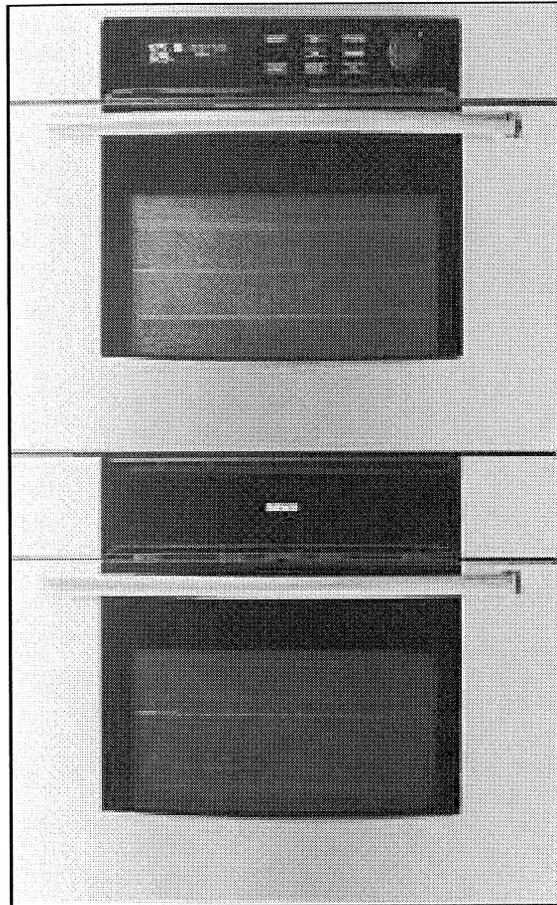
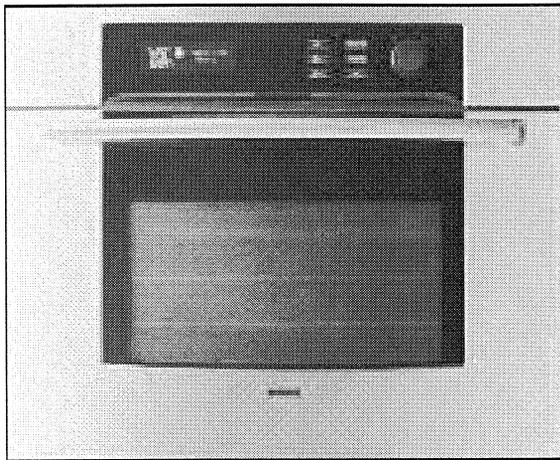
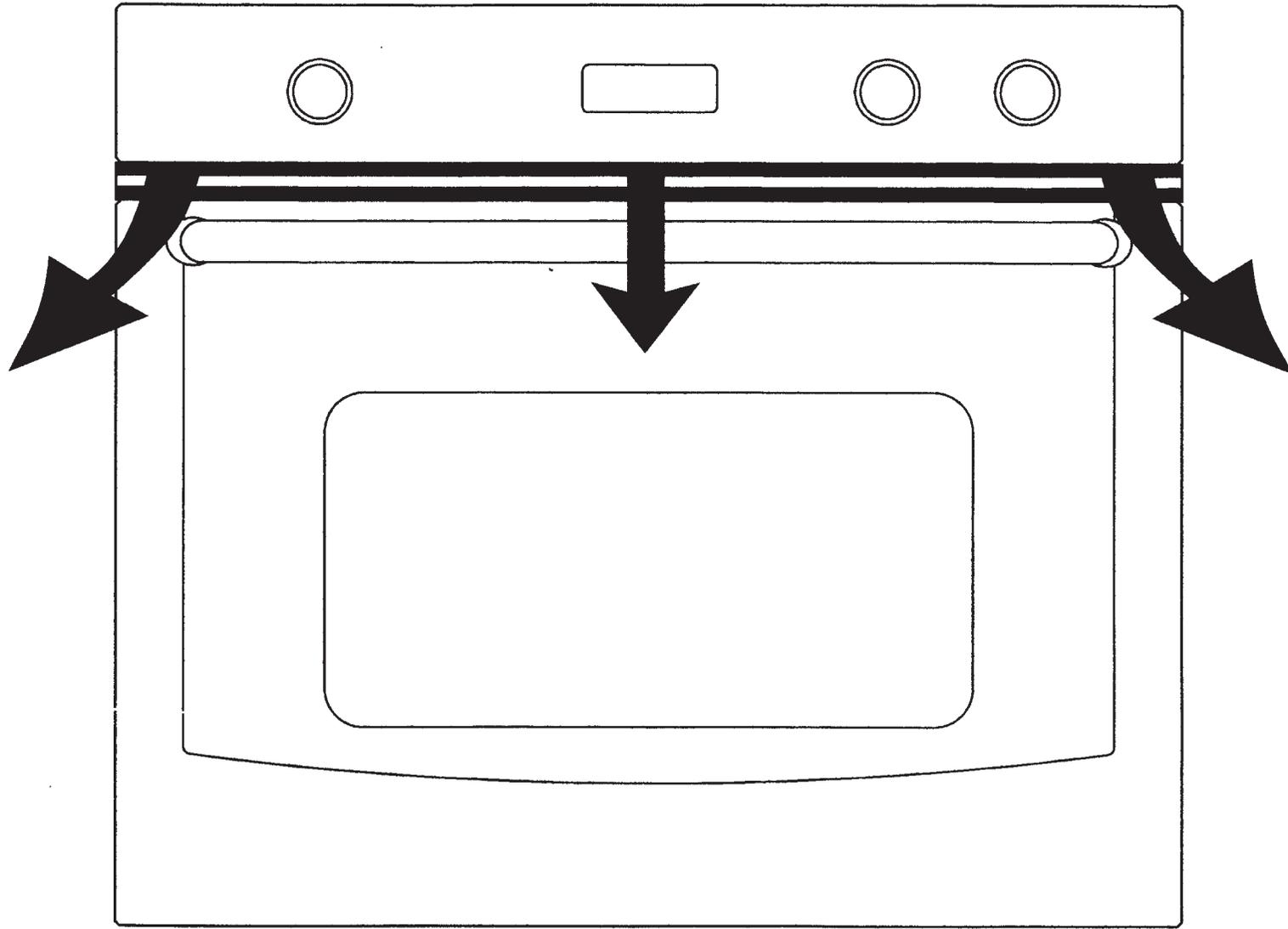


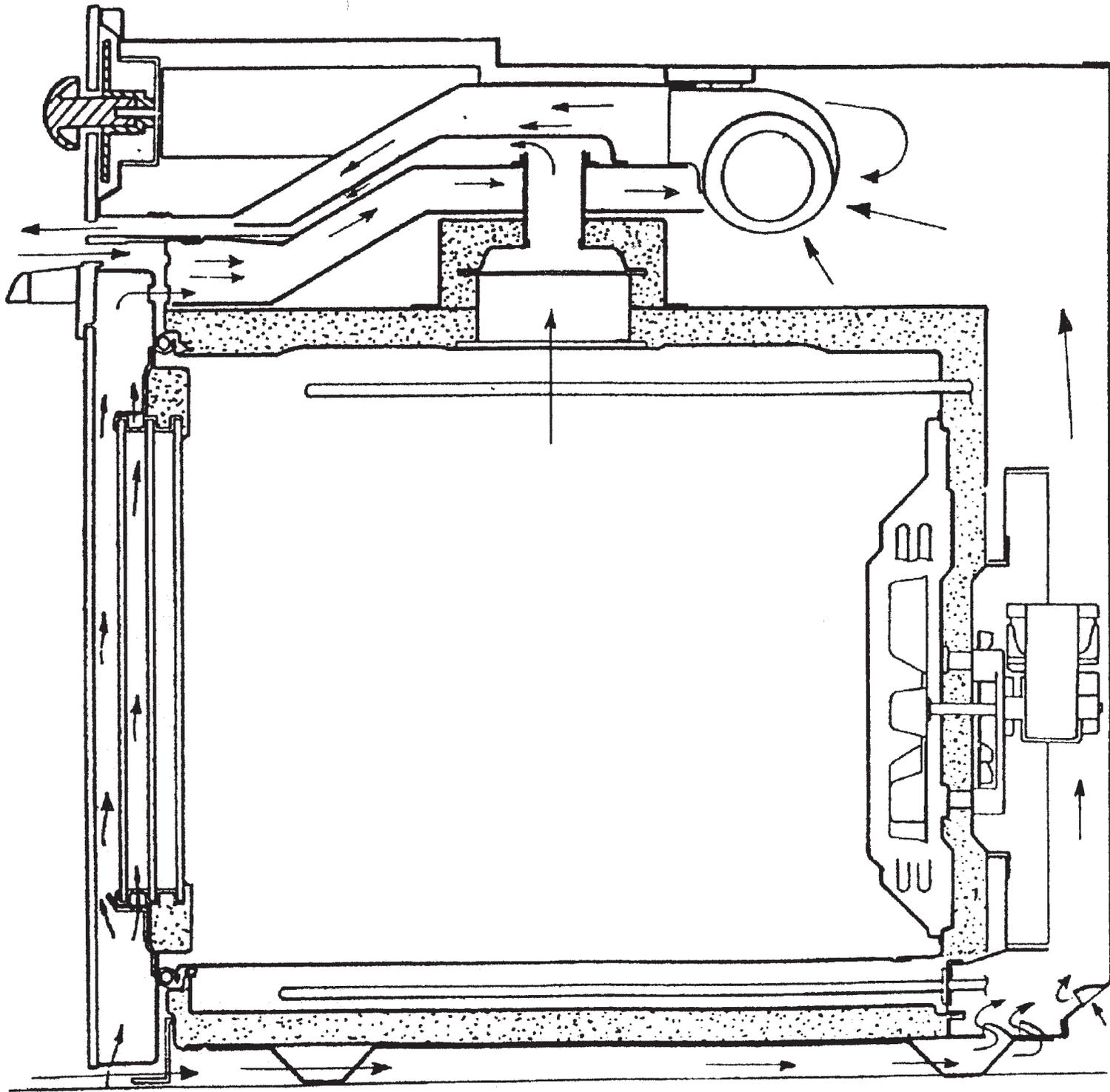
BOSCH

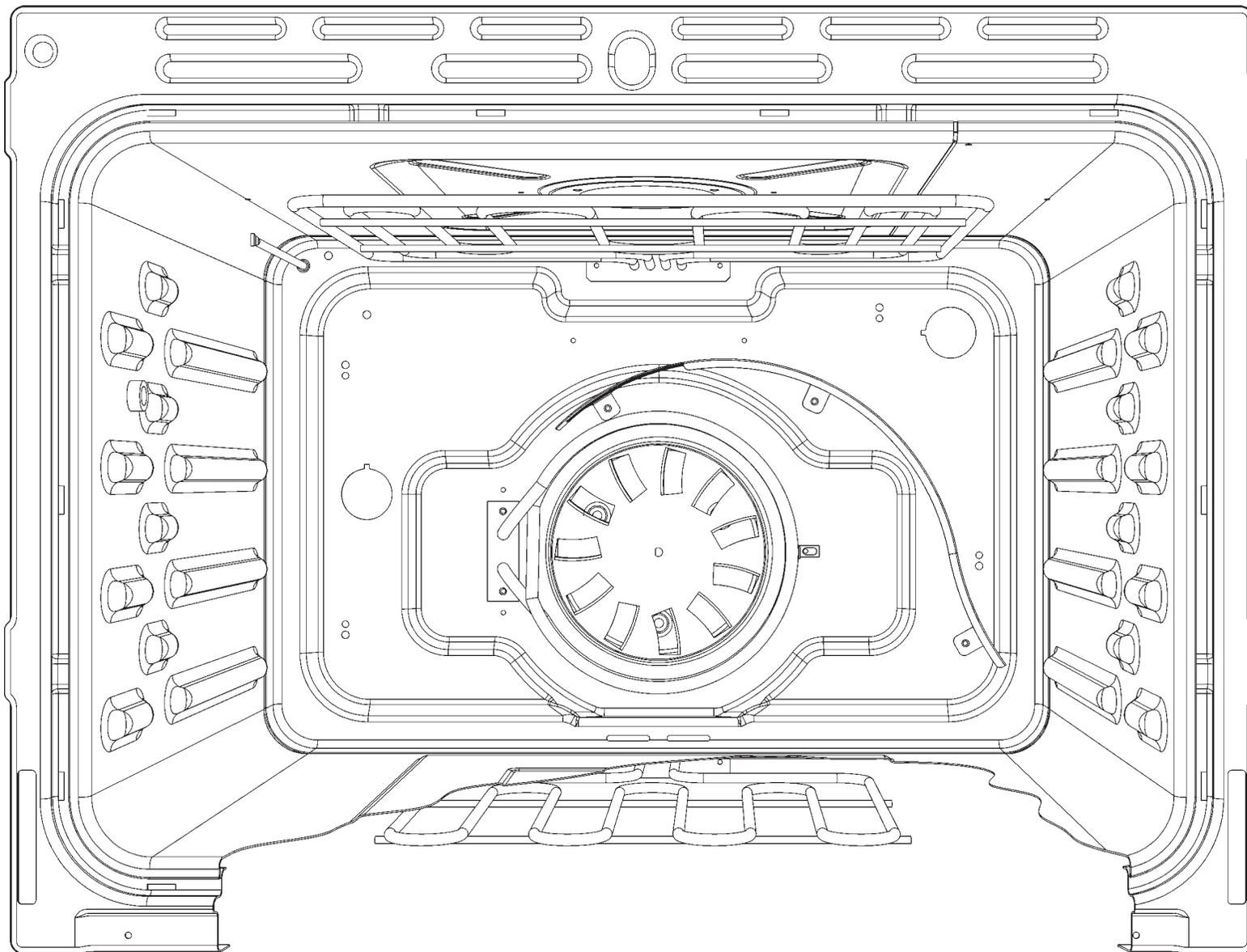
Service Manual



For
Single and Double Built-in Ovens
Models
HBL 73../74../75../76.. and HBN 74../75../76..



