



# **P. D. Q.**

## **Automatic Burnout Furnaces**

115 and 230-volt Models

### **OPERATOR'S MANUAL**



CE



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# INTRODUCTION

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Thank you for purchasing an **PDQ-D Burnout Furnace**.

We have designed and manufactured this furnace using the latest in microcomputer technology to give you many years of dependable service. The controls on your new PDQ-D are different from those you may be used to on an ordinary burnout furnace. To ensure that your PDQ-D Burnout Furnace gives you the highest level of service, review and follow the guidelines outlined in this Operator's Manual.

## WARRANTY

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This Whip Mix equipment is warranted to be free from defects in material and workmanship from the date of installation for a period of 24 months.

Any item returned to Whip Mix will be repaired or replaced at our option at no charge provided that our inspection shall indicate it to have been defective. Dealer charges are not covered by this warranty.

This warranty does not apply to damage due to shipping, misuse, careless handling or repairs by other than authorized service personnel. Whip Mix is not liable for indirect or consequential damage or loss of any nature in connection with this equipment.

This warranty is in lieu of all other warranties expressed or implied. No representative or person is authorized to assume for us any liability in connection with the sale of our equipment.

## SAFETY INSTRUCTIONS

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Use of the PDQ furnace not in conformance with the instructions specified in this manual may result in premature failure of the unit.

**WARNING:** To prevent fire or electrical shock, do not expose this appliance to rain or moisture.

### ATTENTION USERS:



This symbol alerts the user that important Operating and Maintenance instructions have been included with the unit. Read carefully to avoid any problems.



This symbol warns the user to use caution surface is hot.

### Do Not Attempt Internal Service

The interior of the Main Assembly is only accessible by removing hardware with tools and should only be opened and serviced by qualified technicians. Since the interior of the unit may contain high voltage and dangerous components, failure to heed this warning may result in equipment damage, personal injury and/or death.

Please call Whip Mix between 8:00 a.m. and 5:00 p.m. (EST) for service information toll free 800-626-5651.

# SPECIFICATIONS

|                            | <b>PDQ-D Medium</b>                                       | <b>PDQ-D Large</b>  |
|----------------------------|---|---|
| Electrical                 | 115V 50/60Hz 1075W<br>230V 50/60Hz 1280W                  | 115V 50/60Hz 1392W<br>230V 50/60Hz 1890W                  |
| Capacity                   | 8–1 3/4" rings or 2–3" rings                              | 15–1 3/4" rings or<br>5–1 3/4" rings and 3–3" rings       |
| Overall Dimensions         | 10.7"W x 10.6"D x 15.0"H<br>(27.2cm x 26.9cm x 38.1cm)    | 14.4"W x 11.0"D x 15.0"H<br>(36.6cm x 28.0cm x 38.1cm)    |
| Heating Chamber Dimensions | 5-1/2"W x 5-1/4"D x 5-1/8"H<br>(14.0cm x 13.3cm x 13.0cm) | 9-1/8"W x 5-1/4"D x 5-1/8"H<br>(23.2cm x 13.3cm x 13.0cm) |

|             |   |
|-------------|---|
| HEAT RATE*  | a) 1 – 30°F/min. (1 – 17°C/min.)<br>b) "FULL" Stage heats at the maximum rate attainable. |
| TEMPERATURE | 150°F – 2012°F (66°C – 1100°C)  |
| HOLD TIME   | 0 – 4 hours   |

\*Programmable heat rates. Actual heat rate at high temperatures may be lower depending upon furnace load and electrical voltage.

## ENVIRONMENTAL CONDITIONS

- Indoor use
- Altitude up to 2000 m
- Temperature 5°C to 40°C
- Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C
- Mains supply voltage fluctuations not to exceed +/- 10% of the nominal voltage
- Pollution Degree 2, Installation Category II
- Protection Degree IP20 – protected against objects greater than 12.5mm, no liquid protection

