

Precision Premium Ovens

3050 Series

Operating Manual and Parts List LT2148X2 Rev. 1



| Models covered in this manual | | | |
|--------------------------------------|-------------|----------------|---------------------------|
| Models | Size | Voltage | Forced Air/Gravity |
| PR305040G (6947) - Small | 2.5 cu ft | 240V | Gravity |
| PR305040GCN (6948) - Small | 2.5 cu ft | 240V | Gravity |
| PR305040M (6949) - Small | 2.5 cu ft | 240V | Forced Air |
| PR305040MCN (6950) - Small | 2.5 cu ft | 240V | Forced Air |
| PR305045G (6951) - Small | 2.5 cu ft | 120V | Gravity |
| PR305045M (6952) - Small | 2.5 cu ft | 120V | Forced Air |
| PR305050G (6953) - Medium | 3.8 cu ft | 240V | Gravity |
| PR305050GCN (6954) - Medium | 3.8 cu ft | 240V | Gravity |
| PR305050M (6955) - Medium | 3.8 cu ft | 240V | Forced Air |
| PR305050MCN (6956) - Medium | 3.8 cu ft | 240V | Forced Air |
| PR305055G (6957) - Medium | 3.8 cu ft | 120V | Gravity |
| PR305055M (6958) - Medium | 3.8 cu ft | 120V | Forced Air |
| PR305060G (6959) - Large | 5 cu ft | 240V | Gravity |
| PR305060GCN (6960) - Large | 5 cu ft | 240V | Gravity |
| PR305060M (6961) - Large | 5 cu ft | 240V | Forced Air |
| PR305060MCN (6962) - Large | 5 cu ft | 240V | Forced Air |
| PR305065G (6963) - Large | 5 cu ft | 120V | Gravity |
| PR305065M (6964) - Large | 5 cu ft | 120V | Forced Air |

MANUAL NUMBER LT2148X2 (7006947)

| 1 | -- | 1/4/11 | Corrected typo page 4-1 (control temperature is being 'The 3050 Series The') to 'set' | ccs |
|------------|----------------|-------------|--|-----------|
| 0 | -- | 4/22/10 | Transfer to Marietta (was LT2148X2 2/8/10) | ccs |
| REV | ECR/ECN | DATE | DESCRIPTION | By |



Important Read this instruction manual. Failure to read, understand and follow the instructions in this manual may result in damage to the unit, injury to operating personnel, and poor equipment performance. ▲

Caution All internal adjustments and maintenance must be performed by qualified service personnel. ▲

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Equipment being maintained or serviced must be turned off and locked off to prevent possible injury.



Hot surface(s) present which may cause burns to unprotected skin, or to materials which may be damaged by elevated temperatures.



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Section 1 Introduction

Thermo Scientific Precision 3050 Series premium ovens are available in three sizes: small, medium and large. All ovens provide PID Microprocessor control at operating temperatures ranging from 50°C (122°F) to 275°C (527°F).

The forced air models provide improved temperature uniformity and control, as well as faster drying. In these models, fresh air enters through an air intake on the bottom of the oven, then is heated in a plenum below the chamber. A blower circulates the heated air into the wall plenums and the oven chamber itself in uniform flow patterns. Exhaust air is vented through a port at the top of the oven.

Gravity flow models inlet air through a port located under the oven floor. Heat generated convection then gently moves the air in a vertical circulation pattern. Exhaust air is vented through a port at the oven top.

Temperature readouts and control parameters are shown on red LEDs. Three additional LEDs indicate when heater power is being applied, an error condition is encountered, or the temperature is being set.

The small ovens accommodate a maximum of five shelves. The medium hold eight shelves, while the large each hold eleven.

Precision ovens incorporate a variety of safety features. A safety backup is built into the controller software: if the primary heater control fails, the backup will maintain control at 5°C above the set point. An alarm LED then indicates that the backup controller is operating the oven. A circuit breaker protects the oven from power surges. If primary backup heater controls fail, an independent Over Temperature Device will disengage heater operation.

The silicon rubber gasket supplied with the oven is good for continuous use up to 250°C and intermittent use to 275°C. This gasket provides a better seal than the high temperature gasket and is supplied with the unit. An optional high temperature braided gasket is available for customers using the oven frequently above 250°C.

The part numbers of the supplied and optional gasket are listed below:

| Oven | Silicon Rubber Gasket Part # (Supplied with Oven) | Braided Gasket Part # (High Temp Gasket Optional) |
|-----------------|--|--|
| Small - 40 & 45 | SPN 101908 | SPN 95782 |
| Medium 50 & 55 | SPN 101909 | SPN 95783 |
| Large - 60 & 65 | SPN 101910 | SPN 95784 |