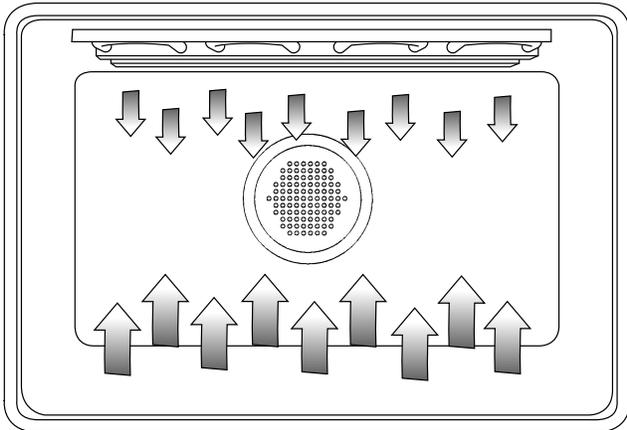




Heating elements BSH/series 700
-convection system-

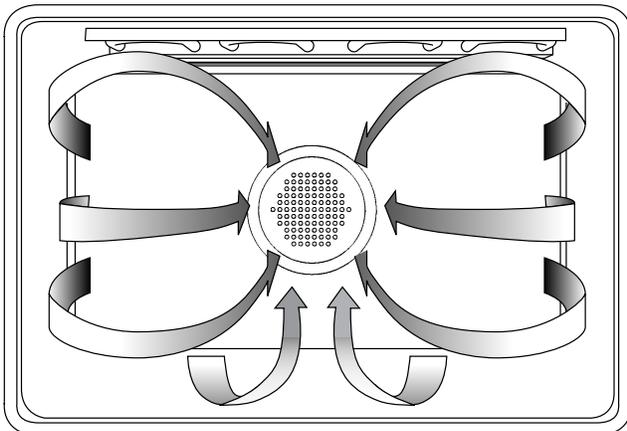
Oven Modes

The following illustrations give an overview of what happens in the oven with each mode setting. The arrows represent the location of the heat source during specific modes. The lower element is concealed under the oven floor.



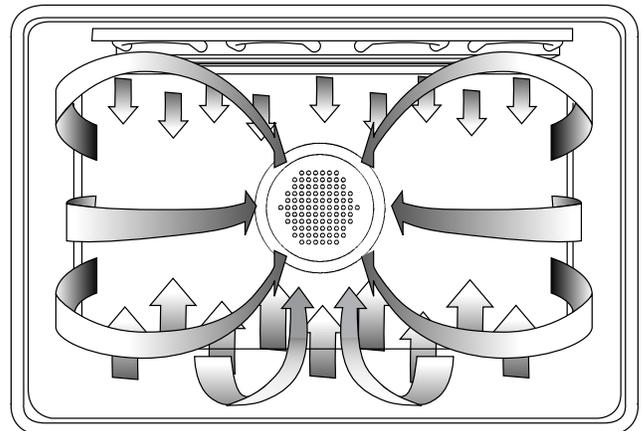
BAKE and WARMING

Baking is cooking with heated air. Both the upper and lower element cycle to maintain the oven temperature. In the Warming mode, the oven will use the lower element to maintain a low temperature to keep food at serving temperature.



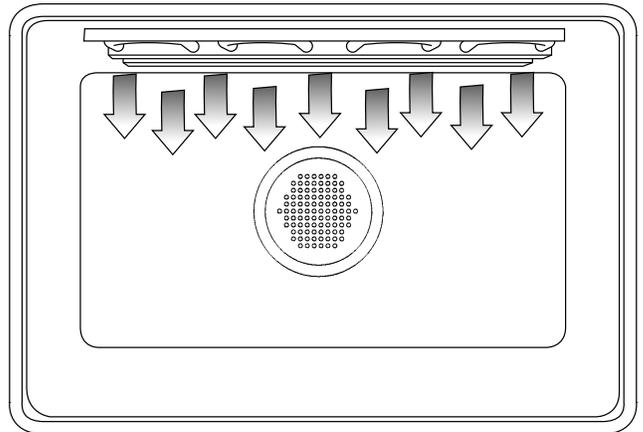
CONVECTION BAKE and DEHYDRATE

Convection Bake cooks with heat from a third element behind the back wall of the oven. The heat is circulated throughout the oven by the convection fan. Dehydrating is similar to convection cooking and holds an optimum low temperature while circulating the heated air to remove moisture slowly for food preservation.



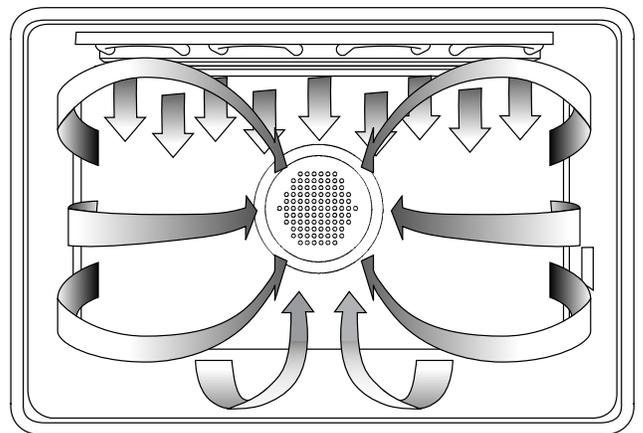
CONVECTION ROAST

Convection Roast uses the top element, bottom element and convection fan.



BROIL

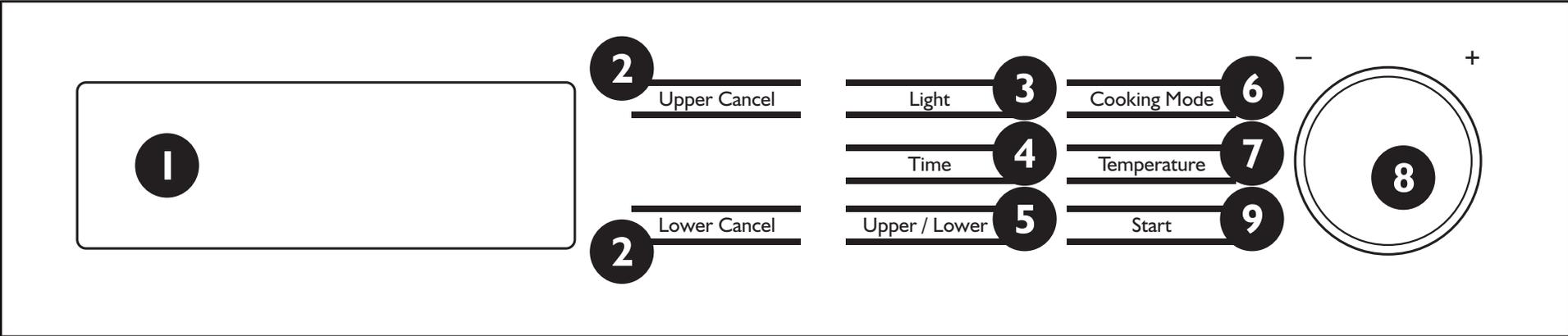
Broiling uses intense heat radiated from the upper element.



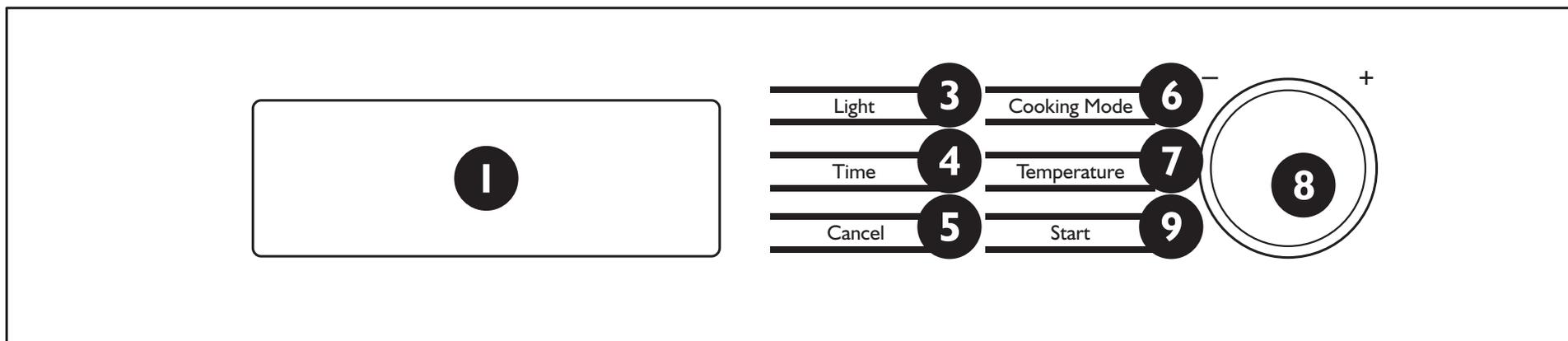
CONVECTION BROIL

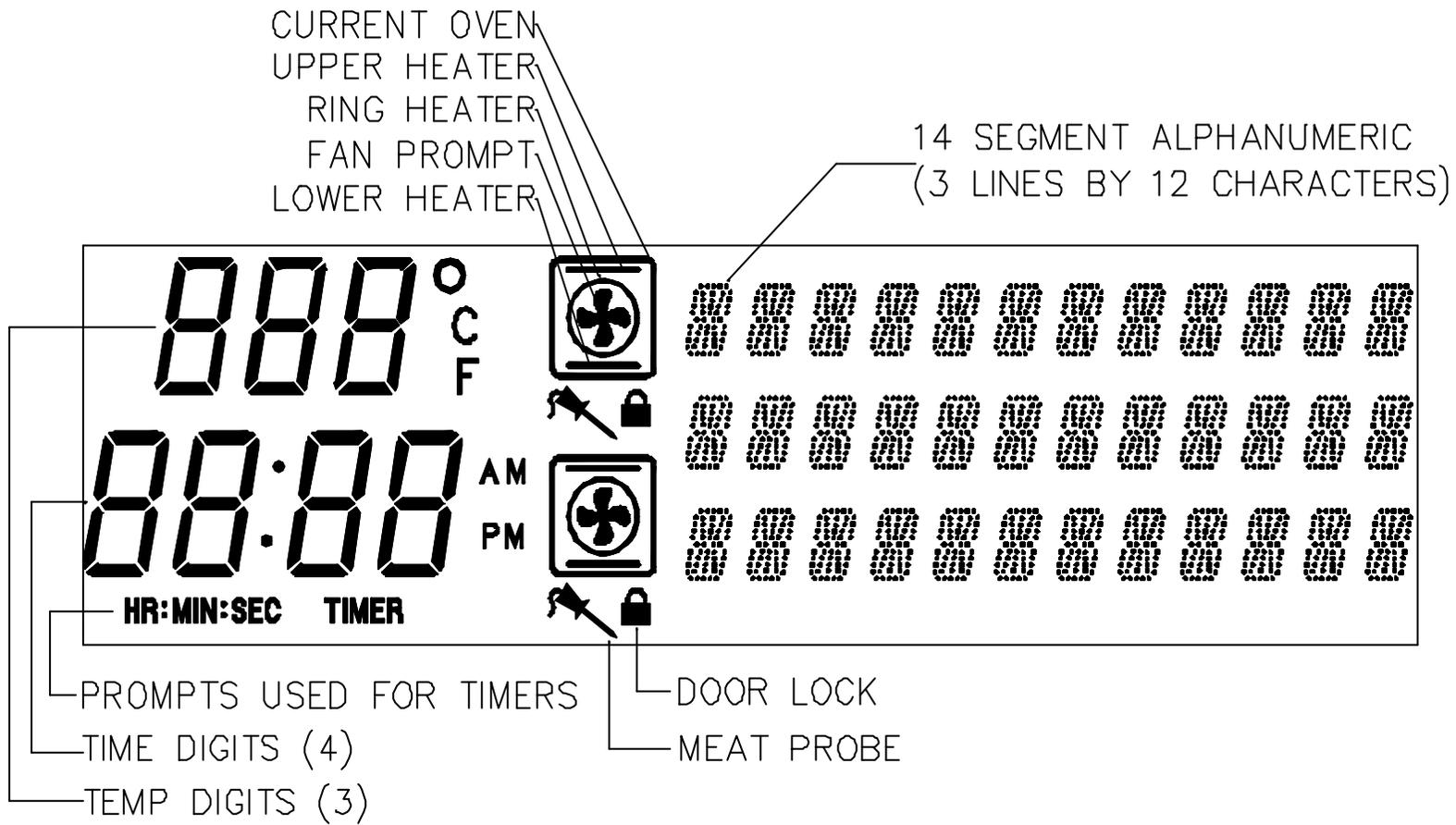
Convection Broil combines the intense heat from the upper element with the heat circulated by the convection fan.

