

P.D.Q.
Digital

Automatic Burnout Furnaces

OPERATOR'S MANUAL



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INTRODUCTION

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

This Jelrus equipment is warranted to be free from defects in material and workmanship from the date of installation for a period of twelve months (the muffle on our furnaces are warranted for 24 months).

Any item returned to our factory in Hicksville, New York, through an authorized dealer, will be repaired or replaced at our option at no charge provided that our inspection shall indicate it to have been defective. Dealer, labor, shipping and handling 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. Jelrus International 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.

ON-LINE WARRANTY REGISTRATION

Quickly and easily register your new Jelrus PDQ Automatic Burnout Furnace on-line. Just have your product model number and serial number available. Then go to the Jelrus website, www.jelrus.com, click the **warranty link** and complete the registration form. This on-line registration ensures a record for the warranty period and helps Jelrus keep you informed of product updates and other valuable information.

SAFETY INSTRUCTIONS

Use of the Infinity 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 Jelrus between 9:00 a.m. and 5:00 p.m. (EST) for service information.

SPECIFICATIONS

	PDQ-D M	PDQ-D L
Electrical	115V 60Hz 1150W	115V 60Hz 1610W
Capacity	8-1 3/4" rings or 2-3" rings	15-1 3/4" rings or 5-1 3/4" rings and 3-3" rings
Overall Dimensions	10-3/4"W x 13-7/8"D x 18-3/4"H (27.3cm x 35.2cm x 47.6cm)	14-1/2"W x 14-3/8"D x 18-3/4"H (36.8cm x 36.5cm x 47.6cm)
Heating Chamber Dimensions	5-1/2"W x 5-1/4"D x 5-1/8"H (14.0cm x 13.3cm x 13.0cm)	9-1/8"W x 5-1/4"D x 5-1/8"H (23.2cm x 13.3cm x 13.0cm)

HEAT RATE*	a) 1 - 30°F/min. (1 - 17°C/min.) 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

KEY PARTS IDENTIFICATION AND EXPLANATION

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. B. When programming or reviewing, indicates (time to completion), HEAT RATE, TEMP and HOLD TIME. 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