Section 2 Specifications

Performance Characteristics

Operating Range50 to 275°

Average Uniformity @ 200°*

Forced Air Models±3°C

Gravity Models±4°C

Control Resolution1°C

Control Sensitivity±0.5°C

Recovery Time @ 200°C**

PR305045M, -40M & -40MCN1.0 minutes

PR305045G, -40G & -40GCN2.0 minutes

PR305055M, -50M & -50MCN2.0 minutes

PR305055G, -50G & -50GCN3.0 minutes

PR305065M, -60M & -50MCN2.5 minutes

PR305065G, -60G & -60GCN4.0 minutes

Rise Time to 275°C

PR305045M, -40M & -40MCN70 minutes

PR305045G, -40G & -40GCN40 minutes

PR305055M, -50M & -50MCN80 minutes

PR305055G, -50G & -50GCN80 minutes

PR305065M, -60M & -50MCN80 minutes

PR305065G, -60G & -60GCN100 minutes

Air Exchanges per Hour*

PR305045M, -40M & -40MCN43

PR305045G, -40G & -40GCN24

PR305055M, -50M & -50MCN29

PR305055G, -50G & -50GCN16

PR305065M, -60M & -50MCN22

PR305065G, -60G & -60GCN2

| BTU/hr Output |@100°C | @200°C |
|--------------------------|-------------|--------|
| PR305045M, -40M & -40MCN |1125 | 2750 |
| PR305045G, -40G & -40GCN |470 | 1325 |
| PR305055M, -50M & -50MCN |1325 | 2925 |
| PR305055G, -50G & -50GCN |1040 | 2025 |
| PR305065M, -60M & -50MCN |1325 | 3095 |
| PR305065G, -60G & -60GCN |1150 | 2040 |

**as per ASTM E145*

***door open one minute*

Electrical Requirements

Small - Forced Air

| | |
|-------------|-----------------------------------|
| PR305045M |120 V, 11.5A, 1380W, 60 Hz |
| PR305040M |240 V, 5.8A, 1392W, 50/60 Hz |
| PR305040MCN | ...240 V, 5.8A, 1392W, 50/60 Hz |

Small - Gravity

| | |
|-------------|----------------------------------|
| PR305045G |120 V, 11A, 1320W, 60Hz |
| PR305040G |240 V, 5.5A, 1320W, 50/60Hz |
| PR305040GCN | ...240 V, 5.5A, 1320W, 50/60Hz |

Medium - Forced Air

| | |
|-------------|-----------------------------------|
| PR305055M |120 V, 15.5A, 1860W, 60 Hz |
| PR305050M |240 V, 7.8A, 1870W, 50/60 Hz |
| PR305050MCN | ...240 V, 7.8A, 1870W, 50/60 Hz |

Medium - Gravity

| | |
|-------------|---------------------------------|
| PR305055G |120 V, 15A, 1800W, 60Hz |
| PR305050G |240 V 7.5A, 1800W, 50/60Hz |
| PR305050GCN | ...240 V 7.5A, 1800W, 50/60Hz |

Large - Forced Air

| | |
|-------------|-----------------------------------|
| PR305065M |120 V, 15.5A, 1860W, 60 Hz |
| PR305060M |240 V, 7.8A, 1872W, 50/60 Hz |
| PR305060MCN | ...240 V, 7.8A, 1872W, 50/60 Hz |

Electrical requirements (continued)

Large - gravity

PR305065G120 V, 15A, 1800W, 60Hz

PR305060G240 V, 7.5A, 1800W, 50/60Hz

PR305060GCN240 V, 7.5A, 1800W, 50/60Hz

Chamber Volumes

Small2.5 cu ft

Medium3.8 cu ft

Large5.0 cu ft

Chamber Dimensions (W x D x H)

Small 18 x 18 x 13.5 in

Medium 18 x 18 x 20 in

Large 18 x 18 x 26.5 in

Environmental Conditions

Operating: ...17°C to 27°C; 20% to 80% RH, non-condensing.

Installation Category II (overvoltage) in accordance with IEC 664.

Pollution Degree 2 in accordance with IEC 664.

Altitude Limit:2,000 meters.

Storage:-25°C to 65°C 10% to 85% RH

Section 3 Installation

The oven requires an area approximately 2 ft. x 2 ft. The bench selected must be capable of supporting at least 120 lbs. for the small ovens, 130 lbs. for medium ovens, or 135 lbs. for the large. Proper electrical power must be available. Locate the oven such that no extension cord is required. The oven shall have a 2" air clearance on all sides (6" if combustible materials) and a minimum of 24" air clearance on top to allow heat dissipation and prevent temperature build ups.

Warning Do not use top of oven as a shelf. ▲

Do not cover oven vent hole.

Keep combustible materials away from oven vent hole.

Warning Hot Surface Oven vent and exiting air are hot. Keep hands away.

Unpacking

Thermo Scientific Precision ovens are shipped in a single carton. After unpacking, locate each item shown in the list below. Report any missing items, by name and part number, to your Thermo distributor. In the event of shipping damage, retain the shipping material and file a claim with the final carrier.

Shelves

Small and medium units - one provided

Large units - two provided

Shelf Supports

Small and medium - two provided

Large - four provided

Note If the equipment is used in a manner not specified by the manufacturer, protection provided by the equipment may be impaired. ▲

Preparing the Oven

To prepare the oven for operation, perform the following procedures:

1. Install the shelf.
2. Make certain all packing material has been removed from oven chamber.
3. Connect the line cord to an appropriate electrical outlet.
4. The oven is now ready for operation. No preliminary adjustments or calibrations are required. Depending on the customer application and customer laboratory procedures an initial calibration may be done at this point. (See **Display Offsets**).