Double Oven Control Panel



Single Oven Control Panel



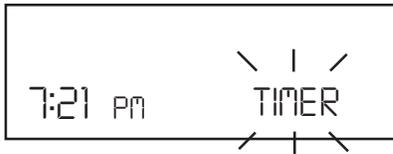


Setting the Clock

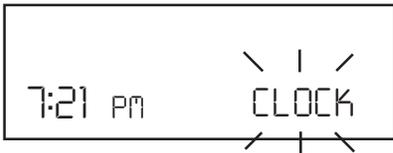
- The time of day is displayed in hours and minutes.
- Always set the clock immediately after installation or after a power failure. Once power returns to the oven, the clock displays the time of day when the power was turned off or lost.
- The clock time will appear during all oven operations except when the timer or a timed cooking operation is running.
- The oven is preset to a 12-hour clock and indicates AM and PM.

TO SET THE CLOCK:

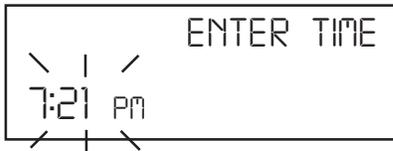
1. Touch TIME. The display will begin flashing **TIMER**.



2. Turn rotary knob once to the right or left and **CLOCK** will flash in display.



3. Touch TIME again. **ENTER TIME** will appear in the display and clock time will flash.

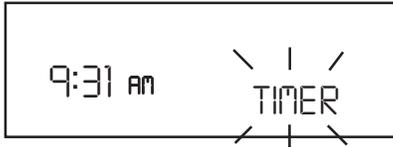


4. Turn the knob to the right or left to quickly move the clock time forward or backward by 10-minute increments. Continue to rotate knob until correct AM or PM is selected.
5. After the initial move of the knob to either the right or left, turn the knob in the *opposite* direction to change the time by 1-minute increments.
6. Touch START. The clock is now set.
 - If operation is not completed, the oven will beep periodically as a reminder to set clock time. Touch START.
 - To cancel the **CLOCK** selection, touch CANCEL at any time when setting the clock.

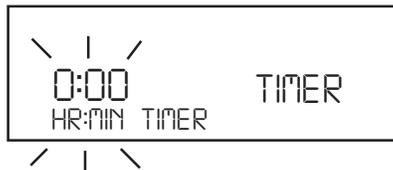
Using Oven Timer

TO SET THE TIMER:

1. Touch TIME once. Display timer will begin flashing and **TIMER** will appear in display.



2. Touch TIME again and **TIMER** will appear in display (below clock time). Oven timer will begin flashing.



3. Turn knob to the right to increase set time.
4. Turn knob to the left to decrease set time.
5. If the knob is turned too far to the left past zero, then the time will roll over to 59 hr 59 min.



6. Touch START.

If START is not touched, oven will beep as a reminder and **PRESS START** will appear in display and time will flash.



7. **END** will appear in display when time ends. Reminder beeps will sound for up to fifteen minutes or until any pad is touched.

TO CHANGE THE TIMER:

1. Touch TIME 2 times. Display timer will begin flashing and **CHANGE TIMER** will appear in display.



2. Turn knob to change set time.



3. Touch START.
4. If START is not touched, oven will begin beeping, timer display will begin flashing and **PRESS START** will appear in display.

TO CLEAR THE TIMER:

1. Touch TIME once. Display will begin flashing **CHANGE TIMER**.



2. Turn knob once to right and **CLEAR TIMER** will flash in display.



3. Touch TIME.
4. Timer is now cleared and clock time appears in display.
5. If TIME pad is not touched, oven will beep and **CLEAR TIMER** will continue to flash in display.

Using Oven Lights

- A single light pad activates the lights in either oven.
- If LIGHT pad is touched when both ovens are off, lights in both the upper and lower oven will turn on. Touch LIGHT pad again, and both oven lights will turn off.
- Oven lights turn on and off automatically when the door is opened and closed.
- When an oven is in use, oven lights turn on automatically when a mode is selected and START

is touched. Oven lights will turn off automatically when the oven mode is cancelled.

- The lights do not operate in the Self-Clean mode.

To manually control the interior oven lights in either the upper or lower oven if one or both ovens are in use:

1. Touch UPPER/LOWER. The display will indicate which oven is selected.
2. Touch UPPER/LOWER to highlight the other oven. Touch LIGHT to turn lights on or off.

Selecting the Oven Mode

The following oven modes will appear in the display when COOKING MODE is touched and the knob is turned:

BAKE

BROIL

CONVECTION BAKE

CONVECTION BROIL

CONVECTION ROAST

CLEAN

WARMING

FAST PREHEAT BAKE

FAST PREHEAT CONVECT BAKE

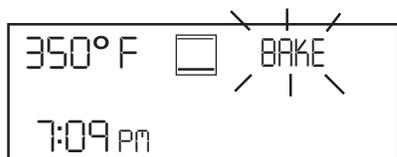
DEHYDRATE

SABBATH (optional)

- When the oven is operating, the selected cooking mode will be displayed.
- The oven temperature will appear in the display.

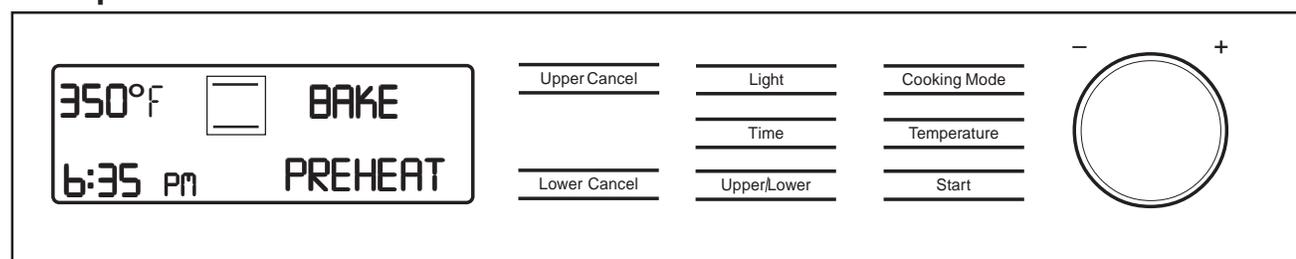
TO SET A COOKING MODE:

1. For double ovens, touch UPPER/LOWER to select the upper oven or lower oven. The selected oven will be highlighted in the display.
2. Touch COOKING MODE.
3. The last mode used will flash in the display. The default temperature for that mode will also be displayed.

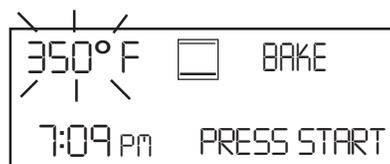


4. If no further setting is made, display will disappear.

Example:



5. To select a different mode, turn the knob to the right or left.
6. The selected mode will appear in the display, along with the default temperature for that mode.
7. To select a different temperature, touch TEMPERATURE and turn knob to the right or left. Temperature can be changed by 5°F.
8. If START is not touched, oven will beep as a reminder and **PRESS START** will appear in display and temperature will flash.



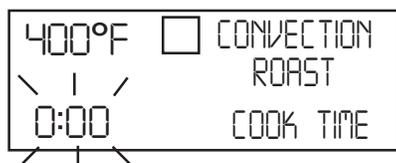
9. Touch START.
10. Oven will begin to heat and oven light will turn on. The temperature display shows the actual temperature, beginning with 100°F. The actual temperature counts up in 5°F increments until set temperature is reached.
11. In modes that require preheat, **PREHEAT** is displayed.
 - When oven has preheated, oven will beep and **PREHEAT** disappears from display.
12. To change temperature during cooking, simply touch TEMPERATURE. Turn the knob to select new temperature and press START.
13. Once cooking has been completed, touch UPPER CANCEL or LOWER CANCEL to turn off oven.

Time Oven Mode Operation

- In double oven models, both ovens can be set independently to operate a timed mode.
- Be sure that the time-of-day clock is displaying the correct time.
- The timed mode turns off the oven at the end of the cook time.

TO SET TIMED MODE:

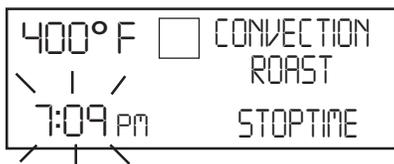
1. Select oven by touching UPPER/LOWER.
2. Touch COOKING MODE.
 - The last cooking mode used will flash in display. To select a different cooking mode, turn the knob.
 - If necessary, change the default temperature at this time by touching TEMPERATURE.
 - Turn knob to select different temperature.
3. Touch TIME two times. **COOKTIME** will appear in the display and time display will begin flashing.



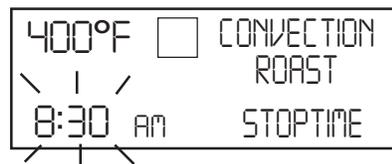
4. Turn knob to enter cooking time. Keep in mind that the time required for the oven to reach temperature must be included in the set cooking time.
5. Touch START.
6. At the end of the programmed cooking time, the oven will automatically turn off.

TO DELAY THE START OF A TIMED MODE:

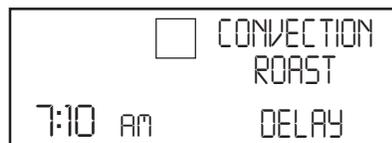
1. Follow steps 1 through 4 above.
2. Touch TIME again and **STOPTIME** will appear in display and clock time display will begin flashing.



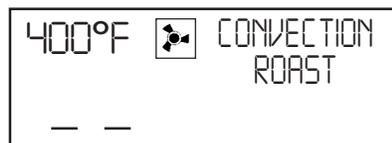
3. Use knob to enter the time of day the oven will stop cooking or turn off.



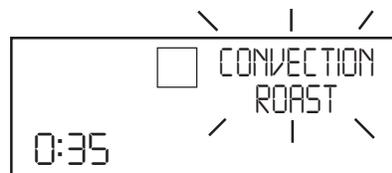
4. Touch **START**.
5. The clocktime will be displayed and **DELAY** appears in the display.



6. The clock automatically calculates the time of day at which the mode starts and stops. The displayed cooking time counts down by the minute.
 - The oven turns on and heats to the temperature selected for the number of hours and minutes needed.



7. At the end of the programmed cooking time, the oven will automatically turn off. Display will show **OFF** and the oven will beep. Reminder beeps will sound for up to fifteen minutes until any pad is touched.
8. To check the cooking time and stop time after a delay has been set, touch COOKING MODE.



- The cooking mode will flash in the display and the set cooking time will be displayed.
- Touch TIME three times and **STOP TIME** will appear in display and the time-of-day the oven will stop cooking can be seen.
- Touch START to return to **DELAY** display.

