

## SECTION 1 DESCRIPTION

### I. MODEL IDENTIFICATION

The Middleby™ Series PS200-R68 Ovens may be used singly or stacked for use as double ovens.

The Series PS200-R68 single oven is mounted on a base pad with 6" extension legs and casters. A double oven is stacked and the lower oven is on a base pad with casters.

The ovens in a double oven operate completely independent of one another. Both ovens use identical controls and components. One can be serviced while the other is operating.

The Series PS200-R68 Ovens can be ordered with the conveyor drive at either the right end or left end of the oven. Each oven is equipped with a remote control box.

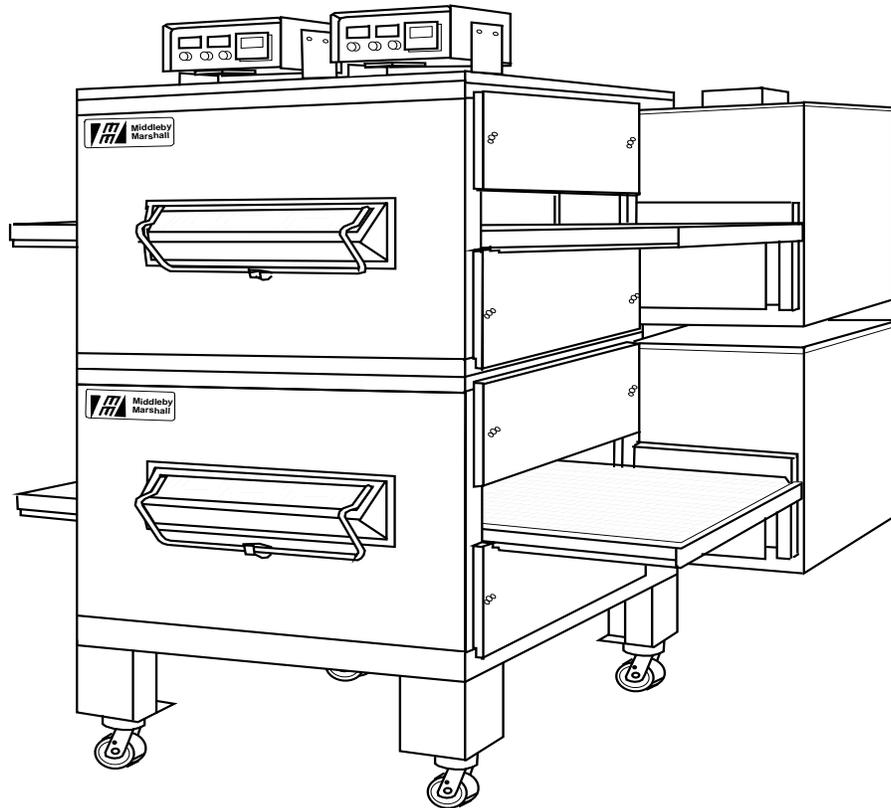


Figure 1-1. Middleby™ Series PS200-R68 Ovens

	PS200-R68 GAS	PS200-R68 ELECTRIC	PS224-R68 GAS	PS224-R68 ELECTRIC	PS220-R68 GAS	PS220-R68 ELECTRIC
Conveyor Belt Width	32"(813mm)	32"(813mm)	24"(610mm)	24"(610mm)	20"(508mm)	20"(508mm)
Heating Zone Length	40-1/2"(1028mm)	40-1/2"(1028mm)	40-1/2"(1028mm)	40-1/2"(1028mm)	40-1/2"(1028mm)	40-1/2"(1028mm)
Baking Area Square Feet	9 sq.ft.(0.84sq.m.)	9 sq.ft.(0.84sq.m.)	6.4 sq.ft.(0.59sq.m.)	6.4 sq.ft.(0.59sq.m.)	5.5 sq.ft.(0.51sq.m.)	5.5 sq.ft.(0.51sq.m.)
Overall Dimension	68"(1727mm) L x	68"(1727mm) L x	68"(1727mm) L x	68"(1727mm) L x	68"(1727mm) L x	68"(1727mm) L x
Red Lobster Double Oven	57-3/4"(1467mm) W x 76-3/4"(1949mm) H	57-3/4"(1467mm) W x 76-3/4"(1949mm) H	49-3/4"(1264mm) W x 76-3/4"(1949mm) H	49-3/4"(1264mm) W x 76-3/4"(1949mm) H	45-3/4"(1162mm) W x 76-3/4"(1949mm) H	45-3/4"(1162mm) W x 76-3/4"(1949mm) H
Weight of Single Oven	925 lbs.(419kg)	925 lbs.(419kg)	825 lbs.(374kg)	825 lbs.(374kg)	750 lbs.(340kg)	750 lbs.(340kg)
Shipping Weight of Single Oven	1,100 lbs.(498.3kg)	1,100 lbs.(498.3kg)	1,000 lbs.(453kg)	1,000 lbs.(453kg)	925 lbs.(419kg)	925 lbs.(419kg)
Shipping Cube of Single Oven	Approx.132 ft <sup>3</sup> (3.74 m <sup>3</sup> )	Approx.132 ft <sup>3</sup> (3.74 m <sup>3</sup> )	Approx.132 ft <sup>3</sup> (3.74 m <sup>3</sup> )	Approx.132 ft <sup>3</sup> (3.74 m <sup>3</sup> )	Approx.132 ft <sup>3</sup> (3.74 m <sup>3</sup> )	Approx.132 ft <sup>3</sup> (3.74 m <sup>3</sup> )
