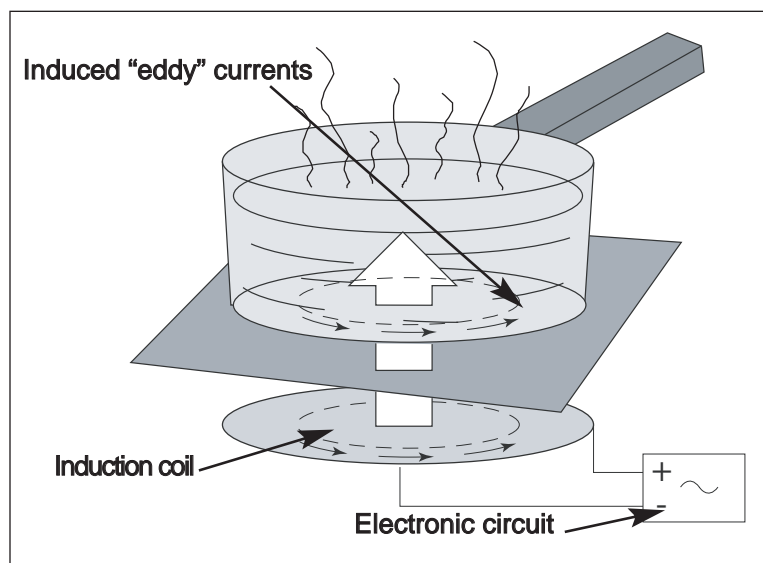**ELECTRONIC CONTROL TERMINOLOGY & COMPONENT DESCRIPTIONS**

Wolf Induction cooktops utilize an electronic control system. The electronic control system monitors, regulates and controls a variety of functions. The control system also displays error codes to identify possible problems with the unit. The table below defines some of the basic electronic control system terminology and describes some of the electronic system components. An understanding of the following information is needed in order to comprehend the input operations and functions of the electronic control system.

Term / Component	Definition / Description
Control PCB Assembly	The printed circuit board that controls the functions and communication between the glass and keypad assembly and generator boards.
Generator Board	The circuit board attached to the induction plate which provides power to inductors
Induction Plate	A metal plate that the inductors, generator boards and filter boards are attached to.
Filter Board	The circuit board which filters incoming power and passes it on to the generator.
Glass & Keypad Assembly	The assembly containing the display(s), keyboard, and glass top.
Microprocessor	An electrical component on the control board which receives electrical signals from other components, processes that information, then sends an electrical signal to the relays on the board to open or close, and other components in the unit to switch on or off.
Keyboard	An assembly of glass and PCB which connects onto the glass top.
Error Codes	Number which appears on the 3 digit display if the unit experiences specific problems related to electrical signals supplied by the electrical components.
LED	Light Emitting Diode
EOC	End of Cycle
CZ	Controled Zone - The useer interface that controls each hob.

Induced "eddy" currents

Induction coil

Electronic circuit

PRINCIPLES OF INDUCTION

Introduction
There are two techniques of glass-ceramic heating:

• Infrared.
• Induction.

The difference is only obvious once the cooking zones are turned on. Induction has no visible indication of operation.

The Infrared is provided with radiant or halogen sources that transmit heat by radiation or conduction. Induction Cooktops produce a magnetic field which passes through the glass ceramic to the pan. When ferro magnetic cookware is used, this magnetic field excites the molecules in the pan, causing them to vibrate at a very high frequencies, producing heat.

The principle of heating by induction is a natural phenomenon discovered in the 19th century by several physicists, among them Leön Foucault. He discovered the induced currents that are named eddy currents.

Eddy currents are caused by a conductor (such as a pot or pan) intersecting a varying magnetic field (created by the inductor hob). These currents transform electromagnetic energy into heat. The glass surface then remains relatively cool and the cooking response time is very quick.

The flexibility of the quick response time and increased safety due to the glass staying cool are not the only advantages to the induction cooktop. The energy efficiency of an induction cooktop is up to 90% and cleaning is easy due to the glass cooking surface staying cool.
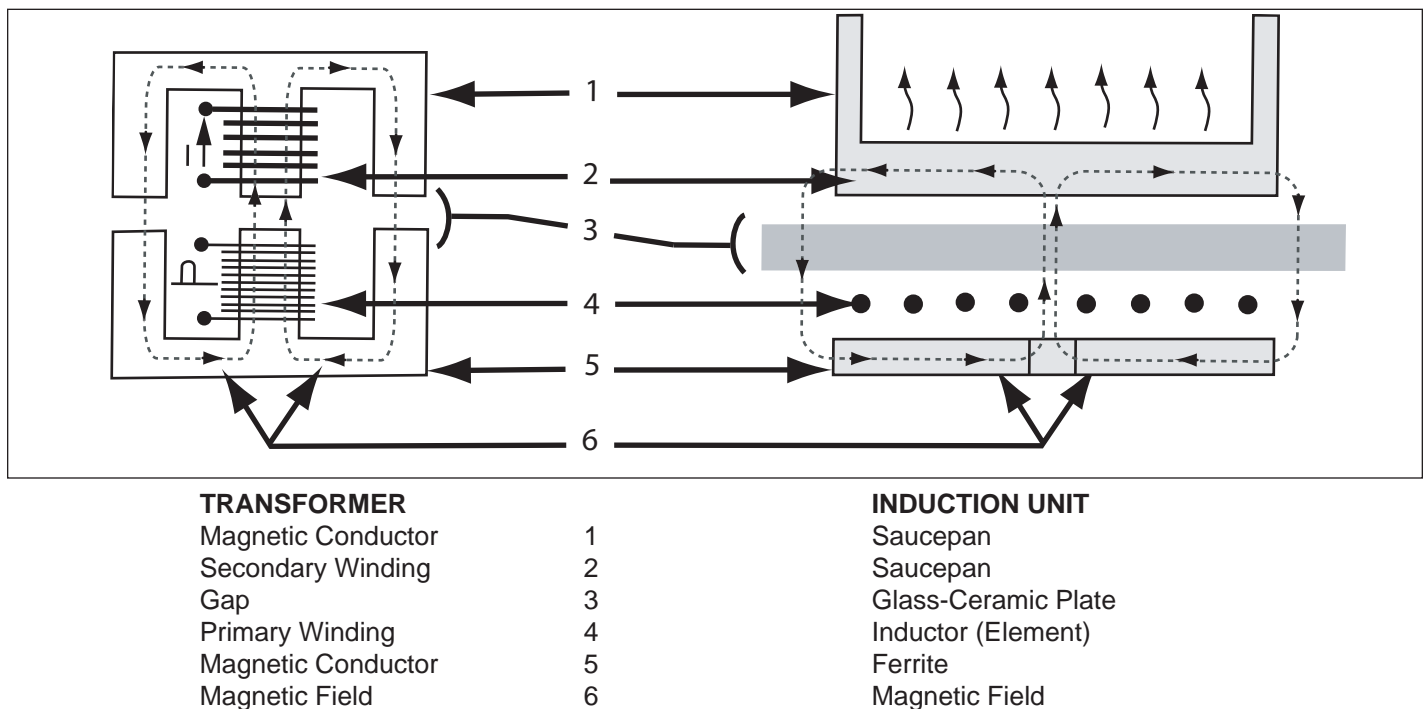
PRINCIPLES OF INDUCTION (continued)