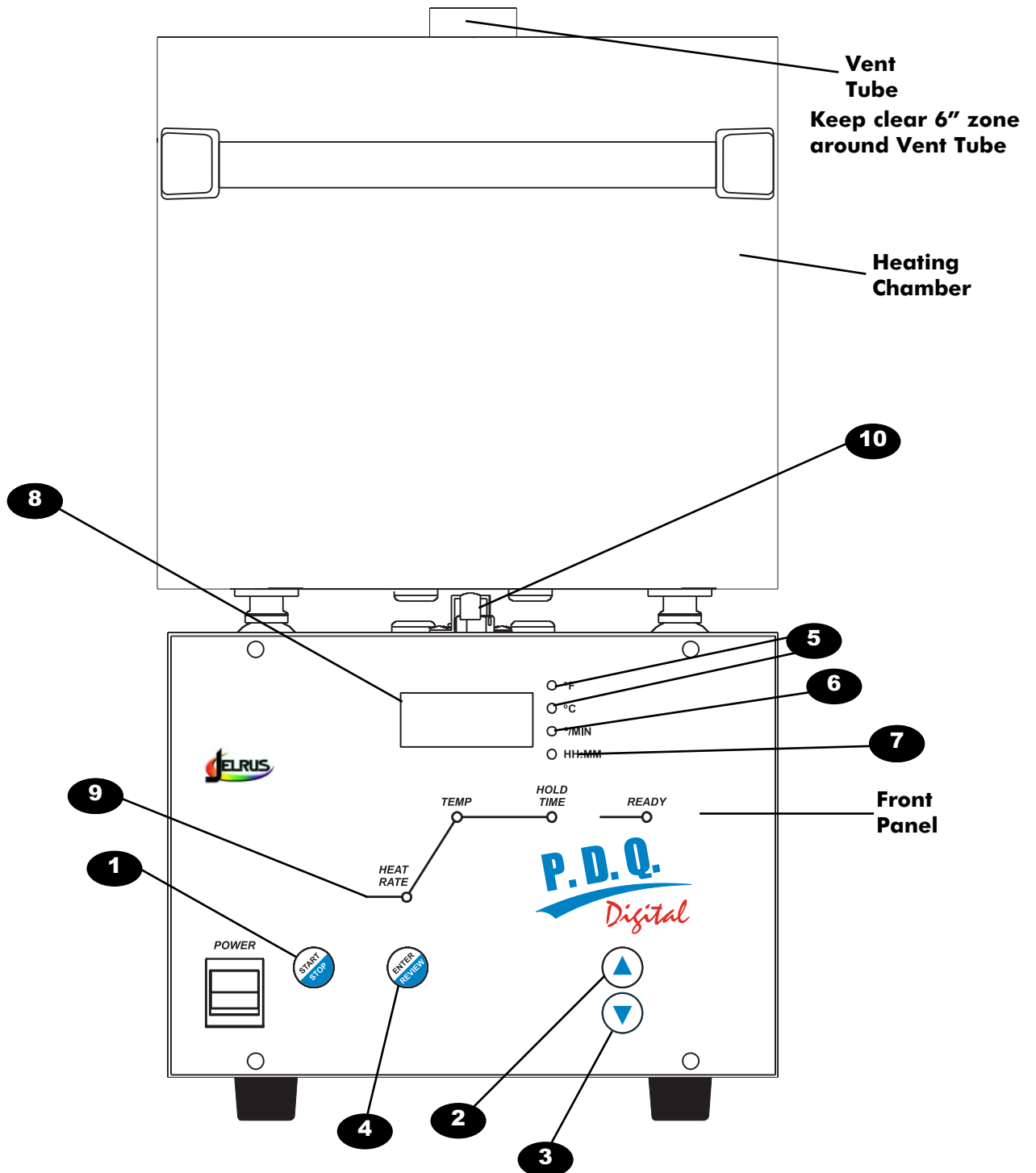


Figure 1
PDQ DIGITAL IDENTIFICATION

KEY PARTS IDENTIFICATION AND EXPLANATION

LOWER BACK PANEL (Figure 2)