Operating Range of Single Oven	120,000 BTU/HR (30,240 kcal) (35.1 kW/HR)	28kW/HR	100,000 BTU/HR (25,200 kcal) (29.3 kW/HR)	28kW/HR	100,000 BTU/HR (25,200 kcal) (29.3 kW/HR)	28kW/HR
Maximum Operating Temperature	550°F(287°C)	550°F(287°C)	550°F(287°C)	550°F(287°C)	550°F(287°C)	550°F(287°C)
Exhaust Vent Size	2" x 3"(50 x 75mm)	--	2" x 3"(50 x 75mm)	--	2" x 3"(50 x 75mm)	--
Exhaust Flow	80 C.F.M.(2.1m <sup>3</sup> m)	--	80 C.F.M.(2.1m <sup>3</sup> m)	--	80 C.F.M.(2.1m <sup>3</sup> m)	--
Warm Up Time	10 min.	15 min.	10 min.	15 min.	10 min.	15 min.
Gas Inlet Line Size	3/4"(19mm)ID for each cavity					
Minimum Gas Meter Rating	450 cu.ft./hr.(12.74m <sup>3</sup> h) for 1 to 2 cavities Add 180 cu.ft./hr.(5.1m <sup>3</sup> h)for each additional cavity					
Minimum Gas Pipe Size:	Natural	2" (51mm)ID for 1 or 2 ovens or 2.5" (64mm)ID for 3 or 4 ovens				
	Propane	1.5" (38mm)ID for 1 to 2 ovens or 2"(51mm)ID for 3 or 4 ovens - (must be dedicated line)				
Gas Pressure:	Natural	6"(152mm) to 14"(356mm) Water Column				
	Propane	11.5"(292mm) to 14"(356mm) Water Column				
Gas Valves	0.75" (19mm)ID full flow gas shut-off valve. A separate connection and valve must be provided for each cavity.					
Recirculating Air Blower	One blower at 1700 RPM					
Jet Air Velocity	3000 F.P.M.(1524cm/sec.)(Average)					
Bake Time	2 min. 40 sec. Bake Time minimum 29 min. 50 sec. Bake Time maximum					

**SERIES PS200-R68  
ELECTRICAL SPECIFICATIONS**

**GAS HEATED OVENS**

Main Blower & Elements Voltage	Control Circuit Voltage	Phase	Frequency	Amperage Draw	Poles	Wires
208-240V	120V	1 Ph	50/60 Hz	4.1 Amp	3 Pole	4 Wire (2 hot, 1 neut, 1 grd)
208V Export	120V Transformer	1 Ph	50/60 Hz	4.1 Amp	2 Pole	3 Wire (2 hot, 1 grd)
200V Export	120V Transformer	1 Ph	50/60 Hz	4.1 Amp	2 Pole	3 Wire (2 hot, 1 grd)
220-240V Export	120V Transformer	1 Ph	50/60 Hz	4.1 Amp	2 Pole	3 Wire (2 hot, 1 grd)