Operational Principles

An induction cooktop operates thanks to the electromagnetic properties of most containers used on the traditional cooktop.

You can compare this cooktop with a transformer of which the secondary winding would be shorted. A significant internal current arises and causes quick heating.
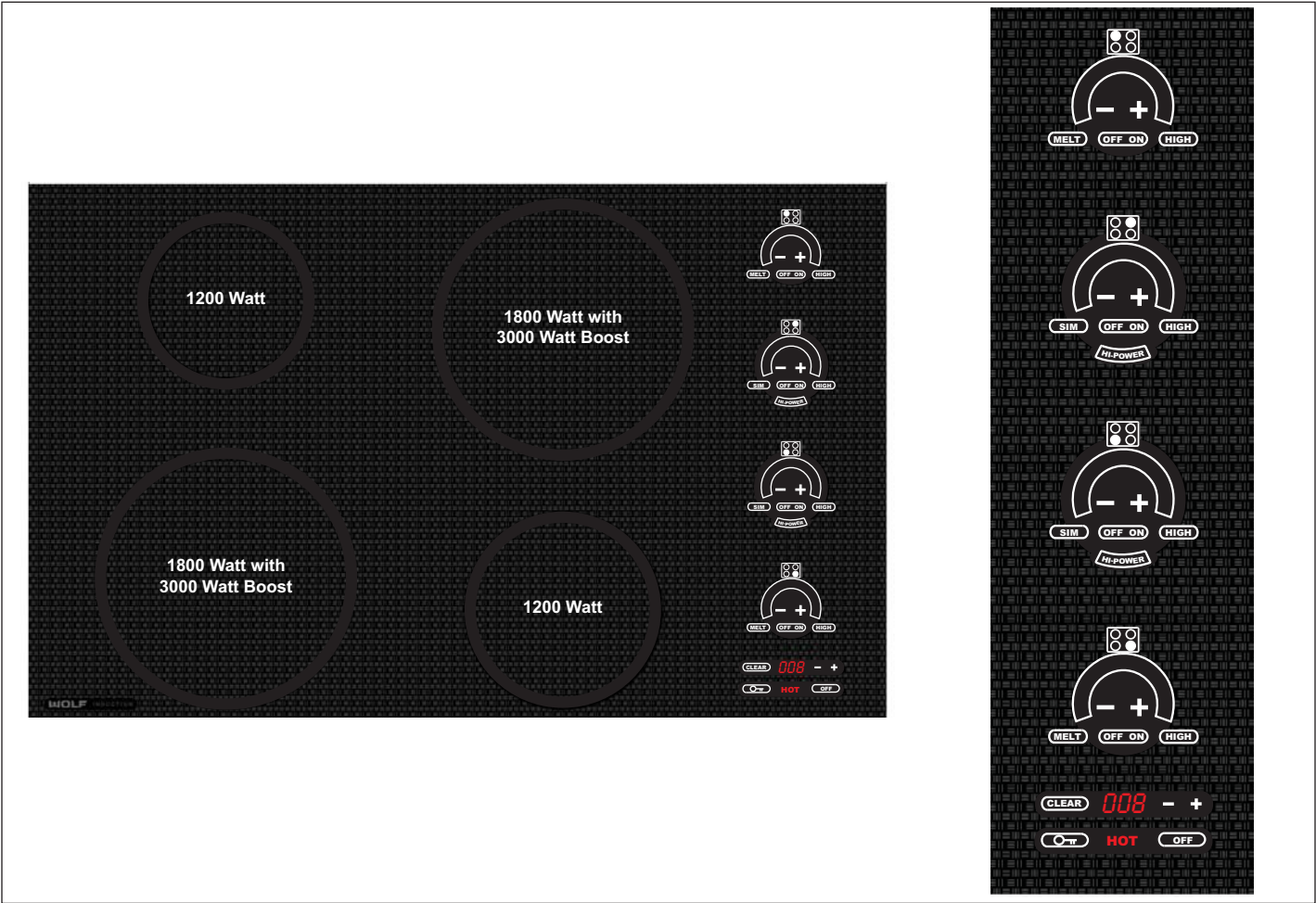
The saucepan can be compared with a shorted set of concentric coils whose internal resistance is not zero.