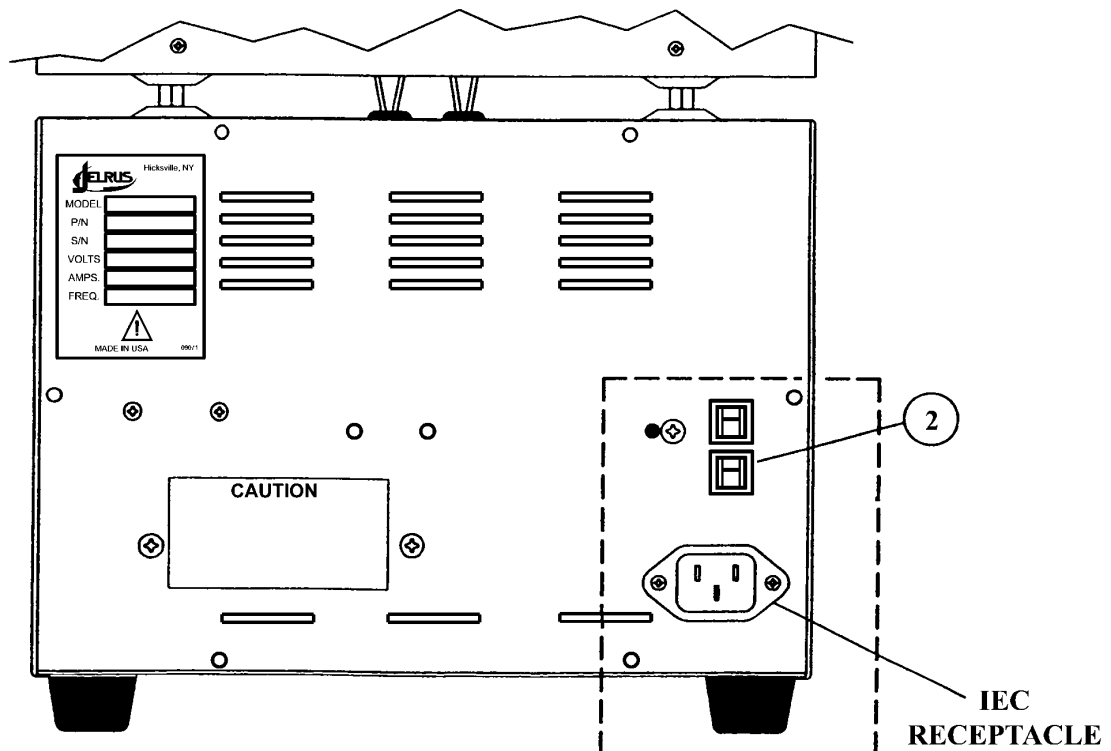
DISPLAY

1. Power Cord
2. Circuit Breaker

DESCRIPTION

- AC power cords are provided to correspond to receptacles that are available in a specific country.
- 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



INSTALLATION

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.
3. Plug the power cord into a wall receptacle. Connect the power cord to the IEC receptacle located on the rear of the furnace. A separate electrical circuit is recommended.
The voltage rating of your furnace is on the serial number plate.
For large furnaces a dedicated 20A, 115V circuit terminated with a NEMA 5-20 R type receptical is required.
For medium furnaces a dedicated 15A, 115V circuit terminated with a NEMA 5-15 R type receptical is the minimum requirement. A 20 AMP circuit is recommended.
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.

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 combustable 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 1,00 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. First the NIGHT TIME (DELAY START) light turns on and then the HEAT RATE light turns on. When the HEAT RATE light is on, the programmed heat rate appears on the Main Display.
3. Press ENTER / REVIEW and TEMP light turns on. The programmed temperature (TEMP appears on the Main Display).
4. Press ENTER / REVIEW and HOLD TIME light turns on. The programmed HOLD TIME appears on the Main Display in HR : MIN.

EDIT WHILE A PROGRAM IS RUNNING (Figure 1)

1. Any individual parameter can be increased or decreased during the actual running.
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

SAMPLE PROGRAM

HEAT RATE	TEMP	HOLD TIME
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

ERROR CODE	DESCRIPTION	PROBABLE CAUSE
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 Infinity 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 4	OPEN THERMOCOUPLE	Occurs if the thermocouple is open or the connecting wire(s) are broken or disconnected from the terminal board.
Er 7	THERMAL RUNAWAY	Occurs when the temperature has exceeded 2015°F (1102°C) for 1 minute if the highest temperature programmed was less than 2000°F (1093°C). This also occurs when the temperature has exceeded 2050°F (1121°C) for 1 minute if the highest temperature programmed was 2000°F (1093°C) or higher.

SERVICE

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 Jelrus any time between 9:00am and 5:00pm Eastern time.

Toll Free: 1-800-JELRUS-1
In New York: 1-516-942-0202
FAX 1-516-433-7684

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.

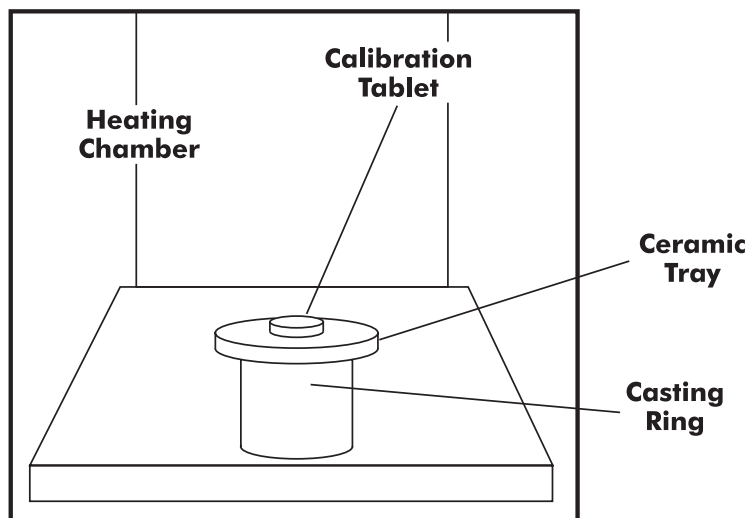
Temperature Calibration with Calibration Tablets (Figure 3)

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 liquify at the edges.