**ELECTRIC HEATED OVENS**

Main Blower & Elements Voltage	Control Circuit Voltage	Phase	Frequency	Amperage Draw	Poles	Wires																														
208-240V	120V	3 Ph	50/60 Hz	75 Amp	4 Pole	5 Wire (3 hot, 1 neut, 1 grd)																														
<b>HEATER AMPERAGE</b>																																				
<table border="1"> <thead> <tr> <th>Voltage</th> <th>kW</th> <th>Amp</th> <th colspan="3">Average Amps</th> </tr> </thead> <tbody> <tr> <td>208</td> <td>27</td> <td>70</td> <td>37</td> <td>37</td> <td>37</td> </tr> <tr> <td>220</td> <td>23.5</td> <td>67</td> <td>30</td> <td>30</td> <td>30</td> </tr> <tr> <td>230</td> <td>25.7</td> <td>63</td> <td>31</td> <td>31</td> <td>31</td> </tr> <tr> <td>240</td> <td>27</td> <td>61</td> <td>33</td> <td>33</td> <td>33</td> </tr> </tbody> </table>							Voltage	kW	Amp	Average Amps			208	27	70	37	37	37	220	23.5	67	30	30	30	230	25.7	63	31	31	31	240	27	61	33	33	33
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380V Export	120V Transformer	3 Ph	50/60 Hz	50 Amp	4 Pole	5 Wire (3 hot, 1 neut, 1 grd)																														
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380	27	38	22	22	22																															
400-416V Export	120V Transformer	3 Ph	50/60 Hz	50 Amp	4 Pole	5 Wire (3 hot, 1 neut, 1 grd)																														
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**NOTE**  
Wiring Diagram is contained at the back of this Manual and is also located inside of the machinery compartment.

# SECTION 1 DESCRIPTION

## II. PRINCIPLE OF AIR FLOW

Air is heated and then pulled through the fan which pushes the air into the oven plenum and delivers heated air into the air fingers. The fingers contain an inner plate and outer plate which columnate the air and evenly distribute heated air across the conveyor belt on which the product rides. Air is then pulled back into the blower and the process continues.

### A. Heat Transfer and How It Works

1. Heat constantly moves from a warm object to a cold object. Heat moves using three different paths which are conduction, radiation and convection.

**Conduction:** This path utilizes surface to surface contact. The pizza dough in contact with the pan is a good example of conduction.

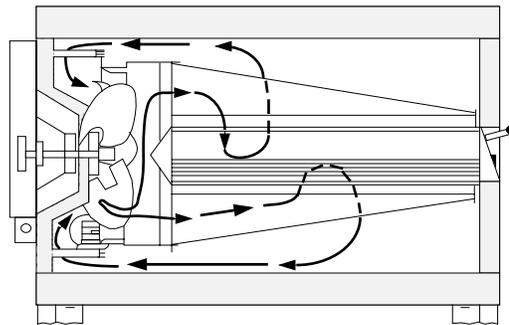
**Radiation:** This path has to do with objects radiating heat. Dark objects absorb heat whereas light or shiny objects reflect more heat. This is the reason that the

inside of the Middleby Series PS200-R68 Oven is light in color to reflect more heat back to the product.

**Convection:** This path has to do with moving amounts of air. It explains why hot air will rise and cooler air replaces hot air. An industrial application of this principle is to incorporate a fan to force the hot air movement which in turn will increase the heat transfer to the product.

The Middleby Series PS200-R68 Oven has a large fan to move the hot air through the air fingers and onto the product so the most efficient bake is achieved.