Special Features

The Special Features function can be used to select the following 10 special oven features:

1. **LOCK KEYS** (Child Lockout)
2. **SABBATH MODE** (for religious faiths with “no work” requirements on the Sabbath)
3. **OVEN OFFSET 1** (upper oven – used to calibrate the oven temperature)
4. **OVEN OFFSET 2** (lower oven – used to calibrate the oven temperature)
5. **LANGUAGE** (select English, Spanish, or French)
6. ° **SELECT UNITS** (switch temperature scale to Fahrenheit or Centigrade)
7. **CLOCK FORMAT** (12 hr or 24 hr)
8. **BEEP VOLUME** (decrease or increase loudness of oven beeps)
9. **VIEW CLOCK** (yes or no)
10. **DEFAULT DATA** (change *all* feature settings back to original factory settings)

To select special features, follow the steps below:

- a. Touch and hold COOKING MODE for 3 seconds.
- b. Clock time disappears and display screen clears.
- c. The four display screen messages shown below will automatically appear, one after the other.

**OVEN SETTINGS
HELP SCREENS
PLEASE READ**

**TO EXIT AND
LOSE CHANGES
PRESS CANCEL**

**TO EXIT AND
KEEP CHANGES
PRESS START**

**TO BEGIN
TURN KNOB
THANK YOU**

Tips on Using Special Features:

- There will be a **slight delay** before each message (or feature) can be seen in the display.
- Turn knob **slowly**, one click then wait approximately one second for display to show next feature. Turn knob one more click and pause for next feature.
- When selecting a feature, the display will read **PRESS MODE TO SELECT**.
- To move through the feature menu, **slowly** turn the knob clockwise one click after each feature appears.

FEATURE #1 – LOCK KEYS (YES or no)

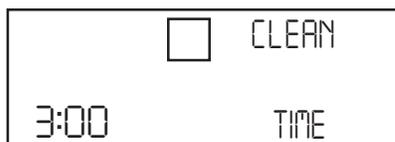
1. Select Special Features.
2. Turn knob clockwise **slowly** until **LOCK KEYS** is displayed.
3. Touch COOKING MODE.
4. Turn knob once and **YES** will appear in screen.
5. Touch COOKING MODE to hold new selection.
6. Touch START to accept new setting.
7. If a pad is now touched, display will read **KEYS LOCKED**.
8. To unlock keypads, touch COOKING MODE and hold for 5 seconds.
 - Display will now read **KBD UNLOCKED** (keypads unlocked).
 - This feature can be used as the child lock-out feature.

no LOCK KEYS

Setting the Self-Clean Mode

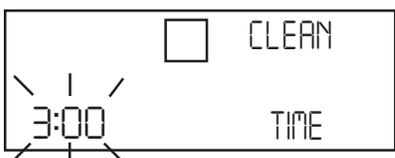
TO SET THE SELF-CLEAN MODE:

1. Touch UPPER/LOWER to select oven to be cleaned.
2. Touch COOKING MODE.
3. Rotate knob until **CLEAN** mode appears. The number of cleaning hours is displayed automatically.

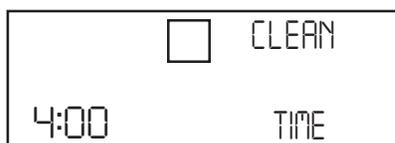


4. To change the setting from 3 hours, select either 2 hours for light soil or 4 hours for heavy soil immediately before starting.

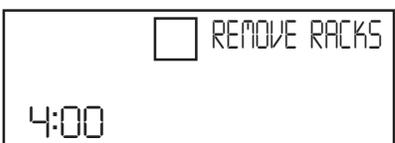
- To change hours, touch TIME twice.
- Number of hours to clean will flash in display.



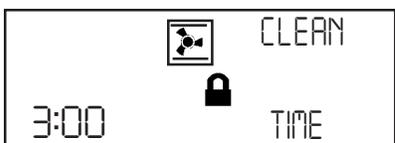
- Rotate knob to select number of hours.



5. Touch START pad and **REMOVE RACKS** appears in the display as a reminder to remove oven racks.



6. Touch START again. Do not attempt to open the door while the door is locking. Lock symbol will appear after a short delay. When the lock symbol is displayed, the door cannot be opened. Confirm that the door locks and will not open before starting Self-Clean mode.



If door does not lock, press UPPER CANCEL or LOWER CANCEL and do not self-clean; phone 800/735-4328 for service (see Page 39 for obtaining service). If the door is in the open position when this mode is selected, **CLOSE DOOR** will appear in display.

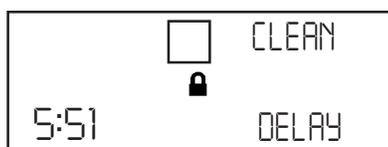
7. At the end of the programmed cleaning time, the oven will automatically turn off.
8. To cancel or stop the mode after the lock symbol is displayed, touch UPPER CANCEL or LOWER CANCEL.

TO DELAY THE START OF THE MODE:

1. Follow steps 1 through 4 above.
2. Touch TIME pad again and clock time will begin flashing and **STOPTIME** will appear in display.



3. Use knob to enter a Stoptime.
4. Touch START once and display will remind you to remove oven racks.
5. Touch START to set the Delay mode.



6. Oven door will lock and display shows **DELAY**.
7. At the end of the programmed cleaning time, the oven will automatically turn off.
8. To cancel or stop the mode after the lock (🔒) symbol is displayed, touch UPPER CANCEL or LOWER CANCEL.

TO CHECK CLEAN TIME FOR DELAYED SELF-CLEAN:

1. Touch TIME one time. **TIMER** will flash in display.
2. Turn knob slowly to the right and **TIME** will flash in display.
3. Touch TIME again and the actual clean time will appear in display.
4. After a short pause, the oven will automatically revert to the **DELAY** message in the display.

TO CHECK STOP TIME FOR DELAYED SELF-CLEAN:

1. Touch TIME one time. **TIMER** will flash in display.
2. Turn knob slowly to the left and **STOPTIME** will flash in display.
3. Touch TIME again and the actual stop time will appear in display.
4. After a short pause, the oven will automatically revert to the **DELAY** message in the display.

Maintaining And Cleaning

1. To clean the cavity and the inner door never use any metal tool. After the Pyrolytic Cleaning process use only a damped cloth or sponge with dish soap for final cleaning of the surfaces.
2. Grids and cookie sheets must always be removed before using the Selfcleaning mode. Otherwise chromed metal grids will be discolored and not be shiny anymore.
3. The cleaning time can be chosen between 2- 4 hours depending on the level of soil the cavity has collected.
4. If the door gasket has become dirty it should only be cleaned very carefully with a damped and soaped rag. Consider that the Selfcleaning process will not clean the gasket.
5. Particles or dust between the glass layers of the door window can only be cleaned after disassembling of the complete door. This operation should only be done by an authorized service technician.
6. The front surface of the unit should be cleaned only with soapy water and a rag or sponge.
7. Stainless steel panels must be carefully cleaned with a soft damped rag or sponge and dish soap. Never use any rubbing materials like metal wool, abrasive sponges or scouring pads of any type. This will create shiny marks or scratches which never can be repaired and will remain. Clean the stainless steel panels always only in one direction and follow the satinated structure on the panels.

MEAT PROBE COOKING

- Temperature probe range is 130°F to 210°F (55°C to 100°C), while the default setting is 170°F (77°C).
- Maximum cavity temperature when using meat probe is 475°F (245°C).

1. Insert the probe inside the thickest portion of meat.
2. Plug the meat probe in its receptacle and check that the probe icon is displayed.
3. Press [Cooking Mode] key to select the desired cooking mode. Only some of the cooking modes are available for probe cooking:
 - a. BAKE
 - b. CONVECTION BAKE
 - c. CONVECTION ROAST
 - d. FAST PREHEAT BAKE
 - e. FAST PREHEAT CONVECTION BAKE
4. Press once [Temperature] key to change the probe temperature set-point, twice to change the cavity temperature set-point. The icon is flashing while the probe temperature is in edit mode. Set the desired values, by rotating the knob CW or CCW, then press [Start] to accept the cooking mode.
5. As soon as the meat probe reaches its set point temperature, the icons turn off. The control displays OFF to indicate probe cooking complete and cancels the cooking activity.
6. The icon is still displayed until the probe is removed.

OVEN REGULATION PARAMETERS FOR COOK MODES

Serial #	Cooking Function		Conv Fan Speed	Default Temperature °C / °F	Full-power period in seconds	Elements used during Preheat Operation On-Time ⁽¹⁾ (in seconds)			
						Lower	Upper	Ring	Additional
1	Bake ⁽³⁾		-	175 / 350	60	40	12	-	-
2	Convection Bake	Preheat cycle	Full	160 / 325	30	-	-	30	-
		Normal cook cycle	Reduced						
3	Dehydrate – Low Power Convection Bake		Full	60 / 140	30	-	-	30	-
4	Convection Roast	Preheat cycle	Full	160 / 325	60	40	12	-	-
		Normal cook cycle	Reduced						
5	Broil		-	Level 3	60	-	LEVEL 1 = 11sec. LEVEL 2 = 21sec. LEVEL 3 = 31 sec. LEVEL 4 = 42sec. LEVEL 5 = 52sec.	-	-
6	Convection Broil	Preheat cycle	Full	245 / 475	60	-	52	-	-
		Normal cook cycle	Reduced						
7	Self-Clean		Full		60	12	43	-	60 ⁽²⁾
8	Warming – Low Power Bake ⁽³⁾		-	75 / 170	60	40	-	-	-
9	Fast Preheat Bake	Preheat cycle	Full	175 / 350	60			60	60
		Normal cook cycle	-	175 / 350	60	40	12	-	-
10	Fast Preheat Convection Bake	Preheat cycle	Full	160 / 325	60			60	60
		Normal cook cycle	Reduced	160 / 325	30	-	-	30	-

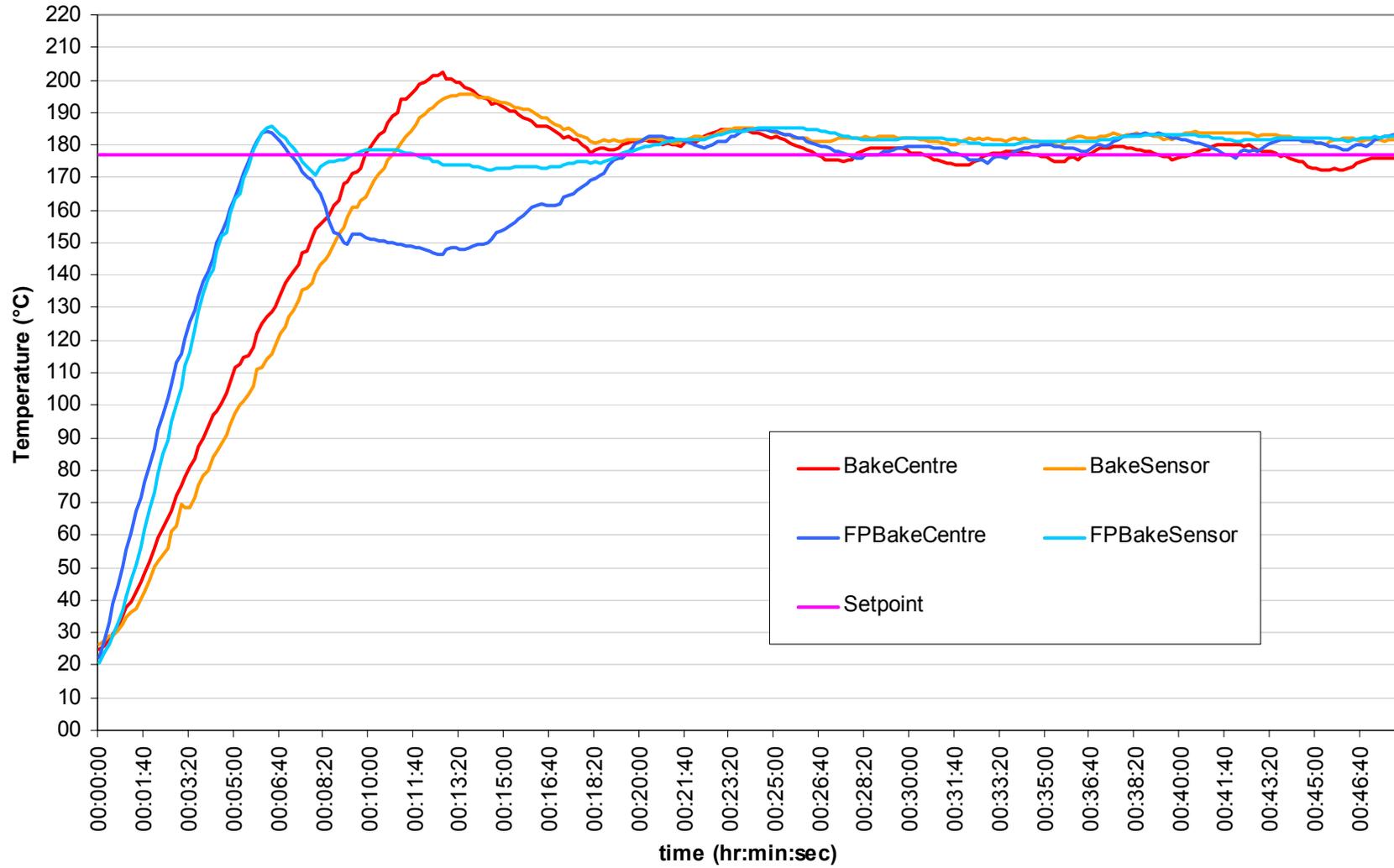
NOTE 1: The control will follow the on time ratio for the particular cookmode when cooking.