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



POWER FAILURE

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

NOTE: The HR:MIN 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

PDQ-D M PN 15722 Door Insulation

PDQ-D L PN 15712 Door Insulation

PDQ-D M and L30 PN 33997 Door Spring and Hook Assembly Kit

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

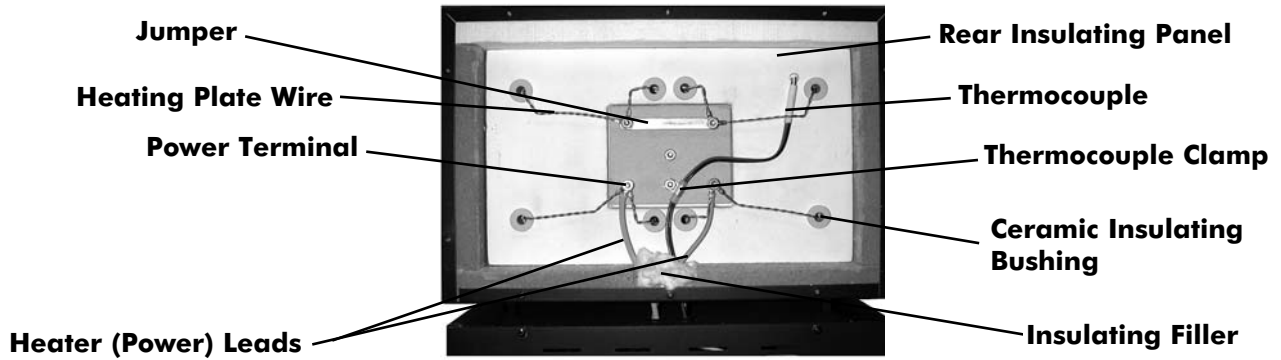
REPLACEMENT PART NUMBERS

M (Set of 2) L	115V 33915
Set of 2 Side Plates	33918
Set of 2 Rear Plates	33917

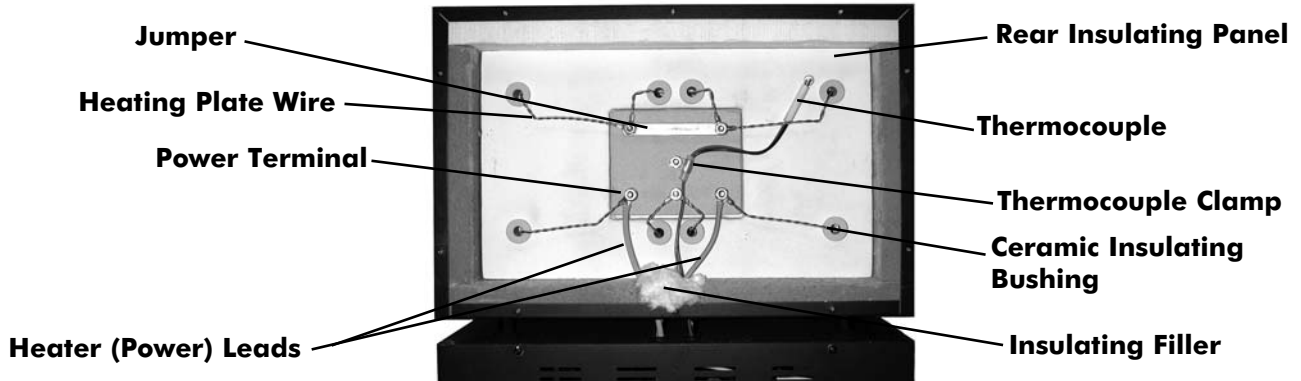
1. Remove the back panel of the furnace.
2. Remove the nuts which hold the heating plate wires to the power terminals and straighten the heating plate wires (Figure 4).
3. Open the furnace door and find the two ceramic sections at the front of the furnace chamber. Hold the furnace door partially open while removing the ceramic sections. They are not readily removed when the door is fully open. Remove the right-hand ceramic section by lifting it upward until the bottom of the section clears the sheet metal housing. Pull the bottom of the ceramic section out, then pull it down so the upper half clears the sheet metal housing. Remove the left-hand ceramic plate in the same way.
4. Remove the floor plate, then carefully slide the two side heating plates out the front of the furnace. The two rear heating plates on PDQ-D L may now be removed.
5. Check the condition of the filler strip insulation in the space to the left and right of the ceramic front sections. Replace if required*.
6. Check the condition of the floor plate which provides insulation and serves as a spacer between the bottom ends of the heating plates. Replace if required*.
7. To install the new heating plates reverse the procedure. Push the ceramic heating plates back into place on the rear insulating panel. When reconnecting the heating plate wires at the rear of the furnace, be sure to replace all hardware in its original position. (Figure 4.) Tighten all connections.