Power Switch

The 3050 Series ovens feature a front panel mounted power switch which is a combination; power switch and circuit breaker, eliminating the need for separate fusing. The circuit breaker will interrupt power in the event of an oven heater malfunction. Press the I (upper) half of the rocker-type power switch to turn the oven On. Press the 0 (lower) half to turn Off oven power. To reset the breaker, first place the switch in the Off position, then return it to the On position.

Caution See dataplate on oven for voltage, current and line frequency specifications. Check that the power requirements of the oven will not overload the circuit to which it will be connected. ▲

Section 4 Controls

The following sections briefly describe the locations and functions of various display fields and keypad controls. More detailed descriptions are provided, when required, in the operating sections of the manual.

Display

The 3050 Series controller features a bright, one-half inch LED numeric display which reads out the oven temperature. Three smaller LEDs indicate, respectively, an alarm condition, that power is being applied to the oven heaters or that the control temperature is being set. Each display field is discussed separately below.

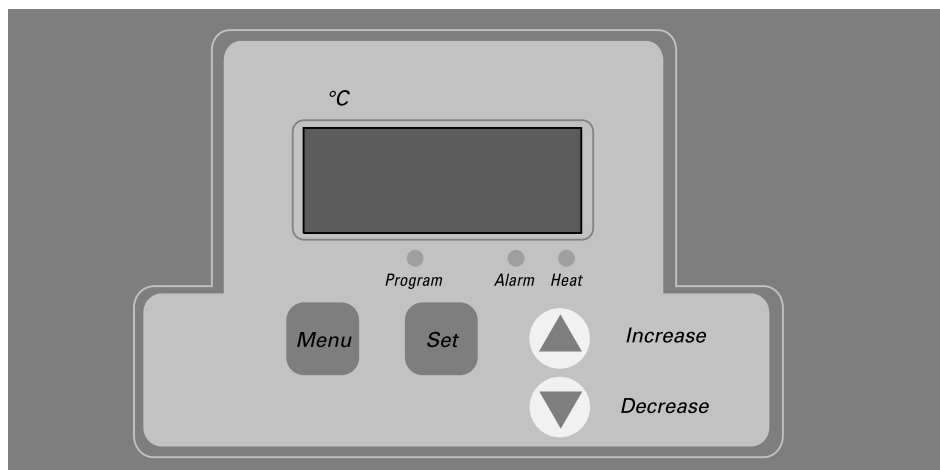


Figure 4-1. Display Fields

Temperature Display

In the normal operating mode, shows the current oven temperature.
During programming, indicates the oven set temperature target.

Heat Indicator

Lights when power is being supplied to the oven heater.

Alarm Indicator

Lights if the actual oven temperature exceeds the alarm temperature. The alarm temperature is factory-adjusted to be 5°C above the set temperature.

Program Indicator

Lights when the control temperature is being set.

Keypad

The 3050 Series incorporates a four-key, tactile keypad. Refer to Figure 4-1 on the previous page. The function of each key is discussed individually below.

- Pressing MENU while holding down the SET key decreases the oven set temperature, as indicated on the temperature display.
- Pressing INCREASE arrow while holding down the SET key increases the oven set temperature, as indicated on the temperature display.
- Pressing DECREASE arrow while holding down the SET key decreases the oven set temperature, as indicated on the temperature display.
- Pressing SET causes the display to show the set temperature. Used with INCREASE and DECREASE arrows to change the set temperature. With MENU to access entry of a temperature display offset.

Section 5 Operation

The 3050 Series ovens maintain a set temperature until that set temperature is changed. To set a temperature, perform the following:

1. Place the power switch in the ON position. All 8s will flash as a test of the display.
2. Press and hold the SET.
3. Observe the set temperature in the display window.
4. To decrease the set temperature, press DECREASE while holding SET.
5. To increase the set temperature, press INCREASE while holding SET.
6. When the desired set temperature is shown, release the INCREASE or DECREASE keys. Finally, release the SET key. The oven automatically begins to control at the set temperature.

Note To rapidly increase or decrease the set temperature, press and hold the appropriate arrow key. To slowly increment or decrement the set temperature one degree at a time, press and immediately release the arrow key. ▲

Safety Precautions

- This unit is not explosion proof. Do not use in the presence of flammable or combustible materials; Fire or explosion may result. Unit contains components that may ignite such materials. Before operating ovens, always observe the following safety precautions:
- Fumes and spillage from acidic solutions cause corrosion of the stainless steel chamber. Care should be taken to maintain a neutral PH at all times.
- The heater for the unit is in the bottom of the unit. Surface temperatures at the bottom cover of the unit may be higher than set point temperature. For example: A plastic container on the heater cover may become hot enough to melt/burn the container at settings below the melting point of plastic. Do not place items on the heater cover.
- Wear insulated gloves.
- Use tongs.
- Never stand in front of an open oven.
- Use safety goggles.

Limit Alarms

The 3050 Series controllers feature a deviation alarm which alerts the operator and interrupts heater power whenever the actual oven temperature differs from the set temperature by more than 5°C. The set limit is built in to the controller and cannot be changed.

- If the actual temperature exceeds the alarm limit, the alarm indicator LED will light and the display will indicate EEE.
- The reference point for the alarm is the set temperature. Any change in the set temperature will cause a corresponding shift in the alarm temperature.