NOTE 2: The additional element in a Self-Clean will only be used when the Voltage service to the oven is 208VAC.

NOTE 3: For Bake and Warming modes, period and element times are divided in half for control temperatures lower than 250°F.

NOTE 4: In any cooking mode, the associated element icon and fan will always be ON in the display when the cooking mode is active. In Fast Preheat Bake, the icon will switch to bake state at steady conditions.

Comparison between Bake and Fast Preheat Bake



SABBATH MODE

- To select Sabbath mode, press [Cooking Mode] key for some seconds while in stand-by to enter the user options menu and select the item.
- Sabbath is actually a bake mode, with additional “no work” requirements due to religious faith.
- To start a Sabbath in one cavity, select it by pressing [cooking mode] key and rotating the knob, then pressing [start] key, as usual.
- To start a Sabbath in both cavities, in a double oven, first start a Bake in the lower one, then start Sabbath in the upper one. Both will run Sabbath mode.
- When Sabbath is running, “no work” requirements are:
 1. Working fan is disabled.
 2. Light switching is not possible even when opening the door.
 3. Latch motor is disabled.
 4. No beep tones are allowed.
 5. The display is prevented from changing messages, flashing, etc.
 6. Keys are disabled with the exception of [Cancel] for single oven and [Upper Cancel, Lower Cancel] for the double.
 7. Timed and delayed cooking are not allowed.
 8. Minute minder is disabled too.
 9. Probe cooking is not available.

Press the correspondent [Cancel] key to stop Sabbath.

- 5. SAFETY THERMOSTATS.** The oven is provided with two safety thermostats. They simply cut off L2 when temperature inside gets too high. The high temperature one (165°C) is always in series with the heaters, the low temperature (110°C) is by-passed during self-clean. They are mounted together, behind the cooling fan.
- 6. KLIXON RELAY BOARD.** It's mounted on the cooling channel, to by-pass the low temperature safety thermostat during self-clean.
- 7. TOUCH KEYBOARDS.** They can be 6 pads (single oven) or 8 pads (double oven). They are glued on the front panel glass.
- 8. ROTARY SWITCH.** It's activated through the knob on the front panel. The control detects rotation verse and number of ticks.
- 9. TEMPERATURE SENSORS.** They are mounted inside the cavity, fixed from the outside, on the rear wall. The only mean to measure oven temperature.
- 10. LATCH MECHANISM.** To lock the door when self-clean is running, until the cavity cools down.
- 11. AUXILIARY LOADS.** Working and cooling fans, oven lights, for both cavities.

12.MEAT PROBE. The oven is provided with a meat probe, which needs only to be plugged in its receptacle on the cavity left side wall.

IMPORTANT WARNINGS

1. **LATCH AUTO-TEST.** At power-up, the control runs a latch mechanism self-test. The display shows the message *UNLOCKING DOOR* until both cavities have completed their lock/unlock cycle. This allows the user to restore the latch position, in case of any problem: turn off the main power supply and wait for a few minutes before re-powering. Each latch takes about 30sec. to run the test. If the control can't complete this test, power down the oven, search for a hardware fault and remove it.
2. **BY-PASSING LATCH TEST.** If there is any reason to by-pass the latch test, at power-up, simply keep the [Start] key pressed until the clock is displayed.
3. **OVEN MODEL SELECTION OR MANUAL TEST.** If you intend to enter this special sections, **never press [Cooking Mode] key before** doing it because the two features will be disabled. In any case, **both features must be accessed within 5 minutes from the power-up.**

OVEN MODEL SELECTION

This operation is normally executed at the manufacturer facilities. If the display board has to be replaced, the oven model must be reconfigured. At first power-up, the Double Oven is always configured as a 30" both multifunction cavities.

MANUAL TEST ACCESS PROCEDURE:

1. Press CANCEL key.
2. Turn the knob 4 detents CW.
3. Turn the knob 6 detents CCW.
4. Press START key.
5. The writing *MANUAL TEST* is displayed.

To reconfigure the oven model as a different double:

1. Press [Cooking Mode] key.
2. Turn the knob to select the correct oven model.

N°	MOD	DISPLAY	OVEN MODEL
1	C	30 CONVECT 2	30" DOUBLE OVEN MULTIFUNCTION/MULTIFUNCTION
3	D	30 THERMAL 2	30" DOUBLE OVEN MULTIFUNCTION/THERMAL
5	G	27 CONVECT 2	27" DOUBLE OVEN MULTIFUNCTION/MULTIFUNCTION
7	H	27 THERMAL 2	27" DOUBLE OVEN MULTIFUNCTION/THERMAL

3. Press [Start] key to accept the new selection, the control sounds a tone.
4. Press [Cooking Mode] key again to quit the oven model menu and going back to manual test procedure.

OVEN MODEL SELECTION SINGLE OVEN

This operation is normally executed at the manufacturer facilities. If the display board has to be replaced, the oven model must be reconfigured. There is only one single part number for the display board then, after having replaced it, also a single oven is configured as a double oven 30" Multifunction/Multifunction.

IMPORTANT: ALWAYS KEEP PRESSED START KEY AT FIRST POWER-UP ON A SINGLE OVEN, UNTIL THE CLOCK IS DISPLAYED.

Otherwise, the control will try to run the latch auto-test but, missing one cavity, it will never be able to complete it. At first power-up, the control realizes that one cavity is missing: the display shows a calibration error message. Ignore it and proceed with the...

MANUAL TEST ACCESS PROCEDURE

1. Press CANCEL key.
2. Turn the knob 4 detents CW.
3. Turn the knob 6 detents CCW.
4. Press START key.
5. The writing *MANUAL TEST* is displayed.

To reconfigure the oven model as a single:

1. Press [Cooking Mode] key.
2. Turn the knob to select the correct oven model.

N°	MOD	DISPLAY	OVEN MODEL
0	A	30 CONVECT 1	30" SINGLE MULTIFUNCTION
2	B	30 THERMAL 1	30" SINGLE THERMAL
4	E	27 CONVECT 1	27" SINGLE MULTIFUNCTION
6	F	27 THERMAL 1	27" SINGLE THERMAL

3. To confirm the selection:
 - a. If the Display Board is still configured as a double, **KEEP THE [START] KEY PRESSED UNTIL THE CLOCK APPEARS ON THE DISPLAY.** The control resets itself.
 - b. If the Display Board is already configured as a single, press the [Start] key to accept the new selection, the control sounds a tone. Press then [Cooking Mode] key again to quit the oven model menu and going back to manual test procedure.

POWER SUPPLY SELECTION

The oven provides a 208V power supply option, for areas where the standard 240V is not available. First connect the oven to power then, to access this option, follow the procedure below:

240V/208V POWER SELECTION:

1. Open the oven door (upper oven for double).
2. Turn the knob 6 detents CW.
3. Turn the knob 9 detents CCW.
4. Press [Start] key.
5. *240 SELECTED* is displayed (or *208 SELECTED*).
6. Press [Cooking Mode] key to change selection.
7. Touch [Start] key to confirm the new selection.

MANUAL TEST

The scope of the test is to check all the control outputs independently. Turn the knob CW to proceed with the following steps.

Single oven has only step 1 to 8.

N°	CAVITY	DISPLAY	ACTIVATED OUTPUT
1	UPPER	UPPER ELEMENT	Upper element (3500W at 240V).
2	UPPER	LOWER ELEMENT	Lower element (3000W at 240V).
3	UPPER	RING ELEMENT	Ring element (2500W at 240V).
4	UPPER	ADDITIONAL ELEMENT	Additional element (1000W at 240V).
5	UPPER	LIGHT	Oven lights are activated.
6	UPPER	CONV. FAN LO	Working fan at low speed.
7	UPPER	CONV. FAN HI	Working fan at high speed.
8	UPPER	COOLING FAN	Cooling fan at ordinary speed.

In a double oven , steps 1 to 8 are for upper cavity, steps 9 to 16 are for the lower one.

9	LOWE R	UPPER ELEMENT	Upper element (3500W at 240V).
10	LOWE R	LOWER ELEMENT	Lower element (3000W at 240V).
11	LOWE R	RING ELEMENT	Ring element (2500W at 240V).
12	LOWE R	ADDITIONAL ELEMENT	Additional element (1000W at 240V).
13	LOWE R	LIGHT	Oven lights are activated.
14	LOWE R	CONV. FAN LO	Working fan at low speed.
15	LOWE R	CONV. FAN HI	Working fan at high speed.
16	LOWE R	COOLING FAN	Cooling fan at ordinary speed.

OPERATIONS TO CHECK REMAINING FUNCTIONALITIES

- 1. Latch mechanism and cooling fan high speed.** Press [Cooking Mode] key then turn the knob CW until the *CLEAN* mode is found. Press [Start] key once and again when the writing *REMOVE RACKS* appears. The control runs the latch until the door is locked. Just a while before the lock symbol is displayed, the cooling fan switches to high speed. Check that the door is actually fully locked. To unlock the door, press [Cancel] key and wait for the lock symbol on the display disappear. Now the door has to be fully unlocked.
- 2. Door switches and cavity lights.** Open the door, if the cavity lights turn on it means that the control has detected a change. Close the door, the lights must turn off. If the lights don't turn on, try to press the [Light] key and be sure to hear a key pressed tone. If the lights still remain off, they are probably broken. If no tone is heard, then the [Light] key is not working.
- 3. Keyboard and thermal cavities.** Select the lower cavity by pressing [Upper/Lower] key, until the box is displayed in the lower oven position (only for double oven). Press [Cooking Mode] key, *BAKE* will flash. Turn the knob CW until *BAKE* mode is found again. If the cavity is set as thermal, only *BAKE*, *BROIL CLEAN* and *WARMING* must be available. Press [Temperature] key and see that the displayed temperature is flashing. Press [Start] to run the cooking mode then [Lower Cancel] (simply [Cancel] for a single oven) to stop it.

4. **Meat probe.** Plug the meat probe in its receptacle, on the left side in the cavity. In a double oven only the upper cavity can be used for probe cooking. The probe icon on the display must be shown whenever the probe is inserted. If it blanks or flashes a problem in the connection may exist. Only *BAKE*, *CONVECTION BAKE*, *CONVECTION ROAST*, *FAST PREHEAT BAKE* and *FAST PREHEAT CONVECTION BAKE* must be available for cooking. When probe cooking is running or before starting, press [Temperature] key:
 - a. Once, to edit the probe temperature edit state (probe icon and temperature flash).
 - b. Twice, to edit the cavity temperature (temperature flashes).

When probe cooking is running, the actual probe temperature is displayed.

5. **[Time] key + knob.** Press [Time] key, *TIMER* is displayed. Press it once again, in the time area *0:00* starts flashing. Turn the knob 5 detents CW and check that time increments by one each detent until *0:05* is displayed, then turn 5 detents CCW and check that time decrements by 1 each detent until the timer is back to *0:00*. Press [Time] key again to display the clock again.

NOTE: This last five actions allows to check all the devices which haven't been tested yet during the Manual Test, including the keyboard and the rotary switch.