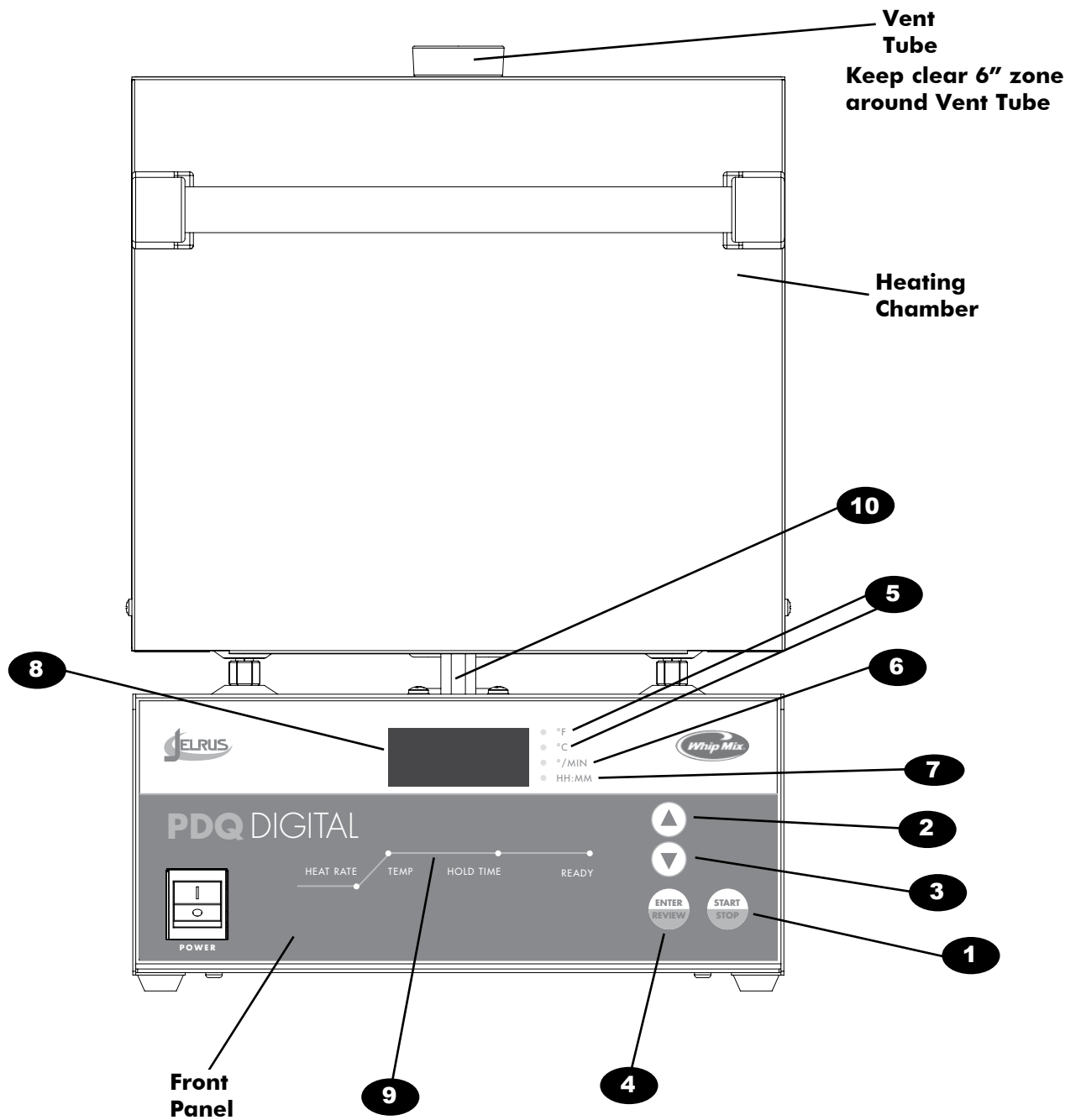
# KEY PARTS IDENTIFICATION AND EXPLANATION

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## FRONT PANEL (Figure 1)

| DISPLAY                          | DESCRIPTION   |
|----------------------------------|---|
| 1. START / STOP                  | Press to start or stop a program.   |
| 2. ↑                             | Press to increase a number. The longer the button is pressed, the faster the numbers change.  |
| 3. ↓                             | Press to decrease a number. The longer the button is pressed, the faster the numbers change.  |
| 4. ENTER / REVIEW                | When programming or reviewing a program in process, press to advance to the next parameter.   |
| 5. °F and °C                     | Identifies the temperature scale.   |
| 6. °/ MIN                        | Identifies the heat rate.   |
| 7. HH : MM                       | Indicates time. When flashing it indicates that a power failure has occurred.   |
| 8. Main Display                  | A. The 4 digit display indicates the chamber temperature.<br>B. When programming or reviewing, indicates (time to completion), HEAT RATE, TEMP and HOLD TIME.<br>C. Displays special words and error codes. |
| 9. Program Status Graph          | Indicates status of the burnout process.  |
| 10. Door Interlock Safety Switch | Shuts off electrical power from the heating plates when the furnace door is opened.   |

# KEY PARTS IDENTIFICATION AND EXPLANATION



**Figure 1**  
**PDQ DIGITAL IDENTIFICATION**

# KEY PARTS IDENTIFICATION AND EXPLANATION

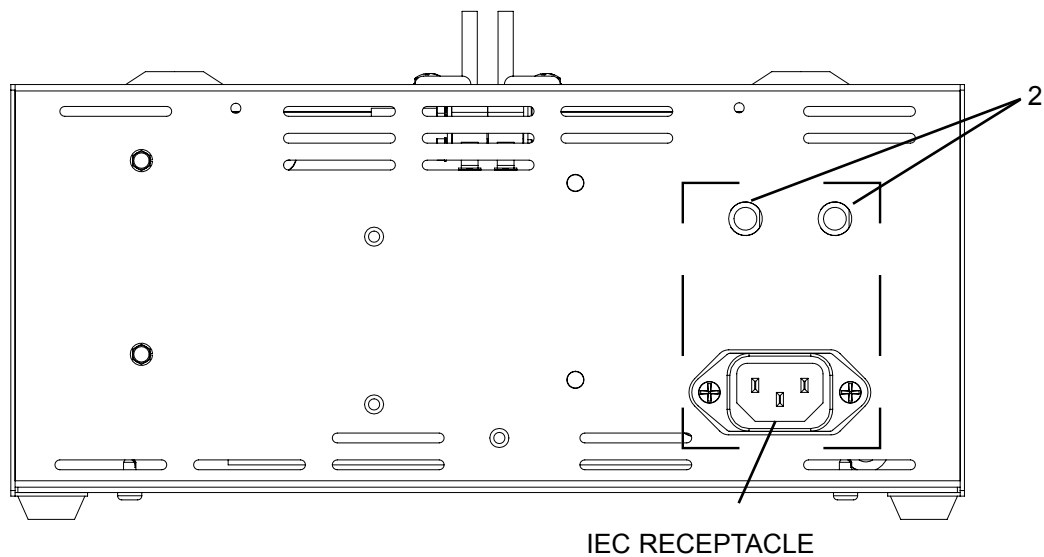
## LOWER BACK PANEL (Figure 2)