Example: If the set temperature is 150°C, the alarm will trip at 155°C. If the set temperature is changed to 200°C, the alarm will follow the set temperature and trip at 205°C.

- Changing the set temperature to a value more than 5°C below the present oven temperature will trip the alarm. Power is removed from the heaters when an alarm condition occurs.

Example: First experiment samples were being soaked at 160°C. Experiment completed and oven reset to 140°C. The oven immediately goes in to alarm once the set point is reset to 140 from 160. The oven will stay in alarm until the oven temperature cools down to 144.9° (140,+5, -0.1).

Display Offsets

The 3050 Series controllers permit the operator to select a display offset temperature. With a display offset entered, the temperature displayed will be the actual oven temperature (measured at the control thermocouple) plus or minus the display offset selected. Functionally, the offset feature permits the operator to measure and calibrate such that the display will indicate the temperature at a specific point or zone within the oven. To enter a display offset, carry out the following steps:

1. Press the MENU, the display will indicate CAL
2. To view the present offset value, press and hold the SET key.
3. To change the display offset, press and hold the SET key. Press INCREASE or DECREASE until the display indicates the desired offset.
4. Release the SET key.
5. Press MENU once to return to normal temperature control.

Display Offsets (continued)

Examples:

1. The displayed temperature is the result of algebraically adding the actual temperature to the offset value. Thus, if an offset of -3° is being used, a measured temperature of 50° will be displayed as 47° .
2. A test is to be performed at 150°C in the center of the oven and temperature is critical. Place a thermometer or thermocouple (calibrated) at the critical point and set the oven to 150°C and allow the oven to stabilize. The calibrated thermometer reads 151°C . A display offset of 1 is entered. The immediate display reads 151. The oven cools to 150°C , the display reads 150 and the calibrated thermometer reads 150.

Section 6 Service

The following sections describe procedures for servicing the 3050 Series ovens. The first procedure, Replacing the Door Gasket, may be performed by most users. However, all other service procedures involve potential exposure to line voltage. These procedures should be undertaken only by qualified service personnel. The second section, Accessing the Electronics Compartment, describes procedures required for subsequent service sections and is referenced by these later sections when required.

In the event service is required beyond that available by the customer, or for warranty service, contact Technical Services.

Caution Service procedures requiring access to the electronics compartment involve exposure to line voltage and should be performed only by qualified service personnel. Disconnect oven from power source before attempting repairs. ▲

Caution Only factory authorized components should be used for all repairs. Failure to use factory authorized replacement components will void warranty and could result in unit malfunction and or hazardous operating conditions. ▲

Caution Allow oven to cool to ambient temperature before attempting repair.

Replacing the Door Gasket

The Precision 3050 Series ovens incorporate a durable, silicone door gasket to minimize heat loss. Should the gasket become defective or be damaged, it may be replaced by following the procedures below.

1. Set the power switch to off position and open chamber door.
2. Open door fully. Carefully remove and retain hardware from door hinges (case side). Lay door on a flat surface with the handle over the edge.
3. Note the joint position of the old gasket. This is where the new gasket installation will start.

Note Study the method of door gasket attachment before starting disassembly. Understanding will avoid confusion later in this process. ▲

4. Bend back the old door gasket and remove the Phillips head screws attaching the gasket.
5. Remove the old door gasket.
6. Loosely install two screws through the stainless steel liner and into the door wrap to align these pieces.
7. Begin installing the replacement gasket at the joint position of the old gasket. Stretch the replacement gasket around the corners of the liner to avoid bunching up of the gasket material.
8. Install a Phillips head screw as the gasket rounds each corner to keep the gasket properly stretched. (The screw goes through the liner, pierces the gasket and threads into the door wrap.)
9. After all four corners are secured, install the remainder of the Phillips head screws. Make sure there is no gap at the gasket joint; stretch the gasket slightly if necessary.
10. Reinstall the door onto the case with hinges.

Replacing the Door Handle

To replace a defective door handle, perform the steps below:

1. Remove the two mounting screws holding latch cover in place.
2. Remove the two mounting screws holding defective handle in place.
3. Mount the replacement handle using two screws.
4. Adjust bottom nut (13/16) from end of shaft.
5. Secure latch cover in place with two screws.

Adjusting the Door Cam

Due to handling in shipment or to heat distortion with use, the door cam may require adjustment. To facilitate proper closing and sealing of door, Steps 1 through 6 may have to be performed more than once.

To adjust the door cam, perform the following:

1. Open door and remove screws holding latch cover in place.
2. Locate nuts securing tongue on cam shaft.
3. Loosen but do not remove outside nut.
4. Adjust inside nut, one full turn clockwise draws door 1/16" closer to cabinet when door is closed.
5. Secure cam tongue in place by tightening outside nut.
6. Secure latch cover in place with two screws.

Accessing Electronics Compartment

To access the electronics compartment, proceed as follows (refer to Figure 6-1):

1. Disconnect power cord from the electrical outlet.
2. Open the chamber door. Carefully remove and retain hardware from door hinges (case side). Set door aside.
3. Slide the oven forward until the front of the bezel (control panel) is at least three inches from the edge of the bench top (or the oven feet are at the edge of the bench).
4. Prop up the oven front by placing a shim under each front foot. Use shims between 1½ and 2 inches in thickness.
5. Remove the screws securing bezel from bottom of oven.
6. Slide the oven back on the table plus a few inches (to set the bezel on the bench) and rotate the bottom of the bezel out from the oven. The top clips will come loose but the wiring will still be connected.
7. Carefully set the bezel on the bench.

