperature.
- 4. Press Start/Stop key to begin the cooking cycle.

NOTE: The Delta T differential can not be adjusted without stopping and starting the cycle again. The Delta T differential is retained in memory and is displayed when the Delta T key is pressed.

NOTE: The probe temperature can be adjusted throughout the cooking cycle by pressing the up or down time keys. The adjusted temperature is retained in memory and is displayed when the time key is pressed.

- A. Start/Stop LED on.
- 5. Internal product temperature reaches probe set point temperature.
 - A. Buzzer sounds for approximately 10 seconds on and 45 seconds off. The buzzer continues to cycle at these times until the Start/Stop key is pressed.
 - B. Probe temperature flashes in the time display.
 - C. Convection and/or steam generator heating elements de-energized.
 - D. Cavity fan motor(s) remain energized.
- 6. Press Start/Stop key to end the heating cycle.
 - A. Start/Stop LED off.
 - B. Buzzer off.
 - C. Delta T method remains selected with Delta T and probe LED's on.
 - D. Cavity fan motor(s) de-energized.
 - E. Probe and Delta T temperatures remain as entered unless the heating mode or set point temperatures are changed or the oven is turned off.

NOTE: If time key is pressed accidentally, the Delta T method is canceled and the LED turns off.

Programed Cooking Operation

Refer to the Installation & Operation Manual for programing instructions.

Powering Down

- 1. The control can be in any heating mode and the door in the open or closed position.
- 2. Press the off key.

NOTE: There is a four second time delay after pressing the off key to cancel the shut down sequence and resume normal operation.

- A. Displays and LED's turn off.
- B. All power removed from the heating elements and cavity fan(s).
- C. Vent motor energized and operates till vent opens.
- D. Door unlocks and opens.
- E. Drain pump activated for 45 seconds on 6 and 10 levels; 60 seconds on 20 levels.
- 3. At the end of the drain cycle.
 - A. Cavity lamp de-energized.
 - B. Cooling fan(s) de-energized.

Manual Oven Controls

This sequence of operation is written for the combi oven models that use the deluxe manual or standard manual oven controls. Control features that are not available on the standard manual control, are indicated where the differences occur. The three heating modes outlined below (convection, steam and combi) are for manual operation of the oven. The timed and temperature probe cooking methods are then outlined.

Powering Control

- 1. Conditions.
 - A. Oven connected to correct voltage supply and properly grounded.
 - B. Oven control (CPU/display/keypad board) are powered but not on; displays and LED's are off.
- NOTE:** When oven is initially powered, the buzzer sounds and the displays, LED's and service error lights come on for three seconds then turn off.
- C. Oven control configured properly. See "CONFIGURATION MODE - MANUAL CONTROLS" outlined under "SERVICE PROCEDURES AND ADJUSTMENTS".
- D. Voltage tap wire on power supply board set to the proper machine voltage.
- E. Door is properly closed but not locked and the door handle position is closed.
 - 1) Door handle magnet is positioned over magnetic door reed switch (N.O.) and is closed.
- F. High limit thermostats closed (manual reset).
- G. Thermal fuses closed.

- H. Cavity vent open.
 - I. 240VAC supplied to relay board.
 - J. Steam generator empty.
 - K. Water supply on.
2. Rotate the selector knob to one of the cooking modes (Heat, Steam or Combi) to turn the oven on.
- A. Oven control runs a self diagnostic test.
 - 1) "HHH" is displayed in the time display.
 - 2) Total cooking hours is displayed in the temperature display.
3. Control passes self diagnostic test.
- A. Set point temperature is displayed (default or last temperature that was set).
 - B. Time displays " - :- - " and time Led turns on.
 - C. Oven cavity lamp energized.
 - D. Cooling fan(s) energized.
 - E. Cavity vent motor energized.
 - 1) Cavity vent closes.

NOTE: When the oven is turned on, the default condition of the cavity vent is closed. Pressing the VENT key opens the cavity vent and turns the Vent LED on. Pressing the VENT key a second time closes the cavity vent and turns the vent LED off. Vent key is present on deluxe manual controls only.

- F. Door motor energized.
 - 1) Door closes and locks.
 - a. When the door is locked, switch 2SW closes and door motor is de-energized. On 20 levels only, switch 6SW also closes.
 - b. Switch 3SW opens. On 20 levels only, switch 5SW also opens.

NOTE: Pressing the DOOR key automatically unlatches and opens the door (slightly) for 3 seconds. If door is not disengaged manually (door handle pulled out), it will automatically close. While open, all heating stops and the cavity vent opens.

- g. Steam generator fill solenoid is energized until proper water level is reached then turns off. See "WATER LEVEL SENSORS" under "COMPONENT FUNCTION".

- 4. Proceed to the appropriate heating mode (convection, combi or steam) for the continuation of the sequence.

Convection Mode

- 1. Conditions exist as described in "POWERING CONTROL".
- 2. With the selector knob rotated to HEAT, the cooking cycle begins.
 - A. Time LED is on and " - :- - " is displayed in the time display.
 - B. Cavity set point temperature (the last temperature that was set) is displayed in the temperature display.
 - C. Convection heating elements energized and cycle as described under "HEATING REGULATION".
 - D. Steam generator pre-heats (initial start up only) as described under "STEAM PRE-HEAT".

NOTE: When degree symbol shows in the temperature display, convection and/or steam generator heating elements are energized.

- 1) Drain cool down solenoid energized.

NOTE: Whenever steam generator heating elements are on, the drain cool down solenoid is energized.

- E. Cavity fan motor(s) energized.
- 3. Press the temp key to set the operating temperature (the last temperature that was set is displayed; adjustable range is 35 to 518°F). The temperature symbol (°F or °C) will flash in the temperature display to indicate the cavity set point temperature can be adjusted.
 - A. Rotate the adjustment knob clockwise or counterclockwise to adjust the setting (temperature symbol stops flashing).
 - B. If a pause of 5 seconds is made during or at the end of the adjustment, the temperature symbol will begin to flash. When the temperature symbol stops flashing, the temperature can no longer be adjusted and the cavity set point temperature is displayed.

NOTE: To display the actual cavity temperature for several seconds, press and hold the temperature key.

- 4. Oven control monitors cavity temperature and cycles the convection heating elements as necessary, to maintain set point temperature.
 - A. The operating temperature remains as entered unless the operating temperature setting is changed.

Steam Mode

1. Conditions exist as described in "POWERING CONTROL".
2. With the selector knob rotated to STEAM, the cooking cycle begins..
 - A. Time LED is on and "- :- -" is displayed in the time display.
 - B. Cavity set point temperature (default) is displayed in the temperature display. If the oven has not been turned off, the previous set point temperature is displayed.
 - C. With the water at the proper level in the steam generator, steam generator heating elements are energized and cycle as described in "STEAM MODE" under "STEAM REGULATION".

NOTE: When degree symbol shows in the temperature display, steam generator heating elements are energized.

- 1) If oven cavity temperature is below set point temperature, the steam generator heating elements turn on at full power until steam temperature is reached, then turn off.
- 2) If oven cavity temperature is above set point temperature, the oven performs an automatic cool down as described under "WATER INJECTION (HUMIDIFIER)", then the steam generator heating elements turn on.

D. Drain cool down solenoid energized.

NOTE: Whenever steam generator heating elements are on, the drain cool down solenoid is energized.

E. Cavity fan motor(s) energized.

3. Press the temp key to set the operating temperature. The temperature symbol (°F or °C) will flash in the temperature display to indicate the cavity set point temperature can be adjusted. The default temperature displayed (195 to 212°F) is pre-selected in the configuration mode and is the steam temperature setting (boiling point adjustment) for elevation. The adjustable operating range is 35 to 212°F. See "CONFIGURATION MODE - MANUAL CONTROLS" under "SEQUENCE OF OPERATION".
 - A. Rotate the adjustment knob clockwise or counterclockwise to adjust the setting (temperature symbol stops flashing).