### DISPLAY

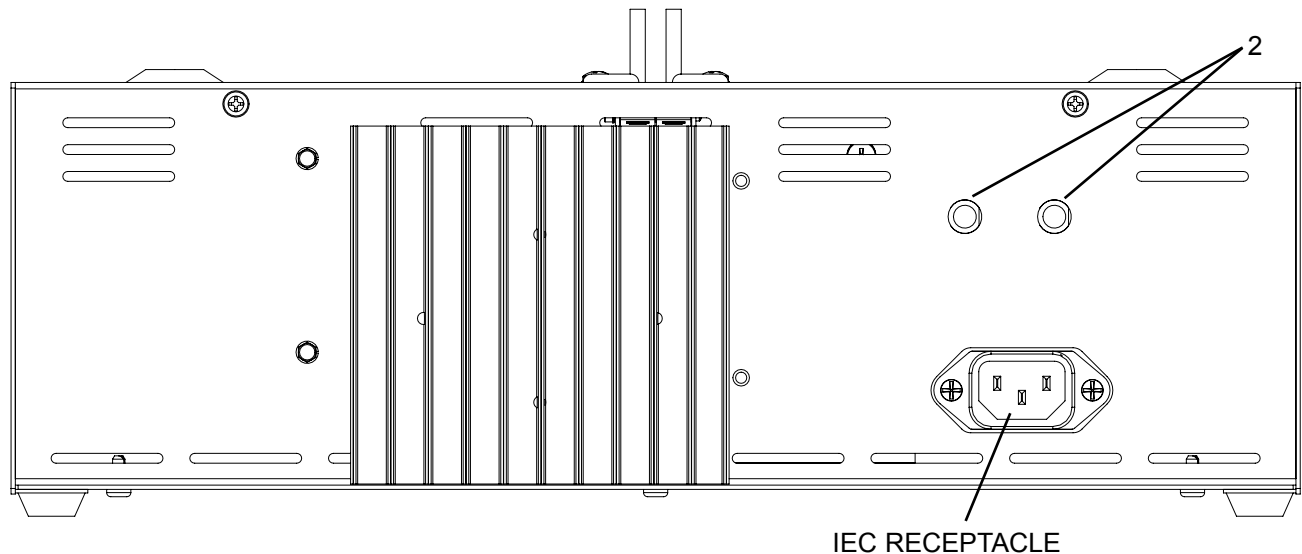
### DESCRIPTION

1. Power Cord  
AC power cords are provided to correspond to receptacles that are available in a specific country.
2. Circuit Breaker  
Protects circuitry from electrical overload.
  - Black button will “pop out” if overload is present.
  - To reset, wait one minute and push black button into body of circuit breaker.

**Figure 2**  
**PDQ-D LOWER BACK PANEL (MEDIUM)**



**PDQ-D LOWER BACK PANEL (LARGE)**



# INSTALLATION

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## UNPACK AND SET-UP

1. Unpack the contents of the box. Remove the following materials:
  - A. Vent Tube – Remove from bubble wrap and insert in hole on top of furnace.
  - B. Calibration Table Kit – Remove plastic bag containing two tablets and save for future use.
  - C. Burnout Tray – Remove tray(s) from bubble wrap and install on the floor of the chamber.
2. Place the furnace in position allowing a minimum of 10 inches (25.4 cm) of air space on all sides. Do not place the unit so as to block access to the power outlet.
3. Plug the power cord into a grounded AC electrical outlet. First connect the power cord located in the rear of the furnace. A dedicated circuit is required.
4. The furnace is now ready for operation.

## CAUTIONS:

**DO NOT BLOCK VENT HOLE ON TOP OF THE FURNACE. Hot gases are vented through this hole.**

## TO SET TEMPERATURE SCALE (Figure 1)

115V furnace is pre-set in degrees Fahrenheit.

230V furnace is pre-set in degrees Celsius.

1. Turn the power switch on. (If the furnace is already on, be sure it is in the idle mode – no program is running.) The chamber temperature appears on the Main Display and the °C or °F light goes on.
2. Press **↑↓** at the same time. The degree light switches to the opposite temperature scale.

## TO TURN THE “BEEP” ON AND OFF (Figure 1)

When a program is completed, 20 “beeps” sound every 15 minutes to remind the operator that the material is ready to cast.

1. Be sure the PDQ-D is in the idle mode – no program is running.
2. Press **↓** and (while holding) press START / STOP to display the status of the “beep.” “ON” indicates the beep is active. “OFF” indicates the beep is inactive.
3. Use either of the **↑↓** to turn the “beeps” on or off.
4. To return to the idle mode, wait 7 seconds or press START / STOP twice. (If START / STOP is pressed once, cycle starts.)

## VENTING INSTRUCTIONS

Vent fans must have a minimum capacity of 100 cubic feet per minute for each burn out furnace.

If a common hood is used for more than one burn out furnace, fan capacity must be 100 cubic feet per minute for each square foot of hood opening.







All hoods, vent pipe and ducting components must be constructed of non-combustible materials and be installed in accordance with local building codes.

Maximum expected exhaust temperature is 1800°F (980°C).

Maximum expected exhaust waste heat is 5,100 BTU’S / Hour or 1,500 Watts.





## **PROGRAM AND OPERATE** (Figure 1)

1. Turn the power switch on.
2. Press ENTER / REVIEW. HEAT RATE light turns on. Enter   to select the heat rate required from 1°F – 30°F / min (1°C – 17°C / min) or “FULL” for the maximum heat rate.
3. Press ENTER / REVIEW. STAGE 1 light remains on, HEAT RATE light turns off and TEMP light turns on. Enter   to select the temperature required up to the maximum of 2012°F (1100°C).
4. Press ENTER / REVIEW. TEMP light turns off and HOLD TIME light turns on. Enter   to program the time needed to hold at above temperature. (0 – 4hrs).
5. All necessary information for this program is now entered.
6. To run the program immediately, press START / STOP.

## **REVIEW A PROGRAM** (Figure 1)

1. Turn the power switch on.
2. Press ENTER / REVIEW. HEAT RATE light turns on. If 7 seconds has elapsed and the furnace temperature appears on the Main Display, press ENTER / REVIEW. When the HEAT RATE light is on, the programmed heat rate appears on the Main Display.
3. Press ENTER / REVIEW and the TEMP light turns on.
4. Press ENTER / REVIEW and the HOLD TIME light turns on. The programmed HOLD TIME appears on the Main Display in HH : MM.

## **EDIT WHILE A PROGRAM IS RUNNING** (Figure 1)

1. Any individual parameter can be increased or decreased during the actual running of the program.
2. To change a parameter while a program is running, press ENTER / REVIEW to advance to the desired parameter (i.e. TEMP or HOLD TIME). Initially, Heat Rate will appear. Any parameter can be increased or decreased by pressing  or .
3. Any program can be stopped or started by pressing the START / STOP button.