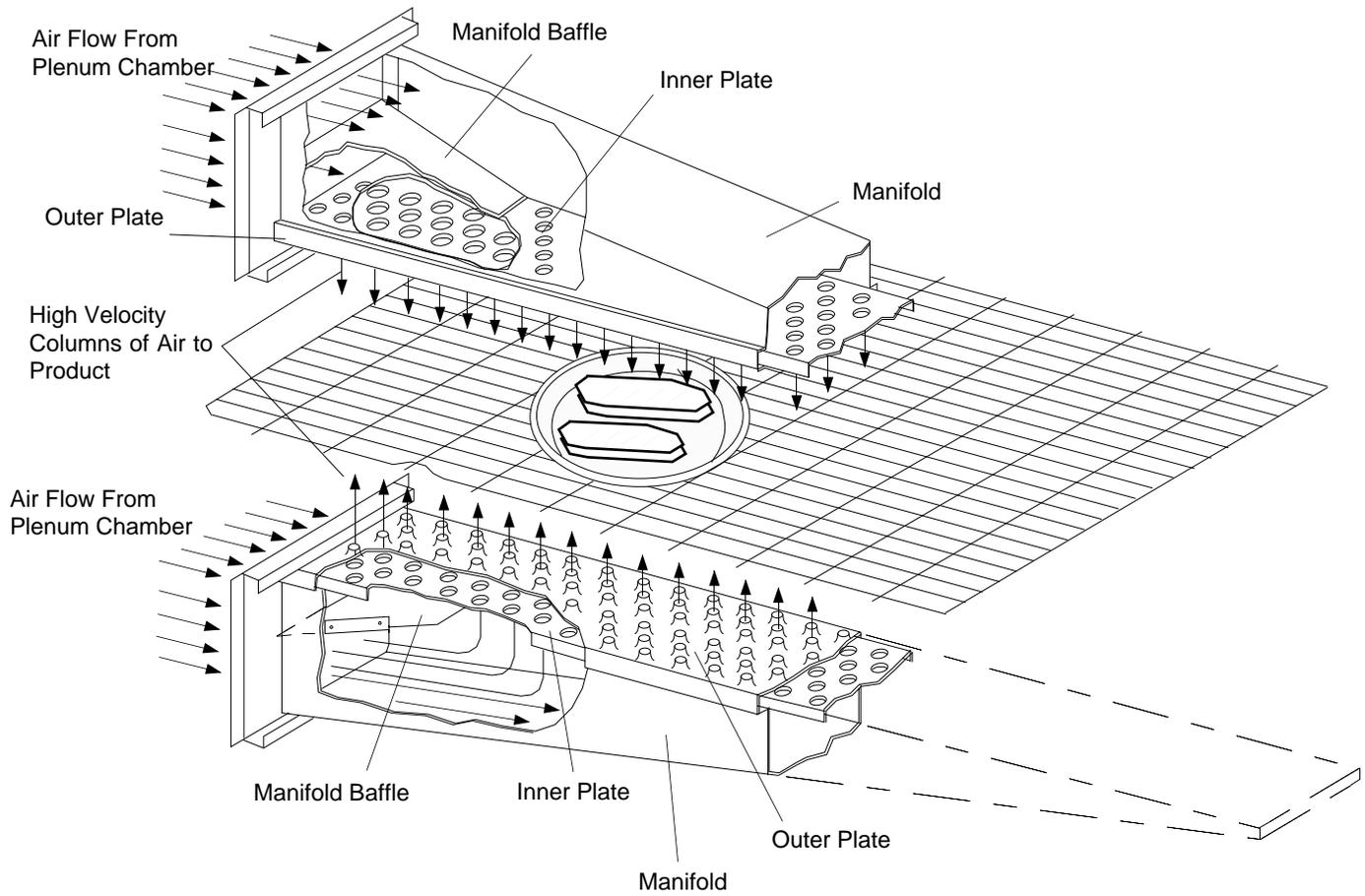
2. Temperature is the intensity of heat at the point which it is sensed. As discussed above, heat flows by conduction, radiation and convection. The speed at which the heat flows is determined by the temperature difference between the oven and the food product. The larger the difference the faster the heat flows to the item that is being baked.



Side View

**Figure 1-2  
Series PS200-R68 Air Flow**

**II. PRINCIPLE OF AIR FLOW Continued**



**Figure 1-3. Air Fingers Showing Air Passing Through Inner Plate And Outer Plate Which Forms High Velocity Columns Of Air To The Product.**

**B. Air Fingers**

The Middleby Series PS200-R68 Oven is a conveyerized hot air oven employing vertical air streams (Figure 1-3) to give uniform and intensive heating. The columnated vertical streams of hot air provide an exceptional heat transfer rate and generally bake faster and at lower temperatures than convection hot air or infrared heating ovens.

This is accomplished with use of hot air fingers inside the oven. The oven can accommodate up to 4 bottom air fingers and 4 top air fingers. Standard PS200-R68 Series ovens have 4 bottom fingers and 2 top fingers.