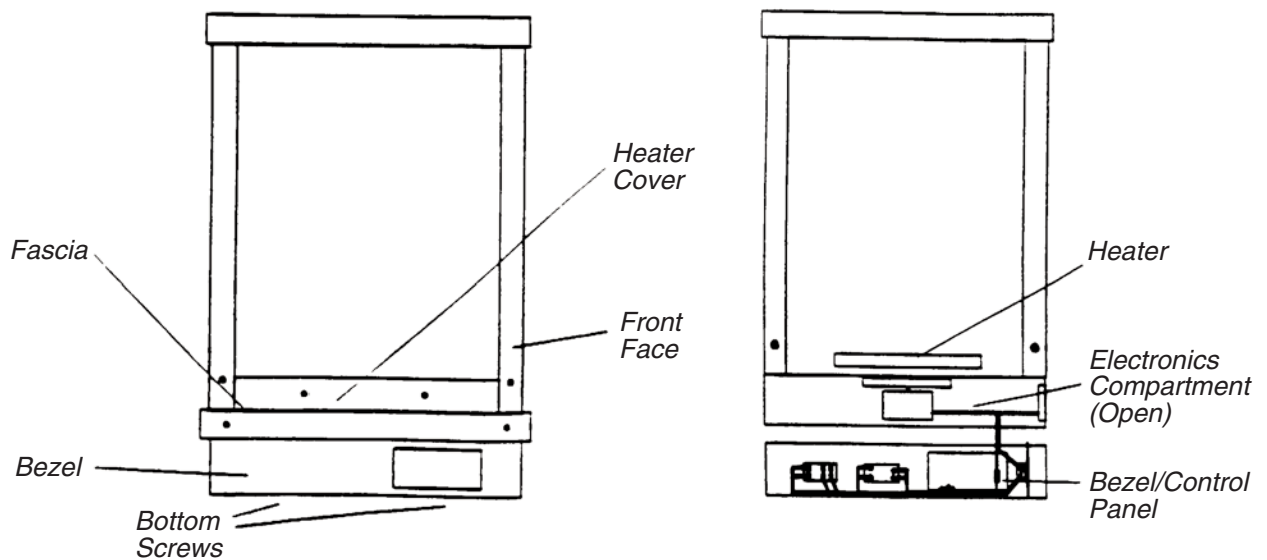


Figure 6-1. Component Locations

Replacing the Heater

To replace a defective heater, proceed as follows.

1. Disconnect power cord from the electrical outlet.
2. Remove the two screws that secure the heater cover. Remove the cover by lifting and sliding it forward. It may be necessary to use a flat-blade screwdriver to assist in lifting the cover upward. Set heater cover aside.
3. Remove the two nuts and shake-proof washers securing the heater leads, then pull the lead terminals off the heater studs.
4. Remove the two screws securing heater to cabinet. Slide heater forward to disengage back heater clips, lift back of heater up, then slide heater back and lift out.
5. Install replacement heater and reassemble oven by generally reversing the steps above.

Replace a Cooling Fan

To replace a defective cooling fan, proceed as follows.

Note When installing the replacement fan, make certain the airflow arrow molded into the fan housing points **into** the oven chassis. ▲

1. Disconnect power cord from the electrical outlet.
2. Open the chamber door. Carefully remove and retain hardware from door hinges (case side). Set door aside.
3. Slide the oven forward until the front of the bezel (control panel) is at least three inches from the edge of the bench top (or the oven feet are at the edge of the bench).
4. Prop up the oven front by placing a shim under each front foot. Use shims between 1½ and 2 inches in thickness.
5. Remove the screws securing bezel from bottom of oven.
6. Slide the oven back on the table plus a few inches (to set the bezel on the bench) and rotate the bottom of the bezel out from the oven. The top clips will come loose but the wiring will still be connected.
7. Carefully set the bezel on the bench.

Replacing the Cooling Fan (continued)

8. Remove the two fan power wires from push-on terminals located on fan housing.
9. Remove the three mounting screws holding the fan in place.
10. Install replacement fan and reassemble oven by generally reversing the steps above.

Replacing the Circulating Fan Motor

To replace a defective circulating fan motor, proceed as follows:

Warning Sheet metal in this area is sharp. Work carefully. ▲

1. Disconnect power cord from the electrical outlet.
2. Open the chamber door. Carefully remove and retain hardware from door hinges (case side). Set door aside.
3. Slide the oven forward until the front of the bezel (control panel) is at least three inches from the edge of the bench top (or the oven feet are at the edge of the bench).
4. Prop up the oven front by placing a shim under each front foot. Use shims between 1½ and 2 inches in thickness.
5. Remove the screws securing bezel from bottom of oven.
6. Slide the oven back on the table plus a few inches (to set the bezel on the bench) and rotate the bottom of the bezel out from the oven. The top clips will come loose but the wiring will still be connected.
7. Carefully set the bezel on the bench.
8. Remove the two screws that secure the heater cover. Remove the cover by lifting and sliding it forward. It may be necessary to use a flat-blade screwdriver to assist in lifting the cover upward. Set heater cover aside.
9. Using an Allen wrench, loosen set-screw holding the fan blade onto the motor shaft. Observe the shaft has a flat side to prevent the set-screw from turning on the shaft.
10. Locate the two electrical leads from the fan motor. Remove the leads from the push-on terminal strip located in the front of the oven bezel.
11. Lay the oven on its back with the oven bottom facing forward.