From the function keys, you can control the electrical power supply to the transformer primary winding that generates a magnetic field. This field induces currents at the bottom of the container placed on the cooking zone. These induced currents immediately heat the container, which transmits the produced heat to the food contained inside. Cooking is performed practically without any loss of energy.
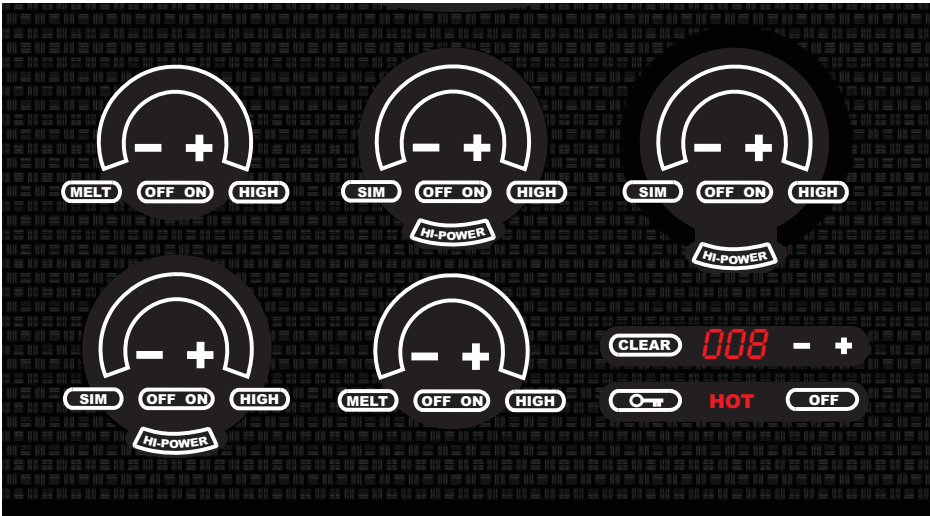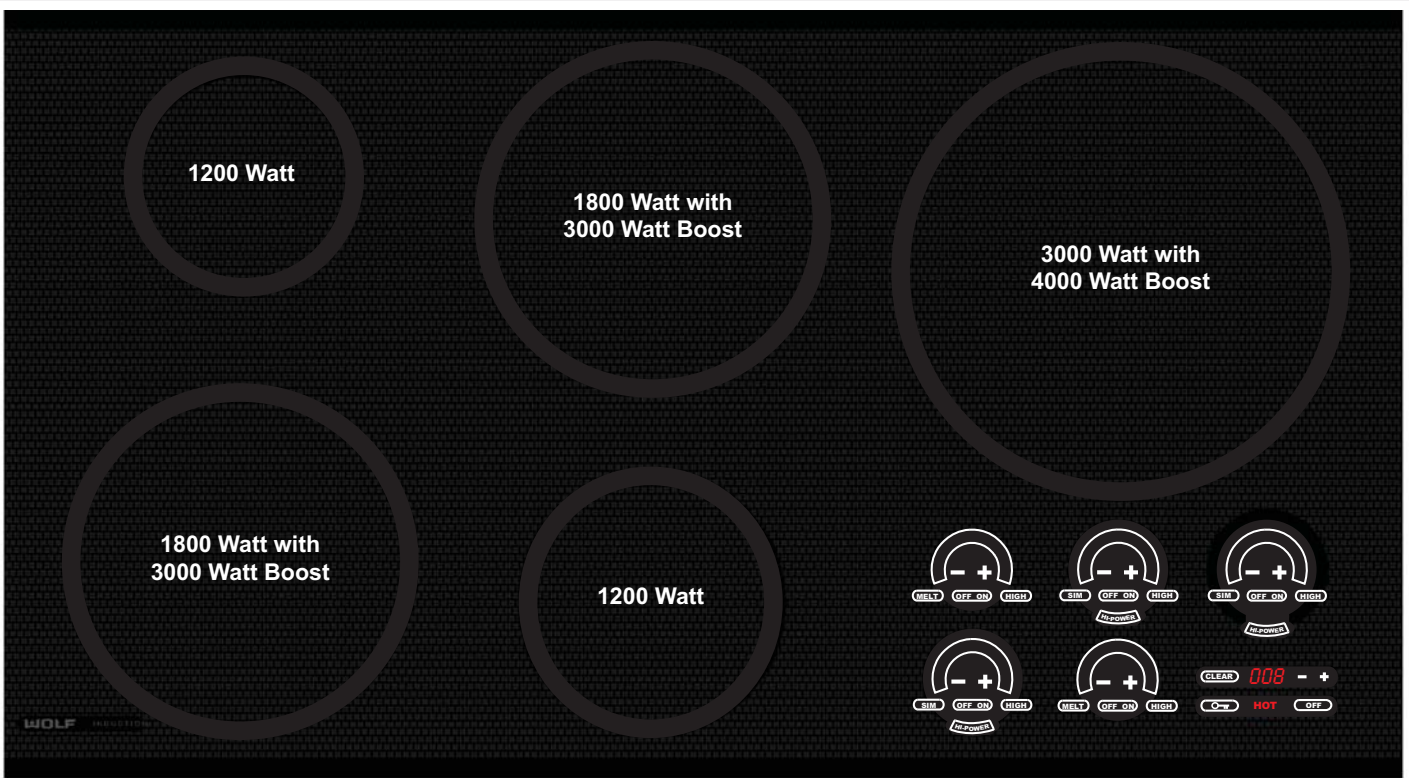

TRANSFORMER		INDUCTION UNIT
Magnetic Conductor	1	Saucepan
Secondary Winding	2	Saucepan
Gap	3	Glass-Ceramic Plate
Primary Winding	4	Inductor (Element)
Magnetic Conductor	5	Ferrite
Magnetic Field	6	Magnetic Field