SECTION 1  
DESCRIPTION

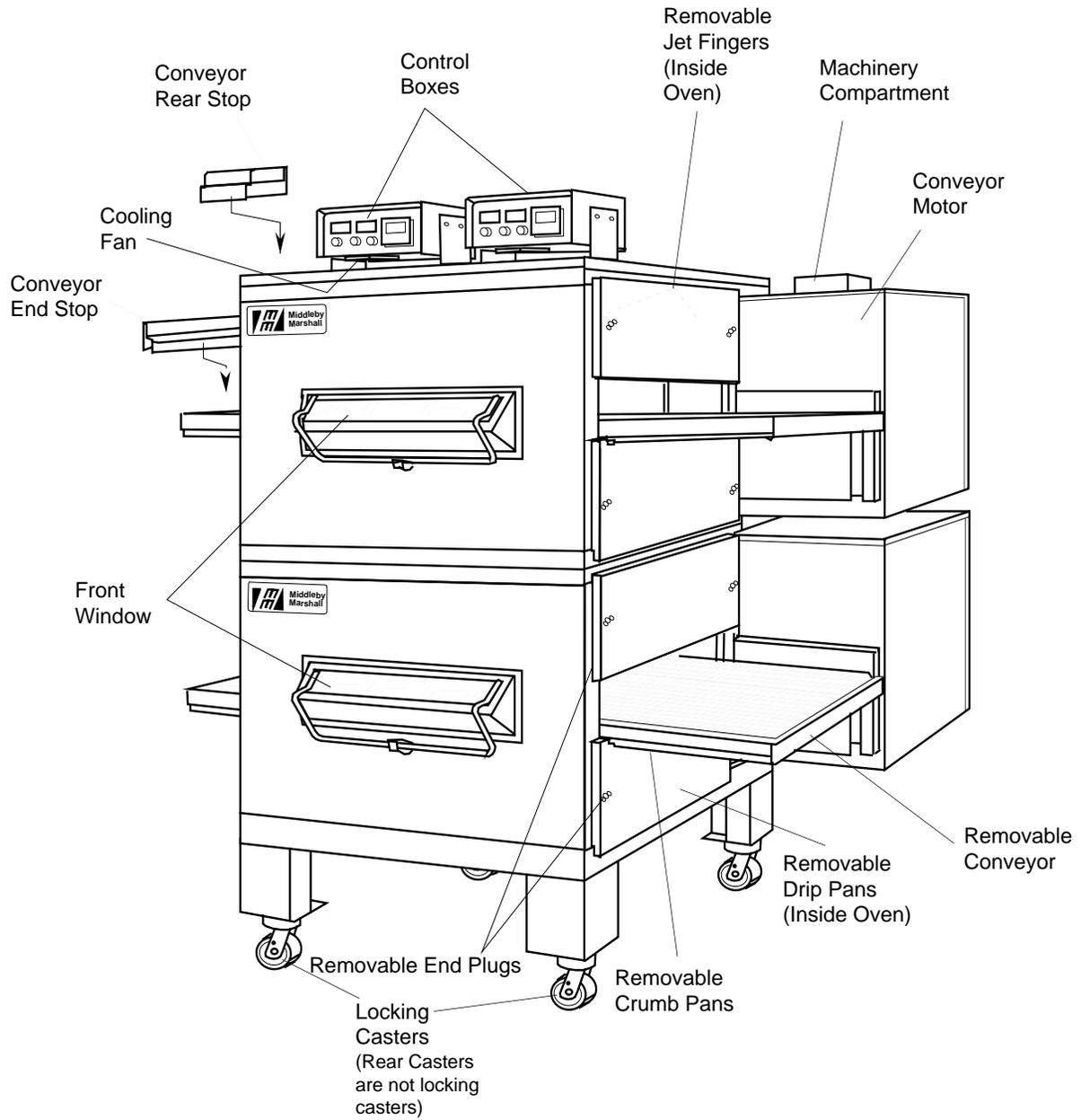


Figure 1-4. Component Location

### III. COMPONENT FUNCTION

#### A. Conveyor

The conveyor is driven by a variable speed electric motor operating through a gear reducer (See Figure 1-5). The motor speed is controlled by a digital control. The stainless steel wire belt can travel in either direction and at variable speeds from 3 minutes to 23 minutes.