Replacing Circulating Fan Motor (cont.)

12. Detach the controller housing (oven bottom) by removing the eight screws which fasten it to the cabinet. Two screws are located on each side of the oven and four on the bottom of the oven.
13. Locate the two access holes for the motor mounting nuts located in the oven floor, in front of and in back of the motor shaft.
14. Push an 11/32-in nut driver through the front access hole, gently pushing aside the oven insulation until the nut driver reaches the front motor mounting nut.
15. Remove front nut and washer, then repeat process using back access hole to remove back motor mounting nut and washer.
16. Remove the fan motor by sliding it out.
17. Install replacement fan motor by generally reversing the steps above.

Replacing the Controller

To replace a defective controller, proceed as follows:

1. Disconnect power cord from the electrical outlet.
2. Open the chamber door. Carefully remove and retain hardware from door hinges (case side). Set door aside.
3. Slide the oven forward until the front of the bezel (control panel) is at least three inches from the edge of the bench top (or the oven feet are at the edge of the bench).
4. Prop up the oven front by placing a shim under each front foot. Use shims between 1½ and 2 inches in thickness.
5. Remove the screws securing bezel from bottom of oven.
6. Slide the oven back on the table plus a few inches (to set the bezel on the bench) and rotate the bottom of the bezel out from the oven. The top clips will come loose but the wiring will still be connected.
7. Carefully set the bezel on the bench.
8. Locate terminal blocks on controller, remove all wires connected to controller. Note color and location of wires.
9. Remove four screws that hold controller to bezel, then remove old controller.
10. Install new replacement controller and reattach wires previously removed.

Replacing the Controller (continued)

11. Check wiring connections against schematic, making sure that the line power wire is attached to the proper terminal, i.e., 120V or 240V.
12. Check switch DS1 setting: If forced air, set switch A to ON, otherwise; set to OFF for gravity. Switch B should always be OFF.

Replacing the Solid State Relay

To replace a defective solid state relay, proceed as follows:

1. Disconnect power cord from the electrical outlet.
2. Open the chamber door. Carefully remove and retain hardware from door hinges (case side). Set door aside.
3. Slide the oven forward until the front of the bezel (control panel) is at least three inches from the edge of the bench top (or the oven feet are at the edge of the bench).
4. Prop up the oven front by placing a shim under each front foot. Use shims between 1½ and 2 inches in thickness.
5. Remove the screws securing bezel from bottom of oven.
6. Slide the oven back on the table plus a few inches (to set the bezel on the bench) and rotate the bottom of the bezel out from the oven. The top clips will come loose but the wiring will still be connected.
7. Carefully set the bezel on the bench.
8. Consult the schematic and locate the solid state relay (mounted on bezel).
9. Remove four lead wires from their screw-down terminals.
10. Remove two Phillips screws which mount the solid state relay to the bezel.
11. Lift out the solid state relay. Put new solid state relay in place, making certain that the thin, conductive pad remains between the solid state relay and the bezel.
12. Generally reverse the steps above to re-assemble oven.

Replacing the Safety Relay

To replace a defective safety relay, proceed as follows:

1. Disconnect power cord from the electrical outlet.
2. Open the chamber door. Carefully remove and retain hardware from door hinges (case side). Set door aside.
3. Slide the oven forward until the front of the bezel (control panel) is at least three inches from the edge of the bench top (or the oven feet are at the edge of the bench).
4. Prop up the oven front by placing a shim under each front foot. Use shims between 1½ and 2 inches in thickness.
5. Remove the screws securing bezel from bottom of oven.
6. Slide the oven back on the table plus a few inches (to set the bezel on the bench) and rotate the bottom of the bezel out from the oven. The top clips will come loose but the wiring will still be connected.
7. Carefully set the bezel on the bench.
8. Consult the schematic and locate the safety relay (mounted on bezel).
9. Remove four lead wires from their push-on terminals.
10. Remove two Phillips screws which mount the safety relay to the bezel.
11. Lift out the safety relay.
12. Generally reverse the steps above to install the replacement safety relay and re-assemble oven.