# OPERATION

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## SAMPLE PROGRAM

| <b>HEAT RATE</b> | <b>TEMP</b>    | <b>HOLD TIME</b> |
|------------------|----------------|------------------|
| 10°F (6°C)       | 1600°F (871°C) | 1:00             |

To start immediately, press START / STOP.

## ERROR CODES

**NOTE: "Beeps" occur when the Error Code appears on the Main Display**

| <b>ERROR CODE</b> | <b>DESCRIPTION</b>                              | <b>PROBABLE CAUSE</b>  |
|-------------------|---|--|
| Er-1              | OPEN THERMOCOUPLE                               | Occurs if the thermocouple is open or the connecting wire(s) are broken or disconnected from the terminal board.   |
| Er 2              | TABLET TEMPERATURE CALIBRATION ERROR            | Occurs when the temperature on the display is outside the allowable range at the time the user pressed the ENTER / REVIEW keys simultaneously to set the PDQ calibration temperature to 1500°F. If this occurs and is not an operator error, it indicates that there is a problem with the thermocouple or the PC board. Press ENTER / REVIEW to turn off the error indication and continue with the program. Press START / STOP to end the program. |
| Er 3              | ELECTRONICS MALFUNCTION                         | Occurs when PC board hardware malfunctions.  |
| Er 5              | REVERSED THERMOCOUPLE OR NO HEAT                | Occurs if the thermocouple extension wires have been connected backwards to the terminals on the printed circuit board. The error will be detected 5 minutes after heating program started. This error will also occur if the program is started and the chamber door is kept open for 5 minutes or the relay is defective, the heater plates are defective or there is a problem with the main PC board.  |
| Er 6              | SHORTED THERMOCOUPLE OR DEFECTIVE HEATER PLATES | Occurs if the thermocouple wires are shorted or the heater plates are defective causing Infinity to achieve a HEAT RATE of less than 6% of the maximum attainable HEAT RATE with full power applied to the heater plates for 5 minutes. This error will also occur if a program is running and the door is kept open for more than 5 minutes or the relay or the Main PC board developed a problem during a burnout process.                         |

# SERVICE

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## CLEANING INSTRUCTIONS

Clean exterior of furnace only by wiping unit with a damp cloth coated with a mild non abrasive cleaner.

**CAUTION: The PDQ-D should be serviced only by qualified service technicians. Be sure to unplug the power cord and wait for the furnace to cool before performing any service operation. For help with operating or servicing your Jelrus equipment, please call Whip Mix any time between 8:00am and 5:00pm Eastern time.**

Toll Free:           1-800-626-5651  
                          1-502-637-1451  
                          FAX 1-502-634-4512

## TEMPERATURE CALIBRATION

PDQ-D Burnout Furnaces come complete with temperature Calibration Tablets (2) which accurately melt at 1500°F (816°C). (Re-Order Calibration Tablet Kit – PN 15291).

Your PDQ-D is factory calibrated. It is not necessary to re-calibrate on installation. If it becomes necessary to re-calibrate in the future, use the following calibration procedure.

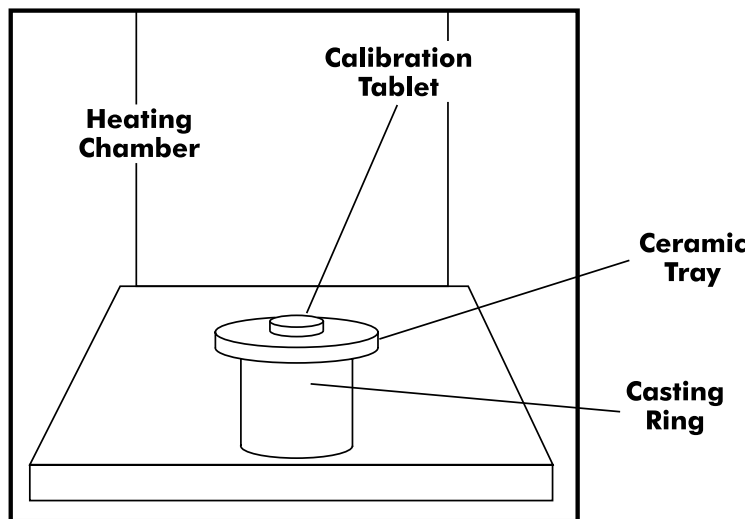
### Temperature Calibration with Calibration Tablets (Figure 3)

1. Place a short metal casting ring towards the front center of the chamber.
2. Place a ceramic tray or a small piece of casting ring lining material on top of the ring. Place a tablet in the center of the tray.
3. Program the PDQ-D as follows:

| HEAT RATE   | TEMP           | HOLD TIME |
|-------------|----------------|-----------|
| 25°F (14°C) | 1700°F (927°C) | 0:00      |

4. When the furnace temperature attains 1400°F (760°C) as indicated on the Main display, open the furnace door slightly and begin to check for the melting of the of the tablet. Continue to do this at each 25°F (14°C) interval, opening the furnace door just enough to determine at a quick glance if the tablet has begun to liquefy at the edges.

5. When the tablet begins to melt or liquefy at the edges, immediately press **↑** and hold. Then press ENTER / REVIEW. Your PDQ is now calibrated. Three “beeps” sound and “CAL” appears on the main display.



## POWER FAILURE

1. If a power failure occurs, the PDQ memorizes the conditions prior to the loss of power. When the power returns, the PDQ returns to the proper point in the program.
2. When power is returned, the HH : MM light flashes indicating that a power failure has occurred. It continues to flash until START / STOP is pressed.

**NOTE: The HH : MM light flashes if the power switch is turned off and on while a program is running and START / STOP was not pressed. It will not flash if the power switch was turned off or a power failure occurred when the PROGRAM READY light was on.**

## REPLACEMENT OF DOOR INSULATION AND SPRINGS

1. Open, locate and remove the two screws on the door closest to the door hinges which hold the retainer strip in place. Remove the retainer strip.
2. Remove the one piece door insulation by sliding it toward the rear of the furnace and slightly lifting.
3. To replace the springs, remove each spring from the hook which holds it in place. Remove both the hook and spring.
4. To reinstall the new door insulation or springs and hooks, reverse the above procedure. If installing springs and hooks, add grease to junction of spring and hook and spring and hinge junction.