1800 Watt with 4000 Watt Boost

1200 Watt

SIM · OFF ON · HIGH · HI-POWER

MELT · OFF ON · HIGH

CLEAR · 888 · − +

HOT · OFF

SIM · OFF ON · HIGH

HI-POWER

MELT · OFF ON · HIGH

CLEAR · 888 · − +

HOT · OFF

15" Inductive Glass / Controls Layout

1200 Watt

1800 Watt with 3000 Watt Boost

1800 Watt with 3000 Watt Boost

1200 Watt

MELT · OFF ON · HIGH

SIM · OFF ON · HIGH · HI-POWER

SIM · OFF ON · HIGH · HI-POWER

MELT · OFF ON · HIGH

CLEAR · 008 · − +

HOT · OFF

MELT · OFF ON · HIGH

SIM · OFF ON · HIGH · HI-POWER

SIM · OFF ON · HIGH · HI-POWER

MELT · OFF ON · HIGH

CLEAR · 008 · − +

HOT · OFF

30" Inductive Glass / Controls Layout

1200 Watt

1800 Watt with
3000 Watt Boost

3000 Watt with
4000 Watt Boost

1800 Watt with
3000 Watt Boost

1200 Watt

MELT OFF ON HIGH   SIM OFF ON HIGH   SIM OFF ON HIGH
                            HI-POWER   HI-POWER

SIM OFF ON HIGH   MELT OFF ON HIGH   CLEAR 008 − +
HI-POWER   HOT OFF

MELT OFF ON HIGH   SIM OFF ON HIGH   SIM OFF ON HIGH
                            HI-POWER   HI-POWER

SIM OFF ON HIGH   MELT OFF ON HIGH   CLEAR 008 − +
HI-POWER   HOT OFF

36" Inductive Glass / Controls Layout

Electronic Control

Hot Surface LED

As an added safety precaution, a hot surface indicator light will illuminate when the surface temperature of the glass is above 65°C. Even if the cooktop controls are turned off, the indicator light will illuminate to show the user that the cooktop surface remains hot. (See Figure 3-3)

Universal "OFF" Key

In an emergency situation where there is a need to turn off all heating elements, press the universal "OFF" touch pad to turn the entire unit off. (See Figure 3-3).

Induction Wattage and Hi Power Boost for 36" Units

Only two elements can have the "Boost" function on at a time.

If all elements are on "High", and the front left inductor Boost is engaged and then the back right inductor Boost is engaged, the power level of the 4000 W element will be limited to 3600 W. The power distribution can be seen in Figure 3-5. The middle back inductors Boost function will not work.

If all inductors are on High, and the front left inductor Boost is engaged and the middle back inductor Boost is engaged, the 4000 W Boost will not work. This power distribution can be seen in Figure 3-6.

NOTE: If one inductor is not on High these rules do not apply.

Hi Power Boost 15" and 30" Units

Turn on and activate element as described on the previous page. Touch "HI POWER" to boost the rear element wattage output from 1800W maximum to 3000W maximum. Indicator light under "HI POWER" touch pad will be illuminated.

NOTE: When "HI POWER" is active, the corresponding 1200W element will be limited to 600W maximum output, and LEDs will display this change in power.

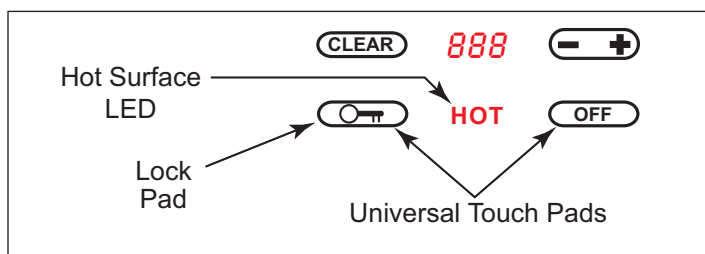Touch "HI POWER" again to de-activate "HI POWER" mode. The light under "HI POWER" touch pad will go out.
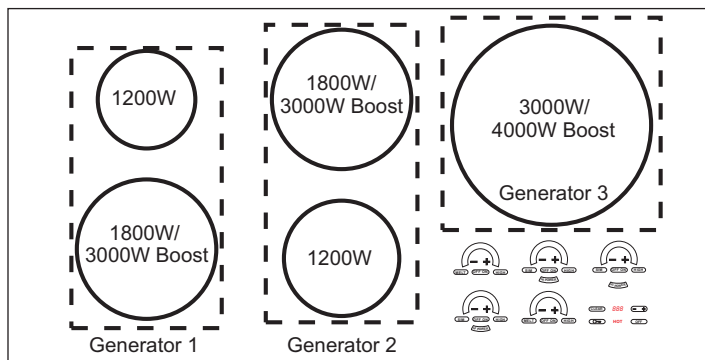

Figure 3-3 Global Controls
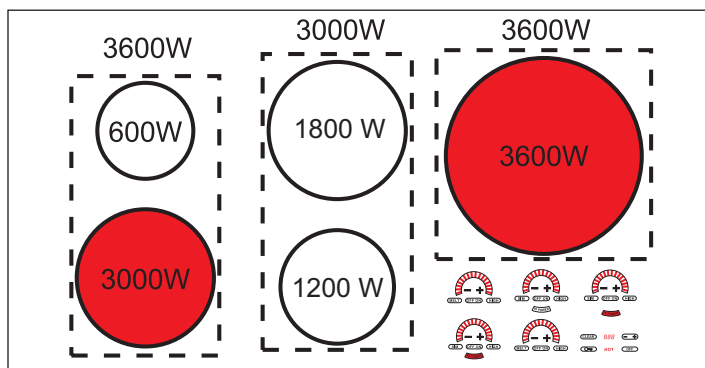

Figure 3-4 Unit Wattage Layout

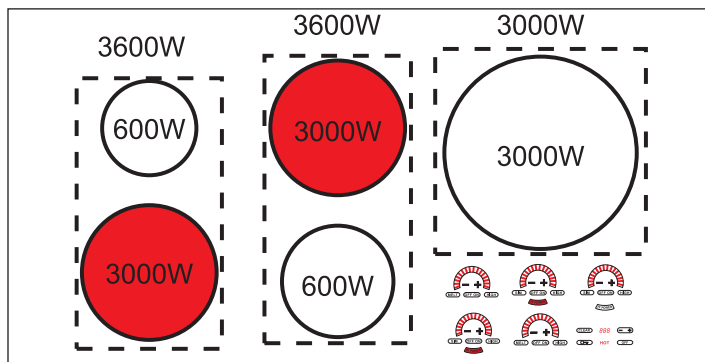**Figure 3-5 With Boost Activated Combination #1**

Figure 3-6 With Boost Activated Combination #2

INDUCTION COOKTOP OPERATION

Control Operation

The Wolf Induction cooktop operates by adjusting the current to the induction coils. As the power level is increased on the control panel, the induction coils will output more power.