*Replacement Part: Floor Plate w/ Filler Strip Insulation
PDQ-D M: PN 33980; PDQ-D L: PN 33981

Figure 4
PDQ-D WITH UPPER REAR PANEL REMOVED



PDQ-D M



PDQ-D L

FIELD SERVICE

REPLACEMENT OF THE MAIN PC BOARD

REPLACEMENT PART NUMBERS

M	115V
L	15500-041
	15500-541

1. Remove the front panel (Figure 5).
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. Remove the calibration jack connector (J1) from the Main PC Board by pulling straight up.
4. Remove five electrical connectors (BLACK, ORANGE, YELLOW, WHITE, GREEN) from the Main PC Board by pulling straight up on the connector. DO NOT PULL ON THE WIRES.
5. Remove the nuts and lockwashers that hold the Main PC Board to the front panel and lift straight up to remove board.
6. Align the holes in the new board with the standoffs on the front panel, reinstall the fasteners and screws.
7. Reconnect the electrical connectors as follows:
Black wire to terminal marked "H." - E5.
Orange wire to terminal marked "GATE." - E4.
Yellow wire to terminal marked "LOAD." - E3.
White wire to terminal marked "N." - E2.
Green wire to ground terminal. - E1.
8. Reconnect calibration jack connector. The green wire on the connector is closest to the bottom edge of the front panel.
9. 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.
10. Replace the front panel.