# FIELD SERVICE

## REPLACEMENT OF HEATING PLATES

Turn off the power to the oven, unplug the power cord, remove trays from the muffle chamber and insure that the oven is cool.

Remove the upper back cover.

On the rear of the unit remove the nuts that hold the heater plate wires to the ceramic terminals. Remove all hardware and wires from the terminals. Discard any burnt hardware and replace with hardware pieces shipped with the heater plates. Retain hardware for later use. Straighten the wires for smoother removal of the plates.

Straighten thermocouple at the bend and remove bushings from heater plate wires.

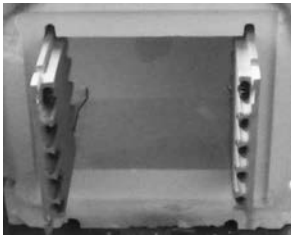
Move heater wires and thermocouple out of the upper housing to allow insulation to slide out the back of the unit.

From the front of the muffle chamber with the door open push the entire insulation chamber out the back of unit and place on a table.

Remove ceramic front plates from muffle insulation and place aside.

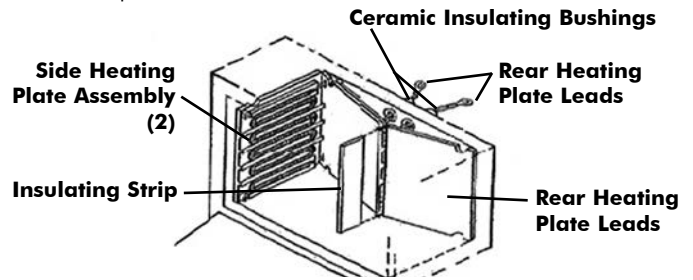


From here the plates can be removed by pulling them out the front of the insulation. The Large models have back plates and side plates, while the Medium model has only side plates.



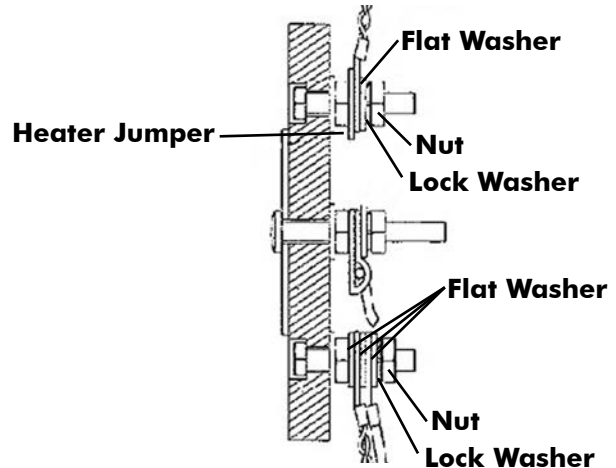
Place the new plates in the chamber, if back plates are being replaced as well they must be installed first, also insure that the wires are bent up so they will slide into the back.

If the back plates are being replaced the filler strip should be replaced as well. A new strip was shipped with the plates.



Once the plates are installed place the insulation chamber back inside the oven and wire the terminals according to the model and voltage in the pictures on the next page:

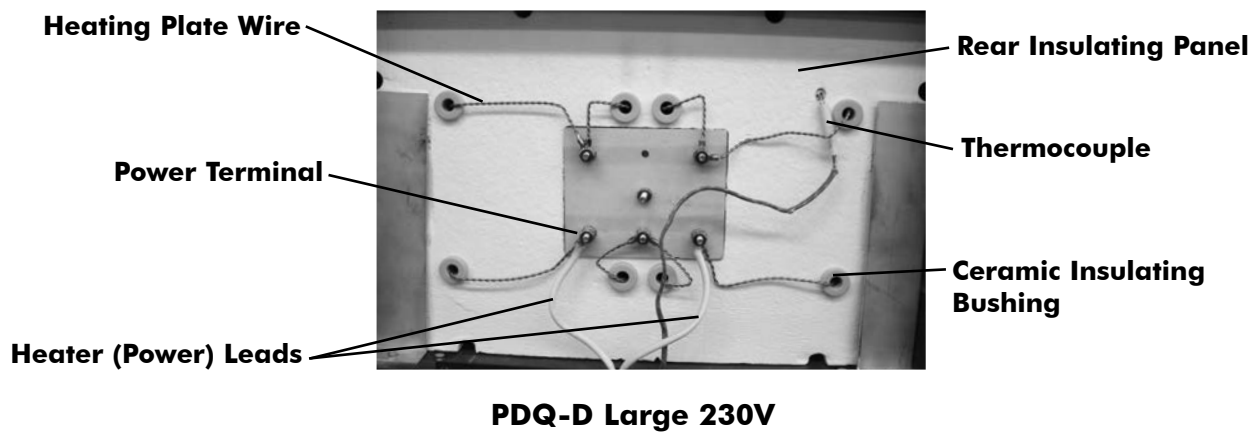
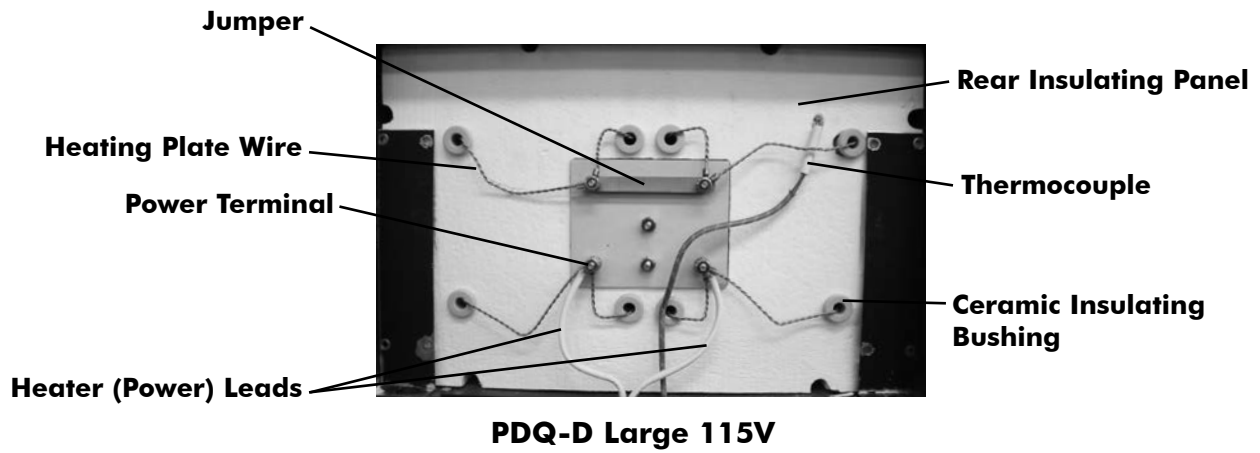
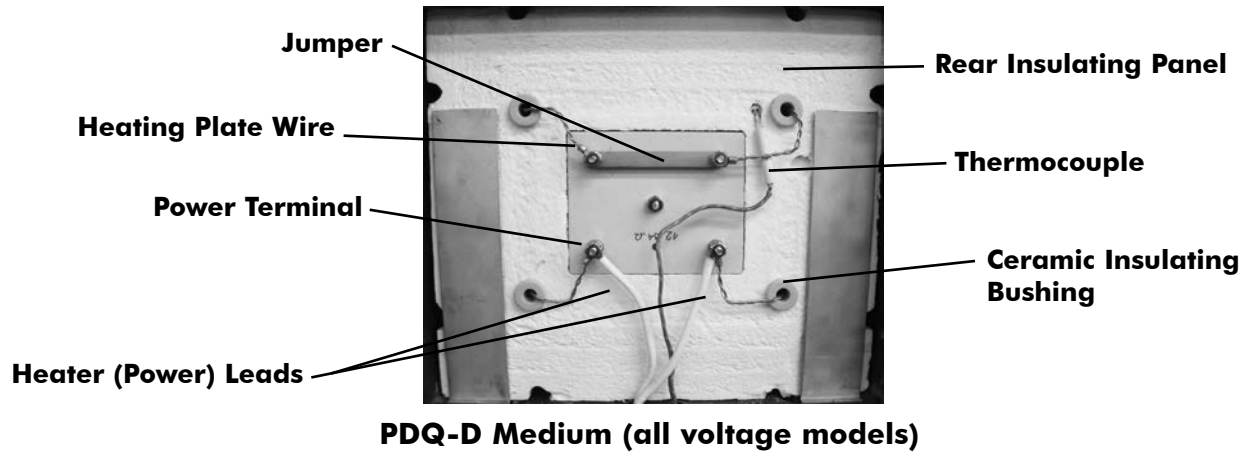
When wiring the plates insure that between each wire a flat washer is placed. See picture below.



**Note: Place flat washer between each wire.**

After the heater plates are wired, replace the upper back cover and bottom cover. Insure that the oven heats by running a program.

**Figure 4**  
**PDQ-D WITH UPPER REAR PANEL REMOVED**



# FIELD SERVICE

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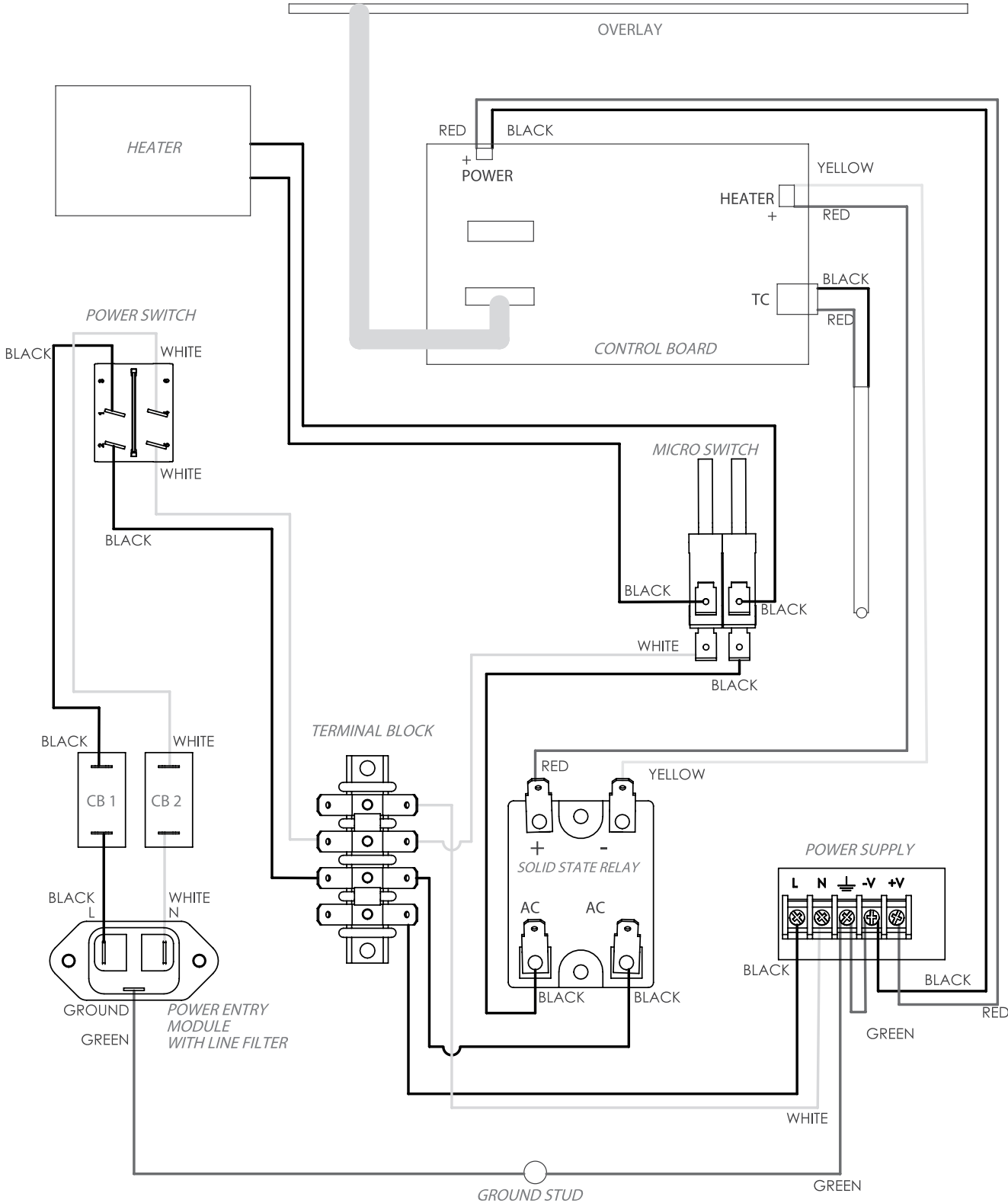
## REPLACEMENT OF THE MAIN PC BOARD