- 1) If a pause of 5 seconds is made during or at the end of the adjustment, the temperature symbol will begin to flash. When the temperature symbol stops flashing, the temperature can no longer be adjusted and the cavity set point temperature is displayed.

NOTE: To display the actual cavity temperature for several seconds, press and hold the temperature key.

4. Oven control monitors cavity temperature and cycles the steam generator heating elements as necessary, to maintain set point temperature.
 - A. The operating temperature remains as entered unless the operating temperature setting is changed or the oven is turned off.

Combi Mode

1. Conditions exist as described in "POWERING CONTROL".
2. With the selector knob rotated to COMBI, the cooking cycle begins.
 - A. Time LED is on and "- :- -" is displayed in the time display.
 - B. Cavity set point temperature (the last temperature that was set) is displayed in the temperature display.
 - C. Deluxe Manual Control - COMBI key LED turns on and 3 LED's in the combi window turn on, indicating the default steam factor setting of 20.
 - 1) Press COMBI key an additional 1 to 3 times to increase the steam factor setting from 30 to 50. With each successive key press, an additional LED illuminates to indicate the setting. This will be the "new" default combi setting until manually changed.
 - D. Standard Manual Control - A fixed steam factor setting of 20 is used. The combi key and the combi window are not present on this control.
 - E. Convection heating elements energized and cycle as described under "HEATING REGULATION".
 - F. Steam generator pre-heats (initial start up only) as described under "STEAM PRE-HEAT".

NOTE: When degree symbol shows in the temperature display, convection and/or steam generator heating elements are energized.

- 1) Drain cool down solenoid energized.

NOTE: Whenever steam generator heating elements are on, the drain cool down solenoid is energized.

- G. Cavity fan motor(s) energized.

3. Press the temp key to set the operating temperature (the last temperature that was set is displayed; adjustable range is 35 to 518°F). The temperature symbol (°F or °C) will flash in the temperature display to indicate the cavity set point temperature can be adjusted.

- A. Rotate the adjustment knob clockwise or counterclockwise to adjust the setting (temperature symbol stops flashing).

- 1) If a pause of 5 seconds is made during or at the end of the adjustment, the temperature symbol will begin to flash. When the temperature symbol stops flashing, the temperature can no longer be adjusted and the cavity set point temperature is displayed.

NOTE: To display the actual cavity temperature for 5 seconds, press and hold the temperature key.

4. Oven control monitors cavity temperature and cycles the convection heating elements as necessary, to maintain set point temperature. Steam generator heating elements cycle as described in "COMBI MODE" under "STEAM REGULATION".

- A. The operating temperature remains as entered unless the operating temperature is changed.

Add the steps outlined in the two cooking methods below to the heating mode sequence (convection, steam or combi) for time and temperature probe operation.

TIME METHOD

NOTE: Assume heating mode and operational temperature already selected.

NOTE: Timed method can not be used in conjunction with temperature probe method.

NOTE: Timed method does not affect oven operation. i.e. contactors, heaters, cavity fans etc.

1. Press the time key.
 - A. Time LED and dashes (- -:- -) flash in the time display.
2. Rotate the adjustment knob clockwise or counterclockwise to the desired cooking time. Time display will be continuous but the time LED will continue to flash.

- A. Once the time is set, it will flash in the time display for 5 seconds then display the selected time.

3. Press the Start key to begin the "timed" cooking cycle.

- A. Start LED on.

- B. Timer counts down.

NOTE: As the cooking time counts down, the colon between hours and minutes in the time display will flash.

NOTE: Time can be adjusted throughout the cooking cycle by pressing the time key and rotating the adjustment knob. The adjusted time is retained in memory and is displayed when the time key is pressed.

4. Cooking time expires, time display flashes and buzzer sounds.

- A. Press the Start key to silence buzzer.

- 1) Start LED off.

5. The cooking time remains as entered and is displayed in the time display.

TEMPERATURE PROBE METHOD (DELUXE MANUAL CONTROL ONLY)

Refer to the Installation & Operation manual for an explanation of temperature probe cooking.

NOTE: Assume heating mode already selected.

NOTE: Temperature probe method can not be used in conjunction with timed method.

NOTE: Timed method does not affect oven operation. i.e. contactors, heaters, cavity fans etc.

1. Press the probe key.
 - A. Time LED off.
 - B. Probe LED and dashes (- -:- - F) flash in the time display.
 - C. Probe set point temperature is displayed in the time display (the last temperature that was set). Default is 140°F; range is 70-210°F.

NOTE: Probe temperature will display a maximum of 210°F or 2°F lower than the cavity temperature.

NOTE: If the probe temperature is not displayed, see "TROUBLESHOOTING" section for details.

2. Rotate the adjustment knob clockwise or counterclockwise to adjust the setting (temperature display will not flash).
 - A. Once the adjustment is made, the temperature display flashes for 5 seconds then displays the selected set point temperature.

NOTE: To display the actual probe temperature for 5 seconds, press and hold the probe key.

3. Press Start key to begin the cooking cycle.
 - A. Start LED on.

NOTE: The probe temperature can be adjusted throughout the cooking cycle by pressing the probe key and rotating the adjustment. The adjusted temperature is retained in memory and is displayed when the time key is pressed.

4. Internal product temperature reaches probe set point temperature.
 - A. Buzzer sounds.
 - 1) Press the Start key to silence the buzzer.
 - a. Start LED off.
 - B. Probe temperature flashes in the time display.
 - C. Probe method remains selected with probe Led on.
 - D. Probe temperature remains as entered and is displayed in the time display.

Powering Down

1. The control can be in any heating mode and the door in the open or closed position.
2. Rotate the selector knob to off.

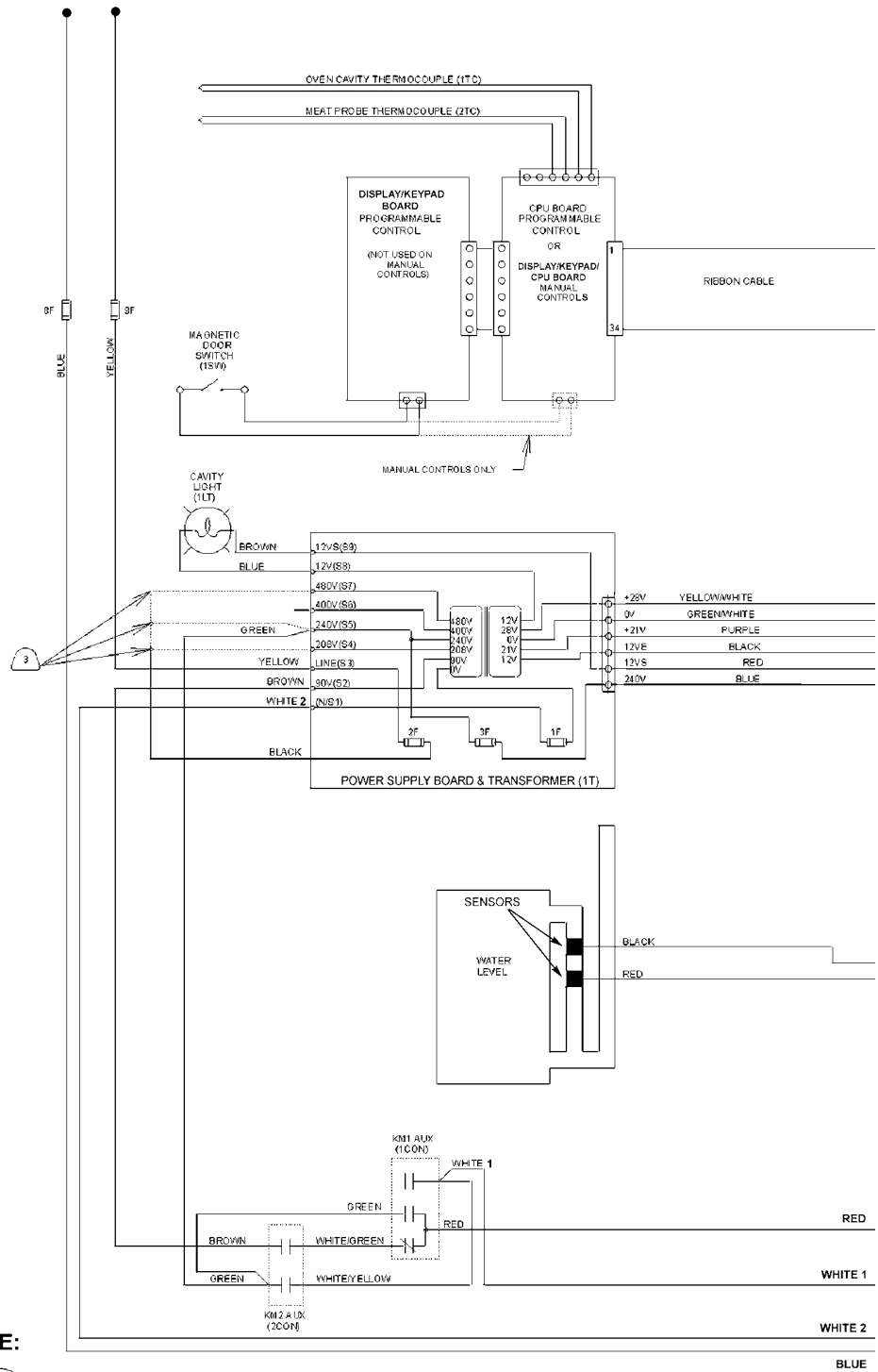
NOTE: There is a 5 second time delay after selecting the off position to cancel the shut down sequence and resume normal operation.