Modes of Operation

Lock Mode: All keypad operation on the control panel is disabled and all of the induction coils are de-energized. A steady glowing light within the "Key" symbol indicates the unit is locked.

To unlock the control, touch and hold the "Key" symbol for 3 seconds. The unit will beep twice and the light with-in the "Key" symbol will go out. The control unit is now in the idle mode. (See Figure 3-8).

To lock the control, touch and hold the "Key" symbol for three seconds. The unit will beep three times and the light within the "Key" symbol will illuminate. (See Figure 3-8).

NOTE: The unit cannot enter LOCK mode while elements are active. An error tone will sound if this is attempted.

NOTE: When the unit is powered up for the first time or if there was a power outage, the unit will default to this mode.

Idle Mode: After unlocking the control panel as described in Lock Mode, the unit enters the idle mode of operation. The only valid keypad operations are the "OFF ON" for each cooking zone, the "Key" symbol, and the timer keys.
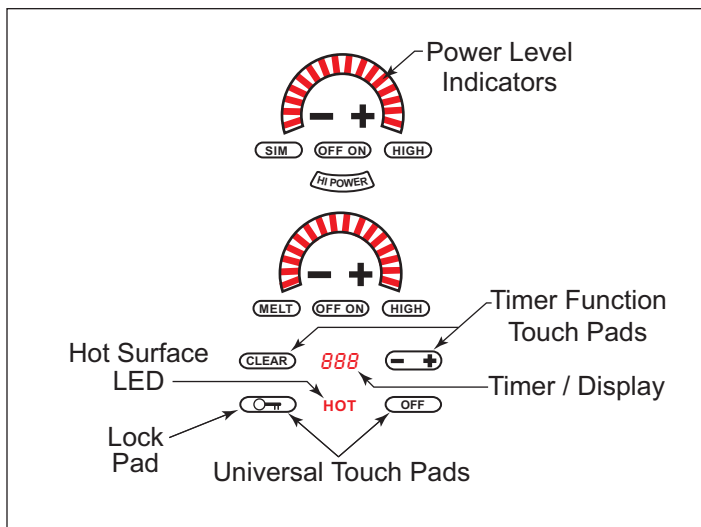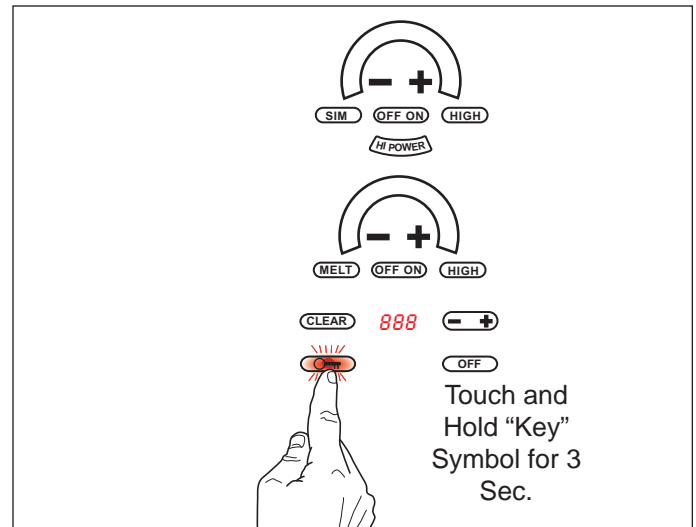

Figure 3-7 Control Panel 15" Keyboard Layout

Figure 3-8 Unlocking Control Panel

Operation Mode: Touch the "OFF ON" pad to enable the corresponding element. The left side eight LED's of the Power Level Indicator light up and blink on the corresponding Control Zone. (See Figure 3-9)

After the "OFF ON" pad is touched, the following touch pads are valid for the corresponding Control Zone.

1. Touching "-" activates 8 Power Level Indicator - LEDs with a power level equivalent to 5. Touching and holding the "-" pad will lower the power level by 1 for every .5 seconds the pad is depressed. (See Figure 3-10 & 3-11)

2. Touching "+" activates 8 Power Level Indicator - LEDs with a power level equivalent to 5. Touching and holding the "+" pad will raise the power level by 1 for every .5 seconds the pad is depressed.

> *NOTE:* 2 LED's = 1 level in some cases.

3. Touching "SIM" activates 1 Power Level Indicator-LED with a power level equivalent to 1. (See Figure 3-12)

4. Touching "MELT" activates 1 Power Level Indicator-LED with a power level equivalent to 1.

5. Touching "HIGH" activates 16 Power Level Indicator - LEDs with a power level equivalent to 10. (See Figure 3-13)

6. Touching "HI POWER" pad activates the power boost LED in addition to the 16 Power Level Indicator-LED's. (See Figure 3-14)

NOTE: If any other key not within the respective Control Zone is touched, or if no other keypad is activated within 10 seconds, the control shall return to the previous state before the last "OFF ON" keypad was initiated.