Part numbers can be found on last page(s) of Manual.

1. Remove the bottom panel.
2. **Note and record the color and location of each wire on the thermocouple terminals located on the Main PC Board.** Remove both wires.
3. **Tag or label the electrical connectors on the Main PC Board before removal so that you know where to reconnect each one. Create a sketch showing the locations and referencing the tag or labeling.** Pull straight out on the connector. **DO NOT PULL ON THE WIRES.**
4. Remove the nuts and lock washers that hold the Main PC Board to the front panel and lift straight away from the front panel to remove board.
5. Align the holes in the new board with the standoffs on the front panel, reinstall the fasteners and screws.
6. Reconnect the electrical connectors by referring to the tags and your sketch.
7. Reconnect the two thermocouple wires to the thermocouple terminals observing the color coding noted in Step 2. If thermocouple wires are reversed, 5 minutes after heating program is started, "Er 5" will appear on the Main Display.
8. Replace the bottom panel.



**Figure 5**  
**PDQ-D WIRING DIAGRAM**



# FIELD SERVICE

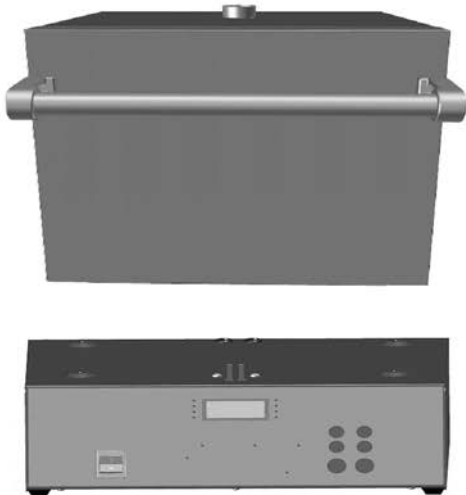
## REPLACEMENT INSTRUCTIONS: 15295 JELRUS THERMOCOUPLE

For assistance call 1-800-626-5651 or write to: tops@whipmix.com

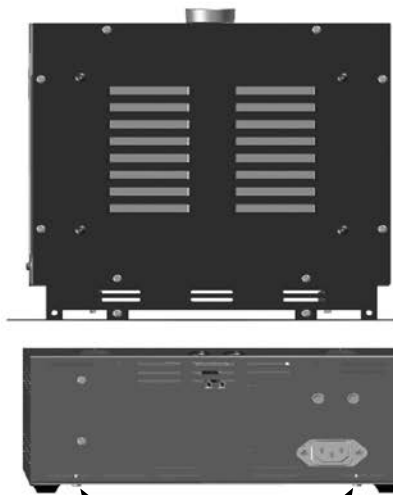
### CAUTION!

**TO PREVENT INJURY, ALWAYS TURN POWER OFF AND DISCONNECT THE OVEN'S POWER CORD BEFORE PERFORMING SERVICE. VERIFY THAT UNIT IS COOL TO THE TOUCH.**

Front View Large

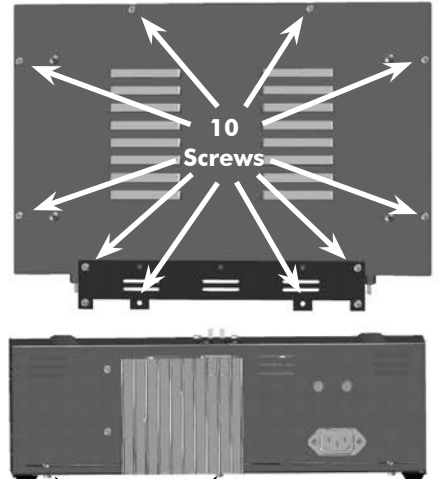


Rear View Medium



4 Screws Bottom Cover

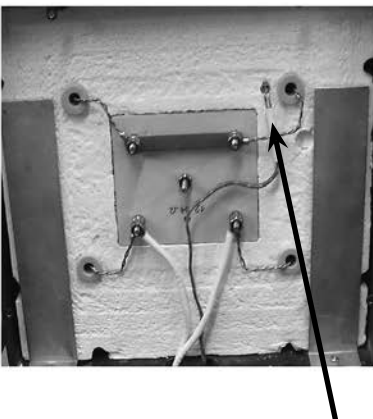
Rear View Large



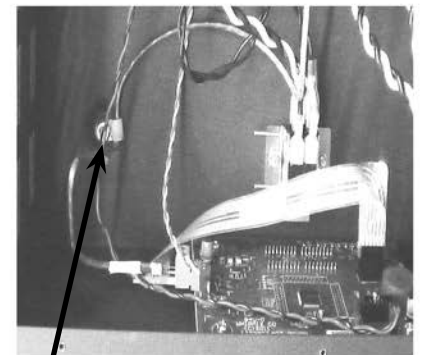
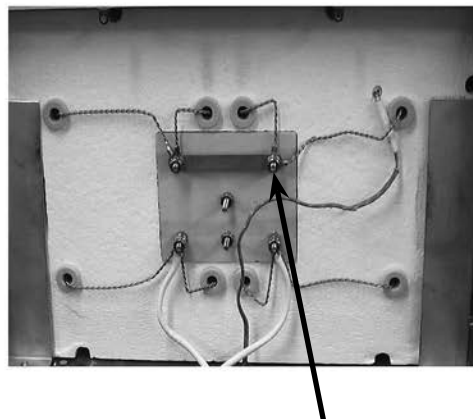
6 Screws Bottom Cover