- A. Displays and LED's turn off.
 - B. All power removed from the heating elements and cavity fan(s).
 - C. Vent motor energized and operates till vent opens.
 - D. Door unlocks and opens.
 - E. Drain pump activated for 45 seconds on 6 and 10 levels; 60 seconds on 20 levels.
3. At the end of the drain cycle.
 - A. Cavity lamp de-energized.
 - B. Cooling fan(s) de-energized.
 - C. Cavity vent closes.

WIRING DIAGRAMS

6 Level

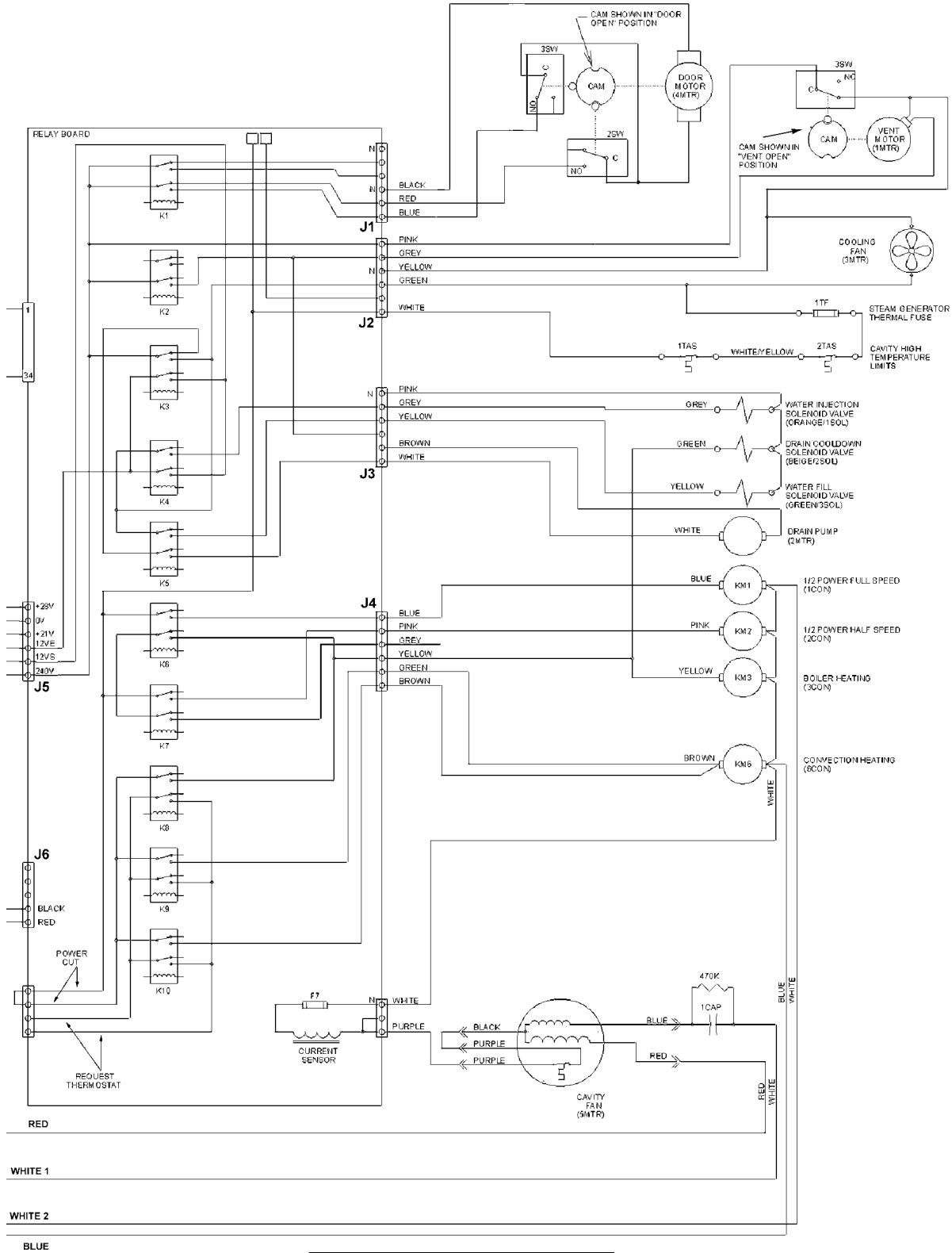
**SUPPLY FROM
TERMINAL BLOCK**



NOTE:

MUST PLACE BLACK WIRE ON APPROPRIATE INPUT TERMINAL (208V - TERMINAL S4, 240V - TERMINAL S5, 480V - TERMINAL S7)