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SYSTEM PARTS

1. DISPLAY BOARD. Mounted on the front panel, it's the oven brain. It manages the user interface (VFD display, selection knob and keyboard), receives inputs (directly from the field or by means of the Power Board) and sends information to the Power Board to drive all outputs (heaters and auxiliary loads).
2. V.F.D. (Vacuum Fluorescent Display). It's mounted on the Display Board and is used to display information for users and technical operators.
3. POWER BOARD. It's mounted on the cooling channel; it provides the Display Board with all its power lines. It manages the latch mechanism, the heaters, the oven lights and the fans, according to the Display Board indications. It measures the temperatures read by the RTD sensors in the cavities.
4. AUXILIARY RELAY BOARD. It's mounted on the front panel. It provides the Double Line Break feature for Canadian requirements and, for the double oven only, the working fan high speed.
5. 2ND THERMOSTAT RELAY BOARD. It's mounted on the cooling channel, to by-pass the low temperature safety thermostat during self-clean. See electric schematics to see how it works.
6. TOUCH KEYBOARDS. There are two different keyboard models, providing the single oven with 6 pads and the double with 8 pads. They are glued on the front panel glass.
7. HEATING ELEMENTS (nominal power at 240V).
 - a. UPPER ELEMENT 3500W
 - b. LOWER ELEMENT 3000W
 - c. RING ELEMENT 2500W
 - d. ADDITIONAL ELEMENT ~1000W (Actually its nominal value is 775W at 208V)

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8. SAFETY THERMOSTATS. The oven is provided with two safety thermostats, mounted together, behind the cooling fan. The high temperature one (165°C) is always connected in series with the heaters, the low temperature (110°C) is by-passed during self-clean. They open L2 circuit when temperature gets too high.
9. ROTARY SWITCH. By means of the knob placed on the front panel, the user activates this electronic device. The control counts the detents and is also able to distinguish if the rotation verse is clockwise or counterclockwise.
10. RTD TEMPERATURE SENSORS. They are mounted inside the cavity (one per cavity), fixed from the outside, on the rear wall. They are the only means to measure oven temperature.
11. LATCH MECHANISM. A motor is activated to lock the door as soon as self-clean starts. When clean stops, the control wait for the cavity cooling down below the temperature threshold. The same motor moves to unlock the door.
12. COOLING FAN. It works at two different speeds, in self-clean and ordinary cooking modes. A resistor in series reduces the voltage on the fan motor and consequently it lowers the fan speed. When the door is locked in self-clean, the resistor is by-passed by a latch contact, in order to run the fan at full speed.
13. CONVECTION FAN. It works at reduced speed in preheat phase and at full speed at steady conditions. Clean always work at full speed. A resistor in series with the fan coil reduces the speed, a relay driven by the control by-passes this resistor when requested.
14. OVEN LIGHTS. Halogen 12V lamps, powered by a 4VA transformer, fused on its secondary winding.
15. MEAT PROBE. The oven is provided with a meat probe, which needs only to be plugged in its own receptacle on the cavity left side. In the double oven, only the upper cavity is provided with the meat probe.

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USEFUL INFORMATION ABOUT THE ELECTRONIC CONTROL:

1. **SHORT POWER OFF.** In case of power loss for a short time, the control saves the currently active settings in its memory. It fetches all these values as soon as power recovers. The oven comes back to the same working condition it was before the power drop. Such a time is variable, more or less a few dozens of seconds, depending on the tolerances of some components on the electronic boards.
2. **LONG POWER OFF.** When the time expires, the control forgets the former working condition and, as soon as power recovers, it performs a complete reset. It shows the SW code numbers and the writing “*UNLOCKING DOOR*”, while the power-up latch auto-test is running. The control is now in a stand-by state; the clock is blinking, waiting for a new user operation. This means that, in case of problems with the latch positioning, the best thing to do is turn off the oven, wait at least for one minute before re-powering the unit, to cause a system reset and run a complete latch lock/unlock cycle.
3. **AVOIDING LATCH AUTO-TEST AT POWER-UP.** For whatever reason, if the technician prefers to skip the latch auto-test at power-up, he just needs to **keep the [START] key pressed while supplying the oven with power**, until the clock is displayed again.
4. **PERSISTING FAULTS OR INHIBITED FUNCTIONS.** When the control detects a fault, first the cause needs to be removed. Sometimes, for safety reason after a fault, self-clean or even all cooking modes are disabled. Once the fault cause has been removed, if the disabling condition persists, **keep the [START] key pressed for one minute, until the F121 fault occurs then press [CANCEL]**.
5. **WARNING:** At every power-down, the control saves the time in its memory but sometimes it doesn't succeed in writing the right checksum value. At the next power-up, the F155 fault code is displayed. Press [Cancel] key to reset the fault, the oven will work correctly. If F155 is displayed when starting a cooking mode, it means that the Display Board must be replaced, having corrupted parameters in memory.

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OVEN MODEL SELECTION

This operation is normally executed at the manufacturer facilities. When a Display Board needs to be replaced in the field, Service Technicians must take care of it.

One single part number exists for the Display Board: its default configuration is:

30" Double Oven - Upper Multifunction Cavity / Lower Multifunction Cavity

After installing a new Display Board, at first power-up, the action must be:

SELECT THE CORRECT OVEN MODEL

Two different kinds of transition exist:

DBL=>DBL

DBL=>SGL

The DBL=>SGL transition occurs only once. The transition SGL=>DBL is never allowed. Once a Display Board has been already re-configured as a SGL, the transition SGL=>SGL is also possible.

WARNING

ALWAYS KEEP PRESSED [START] KEY WHEN YOU FIRST POWER-UP THE OVEN, UNTIL THE CLOCK IS DISPLAYED.

Single Oven: this action prevents the control from running the power-up latch auto-test and it's absolutely important when a Display Board is installed in a Single Oven for the first time. Being still configured as a DBL, the control can't perform successfully the latch test. If this event occurs unintentionally, remove power and repeat the procedure after a few minutes.

Double Oven: the latch test can be performed correctly, even before configuring the oven model. Keeping pressed [START] key just allow the operator to save time.

Wait for the clock to appear, before releasing the [START] key.

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WARNINGS

- **DON'T PRESS [COOKING MODE] KEY BEFORE ENTERING MANUAL TEST.** THE PROCEDURE WILL BE DISABLED.
- MANUAL TEST CAN BE ACCESSED WITHIN 5 MINUTES AFTER POWER-UP.
- MANUAL TEST QUILTS AFTER A 4 MINUTES TIME-OUT IF IDLE.

The control is still configured as a double, at this point. Only on a single oven, missing the lower cavity, the following error messages will be displayed:

POWER UP SEE
CAL VAL ERROR
(CONDITION)

SLV_EE CHIP/
CKT BAD OR
RTDS NOT CAL

DO NOT USE
OVEN
CALL SERVICE

Ignore it and enter the MANUAL TEST through the following procedure:

MANUAL TEST ACCESS PROCEDURE (both for DBL and SGL):

1. Press [CANCEL] key.
2. Turn the knob 4 detents CW.
3. Turn the knob 6 detents CCW.
4. Press [START] key.

The writing *MANUAL TEST* is displayed. Now press [Cooking Mode] key, the control will recognize automatically if the oven is a single or a double. Turn the knob to select the correct oven model.

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The tables below show the two different sets of options when entering the oven model selection menu for the double or single oven:

N°	MOD	DISPLAY	DOUBLE OVEN MODELS
1	C	30 CONVECT 2	30" DOUBLE OVEN MULTIFUNCTION/MULTIFUNCTION
3	D	30 THERMAL 2	30" DOUBLE OVEN MULTIFUNCTION/THERMAL
5	G	27 CONVECT 2	27" DOUBLE OVEN MULTIFUNCTION/MULTIFUNCTION
7	H	27 THERMAL 2	27" DOUBLE OVEN MULTIFUNCTION/THERMAL

N°	MOD	DISPLAY	SINGLE OVEN MODELS
0	A	30 CONVECT 1	30" SINGLE MULTIFUNCTION
2	B	30 THERMAL 1	30" SINGLE THERMAL
4	E	27 CONVECT 1	27" SINGLE MULTIFUNCTION
6	F	27 THERMAL 1	27" SINGLE THERMAL

KEEP THE [START] KEY PRESSED

DBL=>SGL transition: the Display Board resets itself. Wait for the clock on the display.

DBL=>DBL or SGL=>SGL transition: the control accepts the new selection, sounds a tone and updates the letter in the _0047 code displayed. The Display Board doesn't reset. Press [Cooking Mode] key again to quit the oven model selection menu and go back to Manual Test.

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After a system reset, the following writings are displayed:

V0515 C0047

F000 C2K2EAC

They indicate:

1. The SW flash program code V0515.
2. The EEPROM file number C0047, whereas the C red letter indicates the oven model (A, B, E, F for the single oven, C, D, G, H for the double oven).
3. The last saved fault number, whereas F000 means no faults saved.
4. C2K2EAC means Copyright 2002 Emerson Appliance Controls.

POWER SUPPLY SELECTION

The oven provides a 208V power supply option, for areas where the standard 240V is not available. First connect the oven to power then, to access this option, follow the procedure below:

240V/208V POWER SELECTION:

1. Open the oven door (upper oven for double).
2. Turn the knob 6 detents CW.
3. Turn the knob 9 detents CCW.
4. Press [Start] key.
5. *240 SELECTED* is displayed (or *208 SELECTED*).
6. Press [Cooking Mode] key to change selection.
7. Touch [Start] key to confirm the new selection.

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BASIC TROUBLESHOOTING

CHECK CONNECTIONS MEANS:

1. ALL CONNECTIONS MUST CORRESPOND TO THE ELECTRIC SCHEMATICS. EXCHANGING CONNECTIONS CAN DAMAGE THE BOARDS.
2. SHORT OR OPEN CIRCUIT DETECTION.
3. BAD CONNECTOR ASSEMBLING OR HEADER JOINTS WELDING ON THE ELECTRONIC BOARDS.
4. LOOSE CONTACTS OR CONNECTOR TERMINALS INCORRECT INSERTION IN THE HOUSING.
5. REVERSE PIN-TO-PIN CABLES, 1POS SHIFTED CONNECTORS.
6. WIRES CUT OR PINCHED TO DEAD METAL PARTS.

FAULT	CAUSE	ACTION
F31	UPPER OR SINGLE OVEN TEMPERATURE SENSOR FAILURE.	<ol style="list-style-type: none"> 1. Check connections between P4 on the Power Board and the RTD sensor. 2. Unplug the sensor connector and check its resistance (approximately 1080 ohms at room temperature with connector removed). Remember to reconnect it. 3. Replace Power Board.
F32	LOWER OVEN TEMPERATURE SENSOR FAILURE.	<ol style="list-style-type: none"> 1. Check connections between P24 on the Power Board and the RTD sensor. 2. Unplug the sensor connector and check sensor resistance (approximately 1080 ohms at room temperature with connector removed). Remember to reconnect it. 3. Replace Power Board.
F41	UPPER OR SINGLE OVEN LATCH WILL NOT LOCK.	<ol style="list-style-type: none"> 1. Check connections between P4 connector on the Power Board and the latch switches.

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		<ol style="list-style-type: none"> 2. Ensure door latch switches are operating properly. 3. Check connections between P10 connector on the Power Board and the latch motor. 4. Replace Power Board.
F42	LOWER OVEN LATCH WILL NOT LOCK.	<ol style="list-style-type: none"> 1. Check connections between P24 connector on the Power Board and the latch switches. 2. Ensure door latch switches are operating properly. 3. Check connections between P10 connector and the latch motor. 4. Replace Power Board.
F43	UPPER OR SINGLE OVEN LATCH WILL NOT UNLOCK.	<ol style="list-style-type: none"> 1. Check connections between P4 connector on the Power Board and the latch switches. 2. Ensure door latch switches are operating properly. 3. Check connections between P10 connector on the Power Board and the latch motor. 4. Replace Power Board.
F44	LOWER OVEN LATCH WILL NOT UNLOCK.	<ol style="list-style-type: none"> 1. Check connections between P24 connector on the Power Board and the latch switches. 2. Ensure door latch switches are operating properly.

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		<ol style="list-style-type: none"> 3. Check connections between P10 connector and the latch motor. 4. Replace Power Board.
F45	UPPER OR SINGLE OVEN LATCH BOTH LOCKED AND UNLOCKED.	<ol style="list-style-type: none"> 1. Check connections between P4 connector on the Power Board and the latch switches. 2. Ensure door latch switches are operating properly. 3. Check connections between P10 connector on the Power Board and the latch motor. 4. Replace Power Board.
F46	LOWER OVEN LATCH BOTH LOCKED AND UNLOCKED.	<ol style="list-style-type: none"> 1. Check P24 connector on the Power Board. 2. Ensure door latch switches are operating properly. 3. Check that neither latch switch nor common wires are pinched to the appliance chassis. 4. If F46 persists, replace Power Board.
F111	UPPER OR SINGLE OVEN 650°F RUNAWAY CONDITION	<ol style="list-style-type: none"> 1. Oven too hot. Allow oven to cool down <650°F before turning power on. 2. Bad RTD sensor or bad connection. Check P4 connector on the Power Board. 3. Unplug the upper (or single) oven sensor connector and check sensor resistance (approximately 1080 ohms at room temperature with connector removed). 4. Check wiring to heating element. If OK, replace Power Board.