NOTE: If the Control Zone is activated within 10 seconds with no pan on the Control Zone for more than 30 seconds after this activation, the keyboard turns off the Power Level Indicator-LED's and begins to initiate Idle Mode or the previous state of operation. During these 30 seconds of no pan detection, the selected Power Level Indicator- LED's flash at ½ sec. on and ½ sec. off.
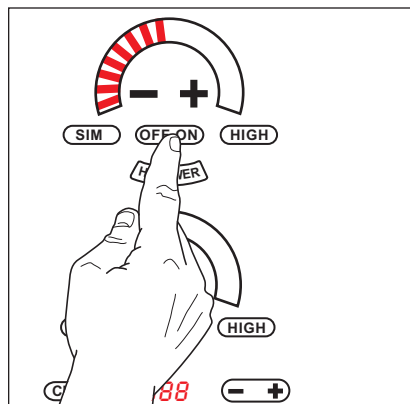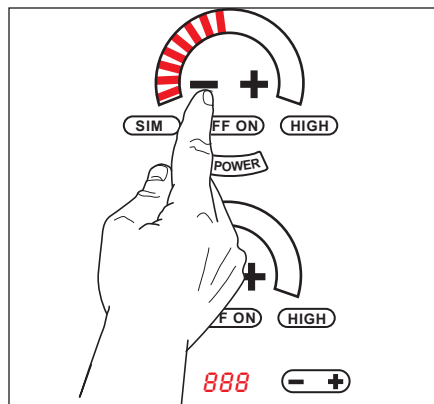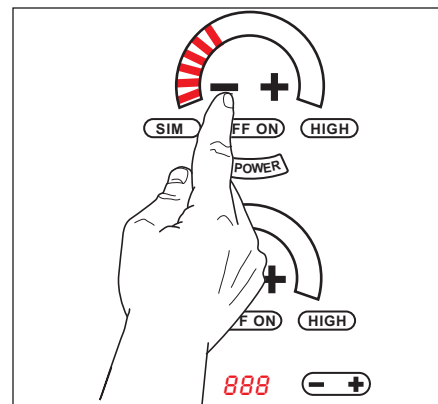

Figure 3-9 Element On
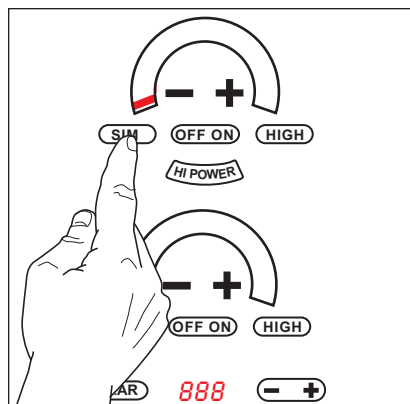

Figure 3-10 Press "-"

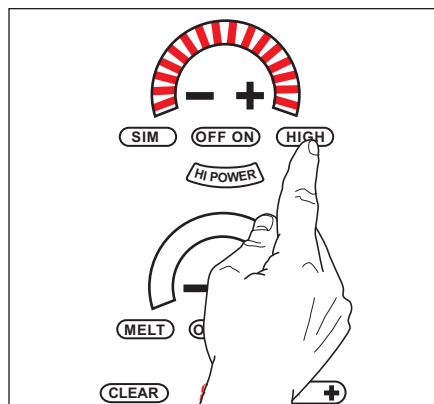Figure 3-11 Press and Hold "-"

Figure 3-12 Press "SIM"
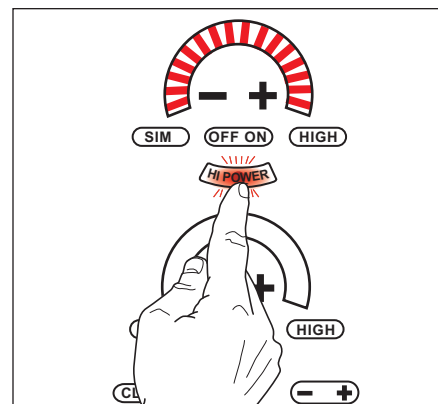

Figure 3-13 Press "HIGH"

Figure 3-14 Press "HI POWER"

Timer Mode

The timer can be used in any mode except Lock Mode. When the timer is not in use the display will be blank.

The timer sets minutes only. During countdown of minutes, when the timer reaches 1 minute, timer will switch to seconds and then display 59, 58, etc. until 00 seconds is reached and the annunciator will continually beep every 5 seconds.

The timer is paused while entering the time and will start 3 seconds after the last change in value. Editing a running timer causes the seconds to be reset so that the displayed time is what will be counted down. As a result, if the minute time is counting down seconds, the "-" key will stop the timer without an alarm.

To initiate the timer, touch and release the "+" key. Upon activation, the timer will display "1" (one minute). The unit will increment/decrement with the touch of the "+" pad, 1 count every .5 sec. (See Figure 3-15)

If the "+" key is held down for more the 3 intervals continuously and the count is divisible by 5, the display will increment/decrement at a rate of 5 count per every .5 seconds.

Likewise, if the "+" key is held down for more then 3 intervals and the count is divisible by 10, the rate of change will become 10 counts per interval. (i.e. 0,1,2,3,4,5,10,15,20,30,40,50,…)

When the timer has run down to 0 seconds, the reminder tone will sound and the display will flash "00" for the duration of the reminder tone.