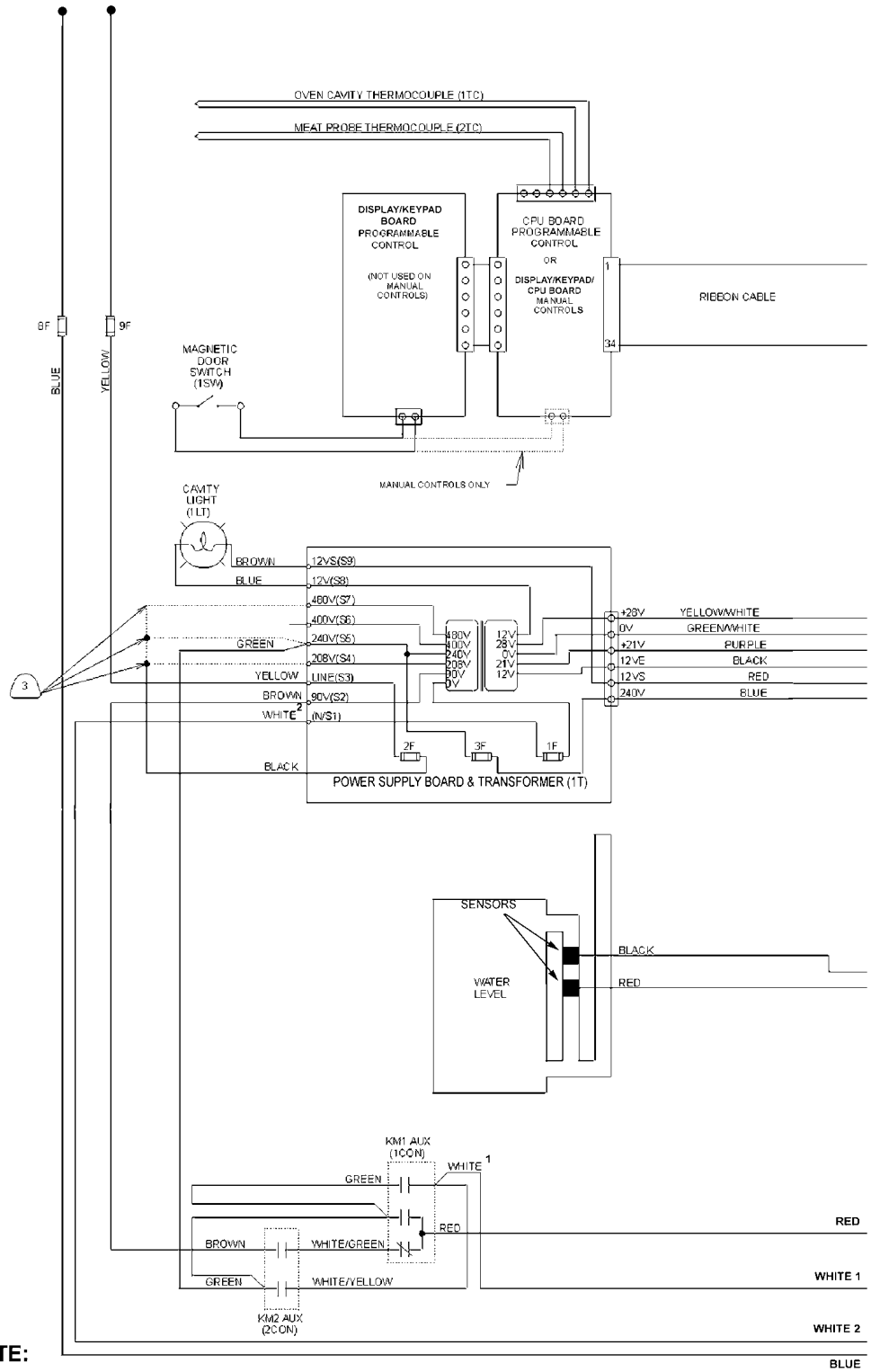
ELECTRIC COMBI OVEN - ELECTRICAL OPERATION



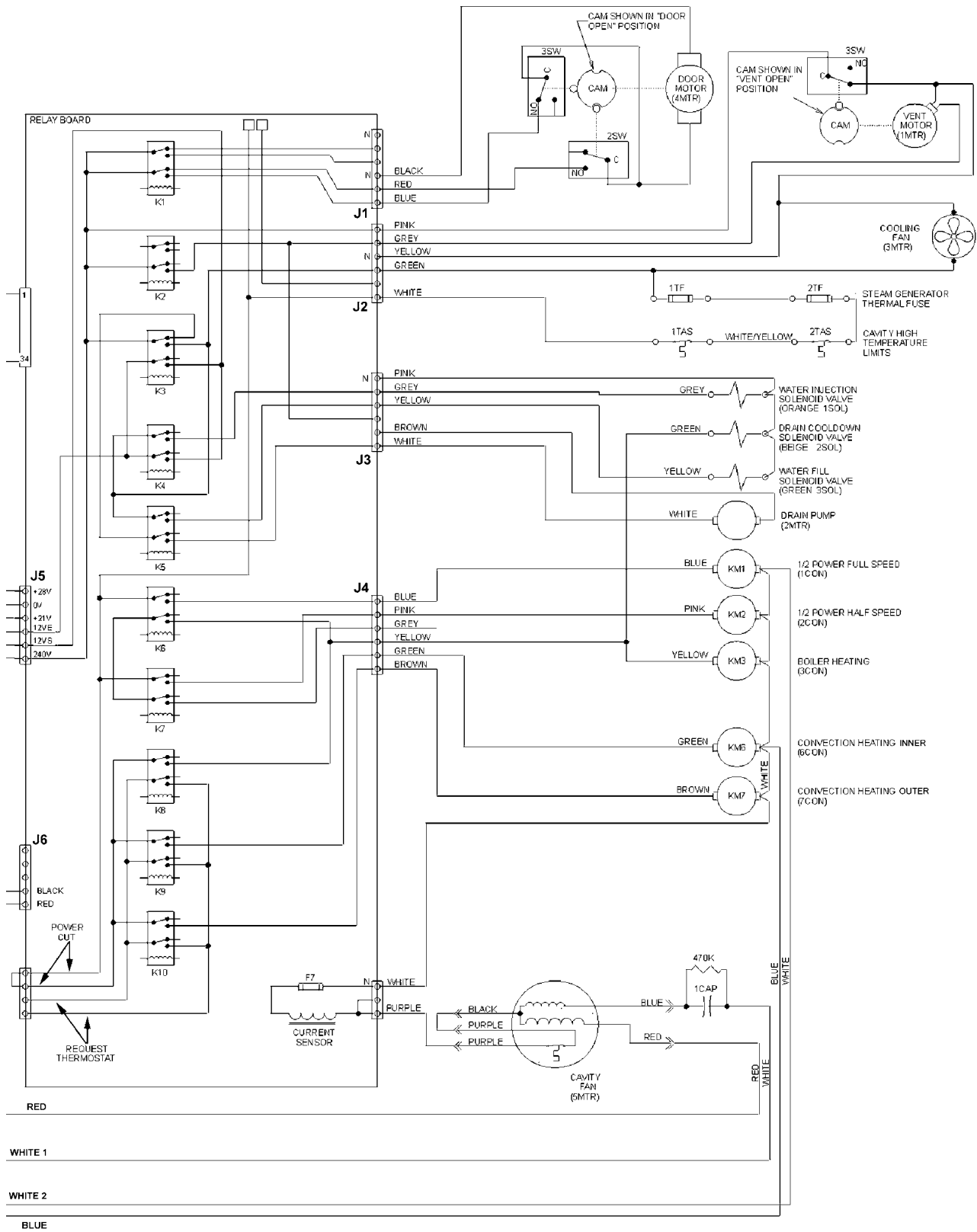
DIAGRAM, 6LEV COMBI
ELECTRIC COMBI OVEN
(208, 240, 480)
DERIVED FROM:
851731-1 REV. B