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F112	LOWER OVEN 650°F RUNAWAY CONDITION	<ol style="list-style-type: none"> 1. Allow oven to cool to <650°F before turning power on. 2. Check P24 connector on the Power Board. 3. Unplug the sensor connector and check lower sensor resistance (approximately 1080 ohms at room temperature with connector removed). 4. Check wiring to heating element. If OK, replace Power Board.
F113	UPPER OR SINGLE OVEN 950°F RUNAWAY CONDITION	<ol style="list-style-type: none"> 1. Check P4 connector on the Power Board. 2. Unplug the upper (or single) oven sensor connector and check sensor resistance (approximately 1080 ohms at room temperature with connector removed). 3. Check wiring to heating element. If OK, replace Power Board.
F114	LOWER OVEN 950°F RUNAWAY CONDITION	<ol style="list-style-type: none"> 1. Check P24 connector on the Power Board. 2. Unplug the sensor connector and check lower sensor resistance (approximately 1080 ohms at room temperature with connector removed). 3. Check wiring to heating element. If OK, replace Power Board.
F121	STUCK KEYBOARD KEY	<ol style="list-style-type: none"> 1. Check all connections between the display head (P5) and the keyboard (J1). 2. Make sure that there are no objects in close proximity to the front and back sides of the keypads. 3. Replace Display Board or keyboard or both.
F123	KEYBOARD DISCONNECTED	<ol style="list-style-type: none"> 1. Check all connections between keyboard (J1) and Display Board (P5).

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		2. If OK, replace keyboard or Display Board or both.
F125	UPPER OR SINGLE CANCEL KEY CIRCUIT PROBLEM	1. Check all connections between keyboard (J1) and Display Board (P5). 2. If OK, replace keyboard or Display Board or both.
F126	LOWER CANCEL KEY CIRCUIT PROBLEM	1. Check all connections between keyboard (J1) and Display Board (P5). 2. If OK, replace keyboard or Display Board or both.
F127	CANCEL KEY REDUNDANT RETURN PROBLEM	1. Check all connections between keyboard (J1) and Display Board (P5). 2. If OK, replace keyboard or Display Board or both.
F141	SLAVE MICRO NOT FUNCTIONING	1. Check power and Display Board connectors P1B and associated wiring. 2. If OK, replace Power Board. 3. If fault persists, replace Display Board.
F143	VCC OPEN CIRCUIT ON SLAVE MICRO	1. Check power and Display Board connectors P1B and associated wiring. 2. If OK, replace Power Board. 3. If fault persists, replace Display Board.
F145	TEMPERATURE SENSOR INPUTS SHORTED TOGETHER (DOUBLE OVEN)	Replace Power Board.
F147	GND OPEN CIRCUIT ON SLAVE	Replace Power Board.

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	MICRO	
F151	EEPROM FAILURE OR COMMUNICATION CIRCUIT ERROR	<ol style="list-style-type: none"> 1. Check power and Display Board connectors P1B and associated wiring. 2. If OK, replace Display Board. 3. If fault persists, replace Power Board.
F153	CONTROL CALIBRATION VALUES OUT OF RANGE	<ol style="list-style-type: none"> 1. Check power and Display Board connectors P1B and associated wiring. 2. If OK, replace Power Board. 3. If fault persists, replace Display Board.
F155	CORRUPTED EEPROM	<ol style="list-style-type: none"> 1. If the fault message is displayed at power-up, ignore it. Sometimes at power down, the control saves the current time but fails to calculate and write the checksum in its memory. At the following power-up, a fault occurs due to this failure. 2. If F155 appears when starting a cooking mode, it means that the cooking parameters in the control memory are corrupted. Replace immediately the Display Board.

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ITEM	ANOMALY	ACTION
MEAT PROBE ICON	The icon is displayed when the probe is not plugged in.	<ol style="list-style-type: none"> 1. Check connections, P2 on the display board. 2. Check the connection terminals on the socket mounted on the cavity left sidewall. They may be shorted (for example, through the aluminum foil around the insulating material) or have a loose contact.
	The icon isn't displayed when the probe is plugged in.	
	The icon is blinking irregularly regardless of the probe.	
LOCK SYMBOL	The symbol is always displayed.	<ol style="list-style-type: none"> 1. Check connections between the latch switches and the Power Board P4 (upper or single cavity) and P24 (lower cavity). 2. Replace the Power Board.
	The symbol is displayed when the door is fully unlocked.	
	The symbol isn't displayed when the door is fully locked.	
	The symbol is blinking irregularly, regardless of the latch position.	
TOUCH PADS	Some of the keys are not working.	<ol style="list-style-type: none"> 1. Check connections, referring to the Display Board ⇔ Keyboard cable table. 2. Replace the Display Board. 3. Replace the Keyboard.

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BUZZER	It never beeps.	<ol style="list-style-type: none"> 1. Check connections, referring to P1A cable shown in the Display Board ⇔ Power Board table. 2. Replace the Display Board.
KNOB	A lot of detents are not recognized by the control.	<ol style="list-style-type: none"> 1. Check connections between P8 on the Display Board and the knob. 2. Replace the knob. 3. Replace the Display Board.
	Increment and decrement rotations are reversed.	Check connections between P8 on the Display Board and the knob.
OVEN LIGHTS	Lights never turn on	<ol style="list-style-type: none"> 1. Check connections, P11 on the Power Board. 2. Check the transformer, particularly the fuse on the secondary winding. 3. Check the lamps themselves. 4. Replace the Power Board.
COOLING FAN	It works even if no cooking modes are running and the cavity is cool.	<ol style="list-style-type: none"> 1. Check the RTD connections. If the circuit is opened, the control sees high temperature. 2. Check the connections between the cooling fan and the Power Board (P10, P19 for SGL or P11 for DBL). 3. Replace the Power Board.

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	<p>It doesn't work or the high speed doesn't work.</p>	<ol style="list-style-type: none"> 1. Check the connections between the cooling fan and the Power Board (P10, P19 for SGL or P11 for DBL). 2. Check R1 (78Ohms) resistor in series with the fan coil. 3. Replace the Power Board.
<p>WORKING FAN</p>	<p>It doesn't work or the high speed doesn't work.</p>	<ol style="list-style-type: none"> 1. Check the connections between the cooling fan and P10 (also P19 for SGL) on the Power Board. 2. Check R2 (39Ohms) resistor in series with the fan coil. 3. Check the connections with the Auxiliary Relay Board P2. 4. Replace the Auxiliary Relay Board or the Power Board if relay outputs don't work.
<p>HEATERS</p>	<p>All the heaters in one cavity never turn on.</p>	<ol style="list-style-type: none"> 1. Check connections, particularly the safety thermostats circuit in series with L2 (black wire) and the common L1 red wire on the top of relays. 2. Check the P1B Display Board ⇔ Power Board cable and refer to the table to detect the heaters relay enable lines. 3. Check connections with the DLB relay on the Auxiliary Relay Board, if present. Check, the relay outputs before replacing the Auxiliary Relay Board. 4. If relay outputs don't work, replace the Power Board.

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	One of the heaters doesn't turn on.	<ol style="list-style-type: none"> 1. Check connections between the heater and its relay on the Power Board. 2. If relay outputs don't work, replace the Power Board.
DOOR LATCH	The latch motors don't turn on.	<ol style="list-style-type: none"> 1. Check the connections between the motors and P10 on the Power Board. 2. Check the P1B Display Board ⇔ Power Board cable and refer to the table to detect the heaters relay enable lines. 3. Replace the Power Board.
DISPLAY	The Display Board doesn't turn on, no beep tone is heard at power-up.	<ol style="list-style-type: none"> 1. Check Power supply connection on the Power Board (P18 for double oven, P5 for single oven). 2. Check the cable in the Display Board ⇔ Power Board P1B table and verify the communication lines between the two boards. 3. Check the cable in the Display Board ⇔ Power Board P1A table and verify the voltages. If voltage lines meet the values indicated in the electric schematics then replace the Display Board. 4. If they don't meet, replace the Power Board.
	The VFD display never turns on but the Display Board seems to work and accept commands (keypads, knob).	<ol style="list-style-type: none"> 1. Check the cable in the Display Board ⇔ Power Board P1B table and verify the VFD power supply lines. 2. Replace the Display Board.

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<p>CALIBRATION ERROR</p>	<p>POWER UP SEE CALVAL ERROR (condition) SLV_EE CHIP/ CKT BAD OR RTDS NOT CAL DO NOT USE OVEN CALL SERVICE</p>	<p>1. This message is displayed at power-up when a calibration error has been detected. The problem can be due to bad values in the memory or to problems in the memory circuit or during data transmission between the two boards. Replace the Power Board.</p> <p>2. If the problem persists, replace the Display Board too.</p> <p>This message is also displayed at first power-up when a Display Board still configured as a double is installed in a single oven, before being re-configured.</p>
<p>BAD TEMPERATURE PROFILE</p>	<p>In both cavities the temperature curves can't reach steady conditions or the heaters turn off.</p>	<p>There can be a HW problem on the Power Board that prevents the pull-in voltage pulses generation to switch the relays on. The problem becomes evident when many relays are activated simultaneously. Replace the Power Board.</p>

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THE FOLLOWING TABLES PROVIDE INFORMATION ABOUT EACH LINE IN THE PIN-TO-PIN CABLES CONNECTING THE ELECTRONIC BOARDS. SOMETIMES THE ELECTRONIC BOARDS ARE CHARGED WITH BEING RESPONSIBLE FOR MANY FAULTS WHEN ACTUALLY THEY ARE CAUSED BY BAD CONNECTIONS. BEFORE REPLACING THE BOARDS, CHECK THE HARNESS, THE CONNECTORS AND THEIR TERMINALS. CHECK THE TABLES TO SEE IF THE FAULT DETECTED CAN BE DUE TO A WRONG CONNECTION.

Examples:

1. [LIGHT], [TEMPERATURE], [COOKING MODE] keys are not working. In the table describing the cable between display board and keyboard, see that line 2 is the only one shared by these keys. Check the corresponding wire and its terminal in the connector before replacing the electronic boards.
2. The VFD display never turns on. Check pins 1,2,3 on the cable between Power and Display Boards.
3. The buzzer doesn't beep. Check pin 4 wire and terminals of P1A cable.

CONNECTION CABLE BETWEEN POWER AND DISPLAY BOARD - P1A (8POS)

PIN	FUNCTION	NOTES
1	FILAMENT 1	PROVIDES THE VFD DISPLAY WITH A LOW ALTERNATE VOLTAGE, REFERRED TO PIN 3
2	+HV	PROVIDES THE VFD DISPLAY WITH POWER SUPPLY (+57V)
3	FILAMENT 2	PROVIDES THE VFD DISPLAY WITH A LOW ALTERNATE VOLTAGE, REFERRED TO PIN 1
4	+15V	PROVIDES THE BUZZER WITH ITS POWER SUPPLY LINE (THE KEYBOARD DOESN'T USE IT ANYMORE)
5	+5V	PROVIDES ALL THE LOGIC ELECTRONIC COMPONENTS WITH THEIR POWER SUPPLY
6	GND	GROUND REFERENCE FOR ALL DISPLAY BOARD VOLTAGES
7	GND	
8	GND	

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CONNECTION CABLE BETWEEN POWER AND DISPLAY BOARD - P1B (12POS) – double oven version

PIN	FUNCTION	NOTES
1	RESET	THE POWER BOARD RESETS THE DISPLAY BOARD IF COMMUNICATION PROBLEMS OCCUR.
2	SINCRONIZZAZIONE 60HZ	
3	RX	COMMUNICATION LINE BETWEEN POWER AND DISPLAY BOARD.
4	TX	COMMUNICATION LINE BETWEEN POWER AND DISPLAY BOARD.
5	RELAY ENABLE 1	PROVIDES THE HEATERS RELAYS ON THE POWER BOARD AND THE DLB RELAY ON THE AUX BOARD WITH POWER. THIS LINE IS FOR UPPER CAVITY ONLY.
6	RELAY ENABLE 2	PROVIDES BOTH CAVITY LATCH MOTOR RELAYS WITH POWER.
7	RELAY ENABLE 3	PROVIDES THE HEATERS RELAYS ON THE POWER BOARD AND THE DLB RELAY ON THE AUX BOARD WITH POWER. THIS LINE IS FOR UPPER CAVITY ONLY.
8	NOT USED	
9	LOWER DOOR SWITCH	THE DOOR SWITCH LINE IS ROUTED ACROSS THE POWER BOARD BUT ACTUALLY READ BY THE DISPLAY BOARD.
10	UPPER DOOR SWITCH	THE DOOR SWITCH LINE IS ROUTED ACROSS THE POWER BOARD BUT ACTUALLY READ BY THE DISPLAY BOARD.
11	UPPER WORKING FAN HIGH SPEED	ACTIVATES THE UPPER CAVITY WORKING FAN SECOND SPEED
12	LOWER WORKING FAN HIGH SPEED	ACTIVATES THE LOWER CAVITY WORKING FAN SECOND SPEED