Figure 5
PDQ-D WITH FRONT PANEL / MAIN PC BOARD REMOVED

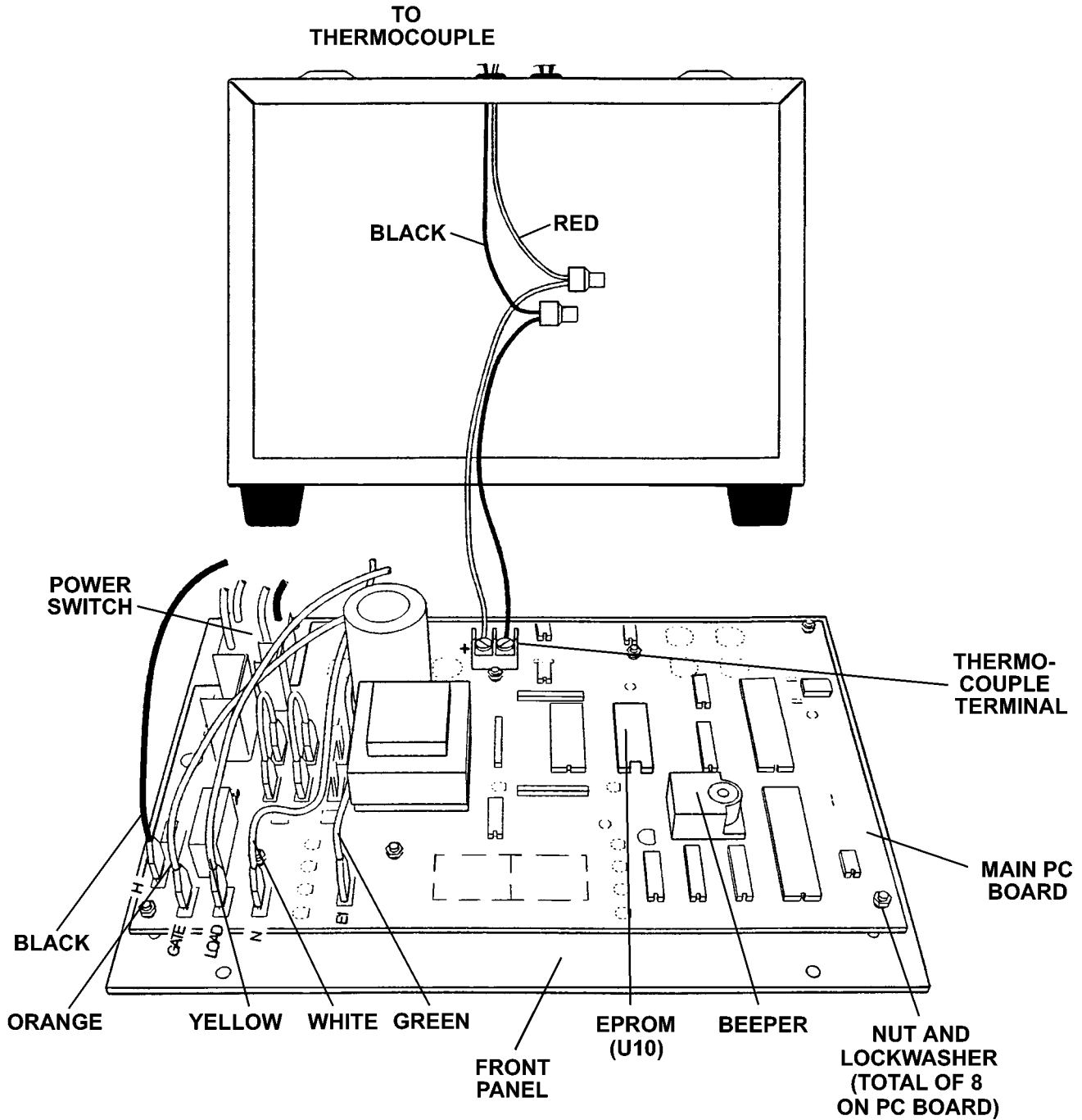
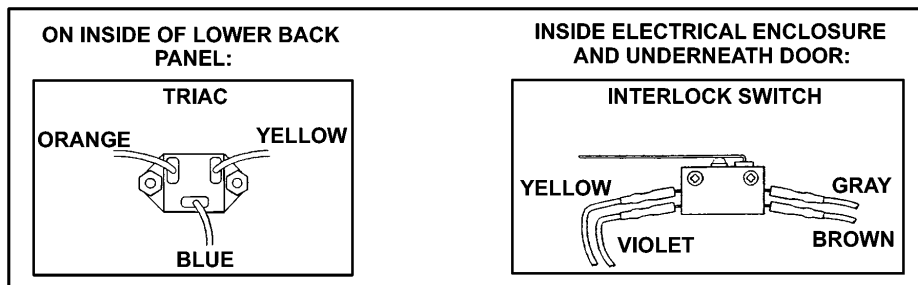


Figure 5A
OTHER COMPONENTS



FIELD SERVICE

REPLACEMENT OF THE THERMOCOUPLE ASSEMBLY (PN 18913)

1. Remove the bottom front panel and the upper and lower rear panels of the furnace. (Note the position of the vent louvers on the rear panels.)
2. Note and record the color and location of the wires on the thermocouple terminals located on the Main PC Board (Figure 5).
3. Remove the thermocouple wires from the thermocouple terminals on the Main PC Board (Figure 5).
4. Remove the clamp which secures the thermocouple to the ceramic terminal block located in the upper rear of the furnace (Figure 4).
5. Remove the heating plate wire which crosses over the thermocouple and bend it out of the way just enough to permit sliding the thermocouple out of the rear of the heating chamber (Figure 4).
6. Remove the insulating filler that covers the holes in the bottom of the upper section (Figure 4). Straighten the thermocouple wires where they were bent at a 90° angle.
7. Withdraw the thermocouple down into the lower rear of the furnace through the holes in the upper and lower sections. Discard thermocouple assembly.
8. Feed the new thermocouple from the lower rear of the furnace up through the holes in the upper and lower sections and into the upper rear of the furnace.
9. Bend the new thermocouple wires at a 90° angle approximately 3 - 3/8 inches (8.6cm) from the exposed tip of the thermocouple. Be sure that there are three ceramic insulating sleeves between the thermocouple tip and the bend. Insert the new thermocouple into the hole at the rear of the heating chamber.
10. Replace the heating plate wire that was removed in Step 3. Check that there is a ceramic insulating sleeve covering the thermocouple wires where they cross the heating plate wire. Replace the clamp that holds the thermocouple wires to the ceramic terminal block. Replace the insulating filler that covers the holes in the bottom of the upper section.
11. Connect the thermocouple wires to the thermocouple terminals on the Main PC Board. Observe the color coding you noted in Step 2.
12. Replace the front panel and the upper and lower rear panels. (Be sure the vent louvers on the rear panels protrude out and face down.)