Replacing the Control Thermocouple

To replace a defective control thermocouple, proceed as follows:

1. Disconnect power cord from the electrical outlet.
2. Open the chamber door. Carefully remove and retain hardware from door hinges (case side). Set door aside.
3. Slide the oven forward until the front of the bezel (control panel) is at least three inches from the edge of the bench top (or the oven feet are at the edge of the bench).
4. Prop up the oven front by placing a shim under each front foot. Use shims between 1½ and 2 inches in thickness.
5. Remove the screws securing bezel from bottom of oven.
6. Slide the oven back on the table plus a few inches (to set the bezel on the bench) and rotate the bottom of the bezel out from the oven. The top clips will come loose but the wiring will still be connected.
7. Carefully set the bezel on the bench.
8. Remove thermocouple wires from the controller 6 terminal connector by loosening the two screws.
9. On roof of oven, locate the clip, which holds thermocouple in place. Remove thermocouple from clip.
10. Pull thermocouple forward into oven chamber, exposing roughly a 6-inch section of the thermocouple wire.
11. Cut the thermocouple wire to remove the thermocouple sheath.
12. Securely loop together the cut end of the defective thermocouple with the two leads of the replacement thermocouple. Wrap tape over the length of the loops to secure them.
13. Gently pull the defective thermocouple out through the electronics compartment while guiding (“fishing”) the replacement thermocouple into place.
14. Consult schematic at end of this manual. Then, generally reverse steps 1 through 10 to complete installation of new thermocouple and reassemble oven.

Caution Verify the yellow thermocouple conductor is under the (+) tab and the red thermocouple conductor is under the (-) tab. ▲

Section 7 Troubleshooting

This table is intended to assist in resolving oven problems by relating symptoms to their likely causes. The service discussed below is beyond the scope of most users and should be performed by qualified and trained personnel. In the event service is required beyond that available by the customer, contact the Technical Services department.

| Symptom | Probable Cause | Action |
|---|--|--|
| No power | Unit not plugged in or turned on | Plug in or turn on |
| | Defective circuit breaker | Replace circuit breaker |
| Oven temperature erratically high | Defective control thermocouple | Replace control thermocouple |
| Failure to heat | Set temperature less than actual temperature | Refer to Operation |
| | Defective control thermocouple | Replace control thermocouple |
| | Poor heater connections | Tighten connections at terminal strip |
| | Defective heater element | Check heater resistance at schematic at back of manual. Replace heater unless approximately the same as schematic. |
| | Defective controller | Replace controller |
| | Defective solid state relay | Refer to schematic and replace relay or safety relay |
| | Over Temperature Device Disengaged or Defective | Replacement of the Over Temperature Device is to be performed by factory authorized personnel only. Disconnect power and contact Technical Services. |
| Alarm LED stays on and control is higher than set temperature | Set temperature has been changed to a value less than the actual temperature minus the high alarm limit. | Wait for actual temperature to cool to the set temperature |
| | Defective controller | Replace controller |
| | Defective solid state relay or safety relay | Refer to schematic and replace relays |
| Set display shows "EEE" | Set temperature has been changed to a value less than the actual temperature minus the high alarm limit | Wait for actual temperature to cool to the set temperature |
| | Defective control thermocouple | Replace control thermocouple |
| | Faulty or broken connections | Check thermocouple connections at rear of temperature controller |
| Temperature different from independent thermometer | Calibration off set needs adjusted. | Begin by setting offset to 0. See Display Offsets. |

Section 8 Replacement Parts

Note Only factory authorized components should be used for repair. ▲

Replacements for oven parts may be ordered, by part number, from Technical Services.