10 Level

SUPPLY FROM TERMINAL BLOCK



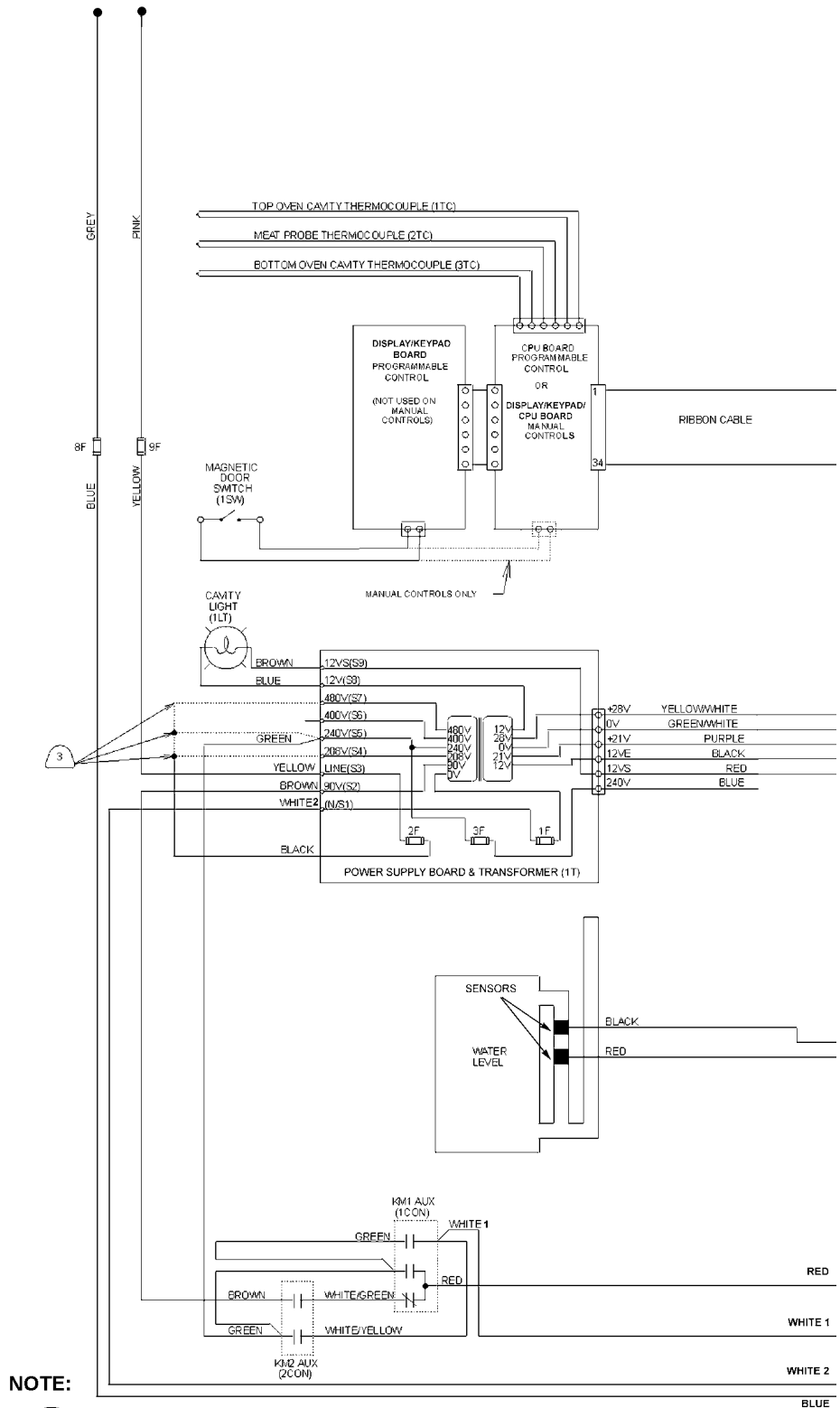
ELECTRIC COMBI OVEN - ELECTRICAL OPERATION



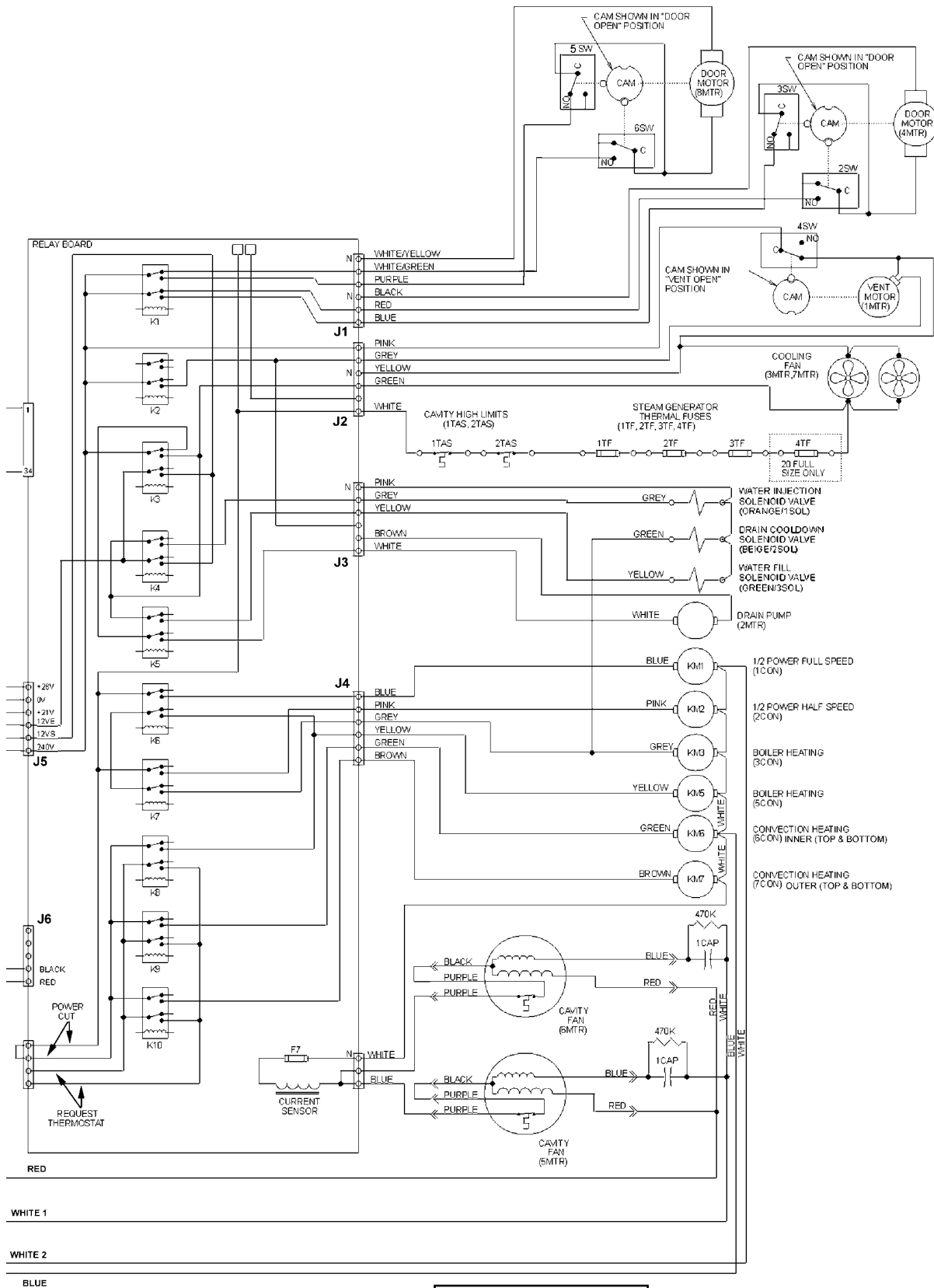
DIAGRAM, 10LEV COMBI
 ELECTRIC COMBI OVEN
 (208, 240, 480)
 DERIVED FROM:
851732-1 REV. B