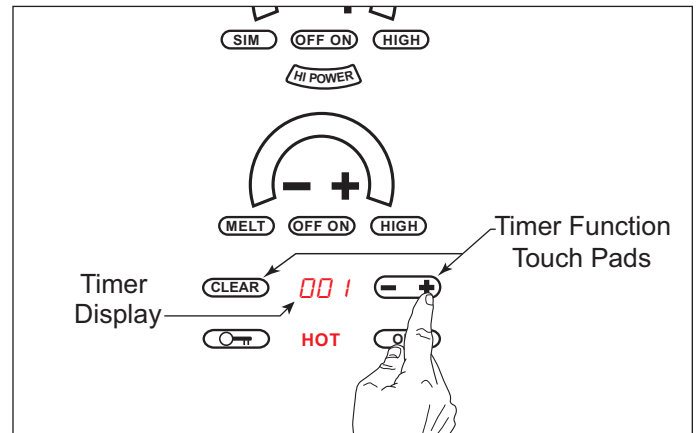Touch the "CLEAR" button to stop the reminder tone and clear the display. (See Figure 3-16)

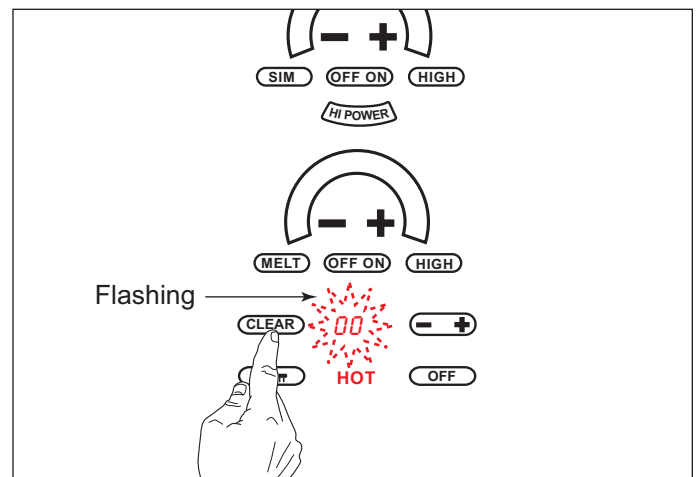Figure 3-15 Press "+" To Start Timer

Figure 3-16 Press "CLEAR" To Stop Timer

Showroom Mode

This mode deactivates the induction coils while still giving the user complete functionality of the controls at either 120V or 240V power.

To activate Showroom Mode

From LOCK MODE, Press and hold the front element "MELT" keypad for 5 seconds. The controls will enter showroom mode. (See Figure 3-17)

NOTE: If any other key pad sensor detects another input signal, the Showroom Mode will not engage.

NOTE: If the "MELT" key pad is not released after 7 seconds, the Showroom Mode will be cancelled and not engaged. The unit will return to Lock Mode.

The controls will light all LEDs for 5 seconds to let the user know that showroom mode has been entered.

During showroom mode "Shr" will be continually displayed in the timer display unless the "CLEAR", '+" or "-" key is pressed. Once there are no key presses for 5 minutes the "Shr" will return.

While in Showroom Mode, all inductors will be disabled and all visual and audible feedback will function as normal.

To exit Showroom Mode

From LOCK MODE, Press and hold the front element "MELT" keypad for 5 seconds. The controls will exit the showroom mode. (See Figure 3-17)

The Controls will go through the start up sequence to indicate that the showroom mode has been exited.

NOTE: An interruption of power will also exit the showroom mode and the unit will start up in LOCK mode when power is restored.

NOTE: If any other key pad sensor detects another input signal, the Showroom Mode will not dis-engage.

NOTE: If the "MELT" key pad is not released after 7 seconds, the Showroom Mode will not be cancelled. The unit will return to Lock Mode in the Showroom Mode.
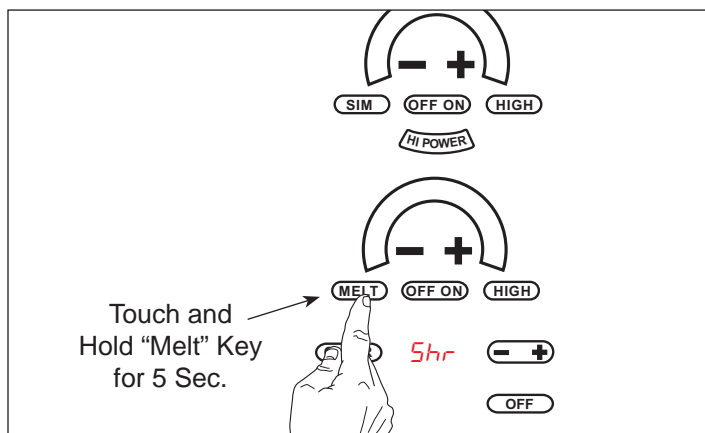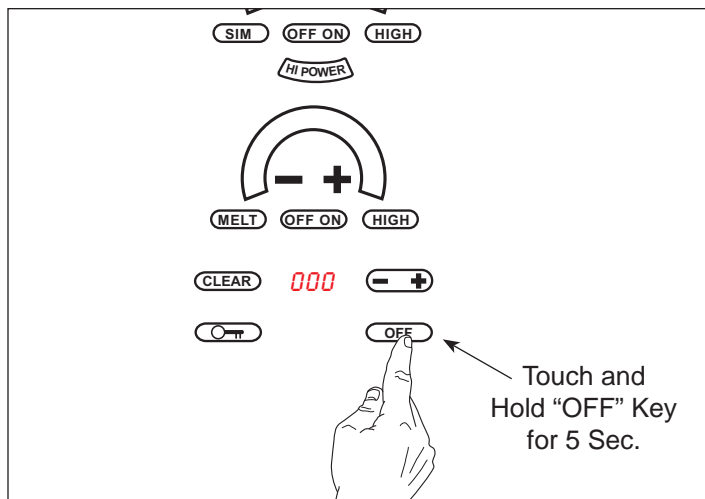

Figure 3-17 Entering or Exiting Showroom Mode

Figure 3-18 Entering Diagnostics Mode

Annunciator

The Annunciator is volume adjustable. The volume is adjusted through the timer controls as a User Option. The cooktop must be in Idle Mode in order to adjust either the volume or frequency.

To enter User Options from Idle Mode:

1. Touch and hold "CLEAR" pad for 3 seconds will activate the Volume adjustment. The 3-digit display will show "Uol". (See Figure 3-19)

2. Touch and hold "CLEAR" pad for more than 5 seconds will activate the Frequency adjustment. The 3-digit display will show "FrE".