Unplug oven, remove trays from inside, then lay oven on its side and remove screws from bottom and back covers.

Rear Back View Medium



Rear Back View Large



**Note: make sure to run thermocouple wire through loop to hold wire stable before pulling into upper housing.**

Disconnect heater wires to pull thermocouple out from the muffle, then through the grommet into lower housing. Disconnect thermocouple from the main board.

**Note: Thermocouple should be wired as shown above. Heater wire must rest over ceramic sheath not to come in contact with bare wire or fiber sleeve.**

## **REPLACEMENT OF THE SSR (Solid State Relay) (PN 96225)**

1. Remove the lower bottom panel (Figure 2, Page 7).
2. Note and record the color and location of each of the four wires on the SSR terminals (Figure 5, Page 17). Remove each of the four wires by pulling straight up on the connector. **DO NOT PULL ON THE WIRES.**
3. Remove the two nuts and screws that hold SSR in place. Lift SSR off the chassis (Figure 5, Page 17).
4. Put the new SSR in place on the rear panel. Locate the SSR so that the center terminal will face downward when the bottom panel is in place.
5. Replace the four wires on the SSR (Figure 5, Page 17).
6. Replace the lower bottom panel (Figure 2, Page 7).

# SPARE PARTS LIST

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## PARTS FOR PDQ-D Medium

| Description                                | Part No. |        |
|--|----------|--------|
|  | 115V     | 230V   |
| Power Cord Kit-Japan & U.S.                | 26202    | N/A    |
| Power Cord Kit-Europe                      | N/A      | 23203  |
| Power Cord Kit-UK                          | N/A      | 23202  |
| Power Cord Kit-Italy                       | N/A      | 23205  |
| NEW-Main PC Board                          | 15298    | 15299  |
| Heater Jumper                              | 33130    | 33130  |
| Ceramic Front Section                      | 15292    | 15292  |
| Door Assembly                              | 15284    | 15284  |
| Door Insulation                            | 15722    | 15722  |
| NEW-Heating Plate Assembly Side (Set of 2) | 33915    | 33916  |
| Ceramic Terminal Block w/Terminals         | 33935    | 33935  |
| Door Handle Kit                            | 15279    | 15279  |
| NEW-Thermocouple Assembly Kit              | 15295    | 15295  |
| NEW-Solid State Relay (SSR) 25 amp         | 96225    | 96225  |
| Tray for Heating Chamber                   | 33256    | 33256  |
| Power Switch                               | 15684    | 15684  |
| Calibration Table Kit 1500°F (816°C)       | 15291    | 15291  |
| NEW-Door Switch Kit                        | 15294    | 15294  |
| Vent Tube                                  | 15729    | 15729  |
| Ceramic Insulating Bushings (Pkg. of 4)    | 33958    | 33958  |
| NEW-Rubber Feet (Set of 4)                 | 96011    | 96011  |
| Door Spring Hook Assembly Kit              | 33997    | 33997  |
| Door Hinges (Set of 2)                     | 33998    | 33998  |
| Circuit Breaker                            | 117046   | 117047 |
| Heater wire assembly                       | 15312    | 15312  |

# SPARE PARTS LIST

## PARTS FOR PDQ-D Large

| Description                                | Part No. |        |
|--|----------|--------|
|  | 115V     | 230V   |
| Power Cord Kit-Japan & U.S.                | 26202    | N/A    |
| Power Cord Kit-Europe                      | N/A      | 23203  |
| Power Cord Kit-UK                          | N/A      | 23202  |
| Power Cord Kit-Italy                       | N/A      | 23205  |
| NEW-Main PC Board                          | 15300    | 15301  |
| Heater Jumper                              | 33130    | 33130  |
| Ceramic Front Section                      | 15293    | 15293  |
| Door Assembly                              | 15286    | 15286  |
| Door Insulation                            | 15712    | 15712  |
| NEW-Heating Plate Assembly Side (Set of 2) | 15297    | 27957  |
| NEW-Heating Plate Assembly Read (Set of 2) | 15296    | 27956  |
| Ceramic Terminal Block w/Terminals         | 33936    | 33936  |
| Floor Plate w/ Filler Strip Insulation Kit | 33981    | 33981  |
| Door Handle Kit                            | 15282    | 15282  |
| NEW-Thermocouple Assembly Kit              | 15295    | 15295  |
| NEW-Solid State Relay (SSR) 25 amp         | 96225    | 96225  |
| Tray for Heating Chamber                   | 33256    | 33256  |
| Power Switch                               | 15684    | 15684  |
| Calibration Table Kit 1500°F (816°C)       | 15291    | 15291  |
| NEW-Door Switch Kit                        | 15294    | 15294  |
| Vent Tube                                  | 15729    | 15729  |
| Ceramic Insulating Bushings (Pkg. of 4)    | 33958    | 33958  |
| NEW-Rubber Feet (Set of 4)                 | 96011    | 96011  |
| Door Spring Hook Assembly Kit              | 33997    | 33997  |
| Door Hinges (Set of 2)                     | 33998    | 33998  |
| Circuit Breaker                            | 117046   | 117047 |
| Heater wire assembly                       | 15312    | 15312  |

# NOTES

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