20 Level

SUPPLY FROM
TERMINAL BLOCK

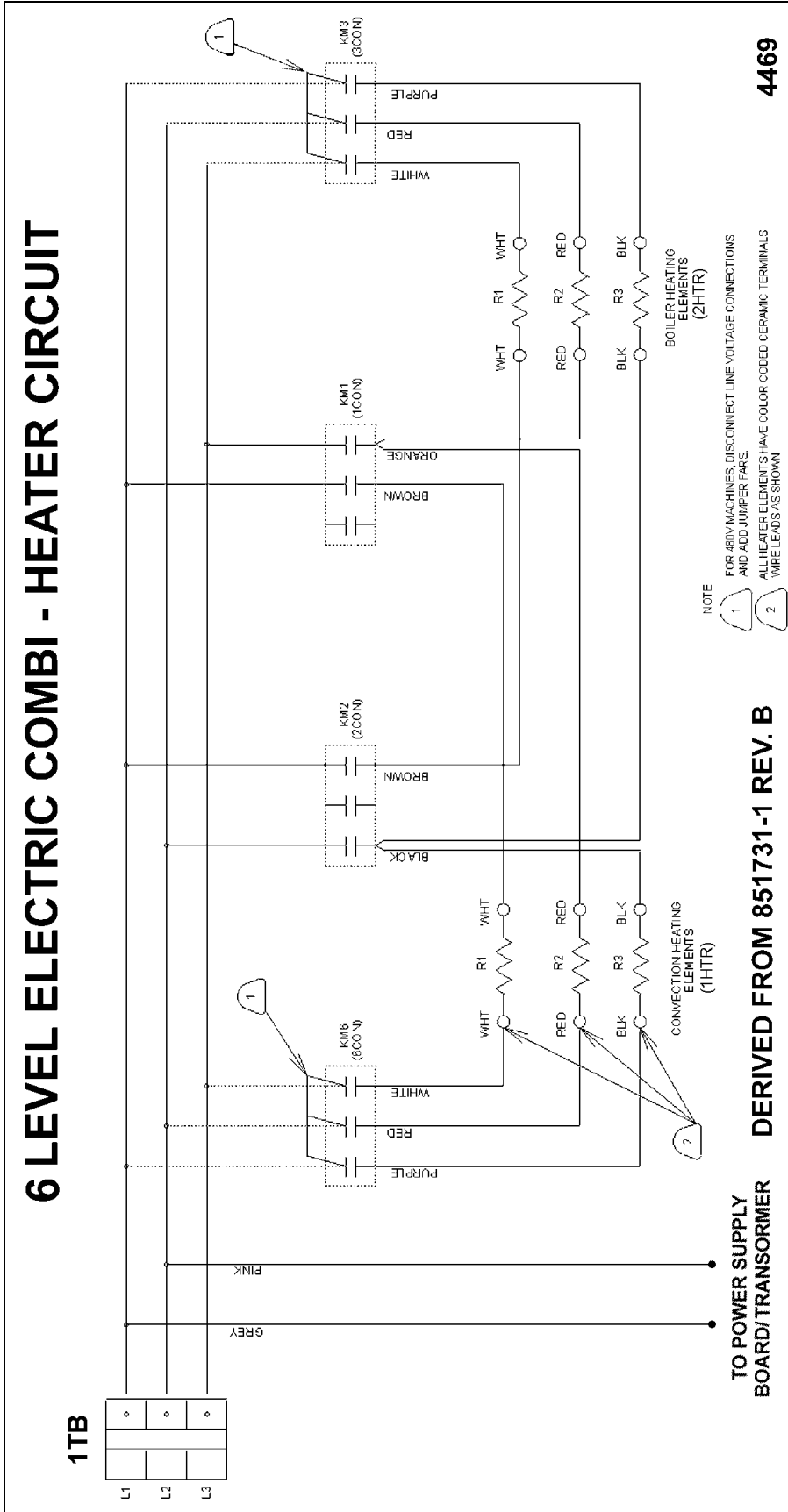


ELECTRIC COMBI OVEN - ELECTRICAL OPERATION

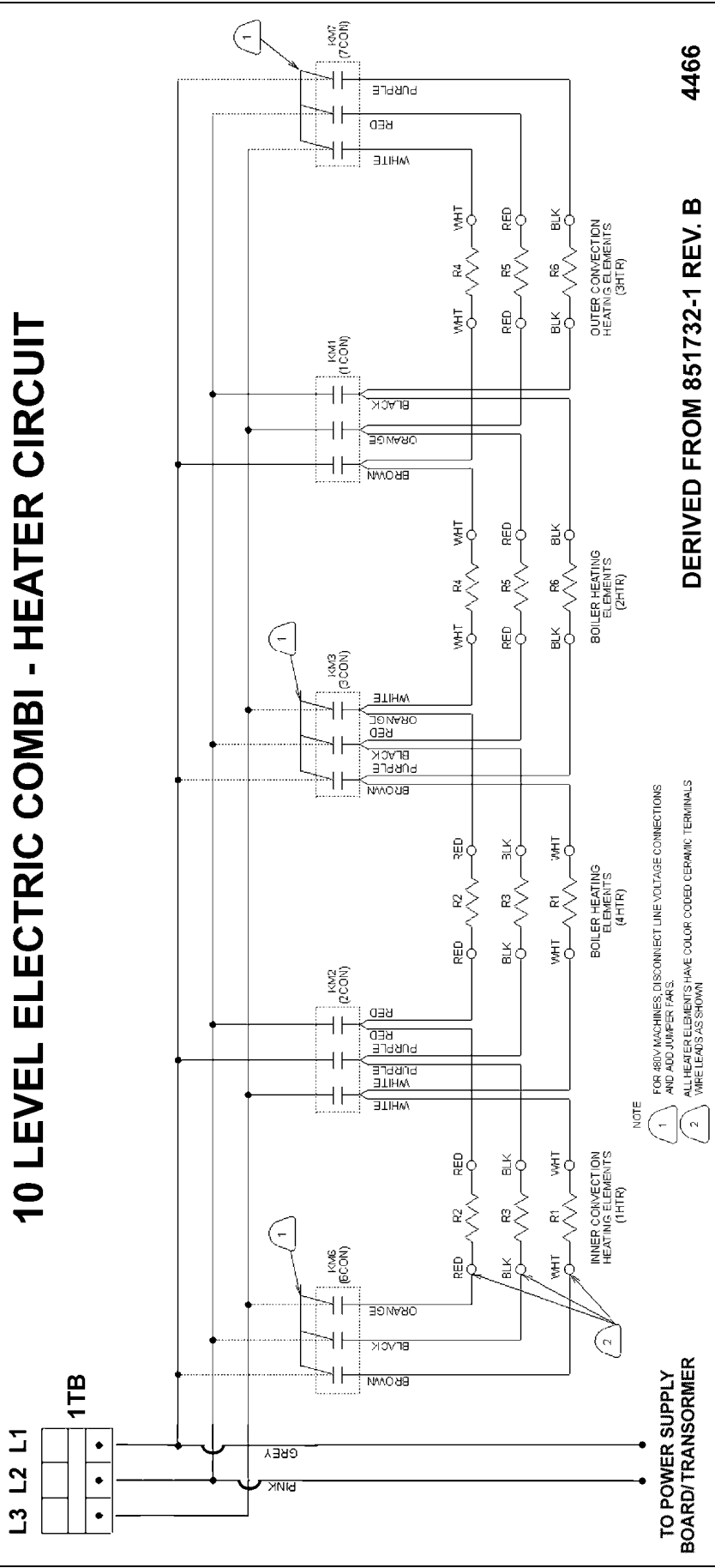


DIAGRAM, 20LEV COMBI
ELECTRIC COMBI OVEN
(208, 240, 480)
DERIVED FROM:
851733-1 REV. B

ELECTRIC HEATER CIRCUITS



10 LEVEL ELECTRIC COMBI - HEATER CIRCUIT

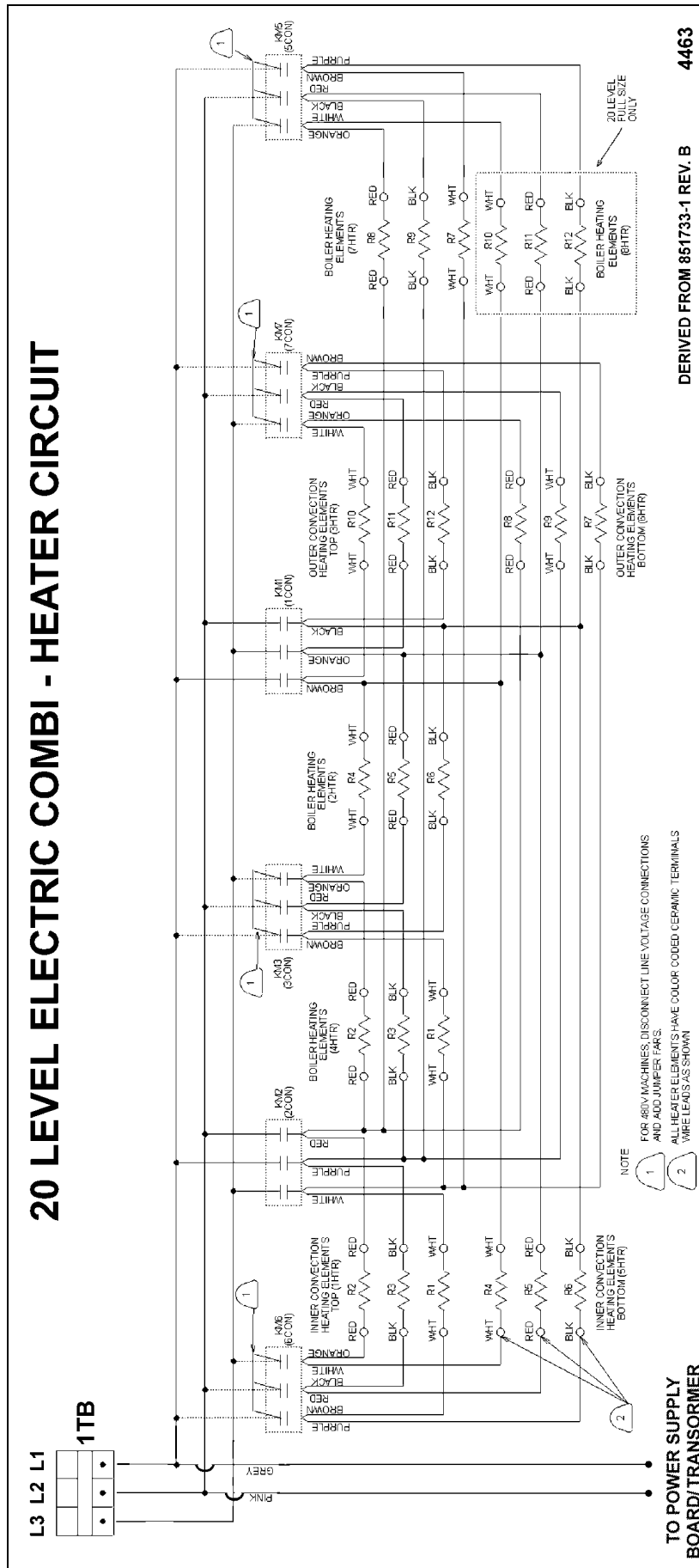


TO POWER SUPPLY BOARD/TRANSFORMER

DERIVED FROM 851732-1 REV. B

4466

20 LEVEL ELECTRIC COMBI - HEATER CIRCUIT



TROUBLESHOOTING

WARNING: CERTAIN PROCEDURES IN THIS SECTION REQUIRE ELECTRICAL TEST OR MEASUREMENTS WHILE POWER IS APPLIED TO THE MACHINE. EXERCISE EXTREME CAUTION AT ALL TIMES. IF TEST POINTS ARE NOT EASILY ACCESSIBLE, DISCONNECT POWER, ATTACH TEST EQUIPMENT AND REAPPLY POWER TO TEST.

Before performing any of the troubleshooting checks listed below, run the oven control in “DIAGNOSTIC TEST MODE” for the oven control in use, as outlined under “SERVICE PROCEDURES AND ADJUSTMENTS”. By utilizing the oven controls “diagnostic test mode” the Service Technician can quickly and easily determine if a component is functioning properly or in need of repair. The “diagnostic test mode” can be entered only when the machine is OFF. If the oven is inoperative, then refer to the troubleshooting guide under SYMPTOM - “Oven inoperative and displays are blank” and/or SYMPTOM - “Button(s) on keypad inoperative”. Also, check the Technical Service Bulletins for changes to the oven and for software revisions to the oven control.

NOTE: An accumulation of lime scale on the water level sensors may cause false water level readings to the oven control. Lime scale that is dry can prevent the sensor from detecting the water level until the lime becomes moist enough to conduct the electrical signal. This condition can cause water errors and/or overfilling of the steam generator. In reverse, lime scale that retains water may already be moist enough to conduct the electrical signal. This condition can cause water errors, prevent the steam generator from filling and cause dry firing of the heating elements. Subsequently, the steam generators thermal fuse(s) would open to protect the oven. See “CLEAN CYCLE MODE - STEAM GENERATOR DELIMING” under “SERVICE PROCEDURES AND ADJUSTMENTS”.

SYMPTOM	POSSIBLE CAUSES
Water error light on, buzzer sounds for one minute and steam generator light comes on in a cooking mode.	<ol style="list-style-type: none"> Time to fill steam generator has exceeded 4 minutes 20 seconds. <ol style="list-style-type: none"> Ensure water supply is on. Check water fill line for clogs. Water too soft for water level sensors to conduct electricity. Lime scale build up (dry) on water level sensors giving a false reading to the oven control. See note at the beginning of troubleshooting section.
Water error light on and buzzer sounds after steam generator drains.	<ol style="list-style-type: none"> Water still in steam generator - check for clogged steam generator drain line or drain pump malfunction. Lime scale build up (moist) on water level sensors giving false reading. See note at the beginning of troubleshooting section.