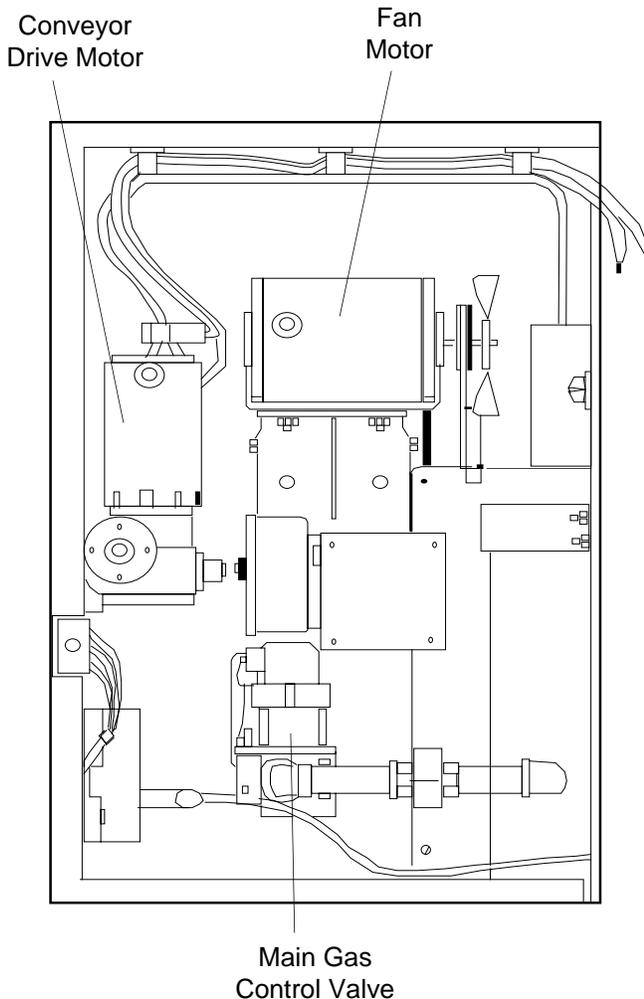


Figure 1-5. Conveyor Drive Motor

#### B. Fan

The fan is located at the rear of the oven. This fan forces heated air through the fingers. The fan switch has two positions and must be "on" for oven warm up and bake and for the conveyor to run.

#### C. Gas Burner (Gas Oven Only)

With the heat and blower switches ON the gas burner heats the air as the air enters the main blowers to maintain the set temperature. The burner flame is ignited and monitored by a solid state burner control device.

Should a flame outage occur the control will close the main gas control valve within 0.8 seconds and attempt to reignite the pilot.

#### D. Electric Heaters (Electric Oven Only)

There are six heater elements mounted on the inside of the rear panel. Each element is connected to a separate electrical contact which is energized by the temperature controller.

#### E. Front Window

The front window is used for viewing items being baked and provides access to the oven for items which do not require full bake time, such as sandwiches, cookies, small items or cheese melting processes.

#### F. Cooling Fan

A cooling fan is located in the back of the oven. This cooling fan blows cool air in through the machinery compartment across the fan motor and conveyor motor and control cabinet. The air is then exhausted through the side of the cabinet and also out the back of the oven compartment. Refer to Figure 1-6.

Another cooling fan is located in the bottom of each control box. Air is drawn in through the louvers in the rear of the control box and out through the fan. Refer to Figure 1-4.

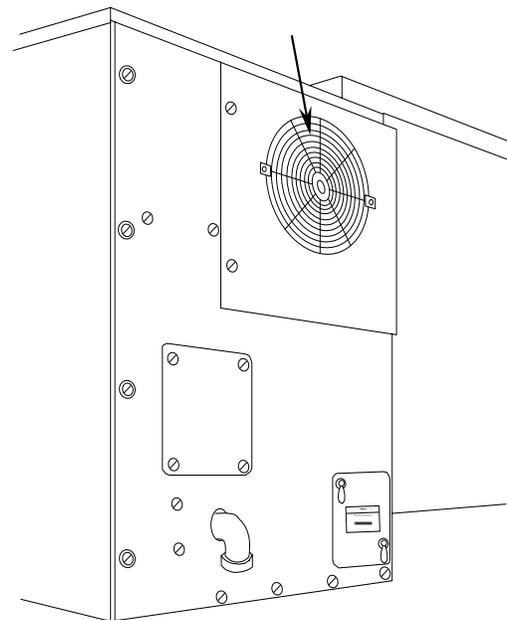


Figure 1-6. Cooling Fan

# SECTION 1 DESCRIPTION

## G. Air Fingers

The Air Finger Assemblies are made up of three parts as follows (See Figure 1-7):

1. **Outer Plate** - The Outer Plate is the removable cover with tapered holes, which directs the air stream onto the product to be baked.
2. **Inner Plate** - The Inner Plate is vital to forming the columnated air jets. It must be assembled onto the

manifold with its holes lined up with outer plate holes.

The inner plate is also manufactured with no rows of holes. This type of finger is a non-columnating air finger.