Section 8

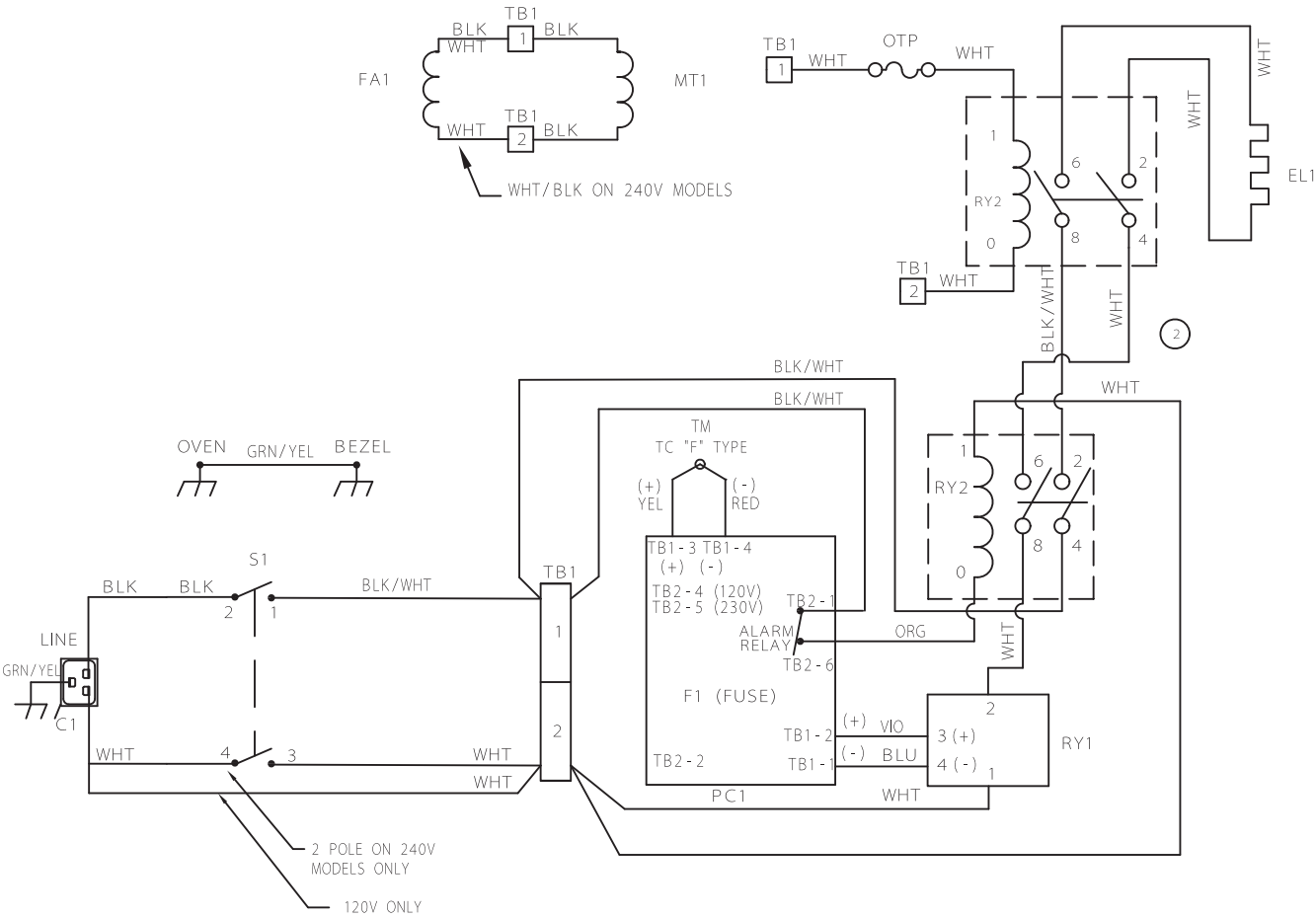
Replacement Parts

| Models | Voltage | China |
|-----------------------------|---------|-------|
| PR305040G (6947) - Small | 240V | |
| PR305040GCN (6948) - Small | 240V | * |
| PR305040M (6949) - Small | 240V | |
| PR305040MCN (6950) - Small | 240V | * |
| PR305045G (6951) - Small | 120V | |
| PR305045M (6952) - Small | 120V | |
| PR305050G (6953) - Medium | 240V | |
| PR305050GCN (6954) - Medium | 240V | * |
| PR305050M (6955) - Medium | 240V | |
| PR305050MCN (6956) - Medium | 240V | * |
| PR305055G (6957) - Medium | 120V | |
| PR305055M (6958) - Medium | 120V | |
| PR305060G (6959) - Large | 240V | |
| PR305060GCN (6960) - Large | 240V | * |
| PR305060M (6961) - Large | 240V | |
| PR305060MCN (6962) - Large | 240V | * |
| PR305065G (6963) - Large | 120V | |
| PR305065M (6964) - Large | 120V | |

| Item | Part Number (ref) |
|---|-------------------|
| Line Cord and Plug | |
| 120V units | CRX121 |
| 240V units except China | CRX123 |
| 240V China units | CRX117 |
| Temperature Controller (120 V / 240 V) | PCX132 |
| Thermocouple Assembly | SPN 95603 |
| Cooling Fan | |
| 120 V units | FAX39 |
| 240 V units | FAX40 |
| Circulating Fan Motor | |
| 120 V units | SPN 95788 |
| 240 V units | SPN 95789 |
| Door Handle | SPN 104976 |
| Shelf Kit (Fits All Ovens) | 13-247S |
| Heater Assembly | |
| Small 120V units | SPN 95695 (HTR) |
| Small 240V units | SPN 95736 |
| Medium and Large 120V | SPN 95696 |
| Medium and Large 240V | SPN 95737 |
| Door Gasket | |
| Small units | SPN 101908 |
| Medium units | SPN 101909 |
| Large units | SPN 101910 |
| Door Gasket Gray Silicon Optional High Temp | |
| Small units | SPN 95782 |
| Medium units | SPN 95783 |
| Large units | SPN 95784 |
| Solid State Relay | SPN 83917 (SSR) |
| Safety Relay | |
| 120V units | SPN 95770 (K1) |
| 240V units | SPN 95787 |
| Circuit Breaker - Single Pole (120V) | SPN 95765 (S1) |
| Double Pole (240V) | SPN 95786 |
| Door Assembly | |
| Small units | DR2034X8 |
| Medium units | DR2033X8 |
| Large units | DR2032X8 |
| Thermal Fuse Assembly | FZ2148X2 |

COMPONENT CHART
FOR SMALL MODELS

| REFERENCE | DESCRIPTION | 120V | 240V |
|-----------------------------|--------------------|------------|------------|
| C1 | POWER ENTRY MODULE | CEX421 | CEX421 |
| EL1 (SML) | ELEMENT | 95695 | 95736 |
| F1 | FUSE | FZX96 | FZX96 |
| FA1 | FAN | FAX39 | FAX40 |
| MT1 (FORCE AIR MODELS ONLY) | MOTOR | 95788 | 95789 |
| PC1 | PC BOARD | PCX132 | PCX132 |
| RY1 | SOLID STATE RELAY | 88616 | 88616 |
| RY2 | SAFETY RELAY | 95770 | 95787 |
| S1 | SWITCH | 95765 | 95786 |
| TB1 | TERMINAL BLOCK | 95767 | 95767 |
| EL1 (MED & LARGE) | ELEMENT | 95696 | 95737 |
| OTP | THERMAL FUSE | 330-261-00 | 330-261-00 |



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