Water error light on and buzzer sounds when oven is turned on.	<ol style="list-style-type: none"> Water still in steam generator - check for clogged steam generator drain line or drain pump malfunction. Lime scale build up (moist) on water level sensors giving false reading. See note at the beginning of troubleshooting section.
Steam generation stops, water error light and steam generator light on in steam mode.	<ol style="list-style-type: none"> Oven control board has not seen a call for water request within 5 minutes powering on. A boil down situation is assumed. <ol style="list-style-type: none"> Lime scale build up on water level sensors giving false reading. See note at the beginning of troubleshooting section. Oven control board malfunction.

SYMPTOM	POSSIBLE CAUSES
Convection heat error light and steam heat error light on.	<ol style="list-style-type: none"> 1. Cavity high temperature limit(s) open (manual reset). 2. Fuse F7 open. 3. Steam generator thermal fuse(s) open.
Cavity fan motor inoperative and cavity fan error light on.	<ol style="list-style-type: none"> 1. Cavity fan motor values in the oven control configuration setup are incorrect. See "CONFIGURATION MODE - PROGRAMABLE CONTROL" or "CONFIGURATION MODE MANUAL CONTROLS" in "SERVICE PROCEDURES" AND "ADJUSTMENTS". 2. Motor shaft is rubbing against the opening in the rear of the cavity. NOTE: This may only occur when the cavity is at a high temperature. If this is true, then remove the motor and inspect the shaft for scratches. 3. Internal motor protector open. 4. Fuse F7 on relay board open. 5. Cavity high temperature limit(s) open (manual reset). 6. Steam generator thermal fuse(s) open. 7. Auxiliary contactor switch(s) on contactor KM1 or KM2 malfunction. 8. Cavity fan motor(s) malfunction. 9. Oven control malfunction.
Oven inoperative and displays are blank.	<ol style="list-style-type: none"> 1. Incoming voltage to machine not present or incorrect. 2. Line fuses F8 and/or F9 open. 3. Voltage tap wire on power supply board <u>not</u> connected or connected to wrong voltage for the machine. 4. Fuse F1 and/or F2 on the power supply board open. 5. Ribbon cable connector to relay board and CPU board is not inserted properly. NOTE: Connector should snap into position. 6. Relay board connector (J6) and/or power supply board connector is not inserted properly. 7. Battery backup voltage low or near zero. 8. Power supply board and transformer (1T) malfunction. 9. Oven control board inoperative.
One or more service error light(s) at bottom of keypad come on.	<ol style="list-style-type: none"> 1. Water supply not on or clogged. 2. Convection heat malfunction. 3. Steam generator heat malfunction. 4. Cavity fan malfunction.
Convection heaters inoperative.	<ol style="list-style-type: none"> 1. No voltage to heating elements. <ol style="list-style-type: none"> A. Cavity high temperature limit(s) open (manual reset). B. Steam generator thermal fuse(s) open. C. Contactor(s) malfunction. See "HEATING MODE AND CAVITY FAN SPEEDS" under "ELECTRICAL OPERATION". 2. Convection heating element(s) malfunction. 3. Relay board malfunction (K6, K7 relay) 4. Oven control board malfunction.