3. **Manifold** - The Manifold is the assembly which slides on tracks into the oven plenum.
4. **Blank Plates** - The Blank Plates are installed on the plenum where air fingers are not required.

**NOTE:** On a PS200-R68 Series Red Lobster oven the 2 upper fingers (M3) have 3 rows of holes in the outer plate and a non-columnating inner plate. The 4 bottom fingers (M6) have 6 rows of holes completely across the inner and outer plates.

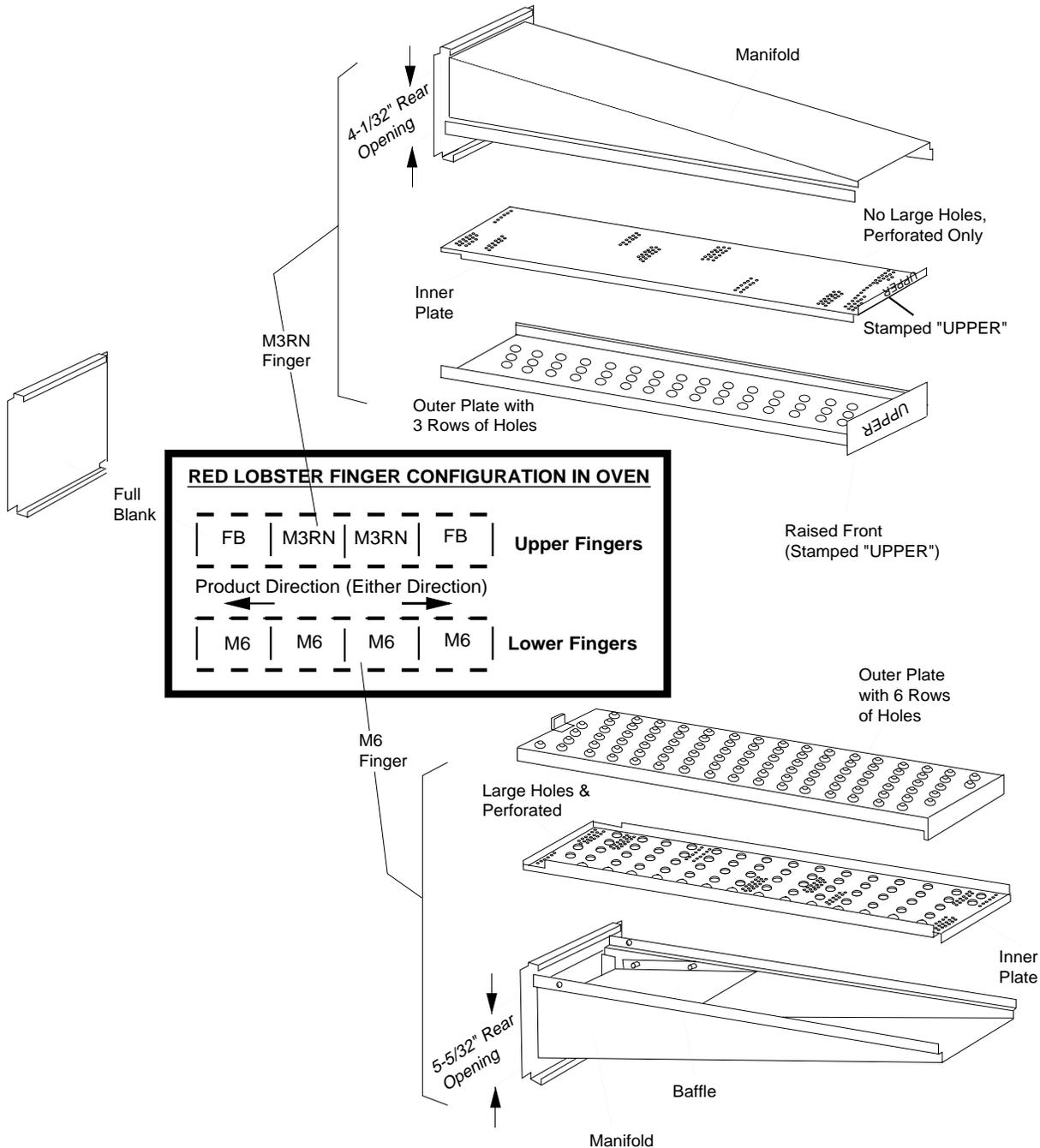


Figure 1-7. Fingers