3. Both the Volume and Frequency are adjusted using the timer "-" and "+" keys. 1 touch equals 1 step up/down in volume or frequency. Power Level Indicator - LEDs will show the current status of the volume/frequency and change with the user's input. (1 LED = Low, 8 LEDs = Med. and 16 LEDs = High). (See Figure 3-20)

    As the volume/frequency is adjusted, the annunciator will beep with each change. The beep will represent the volume/frequency level that is currently displayed by the Power Level Indicator - LEDs.

4. The change will be aceepted if you touch the clear key for 3 seconds or if no keys are touched for more than 10 seconds.

NOTE: Holding the "CLEAR" pad for more than 7 seconds or not pressing any keys for 10+ sec. will deactivate User Options and return cooktop to idle mode.
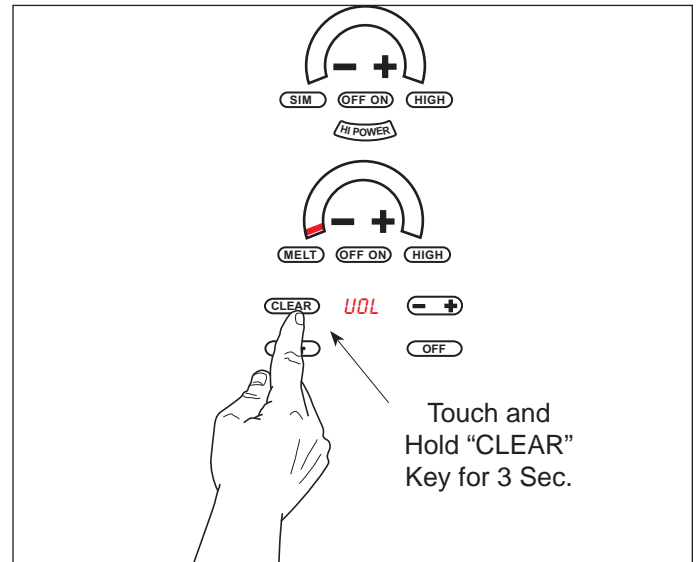

Touch and Hold "CLEAR" Key for 3 Sec.

Figure 3-19 Entering User Options - Volume

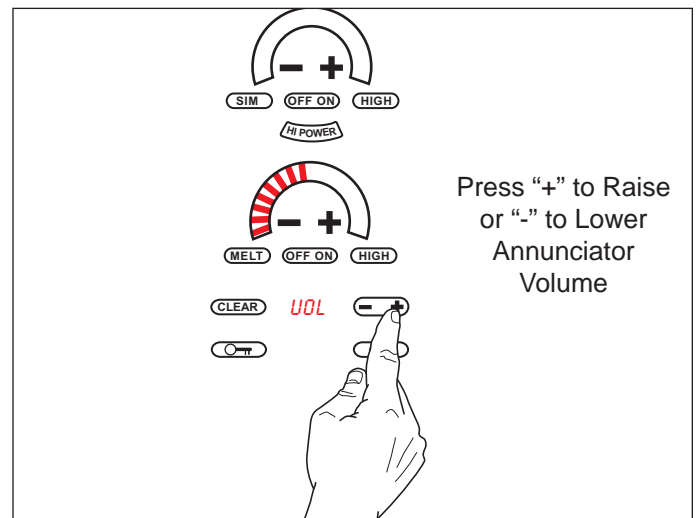Press "+" to Raise or "-" to Lower Annunciator Volume

Figure 3-20 Annunciator Volume Being Raised

Diagnostics Mode

The diagnostics mode will be engaged from Lock Mode of the controls. When the "OFF" keypad sensor is touched and held for 5 seconds, the controls will enter Diagnostics mode 1. A beep will sound after 5 sec. to let the user know that they can lift their finger from the key. (See Figure 3-18)

NOTE: If any other keypad sensor detects another input signal, the diagnostics mode will not engage.

NOTE: If the "OFF" keypad is not released after 7 seconds, the diagnostics mode will be cancelled and not engage. The unit will return to Lock Mode.

NOTE: All Indcution Zones are disabled and there will be no audible signals during diagnostics.

NOTE: If after 60 seconds no other inputs are detected from the keypad, the controls exit the diagnostics mode and return to the Lock Mode.

SEE SECTION 5 FOR DIAGNOSTIC TEST PROCEDURES

Error Mode

Error codes are organized in a priority-based scheme which allows for different behavior based on the priority of the error. There are three priority levels, defined as follows:

Priority 1: Priority 1 errors are considered safety related or of such catastrophic scope that the control is considered inoperable. These errors will be continuously displayed to the end user, indicating that a service call is required. No user functions will be allowed, and any active functions will be cancelled upon generation of the priority 1 error. The error can be canceled, but will re-generate if the condition which caused the error still exists. These errors will be displayed as a stationary LOCK (KEY) LED and an error code in the 3-digit display indicating a permanent error and will not allow the control to return to Stand-By Mode.

Priority 2: Priority 2 errors will be displayed to the user only during an active operational mode or upon an attempt by the user to enter an operational mode. The criteria for these errors, is that they are likely to limit the proper functionality of the system and would normally cause some customer dissatisfaction. These errors can be cancelled and will not be displayed again until the user again attempts to start an operational mode. Any active function on the CZ for which the error has scope will be cancelled upon generation of the priority 2 error. Errors with system scope will apply to all CZ's; errors with CZ scope will apply only to the appropriate CZ unless otherwise noted. This level of error will be expressed by a flashing LOCK (KEY) LED indicating a temporary error and allows the control to return to Stand-By once the situation is permissible

Priority 3: Priority 3 errors are defined as errors which could cause some possible or conditionally impaired functionality, most likely to be never noticed by the end user. These errors, although logged internally, will never be displayed to the end user.

Error Logging

Multiple instances of the same error will not be repeatedly logged – the error log will only show one instance of a particular error.

SEE SECTION 5 FOR ERROR CODE DIAGNOSIS AND REPAIR