SYMPTOM	POSSIBLE CAUSES
No steam generation but cavity fan operates.	<ol style="list-style-type: none"> 1. Cavity temperature is above steam temperature set point and oven is performing automatic cooling before steam generation can start. 2. Water supply off. 3. Steam generator thermal fuse(s) open. 4. Steam generator heating element(s) malfunction. 5. Contactor(s) malfunction. See "HEATING MODE AND CAVITY FAN SPEEDS" under "ELECTRICAL OPERATION". 6. Lime scale build up (moist) on water level sensors giving false reading. See note at the beginning of troubleshooting section. 7. Oven control board malfunction.
Oven displays "888F" or "888C" in the temperature display.	<ol style="list-style-type: none"> 1. Cavity temperature probe. NOTE: On 10 level machines - error in the single cavity temperature probe. On 20 level machines - error in the upper cavity temperature probe. <ol style="list-style-type: none"> A. Damaged probe or thermocouple lead wire open. B. Board connection loose or connector not inserted onto board properly (mis-aligned). C. Thermocouple lead wires reversed. When heating, cavity temperature will appear to decrease for several seconds, then error code will display. 2. Low or no voltage on battery backup to maintain controls setup and program information in SRAM. See "BATTERY BACKUP - PROGRAMMABLE CONTROL" under "SERVICE PROCEDURES AND ADJUSTMENTS". 3. Incorrect temperature probe in use. Ensure the temperature probe is <u>not</u> a thermistor type by checking its resistance. If resistance measures approximately 110 ohms at 70-80°F then do <u>not</u> use.)
Oven displays "999F" or "999C" in the temperature display.	<ol style="list-style-type: none"> 1. Cavity temperature probe. NOTE: On 10 level machines - error in the single cavity temperature probe. On 20 level machines - error in the lower cavity temperature probe. <ol style="list-style-type: none"> A. Damaged probe or thermocouple lead wire open. B. Board connection loose or connector not inserted onto board properly (mis-aligned). C. Thermocouple lead wires reversed. When heating, cavity temperature will appear to decrease for several seconds, then error code will display. 2. Low or no voltage on battery backup to maintain controls setup and program information in SRAM. See "BATTERY BACKUP - PROGRAMMABLE CONTROL" under "SERVICE PROCEDURES AND ADJUSTMENTS". 3. Incorrect temperature probe in use. Ensure the temperature probe is <u>not</u> a thermistor type by checking its resistance. If resistance measures approximately 110 ohms at 70-80°F then do <u>not</u> use.)

SYMPTOM	POSSIBLE CAUSES
Temperature display for cavity or cooking probe does not change after starting a cook cycle.	<ol style="list-style-type: none"> 1. Cavity temperature probe (thermocouple) shorted. 2. Oven cavity not heating - check incoming voltage. 3. Contactor(s) malfunction. See "HEATING MODE AND CAVITY FAN SPEEDS" under "ELECTRICAL OPERATION". 4. Heating element(s) inoperative.
Cooking probe temperature displays "32" in the time display. After approximately 10 minutes, "00" or "32" flashes and the buzzer sounds intermittently. Oven will not operate in probe mode.	<ol style="list-style-type: none"> 1. Product temperature is below 35°F. Once product warms, correct temperature will display. 2. Cooking probe. <ol style="list-style-type: none"> A. Damaged probe or thermocouple lead wire open. B. Board connection loose or connector not inserted onto board properly (mis-aligned). C. Thermocouple lead wires reversed. When heating, cavity temperature will appear to decrease for several seconds, then "32" will display. 3. Incorrect cooking probe in use. Ensure the cooking probe is <u>not</u> a thermistor type by checking its resistance. If resistance measures approximately 110 ohms at 70-80°F then do <u>not</u> use.)
Temperature display flashes current cavity temperature but oven will not heat or produce steam.	<ol style="list-style-type: none"> 1. Door not completely shut or handle not in the closed position. 2. Door reed switch malfunction. 3. Oven control board malfunction.
Cavity cooking temperature is lower than actual temperature displayed.	<ol style="list-style-type: none"> 1. Cavity temperature probe(s) (thermocouple) shorted. 2. Incorrect temperature probe in use. <ol style="list-style-type: none"> A. Cavity thermocouple <u>not</u> the correct type. B. Ensure the temperature probe is <u>not</u> a thermistor type by checking its resistance. If resistance measures approximately 110 ohms at 70-80°F then do not use. 3. Software revision level not current. Determine the current version and obtain an update if available. See "CONFIGURATION MODE - PROGRAMMABLE CONTROL" or "CONFIGURATION MODE - MANUAL CONTROLS" under "SERVICE PROCEDURES" AND "ADJUSTMENTS".
Button(s) on keypad inoperative (programmable control).	<ol style="list-style-type: none"> 1. Display/Keypad board malfunction. Verify keypad is functioning properly. See "DIAGNOSTIC TEST MODE" - PROGRAMMABLE CONTROL" under "SERVICE PROCEDURES AND ADJUSTMENTS". 2. If keypad test is inaccessible, the oven control board may not be properly mounted to the front panel. If the mounting washers are stacked too high or the weld studs have excessive flash, the oven control board will be positioned too far from the keypad to actuate the buttons when pressed.

SYMPTOM	POSSIBLE CAUSES
Heating mode selector switch, adjustment knob or keypad button(s) inoperative (manual control).	<ol style="list-style-type: none"> 1. Display/Keypad/CPU board malfunction. Verify keypad is functioning properly. See "DIAGNOSTIC TEST MODE - MANUAL CONTROLS" under "SERVICE PROCEDURES AND ADJUSTMENTS". 2. If keypad test is inaccessible, the oven control board may not be properly mounted to the front panel. If the mounting washers are stacked too high or the weld studs have excessive flash, the oven control board will be positioned too far from the keypad to actuate the buttons when pressed.
Door will not lock.	<ol style="list-style-type: none"> 1. Door handle magnet not positioned over door reed switch. 2. Door reed switch open. (Check switch operation with an alternate magnet) 3. Fuse F3 open. 4. Relay board malfunction (K1 relay). 5. Door motor & switch mechanism inoperative. 6. Motor stop mechanism remains in the open position.
"HHH" in the time display and "025" in the temperature display. (Programable control only)	<ol style="list-style-type: none"> 1. Low or no voltage on battery backup to maintain the oven control's setup and program information in the event of a power loss. See "BATTERY BACKUP - PROGRAMABLE CONTROL" under "SERVICE PROCEDURES AND ADJUSTMENTS".
Water in component area.	<ol style="list-style-type: none"> 1. Cavity drain "gasket" not sealing properly. 2. Heating element(s) "o-ring" not sealing properly.
Water in bottom of cavity.	<ol style="list-style-type: none"> 1. Water too soft for water level sensors to conduct electricity. 2. Water level sensor leads loose or disconnected. 3. Lime scale build up on water level sensors giving false reading. See note at the beginning of troubleshooting section. 4. Excessive lime descale solution added to steam generator for clean cycle deliming. The increased concentration interferes with water level sensing and causes the steam generator to overflow. 5. Drain line clogged causing backup. 6. Water solenoid valve remains open. 7. Relay board malfunction (K3, K5 relay). 8. Water level sensor(s) malfunction. 9. Oven control board malfunction.
Cavity vent not operating.	<ol style="list-style-type: none"> 1. Vent motor not receiving voltage. <ol style="list-style-type: none"> A. Motor leads loose or disconnected. B. Relay board malfunction (K2 relay). 2. Vent motor/micro switch assembly (4SW) malfunction. 3. Mechanical binds on shaft extension rod or obstructions in vent housing. 4. Shaft extension rod not turning with motor. Mounting screw missing in rod. 5. Oven control board malfunction.

ELECTRIC COMBI OVENS - TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSES
Inner door glass breaks.	1. Glass installed incorrectly with conductive side toward oven cavity. See "OVEN DOOR" under "REMOVAL AND REPLACEMENT OF PARTS".
Steam generator drains continually.	1. Relay board malfunction (K3, K5). 2. Oven control board malfunction.
Cavity fan motor squeaks.	1. Motor seal - grease is dry or dirty. 2. Motor shaft rubbing against the opening in the rear of the cavity. NOTE: This may only occur when the cavity is at a high temperature. If this is true, then remove the motor and inspect the shaft for scratches.. 3. Motor malfunction.
Cavity lamp not working.	1. Lamp inoperative. 2. Power wires to lamp loose or not connected to transformer (1T). 3. Transformer (1T) malfunction. 4. Relay board malfunction (K3 relay). 5. Oven control board malfunction.
Steam leaks around door.	1. Door not sealing or locking properly. See "OVEN DOOR ADJUSTMENT" under "SERVICE PROCEDURES AND ADJUSTMENTS".

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