REPLACEMENT OF THE TRIAC (PN 15475)

1. Remove the lower rear panel (Figure 2).
2. Note and record the color and location of each of the three wires on the triac terminals (Figure 5A). Remove each of the three wires by pulling straight up on the connector. **DO NOT PULL ON THE WIRES.**
3. Remove the two nuts and screws that hold triac in place. Lift triac off the rear panel (Figure 5A).
4. There is an insulating pad located between triac and panel. If it did not come off with the triac, remove it from the rear panel. Do not reuse. Wipe the rear panel to remove any grease-like materials.
5. Put the new insulating pad and then the new triac in place on the rear panel. Locate the triac so that the center terminal will face downward when the rear panel is in place.
6. Replace the three wires on the triac terminals (Figure 5A) observing the following color coding:
 - Yellow wire to upper right terminal.
 - Blue wire to center (lower) terminal.
 - Orange wire to upper left terminal.
7. Replace the lower rear panel (Figure 2).

SPARE PARTS LIST

PARTS FOR PDQ-D M

DESCRIPTION	115V
Power Cord Kit-Japan & U.S.	15288
Main PC Board	33610-1
Heater Jumper	33130
Ceramic Front Section	15292
Rear Insulating Panel w/ Block	33210
Door Assembly	15284
Door Insulation	15722
Heating Plates Assembly Side (Set of 2)	33915
Ceramic Terminal Block w/ Terminals	33935
Upper Rear Panel Kit	33955
Floor Plate w/ Filler Strip Insulation Kit	33980
Door Handle Kit	15279
Heating Chamber Insulation Kit	33982
Thermocouple Assembly Kit	18913
Triac Replacement Kit	15475
Tray for Heating Chamber	33256
Power Switch	15675
Calibration Tablet Kit 1500oF (816oC)	15291
Interlock Switch Kit	15275
Vent Tube	15729
Ceramic Insulating Bushings (Pkg. of 4)	33958
Mounting Feet (Set of 4)	15277
Door Spring Hook Assembly Kit	33997
Door Hinges (Set of 2)	33998
Terminal Block (Rear Panel)	117387
Circuit Breaker	117046
Heater (Power) Leads (Set of 2)	33975
Hinges (Set of 2)	33998
Terminal Block (Rear Panel)	117387

SPARE PARTS LIST

PARTS FOR PDQ-D L

DESCRIPTION	115V
Power Cord Kit-Japan & U.S.	15289
Main PC Board	33610-1
Heater Jumper	33130
Ceramic Front Section (Set of 2)	15293
Rear Insulating Panel w/ Block	33710
Door Assembly	15286
Door Insulation	15712
Heating Plate Assembly, Side (Set of 2)	33918
Heating Plate Assembly, Rear (Set of 2)	33917
Ceramic Terminal Block w/ Terminals	33936
Upper Rear Panel Kit	33956
Floor Plate w/ Filler Strip Insulation Kit	33981
Door Handle Kit	15282
Heating Chamber Insulation Kit	33983
Thermocouple Assembly Kit	18913
Triac Replacement Kit	15475
Tray for Heating Chamber	33256
Power Switch	S15684
Calibration Tablet Kit 1500oF (816oC)	15291
Interlock Switch Kit	15275
Vent Tube	15729
Ceramic Insulating Bushings (Pkg. of 4)	33958
Mounting Feet (Set of 4)	15277
Door Spring Hook Assembly Kit	33997
Door Hinges (Set of 2)	33998
Terminal Block (Rear Panel)	117387

NOTES



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