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CONNECTION CABLE BETWEEN POWER AND DISPLAY BOARD - P1B (12POS) – single oven version

PIN	FUNCTION	NOTES
1	RESET	THE POWER BOARD RESETS THE DISPLAY BOARD IF COMMUNICATION PROBLEMS OCCUR.
2	SINCRONIZZAZIONE 60HZ	
3	RX	COMMUNICATION LINE BETWEEN POWER AND DISPLAY BOARD.
4	TX	COMMUNICATION LINE BETWEEN POWER AND DISPLAY BOARD.
5	RELAY ENABLE 2	PROVIDES CAVITY LATCH MOTOR RELAY WITH POWER.
6	RELAY ENABLE 1	PROVIDES THE HEATERS RELAYS ON THE POWER BOARD AND THE DLB RELAY ON THE AUX BOARD WITH POWER.
7	NOT USED	
8	WORKING FAN HIGH SPEED	ACTIVATES THE CAVITY WORKING FAN SECOND SPEED
9	NOT USED	
10	UPPER DOOR SWITCH	THE DOOR SWITCH LINE IS ROUTED ACROSS THE POWER BOARD BUT ACTUALLY READ BY THE DISPLAY BOARD.
11	NOT USED	
12	NOT USED	

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The two tables below show the meaning of the lines belonging to the cables between the Power and the Auxiliary Board. They represent a means to drive the working fan high speed and the Double Line Break (DLB) relays when requested (Canada).

CONNECTION CABLE BETWEEN POWER AND AUXILIARY BOARD – P3 (5POS)

PIN	FUNCTION	NOTES
1	UPPER RELAY ENABLE	ACTVATES DLB RELAY [K3] AND ENABLE UPPER WORKING FAN HIGH SPEED.
2	NON USATO	
3	GND	GROUND VOLTAGE REFERENCE FOR RELAY DRIVING.
4	GND	GROUND VOLTAGE REFERENCE FOR RELAY DRIVING.
5	LOWER RELAY ENABLE	ACTVATES DLB RELAY [K4] AND ENABLE LOWER WORKING FAN HIGH SPEED.

CONNECTION CABLE BETWEEN POWER AND AUXILIARY BOARD – P1/PX1 (4POS)

PIN	FUNCTION	NOTES
1	GND	GROUND VOLTAGE REFERENCE FOR RELAY DRIVING.
2	NOT USED	
3	UPPER HIGH SPEED	ACTIVATES UPPER WORKING FAN HIGH SPEED - K1 RELAY
4	LOWER HIGH SPEED	ACTIVATES LOWER WORKING FAN HIGH SPEED - K2 RELAY

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**CONNECTION CABLE BETWEEN DISPLAY BOARD P5 (10POS) AND KEYBOARD J1 (STRIP 12POS)
 Double oven version**

P5	J1	FUNCTION	NOTES
	12	NOT USED	CONNECTED WITH J1-1 ON THE KEYBOARD.
	11	FREE POSITION	USED FOR CONNECTOR POLARISING.
1	10	+15V	OBSOLETE. THE CURRENT KEYBOARD DOESN'T USE +15V ANYMORE.
2	9	FEEDBACK	KEYBOARD SENSE FEEDBACK.
3	8	RETURN 3	RETURN LINE FOR <i>UPPER CANCEL</i> , <i>COOKING MODE KEYS</i> .
4	7	RETURN 2	RETURN LINE FOR <i>UPPER/LOWER</i> , <i>TEMPERATURE</i> , <i>START KEYS</i> .
5	6	RETURN 1	RETURN LINE FOR <i>LOWER CANCEL</i> , <i>LIGHT</i> , <i>TIME KEYS</i> .
6	5	RETURN 4	ADDITIONAL SAFETY RETURN LINE FOR ALL <i>CANCEL KEYS</i> .
7	4	STROBE 3	STROBE LINE FOR <i>TIME</i> , <i>START KEYS</i> .
8	3	STROBE 2	STROBE LINE FOR <i>COOKING MODE</i> , <i>TEMPERATURE</i> , <i>LIGHT KEYS</i> .
9	2	STROBE 1	STROBE LINE FOR <i>UPPER CANCEL</i> , <i>UPPER/LOWER</i> , <i>LOWER CANCEL KEYS</i> .
10	1	GND	GROUND VOLTAGE REFERENCE FOR ALL LINES TO KEYBOARD.

REMARK: The control sends three strobe signals alternatively and checks the return lines to see if one of the signals is coming back. Every strobe line scans three keys, if there is a return signal it means that the key has been pressed.

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**CONNECTION CABLE BETWEEN DISPLAY BOARD P5 (10POS) AND KEYBOARD J1 (STRIP 12POS)
 Single oven version**

P5	J1	FUNCTION	NOTES
	12	NOT USED	CONNECTED WITH J1-1 ON THE KEYBOARD.
	11	FREE POSITION	USED FOR CONNECTOR POLARISING.
1	10	+15V	OBSOLETE. THE CURRENT KEYBOARD DOESN'T USE +15V ANYMORE.
2	9	FEEDBACK	KEYBOARD SENSE FEEDBACK.
3	8	RETURN 3	RETURN LINE FOR <i>COOKING MODE</i> KEY.
4	7	RETURN 2	RETURN LINE FOR <i>CANCEL, TEMPERATURE, START</i> KEYS.
5	6	RETURN 1	RETURN LINE FOR <i>LIGHT, TIME</i> KEYS.
6	5	RETURN 4	ADDITIONAL SAFETY RETURN LINE FOR <i>CANCEL</i> KEY.
7	4	STROBE 3	STROBE LINE FOR <i>TIME, START</i> KEYS.
8	3	STROBE 2	STROBE LINE FOR <i>COOKING MODE, TEMPERATURE, LIGHT</i> KEYS.
9	2	STROBE 1	STROBE LINE FOR <i>CANCEL</i> KEY.
10	1	GND	GROUND VOLTAGE REFERENCE FOR ALL LINES TO KEYBOARD.

REMARK: The control sends three strobe signals alternatively and checks the return lines to see if one of the signals is coming back. Every strobe line scans three keys, if there is a return signal it means that the key has been pressed.

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SOFTWARE TRACKING FEATURE TO DETECT A SHORT CIRCUIT BETWEEN THE TEMPERATURE INPUTS ON THE POWER BOARD MICROCONTROLLER. (F145 FAULT, double oven only)

Given that the temperature sensor input channels on the micro controller are close, UL requires an additional software feature to detect if these inputs are shorted together and temperature measurement is not working correctly. In fact, if the inputs are shorted, the control measures the same temperature in both cavities, which is probably lower than the actual one at least in one of them. As a consequence, the control will try to warm up the cavity over and over, causing a runaway condition.

When the control measures the same temperature in both cavities, it realizes that there is the possibility of a short between the sensors but also that the temperatures can be actually the same. For this reason, it starts a special software procedure to distinguish these two situations:

1. The heaters are disabled in the cavity with the lower set point. Now the temperature in this cavity drops down, while in the opposite the heaters continue to work correctly.
2. Every second the control checks if the short conditions are still present and increments a counter. When this counter overtakes its threshold value, a F145 fault is generated and both cavities are switched off. As soon as the short conditions aren't detected anymore, the counter is reset and the heaters formerly disabled are now restored. The short conditions are:
 - a. At least one cavity must be active, both measuring at least a 200°F temperature.
 - b. Measured temperatures are within a 20°F range. It can be 40/50°F also, due to different inputs calibration. Depending on the micro controller internal construction, there is also a physical difference between the two inputs channel, adding a 20°F offset to the upper sensor.
 - c. Temperature slopes must be within a certain range. For example, if temperature is increasing in one cavity and decreasing in the opposite, after a few seconds the counter is reset and no F145 occurs.
 - d. In the active cavity, the heaters must turn on within 6 minutes in any case. To prevent false alarm, there's no short detection if both ovens are cooling down. The counter is reset.

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The F145 fault may occur in different times, given that the counter increment rate can be very different depending on the cooking mode, the set-point temperatures, etc.:

- a. In self-clean, if the short occurs at steady conditions, F145 takes 2 or 3 minutes.
- b. If the short is already present when the cooking mode is activated, one cavity is set at 550°F and the opposite is idle, it takes 15/20 minutes, more or less.
- c. If the short occurs when both cavities are at steady conditions with high temperature set points, F145 takes even 1 hour before shutting down the oven heaters. Also temperature rises very slowly in this situation.

After F145 fault has occurred in self-clean mode, the latch doesn't try to unlock the door until the temperature drops down below 200°F in both cavities. When the door unlocks, the keyboard remains locked. Keep the [Cooking Mode] key pressed for a few seconds, until the display shows the message *KBD UNLOCKED*.

If a power loss occurs during a self-clean, after power recovering the control can't know if the sensors were previously shorted. The latch auto-test cycle is suspended until the temperature drops down below 200°F in both cavities. The display shows the message *"UNLOCKING DOOR"*.

Pull-in voltage for relays

All the relays used to drive the heaters or the auxiliary loads are 24Vdc. The Power Boards provide the relays with a 30V pull-in voltage pulse every 6 seconds, more or less. The relays need at least the 75% of their nominal voltage to switch on. At steady conditions, the relay voltage is about 15V/16V that is enough to keep them on but not necessarily enough to activate them. A problem in the electronic circuit which provides the pull-in voltage may cause the following problems:

1. The heaters sometimes switch off without following their on/off times. This can be evident when both cavities are working: the more relays are activated, the more difficult is for the voltage supply to activate new relays on.
2. The oven is not working at the expected set point but it's working at lower temperature values in an irregular way.
3. The oven cools down even if a cooking mode is active and correctly displayed.

Of course, if such problems occur, it's necessary to replace the Power Board. As a general rule, first check the cables referring to the tables already described.

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Temperature regulation and heater cycles.

According to the temperature set point, the control drives the heaters to catch up with it. The cycles are defined for every cooking mode as described in the next page table. Actually, the temperature regulation is based on the off time between two cycles. The control can decide to run heaters cycle without any pause if the temperature is cool, or not to run any cycle if the oven is already at the set-point and the insulation is good enough to prevent the oven from losing heat. These two situations are the extreme ideal ones. The additional element is used only in self-clean when the 208V power supply is selected, or during the preheat phase in Fast Preheat modes.

Bake and Warming modes work with times divided by two when the set point is below 250°F

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OVEN REGULATION PARAMETERS FOR COOKING MODES

Serial #	Cooking Function	Convection Fan Speed	Default Temperature °C / °F	Full-power period in seconds	Elements used during Preheat Operation On-Time ⁽¹⁾ (in seconds)				
					Lower	Upper	Ring	Additional	
1	Bake	-	175 / 350	60	40	12	-	-	
2	Convection Bake	Preheat cycle	Full	160 / 325	30	-	-	30	-
		Normal cook cycle	Reduced						
3	Dehydrate – (Low Power Convection Bake)	Full	60 / 140	30	-	-	30	-	
4	Convection Roast	Preheat cycle	Full	160 / 325	60	40	12	-	-
		Normal cook cycle	Reduced						
5	Broil	-	Level 3	60	-	LEVEL 1 = 11sec. LEVEL 2 = 21sec. LEVEL 3 = 31 sec. LEVEL 4 = 42sec. LEVEL 5 = 52sec.	-	-	
6	Convection Broil	Preheat cycle	Full	245 / 475	60	-	52	-	-
		Normal cook cycle	Reduced						
7	Self-Clean	Full		60	12	43	-	60	
8	Warming – (Low Power Bake)	-	75 / 170	60	40	-	-	-	
9	Fast Preheat Bake	Preheat cycle	Full	175 / 350	60			60	60
		Normal cook cycle	-	175 / 350	60	40	12	-	-
10	Fast Preheat Convection Bake	Preheat cycle	Full	160 / 325	60			60	60
		Normal cook cycle	Reduced	160 / 325	30	-	-	30	-